

XPT IGBT

$$V_{CES} = 1200V$$

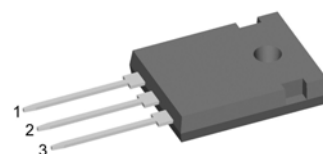
$$I_{C25} = 58A$$

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

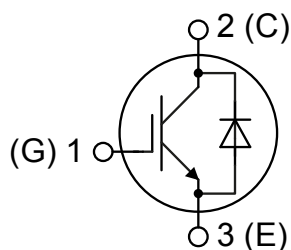
Copack

Part number

IXA33IF1200HB



Backside: collector



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

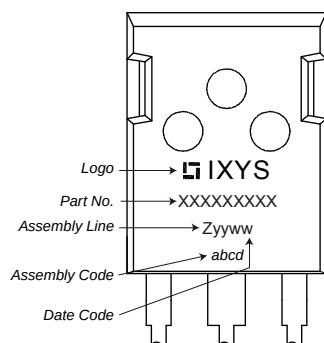
Package: TO-247

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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				58	A
I _{C80}		T _C = 80°C				34	A
P _{tot}	total power dissipation	T _C = 25°C				250	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 V_{CE} = 600V; I_C = 25A V_{GE} = ±15 V; R_G = 39 Ω		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} = ±15 V; R_G = 39 Ω V_{CEmax} = 1200V	T _{VJ} = 125°C				
I _{CM}						75	A
SCSOA	short circuit safe operating area	V_{CEmax} = 900 V V_{CE} = 900V; V_{GE} = ±15 V R_G = 39 Ω; non-repetitive	T _{VJ} = 125°C			10	μs
t _{SC}	short circuit duration						
I _{SC}	short circuit current			100		A	
R _{thJC}	thermal resistance junction to case					0.5	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				60	A
I _{F80}		T _C = 80°C				33	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 -di_F/dt = -600 A/μs I_F = 30A; V_{GE} = 0 V	T _{VJ} = 125°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					0.7	K/W
R _{thCH}	thermal resistance case to heatsink				0.25		K/W

Package TO-247			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
M_D	mounting torque		0.8		1.2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Part number

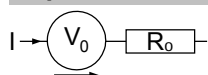
I = IGBT
X = XPT IGBT
A = Gen 1 / std
33 = Current Rating [A]
IF = Copack
1200 = Reverse Voltage [V]
HB = TO-247AD (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA33IF1200HB	IXA33IF1200HB	Tube	30	508562

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150\text{ °C}$



$V_{0\max}$ threshold voltage

$R_{0\max}$ slope resistance *

IGBT

1.1

55

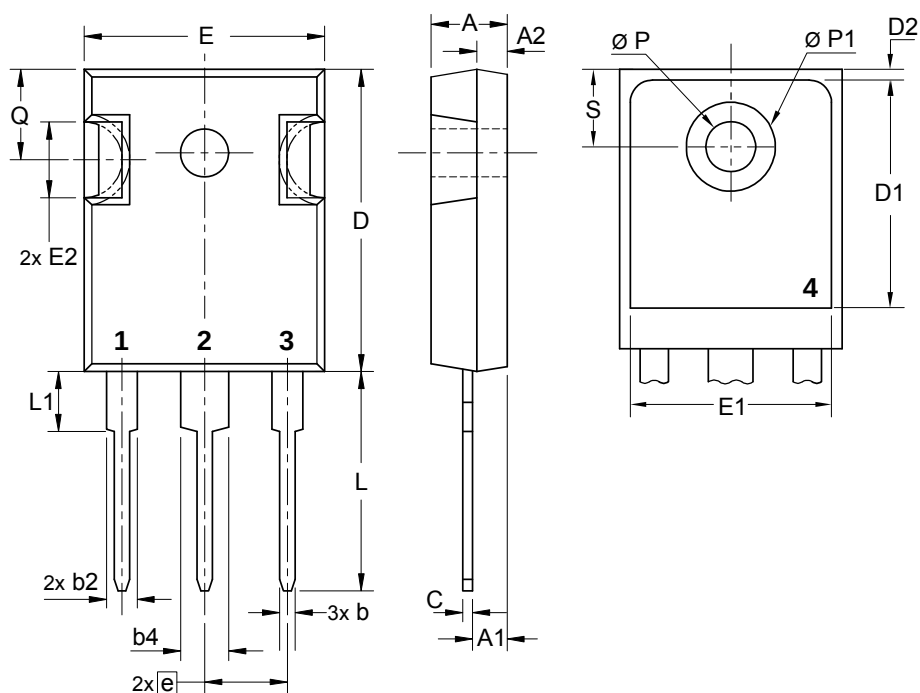
Diode

1.25

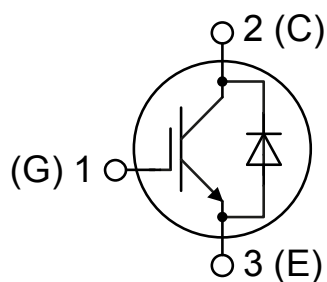
28.3

V

mΩ

Outlines TO-247


Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.215 BSC		5.46 BSC	
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212	0.244	5.38	6.19
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39



