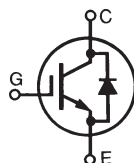


### BiMOSFET™ Monolithic Bipolar MOS Transistor

### IXBN75N170

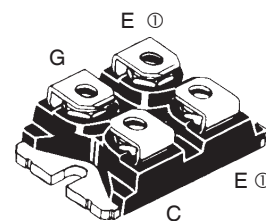
$$\begin{aligned} V_{CES} &= 1700V \\ I_{C90} &= 75A \\ V_{CE(sat)} &\leq 3.1V \end{aligned}$$



| Symbol                        | Test Conditions                                                                     | Maximum Ratings                                   |                        |
|-------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------|------------------------|
| $V_{CES}$                     | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                                      | 1700                                              | V                      |
| $V_{CGR}$                     | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GE} = 1M\Omega$                   | 1700                                              | V                      |
| $V_{GES}$                     | Continuous                                                                          | $\pm 20$                                          | V                      |
| $V_{GEM}$                     | Transient                                                                           | $\pm 30$                                          | V                      |
| $I_{C25}$                     | $T_C = 25^\circ\text{C}$                                                            | 145                                               | A                      |
| $I_{C90}$                     | $T_C = 90^\circ\text{C}$                                                            | 75                                                | A                      |
| $I_{CM}$                      | $T_C = 25^\circ\text{C}, 1\text{ms}$                                                | 680                                               | A                      |
| <b>SSOA</b><br><b>(RBSOA)</b> | $V_{GE} = 15V, T_{VJ} = 125^\circ\text{C}, R_G = 1\Omega$<br>Clamped Inductive Load | $I_{CM} = 150$<br>$V_{CE} \leq 0.8 \cdot V_{CES}$ | A                      |
| $P_C$                         | $T_C = 25^\circ\text{C}$                                                            | 625                                               | W                      |
| $T_J$                         |                                                                                     | -55 ... +150                                      | $^\circ\text{C}$       |
| $T_{JM}$                      |                                                                                     | 150                                               | $^\circ\text{C}$       |
| $T_{stg}$                     |                                                                                     | -55 ... +150                                      | $^\circ\text{C}$       |
| $T_L$                         | Maximum Lead Temperature for Soldering                                              | 300                                               | $^\circ\text{C}$       |
| $T_{SOLD}$                    | 1.6 mm (0.062 in.) from Case for 10                                                 | 260                                               | $^\circ\text{C}$       |
| $V_{ISOL}$                    | 50/60Hz $t = 1\text{min}$<br>$I_{ISOL} \leq 1\text{mA}$ $t = 1\text{s}$             | 2500<br>3000                                      | V~<br>V~               |
| $M_d$                         | Mounting Torque<br>Terminal Connection Torque (M4)                                  | 1.5/13<br>1.3/11.5                                | Nm/lb.in.<br>Nm/lb.in. |
| <b>Weight</b>                 |                                                                                     | 30                                                | g                      |

SOT-227B, miniBLOC

E153432



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

#### Features

- International Standard Package
- High Blocking Voltage
- Isolation Voltage 3000 V~
- High Current Handling Capability
- Anti-Parallel Diode

#### Advantages

- High Power Density
- Low Gate Drive Requirement
- Easy to Mount with 2 Screws
- Integrated Diode Can Be Used for Protection

#### Applications

- Capacitor Discharge
- AC Switches
- Switch-Mode and Resonant-Mode Power Supplies
- UPS
- AC Motor Drives

| Symbol        | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |            |                          |
|---------------|-----------------------------------------------------------------------------|-----------------------|------------|--------------------------|
|               |                                                                             | Min.                  | Typ.       | Max.                     |
| $BV_{CES}$    | $I_C = 250\mu\text{A}, V_{GE} = 0V$                                         | 1700                  |            | V                        |
| $V_{GE(th)}$  | $I_C = 1.5\text{mA}, V_{CE} = V_{GE}$                                       | 2.5                   |            | 5.5 V                    |
| $I_{CES}$     | $V_{CE} = 0.8 \cdot V_{CES}, V_{GE} = 0V$<br>$T_J = 125^\circ\text{C}$      |                       |            | 25 $\mu\text{A}$<br>2 mA |
| $I_{GES}$     | $V_{CE} = 0V, V_{GE} = \pm 20V$                                             |                       |            | $\pm 100$ nA             |
| $V_{CE(sat)}$ | $I_C = I_{C90}, V_{GE} = 15V, \text{Note 1}$<br>$T_J = 125^\circ\text{C}$   |                       | 2.6<br>3.1 | V<br>V                   |

