

XPT IGBT

$$V_{CES} = 1200V$$

$$I_{C25} = 100A$$

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

Boost Chopper

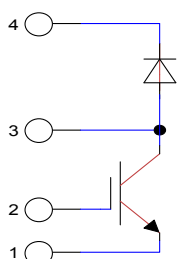
Part number

IXA70R1200NA



Backside: isolated

 E72873



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 $V_{CE(sat)}$

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

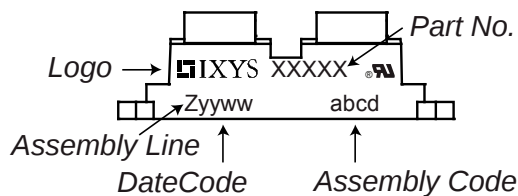
Package: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Either emitter terminal can be used as main or Kelvin emitter

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				100	A
I _{C80}		T _C = 80°C				65	A
P _{tot}	total power dissipation	T _C = 25°C				350	W
V _{CE(sat)}	collector emitter saturation voltage	I _C = 50A; 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 = 2mA; 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 = 50 A			190		nC
t _{d(on)}	turn-on delay time	inductive load T_{VJ} = 125°C V_{CE} = 600V; I_C = 50A V_{GE} = ±15 V; R_G = 15 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				4.5		mJ
E _{off}	turn-off energy per pulse				5.5		mJ
RBSOA	reverse bias safe operating area	V_{GE} = ±15 V; R_G = 15 Ω V_{CEmax} = 1200V	T _{VJ} = 125°C				
I _{CM}						150	A
SCSOA	short circuit safe operating area	V_{CEmax} = 1200 V V_{CE} = 900V; V_{GE} = ±15 V R_G = 15 Ω; non-repetitive	T _{VJ} = 125°C				
t _{sc}	short circuit duration					10	μs
I _{sc}	short circuit current			200		A	
R _{thJC}	thermal resistance junction to case					0.35	K/W
R _{thCH}	thermal resistance case to heatsink				0.10		K/W
Diode							
V _{RRM}	max. repetitive reverse voltage	T _{VJ} = 25°C				1200	V
I _{F25}	forward current	T _C = 25°C				85	A
I _{F80}		T _C = 80°C				51	A
V _F	forward voltage	I _F = 60A	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			0.1	mA mA
Q _{rr}	reverse recovery charge	V_R = 600 V -di_F/dt = 1200 A/μs I_F = 60A; V_{GE} = 0 V	T _{VJ} = 125°C			8	μC
I _{RM}	max. reverse recovery current					60	A
t _{rr}	reverse recovery time					350	ns
E _{rec}	reverse recovery energy					2.5	mJ
R _{thJC}	thermal resistance junction to case					0.6	K/W
R _{thCH}	thermal resistance case to heatsink				0.10		K/W

Package SOT-227B (minibloc)				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				150	A
T_{VJ}	virtual junction temperature			-40		150	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		150	°C
Weight					30		g
M_D	mounting torque			1.1		1.5	Nm
M_T	terminal torque			1.1		1.5	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	10.5	3.2			mm
$d_{Spb/Apb}$		terminal to backside	8.6	6.8			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V
		t = 1 minute		2500			V

Product Marking



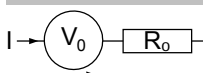
Part description

I = IGBT
 X = XPT IGBT
 A = Gen 1 / std
 70 = Current Rating [A]
 R = Boost Chopper
 1200 = Reverse Voltage [V]
 NA = SOT-227B (minibloc)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA70R1200NA	IXA70R1200NA	Tube	10	514148

Equivalent Circuits for Simulation

* on die level

 $T_{VJ} = 150^\circ\text{C}$  $V_{0\max}$ threshold voltage $R_{0\max}$ slope resistance *

