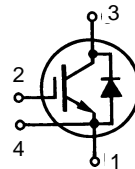


High Voltage IGBT with Diode

IXSN 35N120AU1

$$\begin{aligned} V_{CES} &= 1200 \text{ V} \\ I_{C25} &= 70 \text{ A} \\ V_{CE(sat)} &= 4 \text{ V} \end{aligned}$$

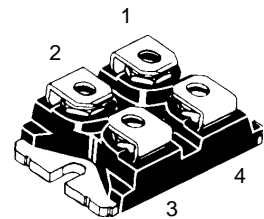


| Symbol | Test Conditions | Maximum Ratings | |
|---|--|----------------------------------|--------------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 1200 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$ | 1200 | A |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 70 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 35 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1 ms | 140 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 22 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$ | $I_{CM} = 70$ @ $0.8 V_{CES}$ | A |
| t_{SC} (SCSOA) | $V_{GE} = 15 \text{ V}$, $V_{CE} = 0.6 \cdot V_{CES}$, $T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$, non repetitive | 10 | μs |
| P_C P_D | $T_C = 25^\circ\text{C}$ | IGBT Diode | 300 175 W W |
| V_{ISOL} | 50/60 Hz $I_{ISOL} \leq 1 \text{ mA}$ | t = 1 min t = 1 s | 2500 3000 V~ 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 Terminal connection torque (M4) | 1.5/13 1.5/13 | Nm/lb.in. Nm/lb.in. |
| Weight | | 30 | g |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|-----------------|--|---|------|----------------------------------|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 5 \text{ mA}$, $V_{GE} = 0 \text{ V}$ | 1200 | | V |
| $V_{GE(th)}$ | $I_C = 4 \text{ mA}$, $V_{CE} = V_{GE}$ | 4 | | V |
| $I_{CES}^{(1)}$ | $V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ | | | 750 15 μA mA |
| I_{GES} | $V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = I_{C90}$, $V_{GE} = 15 \text{ V}$ | | | 4 V |

② Device must be heat sunk during high temperature leakage test to avoid thermal runaway.

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 (ISOTOP) compatible
- Aluminium-nitride isolation
 - high power dissipation
- Isolation voltage 3000 V~
- Low $V_{CE(sat)}$
 - for minimum on-state conduction losses
- Fast Recovery Epitaxial Diode
 - short t_{rr} and I_{RM}
- Low collector-to-case capacitance (< 50 pF)
 - reduces RFI
- Low package inductance (< 10 nH)
 - easy to drive and to protect

Applications

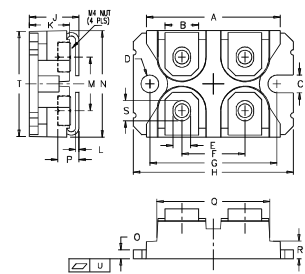
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Advantages

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

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|----------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = I_{C90}, V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\text{ }\mu\text{s}$, duty cycle $d \leq 2\%$ | 20 | 26 | S |
| $I_{C(on)}$ | $V_{CE} = 10\text{ V}$, $V_{GE} = 15\text{ V}$ | | 170 | A |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 3900 | pF |
| C_{oes} | | | 295 | pF |
| C_{res} | | | 60 | pF |
| Q_g | $I_C = I_{C90}, V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 150 | 190 nC |
| Q_{ge} | | | 40 | 60 nC |
| Q_{gc} | | | 70 | 100 nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}, V_{GE} = 15\text{ V}$, $V_{CE} = 0.8 \cdot V_{CES}, R_G = 2.7\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G | | 80 | ns |
| t_{ri} | | | 150 | ns |
| $t_{d(off)}$ | | | 400 | 900 ns |
| t_{fi} | | | 500 | 700 ns |
| E_{off} | | | 10 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}, V_{GE} = 15\text{ V}$, $V_{CE} = 0.8 \cdot V_{CES}, R_G = 2.7\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G | | 80 | ns |
| t_{ri} | | | 150 | ns |
| $t_{d(off)}$ | | | 400 | ns |
| t_{fi} | | | 700 | ns |
| E_{on} | | | 6 | mJ |
| E_{off} | | | 15 | mJ |
| R_{thJC} | | | | 0.42 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 |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|------------|--|---|------|----------|
| | | min. | typ. | max. |
| V_F | $I_F = I_{C90}, V_{GE} = 0\text{ V}$, Pulse test, $t \leq 300\text{ }\mu\text{s}$, duty cycle $d \leq 2\%$ | | | 2.35 V |
| I_{RM} | $I_F = I_{C90}, V_{GE} = 0\text{ V}$, $-di_F/dt = 480\text{ A}/\mu\text{s}$ $V_R = 540\text{ V}$ $I_F = 1\text{ A}$; $-di/dt = 200\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$ | | 32 | 35 A |
| t_{rr} | | | 225 | ns |
| | | | 40 | 60 ns |
| R_{thJC} | | | | 0.71 K/W |

