



Parameters	Ratings	Units
Peak Blocking Voltage	350	$V_p$
Load Current	130	mA
Max On-resistance	30	$\Omega$
Isolation Voltage, Input to Output	5000	$V_{rms}$

### Features

- 5000V<sub>rms</sub> Input/Output Isolation
- 350V<sub>p</sub> Blocking Voltage
- 100% Solid State
- Small 4-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable

### Applications

- Telephony Switching
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

### Description

The CPC1333G is a single-pole, normally closed (1-Form-B) Solid State Relay with an enhanced input to output isolation barrier of 5000V<sub>rms</sub>.

Clare's patented OptoMOS architecture makes available the optically coupled technology necessary to activate the output's efficient MOSFET switches. Control of the isolated output is accomplished by means of the highly effective GaAlAs infrared LED at the input.

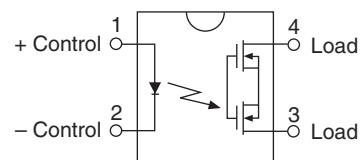
### Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- Certified to EN 60950-1: 2006  
TUV Certificate B 09 07 49410 004

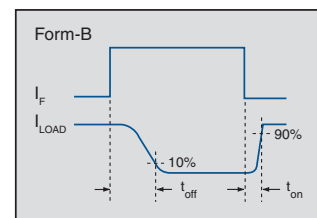
### Ordering Information

Part Number	Description
CPC1333G	4-Pin DIP (100/Tube)
CPC1333GR	4-Pin Surface Mount (100/Tube)
CPC1333GRTR	4-Pin Surface Mount (1000/Reel)

### Pin Configuration



### Switching Characteristics of Normally Closed Devices



### Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Peak Blocking Voltage	350	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation <sup>1</sup>	100	mW
Total Package Dissipation <sup>2</sup>	550	mW
Isolation Voltage, Input to Output	5000	V <sub>rms</sub>
ESD Rating, Human Body Model	8	kV
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C
Maximum Soldering Temperature (10 Seconds)	260	°C

<sup>1</sup> Derate linearly 1.33 mW / °C

<sup>2</sup> Derate linearly 3.00 mW / °C

*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

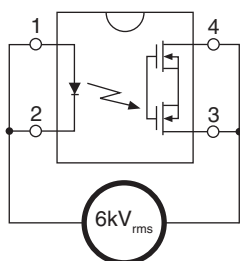
### Electrical Characteristics @ 25°C

Parameters	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current						
Continuous	-	I <sub>L</sub>	-	-	130	mA
Peak	t=10ms	I <sub>LPK</sub>	-	-	350	
On-Resistance <sup>1</sup>	I <sub>L</sub> =130mA	R <sub>ON</sub>	-	25	30	Ω
Off-State Leakage Current	I <sub>F</sub> =2mA, V <sub>L</sub> =350V	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	-	2	ms
Turn-Off		t <sub>off</sub>	-	-	3	
Output Capacitance	I <sub>F</sub> =2mA, V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	6	-	pF
<b>Input Characteristics</b>						
Input Control Current <sup>2</sup>	-	I <sub>F</sub>	-	0.18	2	mA
Input Dropout Current	I <sub>L</sub> =130mA	I <sub>F</sub>	0.1	-	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.26	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
<b>Common Characteristics</b>						
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

<sup>1</sup> Measurement taken within one second of on-time.

<sup>2</sup> For high temperature operation (> 60°C), Clare recommends a LED I<sub>F</sub> ≥ 5mA.

