

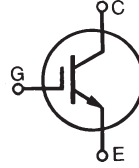
High Voltage IGBT For Capacitor Discharge Applications

IXGH25N250
IXGT25N250
IXGV25N250S

$$V_{CES} = 2500 \text{ V}$$

$$I_{C25} = 60 \text{ A}$$

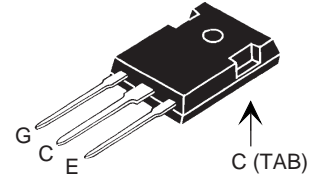
$$V_{CE(sat)} \leq 2.9 \text{ V}$$



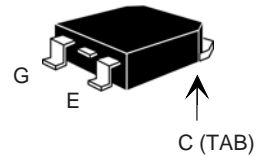
| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|---|-----------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 2500 | V |
| V_{CGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$ | 2500 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 60 | A |
| I_{C110} | $T_C = 110^\circ\text{C}$ | 25 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, V_{GE} = 20 \text{ V}, 1 \text{ ms}$ | 200 | A |
| SSOA (RBSOA) | $V_{GE} = 20 \text{ V}, T_J = 125^\circ\text{C}, R_G = 20 \Omega$ Clamped inductive load @ 1250V | $I_{CM} = 240$ | A |
| P_C | $T_C = 25^\circ\text{C}$ | 250 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| T_{SOLD} | Plastic body for 10 s | 260 | $^\circ\text{C}$ |
| M_d | Mounting torque (TO-247) | 1.13/10 | Nm/lb-in |
| Weight | | TO-247 | 6 g |
| | | TO-268 | 4 g |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified) | | |
|---------------|---|---|------|--------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$ | 2500 | | V |
| $V_{GE(th)}$ | $I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$ | 3.0 | | 5.0 V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$ | | | 50 μA 1 mA |
| I_{GES} | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = 25 \text{ A}, V_{GE} = 15 \text{ V}$ | | | 2.9 V |
| | $I_C = 75 \text{ A}$ | | | 5.2 V |

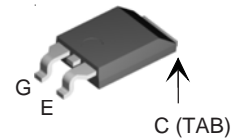
TO-247 (IXGH)



TO-268 (IXGT)



PLUS220SMD (IXGV...S)



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

Features

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

Applications

- Capacitor discharge
- Pulser circuits

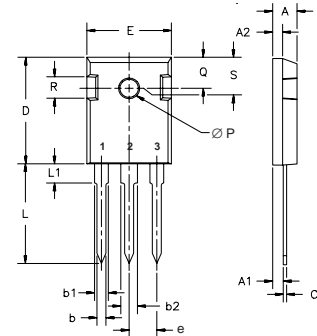
Advantages

- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified) | | |
|--------------|---|---|------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 50\text{ A}$; $V_{CE} = 10\text{ V}$, Note 1 | 16 | 26 | S |
| $I_{C(ON)}$ | $V_{GE} = 15\text{ V}$, $V_{CE} = 20\text{ V}$, Note 1 | | 240 | A |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 2310 | pF |
| C_{oes} | | | 75 | pF |
| C_{res} | | | 23 | pF |
| Q_g | $I_C = 50\text{ A}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 75 | nC |
| Q_{ge} | | | 15 | nC |
| Q_{gc} | | | 30 | nC |
| $t_{d(on)}$ | Resistive load | | 68 | ns |
| t_{ri} | $I_C = 50\text{ A}$, $V_{GE} = 15\text{ V}$, Note 1 | | 233 | ns |
| $t_{d(off)}$ | $V_{CE} = 1250\text{ V}$, $R_G = 5\ \Omega$ | | 209 | ns |
| t_{fi} | | | 200 | ns |
| R_{thJC} | | | 0.5 | $^\circ\text{C/W}$ |
| R_{thCS} | (TO-247) | 0.25 | | $^\circ\text{C/W}$ |

- Notes: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle, $d \leq 2\%$
 2. Additional provisions for lead-to-lead voltage isolation are required at $V_{CE} > 1200\text{ V}$

