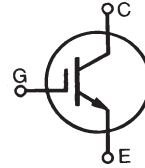


900V XPT™ IGBTs
GenX3™
IXYY8N90C3
IXYP8N90C3

 High-Speed IGBT
 for 20-50 kHz Switching


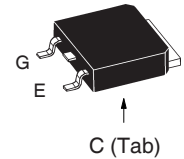
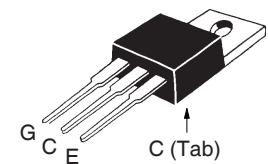
$$V_{CES} = 900V$$

$$I_{C110} = 8A$$

$$V_{CE(sat)} \leq 2.5V$$

$$t_{fi(typ)} = 130ns$$

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|--|--|------------|
| V_{CES} | $T_J = 25^\circ C$ to $175^\circ C$ | 900 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $175^\circ C$, $R_{GE} = 1M\Omega$ | 900 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 20 | A |
| I_{C110} | $T_C = 110^\circ C$ | 8 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 48 | A |
| I_A | $T_C = 25^\circ C$ | 4 | A |
| E_{AS} | $T_C = 25^\circ C$ | 15 | mJ |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 150^\circ C$, $R_G = 30\Omega$ Clamped Inductive Load | $I_{CM} = 16$ @ $V_{CE} \leq V_{CES}$ | A |
| P_C | $T_C = 25^\circ C$ | 120 | W |
| T_J | | -55 ... +175 | $^\circ C$ |
| T_{JM} | | 175 | $^\circ C$ |
| T_{stg} | | -55 ... +175 | $^\circ C$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ C$ |
| T_{SOLD} | 1.6 mm (0.062in.) from Case for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-220) | 1.13/10 | Nm/lb.in. |
| Weight | TO-252 | 0.35 | g |
| | TO-220 | 3.00 | g |

TO-252 (IXYY)

TO-220 (IXYP)


G = Gate C = Collector
 E = Emitter Tab = Collector

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Positive Thermal Coefficient of $V_{ce(sat)}$
- Avalanche Rated
- International Standard Package

Advantages

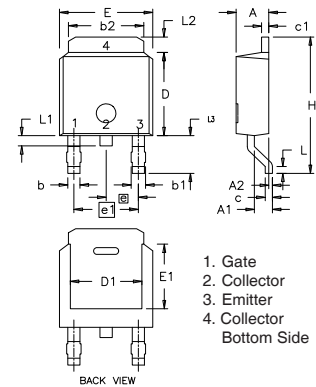
- High Power Density
- Low Gate Drive Requirement

Applications

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------|---------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 950 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 3.5 | | 6.0 V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 150^\circ C$ | | | 60 μA 400 μA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 8A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ C$ | 2.15 2.75 | | 2.50 V V |

| Symbol Test Conditions | | Characteristic Values | | |
|--|---|-----------------------|------|-----------|
| (T _J = 25°C Unless Otherwise Specified) | | Min. | Typ. | Max. |
| g_{fs} | I _C = 8A, V _{CE} = 10V, Note 1 | 2.9 | 4.8 | S |
| C_{ies} | V _{CE} = 25V, V _{GE} = 0V, f = 1MHz | | 400 | pF |
| C_{oes} | | | 24 | pF |
| C_{res} | | | 7.8 | pF |
| Q_{g(on)} | I _C = 8A, V _{GE} = 15V, V _{CE} = 0.5 • V _{CES} | | 13.3 | nC |
| Q_{ge} | | | 3.4 | nC |
| Q_{gc} | | | 5.8 | nC |
| t_{d(on)} | Inductive load, T_J = 25°C I _C = 8A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 30Ω | | 16 | ns |
| t_{ri} | | | 20 | ns |
| E_{on} | | | 0.46 | mJ |
| t_{d(off)} | | | 40 | ns |
| t_{fi} | | Note 2 | 130 | ns |
| E_{off} | | 0.18 | 0.50 | mJ |
| t_{d(on)} | Inductive load, T_J = 125°C I _C = 8A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 30Ω | | 17 | ns |
| t_{ri} | | | 22 | ns |
| E_{on} | | | 1.00 | mJ |
| t_{d(off)} | | | 75 | ns |
| t_{fi} | | Note 2 | 163 | ns |
| E_{off} | | 0.22 | mJ | |
| R_{thJC} | | | | 1.20 °C/W |
| R_{thCS} | TO-252 | 0.35 | | °C/W |
| | TO-220 | 0.50 | | °C/W |

