

XPT IGBT

preliminary

$$V_{CES} = 1200V$$

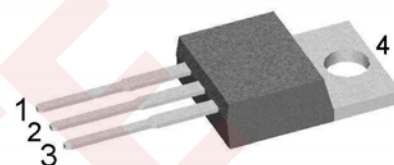
$$I_{C25} = 20A$$

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

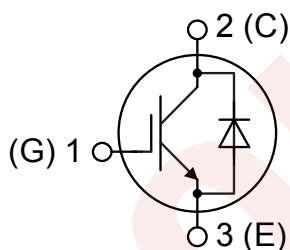
Copack

Part number

IXA12IF1200PB



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-220

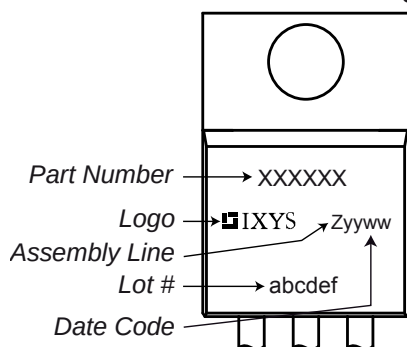
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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		1.8	2.1	V	
		T _{VJ} = 25°C		2.1		V	
		T _{VJ} = 125°C				V	
V _{GE(th)}	gate emitter threshold voltage	I _C = 0.3mA; V _{GE} = V _{CE}	5.4	5.9	6.5	V	
I _{CES}	collector emitter leakage current	V _{CE} = V _{CES} ; V _{GE} = 0 V			0.1	mA	
		T _{VJ} = 25°C				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 = 10 A		27		nC	
t _{d(on)}	turn-on delay time	inductive load V _{CE} = 600V; I _C = 10A 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					
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			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			0.50		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			2.20	V	
		T _{VJ} = 25°C		1.95		V	
		T _{VJ} = 125°C				V	
I _R	reverse current	V _R = V _{RRM}			*	mA	
	* not applicable, see Ices value above			*		mA	
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			0.50		K/W	

preliminary

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking



Part number

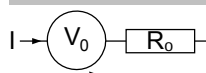
I = IGBT
 X = XPT IGBT
 A = Gen 1 / std
 12 = Current Rating [A]
 IF = Copack
 1200 = Reverse Voltage [V]
 PB = TO-220AB (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA12IF1200PB	IXA12IF1200PB	Tube	50	507428

Similar Part	Package	Voltage class
IXA12IF1200HB	TO-247AD (3)	1200
IXA12IF1200TC	TO-268AA (D3Pak) (2)	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

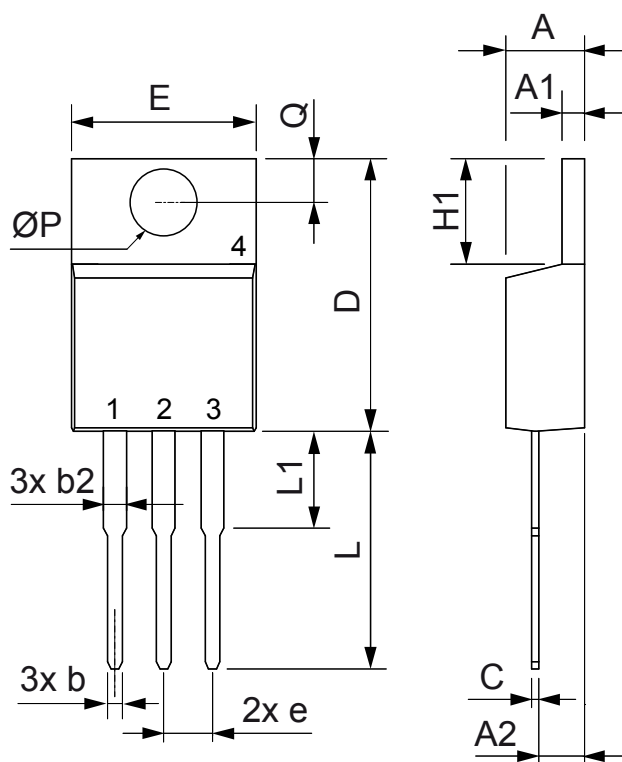
Diode

1.25

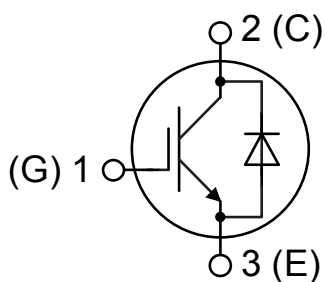
85 mΩ

V

Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	2.54	BSC	0.100	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



