

XPT IGBT

$$V_{CES} = 1200V$$

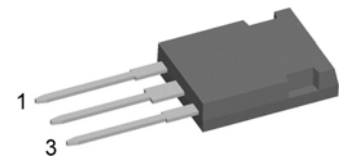
$$I_{C25} = 43A$$

$$V_{CE(sat)} = 1.8V$$

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 μ sec.
 - very low gate charge
 - low EMI
 - square RBSOA @ 3x I_c
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- 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

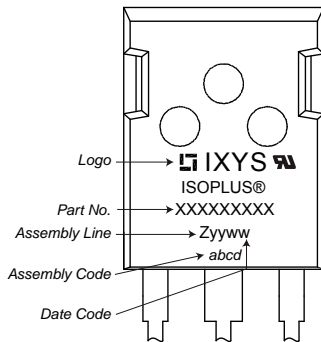
Package: ISOPLUS247

- 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	$T_{VJ} = 25^{\circ}C$			1200	V	
V_{GES}	max. DC gate voltage				± 20	V	
V_{GEM}	max. transient gate emitter voltage				± 30	V	
I_{C25}	collector current	$T_C = 25^{\circ}C$			43	A	
I_{C80}		$T_C = 80^{\circ}C$			27	A	
P_{tot}	total power dissipation	$T_C = 25^{\circ}C$			150	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 25A; V_{GE} = 15V$		1.8	2.1	V	
				2.1		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 1mA; V_{CE} = V_{CE}$	5.4	5.9	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0V$			0.1	mA	
				0.1		mA	
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20V$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600V; V_{GE} = 15V; I_C = 25A$		76		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600V; I_C = 25A$ $V_{GE} = \pm 15V; R_G = 39\Omega$	$T_{VJ} = 125^{\circ}C$	70		ns	
t_r	current rise time			40		ns	
$t_{d(off)}$	turn-off delay time			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	$V_{GE} = \pm 15V; R_G = 39\Omega$	$T_{VJ} = 125^{\circ}C$				
I_{CM}		$V_{CEmax} = 1200V$			75	A	
SCSOA	short circuit safe operating area	$V_{CEmax} = 900V$	$T_{VJ} = 125^{\circ}C$				
t_{sc}	short circuit duration	$V_{CE} = 900V; V_{GE} = \pm 15V$			10	μs	
I_{sc}	short circuit current	$R_G = 39\Omega; \text{non-repetitive}$		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		$T_{VJ} = 25^{\circ}C$		1200	V	
I_{F25}	forward current		$T_C = 25^{\circ}C$		42	A	
I_{F80}			$T_C = 80^{\circ}C$		25	A	
V_F	forward voltage	$I_F = 30A$	$T_{VJ} = 25^{\circ}C$		2.20	V	
			$T_{VJ} = 125^{\circ}C$	1.95		V	
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}C$		*	mA	
	* not applicable, see Ices value above		$T_{VJ} = 125^{\circ}C$	*		mA	
Q_{rr}	reverse recovery charge	$V_R = 600V$ $-di_F/dt = -600A/\mu s$ $I_F = 30A; V_{GE} = 0V$	$T_{VJ} = 125^{\circ}C$	3.5		μC	
I_{RM}	max. reverse recovery current			30		A	
t_{rr}	reverse recovery time			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
$d_{Spbl/Apb}$		terminal to backside	4.1			mm
V_{ISOL}	isolation voltage	t = 1 second	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