TO-252 AA Outline


| Dim. | Millimeter | | Inches | |
|------|------------|-------|-----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.19 | 2.38 | 0.086 | 0.094 |
| A1 | 0.89 | 1.14 | 0.035 | 0.045 |
| A2 | 0 | 0.13 | 0 | 0.005 |
| b | 0.64 | 0.89 | 0.025 | 0.035 |
| b1 | 0.76 | 1.14 | 0.030 | 0.045 |
| b2 | 5.21 | 5.46 | 0.205 | 0.215 |
| c | 0.46 | 0.58 | 0.018 | 0.023 |
| c1 | 0.46 | 0.58 | 0.018 | 0.023 |
| D | 5.97 | 6.22 | 0.235 | 0.245 |
| D1 | 4.32 | 5.21 | 0.170 | 0.205 |
| E | 6.35 | 6.73 | 0.250 | 0.265 |
| E1 | 4.32 | 5.21 | 0.170 | 0.205 |
| e | 2.28 BSC | | 0.090 BSC | |
| e1 | 4.57 BSC | | 0.180 BSC | |
| H | 9.40 | 10.42 | 0.370 | 0.410 |
| L | 0.51 | 1.02 | 0.020 | 0.040 |
| L1 | 0.64 | 1.02 | 0.025 | 0.040 |
| L2 | 0.89 | 1.27 | 0.035 | 0.050 |
| L3 | 2.54 | 2.92 | 0.100 | 0.115 |

Reverse Diode (FRED)

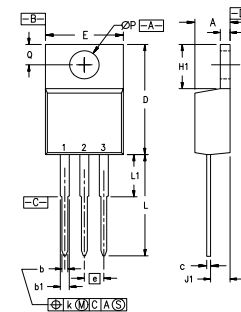
| Symbol Test Conditions | | Characteristic Value | | |
|---|---|------------------------|------|---------------------------------|
| (T _J = 25°C, Unless Otherwise Specified) | | Min. | Typ. | Max. |
| V_F | I _F = 10A, V _{GE} = 0V, Note 1 | | | 3.0 V |
| | | | | T _J = 150°C 2.0 V |
| I_{RM} | I _F = 10A, V _{GE} = 0V, -di _F /dt = 200A/μs, V _R = 600V | | 7.5 | A |
| t_{rr} | | T _J = 100°C | | 114 |
| R_{thJC} | | | | 2.5 °C/W |

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE} (clamp), T_J or R_G.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-220 Outline


Pins: 1 - Gate 2 - Collector
3 - Emitter

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .190 | 4.32 | 4.83 |
| b | .025 | .040 | 0.64 | 1.02 |
| b1 | .045 | .065 | 1.15 | 1.65 |
| c | .014 | .022 | 0.35 | 0.56 |
| D | .580 | .630 | 14.73 | 16.00 |
| E | .390 | .420 | 9.91 | 10.66 |
| e | .100 BSC | | 2.54 BSC | |
| F | .045 | .055 | 1.14 | 1.40 |
| H1 | .230 | .270 | 5.85 | 6.85 |
| J1 | .090 | .110 | 2.29 | 2.79 |
| k | 0 | .015 | 0 | 0.38 |
| L | .500 | .550 | 12.70 | 13.97 |
| L1 | .110 | .230 | 2.79 | 5.84 |
| ØP | .139 | .161 | 3.53 | 4.08 |
| Q | .100 | .125 | 2.54 | 3.18 |

