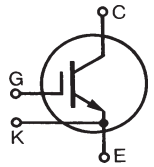
# IXYS

## GenX3™ 600V IGBT

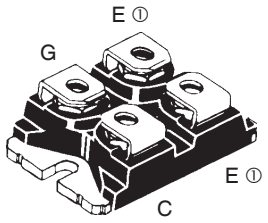
# IXGN200N60B3

$V_{CES}$ = 600V
$I_{C110}$ = 200A
$V_{CE(sat)} \leq$ 1.50V

### Medium-Speed Low-Vsat PT IGBT for 5-40kHz Switching




**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 | | 600 | V |
| $V_{CGR}$ | $T_J$ = 25°C to 150°C, $R_{GE}$ = 1MΩ | | 600 | V |
| $V_{GES}$ | Continuous | | ±20 | V |
| $V_{GEM}$ | Transient | | ±30 | V |
| $I_{C25}$ | $T_C$ = 25°C | | 300 | A |
| $I_{C110}$ | $T_C$ = 110°C | | 200 | A |
| $I_{LRMS}$ | Terminal Current Limit | | 200 | A |
| $I_{CM}$ | $T_C$ = 25°C, 1ms | | 1200 | A |
| **SSOA** | $V_{GE}$= 15V, $T_{VJ}$ = 125°C, $R_G$ = 1Ω | | $I_{CM}$ = 300 | A |
| **(RBSOA)** | Clamped Inductive Load | | $V_{CE} \leq V_{CES}$ | |
| $P_C$ | $T_C$ = 25°C | | 830 | 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 (M4) | | 1.3/11.5 | Nm/lb.in. |
| **Weight** | | | 30 | g |

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $V_{GE(th)}$ | $I_C$ = 250μA, $V_{CE}$ = $V_{GE}$ | 3.0 | | 5.0 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$, $V_{GE}$ = 0V | | | 50 | μA |
| | $T_J$ = 125°C | | | 5 | mA |
| $I_{GES}$ | $V_{CE}$ = 0V, $V_{GE}$ = ±20V | | | ±100 | nA |
| $V_{CE(sat)}$ | $I_C$ = 100A, $V_{GE}$ = 15V, Note 1 | | 1.35 | 1.50 | V |
| | $I_C$ = 200A, | | 1.65 | | V |
| | $T_J$ = 125°C | | 1.75 | | V |

### Features

- International Standard Package miniBLOC
- UL Recognized
- Aluminium Nitride Isolation
  - High Power Dissipation
- Isolation Voltage 3000 V~
- Very High Current IGBT
- Low $V_{CE(sat)}$ for Minimum on-state Conduction Losses
- MOS Gate Turn-On
  - Drive Simplicity
- Low Collector-to-Case Capacitance (< 50 pF)
- Low Package Inductance (< 5 nH)
  - Easy to Drive and to Protect

### Advantages

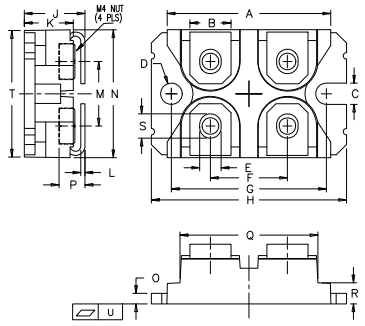
- High Power Density
- Low Gate Drive Requirement

### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- DC Choppers
- AC Motor Speed Drives
- DC Servo and Robot Drives

