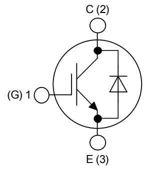
XPT IGBT

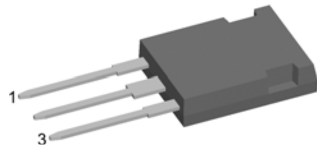
Copack

I_{C25} = 43 A
V_{CES} = 1200 V
$V_{CE(sat)typ}$ = 1.8 V

Part number

IXA27IF1200HJ





Features / Advantages:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers

Package:

- Housing: ISOPLUS247
- Industry standard outline
- DCB isolated backside
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

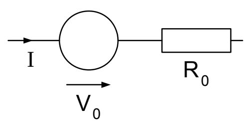
IGBT

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{CES}	*Collector emitter voltage*	V_{GE} = 0 V	T_{VJ} = 25°C			1200	V
V_{GES}	*Maximum DC gate voltage*		T_{VJ} = 25°C			±20	V
I_{C25}	*Collector current*		T_C = 25°C			43	A
I_{C90}			T_C = 90°C			27	A
P_{tot}	*Total power dissipation*		T_{VJ} = 25°C			150	W
I_{CES}	*Collector emitter leakage current*	V_{CE} = V_{CES} ; V_{GE} = 0 V	T_{VJ} = 25°C			0.1	mA
			T_{VJ} = 125°C		0.1		mA
I_{GES}	*Gate emitter leakage current*	V_{CE} = 0 V; V_{GE} = ±20 V				500	nA
$V_{CE(sat)}$	*Collector emitter saturation voltage*	I_C = 25 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.1	V
			T_{VJ} = 125°C		2.1		V
$V_{GE(th)}$	*Gate emitter threshold voltage*	I_C = 1 mA; V_{GE} = V_{CE}		5.4	6	6.5	V
Q_{Gon}	*Total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 25 A			76		nC
$t_{d(on)}$	*Turn-on delay time*				70		ns
t_r	*Current rise time*				40		ns
$t_{d(off)}$	*Turn-off delay time*	Inductive load			250		ns
t_f	*Current fall time*	V_{CE} = 600 V; I_C = 25 A			100		ns
E_{on}	*Turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 39 Ω	T_{VJ} = 125°C		2.5		mJ
E_{off}	*Turn-off energy per pulse*				3.0		mJ
RBSOA	*Reverse bias safe operation area*	V_{GE} = 15 V; R_G = 39 Ω V_{CEK} = 1200 V	T_{VJ} = 125°C			75	A
SCSOA	*Short circuit safe operation area*						
t_{SC}	*Short circuit duration*	V_{CE} = 900 V; V_{GE} = ±15 V	T_{VJ} = 125°C			10	µs
I_{SC}	*Short circuit current*	R_G = 39 Ω; non-repetitive				100	A
R_{thJC}	*Thermal resistance juntion to case*					0.84	K/W

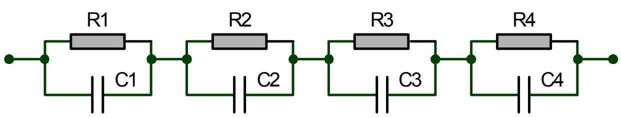
Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
I_{F25}	*Forward current*	T_C = 25°C				42	A
I_{F90}		T_C = 90°C				25	A
V_F	*Forward voltage*	I_F = 30 A	T_{VJ} = 25°C		1.95	2.2	V
			T_{VJ} = 125 °C		1.95		V
Q_{rr}	*Reverse recovery charge*	V_R = 600 V	T_{VJ} = 125 °C		3.5		μC
I_{RM}	*Maximum reverse recovery current*	di_F/dt = - 600 A/μs;			30		A
t_{rr}	*Reverse recovery time*	I_F = 30 A			350		ns
$E_{rec(off)}$	*Reverse recovery losses at turn-off*				0.9		mJ
R_{thJC}	*Thermal resistance juntion to case*					1.2	K/W

Equivalent Circuits for Simulation



Symbol	Definition		Ratings min.	typ.	max.	Unit
V_0	*IGBT*	T_{VJ} = 150 °C			1.1	V
R_0					55	m Ω
V_0	*Diode*	T_{VJ} = 150 °C			1.25	V
R_0					28.3	m Ω



$$Z_{th}(t) = \sum_{i=1}^{n} \left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i} \right) \right) \right]$$