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 @ $T_J = 25^\circ\text{C}$

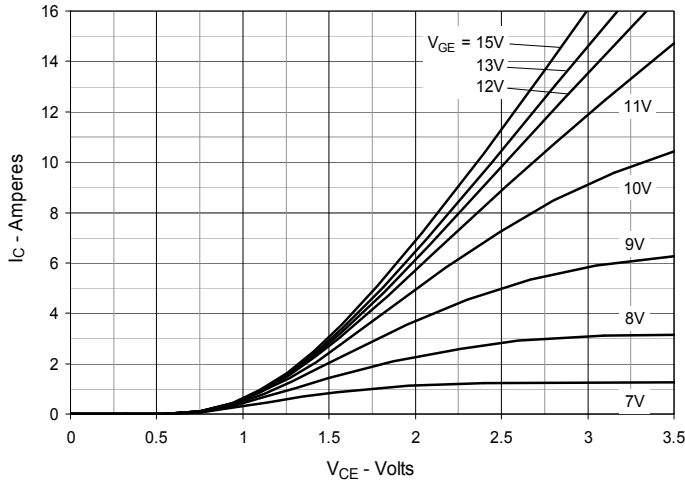


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

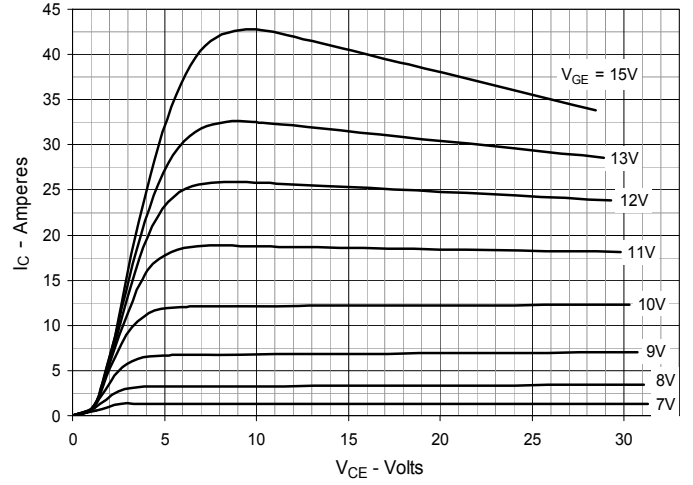


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

