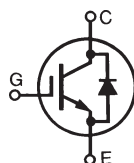


BiMOSFET™ Monolithic Bipolar MOS Transistor High Voltage, High Frequency

IXBX50N360HV



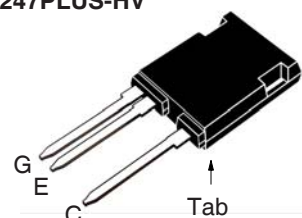
$$V_{CES} = 3600V$$

$$I_{C110} = 50A$$

$$V_{CE(sat)} \leq 2.9V$$

| Symbol | Test Conditions | Maximum Ratings | |
|--|--|---------------------|------------|
| V_{CES} | $T_J = 25^\circ C$ to $150^\circ C$ | 3600 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 3600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 125 | A |
| I_{C110} | $T_C = 110^\circ C$ | 50 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 420 | A |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 5\Omega$ | $I_{CM} = 200$ | A |
| | Clamped Inductive Load | $0.8 \cdot V_{CES}$ | V |
| T_{SC} (SCSOA) | $V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 10\Omega$, $V_{CE} = 1500V$, Non-Repetitive | 10 | μs |
| P_C | $T_C = 25^\circ C$ | 660 | W |
| T_J | | - 55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | - 55 ... +150 | $^\circ C$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10s | 260 | $^\circ C$ |
| F_C | Mounting Force | 20..120/4.5..27 | N/lb |
| Weight | | 6 | g |

TO-247PLUS-HV



G = Gate
C = Collector

E = Emitter
Tab = Collector

Features

- High Blocking Voltage
- High Voltage Package
- Low Conduction Losses

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Uninterruptible Power Supplies (UPS)
- Switch-Mode and Resonant-Mode Power Supplies
- Capacitor Discharge Circuits
- Laser Generators

| Symbol | Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------------|--------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 3600 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 3.0 | | 5.0 V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$ | | | 25 μA 1 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 200 nA |
| $V_{CE(SAT)}$ | $I_C = 50A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$ | | 2.4 3.0 | 2.9 V V |

Symbol Test Conditions(T_J = 25°C Unless Otherwise Specified)**Characteristic Values****Min. Typ. Max.**

| | | | | |
|---------------------------|--|----|------|------|
| g_{fs} | I _C = 50A, V _{CE} = 10V, Note 1 | 24 | 40 | S |
| C_{ies} | V _{CE} = 25V, V _{GE} = 0V, f = 1MHz | | 3990 | pF |
| C_{oes} | | | 195 | pF |
| C_{res} | | | 100 | pF |
| Q_{g(on)} | I _C = 50A, V _{GE} = 15V, V _{CE} = 1000V | | 210 | nC |
| Q_{ge} | | | 27 | nC |
| Q_{gc} | | | 77 | nC |
| t_{d(on)} | Resistive load, T_J = 25°C I _C = 50A, V _{GE} = 15V V _{CE} = 960V, R _G = 5Ω | | 46 | ns |
| t_r | | | 420 | ns |
| t_{d(off)} | | | 205 | ns |
| t_f | | | 1750 | ns |
| t_{d(on)} | Resistive load, T_J = 125°C I _C = 50A, V _{GE} = 15V V _{CE} = 960V, R _G = 5Ω | | 44 | ns |
| t_r | | | 845 | ns |
| t_{d(off)} | | | 210 | ns |
| t_f | | | 1670 | ns |
| R_{thJC} | | | 0.19 | °C/W |
| R_{thCS} | | | 0.15 | °C/W |

Reverse Diode**Symbol Test Conditions**(T_J = 25°C Unless Otherwise Specified)**Characteristic Values****Min. Typ. Max**

| | | | | |
|-----------------------|---|--|-----|----|
| V_F | I _F = 50A, V _{GE} = 0V, Note 1 | | 3.0 | V |
| t_{rr} | I _F = 25A, V _{GE} = 0V, -di _F /dt = 100A/μs V _R = 100V, V _{GE} = 0V | | 1.7 | μs |
| I_{RM} | | | 48 | A |
| Q_{RM} | | | 40 | μC |

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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 | 7,005,734 B2 | 7,157,338B2 |
| | 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343 | 6,710,405 B2 | 6,759,692 | 7,063,975 B2 | |
| | 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 | 7,071,537 | |