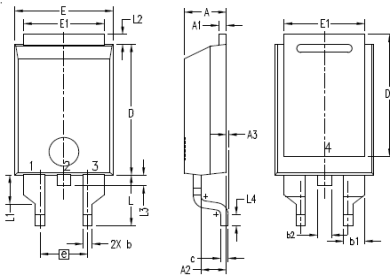
TO-247 (IXGH) Outline



Terminals: 1 - Gate 2 - Drain (Collector)
 3 - Source (Emitter) Tab - Drain (Collector)

| 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 |
| L ₁ | | 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 |

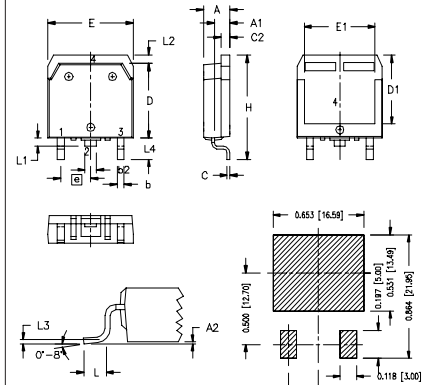
PLUS220SMD (IXGV_S) Outline



1. GATE
 2. DRAIN (COLLECTOR)
 3. SOURCE (EMITTER)
 4. DRAIN (COLLECTOR)

| SYM | INCHES | | MILLIMETER | |
|----------------|----------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .169 | .185 | 4.30 | 4.70 |
| A ₁ | .028 | .035 | 0.70 | 0.90 |
| A ₂ | .098 | .118 | 2.50 | 3.00 |
| A ₃ | .000 | .010 | 0.00 | 0.25 |
| b | .035 | .047 | 0.90 | 1.20 |
| b ₁ | .080 | .095 | 2.03 | 2.41 |
| b ₂ | .054 | .064 | 1.37 | 1.63 |
| c | .028 | .035 | 0.70 | 0.90 |
| D | .551 | .591 | 14.00 | 15.00 |
| D ₁ | .512 | .539 | 13.00 | 13.70 |
| E | .394 | .433 | 10.00 | 11.00 |
| E ₁ | .331 | .346 | 8.40 | 8.80 |
| e | .200 BSC | | 5.08 BSC | |
| L | .209 | .228 | 5.30 | 5.80 |
| L ₁ | .118 | .138 | 3.00 | 3.50 |
| L ₂ | .035 | .051 | 0.90 | 1.30 |
| L ₃ | .047 | .059 | 1.20 | 1.50 |
| L ₄ | .039 | .059 | 1.00 | 1.50 |

TO-268 (IXGT) Outline (D3-Pak)



- 1 - GATE
 2 - DRAIN (COLLECTOR)
 3 - SOURCE (EMITTER)
 4 - DRAIN (COLLECTOR)

| SYM | INCHES | | MILLIMETERS | |
|----------------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A ₁ | .106 | .114 | 2.70 | 2.90 |
| A ₂ | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b ₂ | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C ₂ | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D ₁ | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E ₁ | .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 |
| L ₁ | .047 | .055 | 1.20 | 1.40 |
| L ₂ | .039 | .045 | 1.00 | 1.15 |
| L ₃ | .010 BSC | | 0.25 BSC | |
| L ₄ | .150 | .161 | 3.80 | 4.10 |

Ref: IXYS CO 0052 RA

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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IXYS MOSFETs and IGBTs are covered 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 7,157,338 B2
 by one or more of the following U.S. patents: 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 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 @ 25°C

