

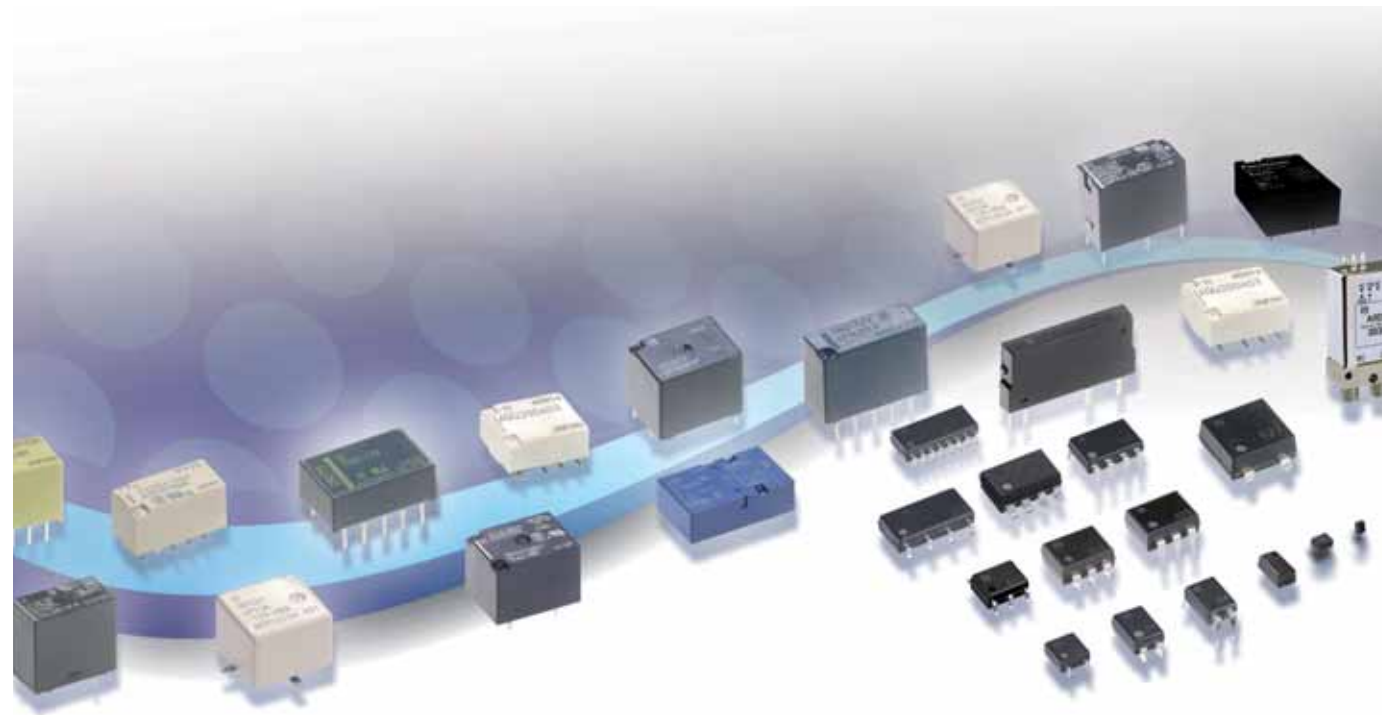
SHORT FORM
RELAYS



Panasonic Relay Technology Innovation across the board

Telecommunications, machine construction, measurement and control systems, automotive electronics, building security and installation – today there is virtually no branch of human activity that can exist without using modern relays. Panasonic is able to meet both simple or complex demands from its vast range of sophisticated, economic switching technologies by offering the relay most appropriate to

solving the specific application. With over 30 years experience at the forefront of relay innovation and development, Panasonic today offers one of the world's most comprehensive ranges of electromechanical and semiconductor types. Currently our product range extends from ultra-miniature SMD semiconductor types to robust, compact industrial devices.



Load switching capability ranges from low-level signals to double-digit ampere values. Panasonic relays are available for all common mounting configurations with screw, PCB, solder or surface mount terminals to meet most demands of operating environments or conditions. With its well established, comprehensive T and G series relays, we are making significant contributions within the field of global data transmission.

Panasonic power relays, particularly those of the J, L and C series, are not only used in mains isolation applications, but also in diverse ranges of consumer

appliances, automotive electrics and diverse OEM manufacturing industries. In the field of safety of man and machine, the SF series relays with forcibly guided contacts, have set a new standard of security. Panasonic has developed a wide range of SMD miniature relays for the new generation of surface mounting, automated assembly processes. In addition to electromechanical SMD types such as the TQ, TX, GN, GQ and CP series, we have made significant developments in the rapidly expanding field of SSR and PhotoMOS relays.

Panasonic Semiconductor Relays: Compact and Reliable

If your application requires long lifetime, stable behavior, small size or high switching speed, semiconductor relays are definitely the best choice for you. Within our broad product range, you can find relays to switch low level loads or double-digit ampere values. Various package options are also available. In other words, our semiconductor relays complement our electromechanical relay selection to allow us to exactly meet your needs. For us, supplying quality products is

paramount. To guarantee superior quality, the company has implemented strict testing and inspection procedures to comply with or even exceed most international specifications. Of course, we sell RoHS compliant products and have ISO9001 certification. If you need more detailed information about Panasonic relays, please ask us to send you the complete relay catalog.

Soldering Guidelines for Lead-free Solder

Our products support lead-free soldering processes. Please contact a Panasonic sales office to find out when each relay will support lead-free solder.

If you are using Sn-Pb eutectic solder, mounting conditions can remain as they are.

When using lead-free solder for our products, please adhere to the following soldering guidelines:

- **DIP type**

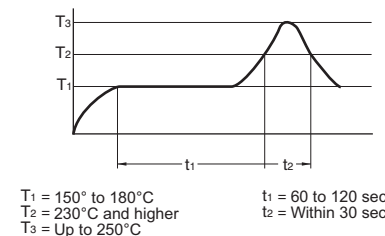
The conditions for mounting with lead-free solder are: preheating at 120°C within 120 seconds and soldering at 260 ±5°C within 6 seconds. (Soldering of PhotoMOS relays can be carried out at 260°C within 10 seconds.)

The reliability of the solder at the joining part can vary greatly depending on the actual mounting conditions. Influencing factors are: the type of lead-free solder, the landscape of the PCB, the mounting conditions.

- **SMT type**

We recommend the following temperature profile as a condition for automatic mounting when using lead-free solder.

- **Recommended temperature profile condition during reflow soldering**



- **Cautions when mounting**

The relay temperature may rise depending on the mounting density and the heating method of the reflow oven. Accordingly, please set the temperature so that the soldered parts of the relay terminals do not exceed the mounting conditions given above. We recommend checking the temperature rise at each part to be soldered under the actual conditions.

Service Has Priority

We are constantly striving to optimize our service sector to enable us to react quickly to customer requests. Whether you have specific application requests or you simply want technical information, we are always ready to advise and assist you; you only have to call. Our current delivery program is assembled for you in this relay overview. Besides the most important technical data, you will find numerous illustrations of possible applications.

Of course, detailed data sheets are available on our homepage

www.panasonic-electric-works.com

Our product managers, sales and application engineers will be happy to advise you.



Relays: Characteristics at a Glance

UL coil insulation	Coil insulation	Relay
	UL-B	LE, LZ, JS, JQ, JW
	UL-F	LE, LZ, JT-N, JT-V

TV rated	TV rated	Steady (A)	Inrush (A)	Relay
	TV-2			HL (1C; NC), HL (2c, NC)
	TV-3	4.5	71	ST, HC (1c,2c), HL (1c, NC)
	TV-4	6.0	91	LA, HL (2c, NO)
	TV-5	7.5	111	LK-P, LK-Q, JQ, JS, JW, HL (1c, NO)
	TV-8	12.0	163	LK-T, LK-Q
	TV-10	15.0	191	HE (2a)
	TV-15	18.8	215	HE (1a)

Surge voltage between contact and coil	Surge voltage	Relay
	5 000V	DS-P
	6 000V	ST, PF, JT-V
	8 000V	JQ, JK, PQ
	10 000V	LF, LE, LZ, LA, LD, LJ, LK-S, LK-P, LK-T, LK-Q, JW, JM, HE, JC, DJ, DK, DQ, DY

High frequency characteristics	Relay	Arrangement	Isolation	Insertion loss
	RD coaxial switch	SPDT, Transfer, SP6T	Min. 60dB (18GHz)	Max. 0.5dB (18GHz)
	RV coaxial switch	SPDT	Min. 60dB (18GHz)	Max. 0.7dB (18GHz)
	RJ	2 Form C	Min. 35dB (5GHz)	Max. 0.5dB (18GHz)
	RE	1 Form C	Min. 30dB (2.6GHz)	Max. 0.5dB (2.6GHz)
	RA	2 Form C	Min. 30dB (1GHz)	Max. 0.3dB (1GHz)
	RS	2 Form C	Min. 30dB (3GHz)	Max. 0.3dB (3GHz)

	Relay
Terminal socket	HN, HC, HJ, HK, HL, SP, NC, HE, SFS
Socket	HC, HL, S, ST, SP, NC, PA, DK, DS-P, JW, JC, Power PhotoMOS Relay, SFS, PF
LED operation indication type	HN, HC, HJ, HK, HL, SFS, AQ-K


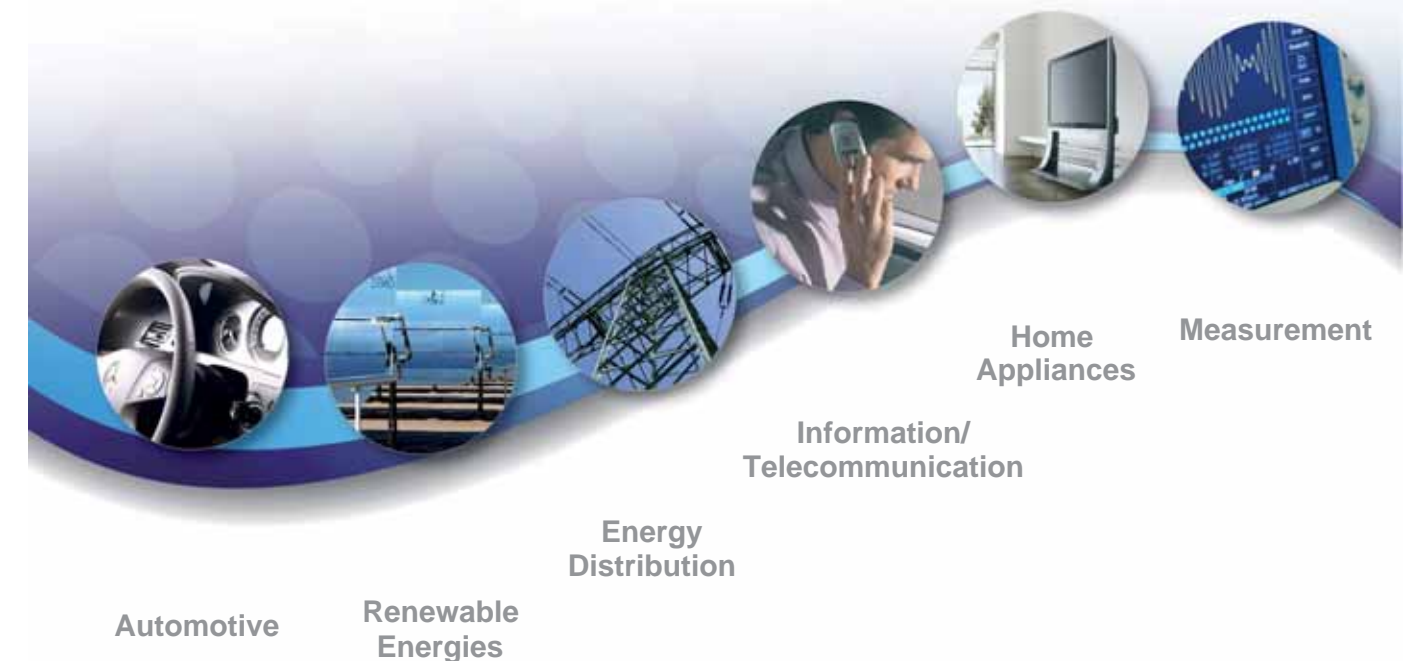
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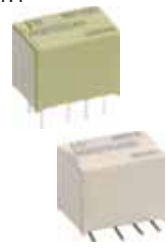





Well Proven in Various Applications

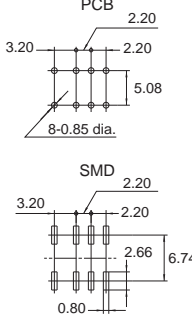
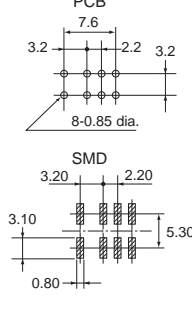
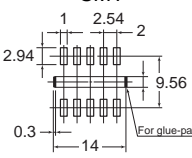
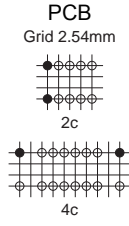









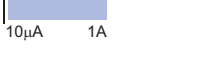
About the Selector Chart

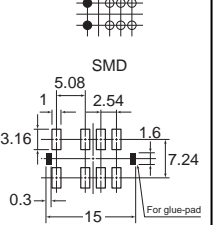
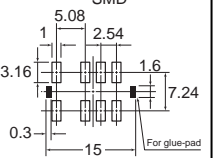
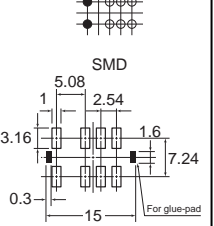
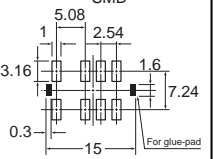
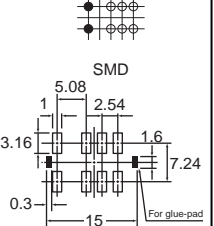
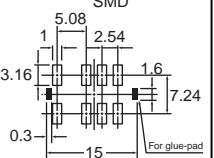
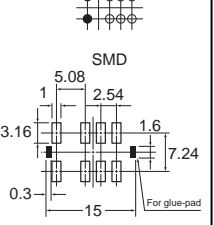
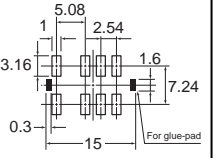
This selector chart is designed to help you quickly select a relay best suited for your needs. Please note: the values given for switching current and switching voltage do not necessarily indicate standard operating conditions. For the nominal switching capacity and other critical



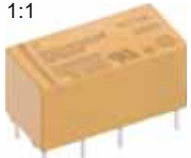



values, please refer to the respective data sheet or contact your Panasonic representative.

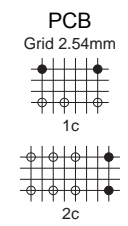

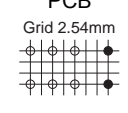

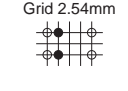

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ GQ (SMD)  10.6 x 7.2 x 5.2/5.4mm	<ul style="list-style-type: none"> Compact flat body saves space Outstanding surge resistance The use of twin crossbar contacts ensures high contact reliability High sensitivity 100mW type available 	Max.: 2A Min.: 10µA 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 6, 9, 12, 24V
★ GN (SMD)  10.6 x 5.7 x 9.0mm	<ul style="list-style-type: none"> Compact slim body saves space Outstanding surge resistance The use of twin crossbar contacts ensures high contact reliability High sensitivity 100mW type available 	Max.: 1A Min.: 10µA 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 6, 9, 12, 24V
★ TQ (SMD)  14 x 9 x 5.6mm	<ul style="list-style-type: none"> Ultra low profile 5.8mm Surge withstand 2,500V 3 types of surface-mount terminals available 	Max.: 2A Min.: 10µA 	<ul style="list-style-type: none"> 220V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
TQ (THT)  14 x 9 x 5mm	<ul style="list-style-type: none"> 1,500V FCC 	Max.: 1A Min.: 10µA 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c,	(DC) 3, 4.5, 5, 6, 9, 12, 24, 48V















Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 140mW (1.5 - 12V DC) 230mW (24V DC) 1 coil latching: 100mW (1.5V - 12V DC) 120mW (24V DC)	750Vrms	1000Vrms	1500Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT 	BSI, CSA, UL
Single side stable: 140mW (1.5 - 12V DC) 230mW (24V DC) 1 coil latching: 100mW (1.5V - 12V DC) 120mW (24V DC)	750Vrms	1000Vrms	1500Vrms	1,500V FCC 2,500V	PCB, SMT 	BSI, CSA, UL
Single side stable: 140mW (up to 12V DC) 200mW (24V DC) 300mW (48V DC) 1 coil latching: 70mW (up to 12V DC) 100mW (24V DC) 2 coil latching: 140mW (up to 12V DC) 200mW (24V DC)	1000Vrms	1500Vrms	1500Vrms	1,500V FCC 2,500V Telcordia	SMT 	CSA, UL
Single side stable: 140mW (3 - 12V DC) 200mW (24V DC) 300mW (48V DC) 1 coil latching: 100mW (3 - 12V DC) 150mW (24V DC) 2 coil latching: 200mW (3 - 12V DC) 300mW (24V DC)	750Vrms	1000Vrms	1000Vrms	1,500V FCC	PCB Grid 2.54mm 	CSA, UL

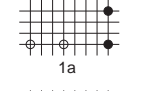
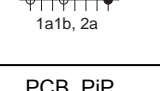

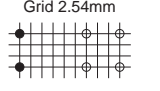
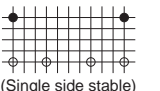

