

XPT IGBT

$$V_{CES} = 1200V$$

$$I_{C25} = 100A$$

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

Boost Chopper

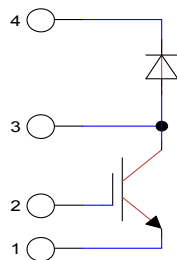
Part number

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 Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(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

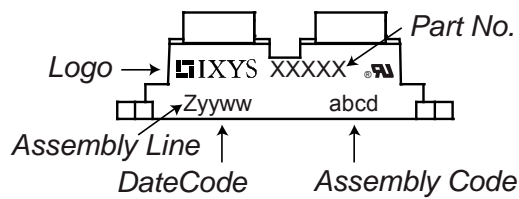
Package: SOT-227B (minibloc)

- 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	$T_{VJ} = 25^{\circ}C$			1200	V	
V_{GES}	max. DC gate voltage				± 20	V	
V_{GEM}	max. transient gate emitter voltage				± 30	V	
I_{C25}	collector current	$T_C = 25^{\circ}C$			100	A	
I_{C80}		$T_C = 80^{\circ}C$			65	A	
P_{tot}	total power dissipation	$T_C = 25^{\circ}C$			350	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 50A; V_{GE} = 15V$		1.8	2.1	V	
				2.1		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 2mA; V_{CE} = V_{CE}$	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	$V_{CE} = 600V; V_{GE} = 15V; I_C = 50A$		190		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600V; I_C = 50A$ $V_{GE} = \pm 15V; R_G = 15\Omega$		70		ns	
t_r	current rise time		$T_{VJ} = 125^{\circ}C$	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	$V_{GE} = \pm 15V; R_G = 15\Omega$					
I_{CM}		$V_{CEmax} = 1200V$			150	A	
SCSOA	short circuit safe operating area	$V_{CEmax} = 1200V$					
t_{sc}	short circuit duration	$V_{CE} = 900V; V_{GE} = \pm 15V$			10	μs	
I_{sc}	short circuit current	$R_G = 15\Omega; \text{non-repetitive}$		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	$T_{VJ} = 25^{\circ}C$			1200	V	
I_{F25}	forward current	$T_C = 25^{\circ}C$			85	A	
I_{F80}		$T_C = 80^{\circ}C$			51	A	
V_F	forward voltage	$I_F = 60A$			2.20	V	
				1.95		V	
I_R	reverse current	$V_R = V_{RRM}$			0.1	mA	
				0.3		mA	
Q_{rr}	reverse recovery charge	$V_R = 600V$ $-di_F/dt = 1200A/\mu s$ $I_F = 60A; V_{GE} = 0V$		8		μC	
I_{RM}	max. reverse recovery current		$T_{VJ} = 125^{\circ}C$	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		3000		V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500		V

Product Marking



Part description

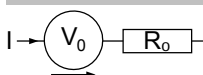
- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 70 = Current Rating [A]
- R = Boost Chopper
- 1200 = Reverse Voltage [V]
- NA = SOT-227B (minibloc)

