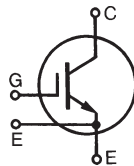


# High Voltage IGBT

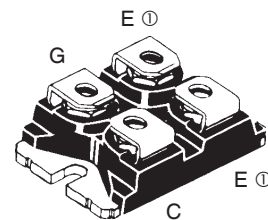
## IXGN100N170

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



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

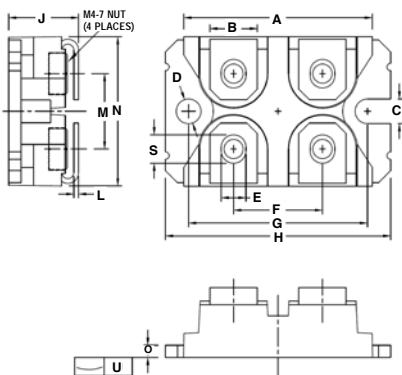
- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ , 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                   |      | V                  |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 125^\circ C$             |                       |      | 50 $\mu A$<br>3 mA |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                    |                       |      | $\pm 200$ nA       |
| $V_{CE(sat)}$ | $I_C = 100A$ , $V_{GE} = 15V$ , Note 1                                | 2.5                   | 3.0  | V                  |

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

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

### SOT-227B (IXGN) OUTLINE

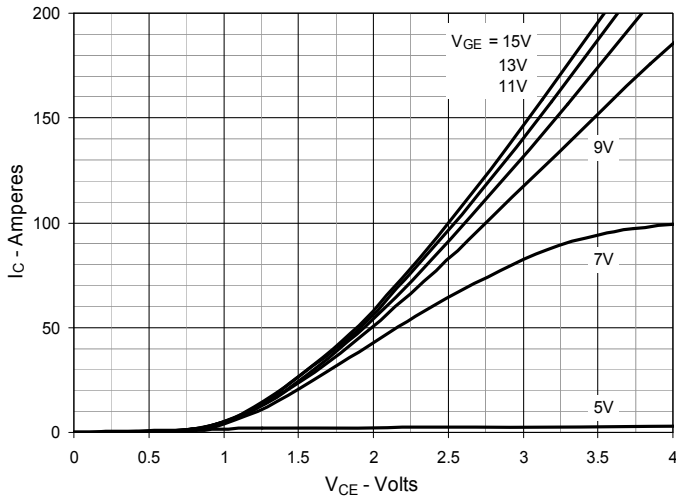
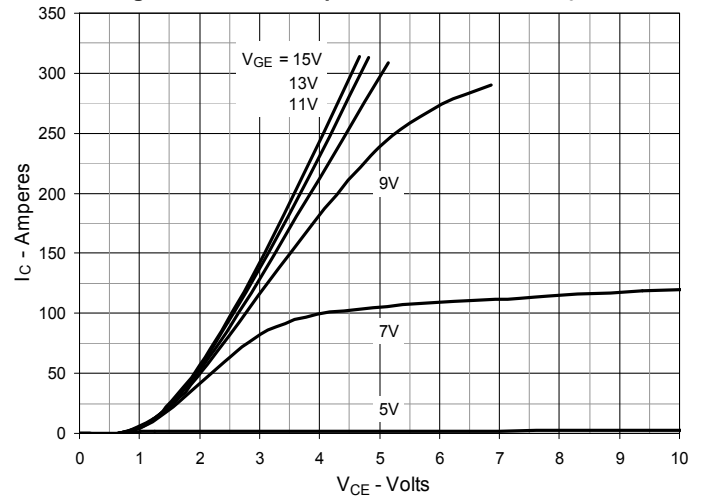
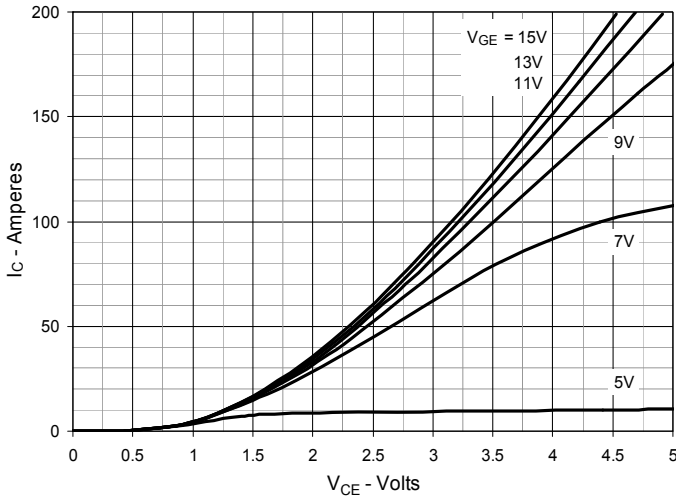
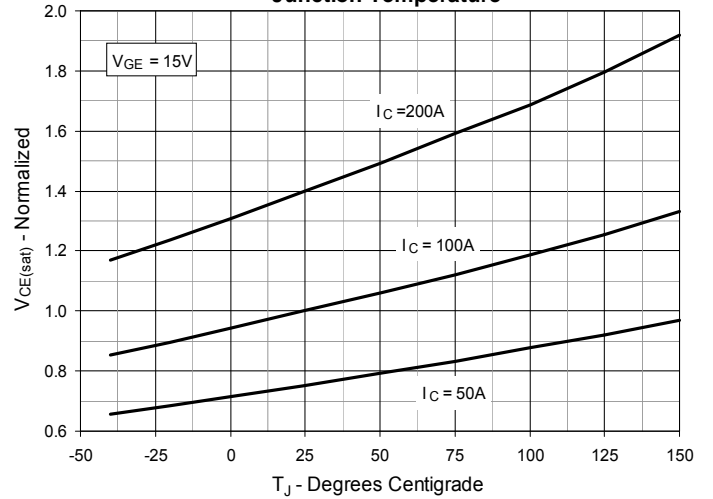
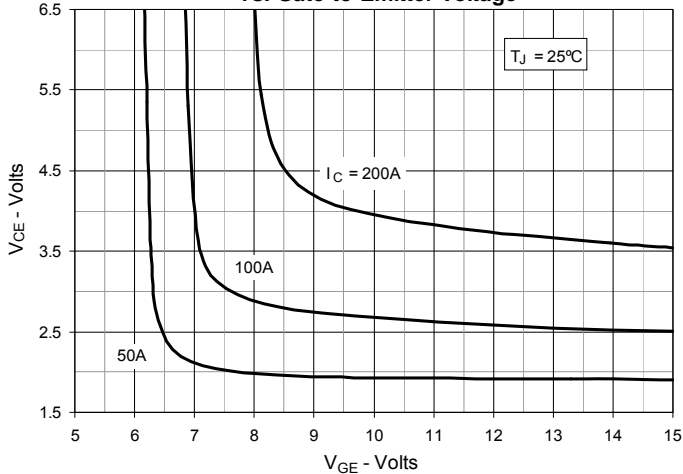
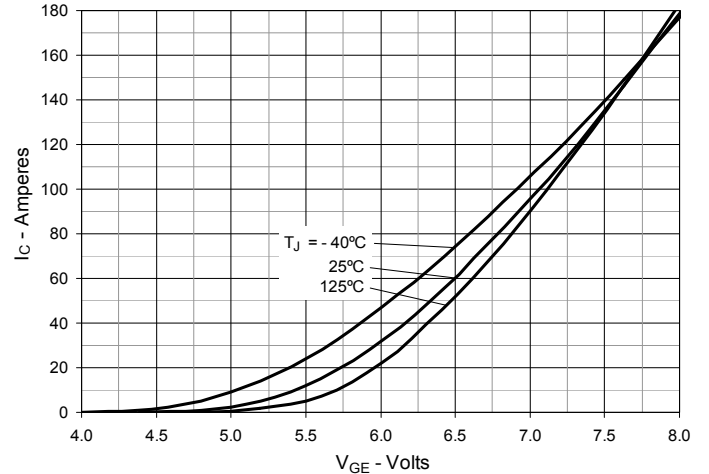