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $I_C$ = 60A, $V_{CE}$ = 10 V, Note 1 | 95 | 160 | | S |
| $C_{ies}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | 26 | | nF |
| $C_{oes}$ | | | 1260 | | pF |
| $C_{res}$ | | | 97 | | pF |
| $Q_{g(on)}$ | $I_C$ = 100V, $V_{GE}$ = 15 V, $V_{CE}$ = 0.5 • $V_{CES}$ | | 750 | | nC |
| $Q_{ge}$ | | | 115 | | nC |
| $Q_{gc}$ | | | 245 | | nC |
| $t_{d(on)}$ | **Inductive load, $T_J$ = 25°C** $I_C$ = 100A, $V_{GE}$ = 15V $V_{CE}$ = 300V, $R_G$ = 1Ω | | 44 | | ns |
| $t_{ri}$ | | | 83 | | ns |
| $E_{on}$ | | | 1.6 | | mJ |
| $t_{d(off)}$ | | | 310 | 450 | ns |
| $t_{fi}$ | | | 183 | 300 | ns |
| $E_{off}$ | | | 2.9 | 4.5 | mJ |
| $t_{d(on)}$ | **Inductive load, $T_J$ = 125°C** $I_C$ = 100A, $V_{GE}$ = 15V $V_{CE}$ = 300V, $R_G$ = 1Ω | | 42 | | ns |
| $t_{ri}$ | | | 80 | | ns |
| $E_{on}$ | | | 2.4 | | mJ |
| $t_{d(off)}$ | | | 430 | | ns |
| $t_{fi}$ | | | 300 | | ns |
| $E_{off}$ | | | 4.2 | | mJ |
| $R_{thJC}$ | | | | 0.15 | °C/W |
| $R_{thCK}$ | | | 0.05 | | °C/W |

**SOT-227B miniBLOC**




| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS 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 |