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

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^\circ\text{C}$

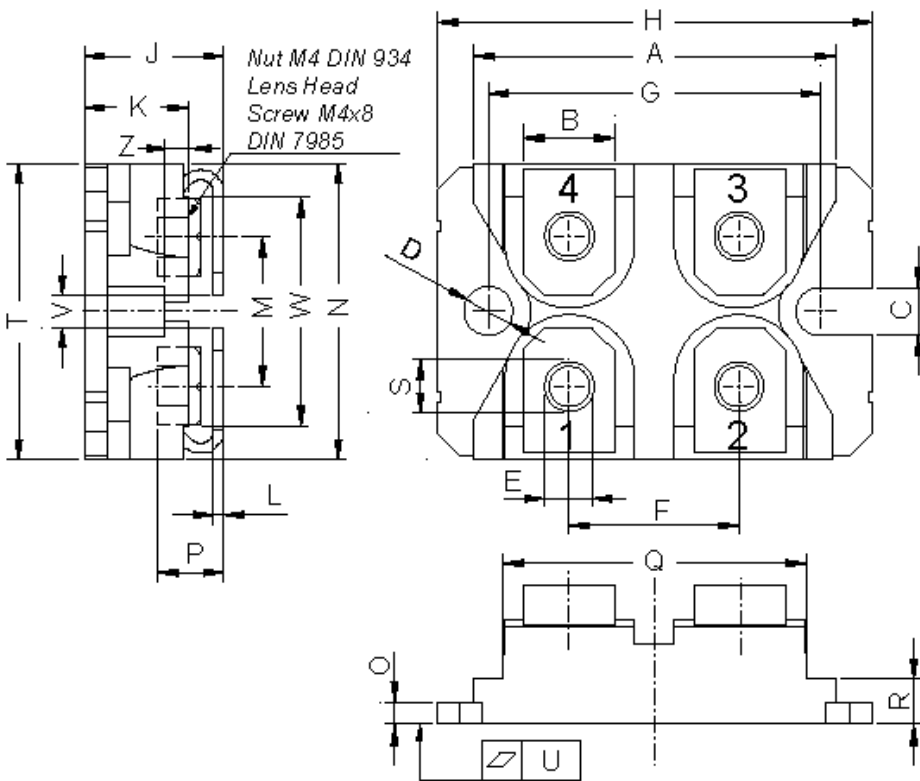


$V_{0\max}$ threshold voltage

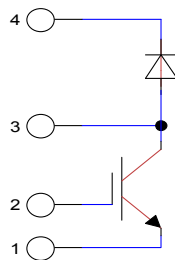
$R_{0\max}$ slope resistance *

	IGBT	Diode	
$V_{0\max}$	1.1	1.2	V
$R_{0\max}$	28	15	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

