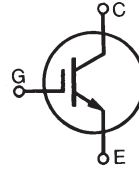


HiPerFAST™ IGBT

C2-Class High Speed IGBTs

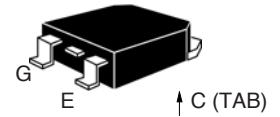
IXGH 40N60C2
IXGT 40N60C2

V_{CES} = 600 V
I_{C25} = 75 A
V_{CE(sat)} = 2.7 V
t_{fi}typ = 32 ns

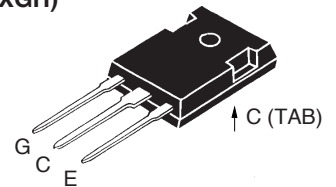


| Symbol | Test Conditions | Maximum Ratings | |
|-------------------|---|----------------------|-----|
| V _{CES} | T _J = 25°C to 150°C | 600 | V |
| V _{CGR} | T _J = 25°C to 150°C; R _{GE} = 1 MΩ | 600 | V |
| V _{GES} | Continuous | ±20 | V |
| V _{GEM} | Transient | ±30 | V |
| I _{C25} | T _C = 25°C (limited by leads) | 75 | A |
| I _{C110} | T _C = 110°C | 40 | A |
| I _{CM} | T _C = 25°C, 1 ms | 200 | A |
| SSOA | V _{GE} = 15 V, T _{VJ} = 125°C, R _G = 10 Ω | I _{CM} = 80 | A |
| (RBSOA) | Clamped inductive load @ ≤ 600 V | | |
| P _C | T _C = 25°C | 300 | W |
| T _J | | -55 ... +150 | °C |
| T _{JM} | | 150 | °C |
| T _{stg} | | -55 ... +150 | °C |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | °C |
| | Plastic body | 200 | °C |
| M _d | Mounting torque (M3) | 1.13/10Nm/lb.in. | |
| Weight | | TO-247 | 6 g |
| | | TO-268 | 4 g |

TO-268 (IXGT)



TO-247 (IXGH)



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

Features

- Very high frequency IGBT
- Square RBSOA
- High current handling capability
- MOS Gate turn-on - drive simplicity

Applications

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

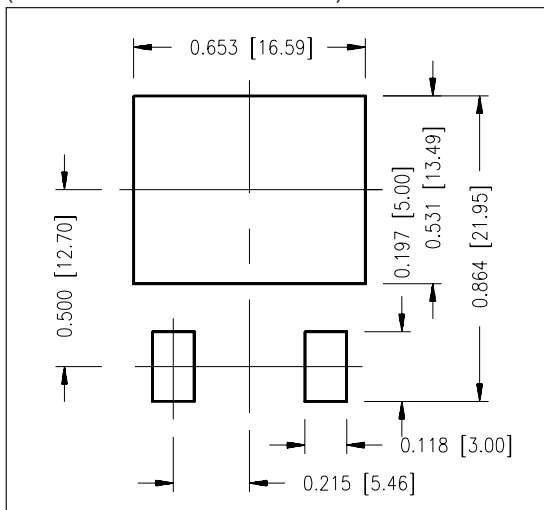
Advantages

- High power density
- Very fast switching speeds for high frequency applications

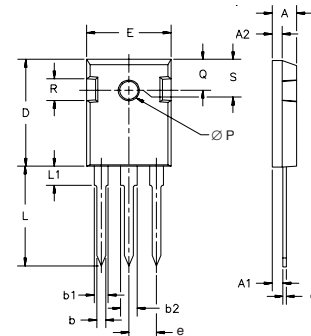
| Symbol | Test Conditions | Characteristic Values (T _J = 25°C unless otherwise specified) | | |
|----------------------|---|---|------------|---------------|
| | | min. | typ. | max. |
| V _{GE(th)} | I _C = 250 μA, V _{CE} = V _{GE} | 3.0 | | 5.0 V |
| I _{CES} | V _{CE} = V _{CES} V _{GE} = 0 V | | | 50 μA 1 mA |
| I _{GES} | V _{CE} = 0 V, V _{GE} = ±20 V | | | ±100 nA |
| V _{CE(sat)} | I _C = 30 A, V _{GE} = 15 V | | 2.2 2.0 | 2.7 V V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified) | | | |
|--|--|---|------|---------------|----|
| | | min. | typ. | max. | |
| g_{fs} | $I_C = 30\text{ A}; V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$ | 20 | 36 | S | |
| C_{ies} C_{oes} C_{res} | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$ | | 2500 | pF | |
| | | | 180 | pF | |
| | | | 54 | pF | |
| Q_g Q_{ge} Q_{gc} | $I_C = 30\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 300\text{ V}$ | | 95 | nC | |
| | | | 14 | nC | |
| | | | 36 | nC | |
| $t_{d(on)}$ t_{ri} $t_{d(off)}$ t_{fi} E_{off} | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 30\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}, R_G = R_{off} = 3\ \Omega$ | | 18 | ns | |
| | | | 20 | ns | |
| | | | 90 | 140 | ns |
| | | | 32 | ns | |
| | | | 0.20 | 0.37 | mJ |
| $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off} | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 30\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}, R_G = R_{off} = 3\ \Omega$ | | 18 | ns | |
| | | | 20 | ns | |
| | | | 0.3 | mJ | |
| | | | 130 | ns | |
| | | | 80 | 240 | ns |
| | | | 0.50 | mJ | |
| R_{thJC} R_{thCK} | (TO-247) | | | 0.42 KW KW | |
| | | 0.25 | | | |

