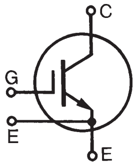
IXYS

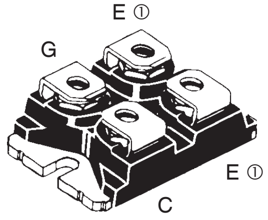
# High Voltage IGBT

# IXGN100N170

$V_{CES} = 1700V$
$I_{C90} = 95A$
$V_{CE(sat)} \leq 3.0V$



**SOT-227B, miniBLOC**
E153432



G = Gate, C = Collector, E = Emitter
① either emitter terminal can be used as Main or Kelvin Emitter

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_J$ = 25°C to 150°C | 1700 | V |
| $V_{CGR}$ | $T_J$ = 25°C to 150°C, $R_{GE}$ = 1MΩ | 1700 | V |
| $V_{GES}$ | Continuous | ±20 | V |
| $V_{GEM}$ | Transient | ±30 | V |
| $I_{C25}$ | $T_C$ = 25°C | 160 | A |
| $I_{C90}$ | $T_C$ = 90°C | 95 | A |
| $I_{CM}$ | $T_C$ = 25°C, 1ms | 600 | A |
| **SSOA**<br>**(RBSOA)** | $V_{GE}$ = 15V, $T_{VJ}$ = 125°C, $R_G$ = 1Ω<br>Clamped Inductive Load | $I_{CM}$ = 200<br>@0.8 • $V_{CES}$ | A |
| $t_{sc}$<br>**(SCSOA)** | $V_{GE}$ = 15V, $V_{CE}$ = 1250V, $T_J$ = 125°C<br>$R_G$ = 10Ω, Non Repetitive | 10 | µs |
| $P_C$ | $T_C$ = 25°C | 735 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $V_{ISOL}$ | 50/60Hz t = 1min | 2500 | V~ |
| | $I_{ISOL} \leq$ 1mA t = 1s | 3000 | V~ |
| $M_d$ | Mounting Torque | 1.5/13 | Nm/lb.in. |
| | Terminal Connection Torque | 1.3/11.5 | Nm/lb.in. |
| **Weight** | | 30 | g |

## Features

- Optimized for Low Conduction and Switching Losses
- Isolation Voltage 2500V~
- Short Circuit Capability
- International Standard Package
- High Current Handling Capability

## Advantages

- High Power Density
- Low Gate Drive Requirement

## Applications

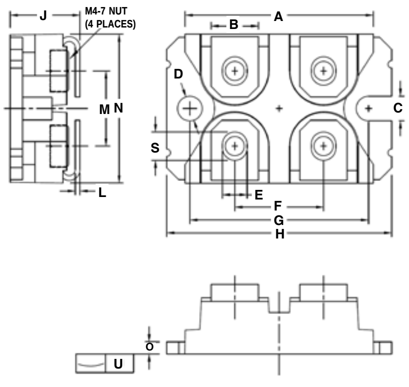
- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 3mA, $V_{GE}$ = 0V | 1700 | | | V |
| $V_{GE(th)}$ | $I_C$ = 8mA, $V_{CE}$ = $V_{GE}$ | 3.0 | | 5.0 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$, $V_{GE}$ = 0V | | | 50 | µA |
| | $T_J$ = 125°C | | | 3 | mA |
| $I_{GES}$ | $V_{CE}$ = 0V, $V_{GE}$ = ±20V | | | ±200 | nA |
| $V_{CE(sat)}$ | $I_C$ = 100A, $V_{GE}$ = 15V, Note 1 | | 2.5 | 3.0 | V |