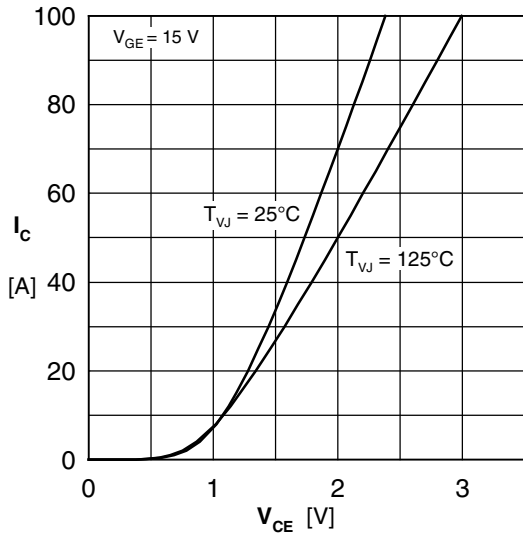


Fig. 1 Typ. output characteristics

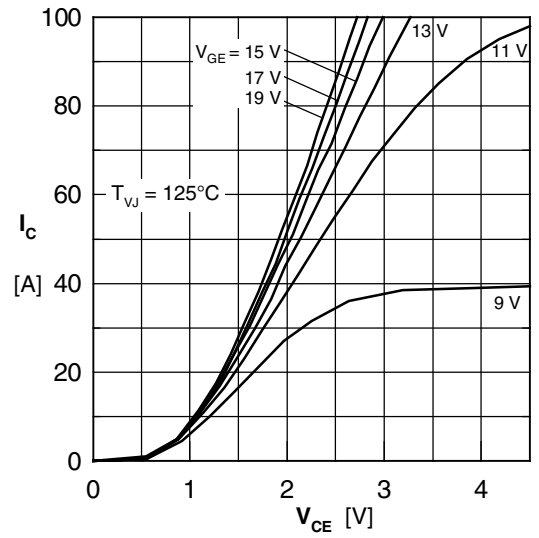


Fig. 2 Typ. output characteristics

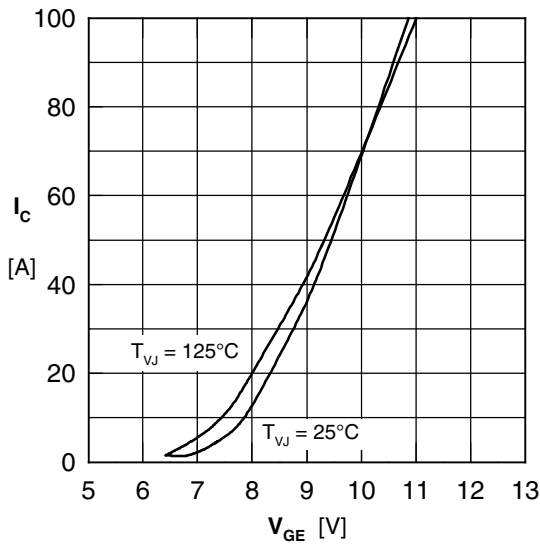


Fig. 3 Typ. transfer characteristics

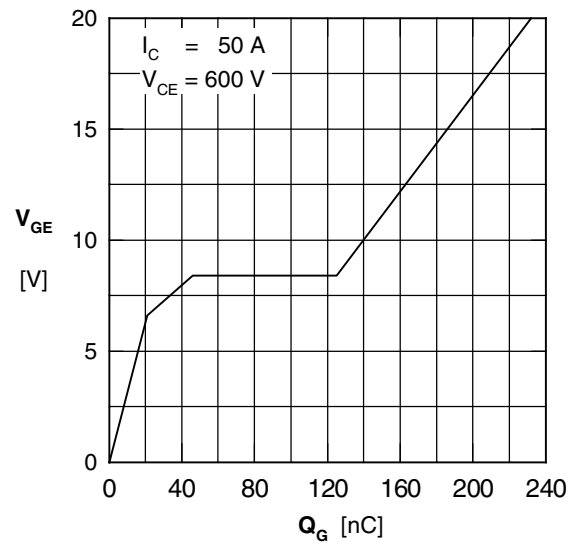


Fig. 4 Typ. turn-on gate charge

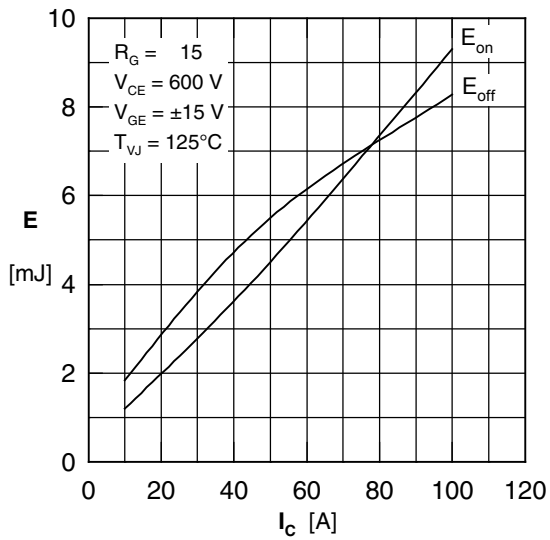


Fig. 5 Typ. switching energy vs. collector current

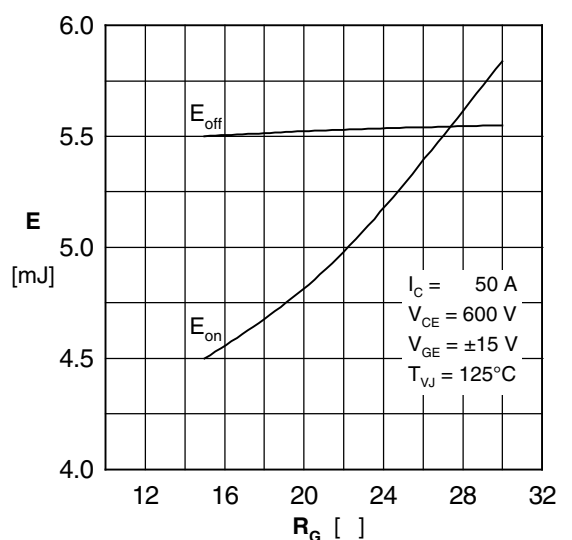


Fig. 6 Typ. switching energy vs. gate resistance

Diode

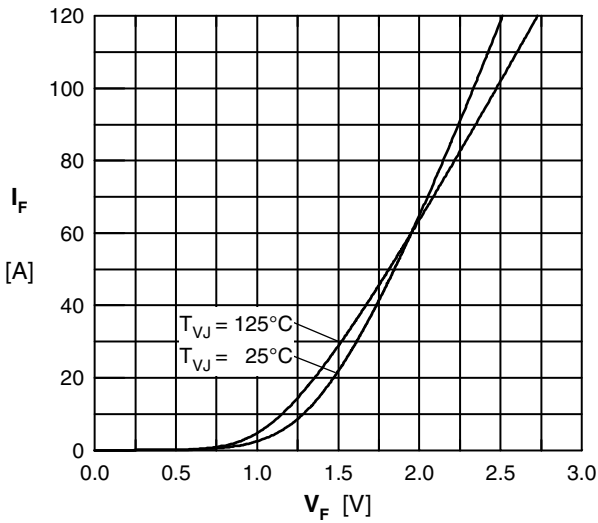