### CPC1333G Isolation Test Circuit



Test Conditions:

Voltage Ramp:

2V/μs

Test Time:

2 Seconds

Leakage Current Threshold:

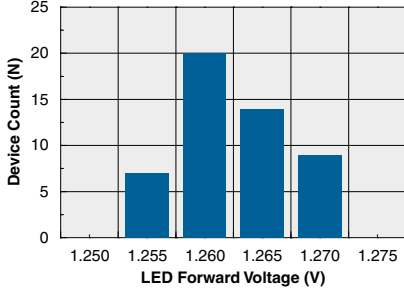
50μA

Test Voltage:

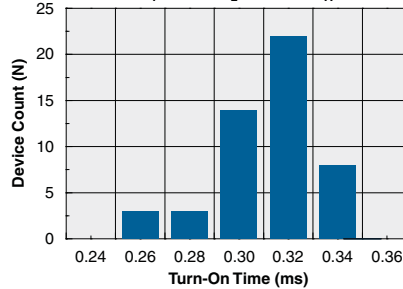
6kV<sub>rms</sub>

**PERFORMANCE DATA\***

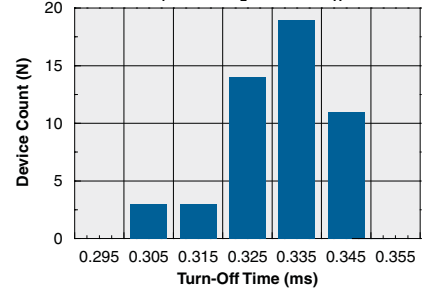
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



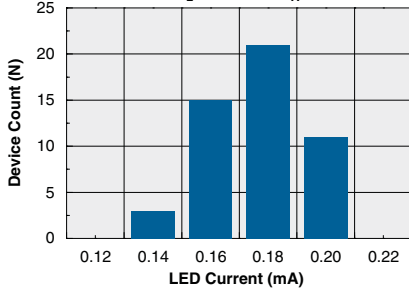
**Typical Turn-On Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=60\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



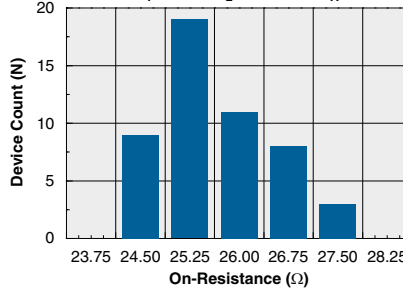
**Typical Turn-Off Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=60\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



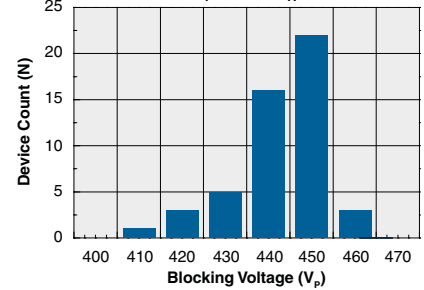
**Typical  $I_F$  for Switch Operation**  
(N=50,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



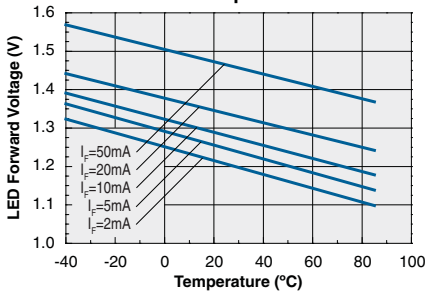
**Typical On-Resistance Distribution**  
(N=50,  $I_F=0\text{mA}$ ,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



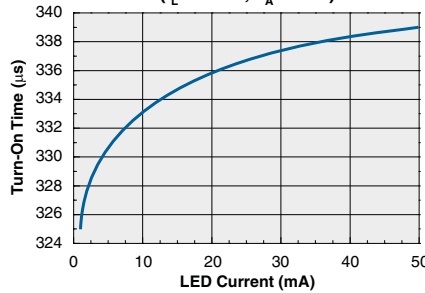
**Typical Blocking Voltage Distribution**  
(N=50,  $I_F=2\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