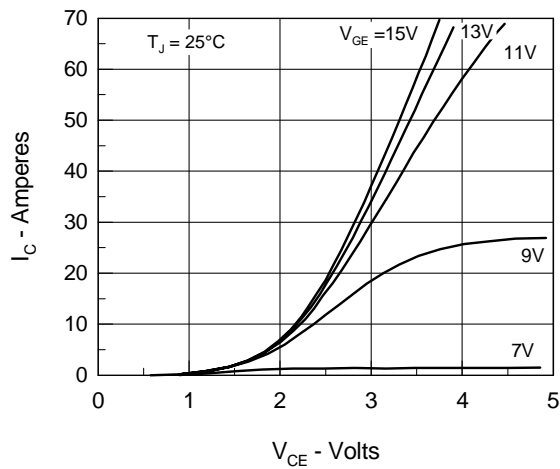
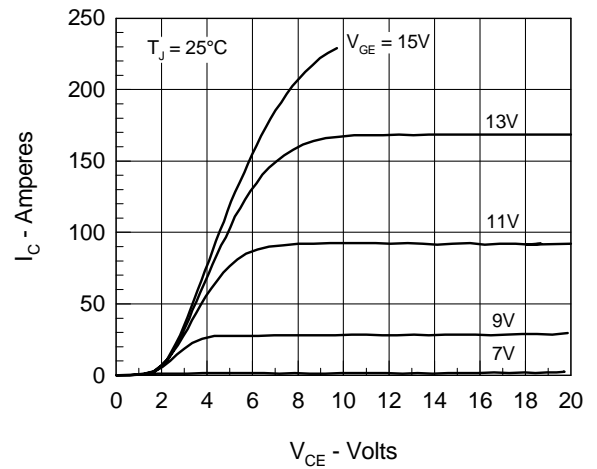
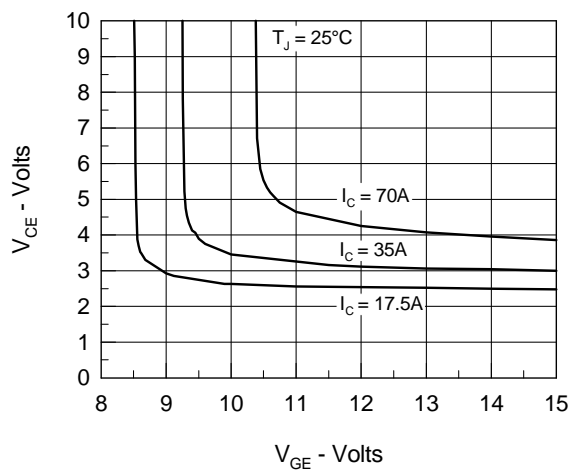
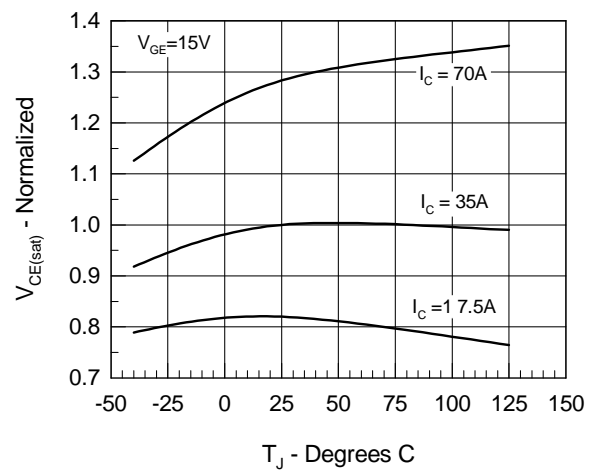
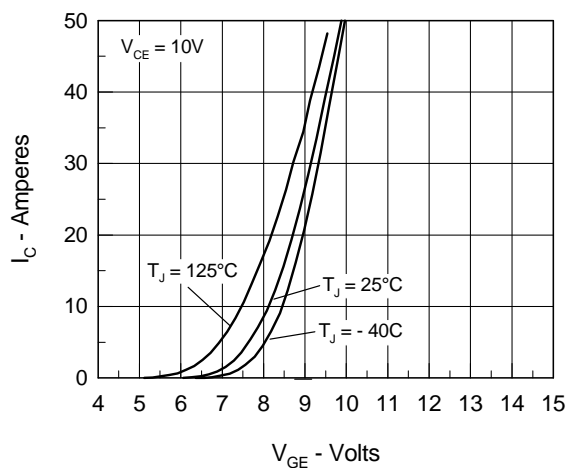
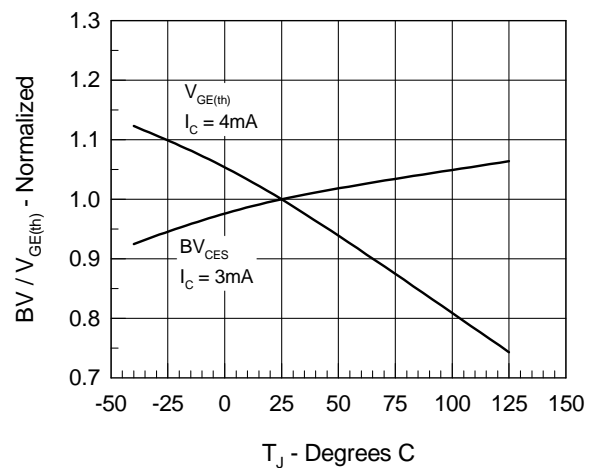
Fig. 1 Saturation Characteristics