IGBT

1.1

28

Diode

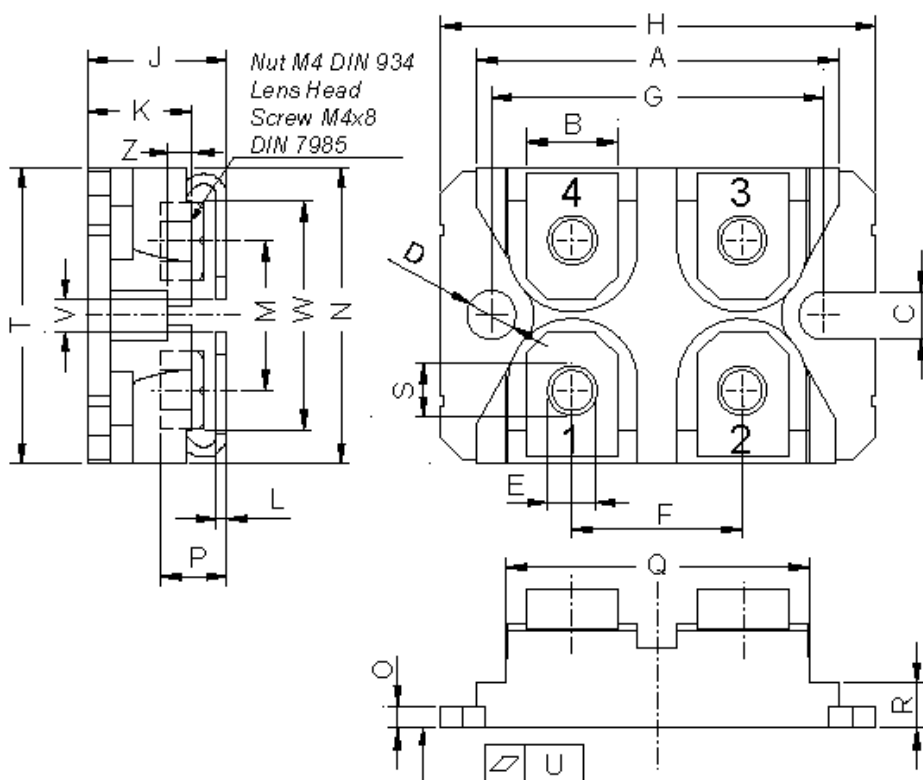
1.2

15

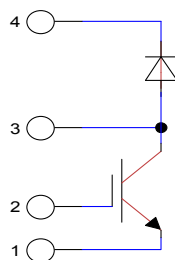
V

mΩ

Outlines SOT-227B (minibloc)



Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



IGBT

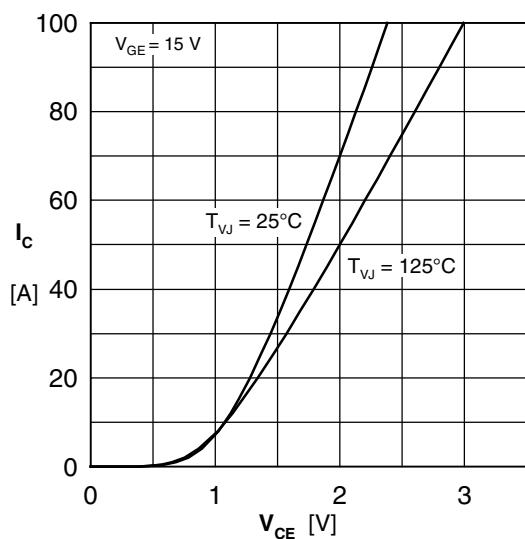


Fig. 1 Typ. output characteristics

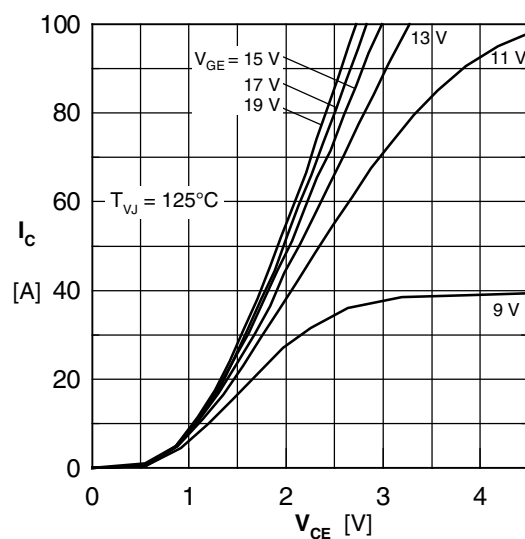


Fig. 2 Typ. output characteristics

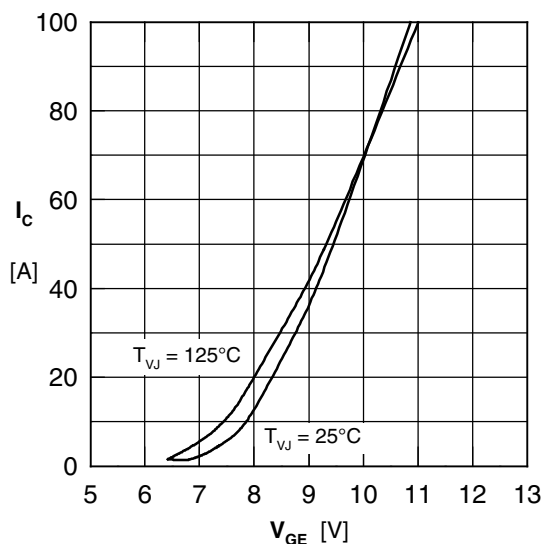


Fig. 3 Typ. transfer characteristics

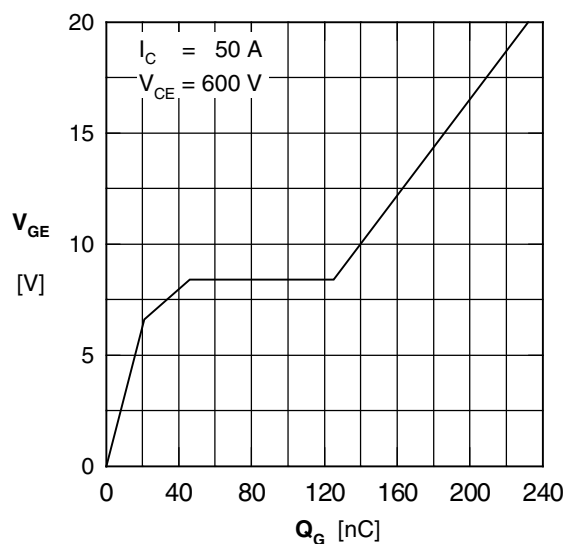


Fig. 4 Typ. turn-on gate charge