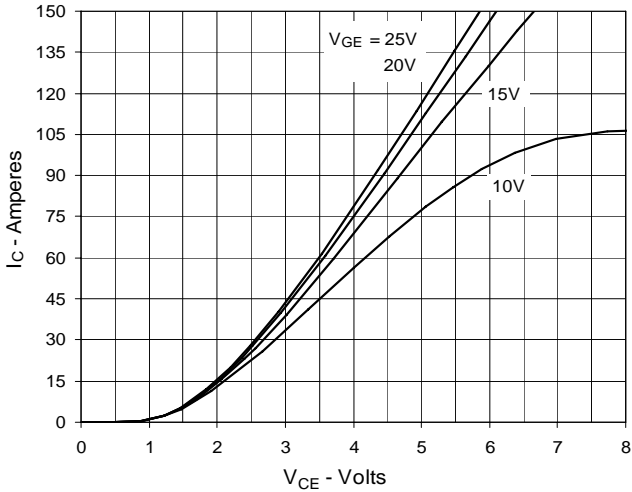


Fig. 2. Extended Output Characteristics @ 25°C

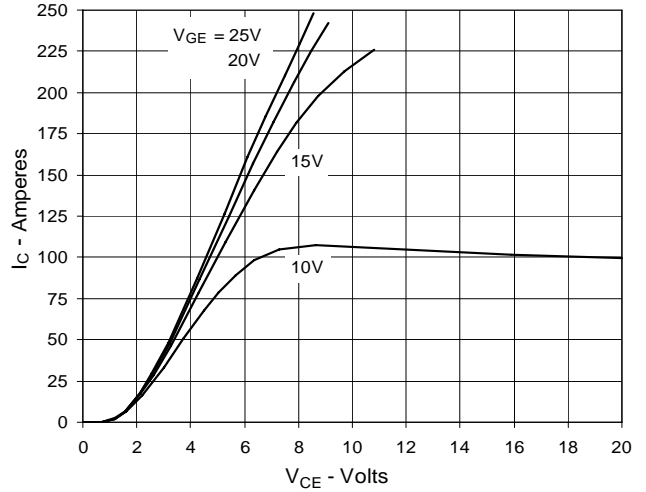


Fig. 3. Output Characteristics @ 125°C

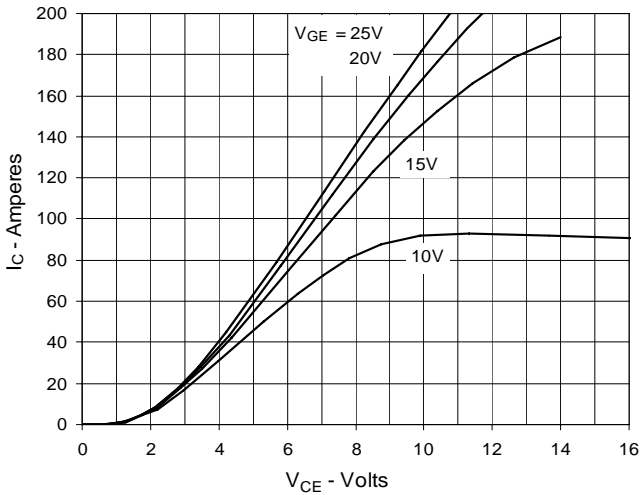


Fig. 4. Dependence of VCE(sat) on Junction Temperature

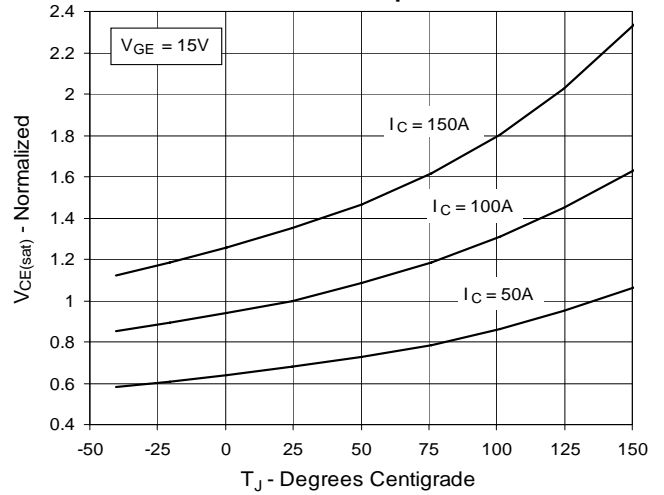


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