$T_{VJ} = 150\text{ °C}$

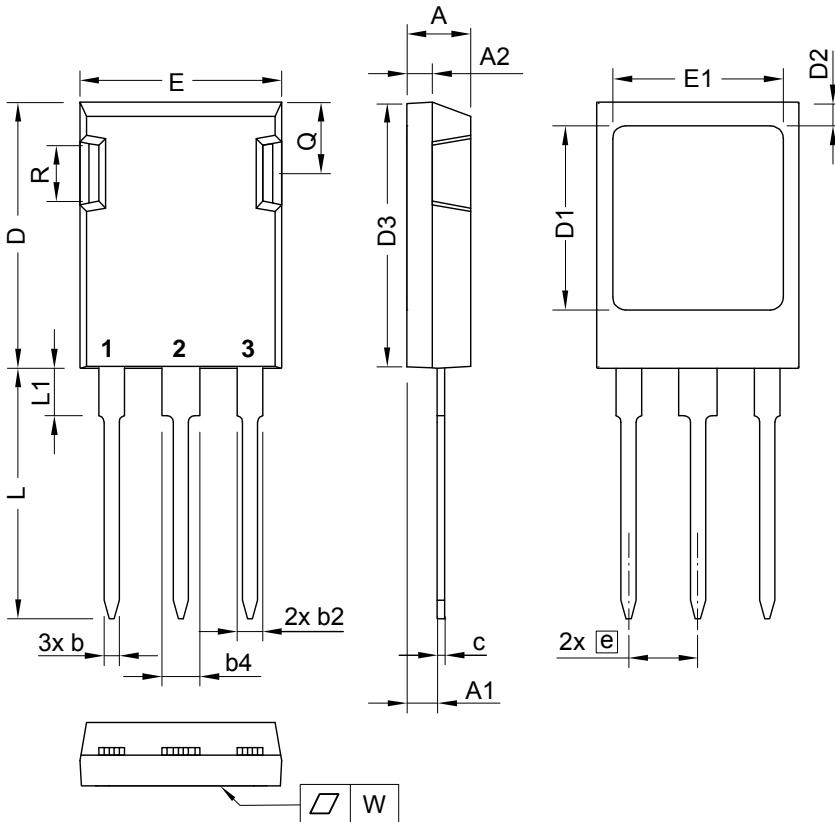


$V_{0\max}$ threshold voltage

$R_{0\max}$ slope resistance *

	IGBT	Diode	
$V_{0\max}$	1.1	1.25	V
$R_{0\max}$	55	28.3	mΩ

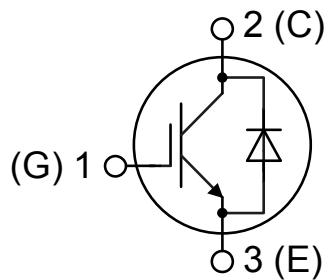
Outlines ISOPLUS247



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 requirement of JEDEC outline TO-247 AD except screw hole and except L_{max} .



