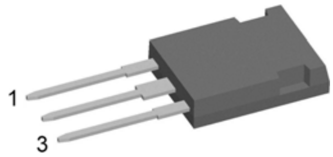
XPT IGBT

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

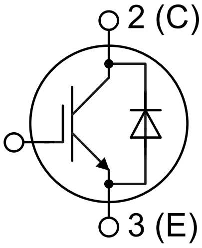
Copack

Part number

IXA27IF1200HJ



Backside: isolated



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
- Pumps, Fans

Package: ISOPLUS247

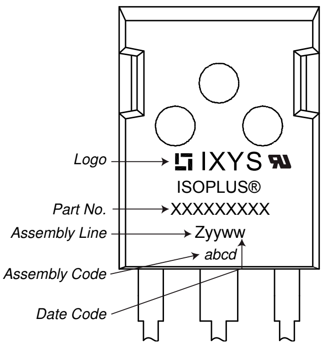
- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			43	A
I_{C80}			T_C = 80°C			27	A
P_{tot}	*total power dissipation*		T_C = 25°C			150	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 25A; 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 = 1mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	5.9	6.5	V
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_{GE} = ±20 V				500	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 25 A			76		nC
$t_{d(on)}$	*turn-on delay time*	inductive load	T_{VJ} = 125°C		70		ns
t_r	*current rise time*	V_{CE} = 600V; I_C = 25A			40		ns
$t_{d(off)}$	*turn-off delay time*	V_{GE} = ±15 V; R_G = 39 Ω			250		ns
t_f	*current fall time*				100		ns
E_{on}	*turn-on energy per pulse*				2.5		mJ
E_{off}	*turn-off energy per pulse*				3		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 39 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200V				75	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 900 V					
t_{SC}	*short circuit duration*	V_{CE} = 900V; 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 junction to case*					0.84	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.25		K/W

Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			42	A
I_{F80}			T_C = 80°C			25	A
V_F	*forward voltage*	I_F = 30A	T_{VJ} = 25°C			2.20	V
			T_{VJ} = 125°C		1.95		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			*	mA
	* not applicable, see Ices value above		T_{VJ} = 125°C		*		mA
Q_{rr}	*reverse recovery charge*	V_R = 600 V			3.5		µC
I_{RM}	*max. reverse recovery current*	-di_F/dt = -600 A/µs	T_{VJ} = 125°C		30		A
t_{rr}	*reverse recovery time*	I_F = 30A; V_{GE} = 0 V			350		ns
E_{rec}	*reverse recovery energy*				0.9		mJ
R_{thJC}	*thermal resistance junction to case*					1.2	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.25		K/W

Package ISOPLUS247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal			70	A
T_{VJ}	*virtual junction temperature*		-40		150	°C
T_{op}	*operation temperature*		-40		125	°C
T_{stg}	*storage temperature*		-40		150	°C
Weight				6		g
F_C	*mounting force with clip*		20		120	N
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	2.7			mm
$d_{Spb/Apb}$		*terminal to backside*	4.1			mm
V_{ISOL}	*isolation voltage*	t = 1 second; 50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute	3000			V

Product Marking



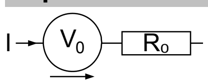
Part number

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

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA27IF1200HJ	IXA27IF1200HJ	Tube	30	509098