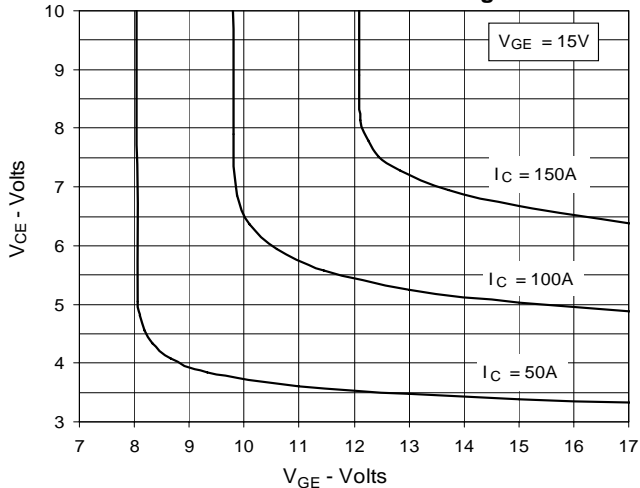


Fig. 6. Input Admittance

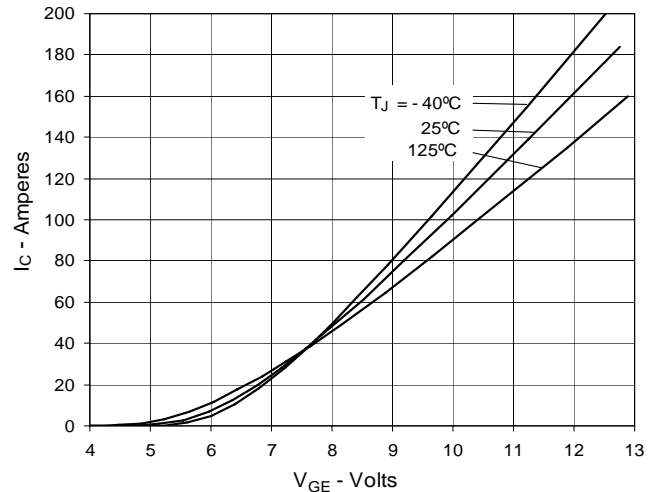


Fig. 7. Transconductance

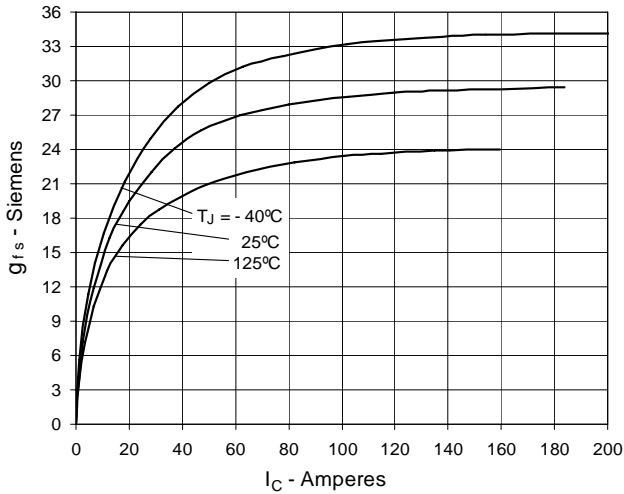


Fig. 8. Resistive Turn-on Rise Time vs. Junction Temperature

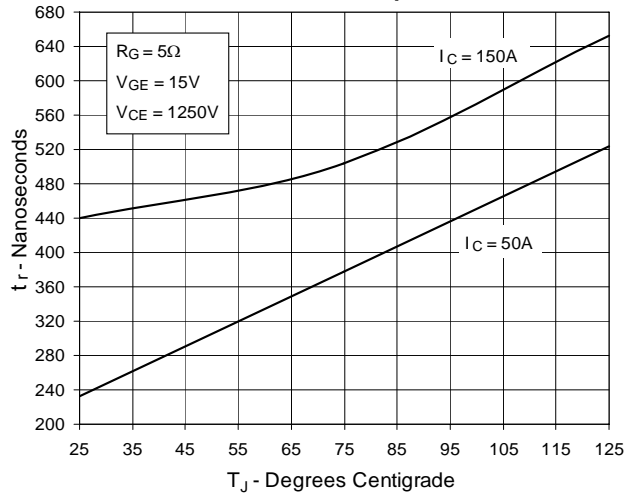


Fig. 9. Resistive Turn-on Rise Time vs. Collector Current