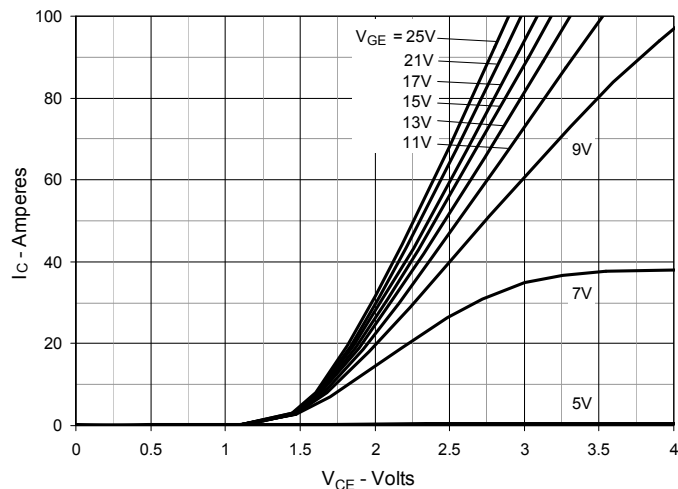
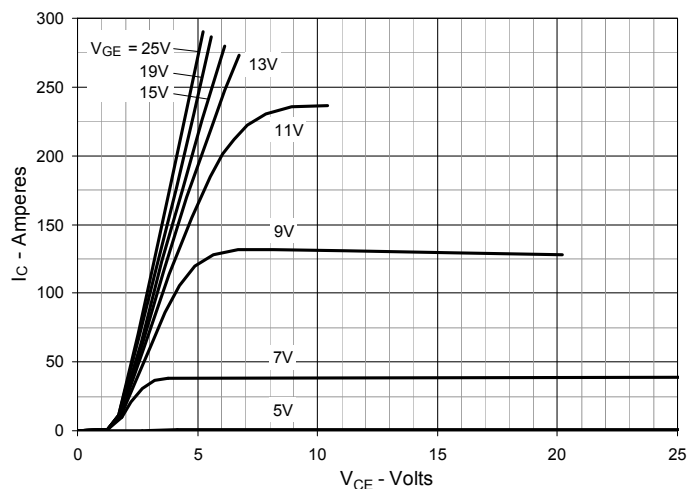
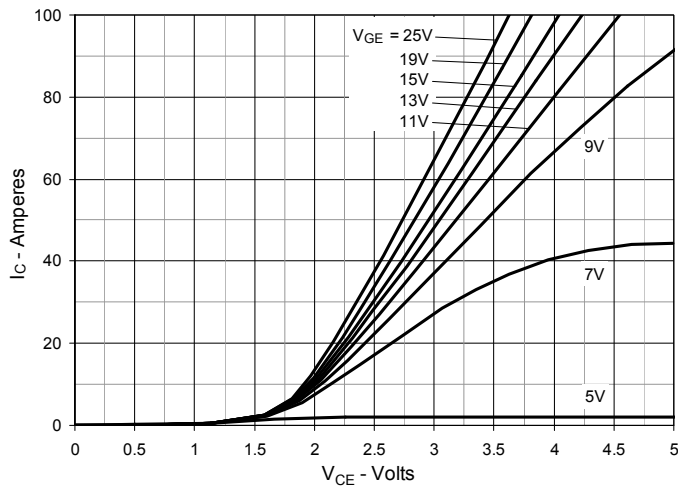
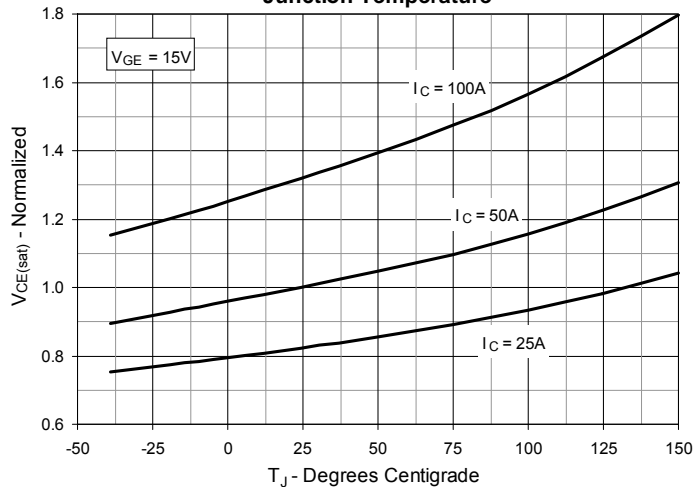