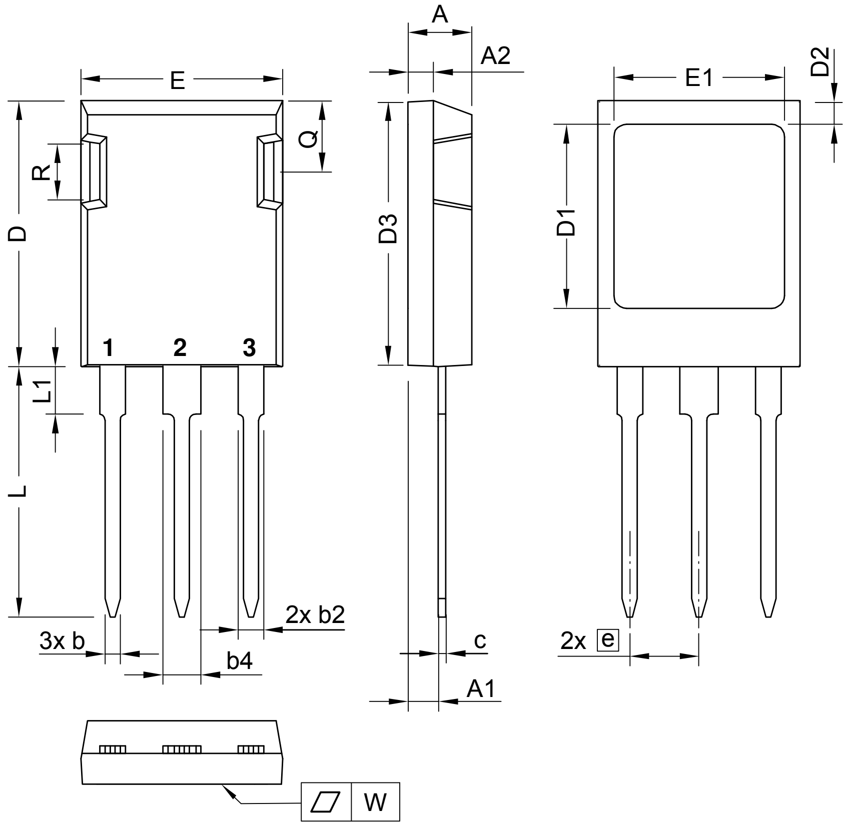
Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150 °C



		IGBT	Diode	
$V_{0\,max}$	*threshold voltage*	1.1	1.25	V
$R_{0\,max}$	*slope resistance **	55	28.3	mΩ

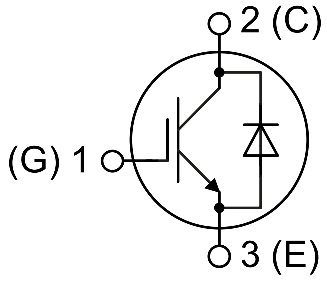
Outlines ISOPLUS247



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
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
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	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche 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 requierement of JEDEC outline TO-247 AD except screw hole and except L_{max}.



