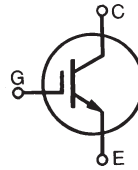


High Voltage IGBT For Capacitor Discharge Applications

IXGF30N400

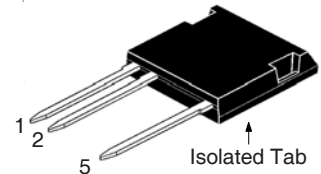
$V_{CES} = 4000V$
 $I_{C25} = 30A$
 $V_{CE(sat)} \leq 3.1V$

(Electrically Isolated Tab)



| Symbol | Test Conditions | Maximum Ratings | |
|----------------|---|---------------------------------|------------|
| V_{CES} | $T_J = 25^\circ C$ to $150^\circ C$ | 4000 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 30 | A |
| I_{C110} | $T_C = 110^\circ C$ | 15 | A |
| I_{CM} | $T_C = 25^\circ C, V_{GE} = 20V, 1ms$ | 360 | A |
| SSOA | $V_{GE} = 20V, T_{VJ} = 125^\circ C, R_G = 2\Omega$ | $I_{CM} = 300$ | A |
| (RBSOA) | Clamped Inductive Load | $V_{CE} \leq 0.8 \cdot V_{CES}$ | |
| P_C | $T_C = 25^\circ C$ | 160 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6 mm (0.062 in.) from case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10s | 260 | $^\circ C$ |
| F_C | Mounting Force | 20..120 / 4.5..27 | Nm/lb.in. |
| V_{ISOL} | 50/60Hz, 1 minute | 4000 | V~ |
| Weight | | 5 | g |

ISOPLUS i4-Pak™



1 = Gate
 2 = Emitter
 5 = Collector

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V Electrical Isolation
- High Peak Current Capability
- Low Saturation Voltage
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Advantages

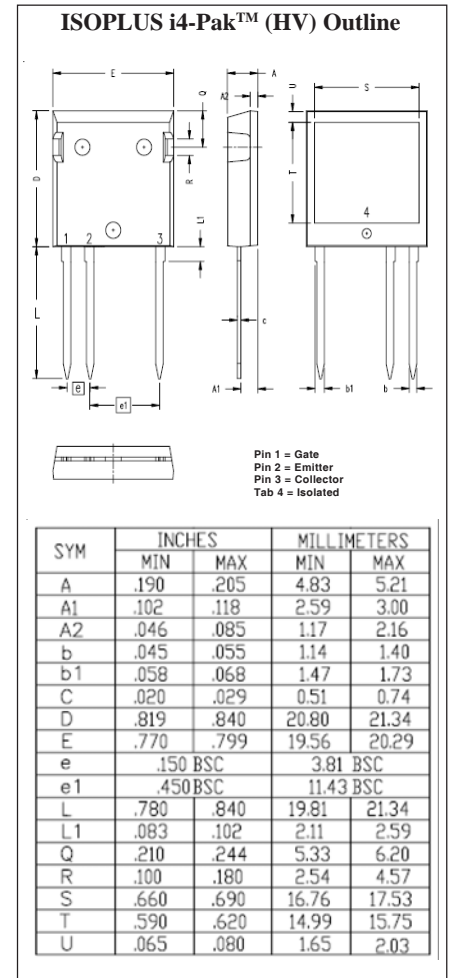
- High Power Density
- Easy to Mount

Applications

- Capacitor Discharge
- Pulser Circuits

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|--|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A, V_{GE} = 0V$ | 4000 | | 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, $T_J = 100^\circ C$ | | | 50 μA 3 mA |
| I_{GES} | $V_{CE} = 0V, V_{GE} = \pm 20V$ | | | ± 200 nA |
| $V_{CE(sat)}$ | $I_C = 30A, V_{GE} = 15V, \text{Note 1}$ $I_C = 90A$ | | | 3.1 V 5.2 V |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 30\text{A}$, $V_{CE} = 10\text{V}$, Note 1 | 14 | 23 | S |
| $I_{C(ON)}$ | $V_{GE} = 15\text{V}$, $V_{CE} = 20\text{V}$, Note 1 | | 360 | A |
| C_{ies} | $V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$ | | 3040 | pF |
| C_{oes} | | | 95 | pF |
| C_{res} | | | 30 | pF |
| Q_g | $I_C = 30\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 600\text{V}$ | | 135 | nC |
| Q_{ge} | | | 22 | nC |
| Q_{gc} | | | 50 | nC |
| $t_{d(on)}$ | Resistive Switching Times $I_C = 30\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 1250\text{V}$, $R_G = 2\Omega$ | | 55 | ns |
| t_r | | | 146 | ns |
| $t_{d(off)}$ | | | 210 | ns |
| t_f | | | 514 | ns |
| R_{thJC} | | | 0.78 | $^\circ\text{C/W}$ |
| R_{thCS} | | 0.15 | | $^\circ\text{C/W}$ |
| R_{thJA} | | 30 | | $^\circ\text{C/W}$ |