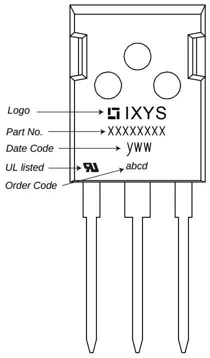
$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
R_1	0.18	0.3413
R_2	0.14	0.2171
R_3	0.36	0.3475
R_4	0.16	0.2941
τ_1	0.0025	0.0025
τ_2	0.03	0.03
τ_3	0.03	0.03
τ_4	0.08	0.08

Package ISOPLUS247

Symbol	Definition	Conditions	Ratings min.	typ.	max.	Unit
T_{VJ}	*Virtual junction temperature*		-55		150	°C
T_{stg}	*Storage temperature*		-55		150	°C
R_{thCH}	*Thermal resistance case to heatsink*			0.25		K/W
Weight				6		g
F_C	*Mounting force with clip*		20		120	N
V_{ISOL}	*Isolation voltage*	t = 1 second	3600			V
		t = 1 minute	3000			V
d_S	*Creapage distance on surface*					mm
d_A	*Striking distance through air*					mm

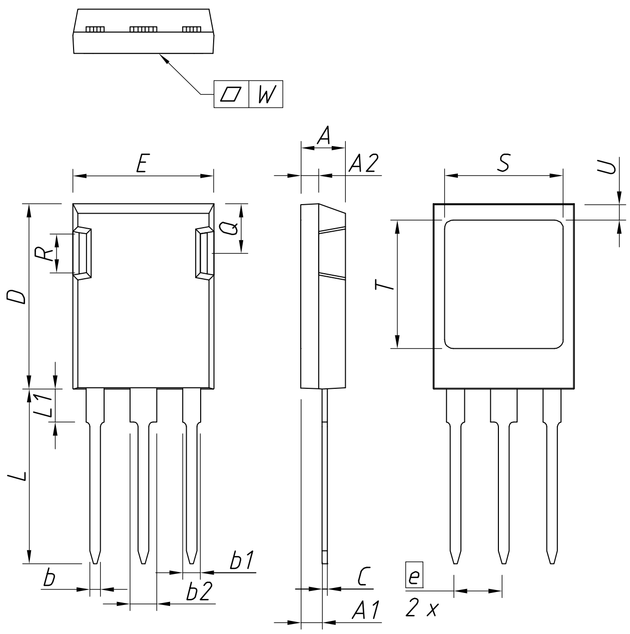
Product Marking



Part number

I = IGBT
X = XPT IGBT
A = Gen 1 / std
27 = Current Rating [A]
IF = Copack
1200 = Reverse Voltage [V]
HJ = ISOPLUS247 (3)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	IXA 27 IF 1200 HJ	IXA27IF1200HJ			



DIM.	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	4,83	5,21	0,190	0,205
A1	2,29	2,54	0,090	0,100
A2	1,91	2,16	0,075	0,085
b	1,14	1,40	0,045	0,055
b1	1,91	2,15	0,075	0,085
b2	2,92	3,20	0,115	0,126
C	0,61	0,83	0,024	0,033
D	20,80	21,34	0,819	0,840
E	15,75	16,13	0,620	0,635
e	5,45 BSC		0,215 BSC	
L	19,81	20,60	0,780	0,811
L1	3,81	4,38	0,150	0,172
Q	5,59	6,20	0,220	0,244
R	4,32	4,85	0,170	0,191
S	13,21	13,72	0,520	0,540
T	15,75	16,26	0,620	0,640
U	1,65	2,03	0,065	0,080
W	-	0,10	-	0,004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoff-oberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max}.
This drawing will meet all dimensions requiarement of JEDEC outline TO-247 AD except screw hole and except L_{max}.