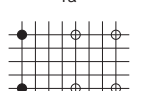
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ TX (SMD)  15 x 7.4 x 8.2mm	<ul style="list-style-type: none"> Surge withstand 2,500V Breakdown voltage between contacts and coil 2,000V 3 types of surface-mount terminals available Added new pin layout (LT type) in 2 coil latching type 	Max.: 2A Min.: 10µA 	<ul style="list-style-type: none"> 220V DC 220V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
★ TX-TH (SMD)  15 x 7.4 x 8.2mm	<ul style="list-style-type: none"> Controlled 7.5A inrush current 2 types of pin layouts 3 types of surface mount terminals available 	Max.: 7.5A Min.: 10µA 	<ul style="list-style-type: none"> 220V DC 250V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
TX-D (SMD)  15 x 7.4 x 8.2/8.4mm	<ul style="list-style-type: none"> High-insulation relay that conforms to the insulation level provided for in the EN41003 3 types of surface-mount terminals available High-insulation relay that conforms to the insulation level provided for in the EN60950 Surge breakdown voltage 6kV (contacts to coil) available 	Max.: 2A Min.: 10µA 	Break Before Make: <ul style="list-style-type: none"> 220V DC 250V AC Make Before Break: <ul style="list-style-type: none"> 125V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V
TX-S (SMD)  15 x 7.4 x 8.2/8.4mm	<ul style="list-style-type: none"> Higher sensitivity Nominal operating power, 50mW 1,500V FCC 3 types of surface-mount terminals available Added new pin layout (LT type) in 2 coil latching type 	Max.: 1A Min.: 10µA 	<ul style="list-style-type: none"> 110V DC 125V AC 	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V










Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 140mW (up to 24V DC) 270mW (48V DC) 1 coil latching: 100mW 2 coil latching: 200mW	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL
Single side stable: 140mW (up to 24V DC) 270mW (48V DC) 1 coil latching: 100mW (up to 24V DC) 2 coil latching: 140mW (up to 24V DC)	1000Vrms	1000Vrms	2000Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL
Single side stable: 200mW (1.5 - 12V DC) 230mW (24V DC) 1 coil latching: 150mW (1.5 - 12V DC) 170mW (24V DC)	1000Vrms	1000Vrms	3000Vrms	6,000V for fax machines & lighting ballasts	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL
Single side stable: 50mW (1.5 - 12V DC) 70mW (24V DC) 1 coil latching: 35mW (1.5 - 12V DC) 50mW (24V DC) 2 coil latching: 70mW (1.5 - 12V DC) 150mW (24V DC)	750Vrms	1000Vrms	1800Vrms	1,500V FCC 2,500V Telcordia	PCB, SMT PCB, grid 2.54mm  SMD 	BSI, CSA, UL

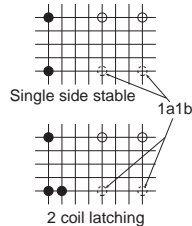

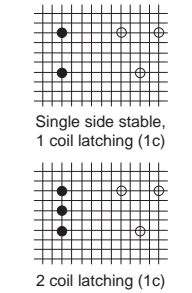

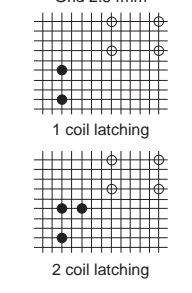

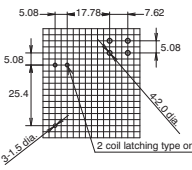

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
DS 1:1  15/20 x 9.9 x 9.9mm	<ul style="list-style-type: none"> • 1,500V FCC • High switching power 	Max.: 2A Min.: 10µA 	<ul style="list-style-type: none"> • 220V DC • 250V AC 	1c, 2c	(DC) 1.5, 3, 5, 6, 9, 12, 24, 48V
★ DS2Y 1:1  20 x 9.9 x 9.3mm	<ul style="list-style-type: none"> • High sensitivity • 2 Form C contact • 1,500V FCC • Sealed construction 	Max.: 2A Min.: 10µA 	<ul style="list-style-type: none"> • 220V DC • 250V AC 	2c	(DC) 1.5, 3, 5, 6, 9, 12, 24, 48V
HY 1:1  12 x 7.4 x 10.1mm	<ul style="list-style-type: none"> • High sensitivity • 150mW / 200mW 	Max.: 1A Min.: 10µA 	<ul style="list-style-type: none"> • 60V DC 	1c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
M type: Single side stable: 400mW 1 coil latching: 180mW 2 coil latching: 360mW S type: Single side stable: 200mW 1 coil latching: 90mW 2 coil latching: 180mW	1000Vrms (DS1-S: 500Vrms)	1000Vrms	1500Vrms (DS1-S: 1000Vrms)	1,500V FCC	PCB Grid 2.54mm 	CSA, UL 
Single side stable: 200mW (up to 24V DC) 300mW (48V DC)	750Vrms	1000Vrms	1000Vrms	1,500V FCC	PCB Grid 2.54mm 	CSA, UL 
Standard: 200mW High sensitivity: 150mW	500Vrms	—	1000Vrms	—	PCB Grid 2.54mm 	CSA, UL 





Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
DSP 1:2  20.2 x 11 x 10.5mm	<ul style="list-style-type: none"> High switching capacity High sensitivity High breakdown voltage Miniature high-power relay Creepage and clearance distance min. 4mm 	Max.: 8A (1a)  5A (1a1b, 2a) 	<ul style="list-style-type: none"> 220V DC 400V AC 	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V
DW 1:2  24 x 10 x 18.8mm	<ul style="list-style-type: none"> Pin-in-Paste version available Surge withstand voltage between coil and contact: 12,000V Breakdown voltage between coil and contact: 5,000V eff Conforms to EN 60335 Creepage and clearance distance min. 6mm 	Max.: 8A (1a) 	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 3, 5, 6, 9, 12, 24V
DE 1:2  25 x 12.5 x 12.5mm	<ul style="list-style-type: none"> Conforms to VDE0631 Low coil power Compact body saves space High switching capacity: 16A = 25,000 10A = 100,000 switching cycles Creepage and clearance distance min. 8mm 	Max.: 10/16A (1a)   8A (1a1b, 2a) 	<ul style="list-style-type: none"> 230V DC 440V AC 	1a, 1a1b, 2a	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
ST 1:2  31 x 14 x 11.3mm	<ul style="list-style-type: none"> High capacity in small size High inrush capability Latching type available Frictionless pivoted rotating armature High breakdown voltage Socket available Not for new applications Creepage and clearance distance min. 4mm 	Max.: 8A Min.: 1mA 	<ul style="list-style-type: none"> 250V DC 400V AC 	1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24, 48V
DK 1:2  20 x 12.5 x 9.7mm	<ul style="list-style-type: none"> Dimensions for 1a = 12.5mm, for 2a, 1a1b = 15mm Low coil power Creepage and clearance distance min. 8mm: DK2A-L2 min. 6.8mm DK1A1B-L2 min. 6.8mm 	Max.: 10A (1a)  8A (1a1b, 2a) 	<ul style="list-style-type: none"> 125V DC 400V AC 	1a, 1a1b, 2a	(DC) 3, 5, 6, 9, 12, 24V

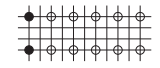

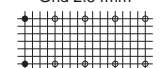
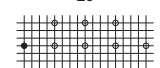

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 300mW 1 coil latching: 150mW 2 coil latching: 300mW	1000Vrms	2000Vrms	3000Vrms	5,000V	PCB Grid 2.54mm  1a  1a1b, 2a	CSA, SEV, TÜV, UL
Single side stable: 200mW 2 coil latching: 400mW	1000Vrms	—	5000Vrms	12,000V	PCB, PiP  4 pins, 1.20 dia. hole 2 coil latching type only	CSA, TÜV, UL
Single side stable: 200mW 1 coil latching: 100mW 2 coil latching: 200mW	1000Vrms	4000Vrms (1a1b, 2a)	5000Vrms	12,000V	PCB Grid 2.54mm 	CSA, TÜV, UL, VDE
Single side stable: 240mW 1 coil latching: 130mW 2 coil latching: 240mW	1200Vrms	2000Vrms	3750Vrms	6,000V	PCB Grid 2.54mm  (Single side stable)	CSA, SEV, TV rating, UL, VDE
Single side stable: 200mW 2 coil latching: 200mW	1000Vrms	4000Vrms	4000Vrms	10,000V	PCB Grid 2.54mm  1a  1a1b, 2a	CSA, SEV, TÜV, UL, VDE

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
DY 1:2  20 x 15 x 9.7mm	<ul style="list-style-type: none"> Low cost, polarized power relay 1a1b-contact arrangement is pin-compatible to DK1a1b Latching type available Creepage and clearance distance min. 6mm 	Max.: 10A (1a)  8A (1a1b) 	<ul style="list-style-type: none"> 125V DC 380V AC 	1a, 1a1b	(DC) 3, 5, 6, 12, 24V
DJ 1:2  29 x 13 x 16/16.5mm	<ul style="list-style-type: none"> Latching type available Compact with high capacity Low coil power Optional available with manual test button Creepage and clearance distance min. 8mm 	Max.: 16A 	<ul style="list-style-type: none"> 125V DC 400V AC 	1a, 1b, 1c, 1a1b, 2a, 2b, 2c	(DC) 5, 6, 12, 24, 48V
DQ 1:2  38 x 29 x 17.3mm	<ul style="list-style-type: none"> Latching type available Compact with high capacity High insulation Creepage and clearance distance min. 8mm 	Max.: 30A 	<ul style="list-style-type: none"> 250V DC 250V AC 	1a	(DC) 4.5, 6, 9, 12, 24V
DQM 1:2  44 x 40.4 x 17.3mm	<ul style="list-style-type: none"> Miniature 60A polarized power relay Latching type available High insulation Creepage and clearance distance min. 8mm 	Max.: 60A 	<ul style="list-style-type: none"> 250V AC 	1a	(DC) 4.5, 6, 9, 12, 24V










Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: 200mW 2 coil latching: 200mW	1000Vrms	4000Vrms	4000Vrms	10,000V	PCB Grid 2.54mm  Single side stable 1a1b 2 coil latching	CSA, TÜV, UL 
Single side stable: 250mW 1 coil latching: 150mW 2 coil latching: 250mW	1000Vrms	—	4000Vrms	10,000V	PCB Grid 2.54mm  Single side stable, 1 coil latching (1c) 2 coil latching (1c)	CSA, SEV, TÜV, UL, VDE 
1 coil latching: 500mW 2 coil latching: 1000mW	1500Vrms	—	4000Vrms	10,000V	PCB Grid 2.54mm  1 coil latching 2 coil latching	CSA, UL 
1 coil latching: 500mW 2 coil latching: 1000mW	1500Vrms	—	4000Vrms	10,000V	PCB  2 coil latching type only	— 

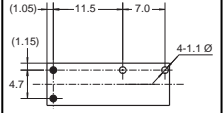
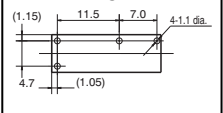
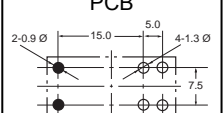
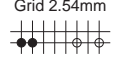
Power










Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
S 1:2  28 x 12 x 10.4mm	<ul style="list-style-type: none"> High switching capacity range due to 5-layer contact High sensitivity High vibration and shock resistance Low thermal electromotive force (approx. 3μV) Latching type available Sockets available 	Max.: 4A Min.: 100μA 	<ul style="list-style-type: none"> 200V DC 250V AC 	2a2b, 3a1b, 4a	(DC) 3, 5, 6, 12, 24, 48V
SP 1:2  2c: 50 x 25.6 x 22mm 4c: 50 x 36.8 x 22mm	<ul style="list-style-type: none"> Polarized power relay with rotating armature High sensitivity High vibration and shock resistance Wide switching range Latching type available Socket available 	Max.: 15A 	<ul style="list-style-type: none"> 110V DC 250V AC 	2c, 4c	(DC) 3, 5, 6, 12, 24, 48V

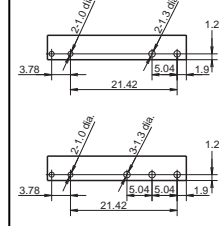

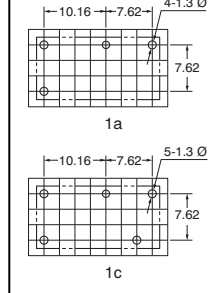

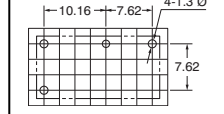

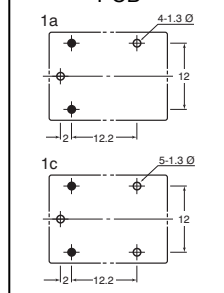

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Single side stable: ~200mW (3V - 24V DC) 271mW (48V DC) 1 coil latching: ~100mW (3V - 24V DC) 144mW (48V DC) 2 coil latching: ~200mW (3V - 24V DC) 355mW (48V DC)	750Vrms	1000Vrms	1500Vrms	—	PCB Grid 2.54mm 	CSA, UL 
Single side stable: 300mW 2 coil latching: 300mW	1500Vrms	3000Vrms	3000Vrms	—	PCB, Plug-in Grid 2.54mm  2c  4c	CSA, TÜV, UL 

Power

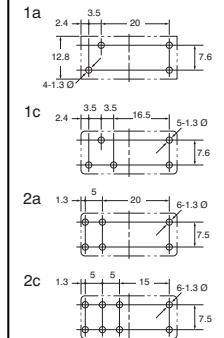

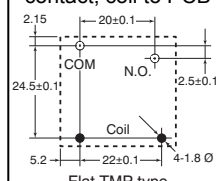

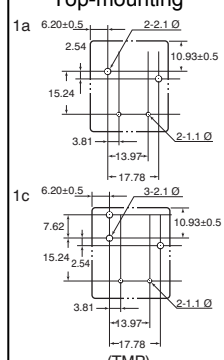

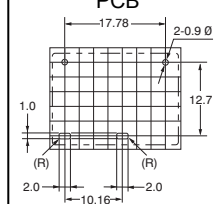

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
LD 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> Slim type: width 7mm Coil power: 200mW Creepage and clearance distance min. 6mm 	Max.: 3A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a	(DC) 4.5, 5, 6, 9, 12, 18, 24V
LD-P 1:2  20.3 x 7 x 15mm	<ul style="list-style-type: none"> Slim type: width 7mm Coil power: 200mW High switching capacity 5A/277V AC Creepage and clearance distance min. 6mm 	Max.: 5A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a	(DC) 5, 6, 9, 12, 18, 24V
LA 1:2  24 x 12 x 25mm	<ul style="list-style-type: none"> Low cost slim power relay: 2 Form A High insulation resistance between contact and coil 3A-version with gold clad contacts available (ideal speaker switch) Surge withstand voltage: 10kV Creepage and clearance distance min. 6mm 	Standard: Max.: 3A (3A rated)  Power type: Max.: 5A (5A, TV-4 rated) 	<ul style="list-style-type: none"> 30V DC 277V AC 	2a	(DC) 12, 24V
PA 1:2  20 x 5 x 12.5mm	<ul style="list-style-type: none"> Slim size permits high density mounting High switching capacity Gold-clad contacts Pin-compatible with the AQZ PhotoMOS relay High surge voltage: 4,000V High breakdown voltage: 2,000V PAD with min. 3.6mm creepage distance and min. 3.1mm clearance distance 	Max.: 5A 	<ul style="list-style-type: none"> 110V DC 250V AC 	1a	(DC) 5, 6, 9, 12, 18, 24V










Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
200mW	750Vrms	—	4000Vrms	10,000V	PCB 	CSA, TÜV, UL, VDE
200mW	750Vrms	—	4000Vrms	10,000V	PCB 	C-UL, UL, VDE
530mW	1000Vrms	1000Vrms	4000Vrms	10,000V	PCB 	CSA, SEV, SEMKO, TÜV, UL
120mW (5 - 18V) 180mW (24V)	1000Vrms	—	2000Vrms	4,000V	PCB Grid 2.54mm 	CSA, TÜV, UL

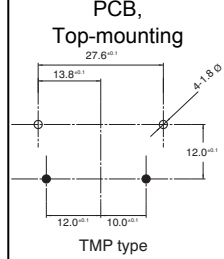
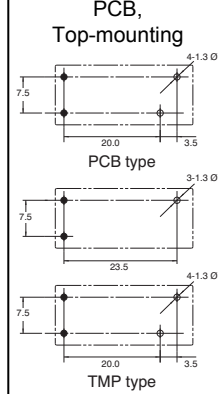
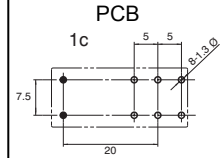
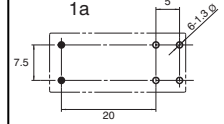
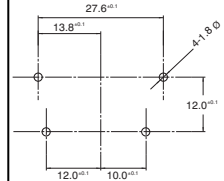
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
PF 1:2  28 x 5 x 15mm	<ul style="list-style-type: none"> Slim size permits high density mounting Wide switching capacity High surge voltage: 6,000V High breakdown voltage: 4,000V Slim relay for grid applications Insulation construction conforms to VDE0700 Contacts with gold flash plating or gold-clad contacts available Print socket available Clearance distance min. 5.5mm Creepage distance min. 8mm 	Max.: 6A 	<ul style="list-style-type: none"> 300V DC 400V AC 	1a, 1c	(DC) 4.5, 5, 6, 12, 18, 24, 48, 60V
JQ 1:2  20 x 10 x 15.6mm	<ul style="list-style-type: none"> High switching capacity in small size High surge withstand voltage: 8,000V Low power consumption Extremely low cost Creepage and clearance distance min. 4mm 	Standard: Max.: 5A  Power type: Max.: 10A 	<ul style="list-style-type: none"> 277V AC 	1a, 1c	(DC) 3, 5, 6, 9, 12, 18, 24, 48V
PQ 1:2  20 x 10 x 15.6mm	<ul style="list-style-type: none"> High electrical noise immunity High sensitivity: 200mW High surge voltage: 8,000V Pin-compatible to JQ1a Gold-clad twin (bifurcated) contacts! 	Max.: 5A 	<ul style="list-style-type: none"> 110V DC 250V AC 	1a	(DC) 3, 5, 6, 9, 12, 18, 24V
JS 1:2  22 x 16 x 16mm	<ul style="list-style-type: none"> Ultra-miniature power relay with universal terminal footprint Special type for high ambient temperature available Extremely low cost High switching capacity: 10A 	Max.: 10A 	<ul style="list-style-type: none"> 100V DC 277V AC 	1a, 1c	(DC) 5, 6, 9, 12, 18, 24, 48V











Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
170mW (5 - 24V) 217mW (48V) 175mW (60V)	1000Vrms	—	4000Vrms	6,000V	PCB 	C-UL, UL, VDE 
200mW (1a) 400mW (1c)	1000Vrms (1a) 750Vrms (1c)	—	4000Vrms	8,000V	PCB 	CSA, SEMKO, TÜV, UL, VDE 
200mW	1000Vrms	—	4000Vrms	8,000V	PCB 	CSA, SEMKO, TÜV, UL, VDE 
360mW	750Vrms	—	1500Vrms	—	PCB 	CSA, TÜV, complies with TV-5, UL, VDE 

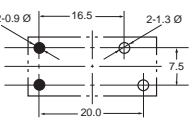

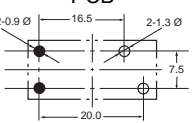

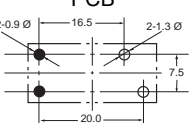

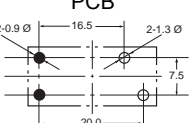

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
JW  1:2 28.6 x 12.8 x 20mm	<ul style="list-style-type: none"> Compact power relay High surge withstand voltage: 10,000V Class B coil insulation types available Creepage and clearance distance min. 8mm between contacts and coil (for 2 changeover contacts min. 7.5mm) 	Standard: Max.: 5A (2a, 2c)  High capacity: Max.: 10A (1a, 1c) 	<ul style="list-style-type: none"> 100V DC 440V AC 	1a, 1c, 2a, 2c	(DC) 5, 6, 9, 12, 18, 24, 48V
JM  1:2 Slim: 30.4 x 16 x 26.5mm Flat: 31 x 28.5 x 17.2mm	<ul style="list-style-type: none"> Superior welding resistance High surge resistance Compact high capacity relay for inductive load Relay for high motor loads Ideal for high inrush currents Pin-compatible with the LF relays 	Max.: 20A 	<ul style="list-style-type: none"> 100V DC 250V AC 	1a	(DC) 5, 6, 9, 12, 24, 48V
JT-V  1:2 PCB: 31.9 x 26.9 x 20.2mm TMP: 32.2 x 27.4 x 27.9mm	<ul style="list-style-type: none"> High breakdown voltage High surge withstand voltage: min. 6kV High switching capacity with small dimensions and low height TMP types available Class F type as standardIncreased insulation construction than JT-N Clearance, contact to coil: min. 6.4mm Creepage, contact to coil: min. 9.5mm 	Max.: 30A 	<ul style="list-style-type: none"> 30V DC 277V AC 	1a, 1c	(DC) 12, 18, 24, 48V
JV-N  1:2 22 x 16 x 10.9mm	<ul style="list-style-type: none"> Compact, flat type with low 10.9mm profile Sensitive coil 	Max.: 16A 	<ul style="list-style-type: none"> 110V DC 277V AC 	1a	(DC) 4.5, 6, 9, 12, 24, 48, 100V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
530mW	1000Vrms	3000Vrms (2a, 2c)	5000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, complies with TV-5, UL, VDE 
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top mount contact, coil to PCB 	CSA, TÜV, UL, VDE 
1000mW	—	1200Vrms	3500Vrms	6,000V	PCB Top-mounting 	C-UL, UL 
(DC) 200mW (4.5V - 48V) (DC) 600mW (100V)	1000Vrms	—	2500Vrms	4,500V	PCB 	CSA, TÜV, UL 









Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
LF 1:2  30.1 x 15.7 x 23.3mm	<ul style="list-style-type: none"> • Ideal for compressor and inverter loads • High insulation resistance • Inrush current: 102A/200V AC 224A/100V AC • High surge withstand voltage • Creepage and clearance distance min. 8mm 	Max.: 25A 	• 250V AC	1a	(DC) 5, 6, 9, 12, 18, 24V
LE 1:2  28.6 x 12.4 x 24.9mm	<ul style="list-style-type: none"> • Ideal for magnetron and heater loads • Excellent heat resistance • 4.8mm fast-on terminals • High sensitivity: 200mW • Creepage and clearance distance min. 8mm 	Max.: 16A 	• 277/400V AC	1a	(DC) 5, 6, 9, 12, 18, 24, 48V
★ LZ 1:2  28.8 x 12.5 x 15.7mm	<ul style="list-style-type: none"> • Low profile relay (15.7mm) • Low operating power of 400mW • Ambient temperature up to 105°C • Creepage and clearance distance min. 10mm 	Max.: 16A 	• 250V DC • 440V AC	1a, 1c	(DC) 5, 9, 12, 18, 24, 48V
★ LF-G1/LF-G2 1:2  30.1 x 15.7 x 23.3mm	<ul style="list-style-type: none"> • Ideal for solar inverters • High insulation resistance • Inrush current: 102A/200V AC 224A/100V AC • High switching capacity 31A/277V AC • High surge withstand voltage • Creepage and clearance distance min. 8mm 	Max.: 22A  Max.: 31A 	• 250V AC	1a	(DC) 9, 12, 18, 24V

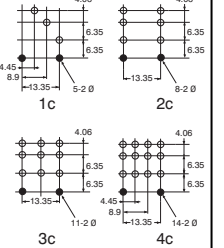
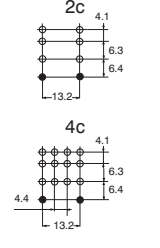

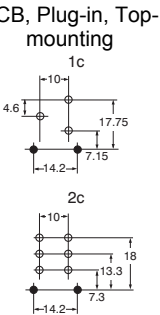
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
900mW	1000Vrms	—	5000Vrms	10,000V	PCB, Top-mounting  TMP type	CSA, SEMKO, TÜV, UL, VDE
Standard: 400mW High sensitivity: 200mW	1000Vrms	—	4000Vrms	10,000V	PCB, Top-mounting  PCB type TMP type	CSA, TÜV, UL, VDE
400mW	1000Vrms	—	5000Vrms	10,000V	PCB 1c  1a 	CSA, UL, VDE
1400mW	2500Vrms	—	4000Vrms	6,000V	PCB 	C-UL, UL, VDE

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
LK-G 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> Contact gap: 1mm 3 different types available High insulation resistance Slim profile High noise immunity Creepage and clearance distance between contact and coil min. 6mm (IEC65 compliant) 	Max.: 10A  Max.: 16A 	• 277V AC	1a	(DC) 5, 9, 12, 24V
LK-P 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> High switching capacity 10A 277V AC High inrush current capability: 111A UL/CSA TV-5 rated type available High insulation: Creepage and clearance distance between contact and coil min. 6mm 	Max.: 10A 	• 30V DC • 277V AC	1a	(DC) 12, 24V
LK-Q 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> Reduced noise High sensitivity: nominal coil power 250mW TV-5/TV-8 rated type available Slim shape Creepage and clearance distance min. 6mm 	Max.: TV5: 5A (AC)  TV8: 8A (AC) 	• 30V DC • 277V AC	1a	(DC) 5, 9, 12, 24V
LK-T 1:2  24 x 11 x 25mm	<ul style="list-style-type: none"> High inrush current capability: 118A UL/CSA TV-8 rated type available High noise immunity realized by the card separation structure between contact and coil High insulation resistance: <ol style="list-style-type: none"> Creepage and clearance distance between contact and coil min. 6mm Surge withstand voltage between contact and coil > 10kV 	Max.: 8A 	• 277V AC	1a	(DC) 5, 9, 12, 24V










Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, TÜV, UL 
530mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, TV-5 rating, UL, VDE 
250mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, complies with TV-5, TV-8, UL, VDE 
250mW	1000Vrms	—	4000Vrms	10,000V	PCB 	CSA, SEMKO, SEV, TÜV, TV rating UL, VDE 

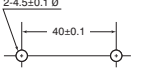
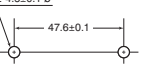
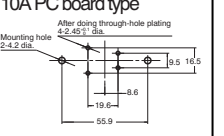
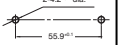
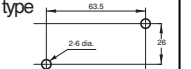
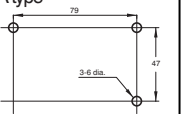
Power

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
HC 1:2  27.2 x 20.8 x 35.2mm	<ul style="list-style-type: none"> Wide applications Versatile range Footprint compatible with competitive types Compact power relay AC and DC coil available Socket available Pin-compatible with the HJ relays 	Max.: 10A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c, 3c, 4c	(DC) 6, 12, 24, 48, 110V (AC) 6, 12, 24, 48, 120, 240V
HJ 1:2  28 x 21.5 x 35/38mm	<ul style="list-style-type: none"> 2 contact arrangements, same footprint as our popular HC relay Coil breakdown detection-function (AC type with LED only) Convenient screw terminal sockets with finger protection also available Test button type available Compact power relay for AC and DC voltage Socket available 	Max.: 7A 	<ul style="list-style-type: none"> 30V DC 250V AC 	2c, 4c	(DC) 12, 24, 48, 110V (AC) 12, 24, 48, 100, 120, 200, 220/240V
HN 1:2  29 x 13 x 28mm	<ul style="list-style-type: none"> Slim (13mm) and compact size relay: The size has been reduced 20% compared with the existing HC/HJ relays. Plug-in solder type available Slim screw terminal socket (17.5mm) Also available with LED indication High reliability AC and DC coil available 	Max.: 5A 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c	(DC) 5, 6, 12, 24, 48V (AC) 100, 120, 240V
HL 1:2  27.2 x 20.8 x 35.4mm	<ul style="list-style-type: none"> Large capacity Compact size Designed for long lifetime Footprint compatible with competitive types High load switching range Socket available 	Max.: 15A Min.: 1mA 	<ul style="list-style-type: none"> 30V DC 250V AC 	1c, 2c	(DC) 6, 12, 24, 48, 110V (AC) 6, 12, 24, 48, 120, 240V




Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 900mW (AC) 1.2VA	700Vrms	700Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	CSA, SEV, TV rating, UL, VDE
(DC) 900 mW (AC) 1.2 - 1.5VA	1000Vrms	2000Vrms	2000Vrms	—	Plug-in 	CSA, SEV, TV rating, UL, VDE
(DC) 530mW (AC) 0.9VA	1000Vrms	3000Vrms	5000Vrms	—	Plug-in, Screw terminal 	UL, C-UL, (VDE)
(DC) 900 - 1000mW (AC) 1.2 - 1.3VA	1000Vrms	1500Vrms	2000Vrms	—	PCB, Plug-in, Top-mounting 	CSA, complies with TV-5, UL

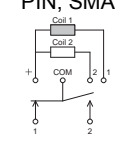
Power




Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
HE/ HE PV 1:3  50 x 33 x 35.8mm	<ul style="list-style-type: none"> High surge withstand voltage: 10,000V High inrush resistance: TV-15: 1 form A, TV-10: 2 form A Compact power relays for AC and DC voltage Contact gap: 3mm Socket available Creepage and clearance distance min. 8mm 	Max.: 30A  Max.: 50A 	<ul style="list-style-type: none"> 100V DC 277V AC 	1a, 2a	(DC) 6, 12, 24, 48, 110V (AC) 12, 24, 48, 120, 240V
EP 1:8 mm  62.4 x 37.9 x 31.3 66.8 x 37.9 x 45  75.5 x 40 x 79  111 x 63 x 74.7	<ul style="list-style-type: none"> High capacity to cut off DC voltage in a compact relay: max. cut-off current 2,500A/300V DC Nominal switching capacity 300A 400V DC Low operating noise High contact reliability DC type with sealed capsule 	Max.: 10A  80A  300A 	<ul style="list-style-type: none"> 400V DC 	1a	(DC) 12, 24, 48, 100V

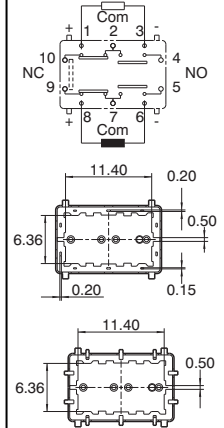
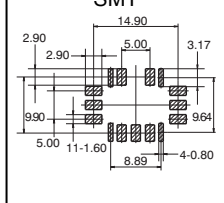
Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
(DC) 1920mW (AC) 1.7 - 2.7VA	2000Vrms	4000Vrms	5000Vrms	10,000V	Top-mounting Panel cutout  (Plug-in terminal type) (Screw terminal type)  (NEMA terminal type) (Screw terminal type, wide pitch)	CSA, TÜV, TV rating, UL, VDE
Max.: 1.4W (10A) 4.5W (80A) 4 - 40W (300A)	2500Vrms	—	2500Vrms	—	PCB 10A PC board type  10A TM type  80A type  300A type 	—

Power

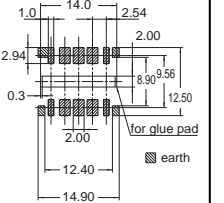
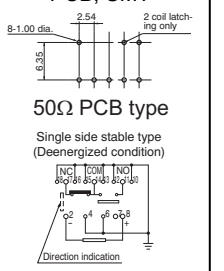
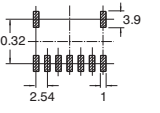
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
RV SPDT 1:1  15.9 x 15.9 x 11.2mm	<ul style="list-style-type: none"> Ultra small coaxial switch Up to 26.5 GHz Impedance 50Ω PIN and SMA terminals available Latching types available 2-coil latching type helps reduce power consumption Failsafe type available Reverse type available Surge withstand voltage: 500Vrms HF Characteristics at 18GHz/ SMA type: <ul style="list-style-type: none"> Isolation min. 40dB Insertion loss max. 0.7dB V.S.W.R. max. 1.7 	HF: 50W (3GHz)	—	SPDT	(DC) 4.5, 12, 24V
★ RD SPDT 1:2  34 x 13.2 x 39mm	<ul style="list-style-type: none"> Coaxial relay Up to 26.5GHz (18GHz) Impedance 50Ω Latching types available TTL Version available HF Characteristics at 18GHz: <ul style="list-style-type: none"> Isolation min. 60dB Insertion loss max. 0.5dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	• 30V DC (indicator)	SPDT	(DC) 4.5, 5, 12, 24V
★ RD TRANSFER 1:2  32 x 32 x 39mm	<ul style="list-style-type: none"> Coaxial relay Up to 26.5GHz (18GHz) Impedance 50Ω Latching types available TTL Version available HF Characteristics at 18GHz: <ul style="list-style-type: none"> Isolation min. 60dB Insertion loss max. 0.5dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	• 30V DC (indicator)	DPDT	(DC) 4.5, 5, 12, 24V

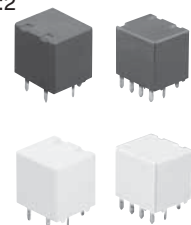


Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
700mW	500Vrms	500Vrms	500Vrms	500Vrms	3 x 10 ⁵	10 ⁶	PIN, SMA 	—
Single side stable: 840-970mW (4.5, 12, 24V) 2 coil latching: 700-900mW (4.5, 12, 24V) Latching with TTL driver (self cut-off function): 5, 12, 24V	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	—
Single side stable: 1540-1670mW (4.5, 12, 24V) 2 coil latching: 1200-1400mW (4.5, 12, 24V) Latching with TTL driver (self cut-off function): 5, 12, 24V	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	—

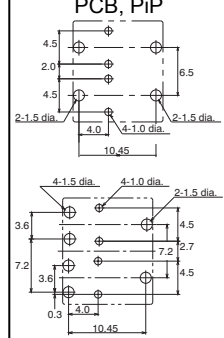
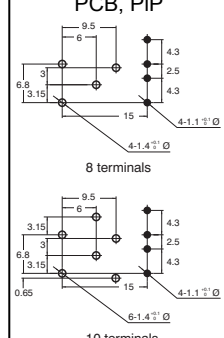
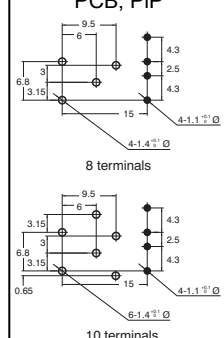
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
★ RD SP6T  1:4 80 x 80 x 39.5mm	<ul style="list-style-type: none"> Coaxial relay Up to 13GHz (18GHz) Terminated type available Impedance 50Ω Latching types available HF Characteristics at 13GHz: <ul style="list-style-type: none"> Isolation min. 65dB Insertion loss max. 0.4dB V.S.W.R. max. 1.5 	DC: 100mA (indicator) HF: 120W (3GHz)	<ul style="list-style-type: none"> 30V DC (indicator) 	SP6T	(DC) 4.5, 5, 12, 24V
★ RJ  1:1 14 x 9 x 8.2mm	<ul style="list-style-type: none"> Shielded HF relay Up to 8GHz Impedance 50Ω Latching types available SMD and PCB version available HF Characteristics at 5GHz: <ul style="list-style-type: none"> Isolation min. 35dB Isolation min. 30dB between contact sets Insertion loss max. 0.5dB V.S.W.R. max. 1.25 	DC: 0.3A HF: 1W (5GHz)	<ul style="list-style-type: none"> 30V DC 	2c	(DC) 3, 4.5, 12, 24V
★ RN  1:1 14.6 x 9.6 x 10.0mm	<ul style="list-style-type: none"> High hot switching capability up to 80W at 2GHz, contact rating up to 150W at 2GHz High frequency capability up to 6GHz 1 changeover contact, impedance 50Ω Reversed contact type available Single side stable or 2 coil latching types available SMT version available Very good HF characteristics HF Characteristics at 2GHz: <ul style="list-style-type: none"> Isolation min. 55dB Insertion loss max. 0.12dB V.S.W.R. max. 1.15 	DC: 0.5A HF: 80W	<ul style="list-style-type: none"> 30V DC 	1c SPDT	(DC) 4.5, 12, 24V