## Symbol Test Conditions

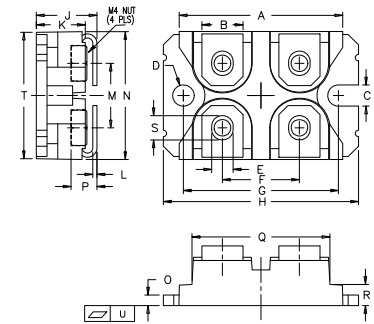
( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

## Characteristic Values

Min. Typ. Max.

|              |                                                                                                                                       |    |      |           |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|----|------|-----------|
| $g_{IS}$     | $I_C = I_{C90}, V_{CE} = 10V, \text{Note 1}$                                                                                          | 34 | 56   | S         |
| $C_{ies}$    | $V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$                                                                                                 |    | 6930 | pF        |
| $C_{oes}$    |                                                                                                                                       |    | 400  | pF        |
| $C_{res}$    |                                                                                                                                       |    | 150  | pF        |
|              |                                                                                                                                       |    |      |           |
| $Q_g$        | $I_C = I_{C90}, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$                                                                             |    | 350  | nC        |
| $Q_{ge}$     |                                                                                                                                       |    | 50   | nC        |
| $Q_{gc}$     |                                                                                                                                       |    | 160  | nC        |
| $t_{d(on)}$  | <b>Resistive load, <math>T_J = 25^\circ C</math></b><br>$I_C = I_{C90}, V_{GE} = 15V$<br>$R_G = 1\Omega, V_{CE} = 0.5 \cdot V_{CES}$  |    | 46   | ns        |
| $t_r$        |                                                                                                                                       |    | 160  | ns        |
| $t_{d(off)}$ |                                                                                                                                       |    | 260  | ns        |
| $t_f$        |                                                                                                                                       |    | 440  | ns        |
| $t_{d(on)}$  | <b>Resistive load, <math>T_J = 125^\circ C</math></b><br>$I_C = I_{C90}, V_{GE} = 15V$<br>$R_G = 1\Omega, V_{CE} = 0.5 \cdot V_{CES}$ |    | 47   | ns        |
| $t_r$        |                                                                                                                                       |    | 230  | ns        |
| $t_{d(off)}$ |                                                                                                                                       |    | 260  | ns        |
| $t_f$        |                                                                                                                                       |    | 580  | ns        |
| $R_{thJC}$   |                                                                                                                                       |    |      | 0.20 °C/W |
| $R_{thCS}$   |                                                                                                                                       |    | 0.05 | °C/W      |

## SOT-227B miniBLOC (IXBN)



| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.240  | 1.255 | 31.50       | 31.88 |
| B   | .307   | .323  | 7.80        | 8.20  |
| C   | .161   | .169  | 4.09        | 4.29  |
| D   | .161   | .169  | 4.09        | 4.29  |
| E   | .161   | .169  | 4.09        | 4.29  |
| F   | .587   | .595  | 14.91       | 15.11 |
| G   | 1.186  | 1.193 | 30.12       | 30.30 |
| H   | 1.496  | 1.505 | 38.00       | 38.23 |
| J   | .460   | .481  | 11.68       | 12.22 |
| K   | .351   | .378  | 8.92        | 9.60  |
| L   | .030   | .033  | 0.76        | 0.84  |
| M   | .496   | .506  | 12.60       | 12.85 |
| N   | .990   | 1.001 | 25.15       | 25.42 |
| O   | .078   | .084  | 1.98        | 2.13  |
| P   | .195   | .235  | 4.95        | 5.97  |
| Q   | 1.045  | 1.059 | 26.54       | 26.90 |
| R   | .155   | .174  | 3.94        | 4.42  |
| S   | .186   | .191  | 4.72        | 4.85  |
| T   | .968   | .987  | 24.59       | 25.07 |
| U   | -.002  | .004  | -0.05       | 0.1   |

## Reverse Diode

## Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

## Characteristic Values

Min. Typ. Max.

|          |                                                                              |  |      |         |
|----------|------------------------------------------------------------------------------|--|------|---------|
| $V_F$    | $I_F = I_{C90}, V_{GE} = 0V, \text{Note 1}$                                  |  | 3.0  | V       |
| $t_{rr}$ | $I_F = 37V, V_{GE} = 0V, -di_F/dt = 100A/\mu s$<br>$V_R = 100V, V_{GE} = 0V$ |  | 1.5  | $\mu s$ |
| $I_{RM}$ |                                                                              |  | 50   | A       |
| $Q_{RM}$ |                                                                              |  | 38.2 | $\mu C$ |

Note 1. Pulse test,  $t \leq 300\mu s$ , duty cycle,  $d \leq 2\%$ .