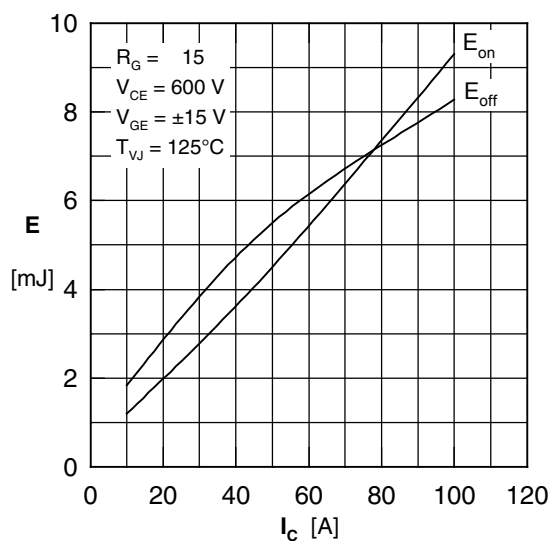


Fig. 5 Typ. switching energy vs. collector current

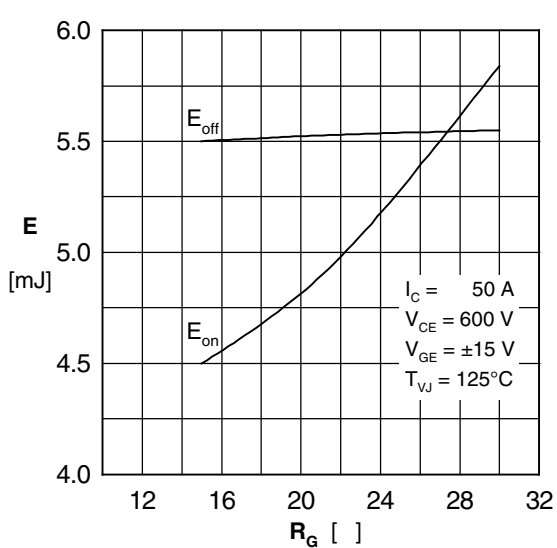


Fig. 6 Typ. switching energy vs. gate resistance

Diode

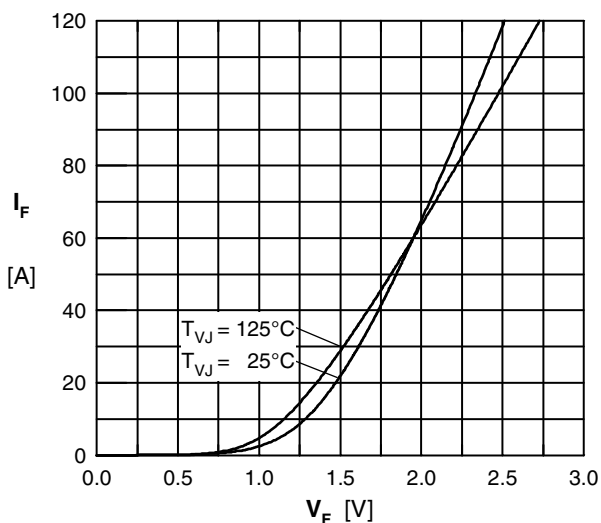


Fig. 7 Typ. Forward current versus V_F

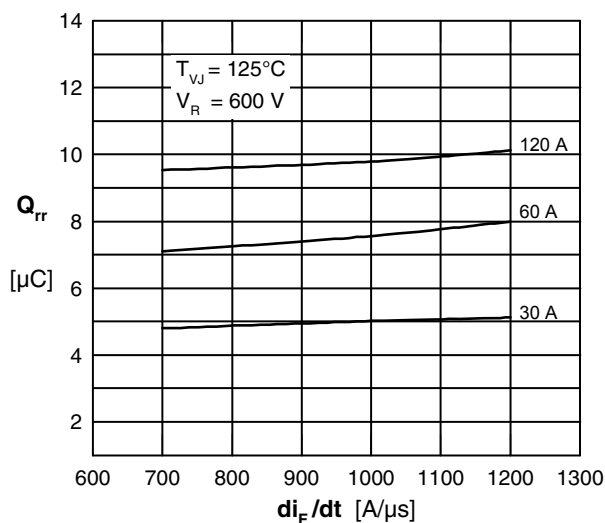


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

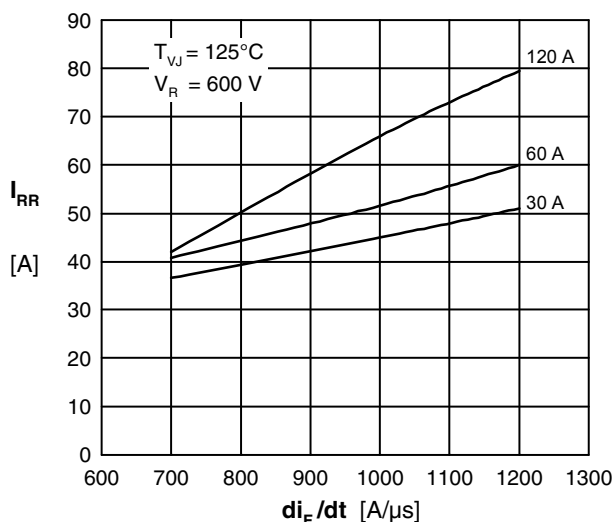


