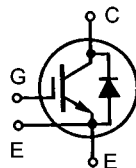


# High Voltage IGBT with Diode

Short Circuit SOA Capability

Preliminary Data

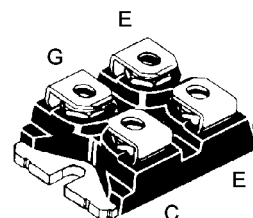
## IXDN 55N120AU1



$$\begin{aligned} V_{CES} &= 1200 \text{ V} \\ I_{C25} &= 85 \text{ A} \\ V_{CE(sat) \text{ typ}} &= 2.5 \text{ V} \end{aligned}$$

| 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                                                     | V                      |
| $V_{GES}$                          | Continuous                                                                                                           | $\pm 20$                                                 | V                      |
| $V_{GEM}$                          | Transient                                                                                                            | $\pm 30$                                                 | V                      |
| $I_{C25}$                          | $T_C = 25^\circ\text{C}$                                                                                             | 85                                                       | A                      |
| $I_{C90}$                          | $T_C = 90^\circ\text{C}$                                                                                             | 52                                                       | A                      |
| $I_{CM}$                           | $T_C = 25^\circ\text{C}, 1 \text{ ms}$                                                                               | 170                                                      | A                      |
| <b>SSOA (RBSOA)</b>                | $V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 22 \Omega$<br>Clamped inductive load, $L = 30 \mu\text{H}$ | $I_{CM} = 100$<br>@ $V_{CES}$                            | A                      |
| <b><math>t_{SC}</math> (SCSOA)</b> | $V_{GE} = 15 \text{ V}, V_{CE} = V_{CES}, T_J = 125^\circ\text{C}$<br>$R_G = 22 \Omega$ , non repetitive             | 10                                                       | $\mu\text{s}$          |
| $P_c$                              | $T_C = 25^\circ\text{C}$ IGBT                                                                                        | 450                                                      | W                      |
| $V_{ISOL}$                         | 50/60 Hz<br>$I_{ISOL} \leq 1 \text{ mA}$                                                                             | $t = 1 \text{ min}$<br>$t = 1 \text{ s}$<br>2500<br>3000 | V~<br>V~               |
| $T_J$                              |                                                                                                                      | -40 ... +150                                             | $^\circ\text{C}$       |
| $T_{JM}$                           |                                                                                                                      | 150                                                      | $^\circ\text{C}$       |
| $T_{stg}$                          |                                                                                                                      | -40 ... +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  
E153432



E = Emitter \*, C = Collector  
G = Gate, E = Emitter \*

\* Either Emitter terminal can be used as Main or Kelvin Emitter

### Features

- Square RBSOA
- International standard package miniBLOC
- Isolation voltage 3000 V~
- Low  $V_{CE(sat)}$   
- for minimum on-state conduction losses
- High switching speed

### 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

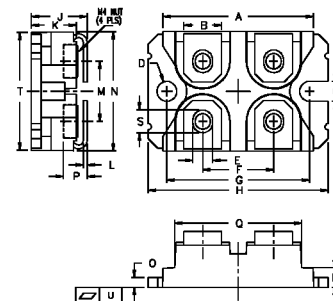
| Symbol        | Test Conditions                                                                                                                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |           |                      |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|----------------------|
|               |                                                                                                                                                   | min.                                                                              | typ.      | max.                 |
| $BV_{CES}$    | $I_C = 5 \text{ mA}, V_{GE} = 0 \text{ V}$                                                                                                        | 1200                                                                              |           | V                    |
| $V_{GE(th)}$  | $I_C = 2 \text{ mA}, V_{CE} = V_{GE}$                                                                                                             | 4                                                                                 | 5.5       | 6.5 V                |
| $I_{CES}$     | $V_{CE} = V_{CES}, V_{GE} = 0 \text{ V}$ $T_J = 25^\circ\text{C}$<br>$V_{CE} = 0.8 \cdot V_{CES}, V_{GE} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$ |                                                                                   | 2.4<br>15 | 3<br>19 mA           |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$                                                                                                 |                                                                                   |           | $\pm 500 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = 50 \text{ A}, V_{GE} = 15 \text{ V}$                                                                                                       |                                                                                   | 2,5       | 3 V                  |