## PRELIMINARY TECHNICAL INFORMATION

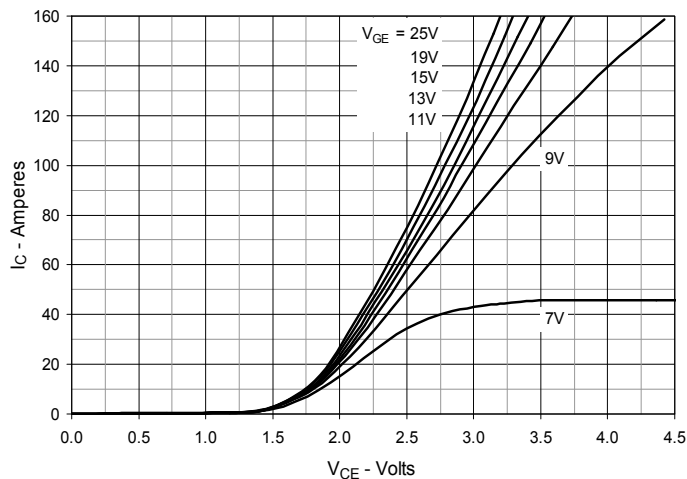
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right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

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

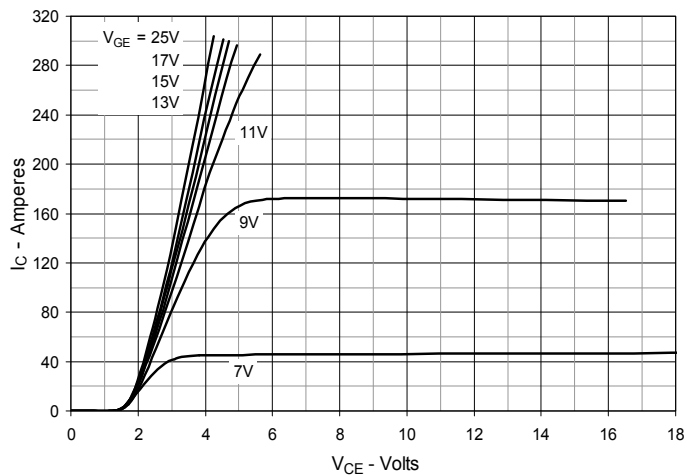
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |              |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| 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 | 7,157,338 B2 |
| 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    |              |

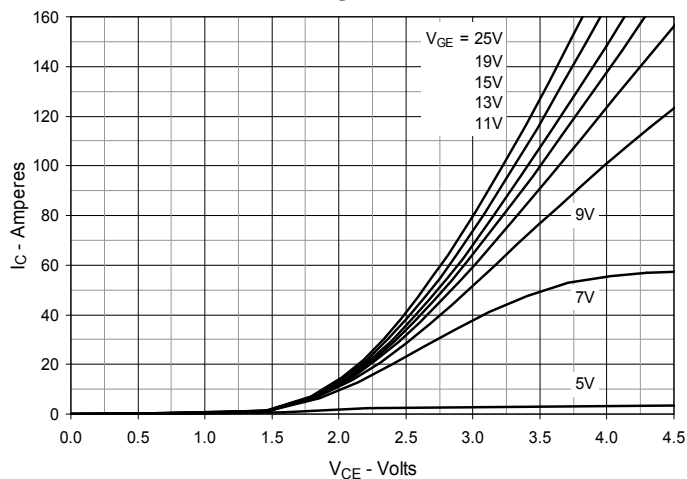
**Fig. 1. Output Characteristics**  
@ 25°C