| Symbol | Test Conditions<br>($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values<br>Min. | <br>Typ. | <br>Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $I_C$ = 60A, $V_{CE}$ = 10V, Note 1 | 36 | 64 | | S |
| $C_{ies}$ | $V_{CE}$ = 25V, $V_{GE}$ = 0V, f = 1MHz | | 9200 | | pF |
| $C_{oes}$ | | | 455 | | pF |
| $C_{res}$ | | | 150 | | pF |
| $Q_g$ | $I_C$ = 100A, $V_{GE}$ = 15V, $V_{CE}$ = 0.5 • $V_{CES}$ | | 425 | | nC |
| $Q_{ge}$ | | | 65 | | nC |
| $Q_{gc}$ | | | 186 | | nC |
| $t_{d(on)}$ | **Resistive load, $T_J$ = 25°C**<br>$I_C$ = 100A, $V_{GE}$ = 15V<br>$V_{CE}$ = 0.5 • $V_{CES}$, $R_G$ = 1Ω | | 35 | | ns |
| $t_r$ | | | 192 | | ns |
| $t_{d(off)}$ | | | 285 | | ns |
| $t_f$ | | | 395 | | ns |
| $t_{d(on)}$ | **Resistive load, $T_J$ = 125°C**<br>$I_C$ = 100A, $V_{GE}$ = 15V<br>$V_{CE}$ = 0.5 • $V_{CES}$, $R_G$ = 1Ω | | 35 | | ns |
| $t_r$ | | | 250 | | ns |
| $t_{d(off)}$ | | | 285 | | ns |
| $t_f$ | | | 435 | | ns |
| $R_{thJC}$ | | | | 0.17 | °C/W |
| $R_{thCS}$ | | | 0.05 | | °C/W |

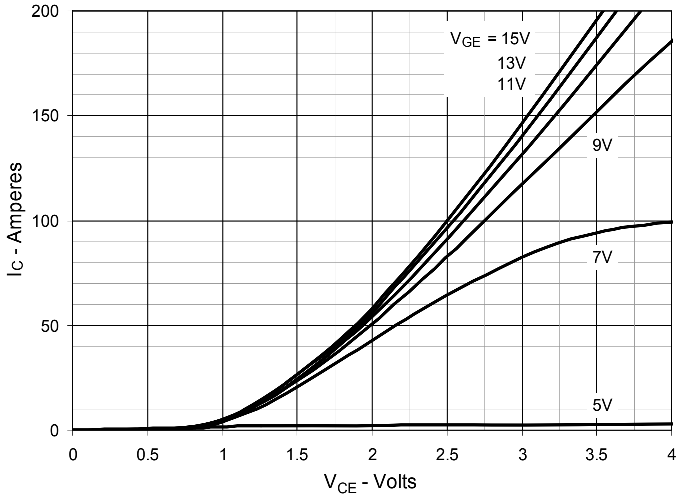
Note: 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