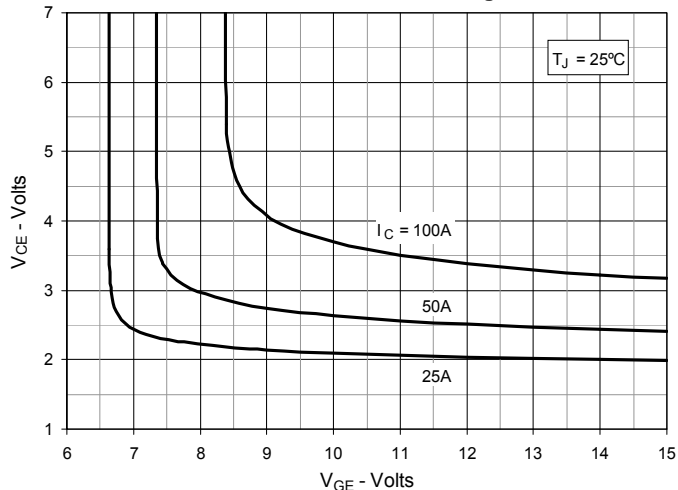
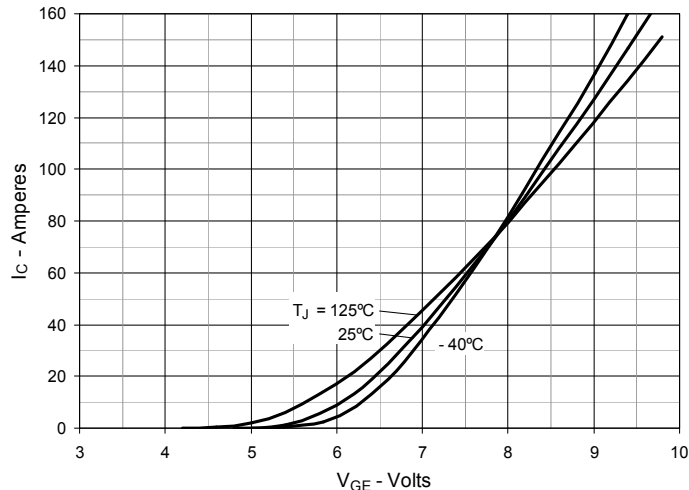
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