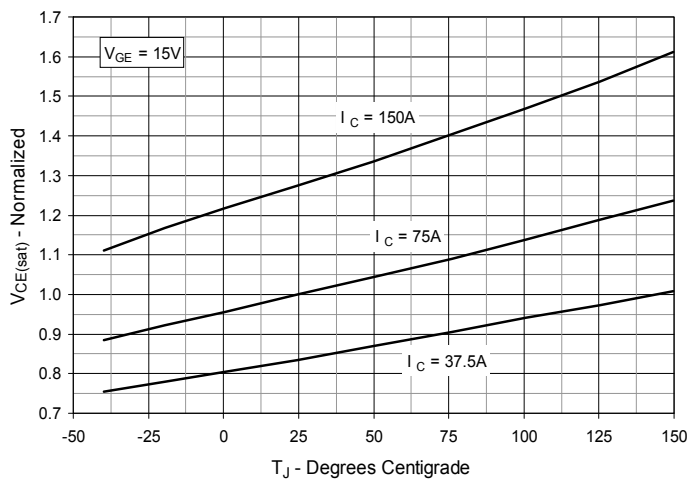
**Fig. 2. Extended Output Characteristics**  
@ 25°C



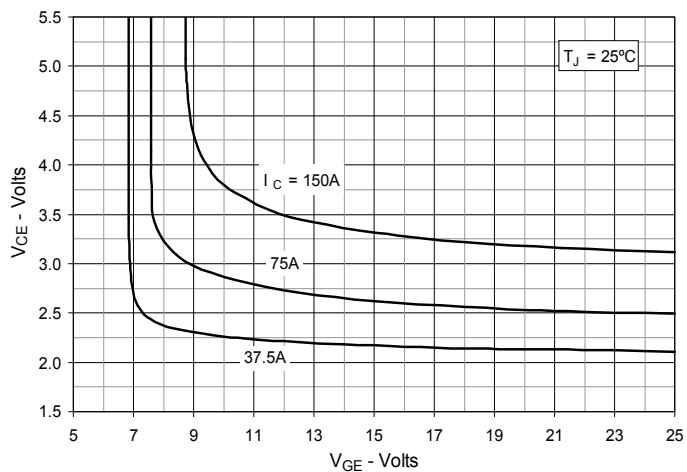
**Fig. 3. Output Characteristics**  
@ 125°C



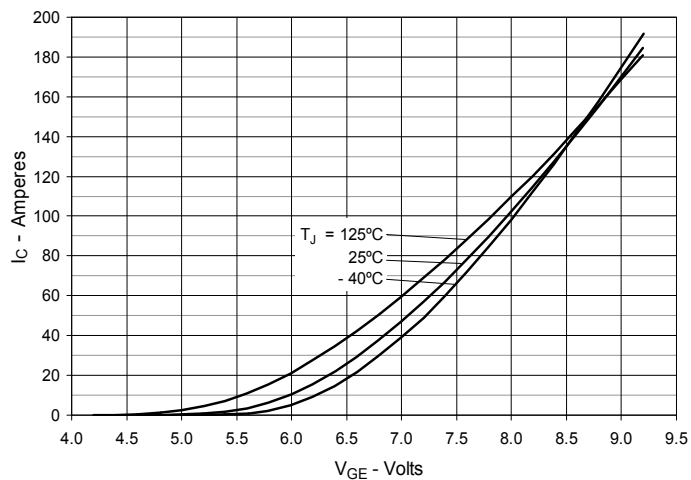
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**