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

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

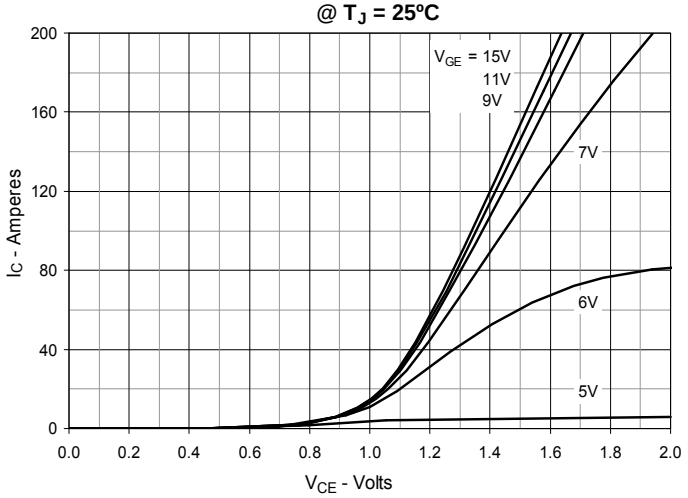



**Fig. 2. Extended Output Characteristics @ $T_J$ = 25ºC**

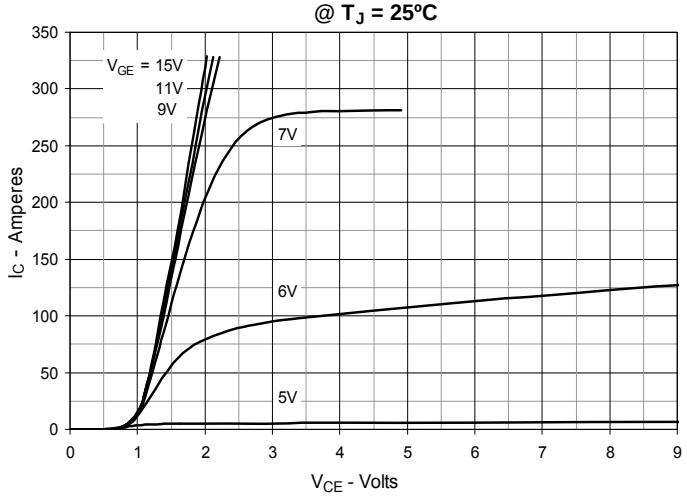



**Fig. 3. Output Characteristics @ $T_J$ =125ºC**

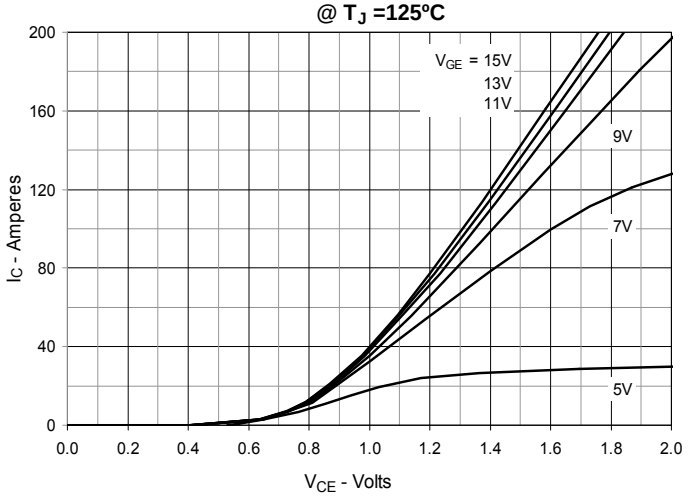



**Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature**

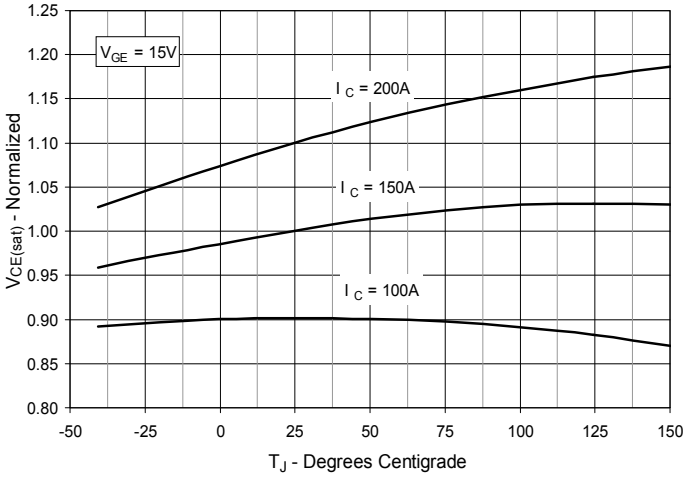