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

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

Fig. 6. Input Admittance


Fig. 7. Transconductance

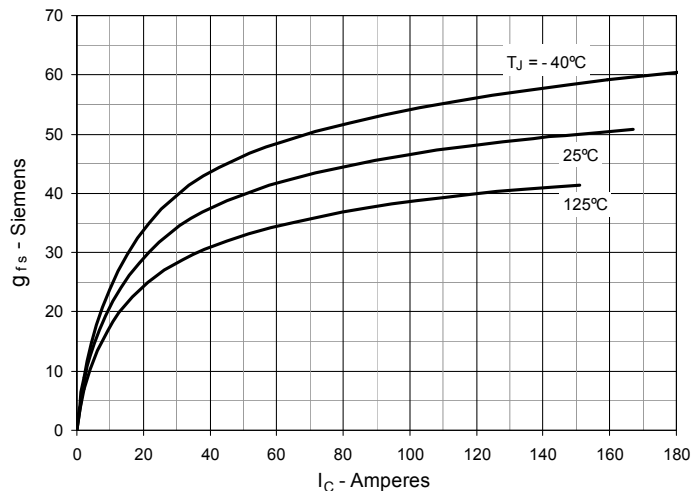


Fig. 8. Gate Charge

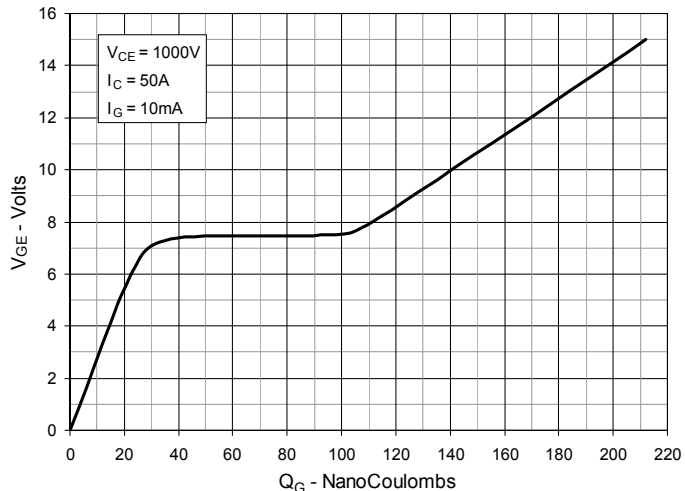


Fig. 9. Forward Voltage Drop of Intrinsic Diode