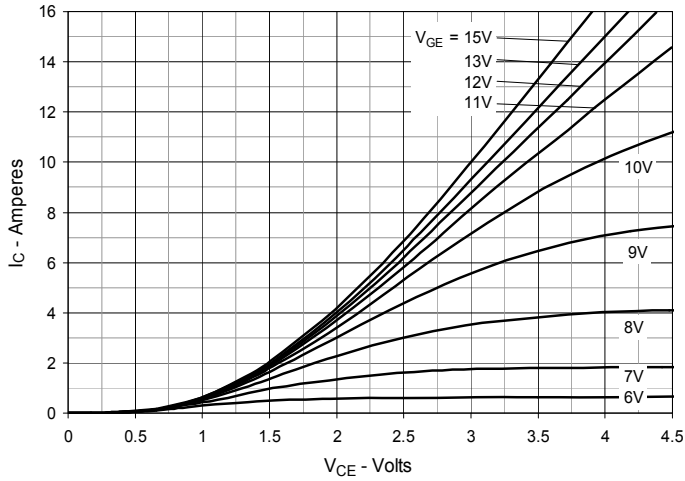


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

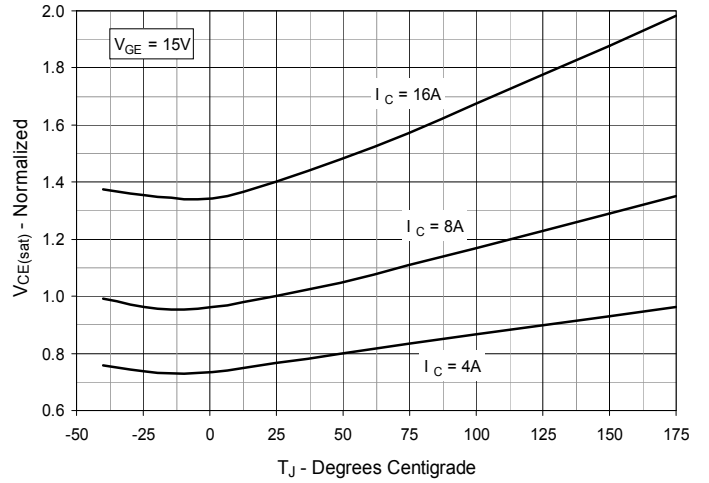


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

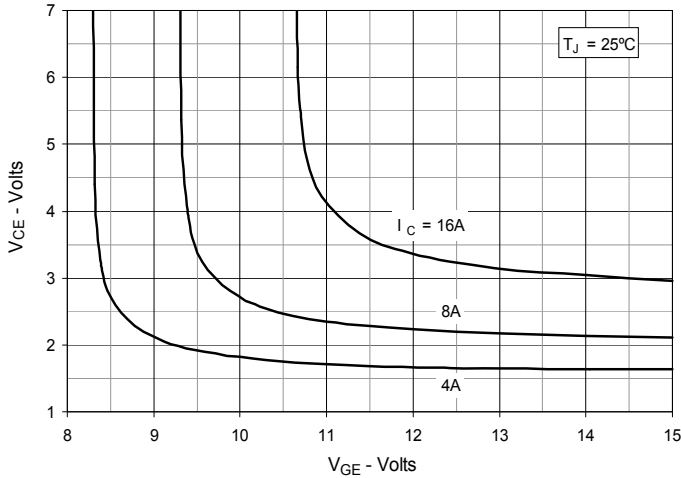


Fig. 6. Input Admittance

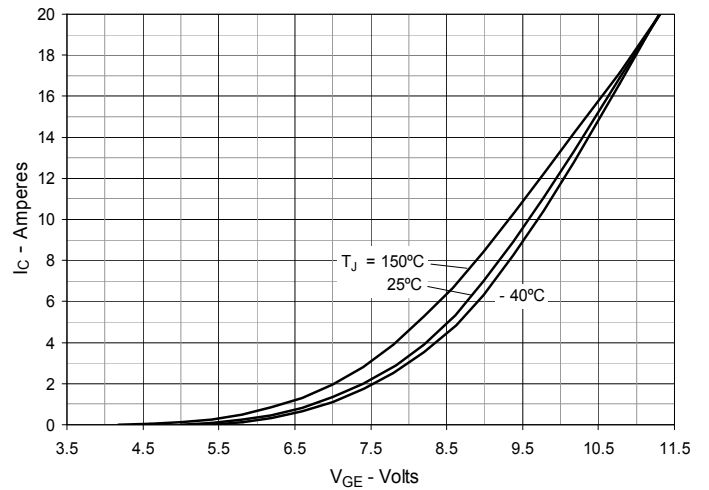