**SOT-227B (IXGN) OUTLINE**

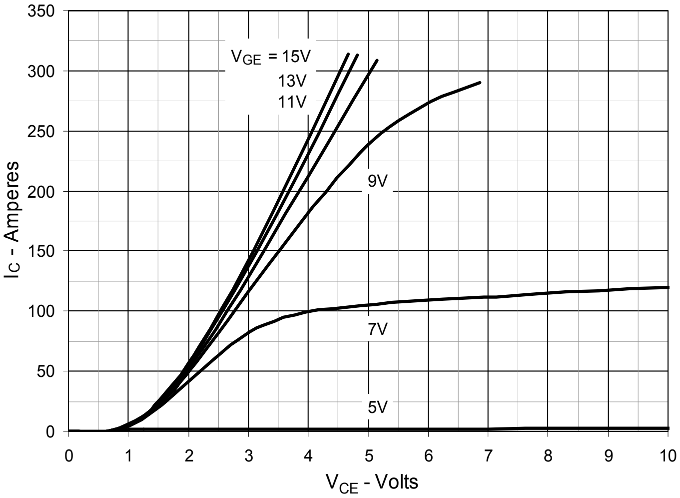


| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|
| A | 1.224 | 1.260 | 31.10 | 32.00 |
| B | .303 | .327 | 7.70 | 8.30 |
| C | .161 | .173 | 4.10 | 4.40 |
| D | .161 | .173 | 4.10 | 4.40 |
| E | .161 | .173 | 4.10 | 4.40 |
| F | .587 | .598 | 14.90 | 15.20 |
| G | 1.181 | 1.201 | 30.00 | 30.50 |
| H | 1.488 | 1.508 | 37.80 | 38.30 |
| J | .461 | .484 | 11.70 | 12.30 |
| L | .030 | .033 | 0.75 | 0.85 |
| M | .492 | .512 | 12.50 | 13.00 |
| N | .984 | 1.004 | 25.00 | 25.50 |
| O | .075 | .087 | 1.90 | 2.20 |
| S | .181 | .193 | 4.60 | 4.90 |
| U | .000 | .005 | 0.00 | 0.13 |

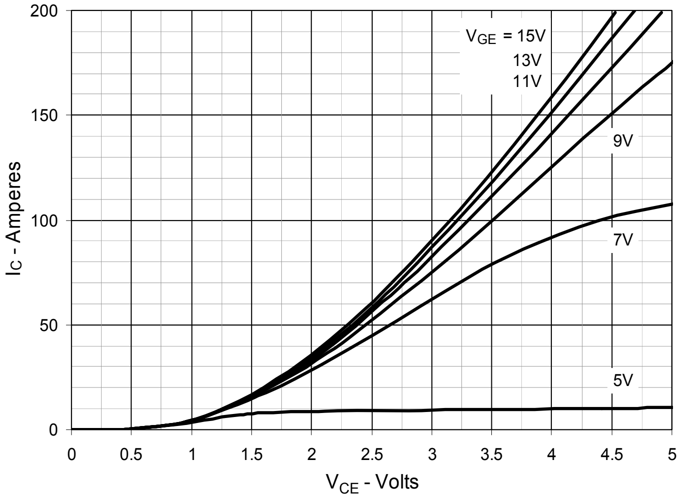
### Fig. 1. Output Characteristics @ $T_J$ = 25ºC



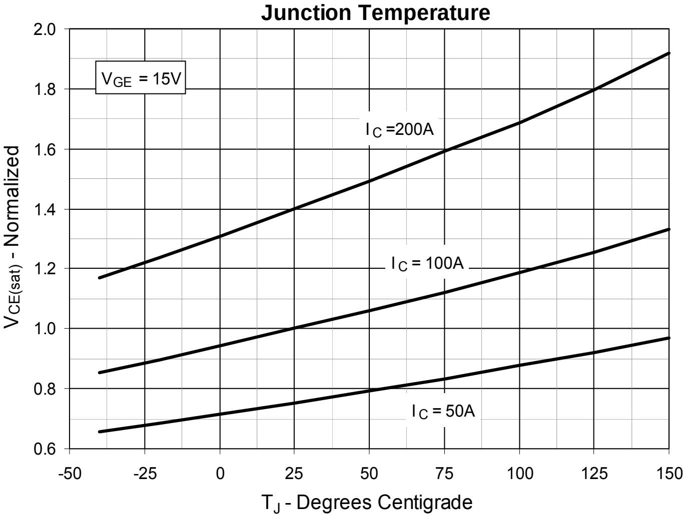
### Fig. 2. Extended Output Characteristics @ $T_J$ = 25ºC



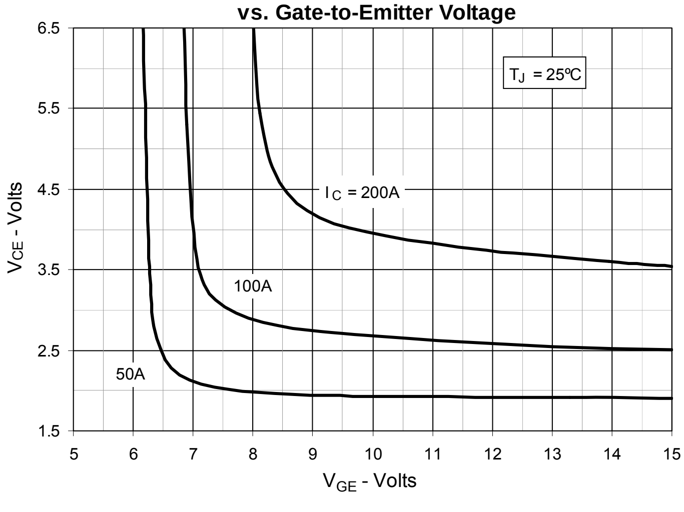
### Fig. 3. Output Characteristics @ $T_J$ = 125ºC