IGBT

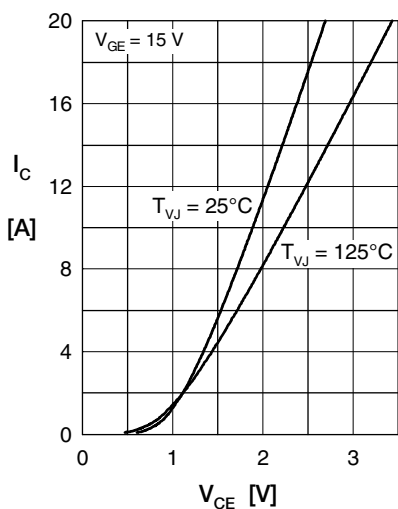


Fig. 1 Typ. output characteristics

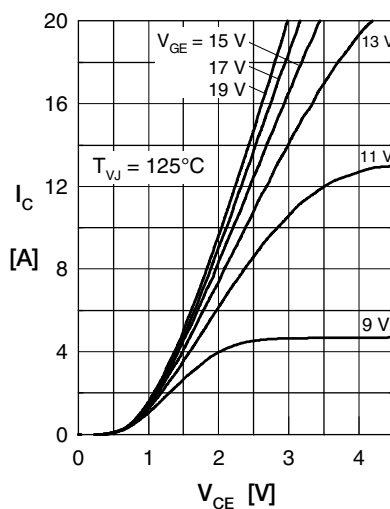


Fig. 2 Typ. output characteristics

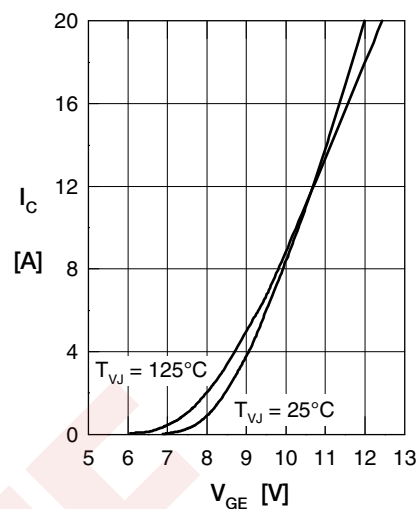


Fig. 3 Typ. transfer characteristics

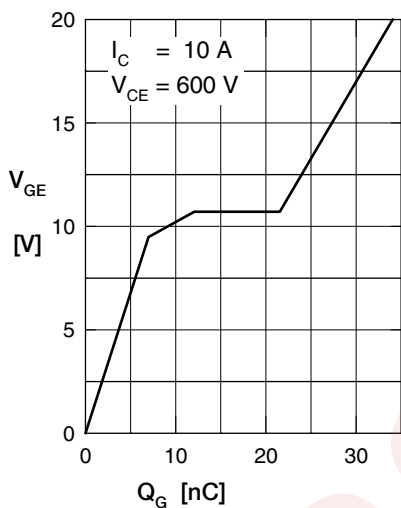


Fig. 4 Typ. turn-on gate charge

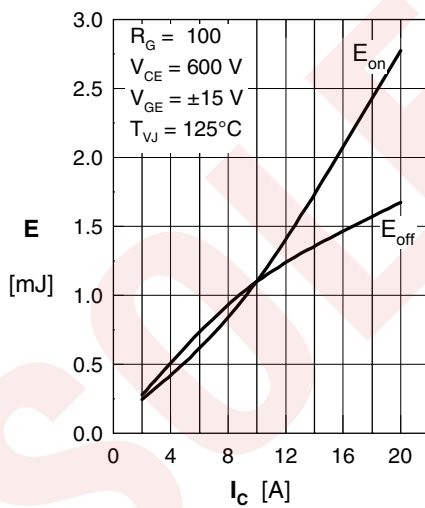


Fig. 5 Typ. switching energy vs. collector current

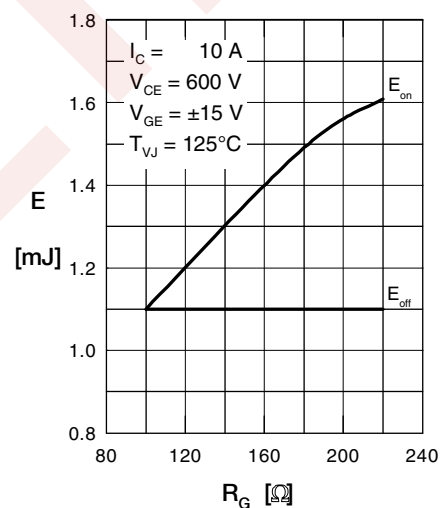


Fig. 6 Typ. switching energy vs. gate resistance

Fig. 7 Typ. transient thermal impedance junction to case

Diode

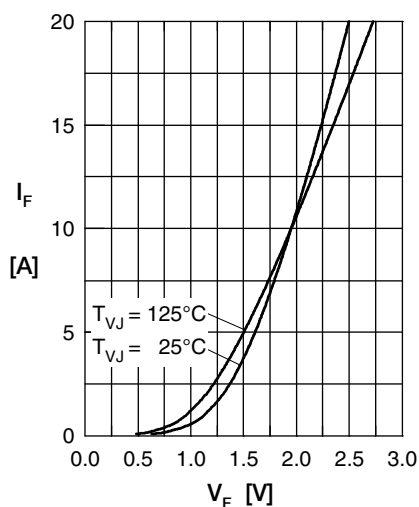


Fig. 1 Typ. forward current versus V_F