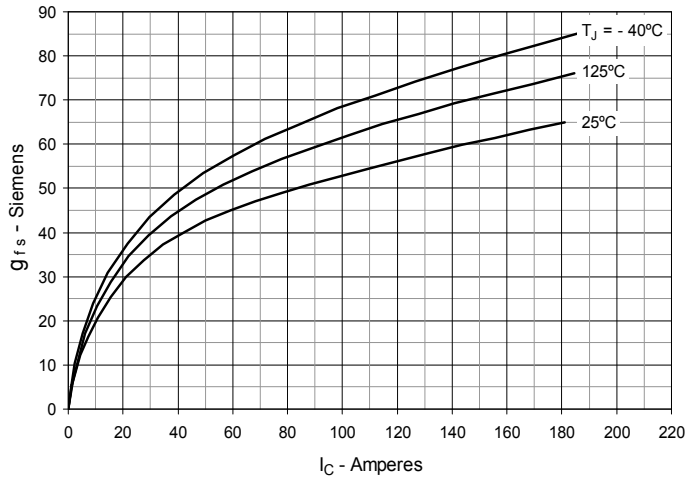
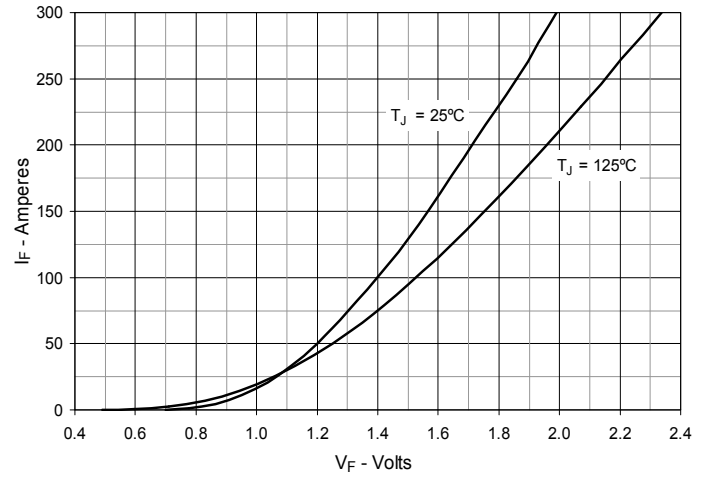
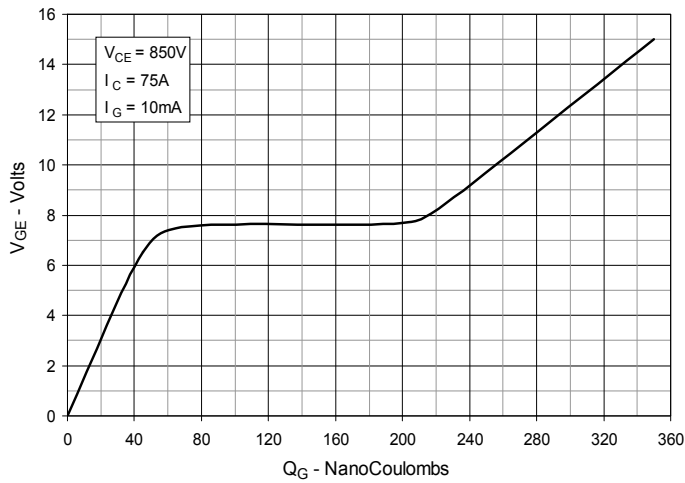
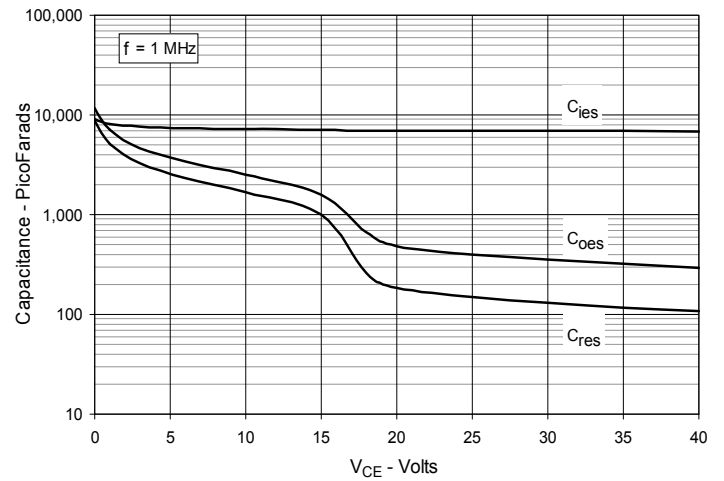
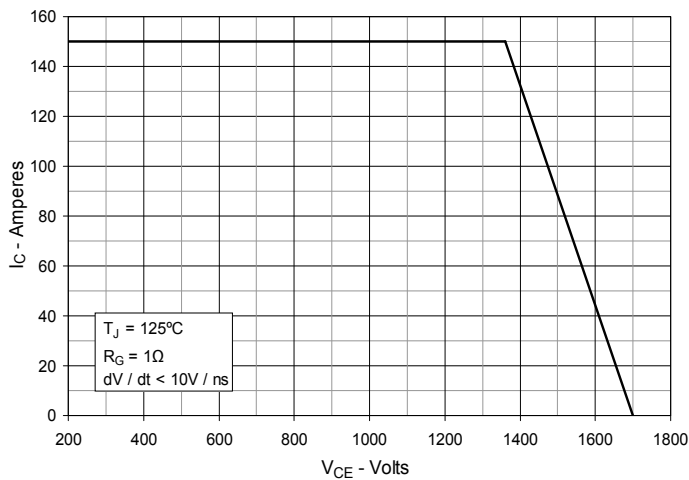
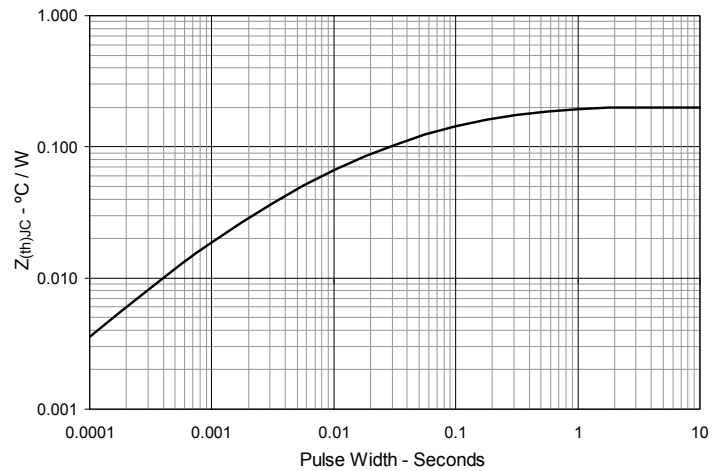


