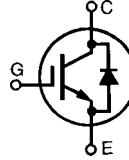


HiPerFAST™ IGBT Lightspeed™ Series

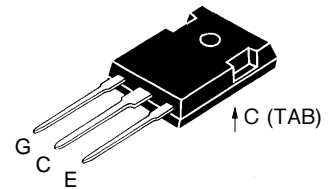
IXGH 12N60CD1

$V_{CES} = 600 \text{ V}$
 $I_{C25} = 24 \text{ A}$
 $V_{CE(sat)} = 2.7 \text{ V}$
 $t_{fi(typ)} = 55 \text{ ns}$



| Symbol | Test Conditions | Maximum Ratings | |
|---|---|----------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 24 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 12 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, 1 \text{ ms}$ | 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 | $T_C = 25^\circ\text{C}$ | 100 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| M_d | Mounting torque with screw M3 Mounting torque with screw M3.5 | 0.45/4 0.55/5 | Nm/lb.in. |
| Weight | | 6 | g |
| Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 | $^\circ\text{C}$ |

TO-247 AD



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

Features

- Very high frequency IGBT
- New generation HDMOS™ process
- International standard package JEDEC TO-247AD
- High peak current handling capability

Applications

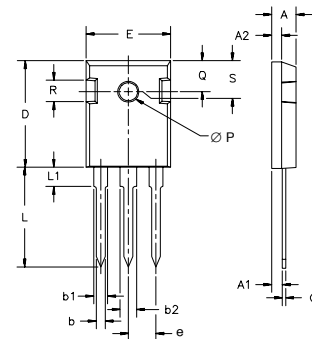
- PFC circuit
- AC motor speed control
- DC servo and robot drives
- Switch-mode and resonant-mode power supplies
- High power audio amplifiers

Advantages

- Fast switching speed
- High power density

| 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 |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}, V_{GE} = V_{GE}$ | 2.5 | | 5.0 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} | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{CE90}, V_{GE} = 15 \text{ V}$ | 2.1 | 2.7 | V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|----------|
| | | min. | typ. | max. |
| g_{fs} | $I_C = I_{C90}$; $V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$ | 5 | 11 | S |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 860 | pF |
| C_{oes} | | | 100 | pF |
| C_{res} | | | 15 | pF |
| Q_g | $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 32 | nC |
| Q_{ge} | | | 10 | nC |
| Q_{gc} | | | 10 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for V_{CE} (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, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 V_{CES}$, higher T_J or increased R_G | | 20 | ns |
| t_{ri} | | | 20 | ns |
| E_{on} | | | 0.5 | mJ |
| $t_{d(off)}$ | | | 85 | 180 ns |
| t_{fi} | | | 85 | 180 ns |
| E_{off} | | | 0.27 | 0.60 mJ |
| R_{thJC} | IGBT | | | 1.25 K/W |
| R_{thCK} | | 0.25 | | K/W |

TO-247 AD Outline


| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | | 4.50 | | .177 |
| ØP | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | .242 | BSC |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|------------|--|---|------|---------|
| | | min. | typ. | max. |
| V_F | $I_F = 15\text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$ | | 1.7 | V |
| | | | | 2.5 V |
| I_{RM} | $V_R = 100\text{ V}$; $I_F = 25\text{ A}$; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $L < 0.05\ \mu\text{H}$; $T_{VJ} = 100^\circ\text{C}$ | | 2 | 2.5 A |
| t_{rr} | $I_F = 1\text{ A}$; $-di/dt = 50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$ $T_J = 25^\circ\text{C}$ | | 35 | ns |
| R_{thJC} | Diode | | | 1.6 K/W |

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