| Symbol       | Test Conditions                                                                                                                                                                                                                                                                          | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------|
|              |                                                                                                                                                                                                                                                                                          | min.                                                                              | typ. | max.     |
| $C_{ies}$    | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$                                                                                                                                                                                                                            |                                                                                   | 3300 | pF       |
| $C_{oes}$    |                                                                                                                                                                                                                                                                                          |                                                                                   | 500  | pF       |
| $C_{res}$    |                                                                                                                                                                                                                                                                                          |                                                                                   | 220  | pF       |
| $Q_g$        | $I_C = 50\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$                                                                                                                                                                                                                          |                                                                                   | TBD  | nC       |
| $Q_{ge}$     |                                                                                                                                                                                                                                                                                          |                                                                                   | TBD  | nC       |
| $Q_{gc}$     |                                                                                                                                                                                                                                                                                          |                                                                                   | TBD  | nC       |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 50\text{ A}, V_{GE} = 15\text{ V},$<br>$V_{CE} = 0.5 V_{CES}, R_{on/off} = 22\ \Omega$<br>Remarks: Switching times may increase<br>for $V_{CE}$ (Clamp) $> 0.5 \cdot V_{CES}$ , higher $T_J$ or<br>increased $R_G$ |                                                                                   | 45   | 100 ns   |
| $t_{ri}$     |                                                                                                                                                                                                                                                                                          |                                                                                   | 55   | 100 ns   |
| $t_{d(off)}$ |                                                                                                                                                                                                                                                                                          |                                                                                   | 400  | 600 ns   |
| $t_{fi}$     |                                                                                                                                                                                                                                                                                          |                                                                                   | 70   | 100 ns   |
| $E_{on}$     |                                                                                                                                                                                                                                                                                          |                                                                                   | 8.5  | mJ       |
| $E_{off}$    |                                                                                                                                                                                                                                                                                          |                                                                                   | 4.8  | mJ       |
| $R_{thJC}$   |                                                                                                                                                                                                                                                                                          |                                                                                   |      | 0.28 K/W |
| $R_{thCK}$   |                                                                                                                                                                                                                                                                                          |                                                                                   | 0.1  | K/W      |

## Reverse Diode (FRED)

| Symbol     | Test Conditions                                                                                                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |         |
|------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------|
|            |                                                                                                                                    | min.                                                                              | typ. | max.    |
| $V_F$      | $I_F = 50\text{ A}, V_{GE} = 0\text{ V},$<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$                       |                                                                                   | 1.8  | 2.2 V   |
| $I_{RM}$   | $I_F = 50\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 400\text{ A}/\mu\text{s}$<br>$V_R = 600\text{ V}$<br>$T_J = 100^\circ\text{C}$ |                                                                                   | 28   | 35 A    |
| $t_{rr}$   | $I_F = 50\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 400\text{ A}/\mu\text{s}$<br>$V_R = 600\text{ V}$<br>$T_J = 100^\circ\text{C}$ |                                                                                   | 200  | ns      |
|            | $I_F = 1\text{ A}; -di/dt = 200\text{ A}/\mu\text{s}; V_R = 30\text{ V}$<br>$T_J = 25^\circ\text{C}$                               |                                                                                   | 40   | 60 ns   |
| $R_{thJC}$ |                                                                                                                                    |                                                                                   |      | 0.6 K/W |

## miniBLOC, SOT-227 B



M4 screws (4x) supplied

| Dim. | Millimeter |      | Inches |       |
|------|------------|------|--------|-------|
|      | Min.       | Max. | Min.   | Max.  |
| A    | 31.5       | 31.7 | 1.241  | 1.249 |
| B    | 7.8        | 8.2  | 0.307  | 0.323 |
| C    | 4.0        | -    | 0.158  | -     |
| D    | 4.1        | 4.3  | 0.162  | 0.169 |
| E    | 4.1        | 4.3  | 0.162  | 0.169 |
| F    | 14.9       | 15.1 | 0.587  | 0.595 |
| G    | 30.1       | 30.3 | 1.186  | 1.193 |
| H    | 38.0       | 38.2 | 1.497  | 1.505 |
| J    | 11.8       | 12.2 | 0.465  | 0.481 |
| K    | 8.9        | 9.7  | 0.351  | 0.382 |
| L    | 0.75       | 0.85 | 0.030  | 0.033 |
| M    | 12.6       | 12.8 | 0.496  | 0.504 |
| N    | 25.2       | 25.4 | 0.993  | 1.001 |
| O    | 1.95       | 2.05 | 0.077  | 0.081 |
| P    | -          | 5.0  | -      | 0.197 |