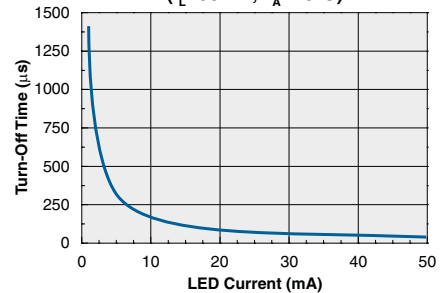
**Typical LED Forward Voltage Drop vs. Temperature**



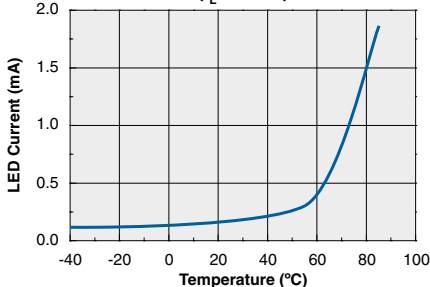
**Typical Turn-On Time vs. LED Forward Current**  
( $I_L=60\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



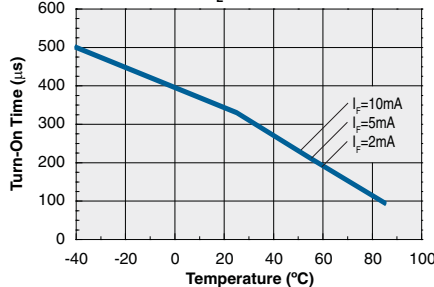
**Typical Turn-Off Time vs. LED Forward Current**  
( $I_L=60\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



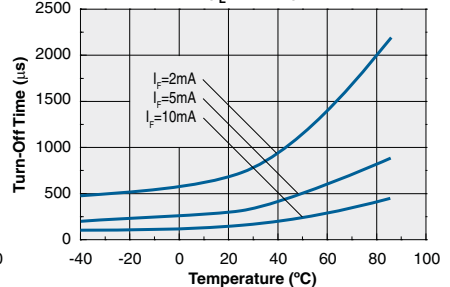
**Typical  $I_F$  for Switch Operation vs. Temperature**  
( $I_L=60\text{mA}$ )