Notes:

1. Pulse test, $t < 300\mu\text{s}$, duty cycle, $d < 2\%$.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

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 |
| | 4,850,072 | 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 @ $T_J = 25^\circ\text{C}$

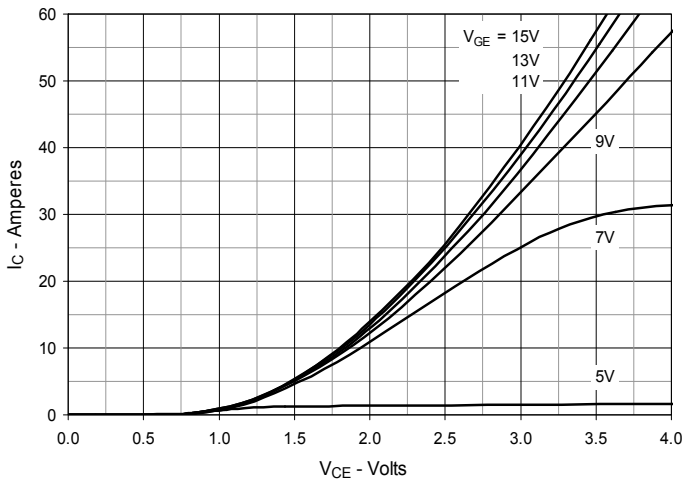