Fig. 7 Typ. Forward current versus V_F

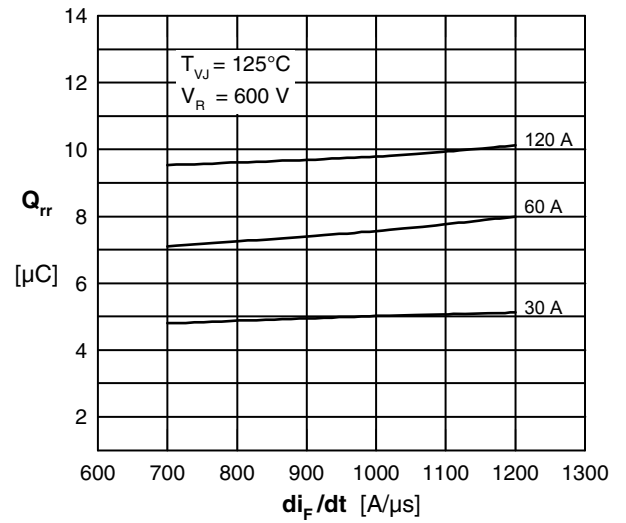


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

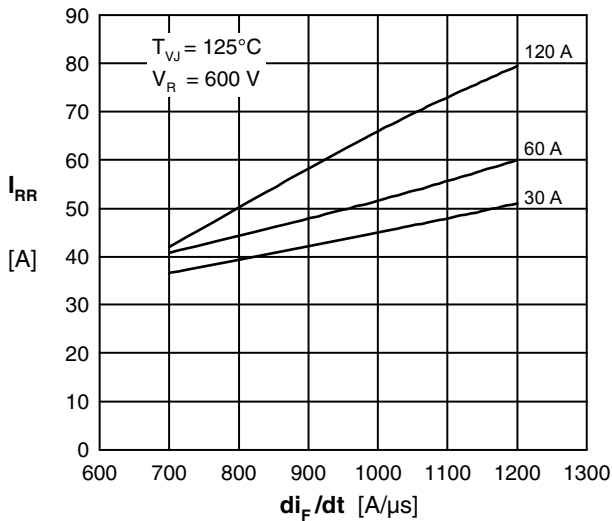


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

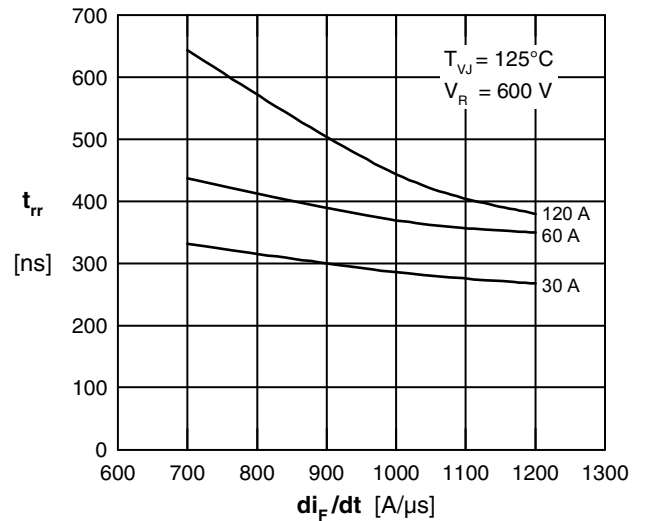


Fig. 10 Typ. recovery time t_{rr} versus di/dt

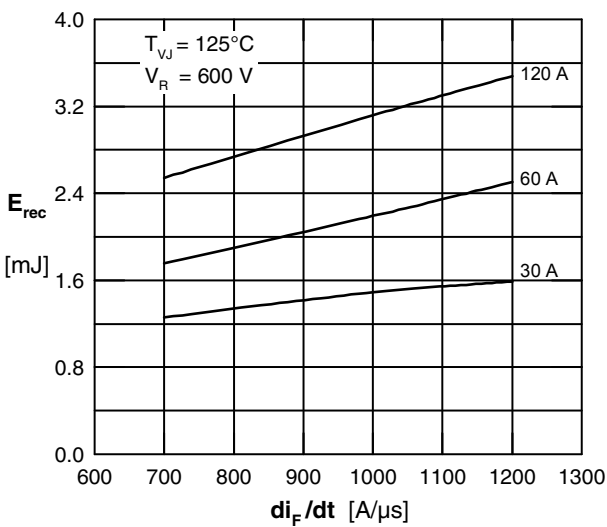


Fig. 11 Typ. recovery energy E_{rec} versus di/dt

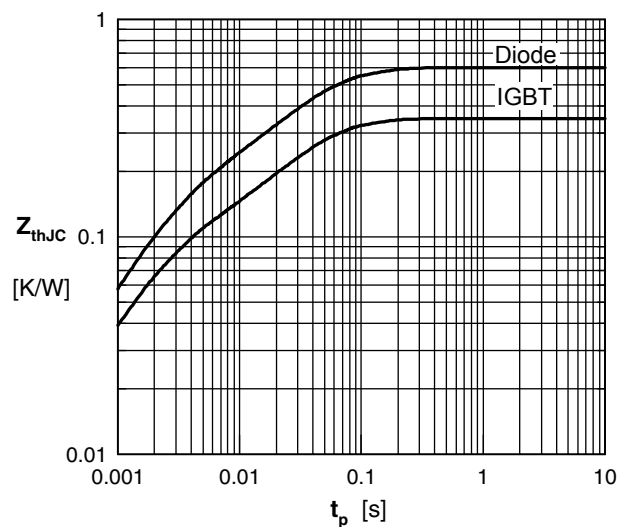


Fig. 12 Typ. transient thermal impedance



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.