

## XPT IGBT

## Single IGBT

Part number

IXA220I650NA

tentative

$$V_{CES} = 650V$$

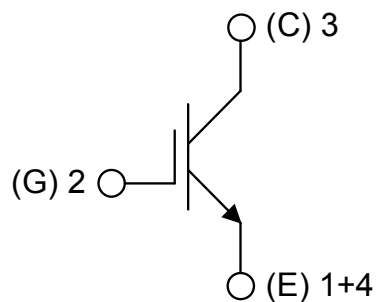
$$I_{C25} = 255A$$

$$V_{CE(sat)} = 1.6V$$



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  $\mu$ sec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 2x 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

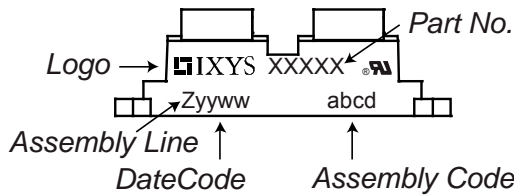
IGBT				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{CES}$	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			650	V	
$V_{GES}$	max. DC gate voltage				$\pm 20$	V	
$V_{GEM}$	max. transient gate emitter voltage				$\pm 30$	V	
$I_{C25}$	collector current	$T_C = 25^{\circ}\text{C}$			255	A	
$I_{C80}$		$T_C = 80^{\circ}\text{C}$			156	A	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			625	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 200\text{A}; V_{GE} = 15\text{V}$		1.6	1.8	V	
				1.9		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 3.2\text{mA}; V_{GE} = V_{CE}$	4	4.8	5.5	V	
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{V}$			0.1	mA	
				0.1		mA	
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 300\text{V}; V_{GE} = 15\text{V}; I_C = 200\text{A}$		280		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 300\text{V}; I_C = 200\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 3.9\Omega$		30		ns	
$t_r$	current rise time		$T_{VJ} = 125^{\circ}\text{C}$		50		ns
$t_{d(off)}$	turn-off delay time				100		ns
$t_f$	current fall time				40		ns
$E_{on}$	turn-on energy per pulse				2		mJ
$E_{off}$	turn-off energy per pulse				7.6		mJ
<b>RBSOA</b>	reverse bias safe operating area	$V_{GE} = \pm 15\text{V}; R_G = 3.9\Omega$					
$I_{CM}$		$V_{CEmax} = 650\text{V}$			400	A	
<b>SCSOA</b>	short circuit safe operating area	$V_{CEmax} = 650\text{V}$					
$t_{sc}$	short circuit duration	$V_{CE} = 360\text{V}; V_{GE} = \pm 15\text{V}$			10	$\mu\text{s}$	
$I_{sc}$	short circuit current	$R_G = 3.9\Omega; \text{non-repetitive}$		800		A	
$R_{thJC}$	thermal resistance junction to case				0.2	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.10		K/W	

tentative

Package SOT-227B (minibloc)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal <sup>1)</sup>			150	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				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

<sup>1)</sup>  $I_{RMS}$  is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

### Product Marking



### Part description

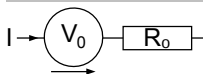
- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 220 = Current Rating [A]
- I = Single IGBT
- 650 = Reverse Voltage [V]
- NA = SOT-227B (minibloc)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA220I650NA	IXA220I650NA	Tube	10	514555

### Equivalent Circuits for Simulation

\* on die level

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



IGBT

$V_{0\ max}$  threshold voltage

1.1

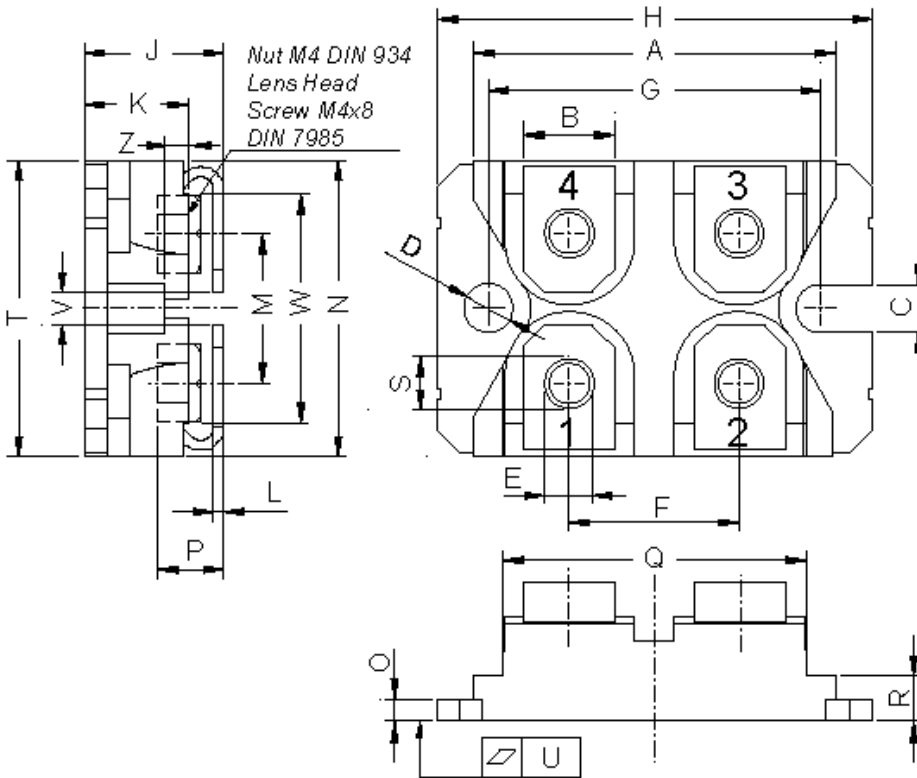
V

$R_{0\ max}$  slope resistance \*

5.3

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

