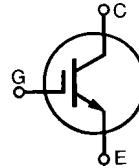


HiPerFAST™ IGBT ISOPLUS247™

IXGR 12N60C

(Electrically Isolated Back Surface)



$$V_{CES} = 600 \text{ V}$$

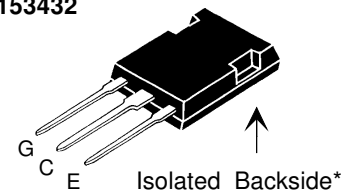
$$I_{C25} = 15 \text{ A}$$

$$V_{CE(sat)} = 2.7 \text{ V}$$

$$t_{fi(typ)} = 55 \text{ ns}$$

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|----------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 15 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 8 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1 ms | 48 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 33 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$ | $I_{CM} = 24$ @ $0.8 V_{CES}$ | A |
| P_C | $T_C = 25^\circ\text{C}$ | 55 | W |
| T_J | | -40 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -40 ... +150 | $^\circ\text{C}$ |
| V_{ISOL} | Isolation Voltage | 2500 | V |
| Weight | | 5 | g |
| Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 | $^\circ\text{C}$ |

ISOPLUS 247



G = Gate C = Drain
E = Source

* Patent pending

Features

- Silicon chip on Direct-Copper-Bond substrate
- High power dissipation
- Isolated mounting surface
- 2500V electrical isolation
- Low collector to tab capacitance (<35pF)
- 3rd generation HDMOS™ process
- $V_{CE(sat)}$
- Rugged polysilicon gate cell structure

Applications

- PFC circuits
- AC motor control
- Switched-mode and resonant-mode power supplies, UPS, no screws, or isolation foils
- DC choppers

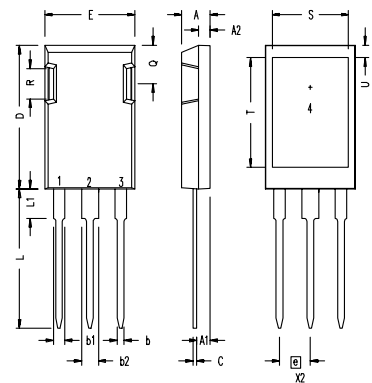
Advantages

- Easy assembly
- Low capacitance to ground, low EMI

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|--|---|------|--|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 250 \mu\text{A}$, $V_{GE} = 0 \text{ V}$ | 600 | | V |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}$, $V_{CE} = V_{GE}$ | 2.5 | | V |
| I_{CES} | $V_{CE} = 0.8 V_{CES}$, $V_{GE} = 0 \text{ V}$ | | | $T_J = 25^\circ\text{C}$ 200 μA $T_J = 125^\circ\text{C}$ 1.5 mA |
| I_{GES} | $V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_T$, $V_{GE} = 15 \text{ V}$ | | | 2.7 V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = I_T; V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$ | 7 | 11 | S |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 860 | pF |
| C_{oes} | | | 64 | pF |
| C_{res} | | | 15 | pF |
| Q_g | $I_C = I_T$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 32 | nC |
| Q_{ge} | | | 10 | nC |
| Q_{gc} | | | 10 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_T$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$, higher T_J or increased R_G | | 20 | ns |
| t_{ri} | | | 20 | ns |
| $t_{d(off)}$ | | | 60 | ns |
| t_{fi} | | | 55 | ns |
| E_{off} | | | 0.09 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_T$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$, higher T_J or increased R_G | | 20 | ns |
| t_{ri} | | | 20 | ns |
| E_{on} | | | 0.15 | mJ |
| $t_{d(off)}$ | | | 85 | 180 ns |
| t_{fi} | | | 85 | 180 ns |
| E_{off} | | | 0.27 | 0.60 mJ |
| R_{thJC} | | | 2.27 | KW |
| R_{thCK} | | 0.15 | | KW |

Note: $I_T = 12\text{ A}$

ISOPLUS247 OUTLINE


- 1 Gate, 2 Drain (Collector)
 3 Source (Emitter)
 4 no connection

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 2.92 | 3.12 | .115 | .123 |
| C | 0.61 | 0.80 | .024 | .031 |
| D | 20.80 | 21.34 | .819 | .840 |
| E | 15.75 | 16.13 | .620 | .635 |
| e | 5.45 BSC | | .215 BSC | |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | 3.81 | 4.32 | .150 | .170 |
| Q | 5.59 | 6.20 | .220 | .244 |
| R | 4.32 | 4.83 | .170 | .190 |