

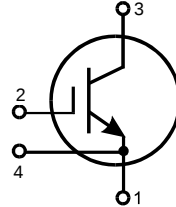
# High Voltage IGBT

## IXSN 55N120A

$$\begin{aligned} V_{CES} &= 1200 \text{ V} \\ I_{C25} &= 110 \text{ A} \\ V_{CE(sat)} &= 4 \text{ V} \end{aligned}$$

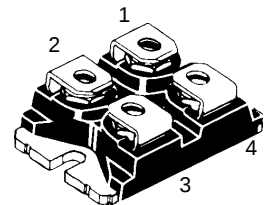
### Short Circuit SOA Capability

Preliminary Data



| Symbol                             | Test Conditions                                                                                                      | Maximum Ratings                          |                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------|
| $V_{CES}$                          | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                                                                       | 1200                                     | V                      |
| $V_{CGR}$                          | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$                                           | 1200                                     | A                      |
| $V_{GES}$                          | Continuous                                                                                                           | $\pm 20$                                 | V                      |
| $V_{GEM}$                          | Transient                                                                                                            | $\pm 30$                                 | V                      |
| $I_{C25}$                          | $T_C = 25^\circ\text{C}$                                                                                             | 110                                      | A                      |
| $I_{C90}$                          | $T_C = 90^\circ\text{C}$                                                                                             | 55                                       | A                      |
| $I_{CM}$                           | $T_C = 25^\circ\text{C}, 1 \text{ ms}$                                                                               | 160                                      | A                      |
| <b>SSOA (RBSOA)</b>                | $V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 22 \Omega$<br>Clamped inductive load, $L = 30 \mu\text{H}$ | $I_{CM} = 110$<br>@ $0.8 V_{CES}$        | A                      |
| <b><math>t_{SC}</math> (SCSOA)</b> | $V_{GE} = 15 \text{ V}, V_{CE} = 0.6 V_{CES}, T_J = 125^\circ\text{C}$<br>$R_G = 22 \Omega$ , non-repetitive         | 10                                       | $\mu\text{s}$          |
| $P_C$                              | $T_C = 25^\circ\text{C}$                                                                                             | 500                                      | W                      |
| $V_{ISOL}$                         | 50/60 Hz<br>$I_{ISOL} \leq 1 \text{ mA}$                                                                             | $t = 1 \text{ min}$<br>$t = 1 \text{ s}$ | 2500 V~<br>3000 V~     |
| $T_J$                              |                                                                                                                      | -55 ... +150                             | $^\circ\text{C}$       |
| $T_{JM}$                           |                                                                                                                      | 150                                      | $^\circ\text{C}$       |
| $T_{stg}$                          |                                                                                                                      | -55 ... +150                             | $^\circ\text{C}$       |
| $M_d$                              | Mounting torque<br>Terminal connection torque (M4)                                                                   | 1.5/13<br>1.5/13                         | Nm/lb.in.<br>Nm/lb.in. |
| <b>Weight</b>                      |                                                                                                                      | 30                                       | g                      |

miniBLOC, SOT-227 B



1 = Emitter ①      3 = Collector  
2 = Gate            4 = Emitter ①

① Either Emitter terminal can be used as Main or Kelvin Emitter

### Features

- International standard package miniBLOC
- Aluminium-nitride isolation
  - high power dissipation
- Isolation voltage 3000 V~
- UL registered E 153432
- Low  $V_{CE(sat)}$ 
  - for minimum on-state conduction losses
- Low collector-to-case capacitance (<100 pF)
  - reduces RFI
- Low package inductance (< 10 nH)
  - easy to drive and to protect

### Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

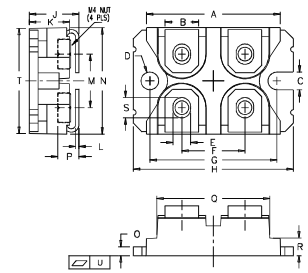
### Advantages

- Space savings
- Easy to mount with 2 screws
- High power density

| Symbol        | Test Conditions                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                      |
|---------------|---------------------------------------------------|-----------------------------------------------------------------------------------|------|----------------------|
|               |                                                   | Min.                                                                              | Typ. | Max.                 |
| $BV_{CES}$    | $I_C = 6 \text{ mA}, V_{GE} = 0 \text{ V}$        | 1200                                                                              |      | V                    |
| $V_{GE(th)}$  | $I_C = 8 \text{ mA}, V_{CE} = V_{GE}$             | 4                                                                                 |      | 8 V                  |
| $I_{CES}$     | $V_{CE} = 0.8 V_{CES}$<br>$V_{GE} = 0 \text{ V}$  |                                                                                   |      | 1 mA<br>2.5 mA       |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ |                                                                                   |      | $\pm 200 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}, V_{GE} = 15 \text{ V}$            |                                                                                   |      | 4 V                  |

| Symbol       | Test Conditions                                                                                                                                                                                                                                                              | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------|
|              |                                                                                                                                                                                                                                                                              | Min.                                                                              | Typ. | Max.     |
| $g_{fs}$     | $I_C = I_{C90}$ ; $V_{CE} = 10\text{ V}$<br>Pulse test, $t \leq 300\text{ }\mu\text{s}$ , duty cycle $d \leq 2\%$                                                                                                                                                            | 32                                                                                | 45   | S        |
| $I_{C(on)}$  | $V_{CE} = 10\text{ V}$ , $V_{GE} = 15\text{ V}$                                                                                                                                                                                                                              |                                                                                   | 340  | A        |
| $C_{ies}$    | $V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$ , $f = 1\text{ MHz}$                                                                                                                                                                                                          |                                                                                   | 8000 | pF       |
| $C_{oes}$    |                                                                                                                                                                                                                                                                              |                                                                                   | 590  | pF       |
| $C_{res}$    |                                                                                                                                                                                                                                                                              |                                                                                   | 120  | pF       |
| $Q_g$        | $I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$                                                                                                                                                                                                            |                                                                                   | 300  | nC       |
| $Q_{ge}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 80   | nC       |
| $Q_{gc}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 140  | nC       |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.8 V_{CES}$ , $R_G = 2.7\text{ }\Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$  |                                                                                   | 140  | ns       |
| $t_{ri}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 220  | ns       |
| $t_{d(off)}$ |                                                                                                                                                                                                                                                                              |                                                                                   | 400  | ns       |
| $t_{fi}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 700  | ns       |
| $E_{off}$    |                                                                                                                                                                                                                                                                              |                                                                                   | 18   | mJ       |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.8 V_{CES}$ , $R_G = 2.7\text{ }\Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$ |                                                                                   | 140  | ns       |
| $t_{ri}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 250  | ns       |
| $t_{d(off)}$ |                                                                                                                                                                                                                                                                              |                                                                                   | 600  | ns       |
| $t_{si}$     |                                                                                                                                                                                                                                                                              |                                                                                   | 900  | ns       |
| $t_c$        |                                                                                                                                                                                                                                                                              |                                                                                   | 950  | ns       |
| $E_{(on)}$   |                                                                                                                                                                                                                                                                              |                                                                                   | 6    | mJ       |
| $E_{off}$    |                                                                                                                                                                                                                                                                              |                                                                                   | 25   | mJ       |
| $R_{thJC}$   |                                                                                                                                                                                                                                                                              |                                                                                   |      | 0.25 K/W |
| $R_{thCK}$   |                                                                                                                                                                                                                                                                              |                                                                                   | 0.05 | K/W      |

## miniBLOC, SOT-227 B



M4 screws (4x) supplied

| 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    | 38.00      | 38.23 | 1.496  | 1.505 |
| J    | 11.68      | 12.22 | 0.460  | 0.481 |
| K    | 8.92       | 9.60  | 0.351  | 0.378 |
| L    | 0.76       | 0.84  | 0.030  | 0.033 |
| M    | 12.60      | 12.85 | 0.496  | 0.506 |
| N    | 25.15      | 25.42 | 0.990  | 1.001 |
| O    | 1.98       | 2.13  | 0.078  | 0.084 |
| P    | 4.95       | 5.97  | 0.195  | 0.235 |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | 0.155  | 0.174 |
| S    | 4.72       | 4.85  | 0.186  | 0.191 |
| T    | 24.59      | 25.07 | 0.968  | 0.987 |
| U    | -0.05      | 0.1   | -0.002 | 0.004 |