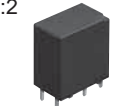

Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
Single side stable: 840mW (4.5, 12V) 970mW (24V) Latching: 700mW (SET 4.5V) 750mW (SET 12V) 900mW (SET 24V)	500Vrms	500Vrms	500Vrms	500Vrms	5 x 10 ⁶	5 x 10 ⁶	Coax	—
Single side stable: 200mW 2 coil latching: 150mW	500Vrms	500Vrms	500Vrms	500Vrms	10 ⁶	10 ⁷	PCB, SMT 	—
Single side stable: 320mW 2 coil latching: 400mW	500Vrms	—	500Vrms	500Vrms	10 ⁵	10 ⁶	SMT 	—

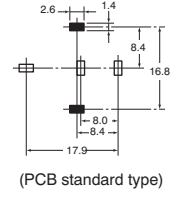
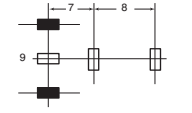
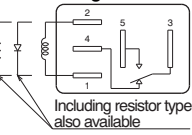
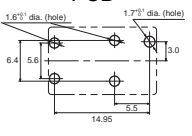
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
RA 1:1  14.7 x 9.7 x 5.9mm	<ul style="list-style-type: none"> • HF relay in SMT version • Up to 1GHz • Impedance 50Ω • Latching types available HF Characteristics at 1GHz: <ul style="list-style-type: none"> • Isolation min. 20dB • Isolation min. 30dB between contact sets • Insertion loss max. 0.3dB • V.S.W.R. max. 1.2 	DC: 1A HF: 3W (1GHz, carrying point to carrying current)	• 30V DC	2c	(DC) 1.5, 3, 4.5, 5, 6, 9, 12, 24, 48V
RS 1:1  14 x 8.6 x 7/8mm	<ul style="list-style-type: none"> • HF relay • Up to 3GHz • Impedance 50/75Ω • Silent type available • Latching types available • SMT and PCB version available • 10W at 3GHz contact carrying power HF Characteristics at 3GHz (50Ω PCB type): <ul style="list-style-type: none"> • Isolation min. 35dB • Insertion loss max. 0.35dB • V.S.W.R. max. 1.4 	DC: 0.5A HF: 1W (3GHz)	• 30V DC	1c	(DC) 3, 4.5, 9, 12, 24V
RE 1:1  20.2 x 11.2 x 8.9/9.6mm	<ul style="list-style-type: none"> • HF relay • Up to 2.6GHz • Impedance 50/75Ω • SMT and PCB version available HF Characteristics at 2.6GHz (75Ω PCB type): <ul style="list-style-type: none"> • Isolation min. 30dB • Insertion loss max. 0.5dB • V.S.W.R. max. 1.5 	DC: 0.5A HF: 1W (2.6GHz)	• 30V DC	1c	(DC) 3, 4.5, 6, 9, 12, 24V













Coil power	Breakdown voltage				Life (min. operations)		Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil	Between live parts and ground	Electrical	Mechanical		
Single side stable: 140mW (1.5 - 12V) 200mW (24V) 300mW (48V) 1 coil latching: 70mW (1.5 - 12V) 100mW (24V) 2 coil latching: 140mW (1.5 - 12V) 200mW (24V)	750Vrms	1000Vrms	1000Vrms	1000Vrms	10 ⁷	10 ⁸	SMT Suggested mounting pads (Top view) 	—
Single side stable: 200mW 1 coil latching: 200mW 2 coil latching: 400mW	500Vrms	—	1000Vrms	500Vrms	3 x 10 ⁵	5 x 10 ⁶	PCB, SMT  50Ω PCB type Single side stable type (Deenergized condition) 50Ω SMT type	—
Single side stable: 200mW	500Vrms	—	1000Vrms	500Vrms	3 x 10 ⁵	10 ⁶	PCB, SMT Grid 2.54mm 	—

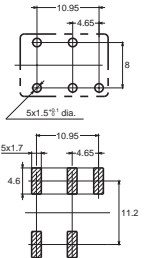
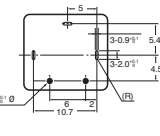
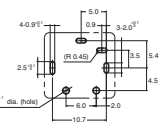
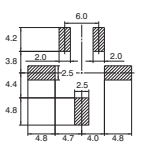
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Twin					
<p>★ CJ</p> <p>1:2</p>  <p>8 Pin Print: 13.7 x 12.2 x 13.5mm PiP: 13.7 x 12.2 x 13.8mm 10 Pin Print: 14.4 x 12.2 x 13.5mm PiP: 14.4 x 12.2 x 13.8mm</p>	<ul style="list-style-type: none"> Ultra small size Twin (1 Form C x 2) High capacity in a compact body H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>20A (N.O.)</p> <p>10A (N.C.)</p>	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT</p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) ACT512 layout = layout of 2 x ACT112 H-bridge type available (twin relay) Quiet operation RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>20A (N.O.)</p> <p>10A (N.C.)</p>	• 16V DC	1c, 1c x 2	(DC) 12V
<p>★ CT POWER</p> <p>1:2</p>  <p>17.4 x 14 x 13.5mm</p>	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) Footprint same as CT standard type 30A switching capacity (motor load) H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	<p>Max.:</p> <p>30A (N.O.)</p> <p>10A (N.C.)</p>	• 16V DC	1c, 1c x 2	(DC) 12V








Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
<p>Standard: 800mW</p> <p>High sensitivity: 640mW</p>	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—
800mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—
1000mW	500Vrms	—	500Vrms	—	<p>PCB, PiP</p> 	—

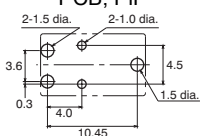
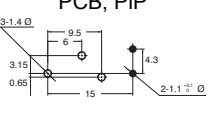
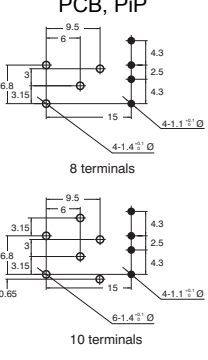
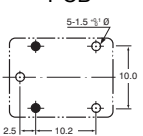
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Single					
CB  1:2 26 x 22 x 25mm	<ul style="list-style-type: none"> 40A switching current at 85°C Mini-ISO type terminals High shock resistance High thermal resistance 1 Form A available with 70A switching current Broad lineup RTIII (IP67) available 	Max.: 70A (N.O. H type)  40A (1a, 1c N.O.)  30A (1c N.C.) 	<ul style="list-style-type: none"> 16V DC (12V DC type) 32V DC (24V DC type) 	1a, 1c	(DC) 12, 24V
★ CM  1:2 20 x 15 x 22mm	<ul style="list-style-type: none"> Small substitute for Mini-ISO relay Micro-ISO terminal type RTIII (IP67) available 	Max.: 35A (N.O.)  20A (N.C.) 	<ul style="list-style-type: none"> 16V DC (12V DC type) 32V DC (24V DC type) 	1a, 1c	(DC) 12, 24V
CV  1:2 22.5 x 15 x 15.7mm	<ul style="list-style-type: none"> Low profile 20A Micro-ISO terminal type RTIII (IP67) 	Max.: 20A (N.O.)  10A (N.C.) 	<ul style="list-style-type: none"> 16V DC 	1a, 1c	(DC) 12V
★ CN-H  1:2 17 x 10.6 x 18.3mm	<ul style="list-style-type: none"> Best space savings in its class Substitute for Micro-ISO relay High current-carrying capacity RTIII (IP67) 	Max.: 	<ul style="list-style-type: none"> 16V DC 	1a	(DC) 12V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
1400mW (12V DC type) 1800mW (24V DC type) 1800mW (12V DC, H type)	500Vrms	—	500Vrms	—	PCB, Plug-in  (PCB standard type)	—
1500mW (12V DC type) 1800mW (24V DC type)	500Vrms	—	500Vrms	—	PCB (24V), Plug-in 	—
800mW	500Vrms	—	500Vrms	—	Plug-in  Including resistor type also available	—
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	—

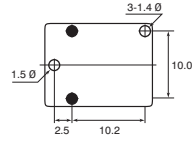
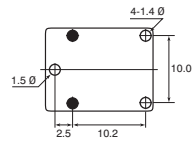
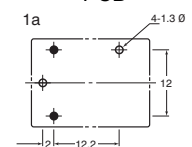
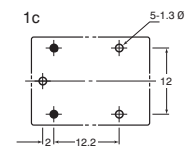
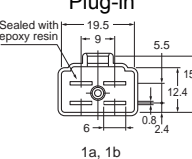
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
CN-M 1:2  15,5 x 11 x 14.4mm	<ul style="list-style-type: none"> Space-saving design High switching capacity (up to 30A) SMD type available RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 30A (N.O.)  30A 25A (N.C.)  25A	• 16V DC	1a, 1c	(DC) 12V
★ CP 1:2  14 x 13 x 9.5mm	<ul style="list-style-type: none"> Very low profile High capacity 24V DC type available on request RTIII (IP67) 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1a, 1c	(DC) 12V, 24V
★ CP POWER 1:2  14 x 13 x 9.5mm	<ul style="list-style-type: none"> Very low profile High capacity type: 45A maximum carrying current Improved heat conduction thanks to additional pin Layout is downward compatible to CP RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1a, 1c	(DC) 12V
★ CP (SMD) 1:2  14 x 13 x 10.5mm	<ul style="list-style-type: none"> Very low profile High capacity RTIII (IP67) 	Max.: 20A (N.O.)  20A 10A (N.C.)  10A	• 16V DC	1c	(DC) 12V









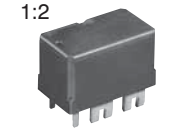

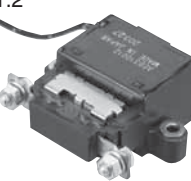

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB, SMT 	—
640mW	500Vrms	—	500Vrms	—	PCB 	—
450mW 640mW	500Vrms	—	500Vrms	—	PCB 	—
640mW	500Vrms	—	500Vrms	—	SMT 	—

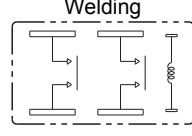
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
CJ  1:2 Print : 13.5 x 12.2 x 7.2mm PiP : 13.8 x 12.2 x 7.2mm	<ul style="list-style-type: none"> Ultra small size Twin (1 Form C x 2) High capacity in a compact body H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 20A (N.O.)  10A (N.C.) 	• 16V DC	1c, 1c x 2	(DC) 12V
CT  1:2 17.4 x 7.2 x 13.5mm	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) ACT512 layout = layout of 2 x ACT112 H-bridge type available (twin relay) Quiet operation RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 20A (N.O.)  10A (N.C.) 	• 16V DC	1c, 1c x 2	(DC) 12V
CT POWER  1:2 17.4 x 7.2 x 13.5mm	<ul style="list-style-type: none"> Super miniature size Twin (1 Form C x 2) Footprint same as CT standard type 30A switching capacity (motor load) H-bridge type available (twin relay) RTIII (IP67) Pin in Paste (with vent hole) available 	Max.: 30A (N.O.)  10A (N.C.) 	• 16V DC	1c, 1c x 2	(DC) 12V
CQ  1:2 17 x 13 x 16.6mm	<ul style="list-style-type: none"> Very quiet operation Terminal layout identical to JJM RTIII (IP67) 	Max.: 20A (N.O.)  10A (N.C.) 	• 16V DC	1c	(DC) 12V









Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Standard: 800mW High sensitivity: 640mW	500Vrms	—	500Vrms	—	PCB, PiP 	—
800mW	500Vrms	—	500Vrms	—	PCB, PiP 	—
1000mW	500Vrms	—	500Vrms	—	PCB, PiP 	—
640mW	500Vrms	—	500Vrms	—	PCB 	—

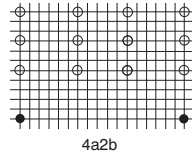
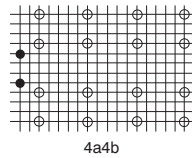
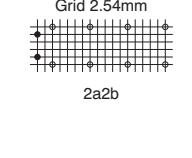
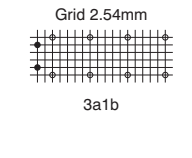
Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
★ JJM 1:2  15.5 x 12 x 13.9mm	<ul style="list-style-type: none"> Compact (half the size of JS-M) Best-selling, familiar blinker sound RTIII (IP67) 	Max.: 20A (N.O.)  10A (N.C.) 	<ul style="list-style-type: none"> 16V DC 	1a, 1c	(DC) 12V
JJM-DM 1:2  15.5 x 12 x 13.9mm	<ul style="list-style-type: none"> Small size Double make contact arrangement Terminal layout compatible to JJM RTIII (IP67) 	Max.: 2 x 6A  	<ul style="list-style-type: none"> 16V DC 	Double make contact	(DC) 12V
JS-M 1:2  22 x 16 x 16.4mm	<ul style="list-style-type: none"> Low pick-up voltage for high ambient temperatures RTIII (IP67) 	Standard: Max.: 10A  High capacity: Max.: 15A 	<ul style="list-style-type: none"> 16V DC 	1a, 1c	(DC) 9, 12V
CA 1:2  21.5 x 14.4 x 37mm	<ul style="list-style-type: none"> Small size Direct plug-in RTIII (IP67) 	Max.: 20A (1a, 1.4W type)  30A (1a, 1.8W type)  20A (1b, 1c) 	<ul style="list-style-type: none"> 15V DC (1c - 12VDC type) 16V DC (1a, 1b - 12VDC type) 30V DC (1c - 24VDC type) 	1a, 1b, 1c	(DC) 12, 24V






Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
640mW	500Vrms	—	500Vrms	—	PCB 	—
1000mW	500Vrms	—	500Vrms	—	PCB 	—
640mW	750Vrms	—	1500Vrms	—	PCB 1a  1c 	—
1800mW 1400mW (type S)	500Vrms	—	500Vrms	—	Plug-in Sealed with epoxy resin 	—

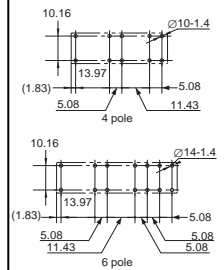

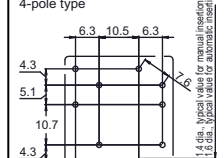
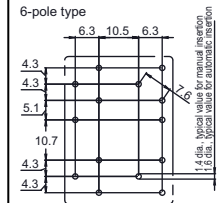

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current (Min.: see data sheet)	Max. switching voltage	Contact arrangement	Coil voltage
Special Types					
EV 1:8  66.8 x 49.7 x 37.9mm 78 x 40 x 48.1mm 82.8 x 40 x 79mm 75.5 x 40 x 80mm 111 x 63 x 75mm	<ul style="list-style-type: none"> • 5 versions available: 10, 20, 80, 120, 300A • DC type with sealed capsule for electric and hybrid vehicles • Compact size • Small arcing space required thanks to blow-out magnets • Safety construction • High contact reliability 	Max.: 10A (1a)  20A (1a)  80A (1a)  120A (1a)  300A (1a) 	• 400V DC	1a	(DC) 12, 24V
EV QUIET 1:4  76 x 36 x 72.3mm 77 x 67.8 x 37.7mm	<ul style="list-style-type: none"> • DC type with sealed capsule, mainly for hybrid vehicles • Very quiet operation • Small size and light weight • Small arcing space required thanks to blow-out magnets • Safety construction • High contact reliability • Standard type for horizontal mounting available 	Max.: 60A (1a) 	• 400V DC	1a	(DC) 12V
CW 1:2  32 x 18 x 26mm	<ul style="list-style-type: none"> • Ideal relay for high output, 3-phase motors (Electric Power Steering) • High cut-off current capability and high carrying current • RTIII (IP67) 	Max.: 	• 14V DC	2a	(DC) 12V
EB 1:2  70 x 80 x 34mm	<ul style="list-style-type: none"> • Automotive high-capacity DC cutoff relay • Supports even 42V vehicles 	Max.: 100A (1a) 	• 42V DC	1a	(DC) 12, 24, 36V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
Stable: • 1240mW (10A, 12/24V) • 3900mW (20A, 12V) • 4200mW (80A/120A, 12/24V) • 3600mW (300A, 12V) • 3800mW (300A, 24V) Inrush: • 37.9W (300A, 12V) • 44.4W (300A, 24V)	2500Vrms	—	2500Vrms	—	Faston terminal —	—
4500mW	Vertical: 2500Vrms Horizontal: 2000Vrms	—	Vertical: 2500Vrms Horizontal: 2000Vrms	—	Vertical type: lead wire Horizontal type: Faston terminal —	—
1400mW	500Vrms	—	500Vrms	—		—
5000mW	1500Vrms	—	2500Vrms	—	Screw terminal —	—

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
SFN4D 1:3  53.3 x 33 x 14.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN50205, Type B Safety double contact Extremely small total power loss Relay height: 14.5mm 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 500V DC 500V AC 	4a2b	(DC) 5, 9, 12, 16, 18, 21, 24, 36, 48, 60V
SF4D 1:3  53.3 x 33 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN50205, Type B Safety double contact 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	4a4b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V
SF2D 1:3  53.3 x 25 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A Safety double contact For applications according to EN 50155 IEC/EN 60335-1 (GWT) compliant 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	2a2b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V
SF3 1:3  53.3 x 25 x 16.5mm	<ul style="list-style-type: none"> Polarised relay with forcibly guided contacts according to EN 50205, Type A For applications according to EN 50155 IEC/EN 60335-1 (GWT) compliant 	Max.: 8A Min.: 10mA 	<ul style="list-style-type: none"> 400V DC 400V AC 	3a1b	(DC) 5, 9, 12, 18, 21, 24, 36, 48, 60V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
390mW (5 - 24V) 420mW (36 - 60V)	2500Vrms	4000Vrms	5000Vrms	—	PCB Grid 2.5mm  4a2b	CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  4a4b	CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  2a2b	CSA, SEV, TÜV, UL
500mW	2500Vrms	2500Vrms	2500Vrms	—	PCB Grid 2.54mm  3a1b	CSA, SEV, TÜV, UL

Type ★ = Popular Type (Picture scale: DIN A4)	Features	Switching current	Max. switching voltage	Contact arrangement	Coil voltage
SFS 1:3  40 x 13 x 24mm  50 x 13 x 24mm	<ul style="list-style-type: none"> • Polarised relay with forcibly guided contacts according to EN 50205, Type A • 4-pole and 6-pole type with various contact arrangements • Slim profile reduces mounting area • PC board sockets and DIN-rail terminal socket available 	Max.: 6A Min.: 1mA 	<ul style="list-style-type: none"> • 30V DC • 250V AC 	2a2b, 3a1b, 4a2b, 5a1b, 3a3b	(DC) 12, 16, 18, 21, 24, 48V
★ SF-Y 1:3  39 x 14.5 x 28.6mm	<ul style="list-style-type: none"> • Polarised relay with forcibly guided contacts according to EN 50205, Type A • 4-pole and 6-pole type with various contact arrangements • Gold clad contacts on request 	Max.: 6A Min.: 1mA 	<ul style="list-style-type: none"> • 30V DC • 250V AC 	2a2b, 3a1b, 4a2b, 5a1b	(DC) 5, 12, 18, 21, 24V

Coil power	Breakdown voltage			Surge withstand voltage	Mounting method (bottom view)	Approvals Data sheet
	Between open contacts	Between contact sets	Contacts to coil			
360mW (4 poles) 500mW (6 poles)	1500Vrms	2500Vrms/ 4000Vrms	4000Vrms	—	PCB 	CSA, TÜV, UL 
670mW	1500Vrms	2500Vrms/ 4000Vrms	4000Vrms	—	PCB 4-pole type  6-pole type 	CSA, TÜV, UL 

What is PhotoMOS?