IGBT

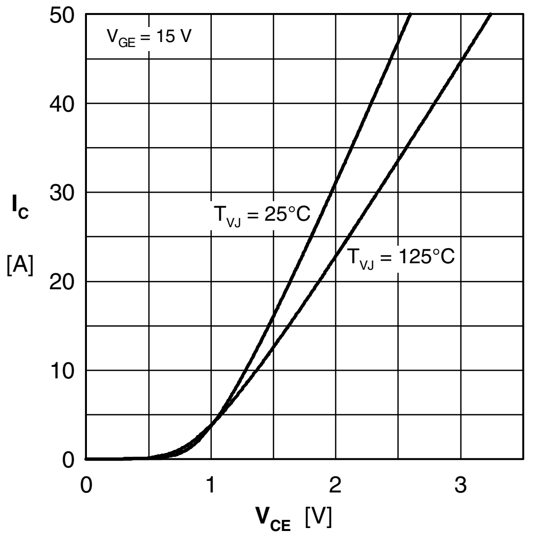


Fig. 1 Typ. output characteristics

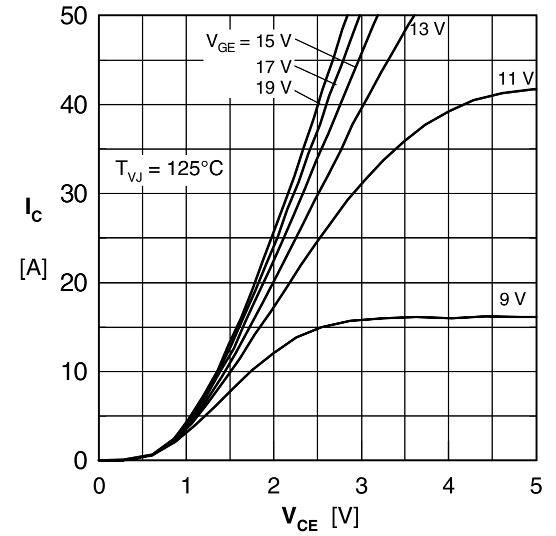


Fig. 2 Typ. output characteristics

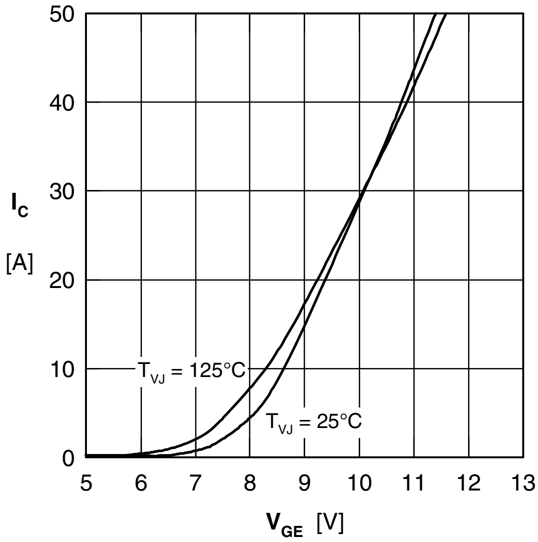


Fig. 3 Typ. tranfer characteristics

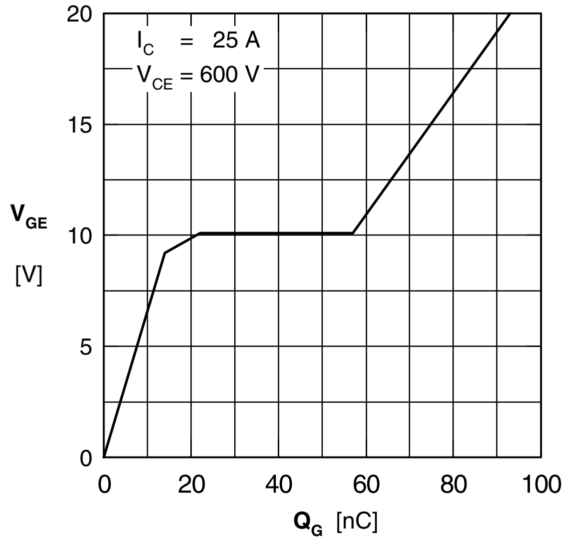


Fig. 4 Typ. turn-on gate charge

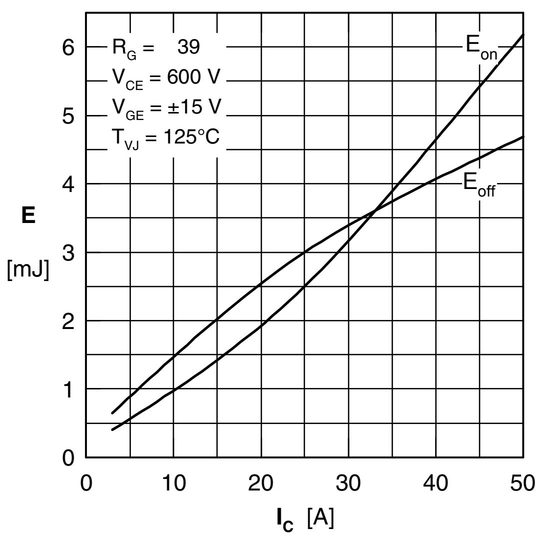