Min. Recommended Footprint (Dimensions in inches and mm)

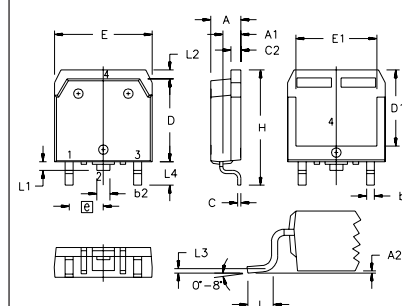


TO-247 AD Outline



| 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 |
| ∅P | 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 |

TO-268 Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b2 | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E1 | .524 | .535 | 13.30 | 13.60 |
| e | .215 BSC | | 5.45 BSC | |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .094 | .106 | 2.40 | 2.70 |
| L1 | .047 | .055 | 1.20 | 1.40 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 BSC | | 0.25 BSC | |
| L4 | .150 | .161 | 3.80 | 4.10 |

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 | 6,404,065 B1 | 6,683,344 | 6,727,585 |
| | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343 | 6,710,405 B2 | 6,759,692 |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | 6,771,478 B2 |

Fig. 1. Output Characteristics
@ 25 Deg. C

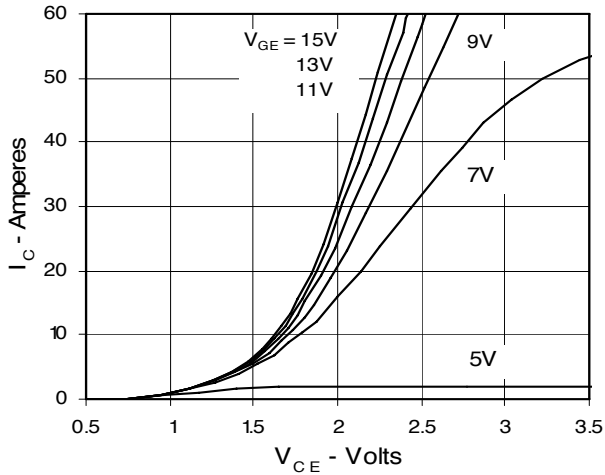


Fig. 2. Extended Output Characteristics
@ 25 deg. C

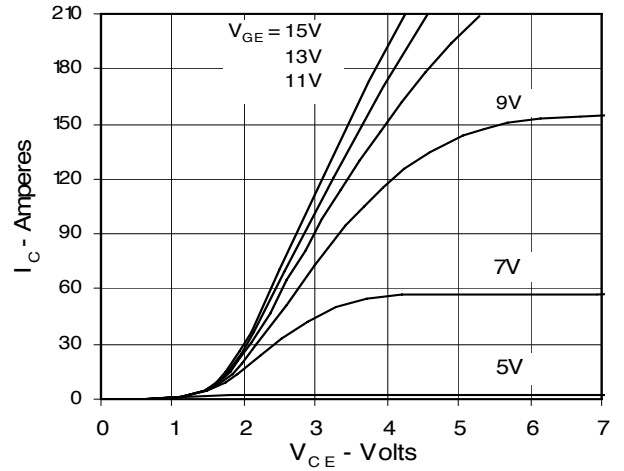


Fig. 3. Output Characteristics
@ 125 Deg. C

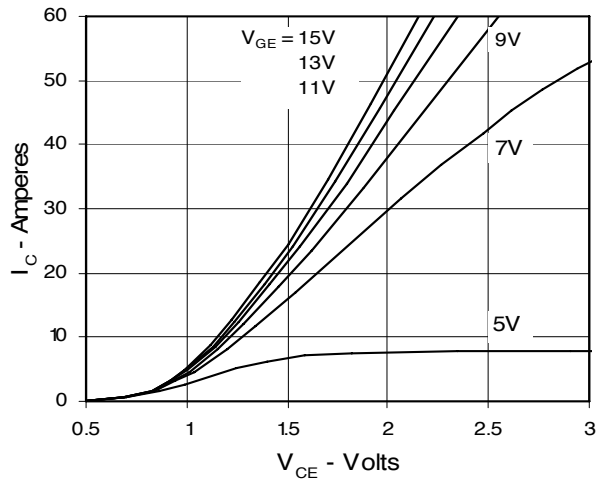


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

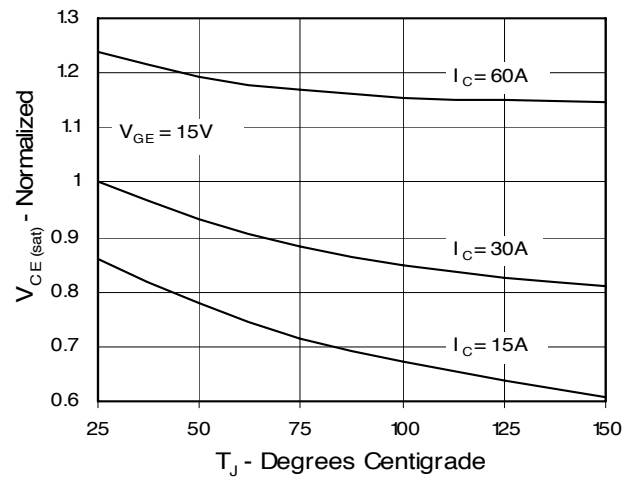