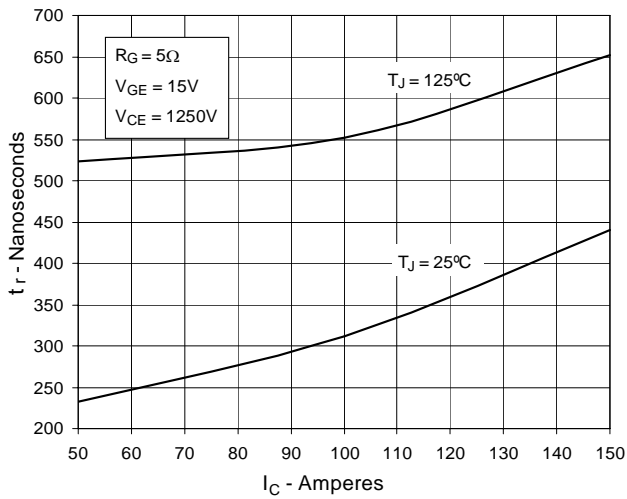


Fig. 10. Resistive Turn-on Switching Times vs. Gate Resistance

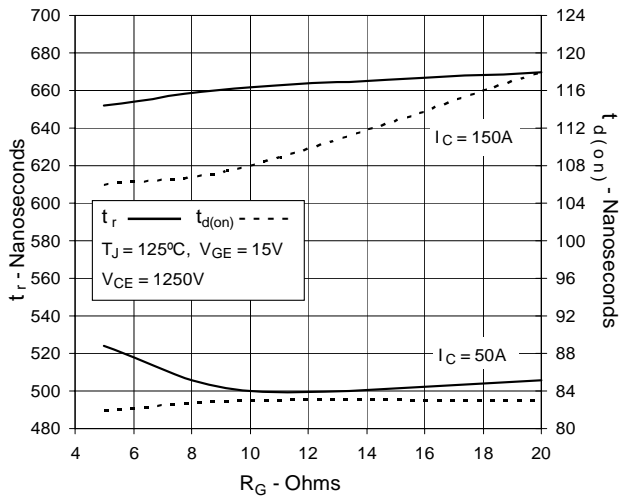


Fig. 11. Resistive Turn-off Switching Times vs. Junction Temperature

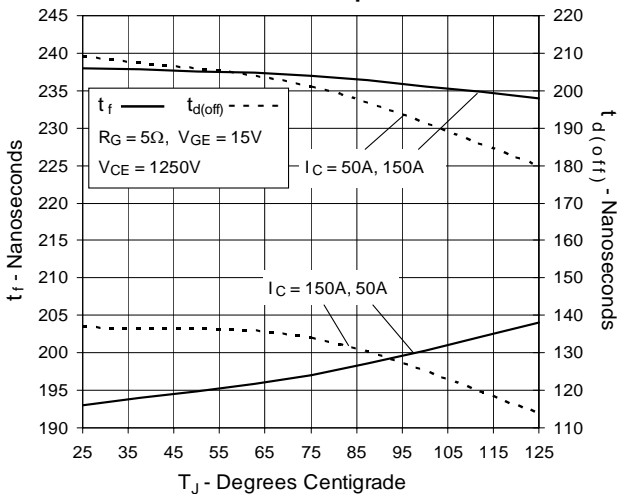


Fig. 12. Resistive Turn-off Switching Times vs. Collector Current

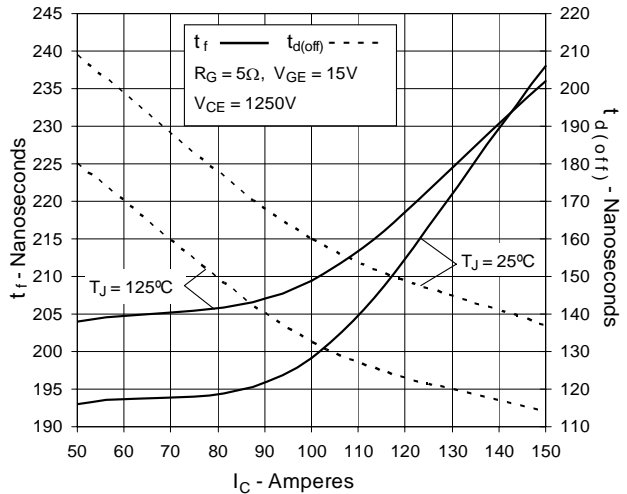