IGBT

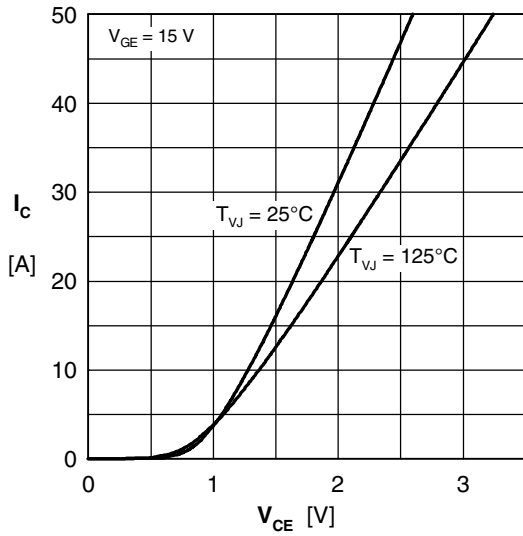


Fig. 1 Typ. output characteristics

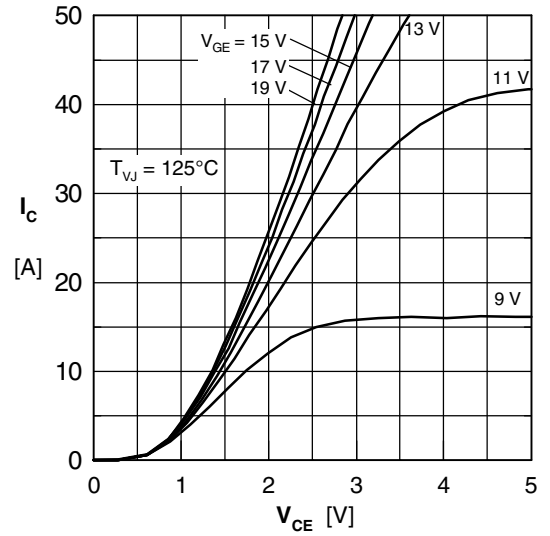


Fig. 2 Typ. output characteristics

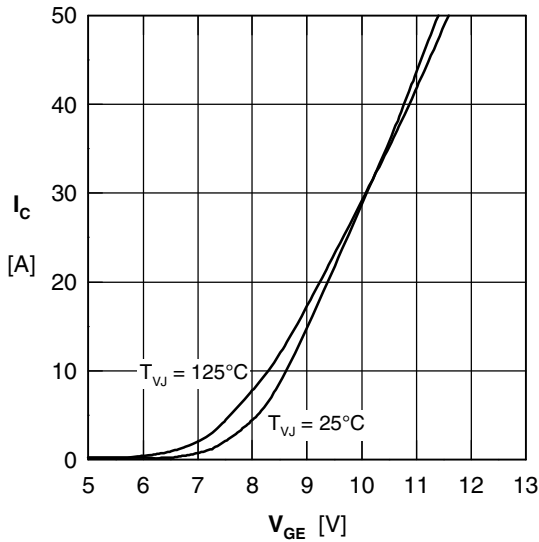


Fig. 3 Typ. transfer characteristics

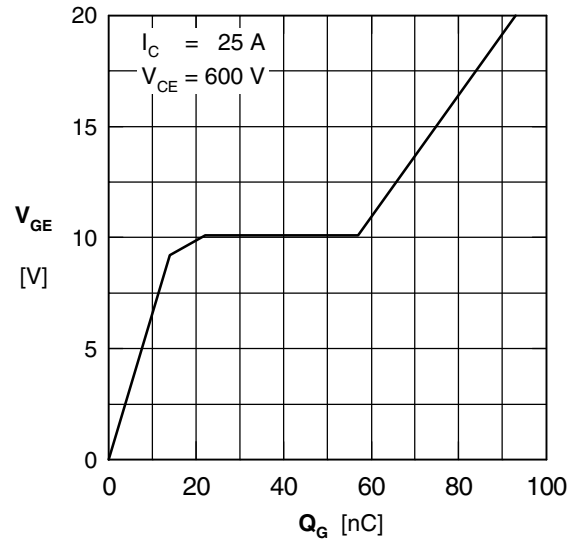


Fig. 4 Typ. turn-on gate charge

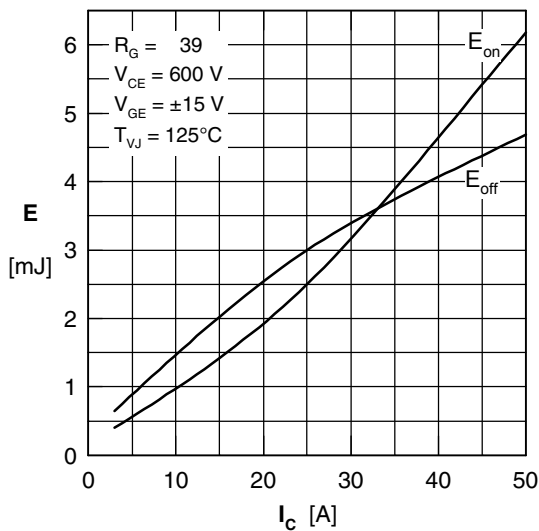