Panasonic Electric Works offers a wide range of PhotoMOS relays for use in telecommunication, measurement, security devices and industrial control. Obviously, the PhotoMOS relay differs from the conventional electromechanical relay, but it also distinguishes itself from other switching solutions that utilize optocouplers or semiconductors.

The construction of the PhotoMOS relay is illustrated below:

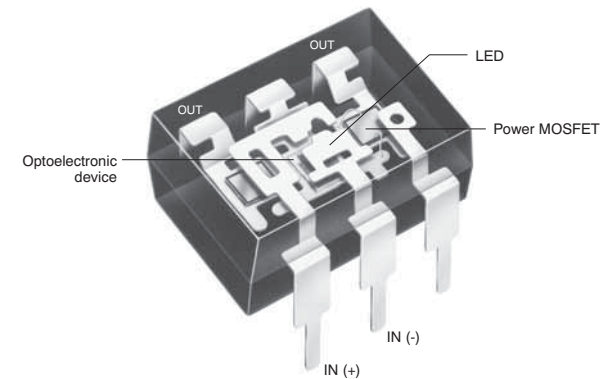


Figure 1 PhotoMOS internal construction

The input pins are connected to a light emitting diode. This LED is located on the upper part of the relay and as soon as a current flows through it, it starts emitting infrared light. Below the LED, there is an array of solar cells intergrated into an optoelectronic device, thus switching the output transistors.

The light emitter and detector are moulded in translucent resin that allows light to pass through but provides a dielectric barrier between the input and output side. By integrating an internal circuit in the optoelectronic device, it serves as a control circuit for switching the power MOSFETs and therefore the load circuit in an ON or OFF-state.

A single power MOSFET is only capable of switching a DC voltage since its internal source-drain diode will become forward biased if the load polarity is reversed. Using a PhotoMOS relay for switching AC voltages therefore requires two source-coupled power MOSFETs in one PhotoMOS relay.

By connecting the two output transistors of an AC relay in parallel, the allowable DC current can also be increased (A,B or C connection) as illustrated below:

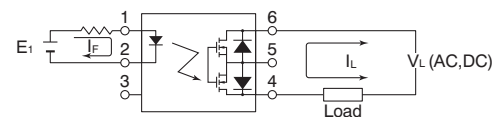


Figure 2 PhotoMOS in A connection

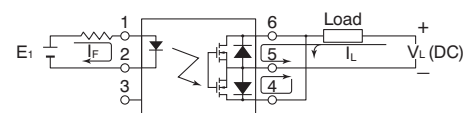


Figure 3 PhotoMOS in C connection

Basically, the power MOSFET's output acts as a pure ohmic resistance thus distinguishing the PhotoMOS from an optocoupler or triac solution, since no saturation voltage or offset voltage is required. However the aforementioned source-drain diode of the MOSFET may influence the linearity of the output, and the output capacitance may limit the usability for higher frequencies. This strongly depends on the type of PhotoMOS relay used and on the application's requirements.



Due to Panasonic's broad product range, we are able to offer PhotoMOS relays for numerous applications, enabling you to utilize

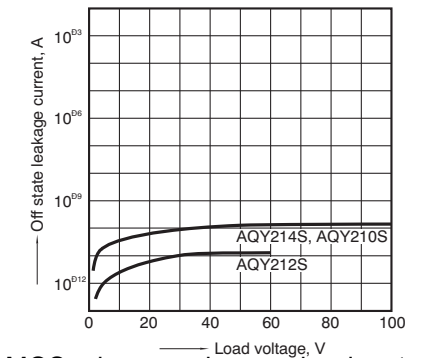
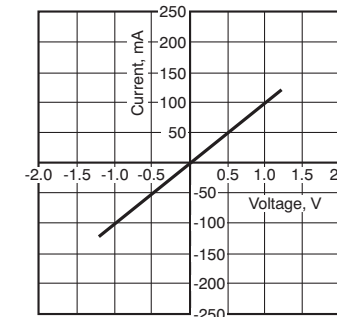
PhotoMOS advantages:

- Low control current
- Control of small analog signals
- Low leakage current
- Fast switching speed
- Stable ON-resistance over lifetime
- Extremely long product life
- Small size
- Flexible mounting position
- High vibration and shock resistance
- No contact bouncing
- No switching noise

Due to the enormous variety of PhotoMOS relays, they are suitable for numerous applications (see figure 4). They can be used in telecommunications and for measurement equipment, for switching and controlling small motors or other power loads, and for controlling various signals out of microcontrollers.

Examples of PhotoMOS Advantages

1. High output linearity without any saturation or offset voltage making PhotoMOS perfectly suitable for switching signals or loads (AQY225R2V).
2. Fast switching times with stable behavior over lifetime and no contact bouncing due to semiconductor technology (AQY221N3V).
3. Perfectly suited for switching low level signals due to low off-state leakage current in the range of pA to nA (AQY21*S).
4. PhotoMOS relays require very low input control currents. Sensitive types are also available (AQV234). Take temperature and safety considerations into account.



2. Fast switching times with stable behavior over lifetime and no contact bouncing due to semiconductor technology (AQY221N3V).

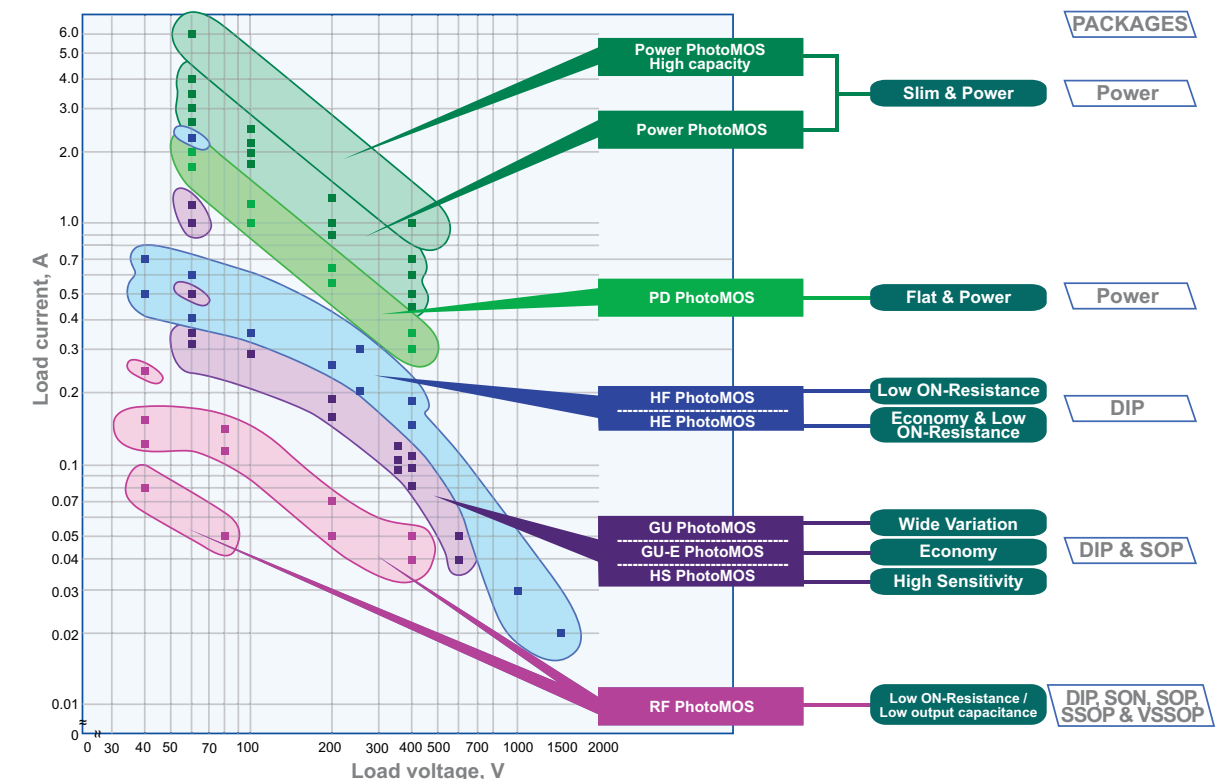
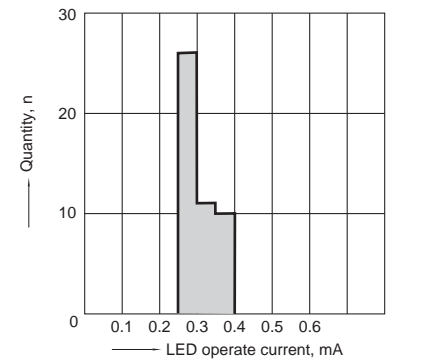
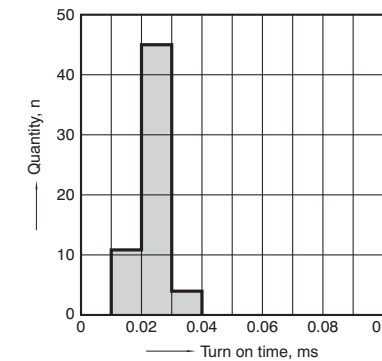
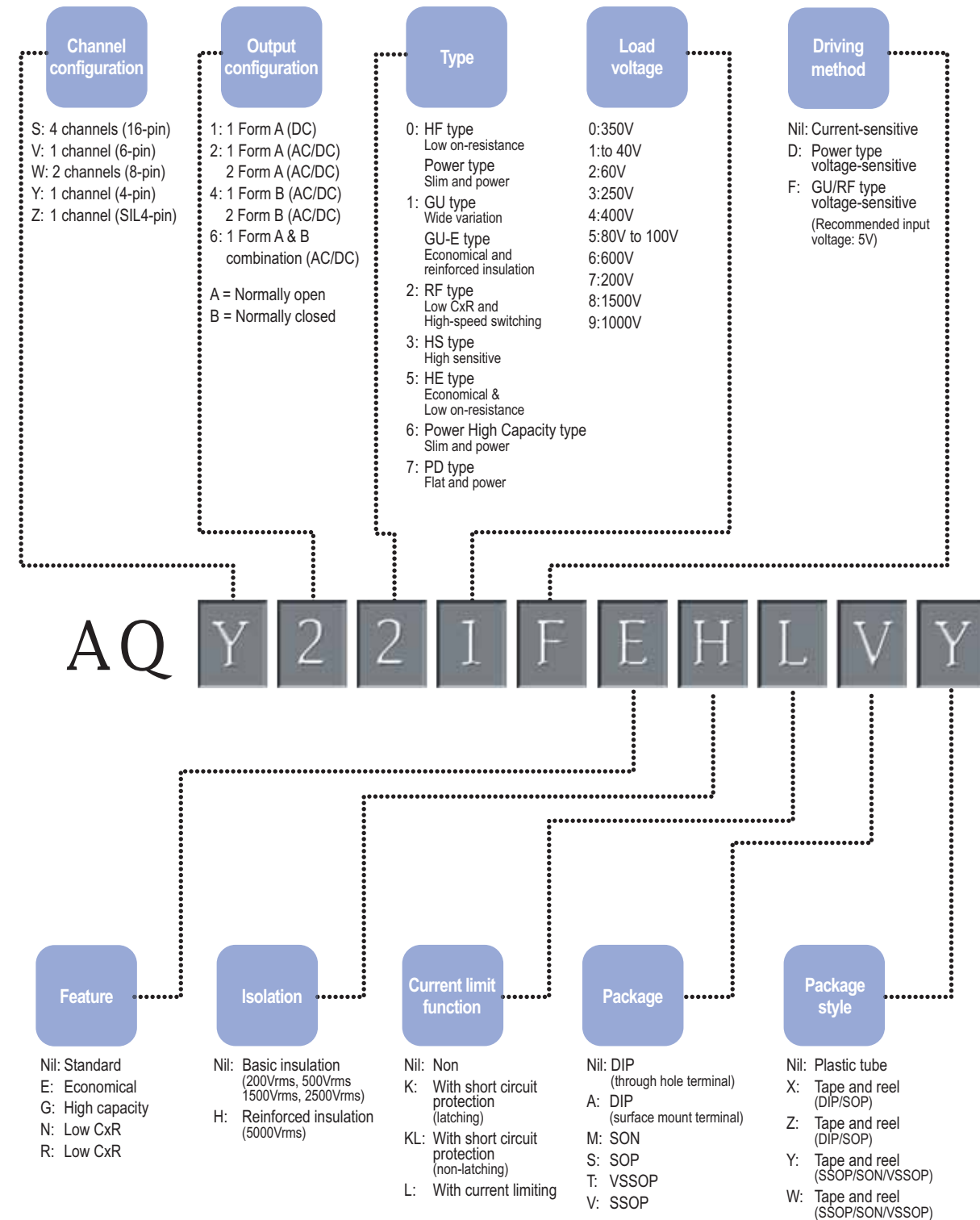


Figure 4 PhotoMOS load current vs. voltage - Selector Chart

Product Key



Note: Valid only for combinations of products listed in the catalog.
 (Please inquire regarding combinations with products not listed in the catalog.)