Fig. 7. Transconductance

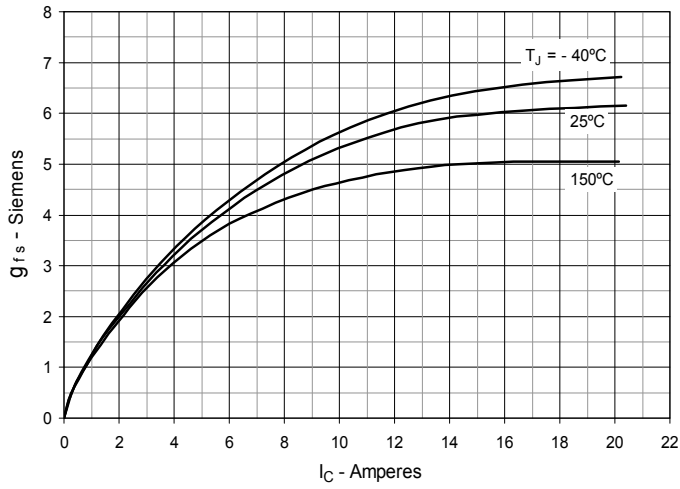


Fig. 8. Gate Charge

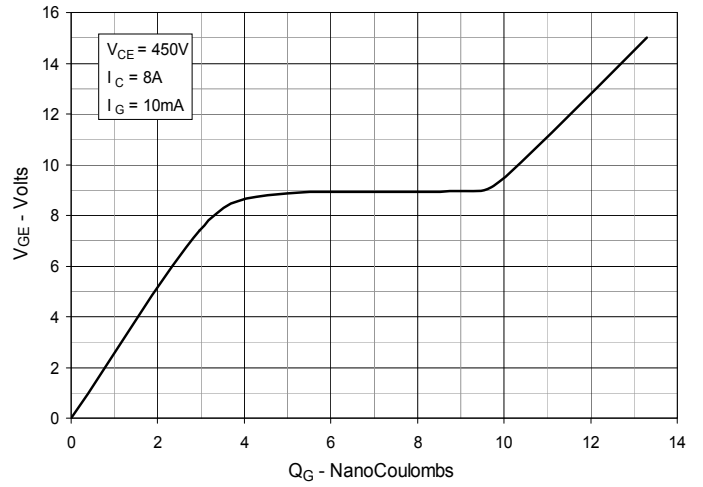


Fig. 9. Capacitance

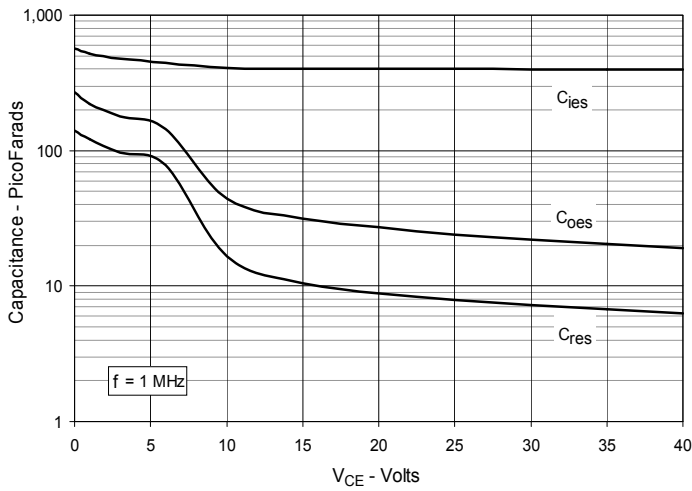


Fig. 10. Reverse-Bias Safe Operating Area

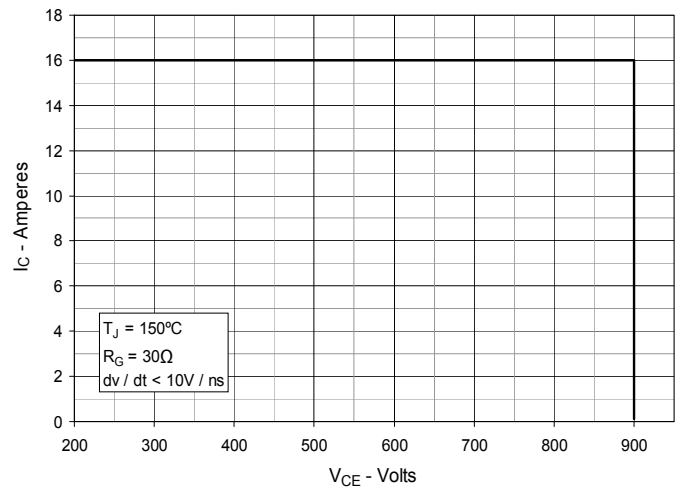


Fig. 11. Maximum Transient Thermal Impedance

