

XPT IGBT

preliminary

$$V_{CES} = 1200V$$

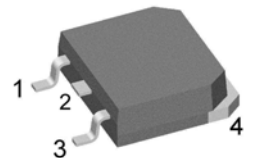
$$I_{C25} = 20A$$

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

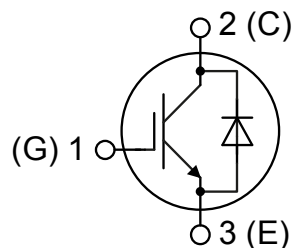
Copack

Part number

IXA12IF1200TC



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-268AA (D3Pak)

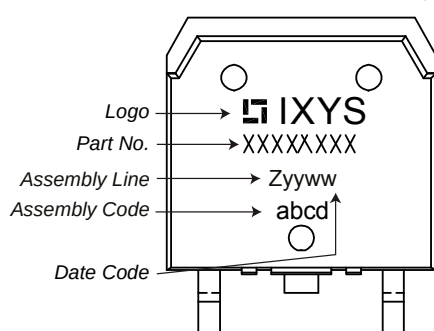
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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				20	A
I _{C100}		T _C = 100°C				13	A
P _{tot}	total power dissipation	T _C = 25°C				85	W
V _{CE(sat)}	collector emitter saturation voltage	I _C = 10A; V _{GE} = 15 V	T _{VJ} = 25°C T _{VJ} = 125°C		1.8 2.1	2.1	V V
V _{GE(th)}	gate emitter threshold voltage	I _C = 0.3mA; 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 T _{VJ} = 125°C			0.1	mA 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 = 10 A			27		nC
t _{d(on)}	turn-on delay time	inductive load V _{CE} = 600V; I _C = 10 A V _{GE} = ±15 V; R _G =100 Ω	T _{VJ} = 125°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				1.1		mJ
E _{off}	turn-off energy per pulse				1.1		mJ
RBSOA	reverse bias safe operating area	V _{GE} = ±15 V; R _G =100 Ω	T _{VJ} = 125°C				
I _{CM}		V _{CEmax} = 1200V				30	A
SCSOA	short circuit safe operating area	V _{CEmax} = 900 V					
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 = 100 Ω; non-repetitive			40		A
R _{thJC}	thermal resistance junction to case					1.5	K/W
R _{thCH}	thermal resistance case to heatsink				0.15		K/W
Diode							
V _{RRM}	max. repetitive reverse voltage	T _{VJ} = 25°C				1200	V
I _{F25}	forward current	T _C = 25°C				22	A
I _{F100}		T _C = 100°C				14	A
V _F	forward voltage	I _F = 10A	T _{VJ} = 25°C T _{VJ} = 125°C			2.20	V V
I _R	reverse current	V _R = V _{RRM}	T _{VJ} = 25°C T _{VJ} = 125°C			*	mA mA
* not applicable, see Ices value above						*	
Q _{rr}	reverse recovery charge	V _R = 600 V -di _F /dt = -250 A/μs I _F = 10A; V _{GE} = 0 V	T _{VJ} = 125°C		1.3		μC
I _{RM}	max. reverse recovery current				10.5		A
t _{rr}	reverse recovery time				350		ns
E _{rec}	reverse recovery energy				0.35		mJ
R _{thJC}	thermal resistance junction to case					1.8	K/W
R _{thCH}	thermal resistance case to heatsink				0.15		K/W

preliminary

Package TO-268AA (D3Pak)			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				5		g
F_c	mounting force with clip		20		120	N

Product Marking



Part number

I = IGBT
 X = XPT IGBT
 A = Gen 1 / std
 12 = Current Rating [A]
 IF = Copack
 1200 = Reverse Voltage [V]
 TC = TO-268AA (D3Pak) (2)

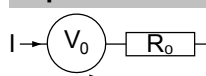
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA12IF1200TC	IXA12IF1200TC	Tube	30	508475

Similar Part	Package	Voltage class
IXA12IF1200HB	TO-247AD (3)	1200
IXA12IF1200PB	TO-220AB (3)	1200