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

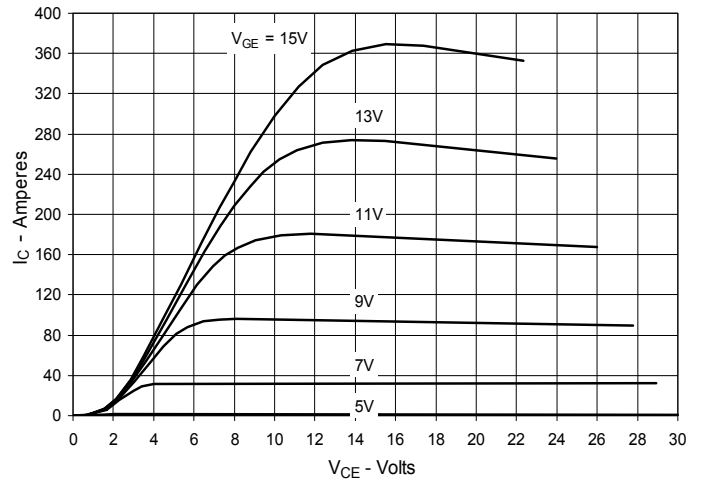


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

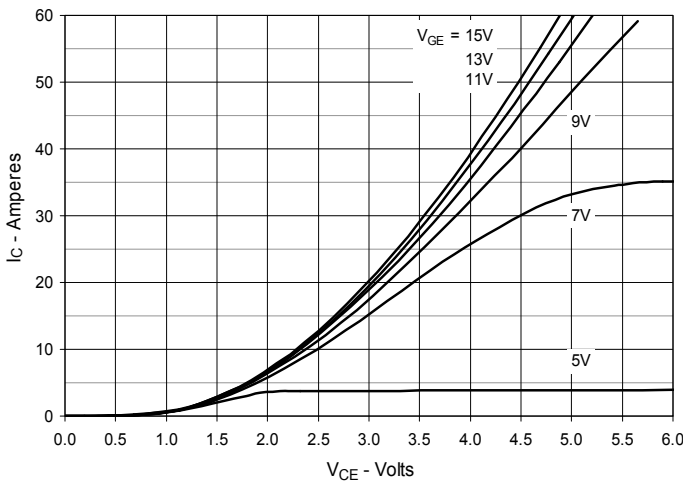


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

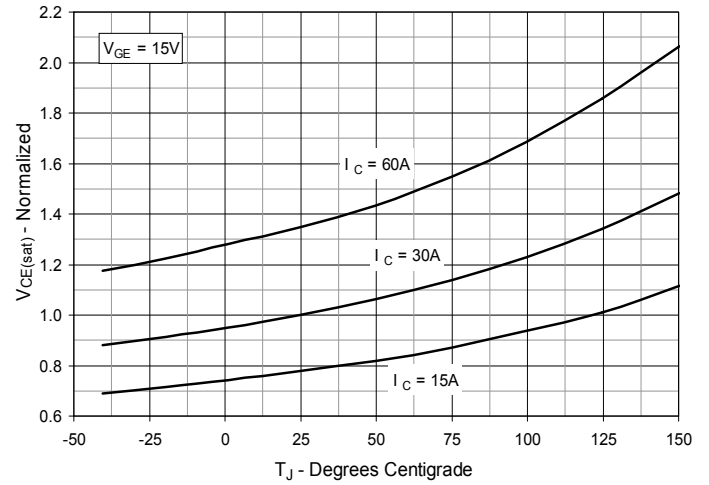


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

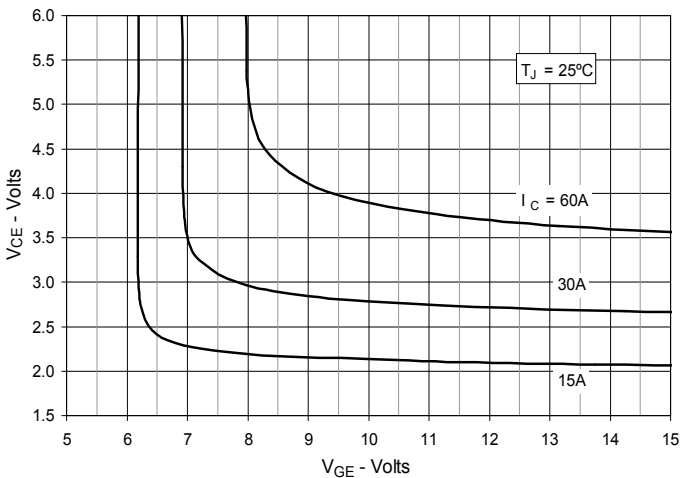