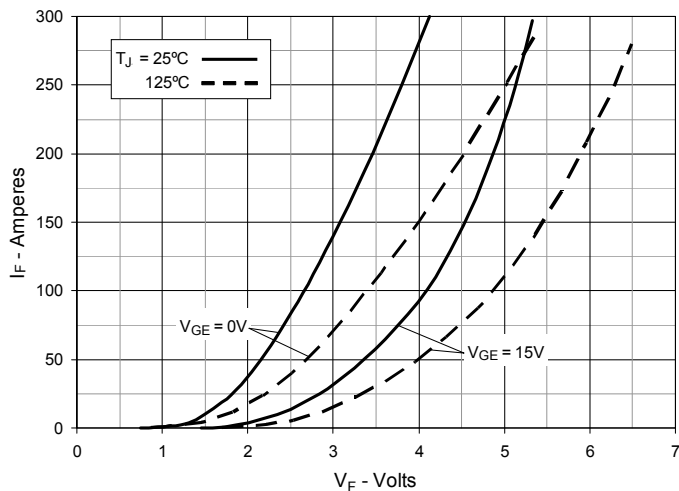


Fig. 10. Capacitance

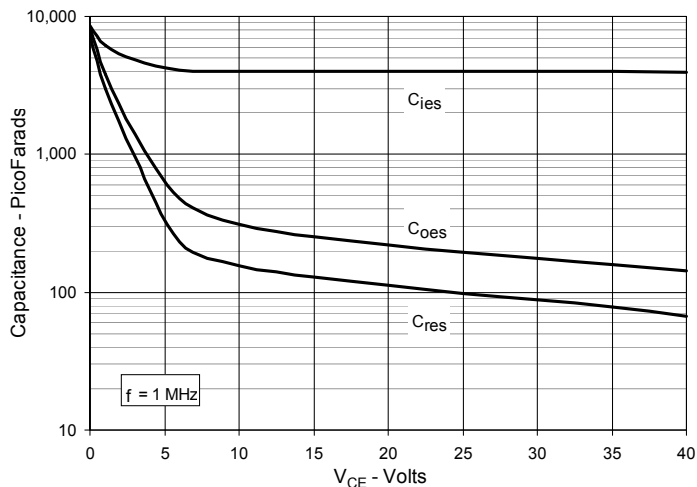


Fig. 11. Reverse-Bias Safe Operating Area

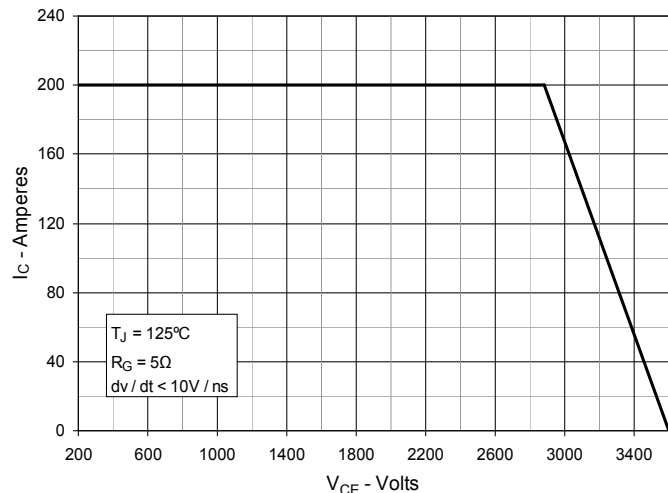


Fig. 12. Maximum Transient Thermal Impedance

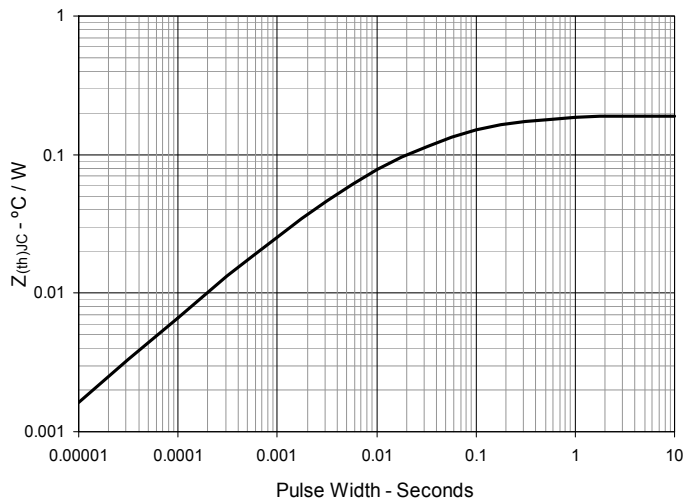