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

153

Diode

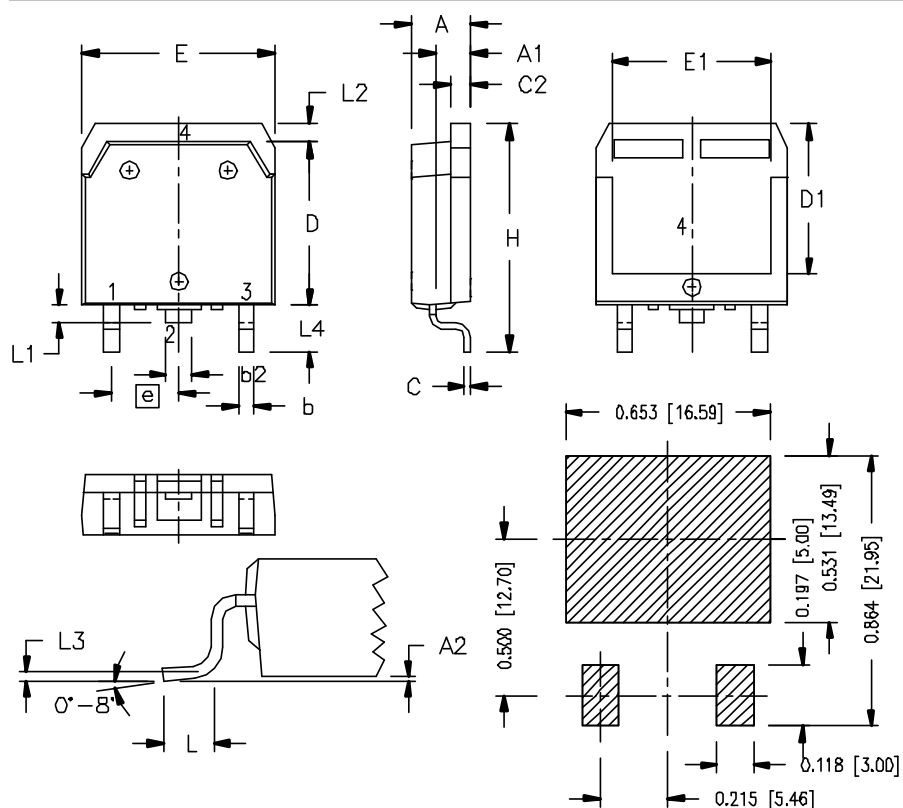
1.25

85

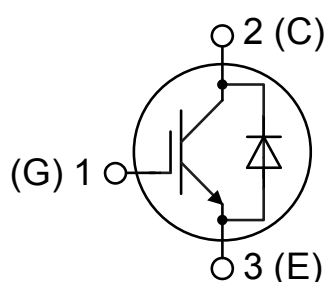
V

mΩ

Outlines TO-268AA (D3Pak)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.100
b	1.15	1.45	0.045	0.057
b2	1.90	2.10	0.075	0.083
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	12.40	12.70	0.488	0.500
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.45 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	2.40	2.70	0.094	0.106
L1	1.20	1.40	0.047	0.055
L2	1.00	1.15	0.039	0.045
L3	0.25 BSC		0.100 BSC	
L4	3.80	4.10	0.150	0.161