Fig. 6. Input Admittance

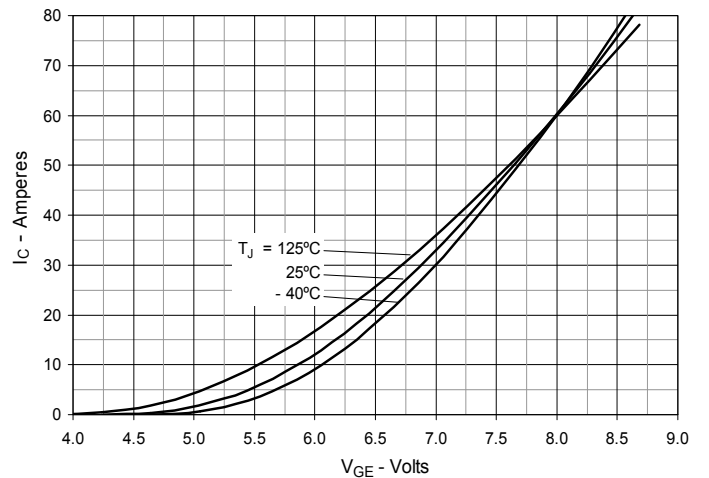


Fig. 7. Transconductance

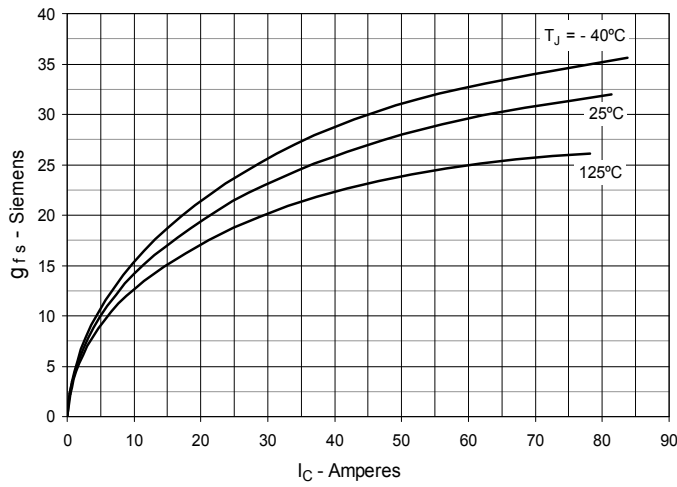


Fig. 8. Gate Charge

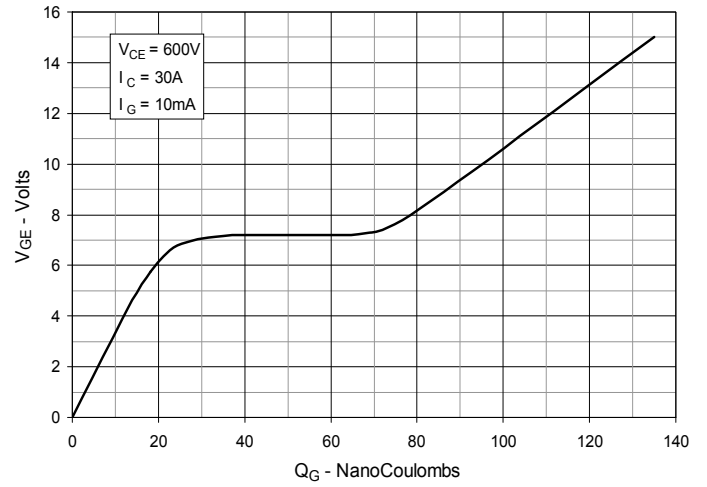


Fig. 9. Reverse-Bias Safe Operating Area

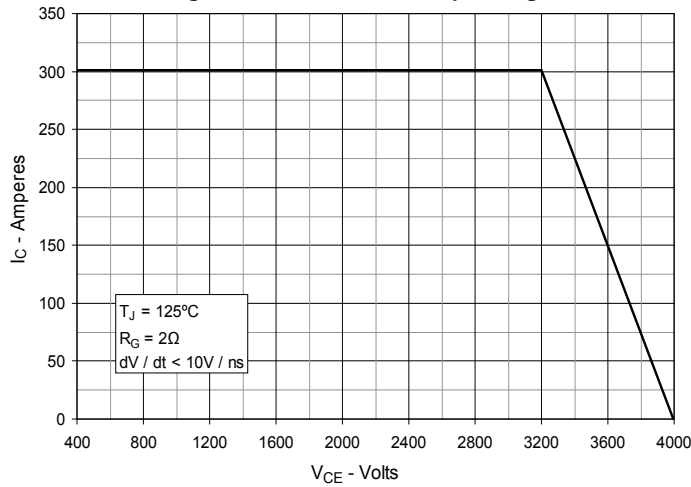


Fig. 10. Capacitance