### 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

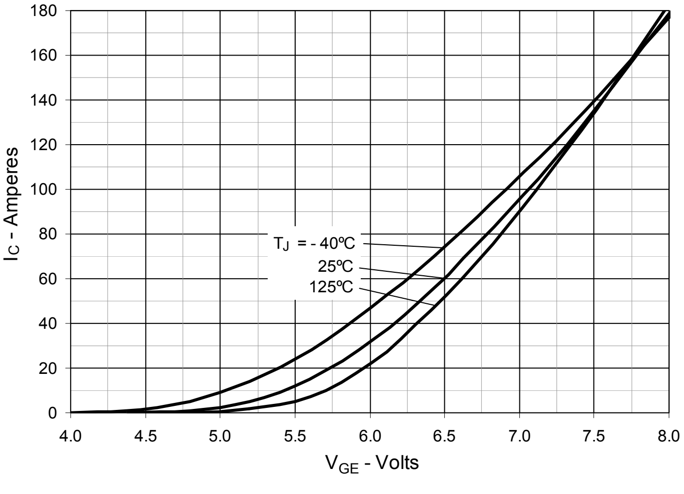


Fig. 7. Transconductance

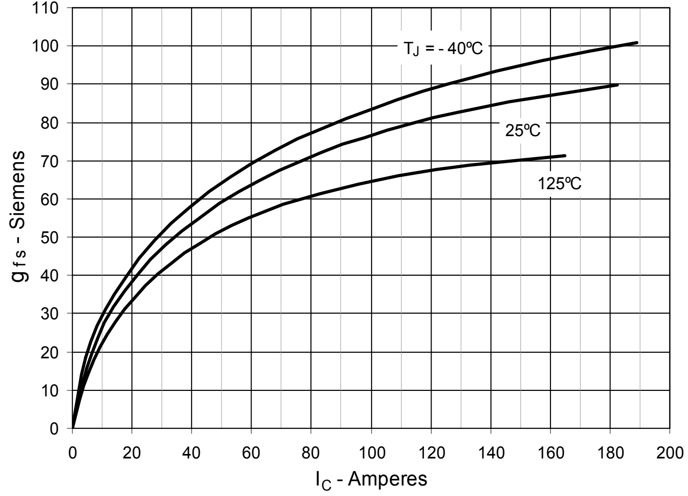


Fig. 8. Gate Charge

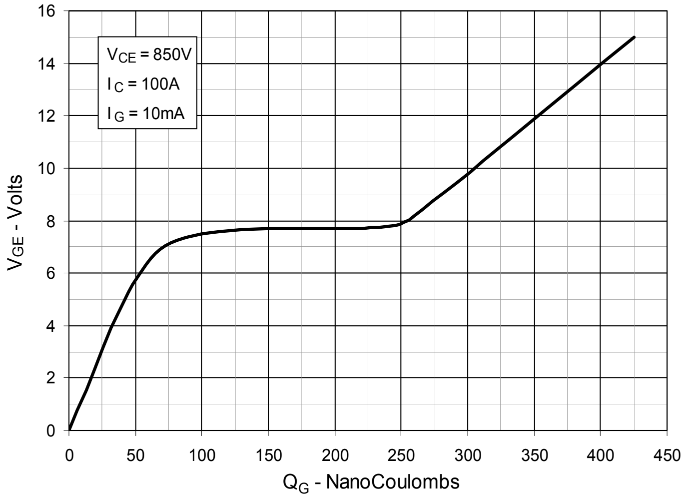


Fig. 9. Reverse-Bias Safe Operating Area