PhotoMOS Relays: ★ Popular Type Selection Table

	Type ¹⁾	Package	Contact	Voltage (V) ²⁾	Current (A) ²⁾	R _{on} ³⁾ (Ω)	Info.
	AQY211EH(A)	DIP4	1a	30	1.0	0.25	General use
	AQY212EH(A)			60	0.55	0.85	
	AQY212GH(A)				1.1	0.34	
	AQY210EH(A)			350	0.13	18	
	AQY214EH(A)			400	0.12	26	
	AQY216EH(A)			600	0.05	52	
	AQY212S	SOP4	1b	60	0.5	0.83	
	AQY212GS				1.0	0.34	
	AQY212G2S				1.25	0.2	
	AQY210S			350	0.12	17	
	AQY214S			400	0.1	25	
	AQY412S			60	0.5	1	
	AQY410S	350	0.12	18			
	AQY414S	400	0.1	26			
	AQY232S	SOP4	1a	60	0.5	0.85	
	AQY230S			350	0.12	19	
	AQY234S			400	0.1	27	
	AQY210KS	SOP4		350	0.12	23	
	AQV112KL(A)	DIP6	1a	60	0.5	0.55	Short circuit protected
	AQV251G	DIP6	1a	30	3.5	0.035	High power
	AQV252G			60	2.5	0.08	
	AQV259H(A)			1,000	0.03	85	
	AQV258H(A)			1,500	0.02	345	
	AQV255GS	SOP6		80	1.25	0.09	
	AQY221R2T	VSSOP	1a	40	0.25	0.8	Low CxR C _{min} = 1pF
	AQY221N2T			40	0.12	9.5	
	AQY221N3T			25	0.15	5.5	
	AQY221R2M	SON		40	0.25	0.8	
	AQY221N2M		40	0.12	9.5		
	AQY221N3M		25	0.15	5.5		
	AQY221N2V	SSOP		40	0.12	9.5	
	AQY221R2V		40	0.25	0.75		
	AQY221N3V		25	0.15	5.5		
	AQY225R2V		80	0.12	10.5		
	AQY221R4V		40	0.5	0.55		
	AQY221N2S	SOP4		40	0.12	9.5	
	AQY221R2S		40	0.25	0.8		
	AQY225R2S		80	0.15	10.5		
	AQS225R2S	SOP16	4a	80	0.07	10.5	
	AQZ102	SIL4	1a	60	4.0	0.05	DC only
	AQZ202			60	3.0	0.11	
	AQZ205			100	2.0	0.23	
	AQZ204			400	0.5	2	
	AQZ404		1b	400	0.5	2.8	AC & DC









¹⁾ A = SMD type
²⁾ Maximum value (DC or peak AC)
³⁾ Typical value








PhotoMOS Relay Dimensions













Please download **CAD Data** from our Web site: www.panasonic-electric-works.com











Type	Dimensions		
AQY21 AQY41 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>
AQV10 AQV11 AQV20 AQV21 AQV22 AQV23 AQV25 AQV41 AQV45 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>
APV1122 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>







Type	Dimensions		
AQW21 AQW22 AQW25 AQW41 AQW45 AQW61 AQW65 Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.25 General tolerance: ±0.1</p>
AQW210EH AQW210HL AQW410EH AQW610EH Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.1</p>
AQY221 (VSSOP) Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.2</p>	<p>Terminal thickness = 0.2 General tolerance: ±0.2</p>
APV21(SOP) APV11(SOP) AQY21(SOP) AQY22(SOP) AQY41(SOP) Series	<p>Through hole terminal type</p>	<p>Surface mount terminal type</p>	<p>PC board pattern (Bottom view)</p>
	<p>Recommended mounting pad (Top view)</p>	<p>Terminal thickness = 0.15 General tolerance: ±0.1</p>	<p>Terminal thickness = 0.15 General tolerance: ±0.1</p>














Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQY212GS	 1:1 4.3 x 4.4 x 2.1mm	High capacity type	60V	• 1.0A / 3.0A 
★ AQY212G2S		High capacity type	60V	• 1.25A / 3.0A 
★ AQY212S			60V	• 0.5A / 1.0A 
AQY210LS		Current limiting	350V	• 0.12A / - 0.18A (Output limit current [typ.]) 
★ AQY210S		PSpice	350V	• 0.12A / 0.3A 
★ AQY210KS		Short circuit protected	350V	• 0.12A / - 0.2A (Cut off current [typ.]) 
★ AQY214S		PSpice	400V	• 0.1A / 0.24A 

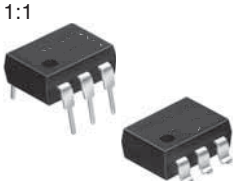












Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.34/0.7Ω	220pF	3.0mA	0.3mA	5.0ms	0.5ms	1,500V AC	C-UL, TÜV, UL, VDE 
0.2/0.5Ω	220pF	3.0mA	0.3mA	5.0ms	0.5ms	1,500V AC	— 
0.83/2.5Ω	80pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	BSI, CSA, C-UL, TÜV, UL 
20/25Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	1,500V AC	BSI, CSA, C-UL, TÜV, UL 
17/25Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	BSI, CSA, C-UL, TÜV, UL 
23.5/35Ω	42pF	3.0mA	0.3mA	2.0ms	1.0ms	1,500V AC	BSI, CSA, C-UL, TÜV, UL 
25/35Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	BSI, CSA, C-UL, TÜV, UL 













Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQY232S	 1:1 4.3 x 4.4 x 2.1mm	Sensitive type	60V	• 0.5A / 1.5A 
★ AQY230S		Sensitive type	350V	• 0.12A / 0.3A 
★ AQY234S		Sensitive type	400V	• 0.1A / 0.24A 
★ AQY211EH	 1:1 DIP : 4.78 x 6.4 x 3.2mm SMD: 4.78 x 6.4 x 2.9mm		30V	• 1.0A / 3.0A 
★ AQY212EH			60V	• 0.55A / 1.5A 
★ AQY212GH		High capacity type	60V	• 1.1A / 3.0A 
★ AQY214EH			400V	• 0.12A / 0.3A 
★ AQY210EH			350V	• 0.13A / 0.4A 
AQY210HL		Current limiting	350V	• 0.12A / - 0.18A (Output limit current [typ.]) 
★ AQY216EH			600V	• 0.05A / 0.15A 









Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.85/2.5Ω	0.8pF	0.5mA	0.1mA	5.0ms	2.0ms	1,500V AC	— 
19/25Ω	0.8pF	0.5mA	0.1mA	5.0ms	2.0ms	1,500V AC	— 
27/35Ω	0.8pF	0.5mA	0.1mA	5.0ms	2.0ms	1,500V AC	— 
0.25/0.5Ω	240pF	3.0mA	0.4mA	5.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
0.85/2.5Ω	80pF	3.0mA	0.4mA	4.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL 
0.34/0.7Ω	220pF	3.0mA	0.3mA	5.0ms	0.5ms	5,000V AC	C-UL, UL, VDE 
26/35Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
18/25Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
20/25Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL 
52/120Ω	35pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 








Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQV212S	 1:1 6.3 x 4.4 x 2.1mm	PSpice	60V	• 0.5A / 1.0A 
AQV215S		PSpice	100V	• 0.3A / 0.9A 
AQV217S		PSpice	200V	• 0.16A / 0.48A 
AQV210S		PSpice	350V	• 0.12A / 0.3A 
AQV214S		PSpice	400V	• 0.1A / 0.3A 
AQV216S		PSpice	600V	• 0.04A / 0.12A 
★ AQV212	 1:1	PSpice	60V	• 0.55A / 1.2A 
★ AQV252G		High capacity type	60V	• 2.5A / 6.0A 
★ AQV251G		High capacity type	30V	• 3.5A / 6.0A 
★ AQV255GS	 1:1 6.3 x 4.4 x 2.0mm	High capacity type	80V	• 1.25A / 2.5A 
AQV215	 1:1	PSpice	100V	• 0.32A / 0.96A 
AQV217		PSpice	200V	• 0.18A / 0.54A 
AQV210		PSpice	350V	• 0.13A / 0.4A 

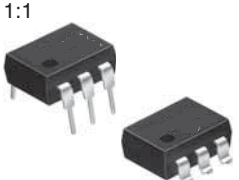








Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.83/2.5Ω	150pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
2.3/4.0Ω	110pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
11/15Ω	70pF	3.0mA	0.4mA	1.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
23/35Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
30/50Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
70/120Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
0.83/2.5Ω	150pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
0.08/0.12Ω	240pF	3.0mA	0.2mA	5.0ms	0.5ms	1,500V AC	CSA, C-UL, TÜV, UL, VDE 
0.035/0.08Ω	350pF	3.0mA	0.2mA	5.0ms	0.5ms	1,500V AC	— 
0.09/0.15Ω	300pF	3.0mA	0.2mA	5.0ms	0.5ms	1,500V AC	— 
2.3/4.0Ω	110pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
11/15Ω	70pF	3.0mA	0.4mA	1.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
23/35Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 









Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQV210E	 <p>1:1 DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>		350V	• 0.13A / 0.4A 
★AQV210EH			350V	• 0.13A / 0.4A 
AQV214		PSpice	400V	• 0.12A / 0.3A 
AQV214E			400V	• 0.12A / 0.3A 
★AQV214EH			400V	• 0.12A / 0.3A 
AQV214H			400V	• 0.12A / 0.3A 
AQV216		PSpice	600V	• 0.05A / 0.15A 
AQV101			40V DC	• 0.7A / 1.8A 
AQV201			40V	• 0.5A / 1.8A 
AQV251			40V	• 0.5A / 1.8A 
AQV102			60V DC	• 0.6A / 1.5A 
AQV202			60V	• 0.4A / 1.5A 

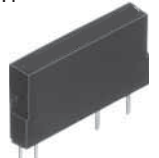













Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
23/35Ω	45pF	3.0mA	1.0mA	2.0ms	1.0ms	1,500V AC	CSA, C-UL, TÜV, UL 
23/35Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
30/50Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
30/50Ω	45pF	3.0mA	0.3mA	2.0ms	1.0ms	1,500V AC	CSA, C-UL, TÜV, UL 
30/50Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
30/50Ω	45pF	3.0mA	0.4mA	0.8ms	0.2ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
70/120Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
0.3/0.5Ω	600pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
0.6/1Ω	350pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
0.6/1.0Ω	350pF	3.0mA	0.4mA	3.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
0.37/0.7Ω	600pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
0.74/1.4Ω	350pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 











Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQV252	 <p>1:1 DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>		60V	• 0.4A / 1.5A 
★AQV112KL		Short circuit protected	60V DC	• 0.5A / - 
AQV255			100V	• 0.35A / 1.0A 
AQV257			200V	• 0.25A / 0.75A 
AQV103			250V DC	• 0.3A / 0.6A 
AQV203			250V	• 0.2A / 0.6A 
AQV253			250V	• 0.2A / 0.6A 








Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.74/1.4Ω	350pF	3.0mA	0.4mA	1.4ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
0.55/2Ω	300pF	10mA	0.3mA	2.0ms	1.0ms	1,500V AC	CSA, C-UL, TÜV, UL, VDE 
1.8/2.5Ω	350pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
2.6/4.0Ω	170pF	3.0mA	0.4mA	3.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
2.7/4Ω	300pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
5.5/8Ω	170pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
5.5/8.0Ω	170pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 






Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQV253H	 <p>DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>		250V	• 0.2A / 0.6A 
AQV104			400V DC	• 0.18A / 0.5A 
AQV204			400V	• 0.15A / 0.5A 
AQV234		Sensitive type	400V	• 0.12A / 0.3A 
AQV254			400V	• 0.15A / 0.5A 
AQV254H			400V	• 0.15A / 0.5A 
★ AQV259			1,000V	• 0.03A / 0.09A 
★ AQV258			1,500V	• 0.02A / 0.06A 

















Output		Input		Switching speed (I LED = 5mA)		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
5.5/8Ω	170pF	3.0mA	0.4mA	4.0ms	0.2ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
6.3/8Ω	300pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
12.4/16Ω	170pF	5.0mA	0.8mA	1.0ms	1.0ms	1,500V AC	C-UL, TÜV, UL 
30/50Ω	45pF	0.31mA	0.1mA	2.0ms	1.0ms	1,500V AC	CSA, C-UL, TÜV, UL 
12.4/16Ω	170pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
12.4/16Ω	170pF	3.0mA	0.4mA	3.0ms	0.2ms	5,000V AC	BSI, CSA, C-UL, TÜV, UL, VDE 
80/200Ω	80pF	3.0mA	0.4mA	1.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 
345/500Ω	80pF	3.0mA	0.4mA	1.0ms	0.2ms	1,500V AC	CSA, C-UL, TÜV, UL 













Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQZ102	 1:1 21 x 3.5 x 12.5mm		60V DC	• 4.0A / 9.0A 
AQZ105		100V DC	• 2.6A / 6.0A 	
AQZ107		200V DC	• 1.3A / 3.0A 	
AQZ104		400V DC	• 0.7A / 1.5A 	
AQZ262	 1:1 43 x 9 x 32mm		60V	• 6.0A / 10.0A 
★ AQZ202	 1:1 21 x 3.5 x 12.5mm		60V	• 3.0A / 9.0A 
★ AQZ205		100V	• 2.0A / 6.0A 	
AQZ207		200V	• 1.0A / 3.0A 	
★ AQZ204		400V	• 0.5A / 1.5A 	
AQY212FG2S	 1:1 4.30 x 4.40 x 2.10mm	Built-in resistor	60V	• 1.25A / 3.0A 















Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.05/0.09Ω	1700pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
0.081/0.17Ω	1700pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
0.34/0.55Ω	900pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
1.06/1.6Ω	900pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
0.036/0.05Ω	1400pF	3.0mA	0.4mA	10.0ms	3.0ms	1,500V AC	CSA, UL 
0.11/0.18Ω	1400pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
0.23/0.34Ω	1400pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
07/11Ω	600pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
2.1/3.2Ω	600pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, TÜV, UL 
0.2/0.5Ω	150pF	Operate voltage V _{Fon} (max.) 4.0V	Turn off voltage V _{Foff} (min.) 0.8V	5.0ms	0.5ms	500V AC	— 

Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQZ264	1:1  43 x 9 x 32mm		400V	• 1.0A / 3.0A 
AQY272	1:1  DIP : 9.3 x 8.8 x 3.9mm SMD: 9.3 x 8.8 x 3.7mm		60V	• 2.0A / 6.0A 
AQY275			100V	• 1.3A / 4.0A 
AQY277			200V	• 0.65A / 2.0A 
AQY274			400V	• 0.35A / 1.0A 










Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
1.0/1.4Ω	600pF	3.0mA	0.4mA	10.0ms	3.0ms	1,500V AC	CSA, UL 
0.11/0.18Ω	1400pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, UL 
0.23/0.34Ω	1400pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, UL 
0.7/1.1Ω	600pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, UL 
2.1/3.2Ω	600pF	3.0mA	0.4mA	5.0ms	3.0ms	2,500V AC	CSA, C-UL, UL 

Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQY221R2T	1:1  1.8 x 2.1 x 2.9mm	Low CxR	40V	• 0.25A 
★ AQY221N2T		Low CxR	40V	• 0.12A 
★ AQY221N3T		Low CxR	25V	• 0.15A 
★ AQY221N3M	1:1  2.2 x 2.95 x 1.4mm	Low CxR	25V	• 0.15A / - 
★ AQY221R2M		Low CxR	40V	• 0.25A / 0.75A 
★ AQY221N2M		Low CxR	40V	• 0.12A / - 
★ AQY221N3V	1:1  2.65 x 4.45 x 1.8mm	Low CxR	25V	• 0.15A / 0.4A 
★ AQY221R4V		Low CxR	40V	• 0.5A / 1.0A 
★ AQY221N2V		Low CxR PSpice	40V	• 0.12A / 0.3A 
★ AQY221R2V		Low CxR PSpice	40V	• 0.25A / 0.75A 
AQY221FR2V		Built-in resistor	40V	• 0.25A / 0.75A 
AQY221FN2V		Built-in resistor	40V	• 0.12A / 0.2A 
AQY225R2V		Low CxR	80V	• 0.12A / 0.3A 












Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.8/1.25Ω	14pF	3.0mA	0.1mA	0.5ms	0.2ms	200V AC	
9.5/12.5Ω	1.1pF	3.0mA	0.2mA	0.2ms	0.2ms	200V AC	
5.5/7.5Ω	1.1pF	3.0mA	0.2mA	0.2ms	0.2ms	200V AC	
5.5/7.5Ω	1.1pF	3.0mA	0.2mA	0.2ms	0.2ms	200V AC	
0.8/1.25Ω	14pF	3.0mA	0.2mA	0.5ms	0.2ms	200V AC	
9.5/12.5Ω	1.1pF	3.0mA	0.2mA	0.2ms	0.2ms	200V AC	
5.5/7.5Ω	1pF	3.0mA	0.2mA	0.2ms	0.2ms	1,500V AC	
0.55/1.0Ω	24pF	3.0mA	0.1mA	0.75ms	0.2ms	1,500V AC	
9.5/12.5Ω	1.0pF	3.0mA	0.2mA	0.5ms	0.2ms	1,500V AC	
0.75/1.25Ω	12.5pF	3.0mA	0.1mA	0.5ms	0.2ms	1,500V AC	
0.75/1.25Ω	12.5pF	Operate volt- age V _{Fon} (max.) 4.0V	Turn off volt- age V _{Foff} (min.) 0.8V	0.5ms	0.2ms	500V AC	
9.5/12.5Ω	1pF	Operate volt- age V _{Fon} (max.) 4.0V	Turn off volt- age V _{Foff} (min.) 0.8V	0.5ms	0.2ms	500V AC	
10.5/15Ω	4.5pF	3.0mA	0.1mA	0.5ms	0.2ms	1,500V AC	










Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQY221N2S	1:1  4.3 x 4.4 x 2.1mm	Low CxR	40V	• 0.12A / 0.3A 
★ AQY221R2S		Low CxR	40V	• 0.25A / 0.75A 
AQY222R1S		Low CxR	60V	• 0.5A / 1.0A 
AQY225R1S		Low CxR	80V	• 0.35A / 0.7A 
★ AQY225R2S		Low CxR	80V	• 0.15A / 0.45A 
AQV227NS	1:1  6.3 x 4.4 x 2.1mm		200V	• 0.05A / 0.15A 
AQV224NS			400V	• 0.04A / 0.12A 
AQV221	1:1  DIP : 8.8 x 6.4 x 3.9mm SMD : 8.8 x 6.4 x 3.6mm		40V	• 0.08A / 0.18A 
AQV225			80V	• 0.05A / 0.15A 
AQV227N			200V	• 0.07A / 0.21A 
AQV224N			400V	• 0.05A / 0.15A 











Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
9.5/12.5Ω	1.0pF	3.0mA	0.2mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
0.8/1.25Ω	13pF	3.0mA	0.1mA	0.5ms	0.2ms	500V AC	CSA, TÜV, UL 
0.8/1.2Ω	24.5pF	3.0mA	0.1mA	0.5ms	0.2ms	1,500V AC	— 
0.8/1.2Ω	37.5pF	3.0mA	0.1mA	0.75ms	0.2ms	1,500V AC	— 
10.5/15Ω	4.5pF	3.0mA	0.1mA	0.5ms	0.2ms	1,500V AC	— 
30/50Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
70/100Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
22/35Ω	5.6pF	3.0mA	0.4mA	0.3ms	0.1ms	1,500V AC	CSA, TÜV, UL 
36/50Ω	4.8pF	3.0mA	0.4mA	0.3ms	0.1ms	1,500V AC	CSA, TÜV, UL 
30/50Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
70/100Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 

Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
1 Form B Signal Relays				
★ AQY412S	1:1  4.3 x 4.4 x 2.1mm		60V	• 0.5A / 1.5A 
★ AQY410S			350V	• 0.12A / 0.3A 
★ AQY414S			400V	• 0.1A / 0.24A 
AQY412EH	1:1  DIP : 4.78 x 6.4 x 3.2mm SMD: 4.78 x 6.4 x 2.9mm		60V	• 0.55A / 1.5A 
★ AQY410EH			350V	• 0.13A / 0.4A 
AQY414EH			400V	• 0.12A / 0.3A 
AQV414S		1:1  6.3 x 4.4 x 2.1mm		400V