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

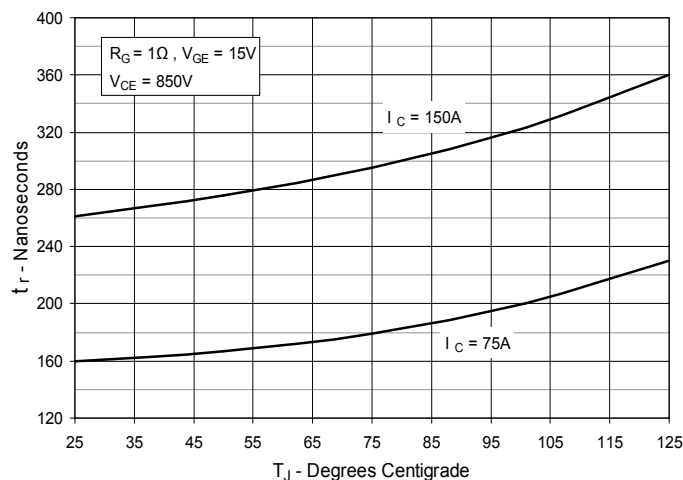


**Fig. 6. Input Admittance**

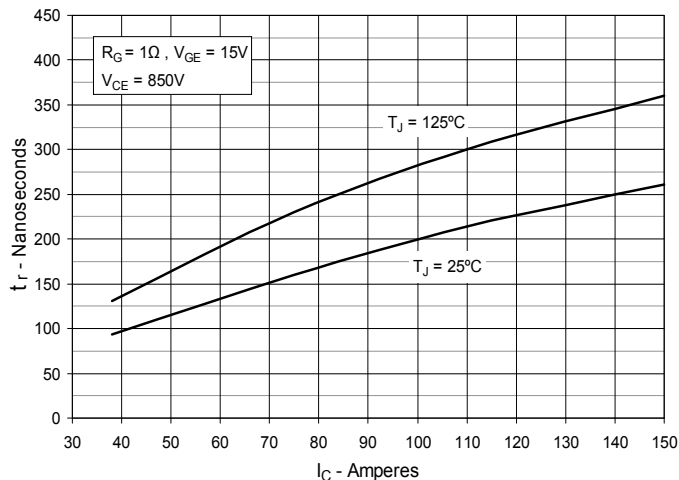


**Fig. 7. Transconductance**

**Fig. 8. Forward Voltage Drop of Intrinsic Diode**

**Fig. 9. Gate Charge**

**Fig. 10. Capacitance**

**Fig. 11. Reverse-Bias Safe Operating Area**

**Fig. 12. Maximum Transient Thermal Impedance**


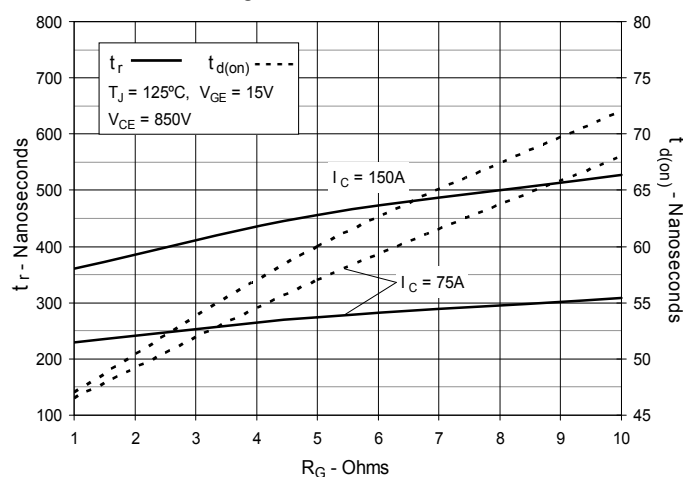
**Fig. 13. Resistive Turn-on**  
Rise Time vs. Junction Temperature