IGBT

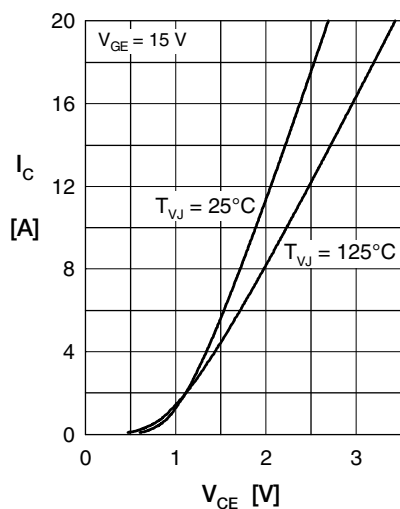


Fig. 1 Typ. output characteristics

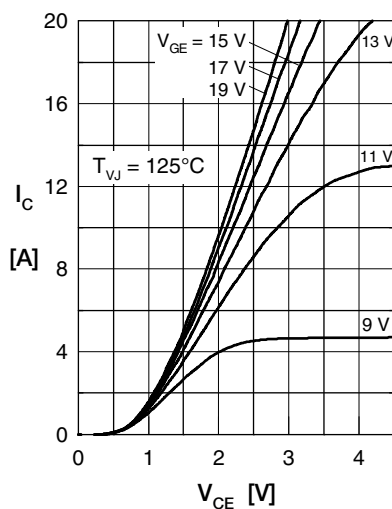


Fig. 2 Typ. output characteristics

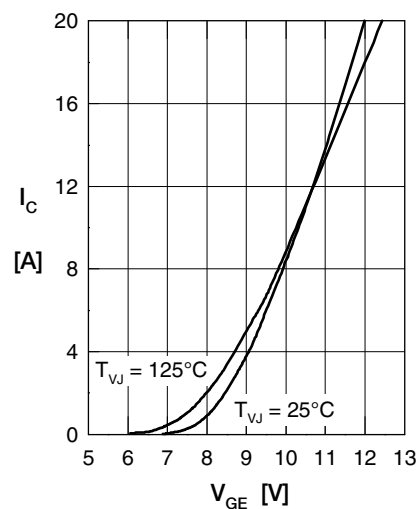


Fig. 3 Typ. transfer characteristics

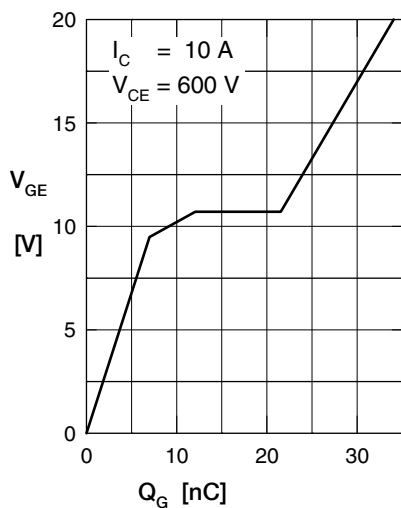


Fig. 4 Typ. turn-on gate charge

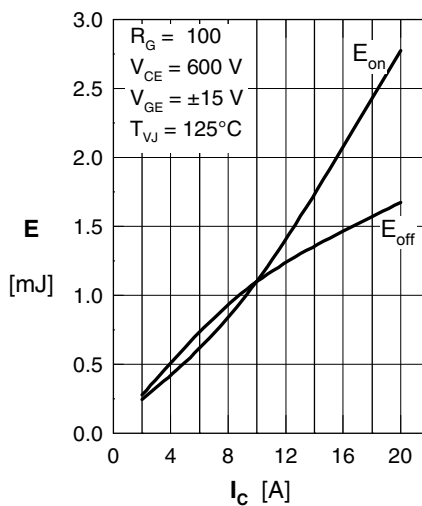


Fig. 5 Typ. switching energy vs. collector current

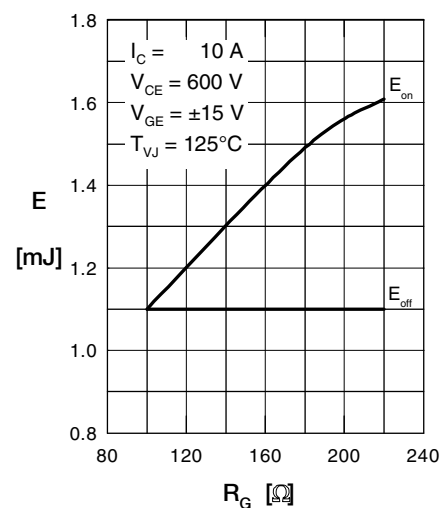


Fig. 6 Typ. switching energy vs. gate resistance

Fig. 7 Typ. transient thermal impedance junction to case

Diode

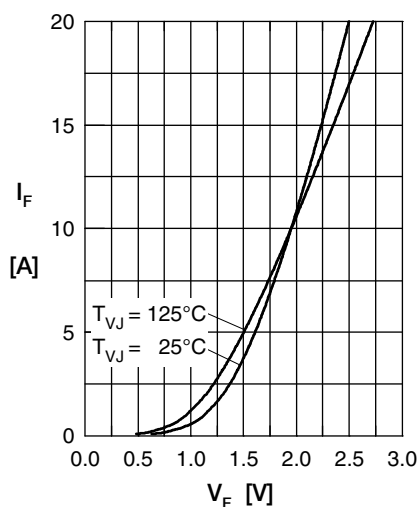