IGBT

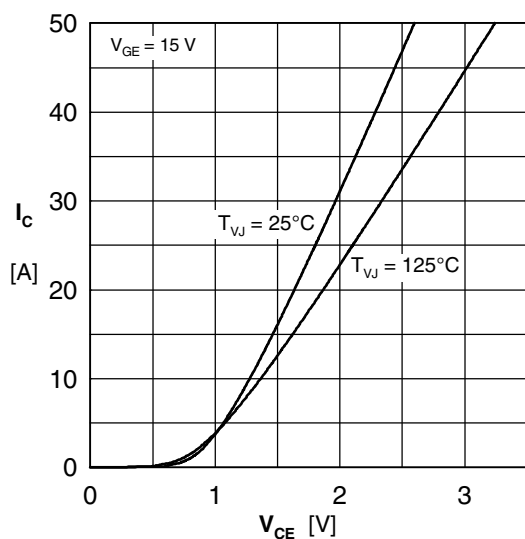


Fig. 1 Typ. output characteristics

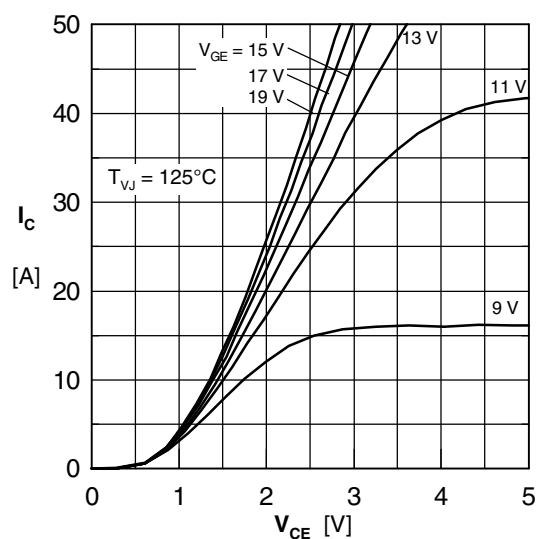


Fig. 2 Typ. output characteristics

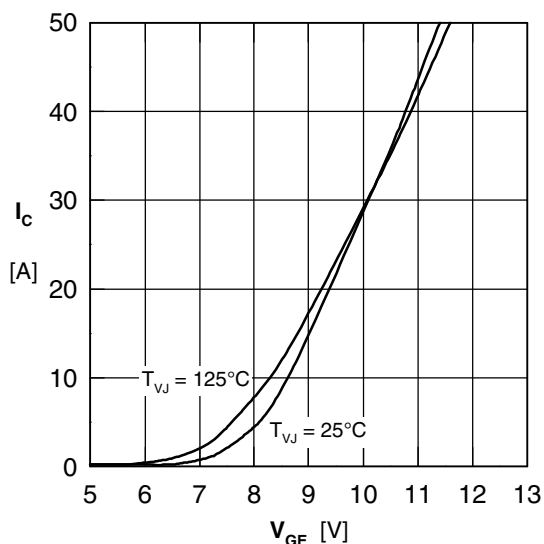


Fig. 3 Typ. transfer characteristics

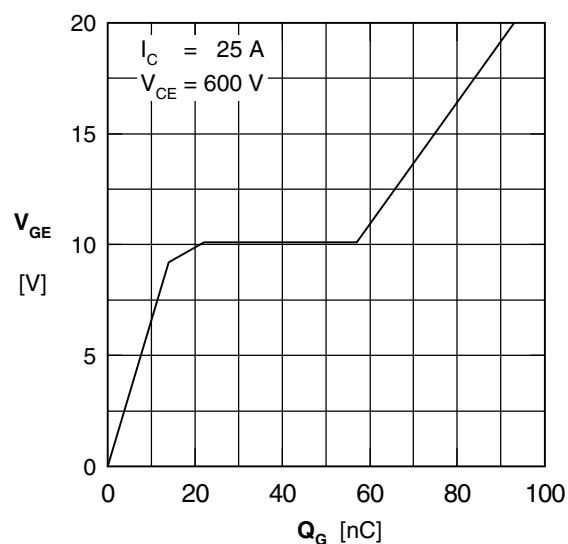


Fig. 4 Typ. turn-on gate charge

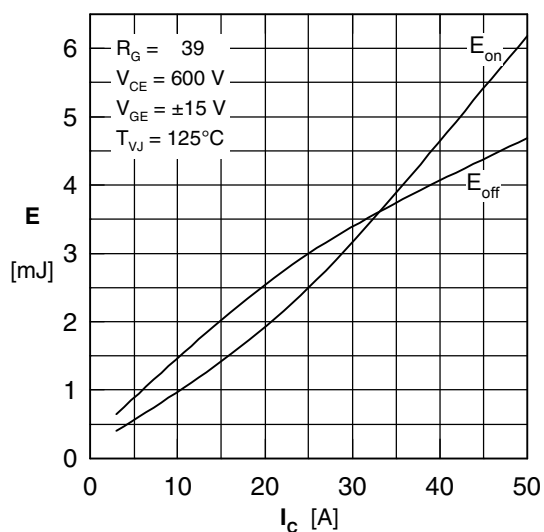