Fig. 5 Typ. switching energy vs. collector current

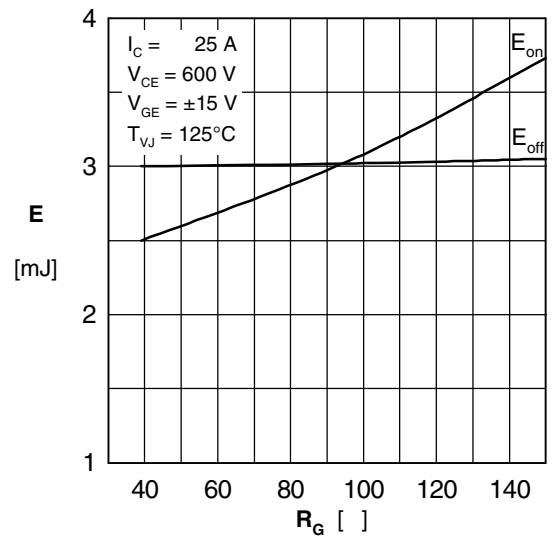


Fig. 6 Typ. switching energy vs. gate resistance

Diode

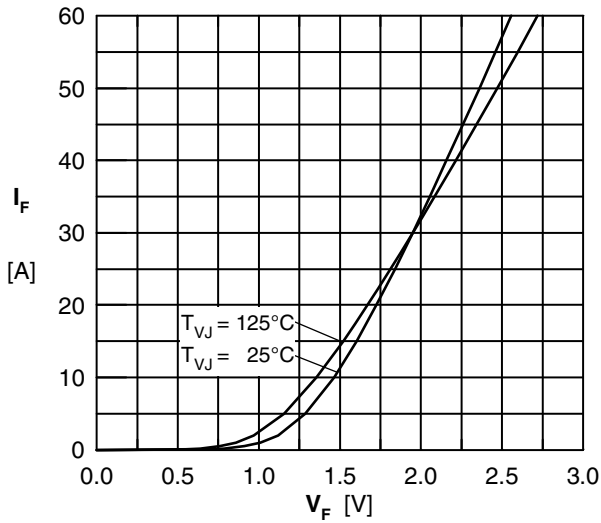


Fig. 7 Typ. Forward current versus V_F

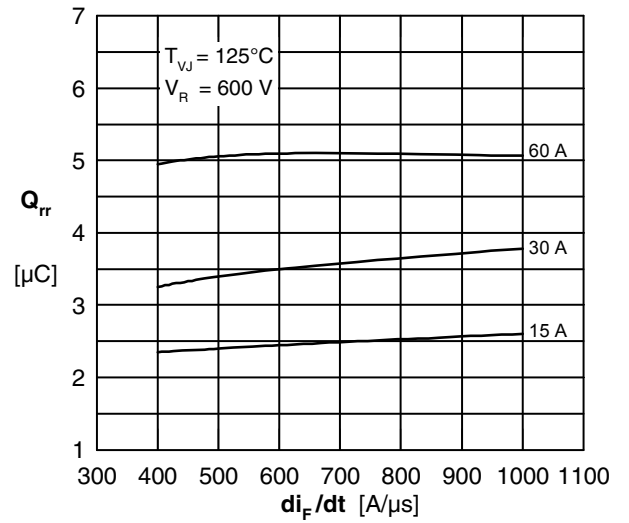


Fig. 8 Typ. reverse recov. charge Q_{rr} vs. di/dt

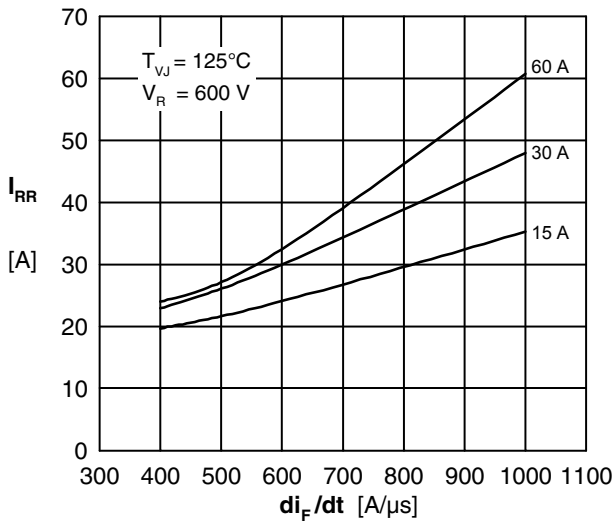


