

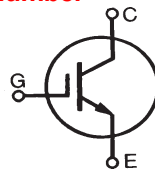
GenX3™ B3-Class IGBTs

Medium Speed low V_{sat} PT IGBTs 5-40 kHz Switching

IXGH72N60B3

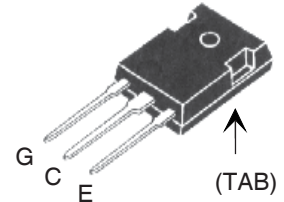
IXGT72N60B3*

*Obsolete Part Number

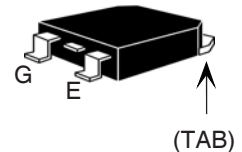


| | | |
|---------------|---|--------------|
| V_{CES} | = | 600V |
| I_{C110} | = | 72A |
| $V_{CE(sat)}$ | ≤ | 1.80V |
| $t_{fi(typ)}$ | = | 90ns |

TO-247 AD (IXGH)



TO-268 (IXGT)



G = Gate C = Collector
E = Emitter TAB = Collector

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|--|---------------------------------------|-----------|
| V_{CES} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GE} = 1\text{M}\Omega$ | 600 | V |
| V_{GES} | Continuous | ±20 | V |
| V_{GEM} | Transient | ±30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ (Limited by Leads) | 75 | A |
| I_{C110} | $T_C = 110^\circ\text{C}$ | 72 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, 1\text{ms}$ | 400 | A |
| I_A | $T_C = 25^\circ\text{C}$ | 20 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 200 | mJ |
| SSOA (RBSOA) | $V_{GE} = 15\text{V}, T_{VJ} = 125^\circ\text{C}, R_G = 3\Omega$ Clamped Inductive Load | $I_{CM} = 240$ @ $V_{CE} \leq 600$ | A V |
| P_C | $T_C = 25^\circ\text{C}$ | 540 | W |
| T_J | | -55 ... +150 | °C |
| T_{JM} | | 150 | °C |
| T_{stg} | | -55 ... +150 | °C |
| M_d | Mounting Torque (TO-247) | 1.13 / 10 | Nm/lb.in. |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | °C |
| T_{SOLD} | Plastic Body for 10 seconds | 260 | °C |
| Weight | TO-247 | 6 | g |
| | TO-268 | 5 | g |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------|---------------------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu\text{A}, V_{GE} = 0\text{V}$ | 600 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu\text{A}, V_{CE} = V_{GE}$ | 3.0 | | V |
| I_{CES} | $V_{CE} = V_{CES}, V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$ | | | 75 μA 750 μA |
| I_{GES} | $V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}$ | | | ±100 nA |
| $V_{CE(sat)}$ | $I_C = 60\text{A}, V_{GE} = 15\text{V}, \text{Note 1}$ $T_J = 125^\circ\text{C}$ | 1.51 1.48 | 1.80 | V V |

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- Avalanche Rated
- International Standard Packages

Advantages

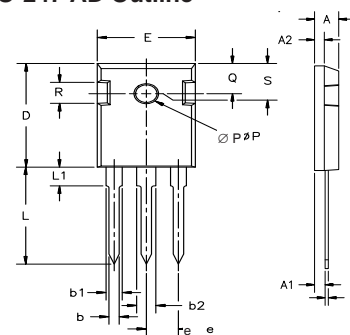
- High Power Density
- Low Gate Drive Requirement

Applications

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

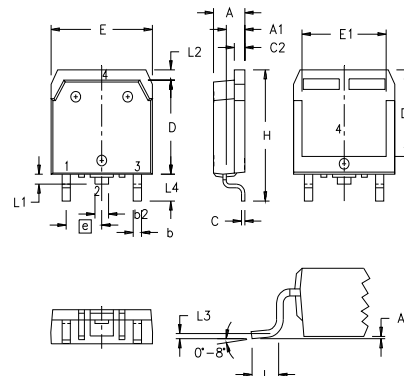
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 60\text{A}, V_{CE} = 10\text{V}$, Note 1 | 50 | 83 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 6800 | pF |
| C_{oes} | | | 575 | pF |
| C_{res} | | | 80 | pF |
| Q_g | $I_C = 60\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$ | | 230 | nC |
| Q_{ge} | | | 40 | nC |
| Q_{gc} | | | 82 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 3\Omega$ | | 31 | ns |
| t_{ri} | | | 33 | ns |
| E_{on} | | | 1.38 | mJ |
| $t_{d(off)}$ | | | 150 | 330 ns |
| t_{fi} | | | 90 | 160 ns |
| E_{off} | | | 1.05 | 2.0 mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 3\Omega$ | | 29 | ns |
| t_{ri} | | | 34 | ns |
| E_{on} | | | 2.70 | mJ |
| $t_{d(off)}$ | | | 228 | ns |
| t_{fi} | | | 142 | ns |
| E_{off} | | | 2.20 | mJ |
| R_{thJC} | (TO-247) | | | 0.23 $^\circ\text{C/W}$ |
| R_{thCS} | | | 0.25 | $^\circ\text{C/W}$ |