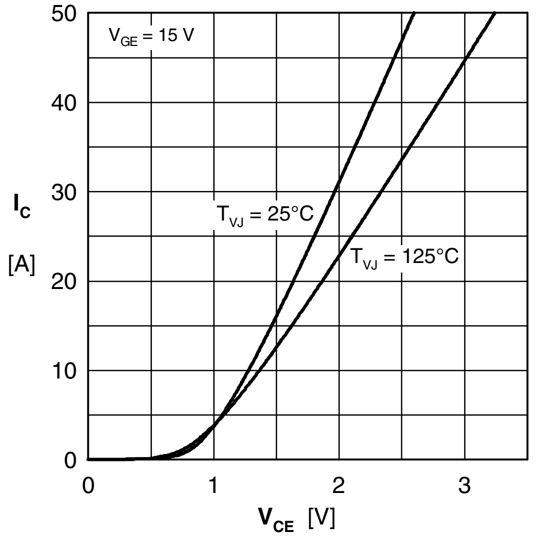


Fig. 1 Typ. output characteristics

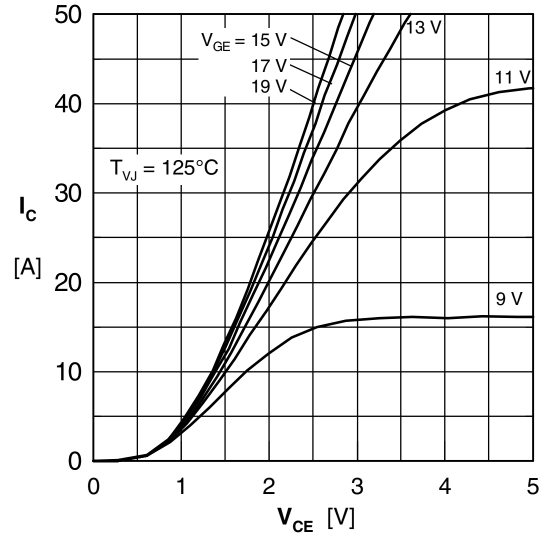


Fig. 2 Typ. output characteristics

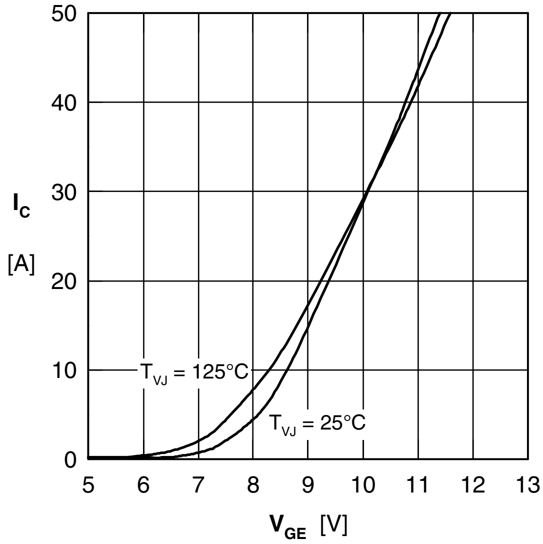


Fig. 3 Typ. tranfer characteristics

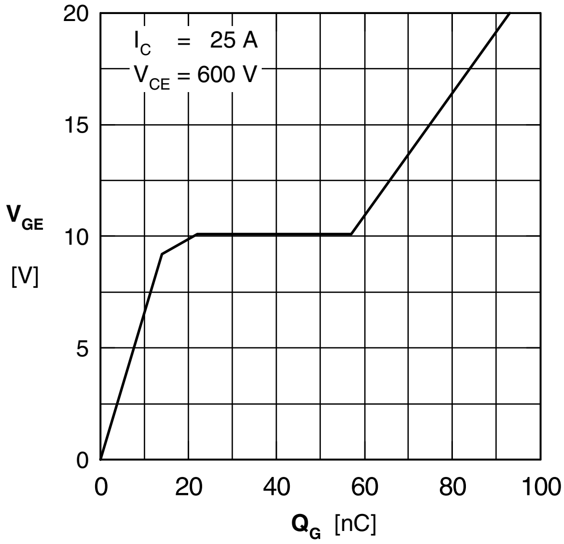


Fig. 4 Typ. turn-on gate charge