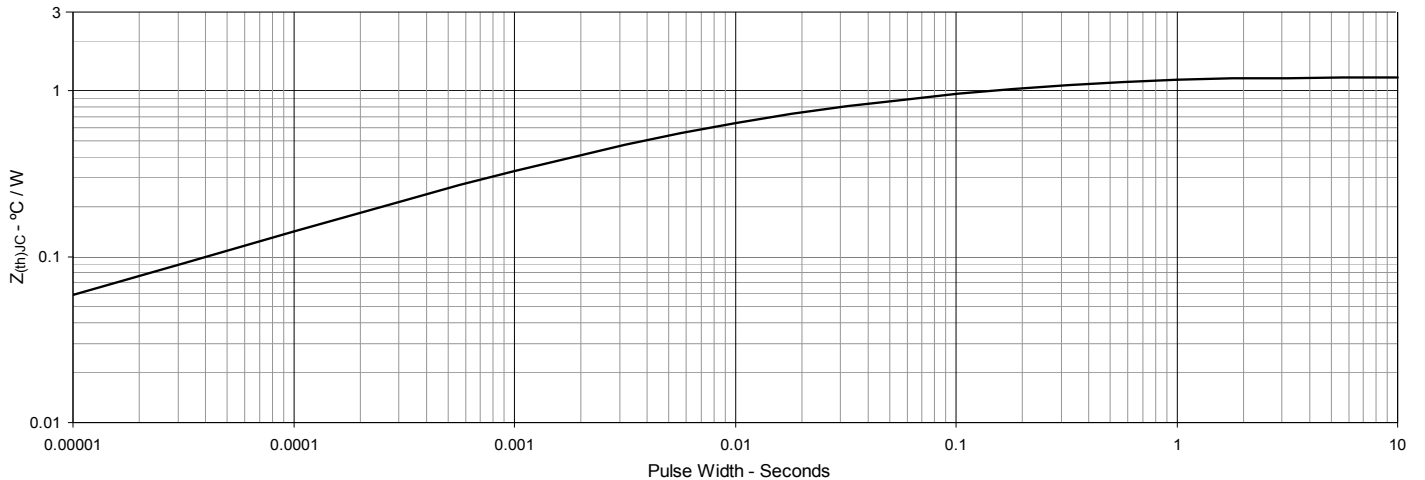


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

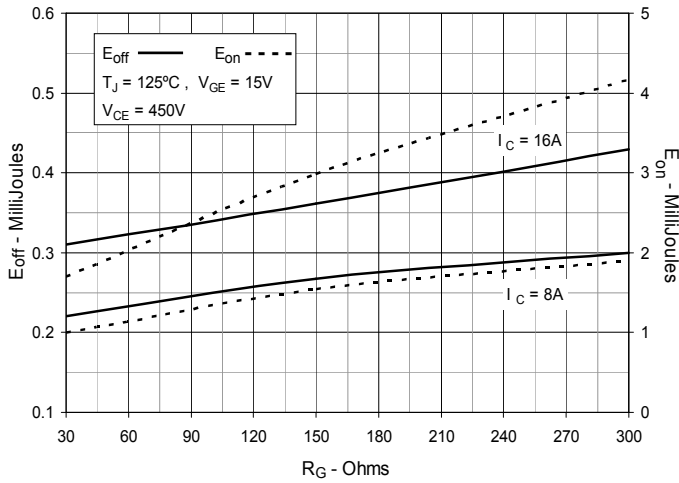


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

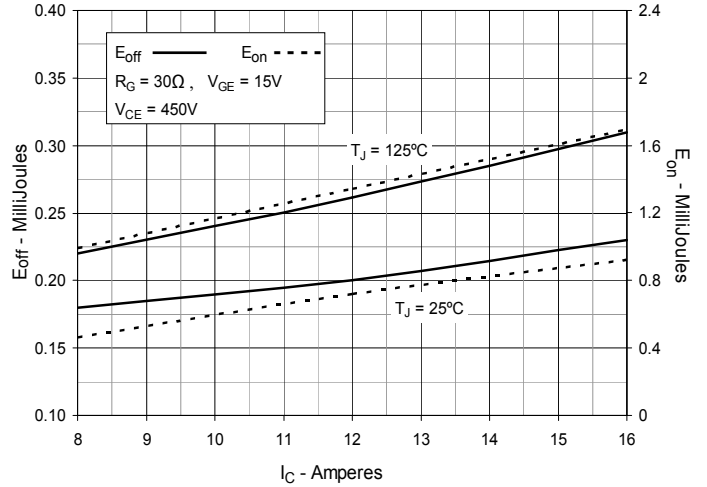


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