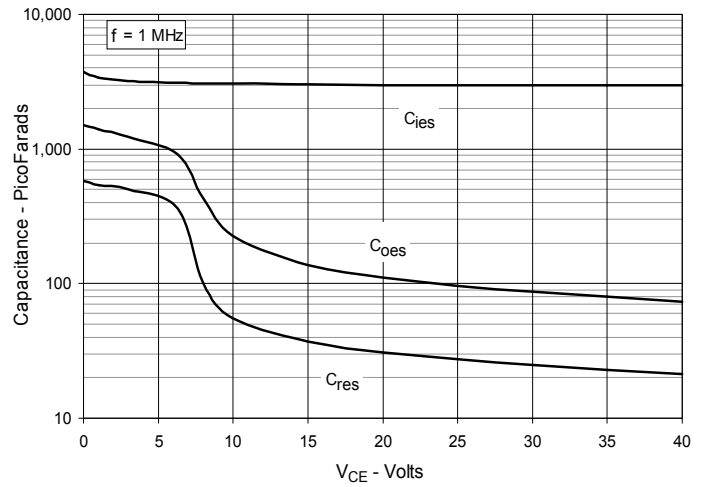


Fig. 11. Maximum Transient Thermal Impedance

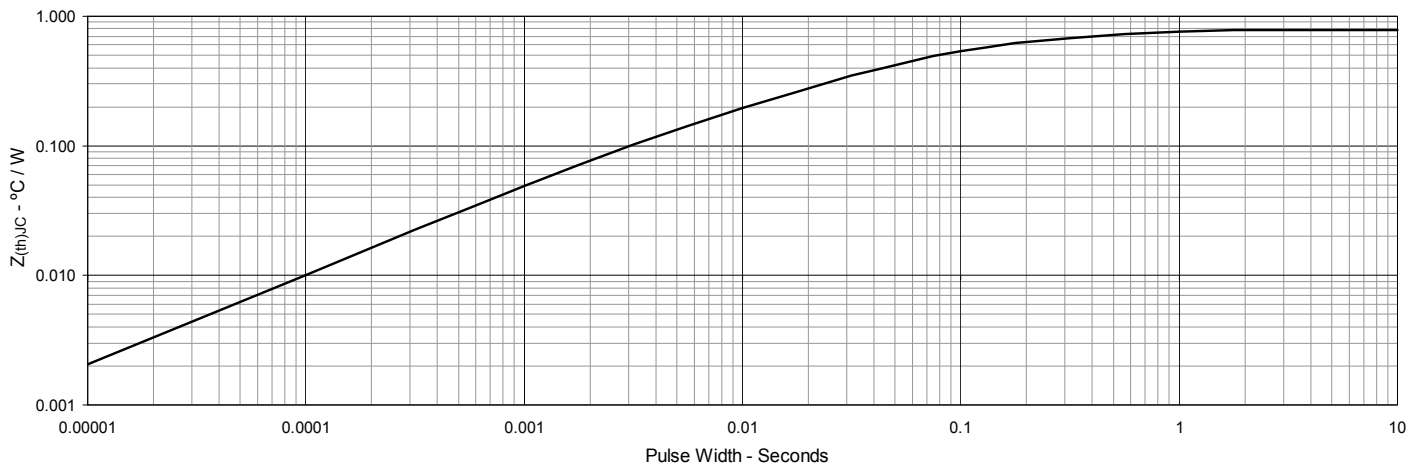


Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature

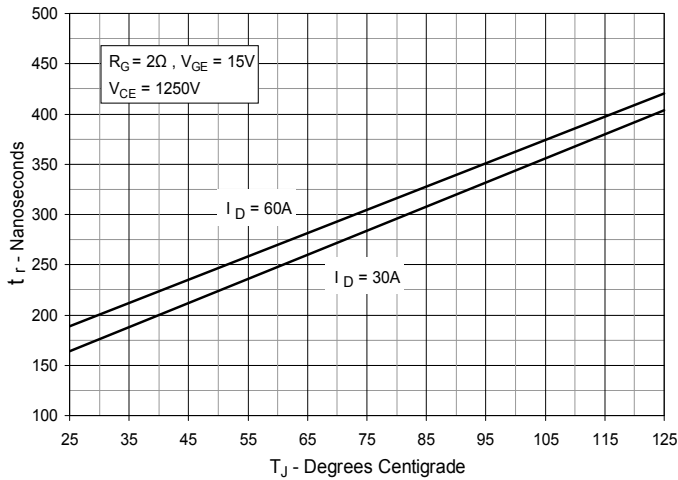


Fig. 13. Resistive Turn-on Rise Time vs. Drain Current

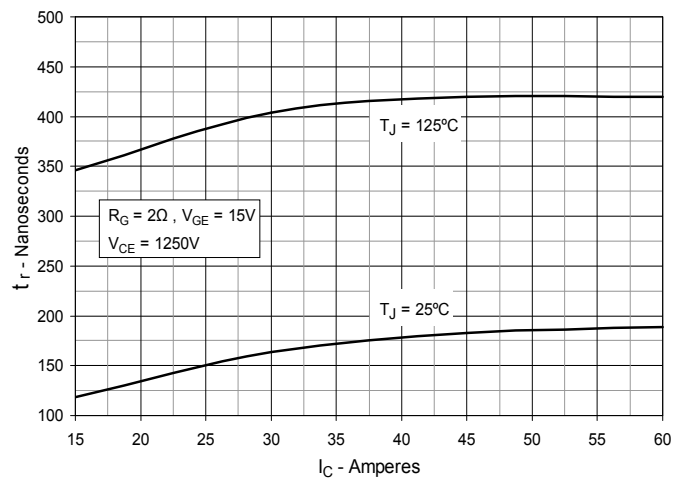


Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance

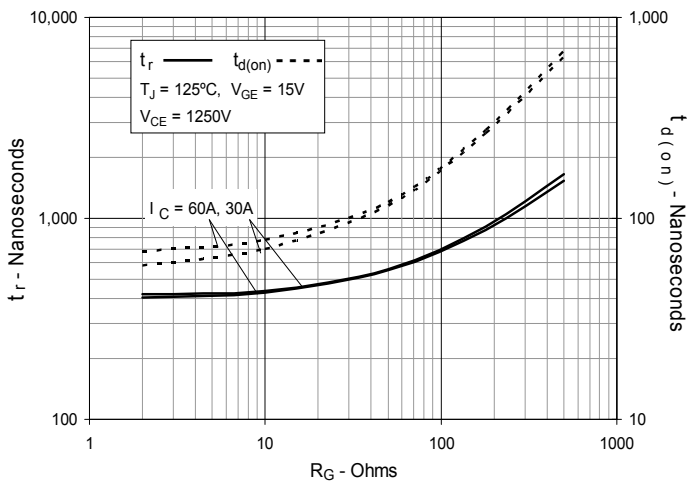


Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature

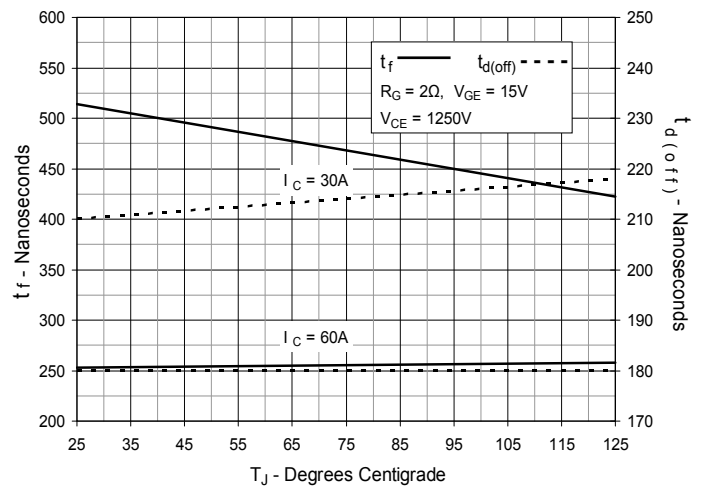


Fig. 16. Resistive Turn-off Switching Times vs. Drain Current

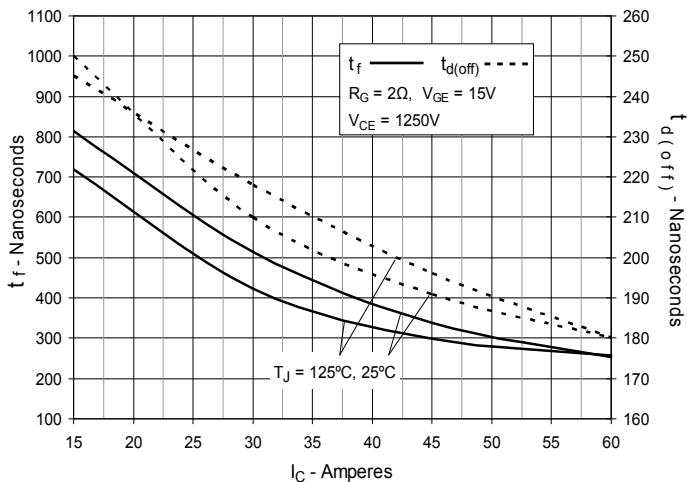


Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance