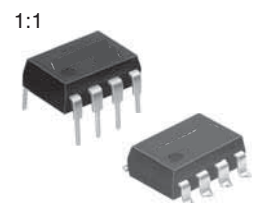







Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
1/2.5Ω	450pF	3.0mA	0.4mA	3.0ms	1.0ms	1,500V AC	CSA, UL, VDE 
18/25Ω	110pF	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	BSI, CSA, TÜV, UL 
26/35Ω	100pF	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	BSI, CSA, TÜV, UL 
1/2.5Ω	480pF	3.0mA	0.4mA	10.0ms	1.0ms	5,000V AC	CSA, UL, VDE 
18/25Ω	110pF	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	BSI, CSA, UL 
26/35Ω	100pF	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	BSI, CSA, UL 
26/50Ω	100pF	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 

Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQV410EH	 <p>1:1 DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>		350V	• 0.13A / 0.4A 
AQV412EH			60V	• 0.55A / 1.5A 
AQV414E			400V	• 0.12A / 0.3A 
AQV414EH			400V	• 0.12A / 0.3A 
AQV453			250V	• 0.2A / 0.6A 
AQV414			400V	• 0.12A / 0.3A 
AQV454			400V	• 0.15A / 0.5A 
AQV454H			400V	• 0.15A / 0.5A 
1 Form B Power Relays				
AQZ404	 <p>1:1 21 x 3.5 x 12.5mm</p>		400V	• 0.5A / 1.5A 




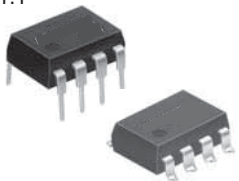







Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
18/35Ω	110pF	3.0mA	0.4mA	3.0ms	1.5ms	5,000V AC	BSI, CSA, TÜV, UL, VDE 
1/2.5Ω	480pF	3.0mA	0.4mA	10.0ms	1.5ms	5,000V AC	CSA, TÜV, UL, VDE 
26/50Ω	100pF	3.0mA	0.3mA	2.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 
26/50Ω	100pF	3.0mA	0.4mA	3.0ms	1.5ms	5,000V AC	BSI, CSA, TÜV, UL, VDE 
5.5/8.0Ω	350pF	3.0mA	0.4mA	3.0ms	1.0ms	1,500V AC	CSA, UL 
26/50Ω	100pF	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 
10.5/16Ω	170pF	3.0mA	0.4mA	2.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 
10.5/16Ω	170pF	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 
2.8/4.0Ω	2000pF	3.0mA	0.4mA	7.5ms	3.0ms	2,500V AC	CSA, UL 








Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
★ AQW210S	 1:1 9.37 x 4.4 x 2.1mm		350V	• 0.1A / 0.3A 
AQW212S			60V	• 0.4A / 1.5A 
★ AQW214S			400V	• 0.08A / 0.24A 
★ AQW212EH	 1:1 DIP : 9.86 x 6.4 x 3.2mm SMD: 9.86 x 6.4 x 2.9mm		60V	• 0.5A / 1.5A 
★ AQW210EH			350V	• 0.12A / 0.36A 
AQW210HL		Current limiting	350V	• 0.1A / - 0.18A (Output limit current [typ.]) 
AQW214EH			400V	• 0.1A / 0.3A 
★ AQW216EH			600V	• 0.04A / 0.12A 











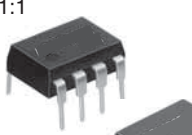



Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
16/35Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
0.83/2.5Ω	-	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, TÜV, UL 
30/50Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
0.83/2.5Ω	80pF	3.0mA	0.4mA	4.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 
18/25Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 
20/25Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 
26/35Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 
52/120Ω	45pF	3.0mA	0.4mA	2.0ms	1.0ms	5,000V AC	CSA, TÜV, UL 








Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
AQW212	 <p>DIP : 9.78 x 6.4 x 3.9mm SMD: 9.78 x 6.4 x 3.6mm</p>		60V	• 0.6A / 1.0A 
AQW215			100V	• 0.3A / 0.9A 
AQW217			200V	• 0.16A / 0.48A 
AQW210			350V	• 0.12A / 0.36A 
AQW214			400V	• 0.1A / 0.3A 
AQW254			400V	• 0.12A / 0.36A 
AQW216			600V	• 0.04A / 0.12A 

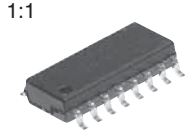




Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
0.83/2.5Ω	150pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, TÜV, UL 
2.3/4.0Ω	110pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, TÜV, UL 
11/15Ω	70pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, TÜV, UL 
23/35Ω	45pF	3.0mA	0.4mA	0.5ms	0.05ms	1,500V AC	CSA, TÜV, UL 
30/50Ω	45pF	3.0mA	0.4mA	0.5ms	0.05ms	1,500V AC	CSA, TÜV, UL 
12.4/16Ω	170pF	3.0mA	0.4mA	2.0ms	0.2ms	1,500V AC	CSA, TÜV, UL 
70/120Ω	45pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 





Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
2 Form A Low CxR				
AQW227NS	1:1  9.37 x 4.4 x 2.1mm	Low CxR	200V	• 0.04A / 0.15A 
AQW223R2S			250V	• 0.14A / 0.42A 
AQW227N	1:1  DIP : 9.78 x 6.4 x 3.9mm SMD: 9.78 x 6.4 x 3.6mm		200V	• 0.05A / 0.15A 
AQW224N			400V	• 0.04A / 0.12A 
2 Form B				
★ AQW414EH	1:1  DIP : 9.86 x 6.4 x 3.2mm SMD: 9.86 x 6.4 x 2.9mm		400V	• 0.1A / 0.3A 
AQW414	1:1 		400V	• 0.1A / 0.3A 
AQW454	 DIP : 9.78 x 6.4 x 3.9mm SMD: 9.78 x 6.4 x 3.6mm		400V	• 0.12A / 0.36A 


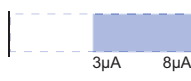


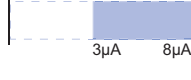


Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
30/50Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	C-UL, TÜV, UL 
10/15Ω	33pF	3.0mA	0.1mA	0.5ms	0.2ms	1,500V AC	C-UL 
30/50Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
70/100Ω	10pF	3.0mA	0.4mA	0.5ms	0.2ms	1,500V AC	CSA, TÜV, UL 
26/35Ω	100pF	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	BSI, CSA, TÜV, UL 
26/50Ω	100pF	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 
11/16Ω	170pF	3.0mA	0.4mA	2.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 





Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
1 Form A / 1 Form B				
AQW612S	1:1  9.4 x 4.4 x 2.1mm		60V	• 0.45A / 1.5A 
★ AQW610S	1:1  9.37 x 4.4 x 2.1mm		350V	• 0.1A / 0.3A 
AQW612EH	1:1  DIP : 9.78 x 6.4 x 3.9mm SMD: 9.78 x 6.4 x 3.6mm		60V	• 0.5A / 1.5A 
★ AQW610EH	1:1 		350V	• 0.12A / 0.36A 
★ AQW614EH	 DIP : 9.86 x 6.4 x 3.2mm SMD: 9.86 x 6.4 x 2.9mm		400V	• 0.1A / 0.3A 
AQW614	1:1 		400V	• 0.1A / 0.3A 
AQW654	 DIP : 9.78 x 6.4 x 3.9mm SMD: 9.78 x 6.4 x 3.6mm		400V	• 0.12A / 0.36A 





Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
1/2.5Ω	80pF (N.O.) 450pF (N.C.)	3.0mA	0.4mA	3.0ms	1.0m	1,500V AC	CSA, TÜV, UL, VDE 
18/25Ω	45pF (N.O.) 100pF (N.C.)	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	BSI, CSA, TÜV, UL 
1/2.5Ω	80pF (N.O.) 480pF (N.C.)	3.0mA	0.4mA	4.0ms (N.O.) 10.0ms (N.C.)	1.0ms	5,000V AC	CSA, TÜV, UL, VDE 
18/25Ω	45pF (N.O.) 100pF (N.C.)	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	BSI, CSA, TÜV, UL 
26/35Ω	45pF (N.O.) 100pF (N.C.)	3.0mA	0.4mA	3.0ms	1.0ms	5,000V AC	BSI, CSA, TÜV, UL 
27/50Ω	45pF (N.O.) 100pF (N.C.)	3.0mA	0.4mA	1.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 
• N.O.: 10/16Ω • N.C.: 11/16Ω	170pF	3.0mA	0.4mA	3.0ms	1.0ms	1,500V AC	CSA, TÜV, UL 

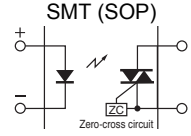

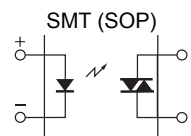
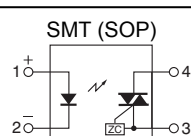
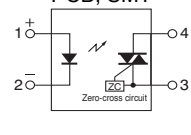

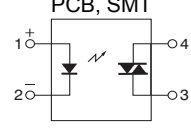
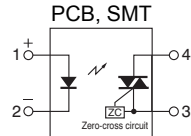
Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Peak load V DC/AC	Continuous load current/ Peak load current (100ms)
Multichannel				
AQS221N2S	 1:1 10.37 x 4.4 x 2.1mm	Low CxR	40V	• 0.06A / 0.12A 
★ AQS225R2S		Low CxR	80V	• 0.07A / 0.2A 
AQS221FR2S		Built-in resistor	40V	• 0.16A / 0.2A 
AQS221FN2S		Built-in resistor	40V	• 0.06A / 0.12A 


Output		Input		Switching speed		I/O isolation voltage	Approvals Data sheet
ON resistance (typical/max.)	Output capacitance (typical)	LED operate current(max.)	LED turn-off current (min.)	Turn-on time (max.)	Turn-off time (max.)		
9.5/12.5Ω	1pF	3.0mA	0.1mA	0.2ms	0.2ms	500V AC	— 
10.5/15.0Ω	4.5pF	3.0mA	0.3mA	0.3ms	0.2ms	1,500V AC	CSA, TÜV, UL 
0.5/1.5Ω	12.5pF	Operate volt- age V _{Fon} (max.) 4.0V	Turn off volt- age V _{Foff} (min.) 0.8V	0.5ms	0.2ms	500V AC	— 
9.5/12.5Ω	1pF	Operate volt- age V _{Fon} (max.) 4.0V	Turn off volt- age V _{Foff} (min.) 0.8V	0.5ms	0.2ms	500V AC	— 

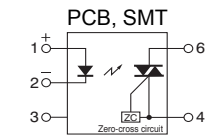
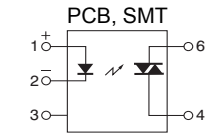
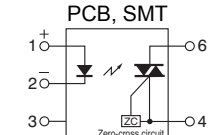
Type ★ = Popular Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output	
			Drop-out voltage (typical/min.)	Short circuit current (typical/min.)
★ APV2111V	1:1  2.65 x 4.45 x 1.8mm	Ultra small SSOP housing	8.2/5.0V	• 8 / 3μA 
★ APV1121S	1:1  4.3 x 4.4 x 2mm	Ultra small SMD (SOP) housing	8.7/6.0V	• 14 / 5μA 
APV2121S		Ultra small SMD (SOP) housing	8.2/5.0V	• 8 / 3μA 
APV1122	1:1  DIP : 8.8 x 6.4 x 3.6mm SMD: 8.8 x 6.4 x 3.9mm	5000V breakdown voltage	8.7/6.0V	• 14 / 5μA 





Input		Switching speed		I/O isolation voltage	Approvals Data sheet
LED operate current (max.)	LED turn-off current (min.)	Turn-on time (typical)	Turn-off time (typical)		
3.0mA	0.2mA	0.8ms	0.1ms	1,500V AC	C-UL 
3.0mA	0.2mA	0.4ms	0.1ms	2,500V AC	C-UL 
3.0mA	0.2mA	0.8ms	0.1ms	2,500V AC	C-UL 
3.0mA	0.2mA	0.4ms	0.1ms	5,000V AC	C-UL 

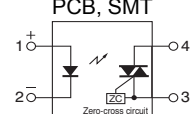

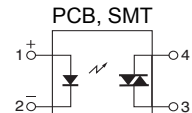
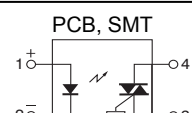
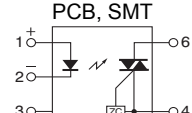

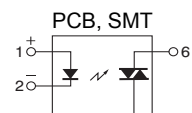
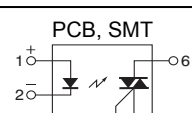
Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output			
			Repetitive peak OFF-state voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	Peak ON-state voltage (max.)	Peak OFF-state current (max.)
APT1211S	 1:1 4.3 x 4.4 x 2.1mm	<ul style="list-style-type: none"> Zero-cross SOP 4 pin 	• 600V	<ul style="list-style-type: none"> 0.05A / 0.6A 	2.5V	1μA
APT1221S		<ul style="list-style-type: none"> Random SOP 4 pin 				
APT1231S		<ul style="list-style-type: none"> Low zero-cross SOP 4 pin 				
APT1211	 1:1 DIP : 4.78 x 6.4 x 3.2mm SMD: 4.78 x 6.4 x 2.9mm	<ul style="list-style-type: none"> Zero-cross DIP 4 pin 	• 600V	<ul style="list-style-type: none"> 0.1A / 1.2A 	2.5V	1μA
APT1221		<ul style="list-style-type: none"> Random DIP 4 pin 				
APT1231		<ul style="list-style-type: none"> Low zero-cross DIP 4 pin 				

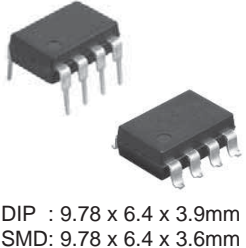




Input			Zero-cross voltage (max.)	I/O isolation voltage	Connection type Switching diagram	Approvals Data sheet
LED trigger current (max.)	LED drop-out voltage (max.)	Turn-on time (max.)				
10mA	1.3V	0.1ms	50V	3,750V AC	SMT (SOP) 	C-UL, UL, VDE 
			—	SMT (SOP) 		
			15V	SMT (SOP) 		
10mA	1.3V	0.1ms	50V	5,000V AC	PCB, SMT 	C-UL, UL, VDE 
			—	PCB, SMT 		
			15V	PCB, SMT 		

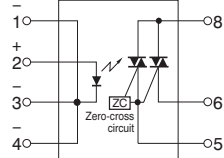
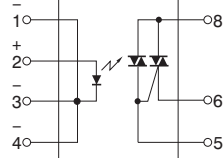
Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output			
			Repetitive peak OFF-state voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	Peak ON-state voltage (max.)	Peak OFF-state current (max.)
APT1212	 <p>1:1</p> <p>DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>	<ul style="list-style-type: none"> • Zero-cross • DIP 6 pin 	• 600V	• 0.1A / 1.2A	2.5V	1μA
APT1222		<ul style="list-style-type: none"> • Random • DIP 6 pin 				
APT1232		<ul style="list-style-type: none"> • Low zero-cross • DIP 6 pin 			2.0V	











Input			Zero-cross voltage (max.)	I/O isolation voltage	Connection type Switching diagram	Approvals Data sheet
LED trigger current (max.)	LED drop-out voltage (max.)	Turn-on time (max.)				
10mA	1.3V	0.1ms	50V	5,000V AC	<p>PCB, SMT</p> 	C-UL, UL, VDE
			—		<p>PCB, SMT</p> 	
			15V		<p>PCB, SMT</p> 	

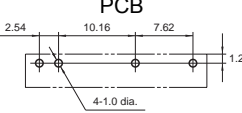
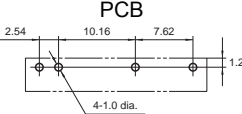
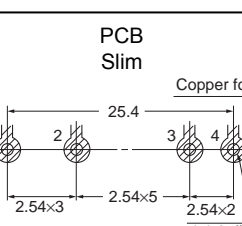
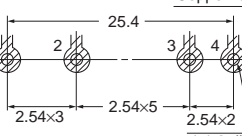
Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output			
			Repetitive peak OFF-state voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	PeakON-state voltage (max.)	Peak OFF-state current (max.)
APT1211W	 <p>1:1 DIP : 4.78 x 6.4 x 3.0mm SMD: 4.78 x 6.4 x 2.7mm</p>	<ul style="list-style-type: none"> • Zero-cross • DIP 4 pin wide terminal 	• 600V	<ul style="list-style-type: none"> • 0.1A / 1.2A 	2.5V	1μA
APT1221W		<ul style="list-style-type: none"> • Random • DIP 4 pin wide terminal 			2.0V	
APT1231W		<ul style="list-style-type: none"> • Low zero-cross • DIP 4 pin wide terminal 				
APT1212W	 <p>1:1 DIP : 8.8 x 6.4 x 3.9mm SMD: 8.8 x 6.4 x 3.6mm</p>	<ul style="list-style-type: none"> • Zero-cross • DIP 6 pin wide terminal 	• 600V	<ul style="list-style-type: none"> • 0.1A / 1.2A 	2.5V	1μA
APT1222W		<ul style="list-style-type: none"> • Random • DIP 6 pin wide terminal 			2.0V	
APT1232W		<ul style="list-style-type: none"> • Low zero-cross • DIP 6 pin wide terminal 				







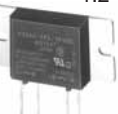



Input			Zero-cross voltage (max.)	I/O isolation voltage	Connection type Switching diagram	Approvals Data sheet
LED trigger current (max.)	LED drop-out voltage (max.)	Turn-on time (max.)				
10mA	1.3V	0.1ms	50V	5,000V AC	PCB, SMT 	C-UL, UL, VDE 
			—		PCB, SMT 	
			15V		PCB, SMT 	
10mA	1.3V	0.1ms	50V	5,000V AC	PCB, SMT 	C-UL, UL, VDE 
			—		PCB, SMT 	
			15V		PCB, SMT 	