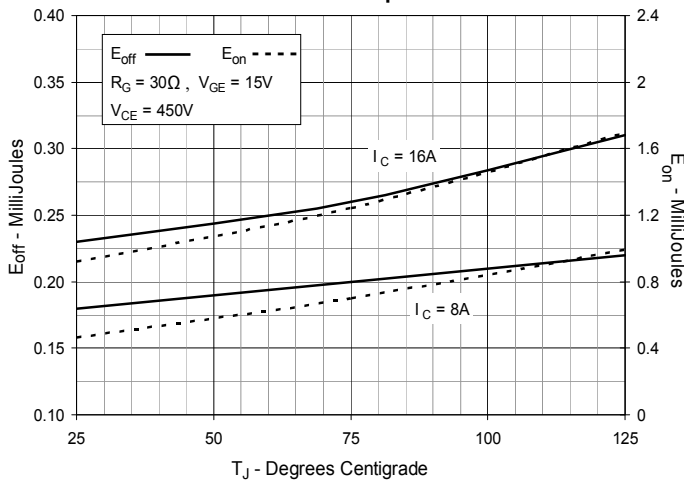


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

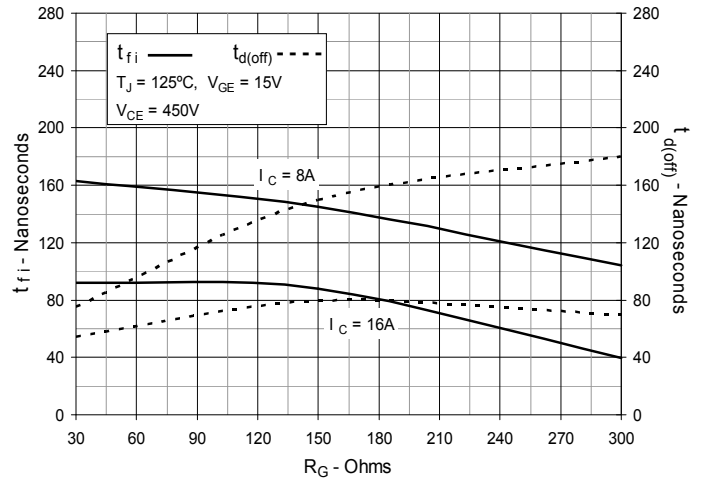


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

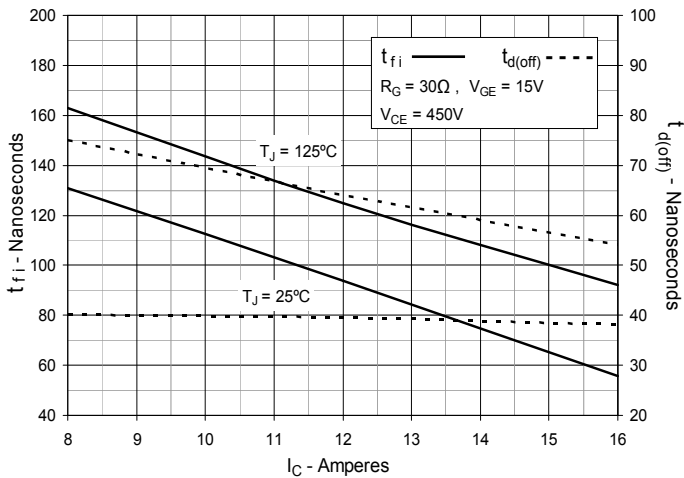


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