**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

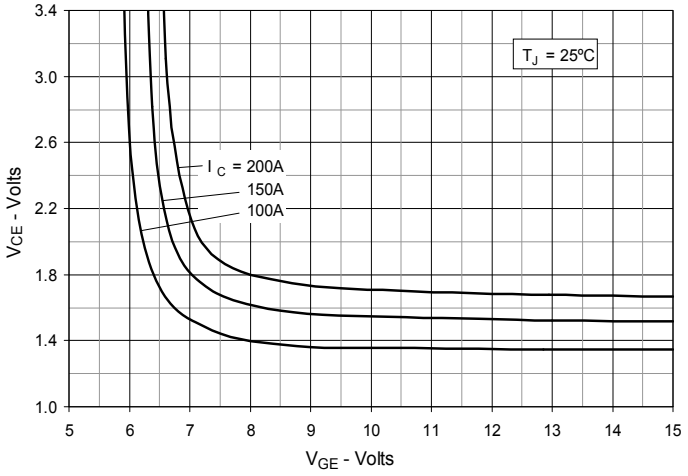



**Fig. 6. Input Admittance**

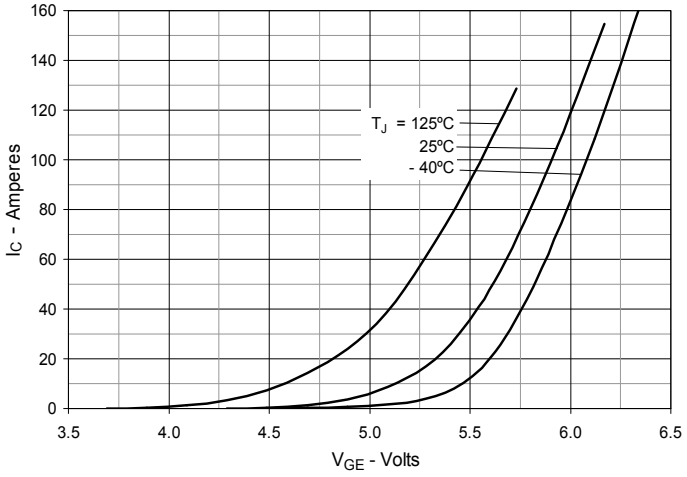


**Fig. 7. Transconductance**

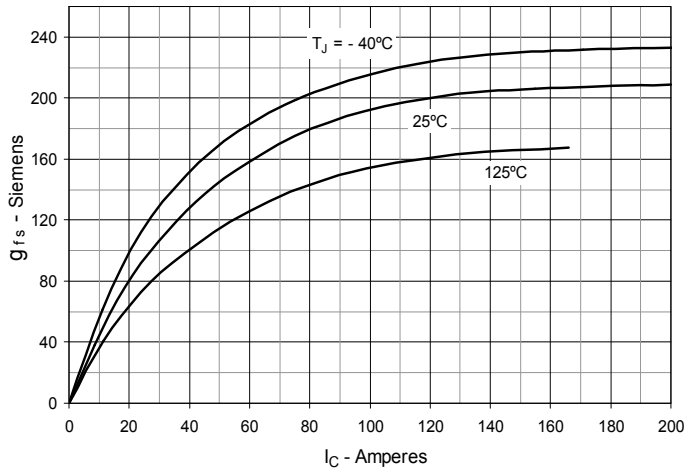



**Fig. 8. Gate Charge**

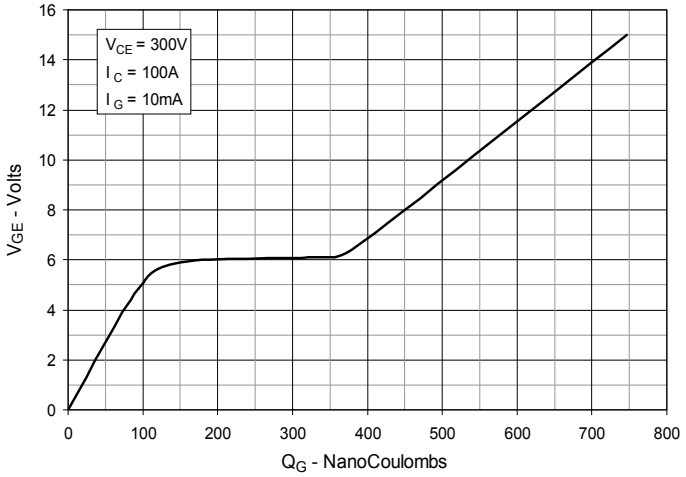



**Fig. 9. Capacitance**

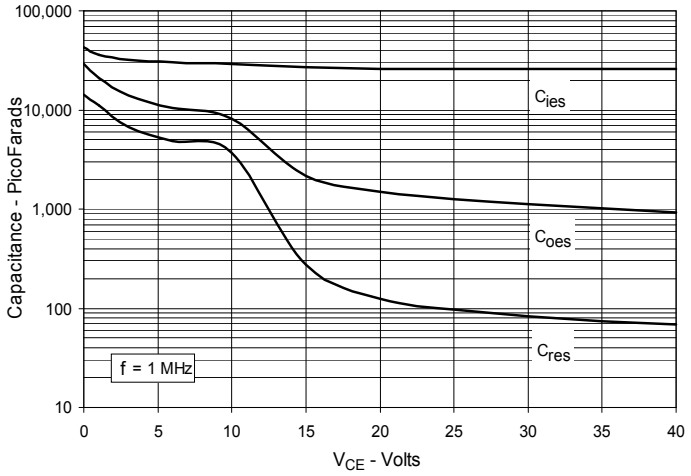