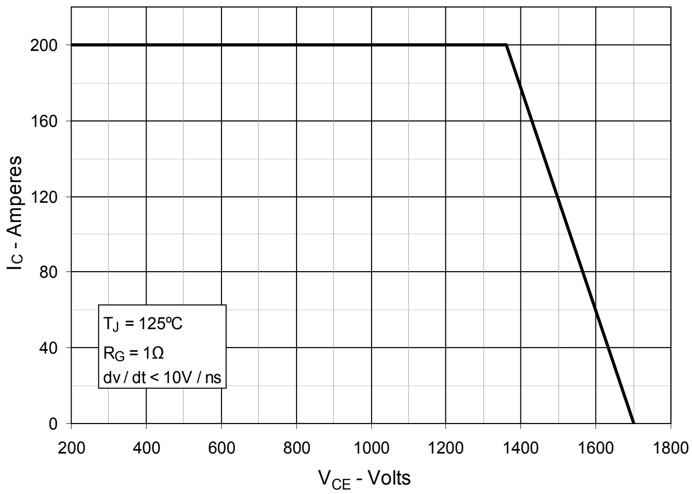


Fig. 10. Capacitance

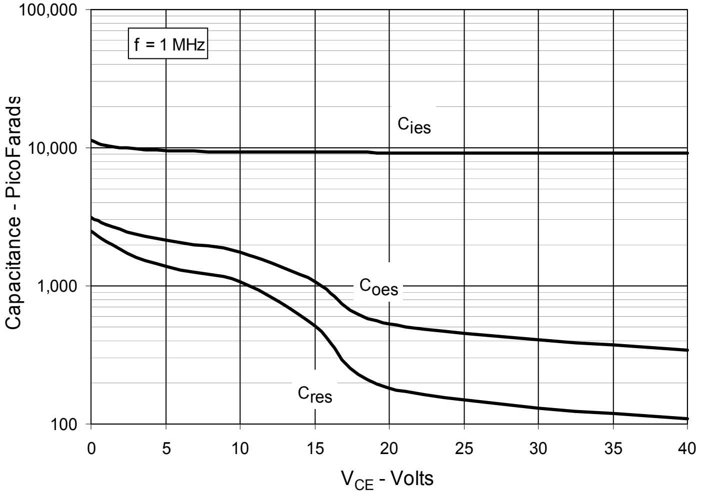


Fig. 11. Maximum Transient Thermal Impedance

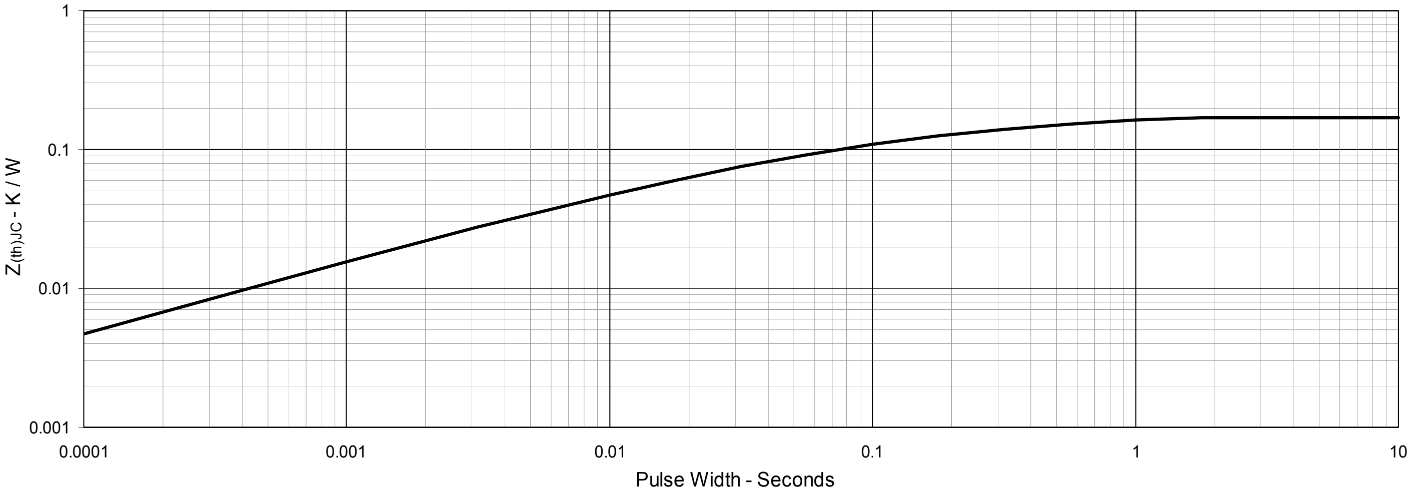


**Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature**

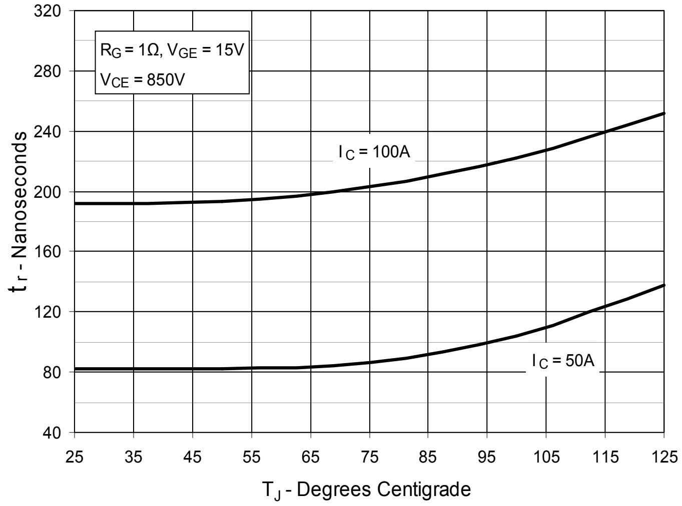