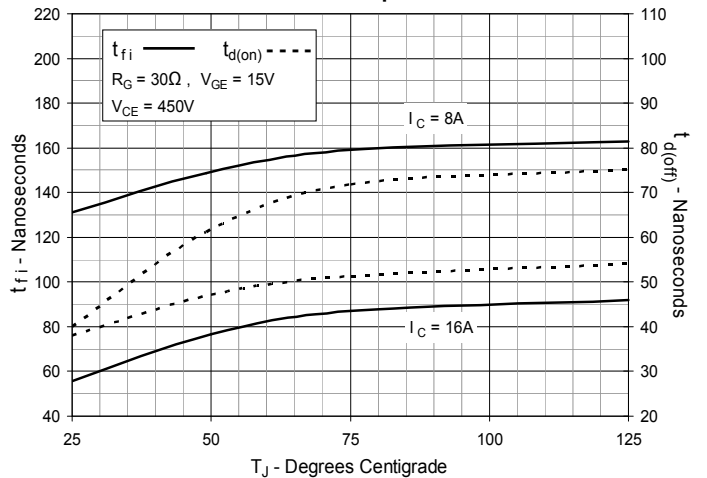


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

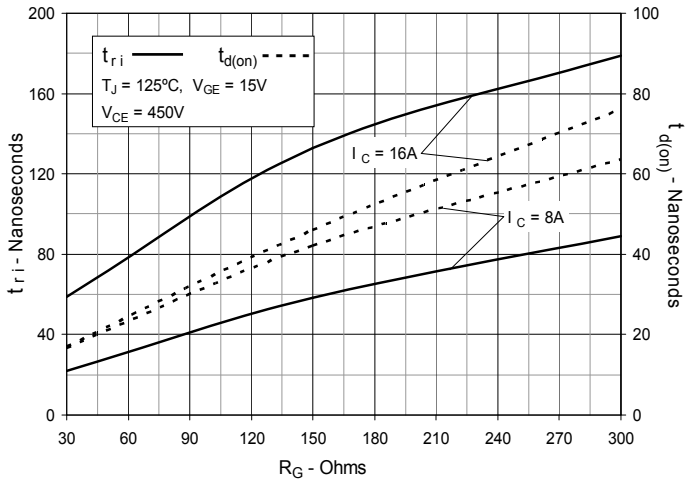


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

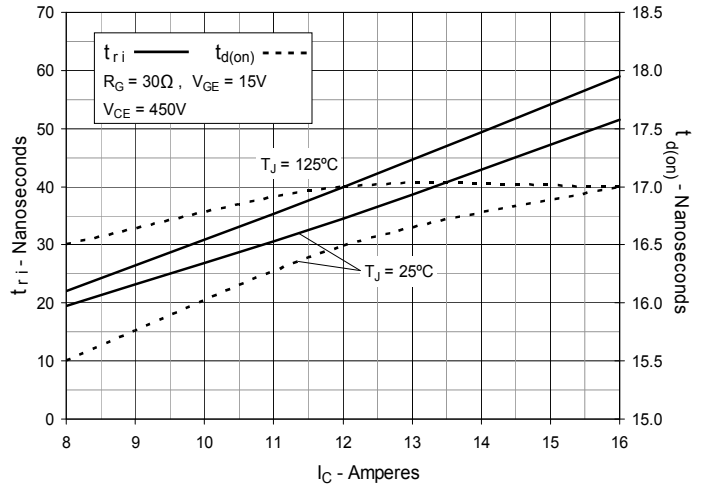


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