Fig. 5 Typ. switching energy vs. collector current

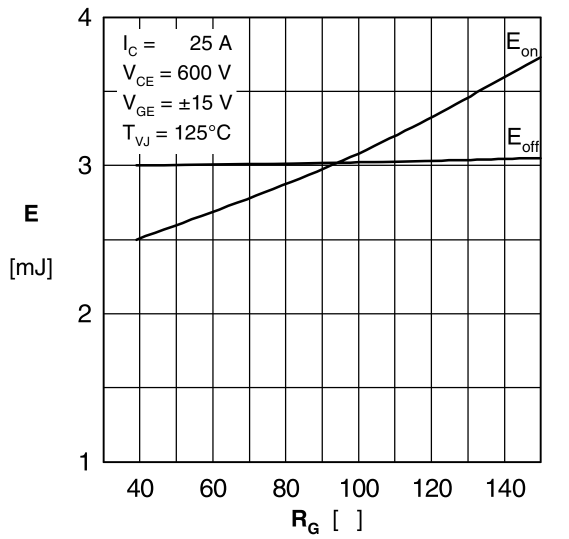


Fig. 6 Typ. switching energy vs. gate resistance

Diode

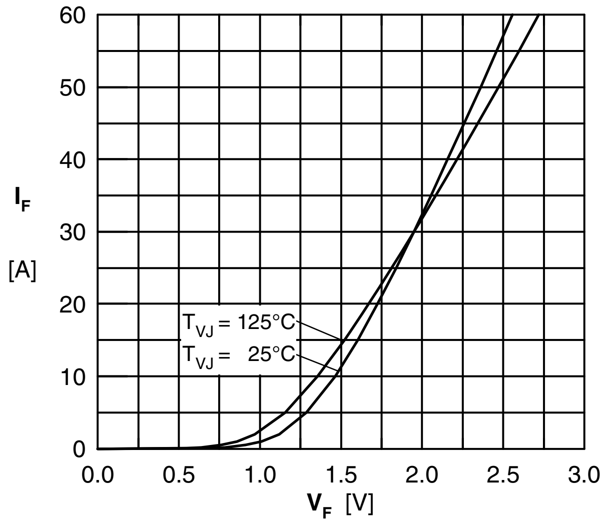


Fig. 7 Typ. Forward current versus V_F

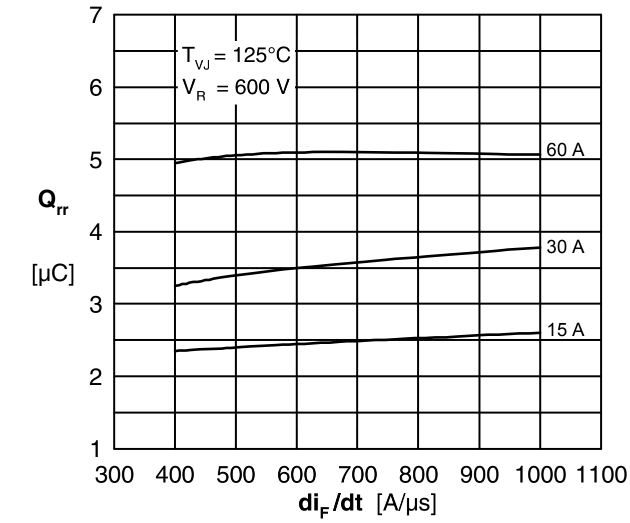


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