Fig. 1 Typ. forward current versus V_F

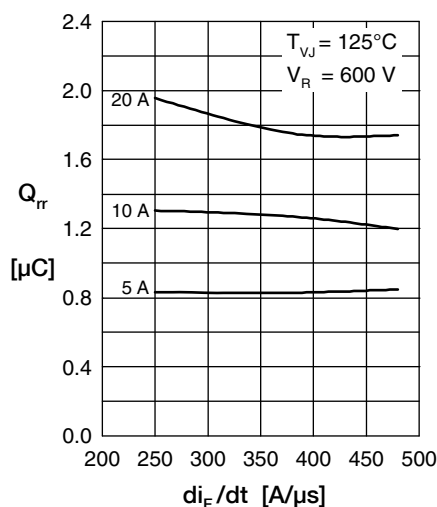


Fig. 2 Typical reverse recov. charge Q_{rr} versus di_F/dt

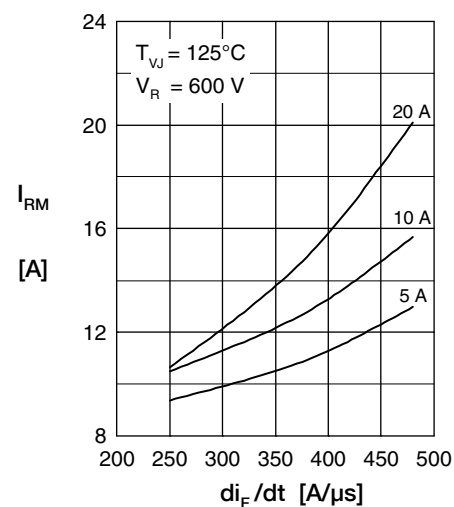


Fig. 3 Typ: peak reverse current I_{RM} versus di_F/dt

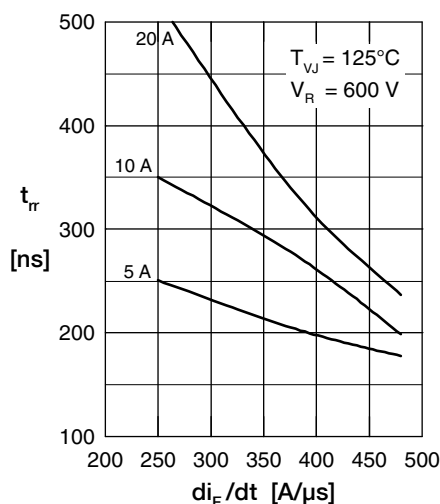


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

Fig. 5 Typ. recovery time t_{rr} versus di_F/dt

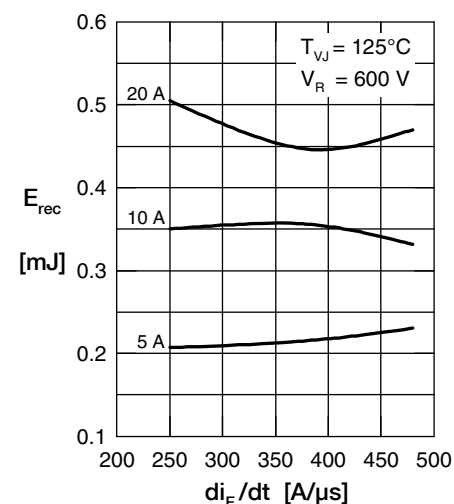


Fig. 6 Typ. recovery energy E_{rec} vs. di_F/dt

Fig. 7 Typ. transient thermal impedance junction to case



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.