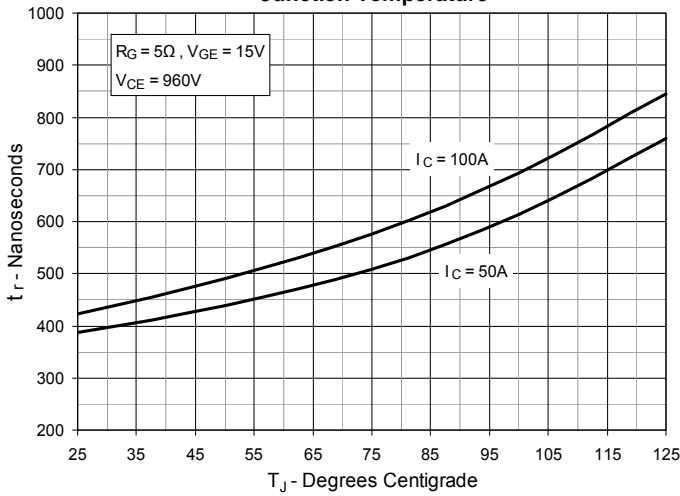
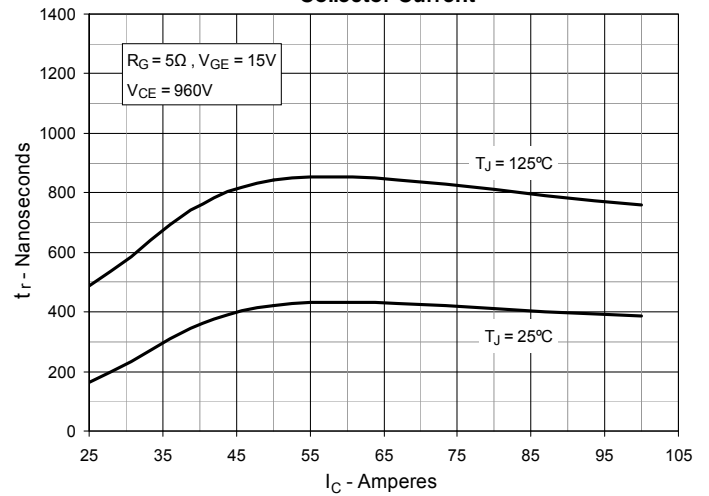
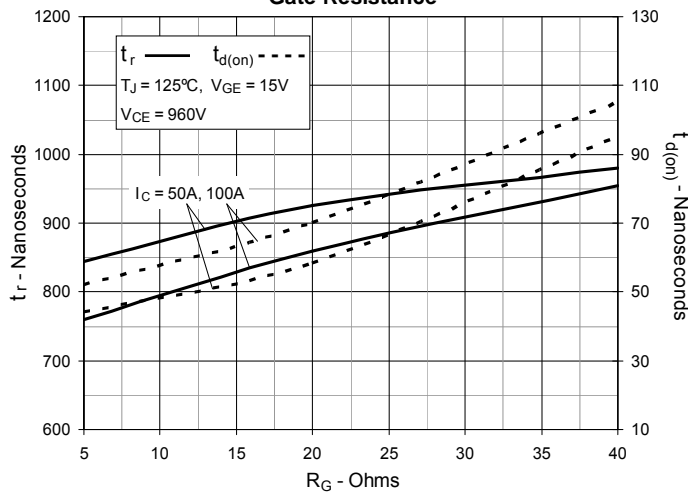
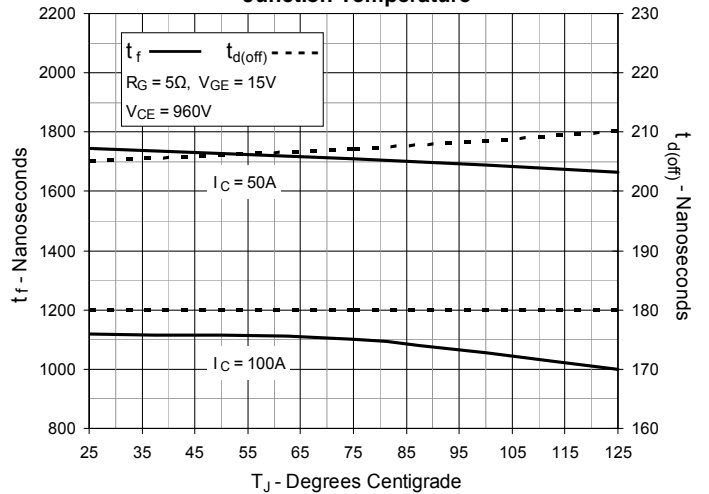
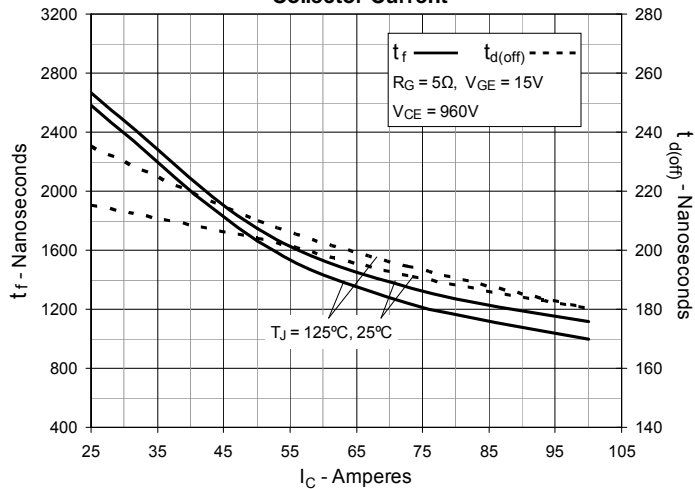
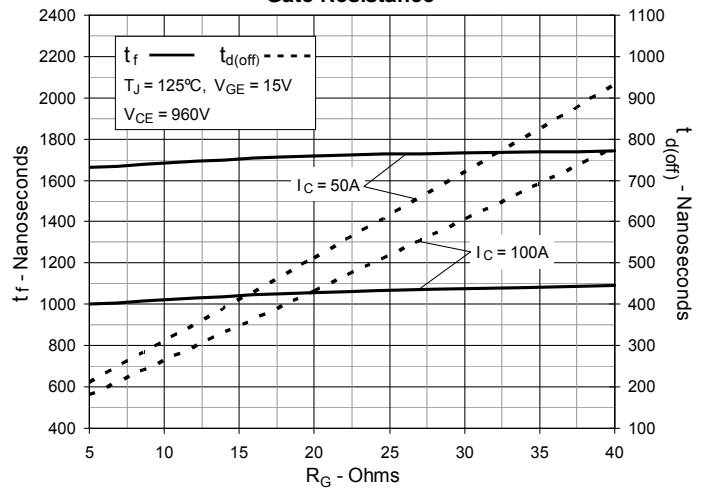
Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance


Fig. 19. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

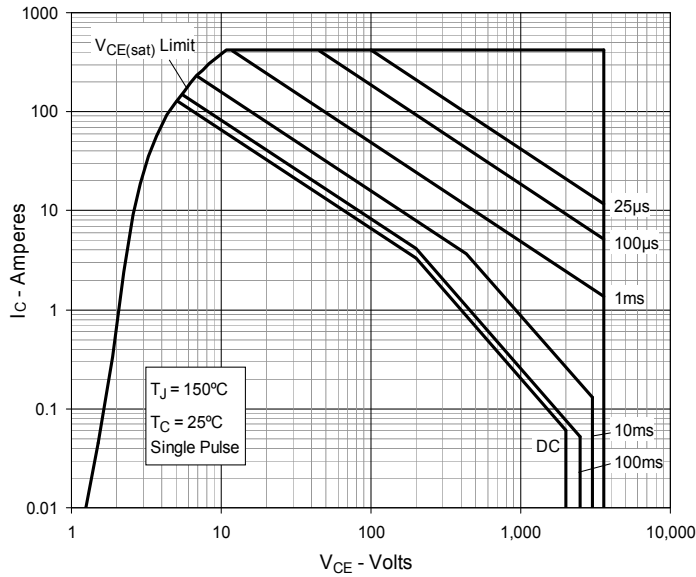
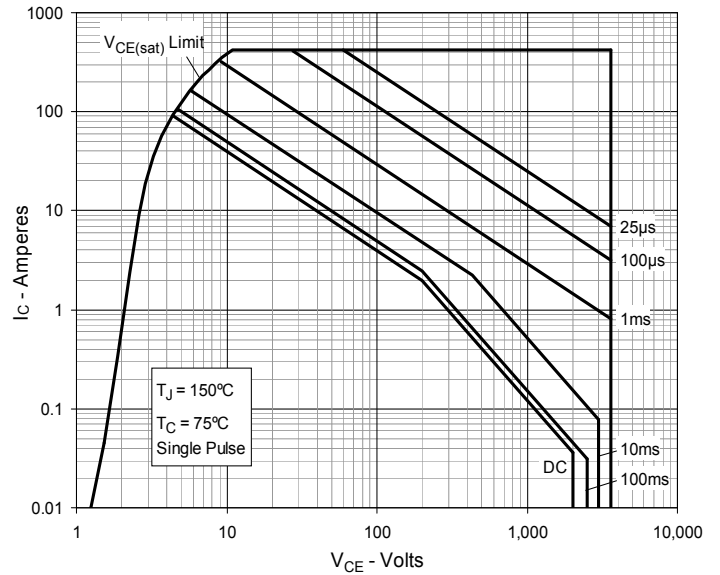
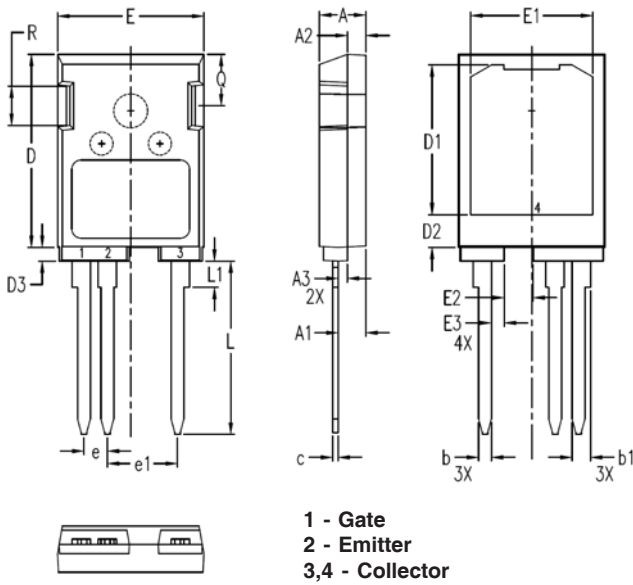


Fig. 20. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$



TO-247PLUS-HV Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|--------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .114 | .122 | 2.90 | 3.10 |
| A2 | .075 | .083 | 1.90 | 2.10 |
| A3 | .035 | .043 | 0.90 | 1.10 |
| b | .053 | .059 | 1.35 | 1.50 |
| b1 | .075 | .083 | 1.90 | 2.10 |
| c | .022 | .030 | 0.55 | 0.75 |
| D | .819 | .843 | 20.80 | 21.40 |
| D1 | .638 | .646 | 16.20 | 16.40 |
| D2 | .134 | .146 | 3.40 | 3.70 |
| D3 | .055 | .063 | 1.40 | 1.60 |
| E | .622 | .638 | 15.80 | 16.20 |
| E1 | .520 | .528 | 13.20 | 13.40 |
| E2 | .118 | .126 | 3.00 | 3.20 |
| E3 | .051 | .059 | 1.30 | 1.50 |
| e | .100 | BSC | 2.54 | BSC |
| e1 | .300 | BSC | 7.62 | BSC |
| L | .732 | .748 | 18.60 | 19.00 |
| L1 | .106 | .118 | 2.70 | 3.00 |
| Q | .216 | .224 | 5.50 | 5.70 |
| R | .165 | .169 | 4.20 | 4.30 |

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