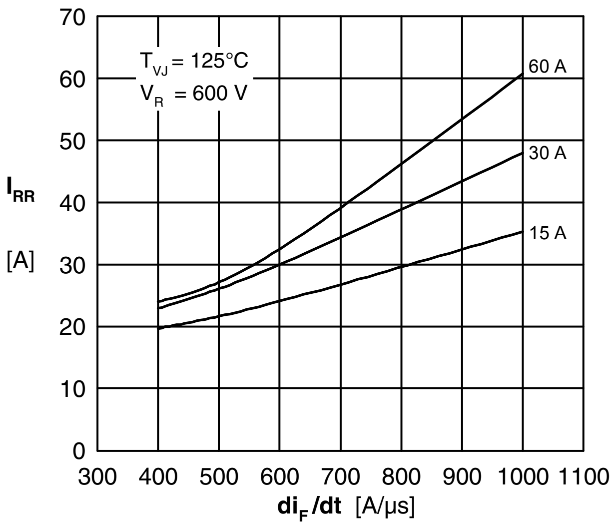


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

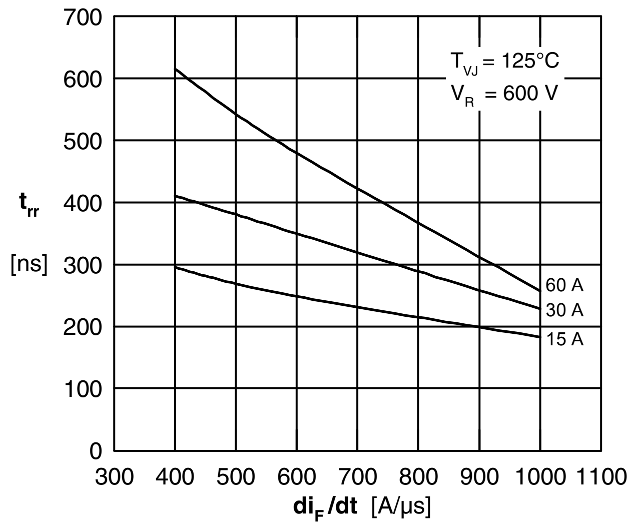


Fig. 10 Typ. recovery time t_{rr} versus di/dt

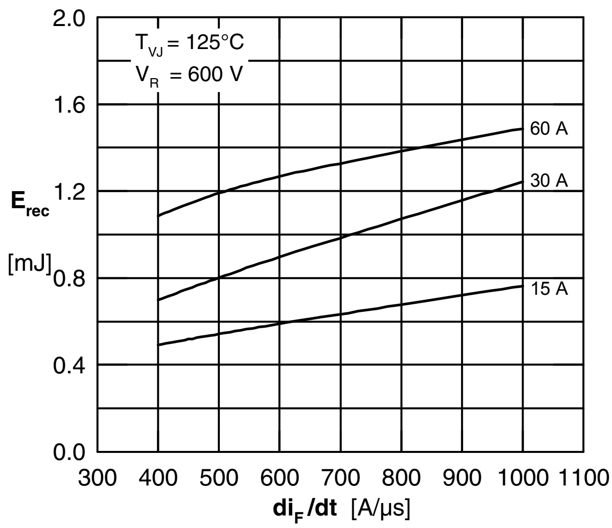


Fig.11 Typ. recovery energy E_{rec} versus di/dt

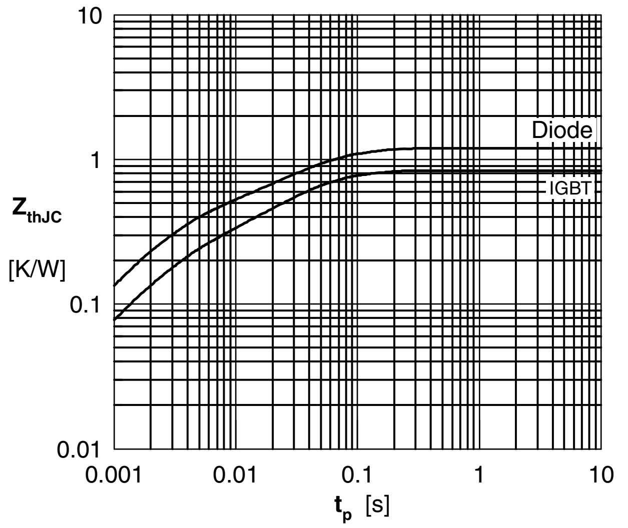


Fig. 12 Typ. transient thermal impedance