Fig. 13. Resistive Turn-off Switching Times vs. Gate Resistance

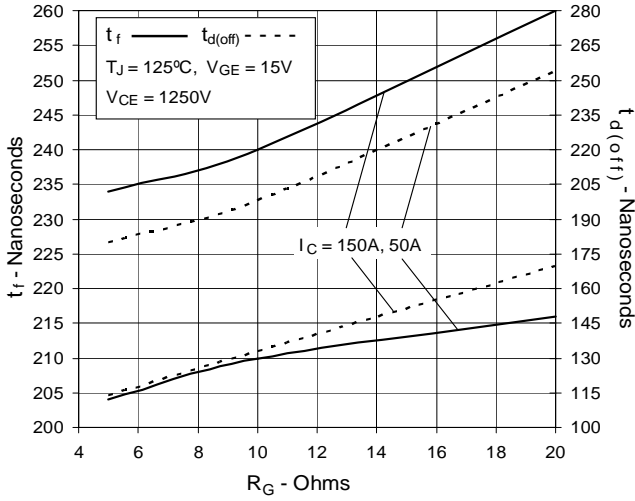


Fig. 14. Gate Charge

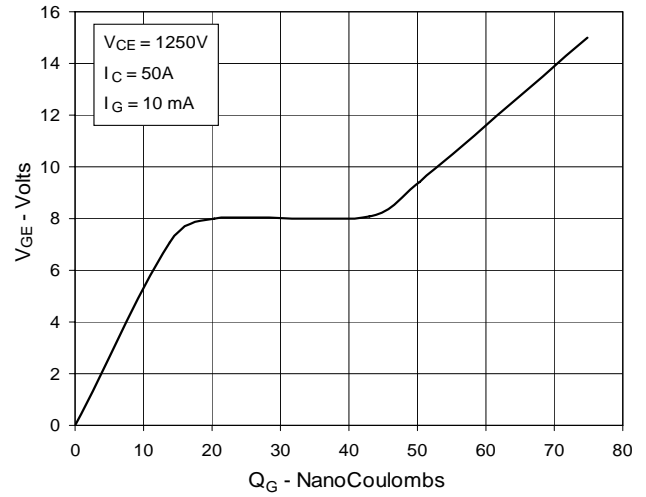


Fig. 15. Reverse-Bias Safe Operating Area

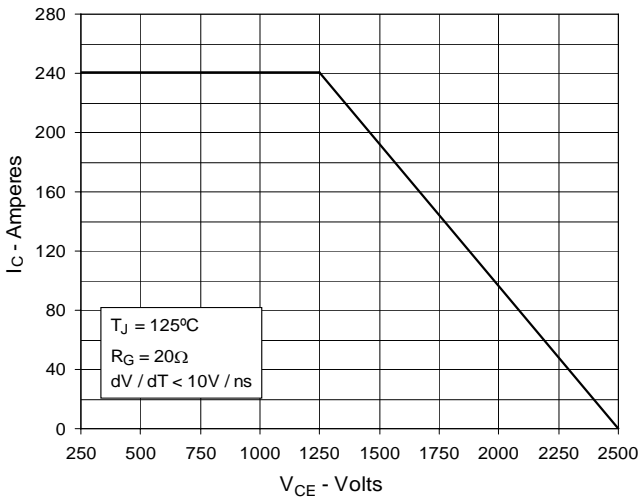


Fig. 16. Capacitance

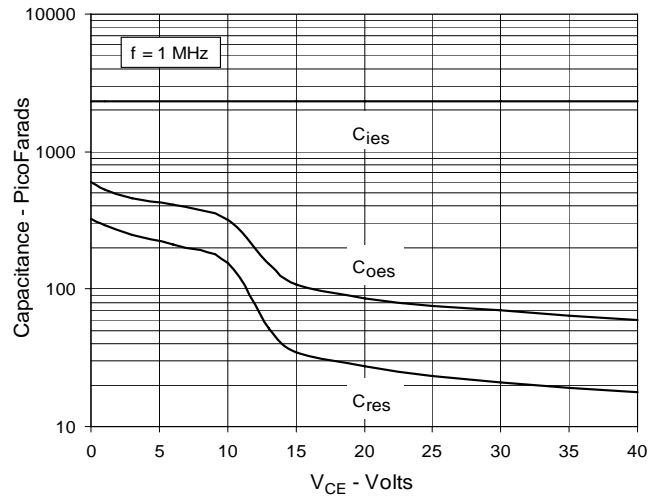


Fig. 17. Maximum Transient Thermal Impedance