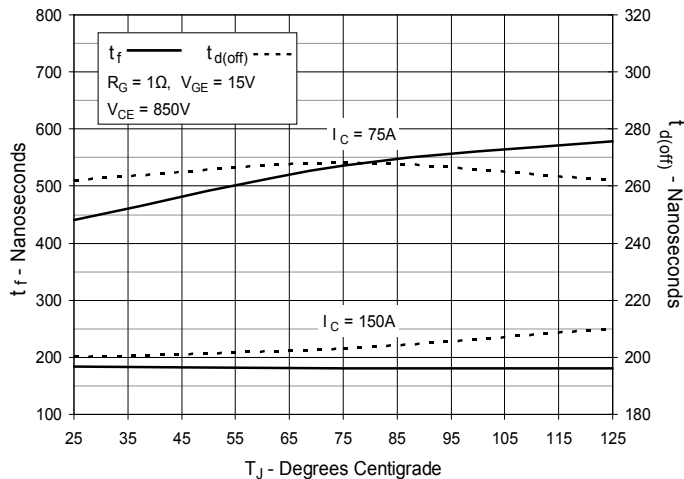
**Fig. 14. Resistive Turn-on**  
Rise Time vs. Collector Current



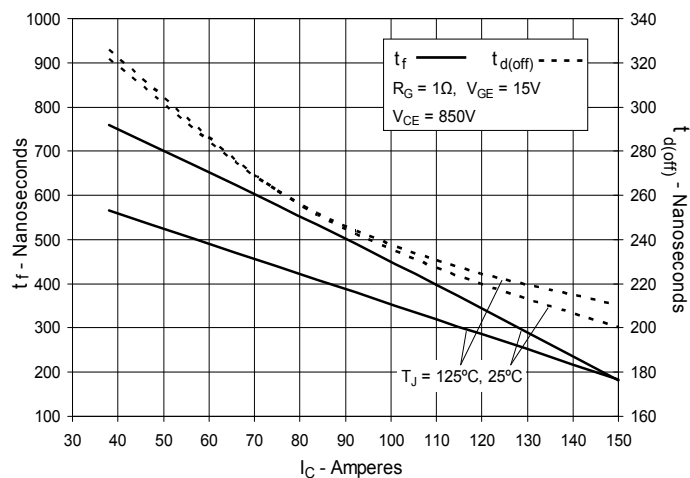
**Fig. 15. Resistive Turn-on**  
Switching Times vs. Gate Resistance



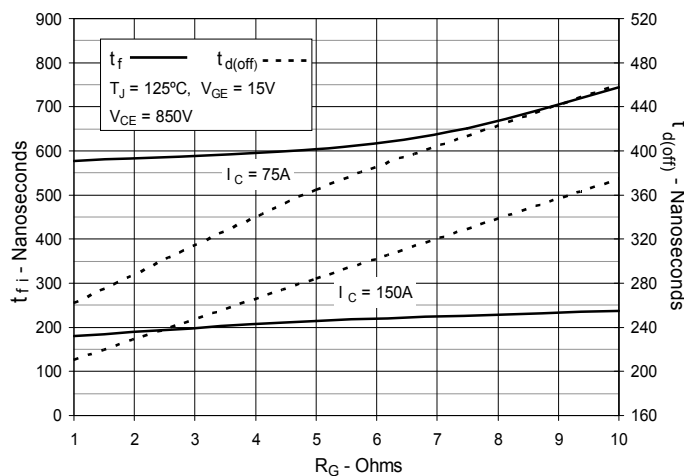
**Fig. 16. Resistive Turn-off**  
Switching Times vs. Junction Temperature



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



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





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