**Typical Turn-On Time vs. Temperature**  
( $I_L=60\text{mA}$ )

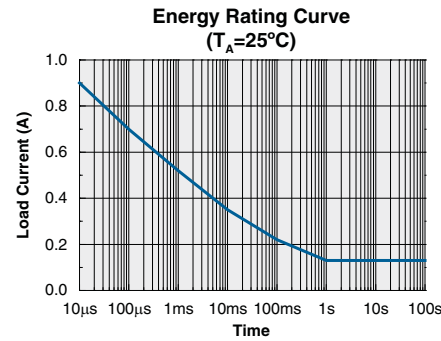
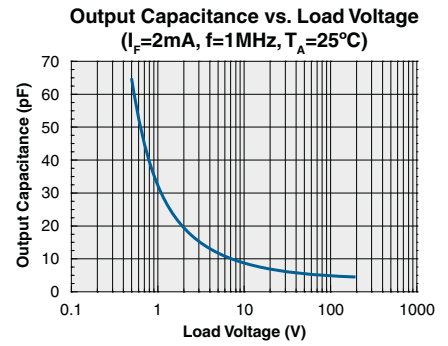
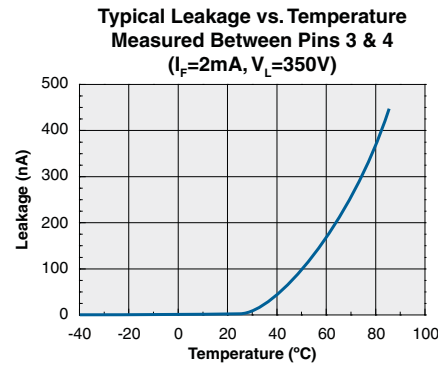
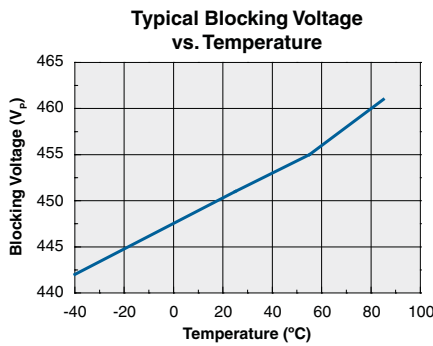
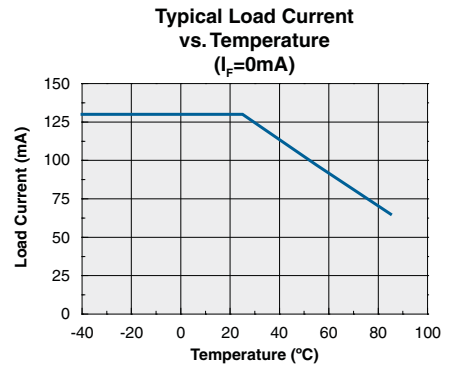
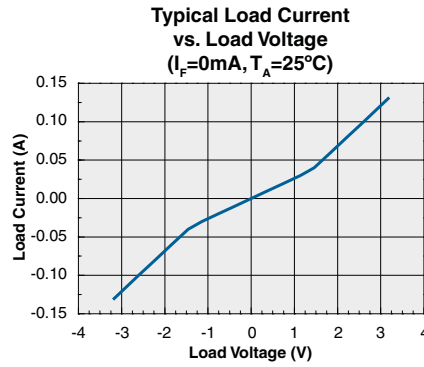
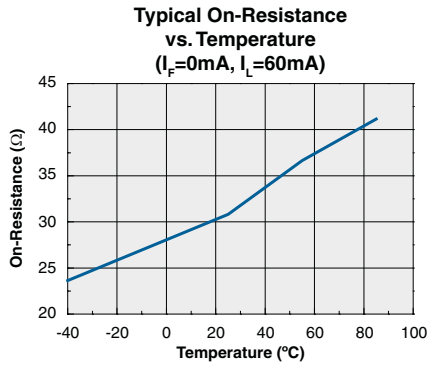


**Typical Turn-Off Time vs. Temperature**  
( $I_L=60\text{mA}$ )



\* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***



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## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. Clare classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
CPC1333G / CPC1333GR	MSL 1

### ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

### Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
CPC1333G / CPC1333GR	250°C for 30 seconds

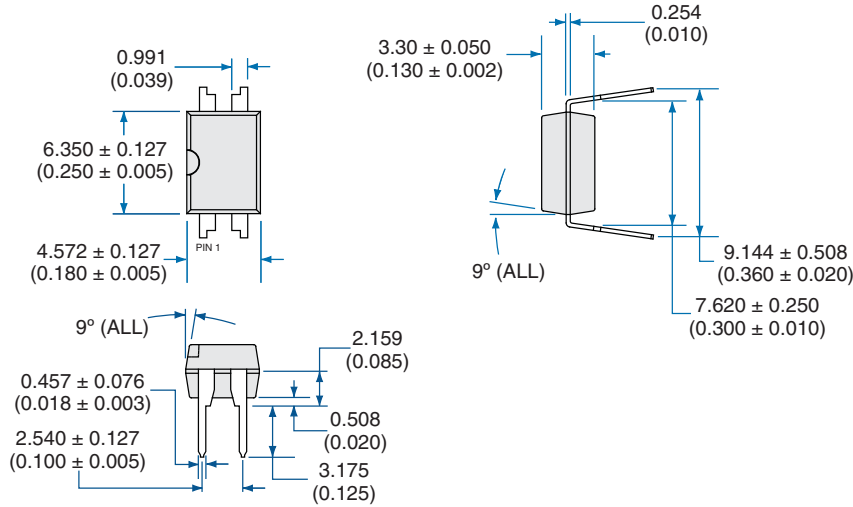
### Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake may be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