**Fig. 13. Resistive Turn-on Rise Time vs. Collector Current**

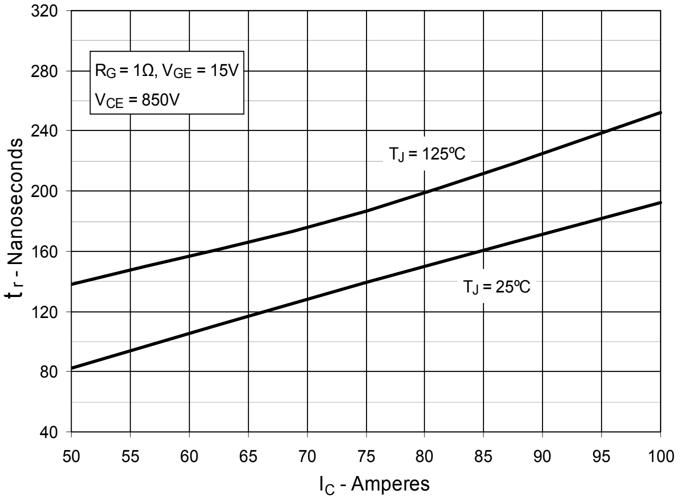


**Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance**

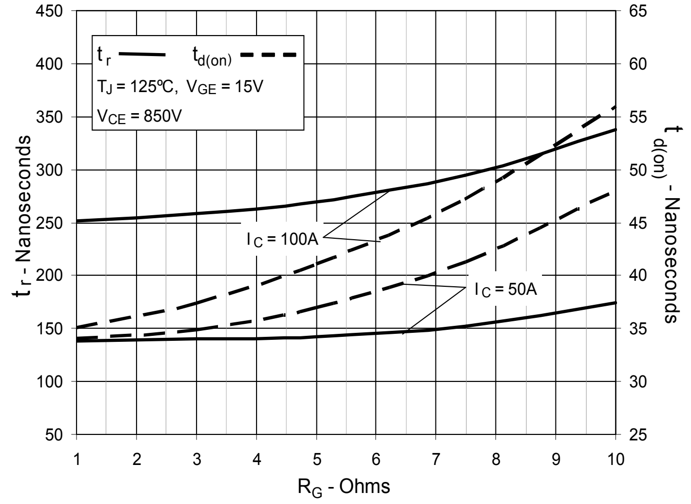


**Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature**

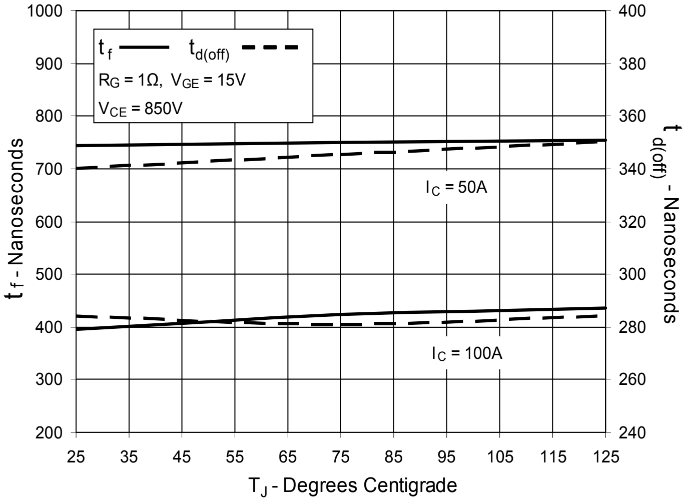