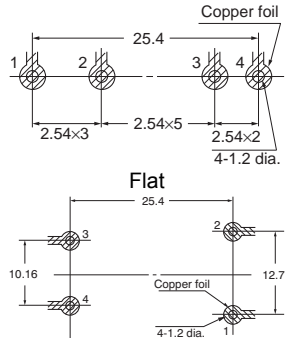
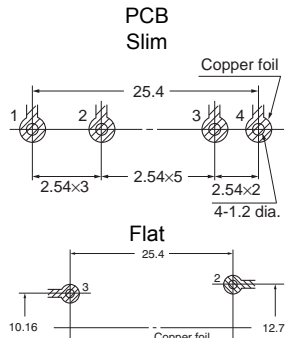
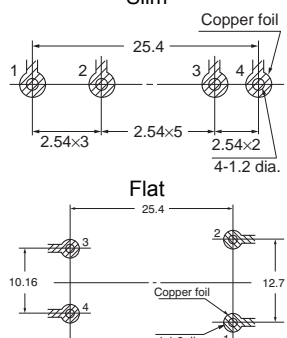
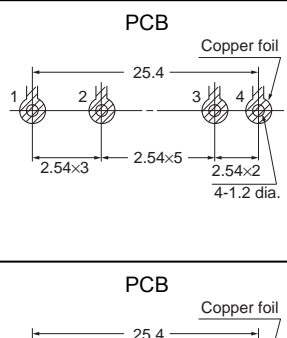
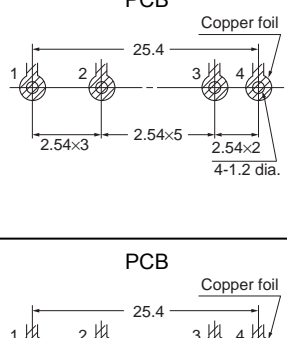
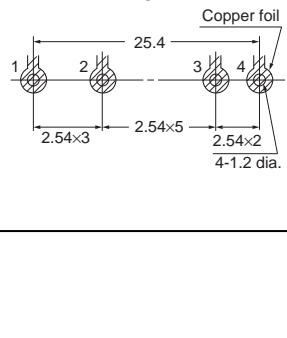
Type	Photo with Dimensions (Picture scale: DIN A4)	Features	Output			
			Repetitive peak OFF-state voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	Peak ON-state voltage (max.)	Peak OFF-state current (max.)
AQH0213		<ul style="list-style-type: none"> • Photo-Triac • Zero-cross 	• 600V	<ul style="list-style-type: none"> • 0.3A / 3A 	2.5V	100µA
AQH0223		<ul style="list-style-type: none"> • Photo-Triac • Random 				
AQH1213		<ul style="list-style-type: none"> • Photo-Triac • Zero-cross 	• 600V	<ul style="list-style-type: none"> • 0.6A / 6A 	2.5V	100µA
AQH1223		<ul style="list-style-type: none"> • Photo-Triac • Random 				
AQH2213		<ul style="list-style-type: none"> • Photo-Triac • Zero-cross 	• 600V	<ul style="list-style-type: none"> • 0.9A / 9A 	2.5V	100µA
AQH2223		<ul style="list-style-type: none"> • Photo-Triac • Random 				
AQH3213		<ul style="list-style-type: none"> • Photo-Triac • Zero-cross 	• 600V	<ul style="list-style-type: none"> • 1.2A / 12A 	2.5V	100µA
AQH3223		<ul style="list-style-type: none"> • Photo-Triac • Random 				









Input			Zero-cross voltage (max.)	I/O isolation voltage	Connection type Switching diagram	Approvals Data sheet
LED trigger current (max.)	LED drop-out voltage (max.)	Turn-on time (max.)				
10mA	1.3V	0.1ms	50V	5,000V	<p>PCB, SMT</p> <p>With zero-cross switch:</p>  <p>Without zero-cross switch:</p> 	C-UL, UL, VDE
			—			
10mA	1.3V	0.1ms	50V	5,000V		
			—			
10mA	1.3V	0.1ms	50V	5,000V		
			—			
10mA	1.3V	0.1ms	50V	5,000V		
			—			

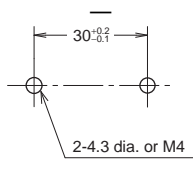
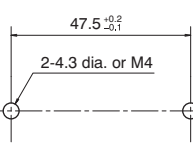
Type	Features	Output		
		Load voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	OFF-state leakage current (max.)
AQG 1A 1:1  24.5 x 4.5 x 13.5mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross • Integrated snubber circuit 	• 75 - 264V AC	• 1A / 8A 	1.5mA
	<ul style="list-style-type: none"> • Photo-Triac • Random • Integrated snubber circuit 	• 75 - 264V AC	• 1A / 8A 	1.5mA
AQG 2A 1:1  24.5 x 4.5 x 20.5mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross • Integrated snubber circuit 	• 75 - 264V AC	• 2A / 30A 	1.5mA
	<ul style="list-style-type: none"> • Photo-Triac • Random • Integrated snubber circuit 	• 75 - 264V AC	• 2A / 30A 	1.5mA
AQ1 1A (DC output) 1:2  33 x 10 x 25.1mm	• Photo-Transistor	• 10 - 200V DC	• 1A / 5A (1s) 	1mA
AQ1 2A (DC output) 1:2  33 x 10 x 25.1mm	• Photo-Transistor	• 3 - 60V DC	• 2A / 5A (1s) 	1mA

Input					Breakdown voltage	Connection type Terminal layout	Approvals Data sheet
Input voltage	Input impedance	Drop-out voltage (min.)	Operate time	Release time			
4 - 6V DC	0.3kΩ	1V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	3,000V AC		C-UL, UL, VDE
9.6 - 14.4V DC	0.8kΩ						
19.2 - 28.8V DC	1.6kΩ						
4 - 6V DC	0.3kΩ	1V	1ms	½ cycle of voltage sine wave + 1ms	3,000V AC		C-UL, UL, VDE
9.6 - 14.4V DC	0.8kΩ						
19.2 - 28.8V DC	1.6kΩ						
4 - 6V DC	0.3kΩ	1V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	3,000V AC		CSA, TÜV, UL
9.6 - 14.4V DC	0.8kΩ						
19.2 - 28.8V DC	1.6kΩ						
3 - 28V DC	1.6kΩ	0.8V	0.5ms	2ms	3,000V AC		CSA, TÜV, UL
3 - 28V DC	1.6kΩ	0.8V	0.5ms	2ms	3,000V AC		

Type	Features	Output		
		Load voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	OFF-state leakage current (max.)
AQ1 2A (AC output) 1:2  33 x 10 x 25.1mm  33 x 25 x 12mm	<ul style="list-style-type: none"> • Photo-Transistor • Zero-cross 	• 75 - 250V AC	• 2A / 80A 	5mA
AQ1 3A (AC output) 1:2  33 x 10 x 25.1mm  33 x 25 x 12mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross and random type available 	• 75 - 250V AC	• 3A / 100A 	5mA
AQ1 5A (AC output) 1:2  54 x 26mm	<ul style="list-style-type: none"> • Photo-Transistor • Zero-cross 	• 75 - 250V AC	• 5A (3A without heat sink) / 100A 	5mA
AQ1 10A (AC output) 1:2  54 x 26mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross and random type available 	• 75 - 250V AC	• 10A (5A without heat sink) / 100A 	5mA

Input					Breakdown voltage	Connection type Terminal layout	Approvals Data sheet
Input voltage	Input impedance	Drop-out voltage (min.)	Operate time	Release time			
3 - 28V DC	1.6kΩ	0.8V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	3,000V AC	PCB Slim  Flat 	CSA, TÜV, UL
4 - 32V DC	— (Input current, max. 20mA)	1.0V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	• 4,000V AC (between input and output) • 2,500V AC (between input, output and case)	PCB Slim  Flat 	VDE
3 - 28V DC	1.6kΩ	0.8V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	• 3,000V AC (between input and output) • 1,500V AC (between input, output and case)	PCB 	CSA, TÜV, UL
4 - 32V DC	— (Input current, max. 20mA)	1.0V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	• 4,000V AC (between input and output) • 2,500V AC (between input, output and case)	PCB 	VDE

Type	Features	Output		
		Load voltage	Max. load current/ Non-repetitive surge current (1 cycle, 60Hz)	OFF-state leakage current (max.)
Solid State Hockey Puck Types				
AQ-J 1:2  38 x 28 x 17mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross • Ultra-compact size • Built-in varistor 	• 75 - 264V AC	• 10A / 100A 	5mA
			• 15A / 150A 	
			• 25A / 250A 	
AQ-A 1:2  58 x 40 x 25.5mm	<ul style="list-style-type: none"> • Photo-Triac • Zero-cross and random type available • Built-in varistor and LED indication 	• 75 - 250V AC	• 15A / 150A 	10mA
			• 25A / 250A 	
			• 40A / 400A 	

Input					Breakdown voltage	Connection type Terminal layout	Approvals Data sheet
Input voltage	Input impedance	Drop-out voltage (min.)	Operate time	Release time			
4 - 6V DC	260Ω	1V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	• 3,000V AC (between input and output) • 2,500V AC (between input, output and case)	 30 ^{+0.1} 2-4.3 dia. or M4	C-UL, TÜV
10 - 18V DC	800Ω						
18 - 28V DC	1.6kΩ						
4 - 6V DC	260Ω						
10 - 18V DC	800Ω						
18 - 28V DC	1.6kΩ						
4 - 6V DC	260Ω						
10 - 18V DC	800Ω						
18 - 28V DC	1.6kΩ						
4 - 32V DC	— (Input current, max. 20mA)	1V	½ cycle of voltage sine wave + 1ms	½ cycle of voltage sine wave + 1ms	• 4,000V AC (between input and output) • 2,500V AC (between input, output and case)	 47.5 ^{+0.2} 2-4.3 dia. or M4	—

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Connectors

Today's electronic components are expected to meet stringent demands: They have to be as compact as possible and provide maximum reliability. To fulfill these requirements, Panasonic engineers have developed narrow-pitch connectors that utilize TOUGH CONTACT technology. In addition to their excellent shock and vibration resistance, these connectors feature an ultra-slim profile, which makes them ideally suited to applications where space is at a premium. Our versatile board-to-board and board-to-FPC connector product range offers the appropriate solution for practically any scenario.



Switches

The immense portfolio includes switches in all common sizes and with various IP degrees of protection, and are guaranteed to cover all standard requirements. Our switches are characterized by a large switching capacity range, long lifetime and exceptional reliability. A wide selection of supplemental actuators coupled with various terminal styles, e.g. solder, quick connect, PC board terminal and cable connections, maximize flexibility and ease application design.



PaPIRS motion sensors

Intelligent automation solutions help increase energy efficiency, cost effectiveness and comfort significantly. With a power consumption as low as 1µA and a height of just 6mm, PaPIRS open up a diverse range of possibilities to the lighting and building technology as well as battery-driven applications.



NaPiOn motion sensors

NaPiOn motion sensors are ideal for efficient lighting and energy management.

- Small size: Ø10x13.5mm (thimble size)
- Integrated amplifier
- 2 lens colors: white and black



Pressure sensors

Panasonic's pressure sensors contain built-in amplification and temperature compensation circuits.

Users need not be concerned with circuit design or customization. State-of-the-art technology allows us to achieve high-level precision and reliability, yet without compromising compactness.

- Footprint 7.0mm (W) x 7.2mm (D)
- 10.4mm (W) x 10.4mm (D) (low pressure type)

1 EMC Directive

The EMC Directive concerns primarily the finished products. In applying the Directive to components, the Guidelines¹ should be consulted to determine whether the component in question has a "direct function". Electric motors, power supply units or temperature controls represent examples of such components with "direct function". These types of components must be provided with a CE marking.

Components which are integrated into a device, such as relays, do not have an independent function of their own. A given relay may perform differing functions in different devices. Consequently, all-or-nothing relays must be considered components without "direct function" which are not subject to the EMC Directive.

All-or-nothing - be they electro-mechanical relays or solid state relays - shall not be labeled with a CE marking nor shall a declaration of conformity be issued within the scope of the EMC Directive.

2 Low Voltage Directive

Relays with terminals for printed boards/plug-and-socket connections do not come within the purview of the Low Voltage Directive.

The Low Voltage Directive concerns electrical equipment intended for incorporation into a device as well as equipment intended for direct use. In the case of electrical equipment which is considered a basic component intended for incorporation into other electrical equipment, the properties and safety of the final product will be largely dependent on how it is integrated: as such, these components do not fall within the Low Voltage Directive and shall not be CE marked. The Guidelines² specifically cite electro-mechanical basic components such as connectors, relays with terminals for printed circuit boards and micro switches. They are therefore not subject to the scope of the Low Voltage Directive.

Except for larger relays which may, for example, find application in switching cabinets, the same considerations apply to common-place relays with plug-in connections available also with printed board terminals. Here again, safety is a function of the individual application. In evaluating these relays' performance from the perspective of the Low Voltage Directive, the same conclusion is reached as with the printed board relay. As such, CE marking is not mandatory for this type of relay.

3 Machinery Directive

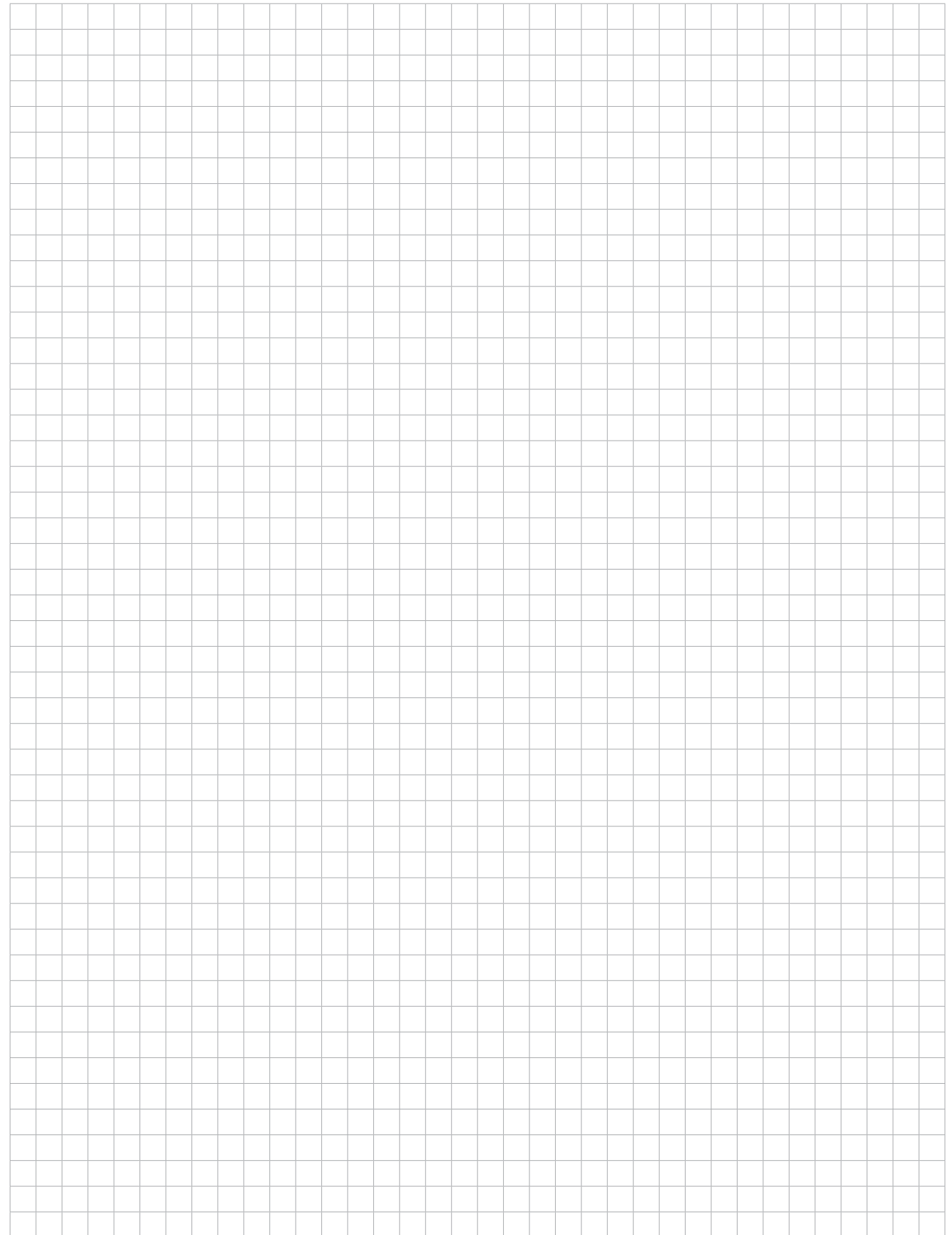
The Machinery Directive differentiates between machines, machine parts and safety components. Relays are not part of any of these categories. The listing of safety components in Appendix IV is conclusive and does not include relays.

Consequently, a CE marking shall not be affixed nor shall a declaration of conformity or manufacturer's declaration be issued under the Machinery Directive.

As of this moment, none of the aforementioned directives require CE marking for all-or-nothing relays³.

4 RoHS Directive

The substances prohibited by the RoHS Directive (Pb, Hg, Cd, Cr⁺⁶, PBB, PBDE) concern 10 categories of devices that are mostly, but not entirely, intended for private use. Components such as relays are not listed in these categories. Therefore they do not directly fall within the scope of this directive. However, if the user employs relays in devices that fall within the scope of this directive, the user must also acknowledge the substances prevented. In order to adapt to this situation in good time, all Panasonic relays are generally RoHS compliant.



1. Guidelines (version dated March 22, 2007) for the Application of the Council Directive 2004/108/EC.
2. Guidelines (version dated August 2007) for the Application of the Council Directive 2006/95/EC.
3. This writing deals exclusively with "non-specified-time all-or-nothing relays". The abbreviated term "all-or-nothing relay" has been introduced merely for purposes of convenience. The term includes solid state all-or-nothing relays.

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