**Fig. 10. Reverse-Bias Safe Operating Area**

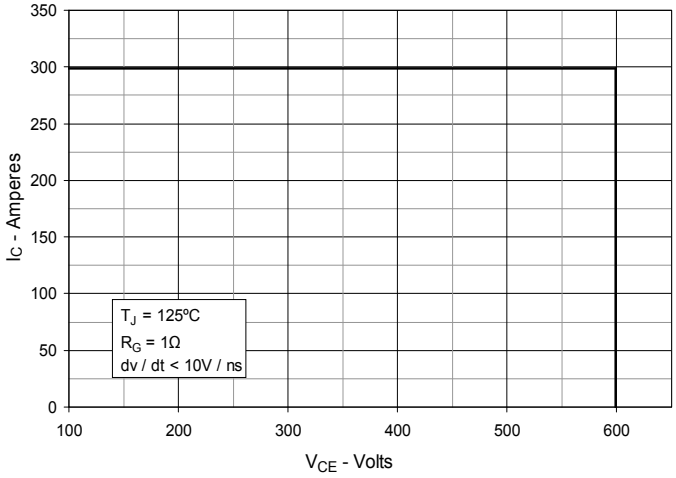



**Fig. 11. Maximum Transient Thermal Impedance**

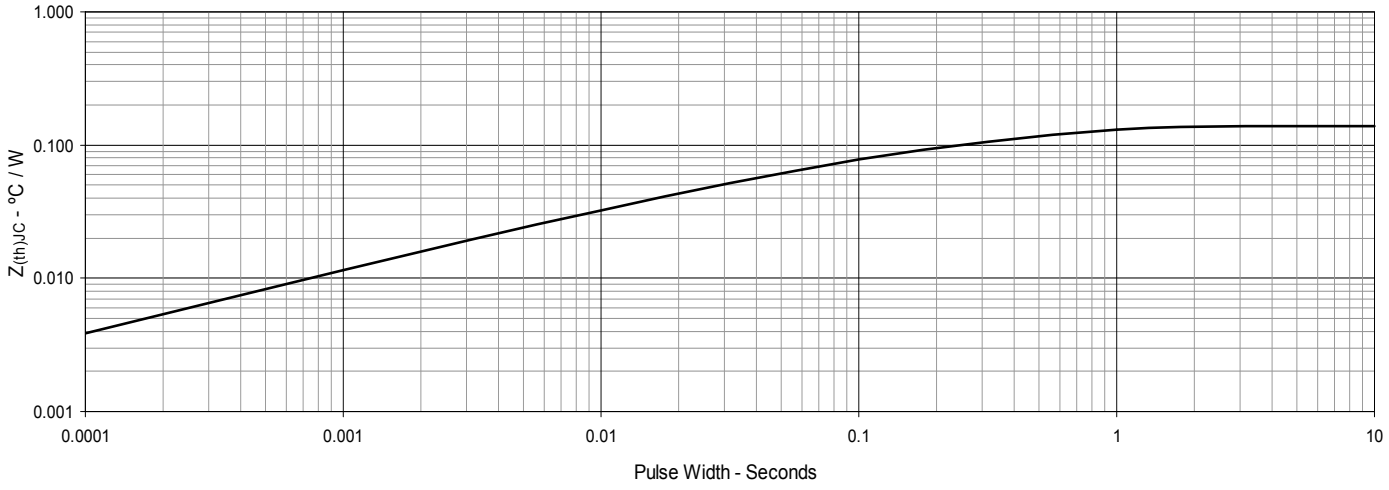


**Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance**

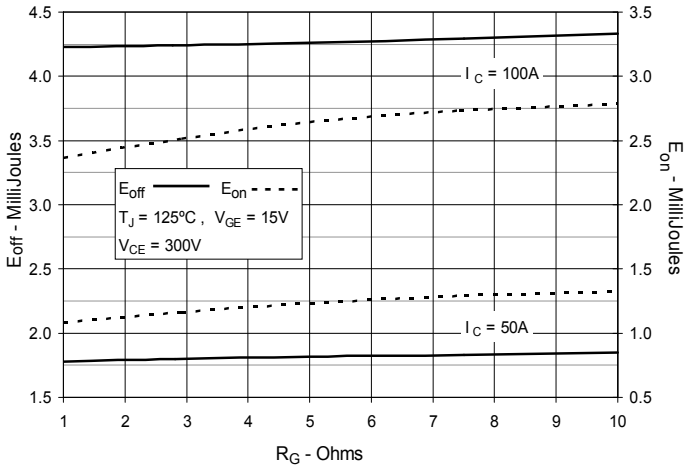



**Fig. 13. Inductive Switching Energy Loss vs. Collector Current**

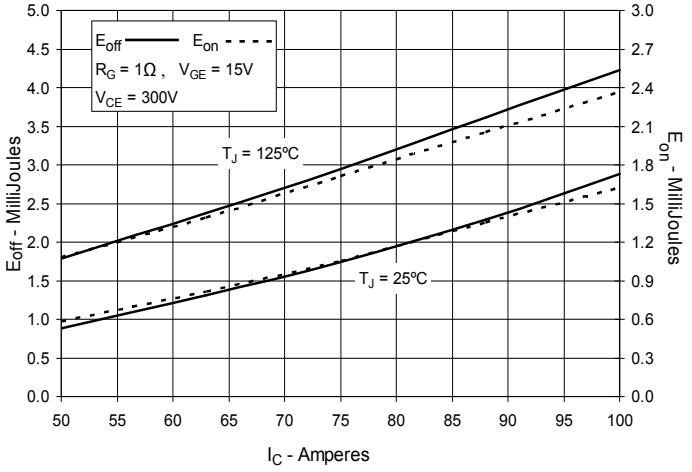



**Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature**

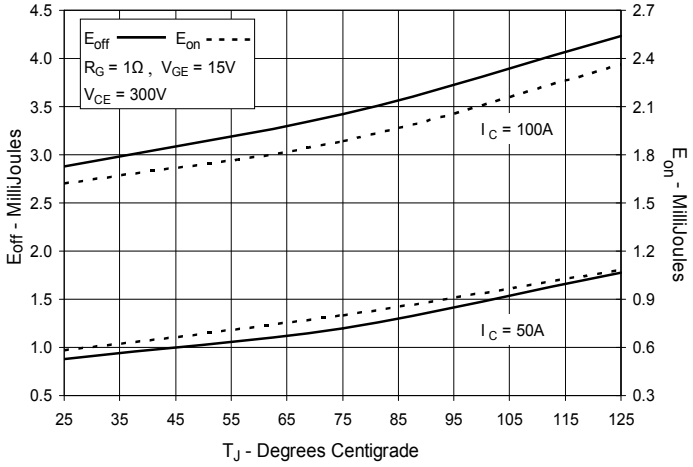



**Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance**

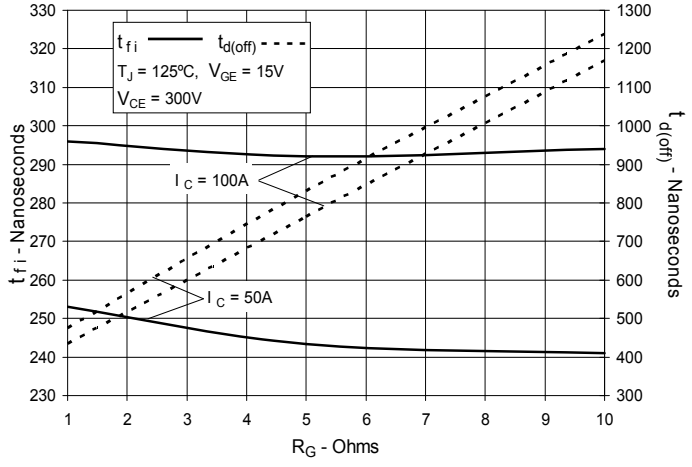



**Fig. 16. Inductive Turn-off Switching Times vs. Collector Current**

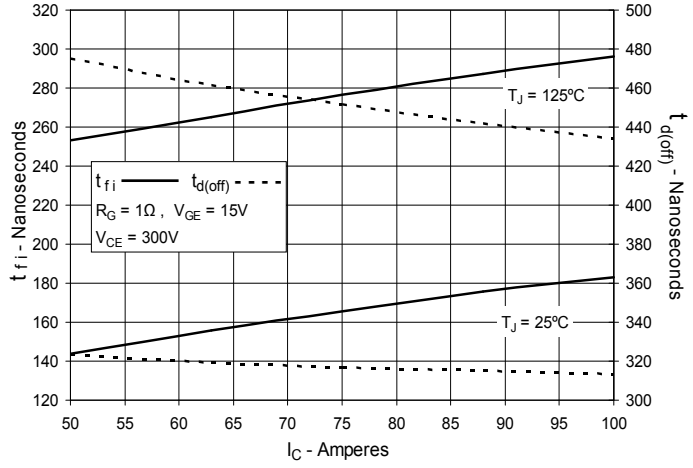



**Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature**

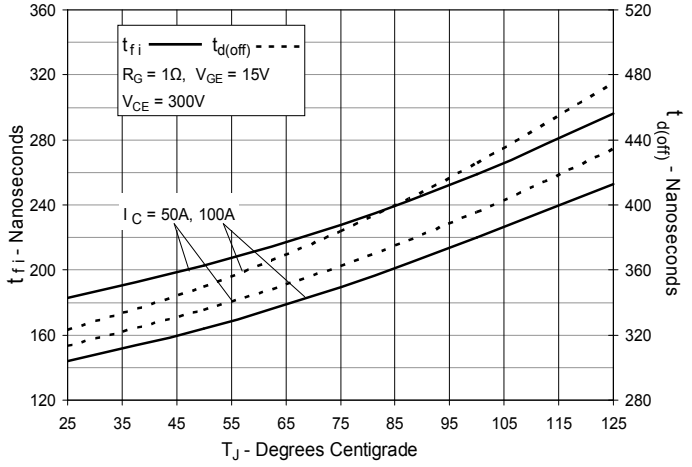


**Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance**

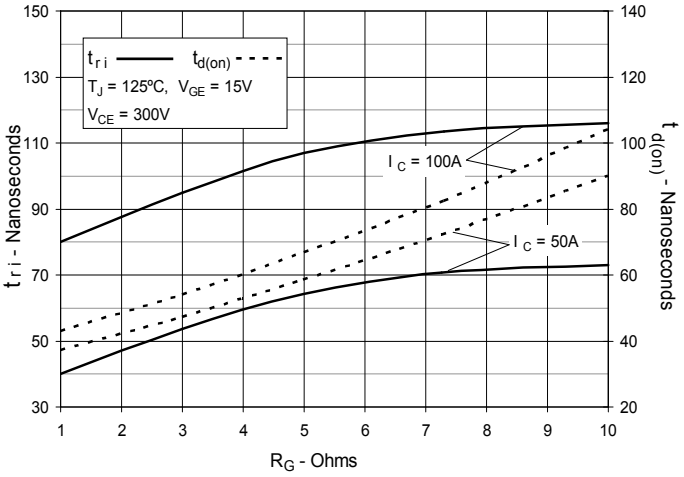



**Fig. 19. Inductive Turn-on Switching Times vs. Collector Current**

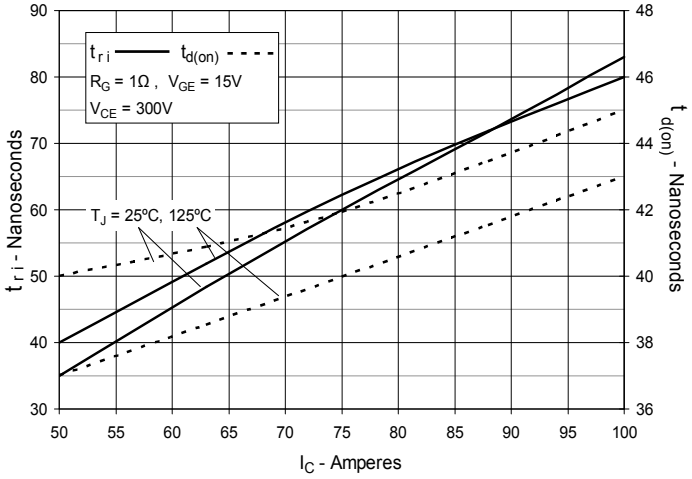
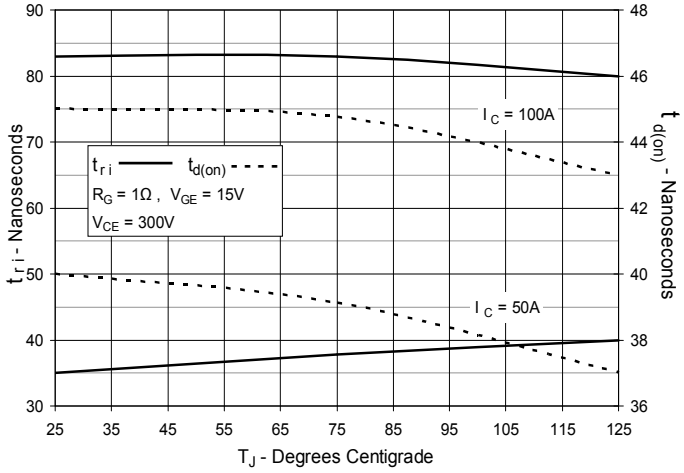



**Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature**



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