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter voltage

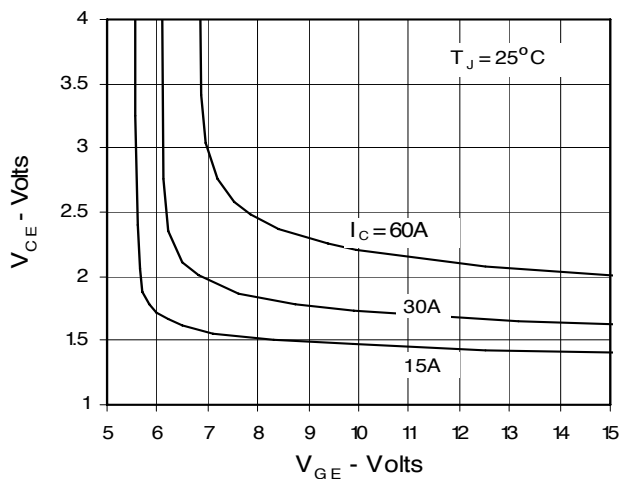


Fig. 6. Input Admittance

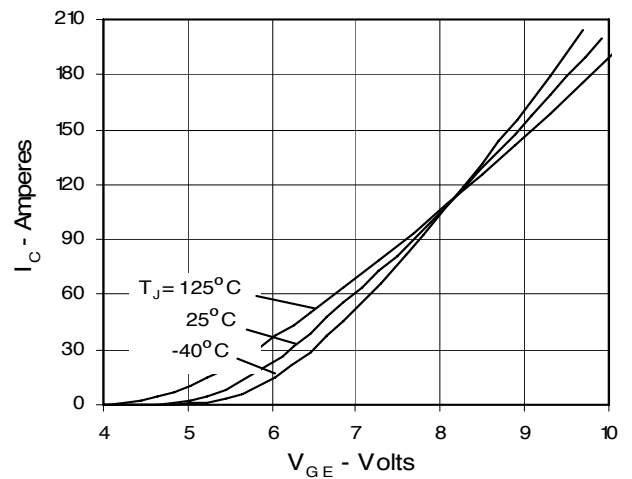


Fig. 7. Transconductance

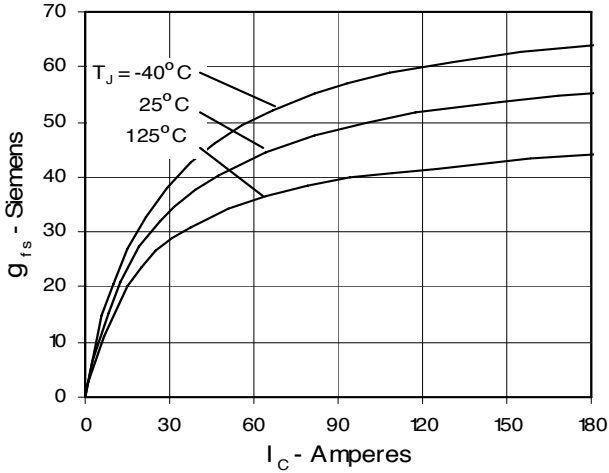


Fig. 8. Dependence of E_{off} on R_G

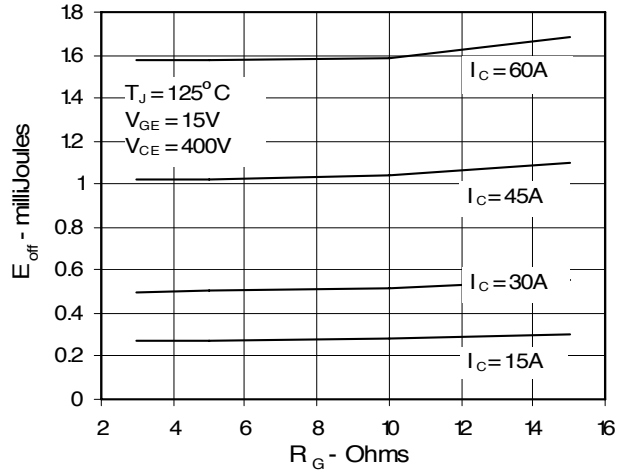


Fig. 9. Dependence of E_{off} on I_C

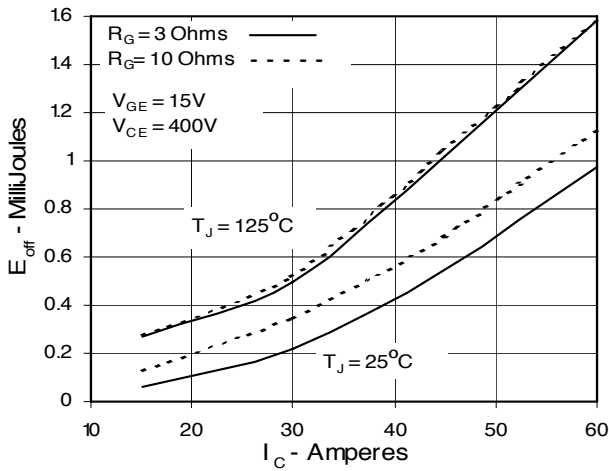


Fig. 10. Dependence of E_{off} on Temperature

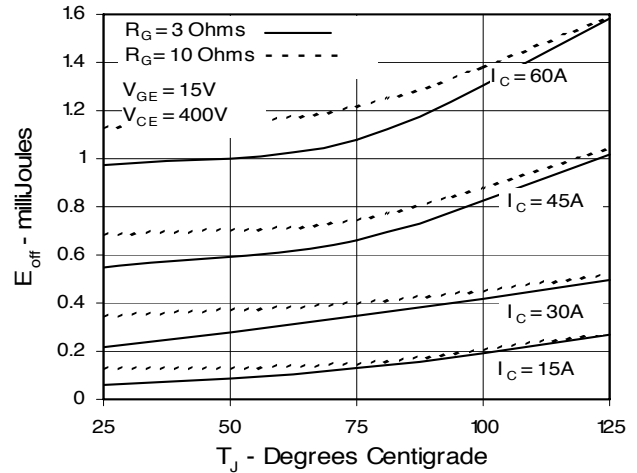


Fig. 11. Gate Charge

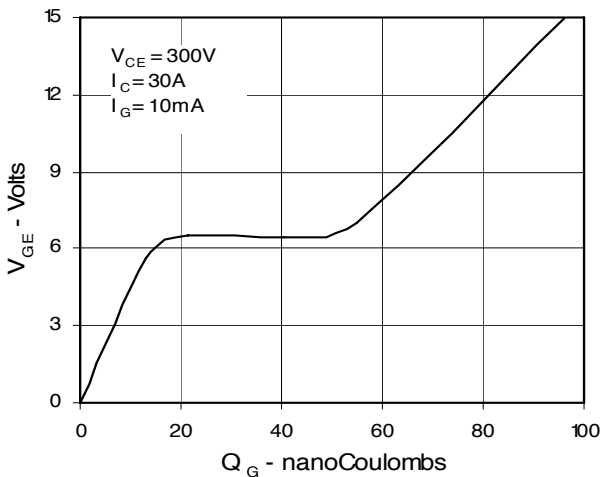


Fig. 12. Capacitance

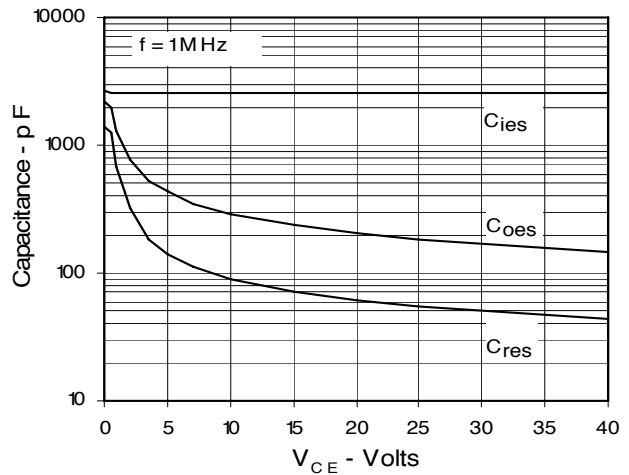


Fig. 13. Maximum Transient Thermal Resistance

