

High Voltage IGBT with Diode

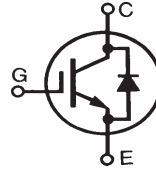
IXGX 32N170H1

$$V_{CES} = 1700 \text{ V}$$

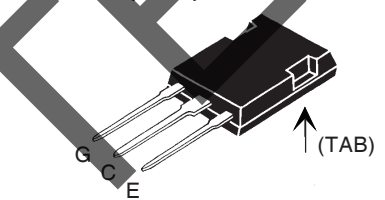
$$I_{C25} = 75 \text{ A}$$

$$V_{CE(sat)} = 3.3 \text{ V}$$

$$t_{fi(typ)} = 290 \text{ ns}$$



PLUS247 (IXGX)



G = Gate,
E = Emitter,
C = Collector,
TAB = Collector

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|----------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 1700 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$ | 1700 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 75 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 32 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1 ms | 200 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 5 \Omega$ Clamped inductive load | $I_{CM} = 90$ @ $0.8 V_{CES}$ | A |
| t_{SC} | $T_J = 125^\circ\text{C}$, $V_{CE} = 1200 \text{ V}$; $V_{GE} = 15 \text{ V}$, $R_G = 10 \Omega$ | 10 | μs |
| P_C | $T_C = 25^\circ\text{C}$ | 350 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| F_C | Mounting force with chip | 22...130/5...30 | 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 |

Features

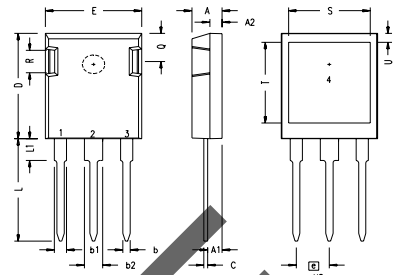
- High current handling capability
- MOS Gate turn-on
- drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification

Applications

- Capacitor discharge & pulser circuits
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|--|---|---|---------------------------|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 1 \text{ mA}$, $V_{GE} = 0 \text{ V}$ | 1700 | | V |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}$, $V_{CE} = V_{GE}$ | 3.0 | | V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ | | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 500 μA 8 mA |
| I_{GES} | $V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}$, $V_{GE} = 15 \text{ V}$ | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 2.5 3.0 | V V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|----------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = I_{C25}; V_{CE} = 10\text{ V}$ Note 2 | 25 | 33 | S |
| C_{ies} | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | | 3500 | pF |
| C_{oes} | | | 250 | pF |
| C_{res} | | | 40 | pF |
| Q_g | $I_C = I_{C90}; V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$ | | 155 | nC |
| Q_{ge} | | | 30 | nC |
| Q_{gc} | | | 51 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}, V_{GE} = 15\text{ V}$ $R_G = 2.7\ \Omega, V_{CE} = 0.8 V_{CES}$ Note 3 | | 45 | ns |
| t_{ri} | | | 38 | ns |
| $t_{d(off)}$ | | | 270 | 500 ns |
| t_{fi} | | | 250 | 500 ns |
| E_{off} | | | 15 | 25 mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}, V_{GE} = 15\text{ V}$ $R_G = 2.7\ \Omega, V_{CE} = 0.8 V_{CES}$ Note 3 | | 48 | ns |
| t_{ri} | | | 42 | ns |
| E_{on} | | | 6.0 | mJ |
| $t_{d(off)}$ | | | 360 | ns |
| t_{fi} | | | 560 | ns |
| E_{off} | | 22 | mJ | |
| R_{thJC} | | | | 0.35 K/W |
| R_{thCK} | | 0.15 | | K/W |

PLUS247 Outline (IXGX)


| 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 |
| O | .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 | $I_F = 70\text{ A}, V_{GE} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 2.7 V |
| I_{RM} | $I_F = 50\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 800\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}$ | | 50 | A |
| t_{rr} | | | 150 | ns |
| R_{thJC} | | | | 0.4 K/W |

- Notes:
- Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.
 - Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$
 - Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or increased R_G .
 - See DH60-18A and IXGH32N170A datasheets for additional characteristics



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