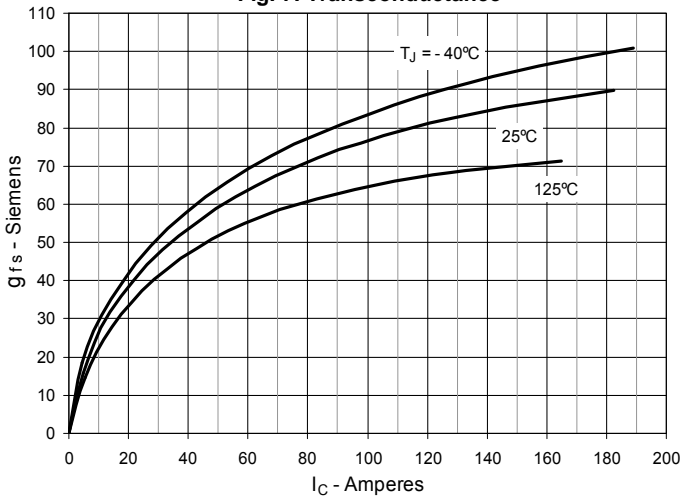
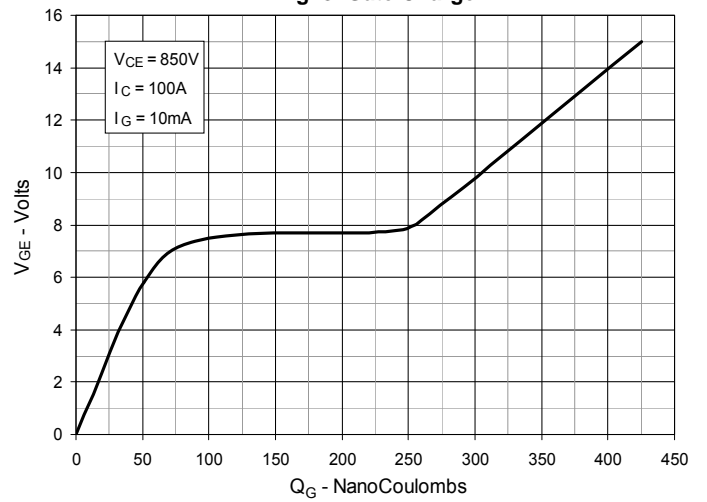
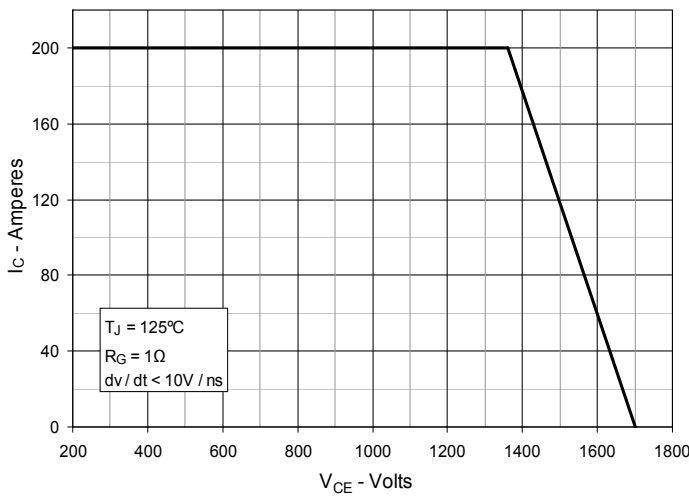
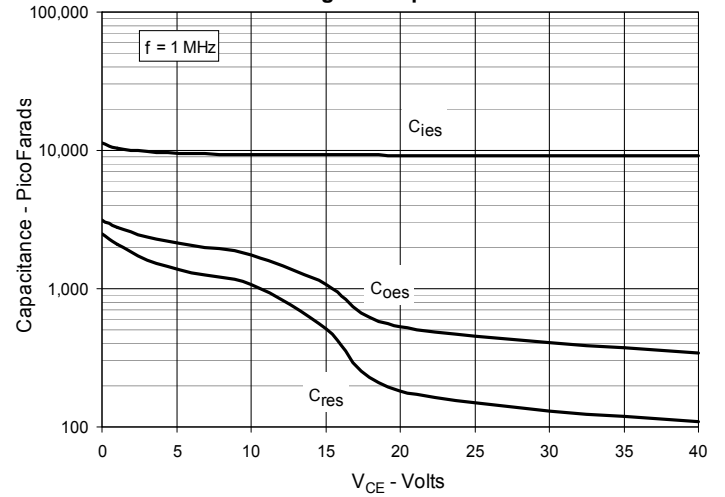
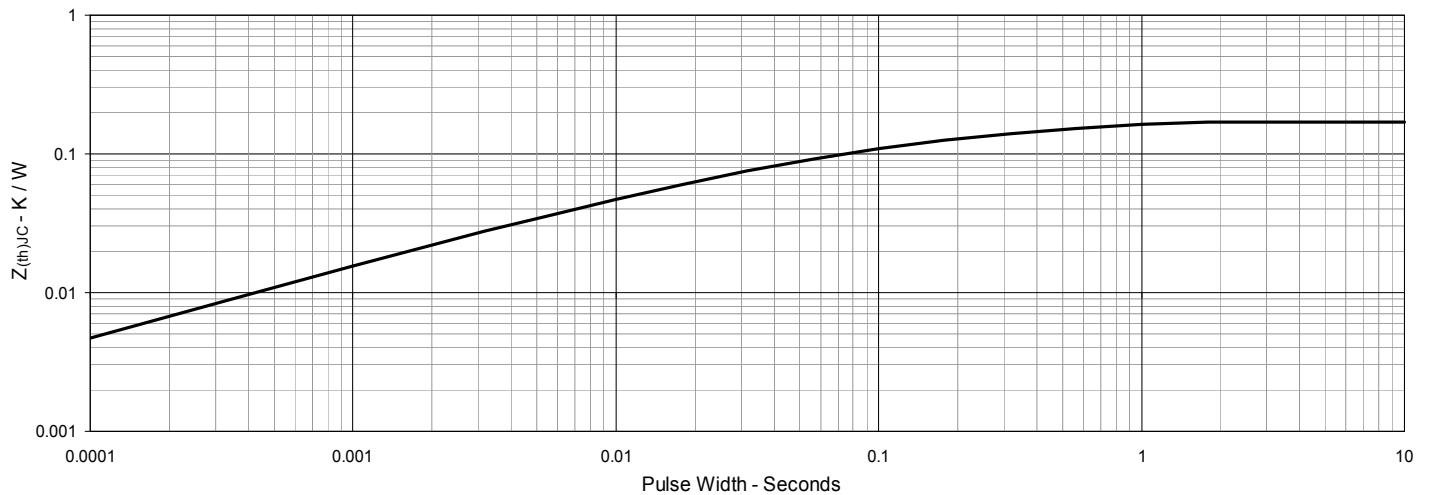
| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.224  | 1.260 | 31.10       | 32.00 |
| B   | .303   | .327  | 7.70        | 8.30  |
| C   | .161   | .173  | 4.10        | 4.40  |
| D   | .161   | .173  | 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  |