Fig. 2 Output Characteristics

Fig. 3 Collector-Emmitter Voltage vs. Gate-Emitter Voltage

Fig. 4 Temperature Dependence of Output Saturation Voltage

Fig. 5 Input Admittance

Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage


Fig.7 Turn-Off Energy per Pulse and Fall Time on Collector Current

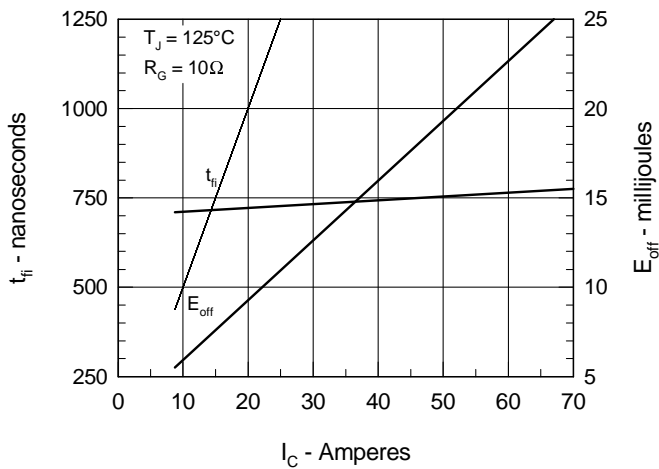


Fig.8 Dependence of Turn-Off Energy Per Pulse and Fall Time on R_G

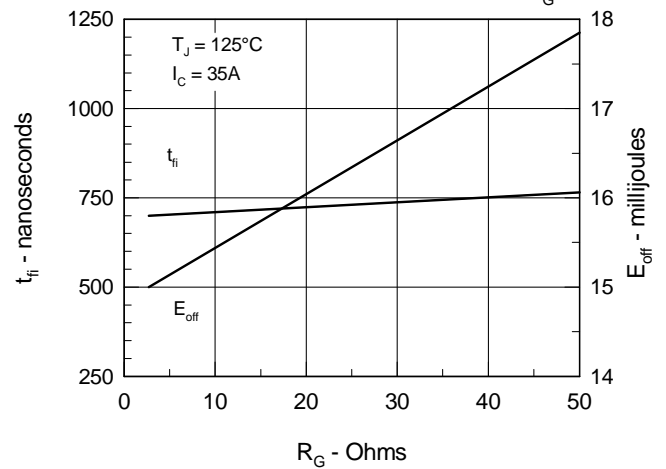


Fig.9 Gate Charge Characteristic Curve

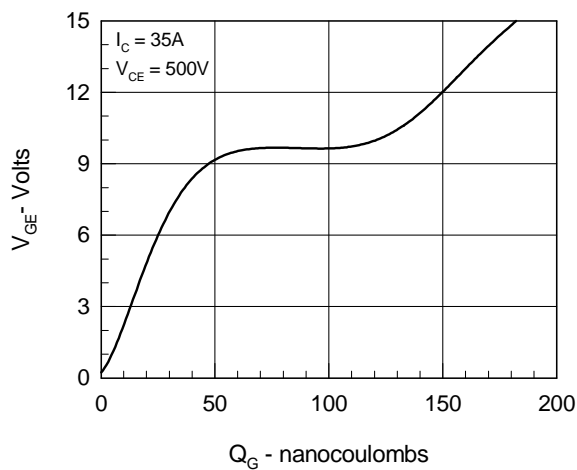


Fig.10 Turn-Off Safe Operating Area

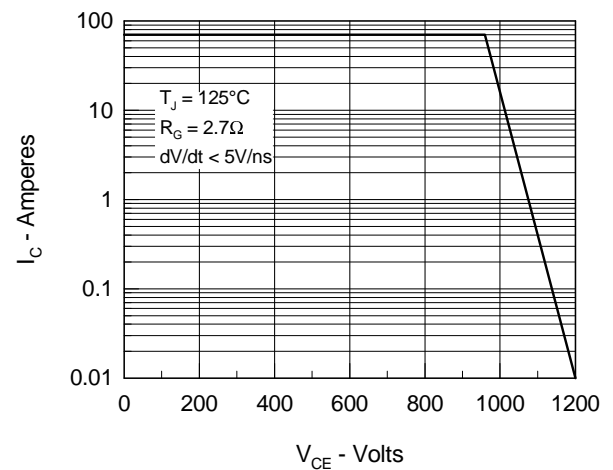


Fig.11 Transient Thermal Impedance