**Fig. 16. Resistive Turn-off Switching Times vs. Collector Current**

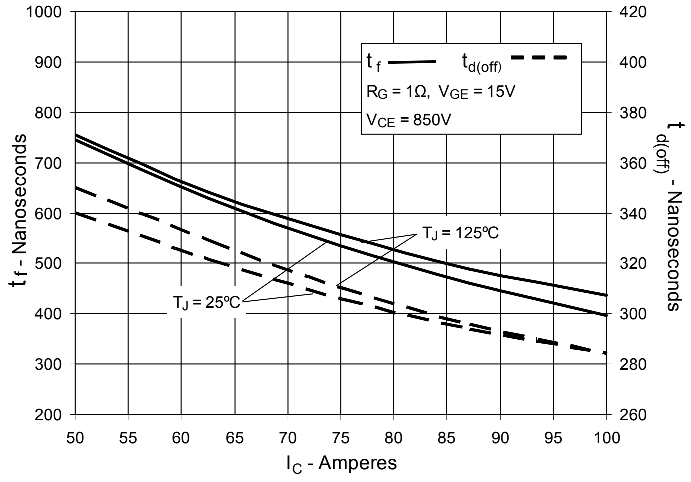
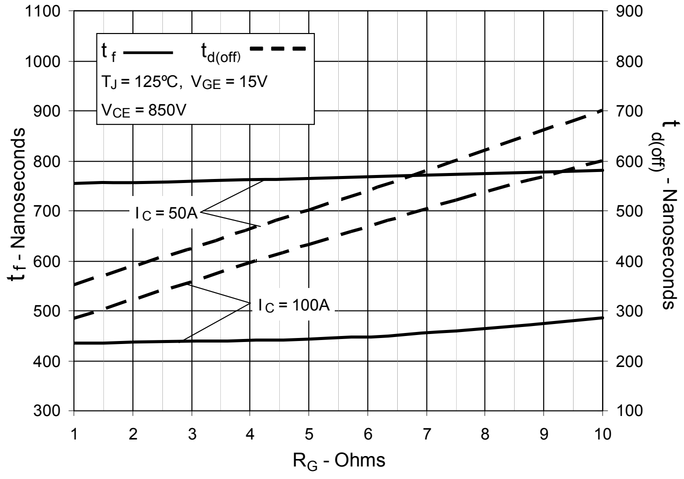


**Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance**



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