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

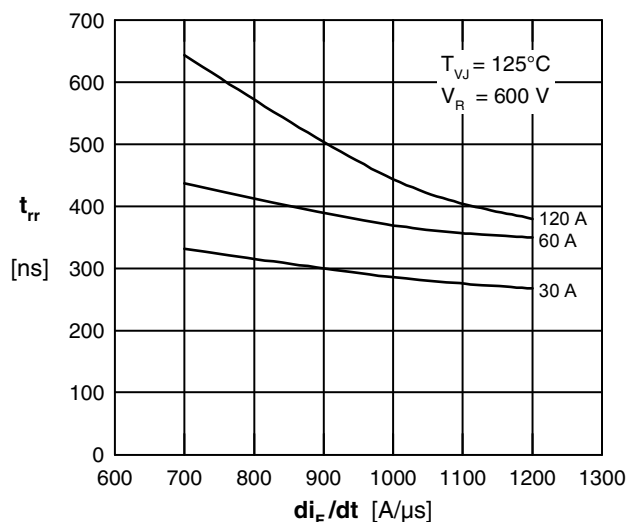


Fig. 10 Typ. recovery time t_{rr} versus di/dt

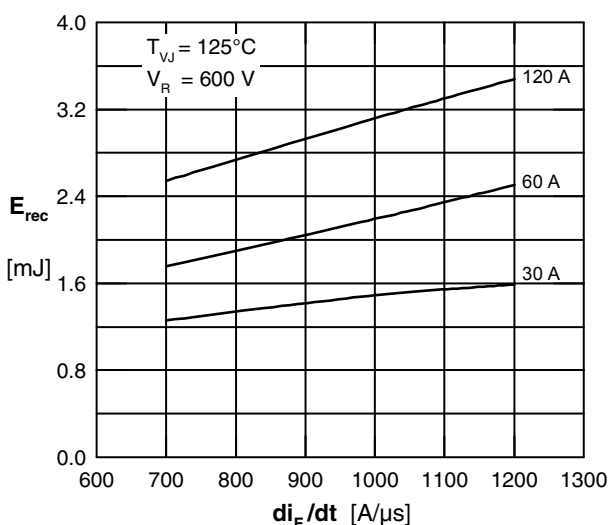


Fig. 11 Typ. recovery energy E_{rec} versus di/dt

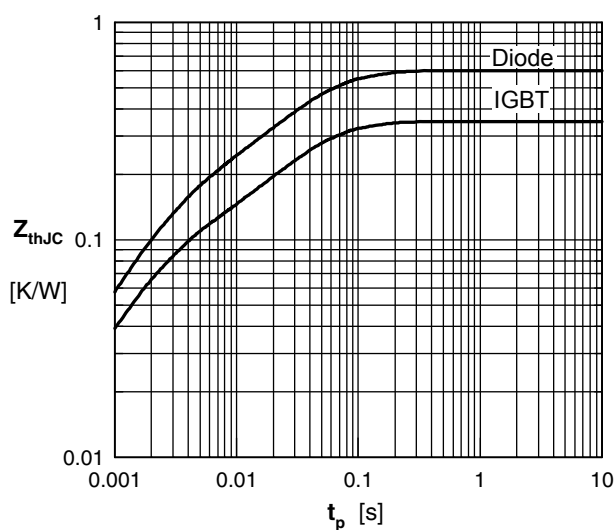


Fig. 12 Typ. transient thermal impedance



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.