Fig. 5 Typ. switching energy vs. collector current

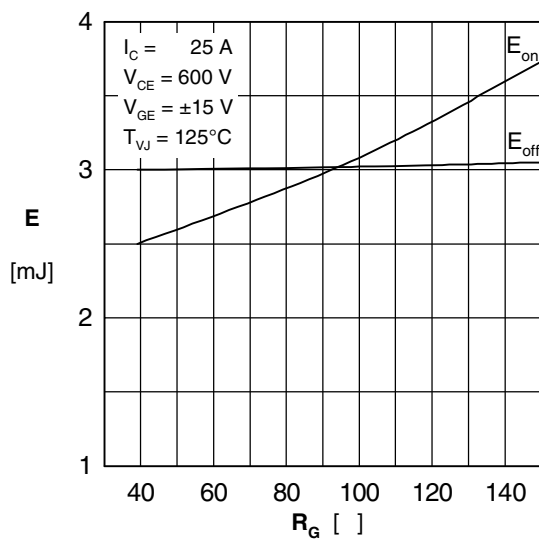


Fig. 6 Typ. switching energy vs. gate resistance

Diode

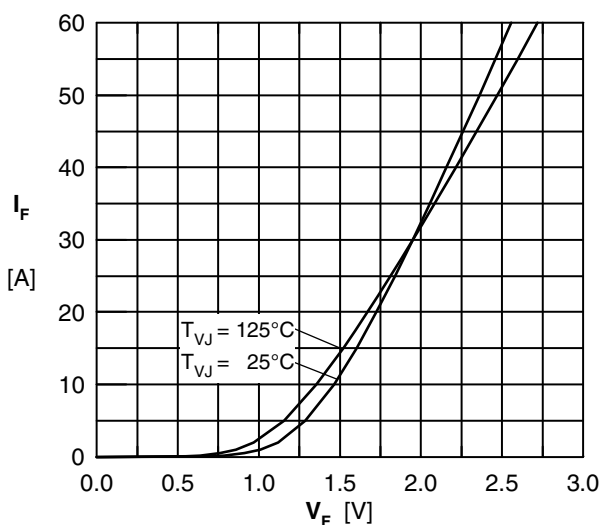


Fig. 7 Typ. Forward current versus V_F

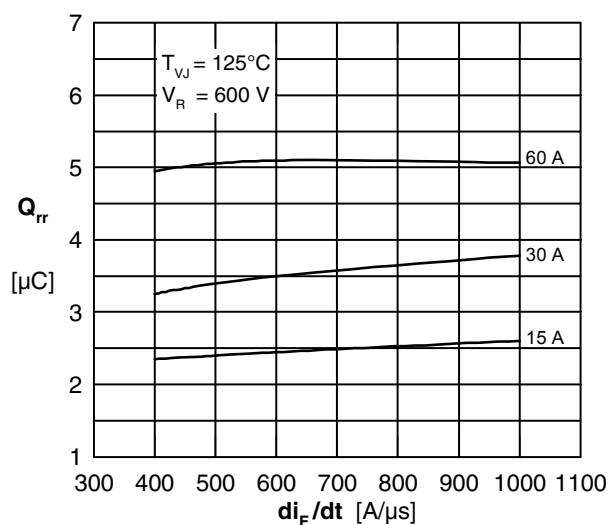


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

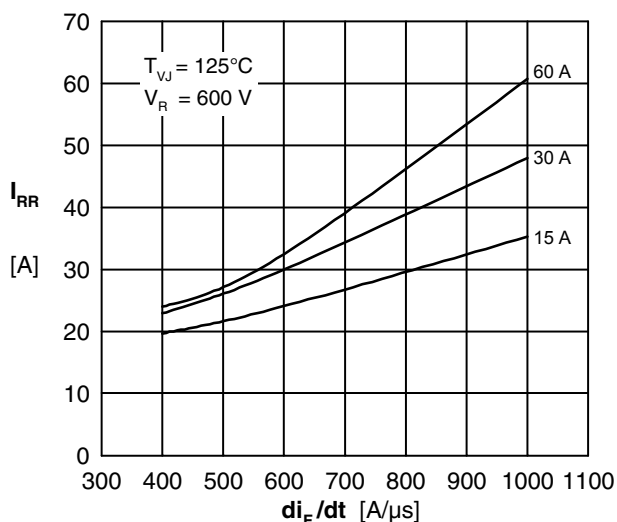