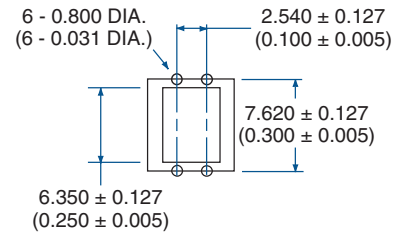


**Mechanical Dimensions**

**CPC1333G**

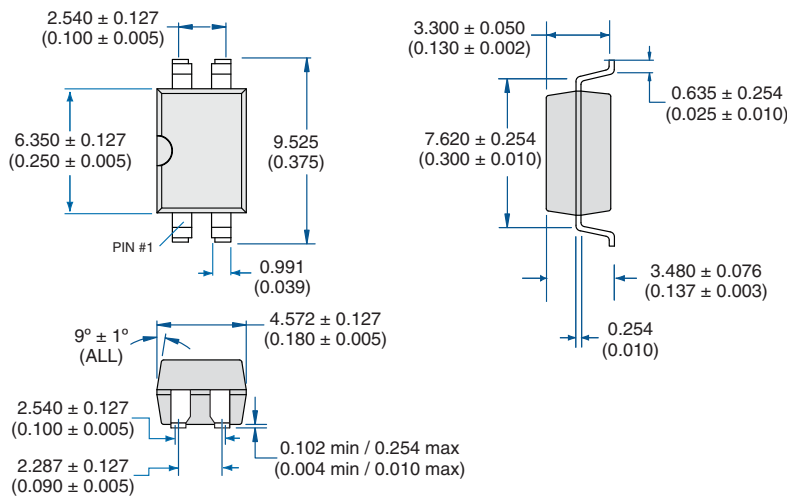


**PC Board Pattern (Top View)**

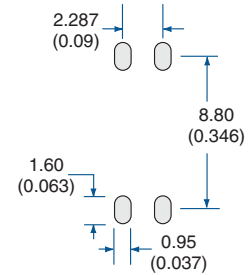


Dimensions  
mm  
(inches)

**CPC1333GR**

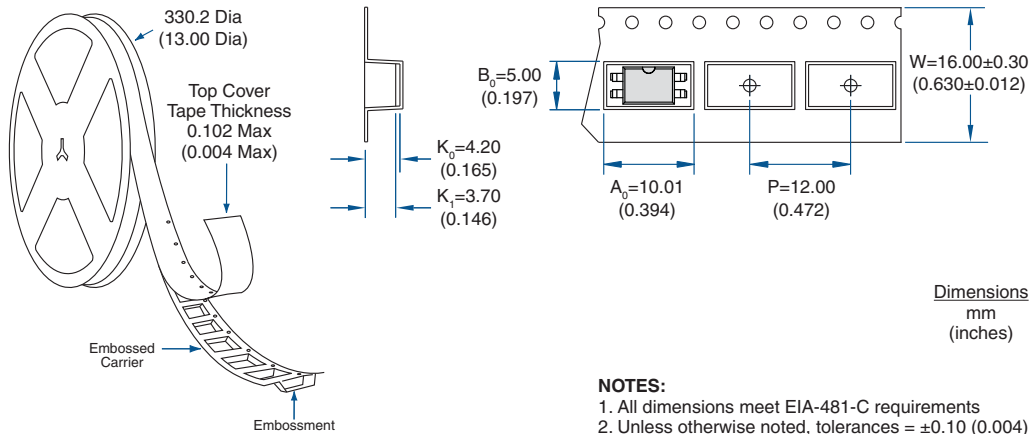


**PCB Land Pattern**



Dimensions  
mm  
(inches)

**CPC1333GR Tape & Reel**



**For additional information please visit our website at: [www.clare.com](http://www.clare.com)**

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