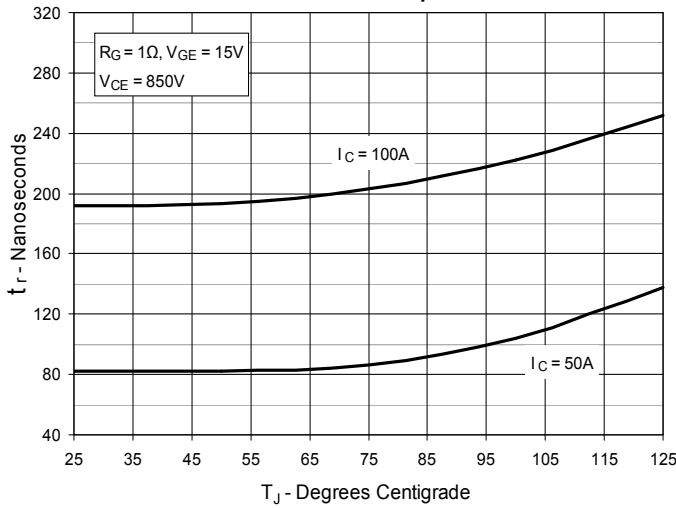
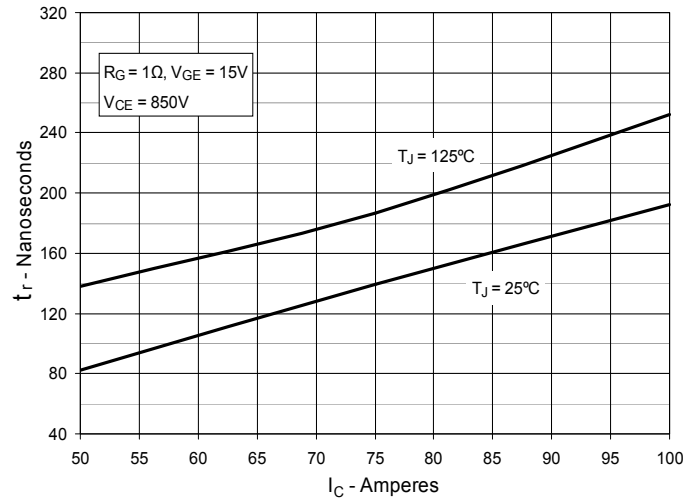
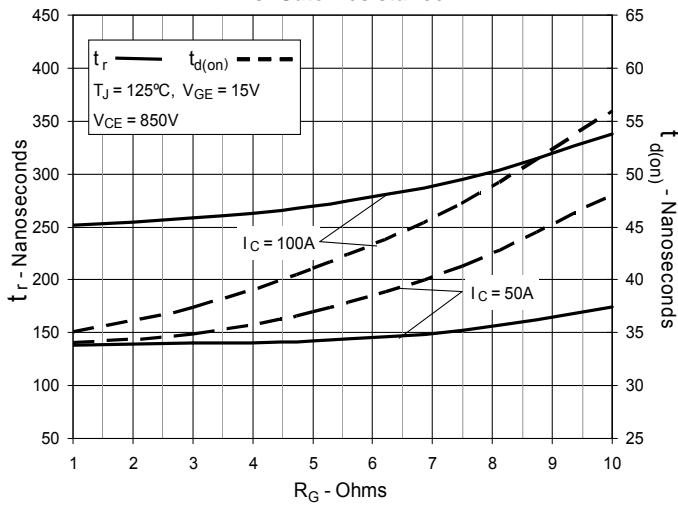
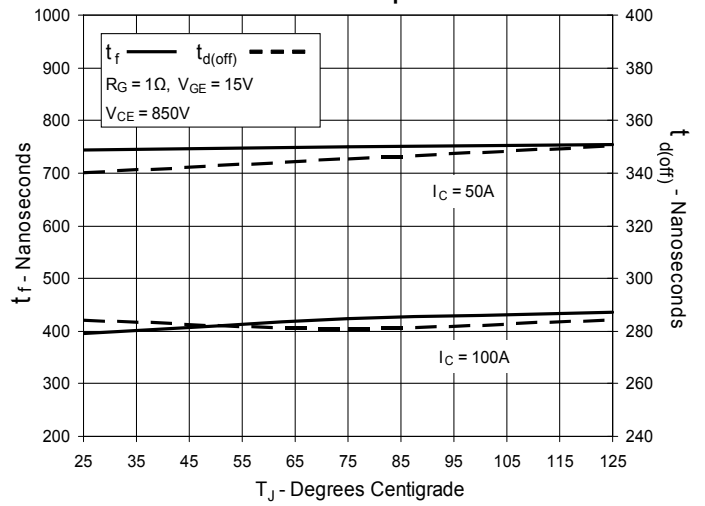
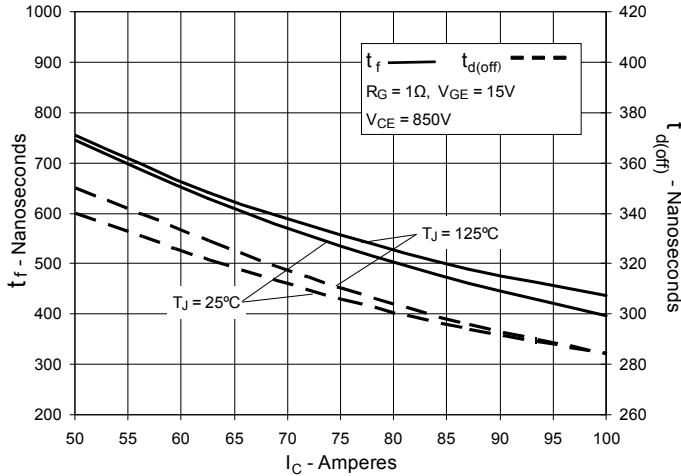
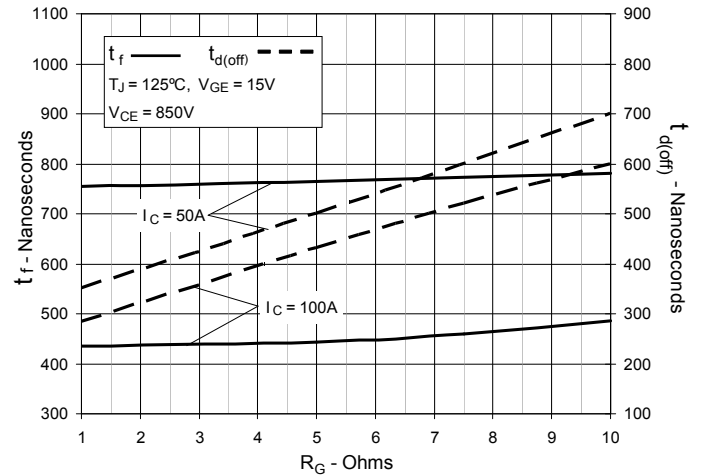
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|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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. 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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