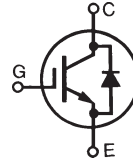


High Voltage IGBT with Diode

(Electrically Isolated Back Surface)

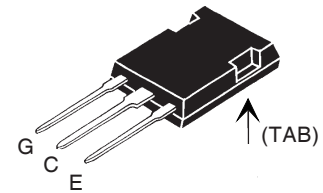
IXGR 35N120BD1

$$\begin{aligned} V_{CES} &= 1200 \text{ V} \\ I_{C25} &= 54 \text{ A} \\ V_{CE(sat)} &= 3.5 \text{ V} \\ t_{fi(typ)} &= 160 \text{ ns} \end{aligned}$$



| 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 | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 54 | A |
| I_{C110} | $T_C = 110^\circ\text{C}$ | 28 | A |
| I_{F110} | $T_C = 110^\circ\text{C}$ | 8 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, 1 \text{ ms}$ | 200 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 10 \Omega$ Clamped inductive load | $I_{CM} = 120$ @ $0.8 V_{CES}$ | A |
| P_C | $T_C = 25^\circ\text{C}$ | 250 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS, $t = 1 \text{ min}$ $I_{SOL} = 1 \text{ mA}, t = 1 \text{ s}$ | 2500 | V~ |
| | | 3000 | V~ |
| F_C | Mounting force | 22...130/5...29 | N/lb |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| Weight | | 6 | g |

ISOPLUS247 (IXGR)



G = Gate
E = Emitter
C = Collector
TAB = Electrically Isolated

Features

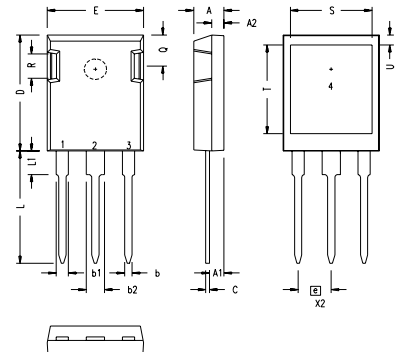
- Silicon chip on DCB substrate
 - High power dissipation
 - Isolated mounting surface
 - 2500V electrical isolation
- IGBT and anti-parallel FRED for resonant power supplies
 - Induction heating
 - Rice cookers
- MOS Gate turn-on
 - drive simplicity
- Fast Recovery Expitaxial Diode (FRED)
 - soft recovery with low I_{RM}

Advantages

- Saves space (two devices in one package)
- Easy to mount
- Reduces assembly time and cost

| Symbol | Test Conditions | Characteristic Values | | |
|----------------------------------------------------------------|-------------------------------------------------------|-------------------------|------|----------------------|
| | | min. | typ. | max. |
| $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ | | | | |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$ | 2.5 | | 5.0 V |
| I_{CES} | $V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$ | $T = 25^\circ\text{C}$ | | 50 μA |
| | | $T = 125^\circ\text{C}$ | | 250 μA |
| I_{GES} | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = 35 \text{ A}, V_{GE} = 15 \text{ V}$ Note 2 | | 2.8 | 3.5 V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = 35\text{A}; V_{CE} = 10\text{V}$, Note 2. | 28 | 38 | S |
| C_{ies} | | | 2300 | pF |
| C_{oes} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 190 | pF |
| C_{res} | | | 80 | pF |
| Q_g | | | 140 | nC |
| Q_{ge} | $I_C = 40\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 V_{CES}$ | | 20 | nC |
| Q_{gc} | | | 50 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ | | 40 | ns |
| t_{ri} | $I_C = 35\text{A}; V_{GE} = 15\text{V}$ | | 50 | ns |
| E_{on} | $V_{CE} = 0.8 V_{CES}; R_G = R_{off} = 3\ \Omega$ | | 0.9 | mJ |
| $t_{d(off)}$ | Note 1. | | 270 | 500 ns |
| t_{fi} | | | 160 | 300 ns |
| E_{off} | | | 3.8 | 7.0 mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ | | 45 | ns |
| t_{ri} | $I_C = 35\text{A}; V_{GE} = 15\text{V}$ | | 60 | ns |
| E_{on} | $V_{CE} = 0.8 V_{CES}; R_G = R_{off} = 3\ \Omega$ | | 1.9 | mJ |
| $t_{d(off)}$ | Note 1 | | 380 | ns |
| t_{fi} | | | 400 | ns |
| E_{off} | | | 8.0 | mJ |
| R_{thJC} | | | | 0.5 K/W |
| R_{thCK} | | | 0.25 | K/W |

ISOPLUS247 Outline


| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .075 | .084 | 1.91 | 2.13 |
| b2 | .115 | .123 | 2.92 | 3.12 |
| C | .024 | .031 | 0.61 | 0.80 |
| D | .819 | .840 | 20.80 | 21.34 |
| E | .620 | .635 | 15.75 | 16.13 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | .150 | .170 | 3.81 | 4.32 |
| Q | .220 | .244 | 5.59 | 6.20 |
| R | .170 | .190 | 4.32 | 4.83 |
| S | .520 | .540 | 13.21 | 13.72 |
| T | .620 | .640 | 15.75 | 16.26 |
| U | .065 | .080 | 1.65 | 2.03 |

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------------|
| | | min. | typ. | max. |
| V_F | $I_F = 10\text{A}, V_{GE} = 0\text{V}$ $I_F = 10\text{A}, V_{GE} = 0\text{V}, T_J = 125^\circ\text{C}$ | | | 3.3 V 2.2 V |
| I_{RM} | $I_F = 10\text{A}; -di_F/dt = 100\text{A}/\mu\text{s}, V_R = 100\text{V}$ | | 4.0 | A |
| t_{rr} | $V_{GE} = 0\text{V}; T_J = 125^\circ\text{C}$ | | 190 | ns |
| t_{rr} | $I_F = 1\text{A}; -di_F/dt = 100\text{A}/\mu\text{s}; V_R = 30\text{V}, V_{GE} = 0\text{V}$ | | 40 | ns |
| R_{thJC} | | | | 2.5 K/W |

- Notes:
- Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G .
 - Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$.

IXYS reserves the right to change limits, test conditions, and dimensions.

| | | | | | | | | |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|-------------|-------------|-----------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065B1 | 6,683,344 | 6,727,585 |
| | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 | 6,710,405B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | |

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