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

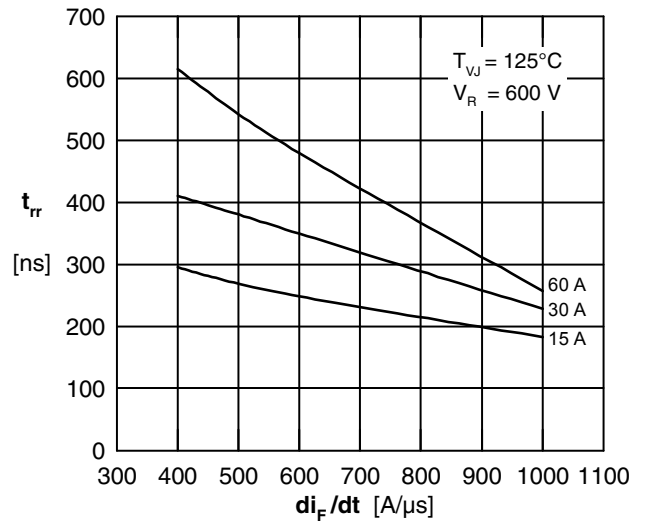


Fig. 10 Typ. recovery time t_{rr} versus di/dt

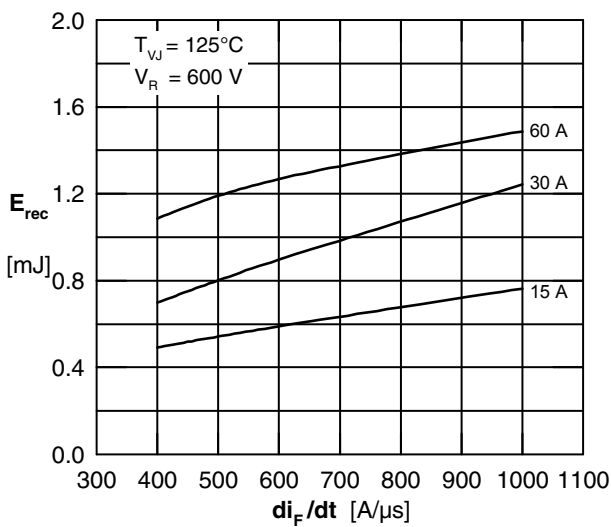


Fig. 11 Typ. recovery energy E_{rec} versus di/dt

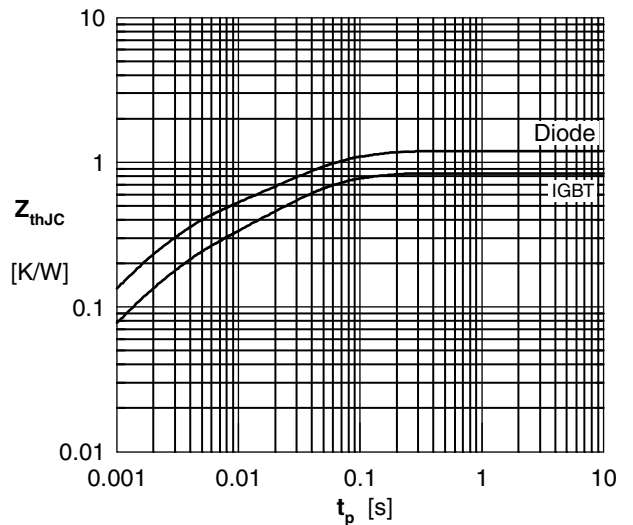


Fig. 12 Typ. transient thermal impedance



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