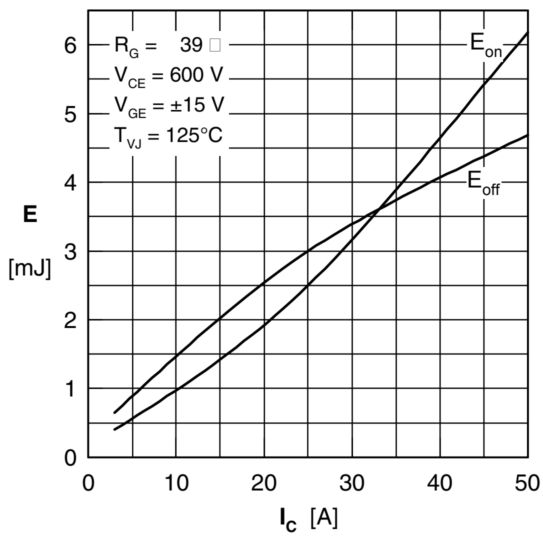


Fig. 5 Typ. switching energy vs. collector current

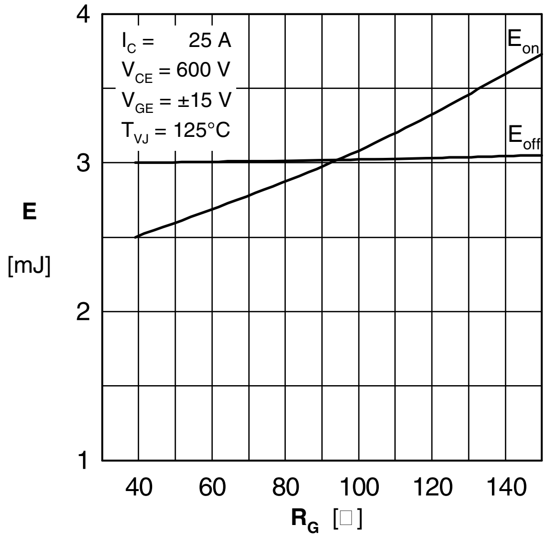


Fig. 6 Typ. switching energy vs. gate resistance

Data according to IEC 60747and per diode unless otherwise specified

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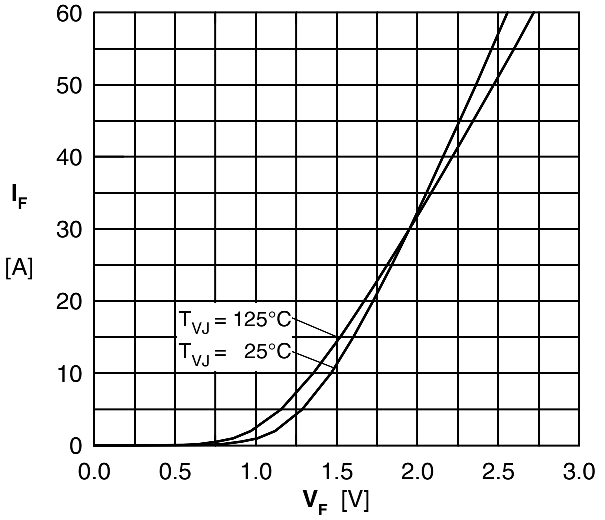