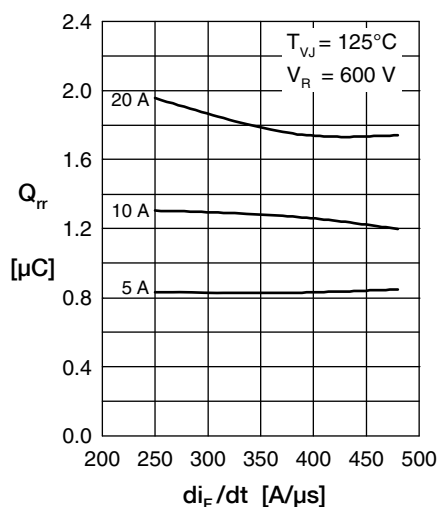


Fig. 2 Typical reverse recov. charge Q_{rr} versus di_F/dt

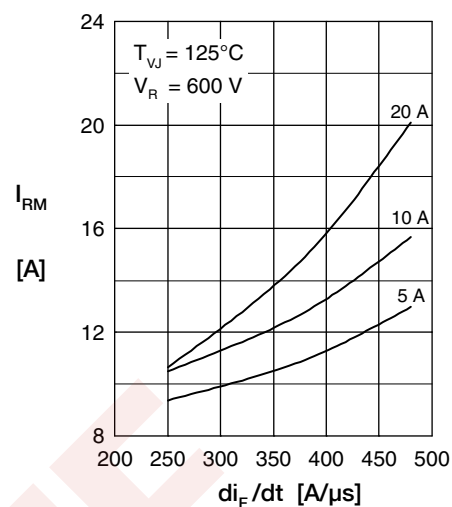


Fig. 3 Typ: peak reverse current I_{RM} versus di_F/dt

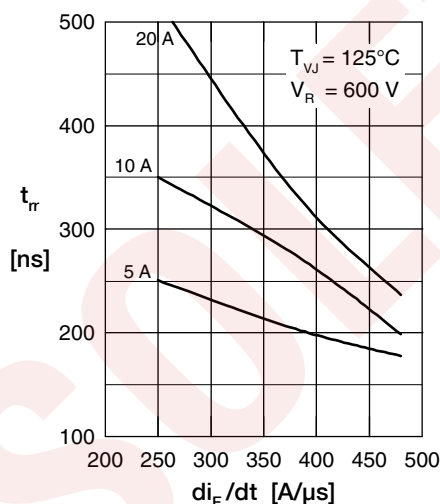


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

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

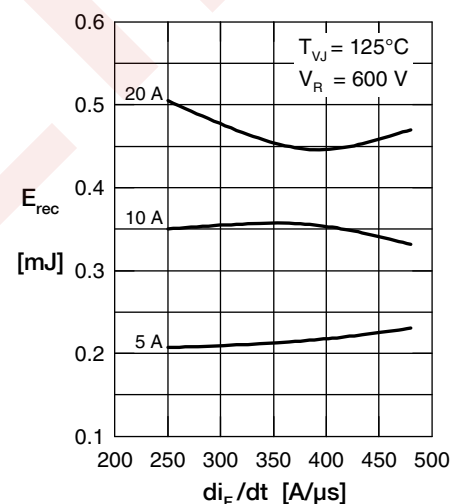


Fig. 6 Typ. recovery energy E_{rec} vs. di_F/dt

Fig. 7 Typ. transient thermal impedance junction to case

OBSOLETE

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IXYS
A Littelfuse Technology

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