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

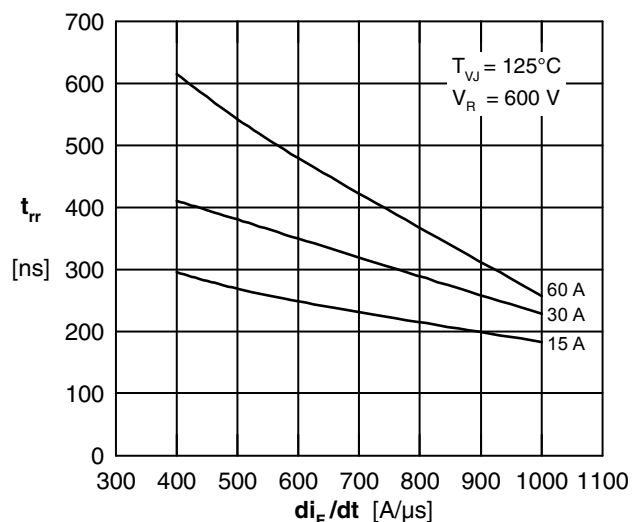


Fig. 10 Typ. recovery time t_{rr} versus di/dt

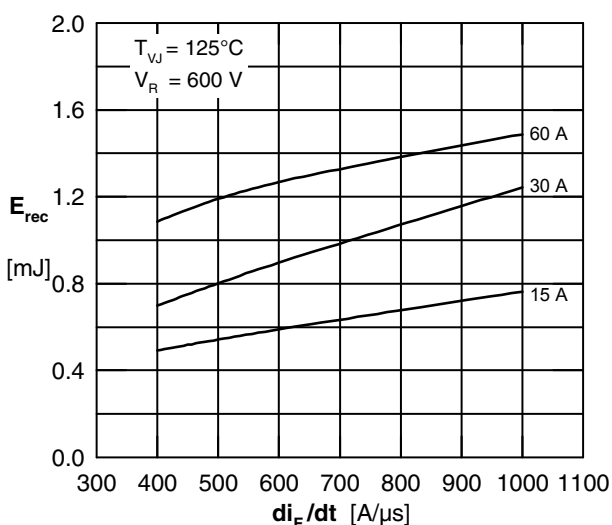


Fig. 11 Typ. recovery energy E_{rec} versus di/dt

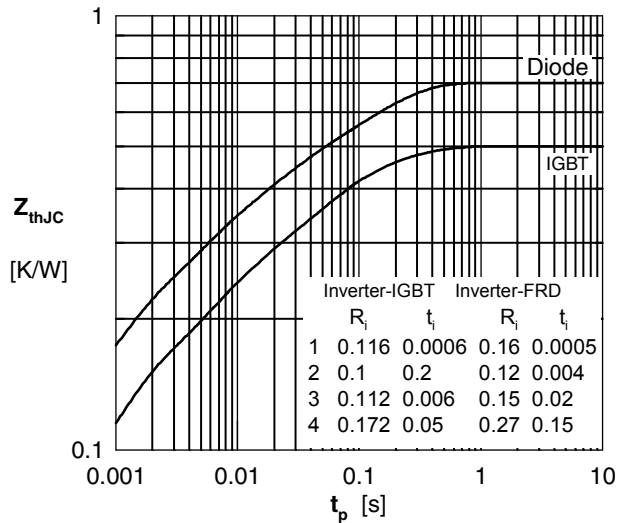


Fig. 12 Typ. transient thermal impedance



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.