Fig. 7 Typ. Forward current versus V_F

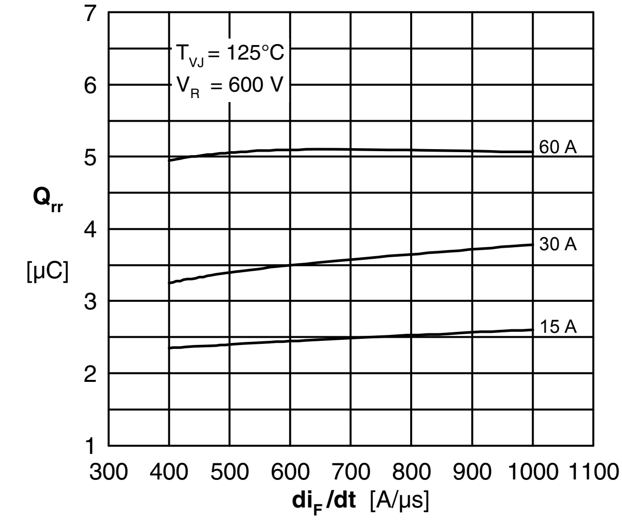

Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

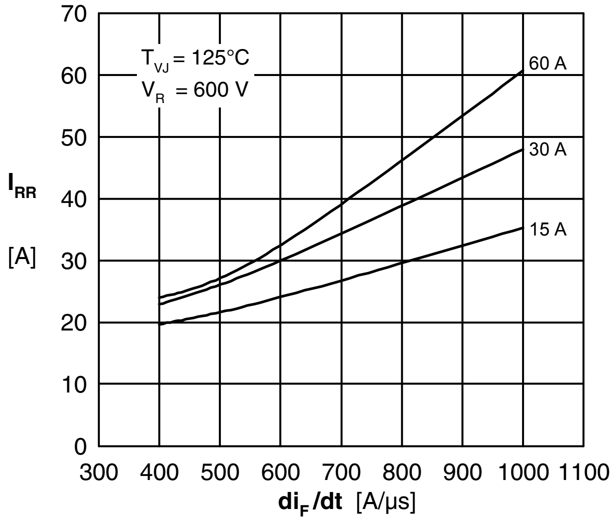

Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

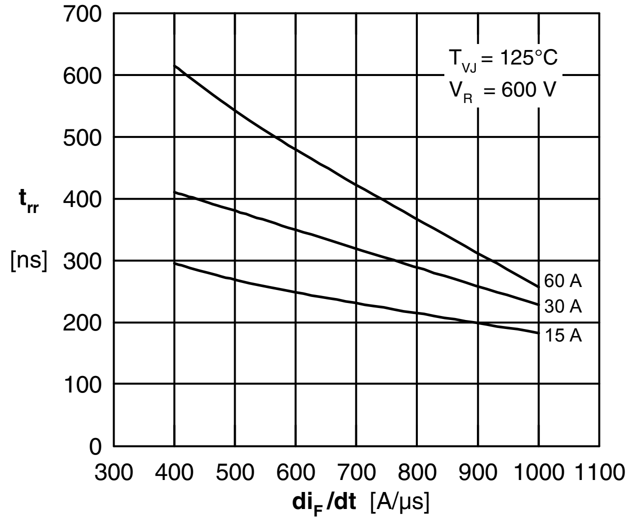

Fig. 10 Typ. recovery time t_{rr} versus di/dt

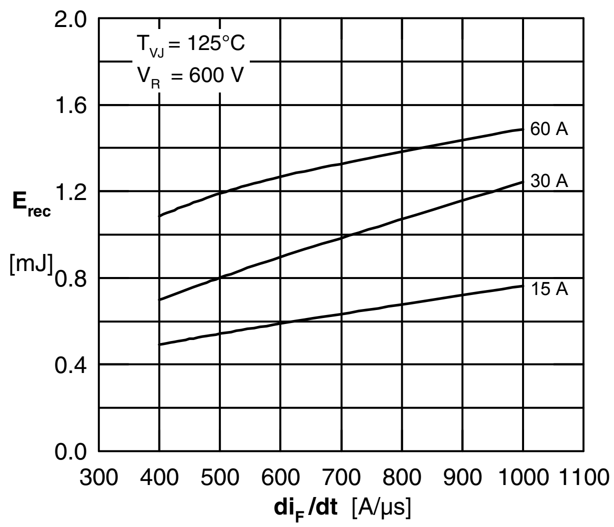

Fig.11 Typ. recovery energy E_{rec} versus di/dt

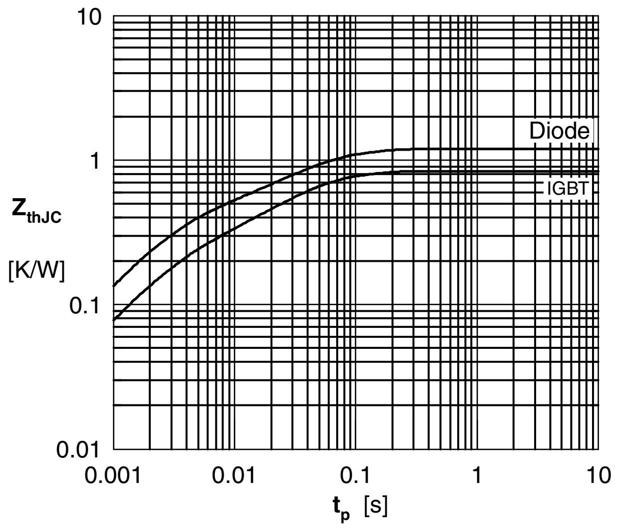

Fig. 12 Typ. transient thermal impedance