TO-247 AD Outline



| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L ₁ | | 4.50 | | .177 |
| ∅P | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | .242 | BSC |

TO-268 Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b2 | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E1 | .524 | .535 | 13.30 | 13.60 |
| e | .215 BSC | | 5.45 BSC | |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .094 | .106 | 2.40 | 2.70 |
| L1 | .047 | .055 | 1.20 | 1.40 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 BSC | | 0.25 BSC | |
| L4 | .150 | .161 | 3.80 | 4.10 |

Note 1: Pulse Test, $t \leq 300\mu\text{s}$, Duty Cycle, $d \leq 2\%$.

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
@ 25°C

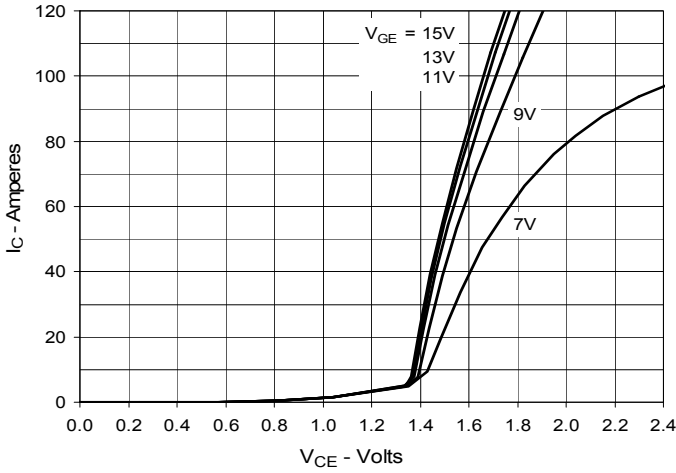


Fig. 2. Extended Output Characteristics
@ 25°C

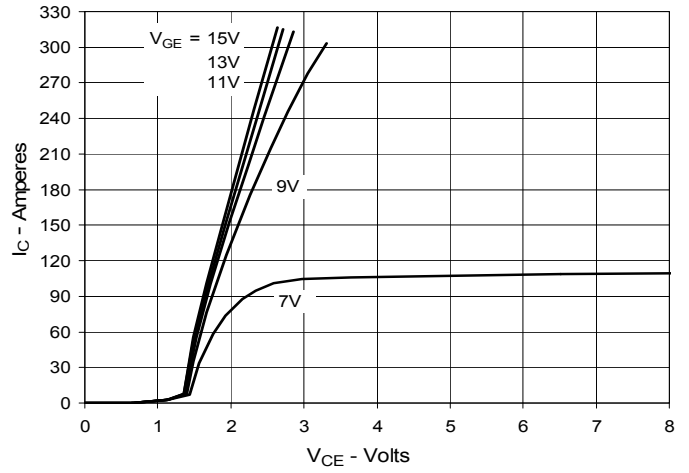


Fig. 3. Output Characteristics
@ 125°C

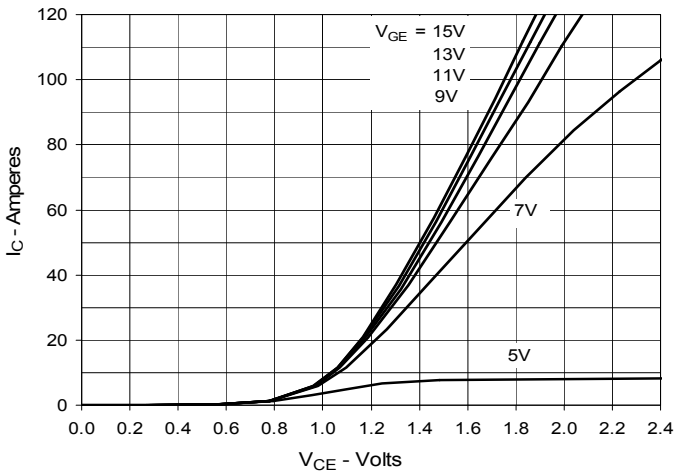


Fig. 4. Dependence of Vce(sat) on
Junction Temperature

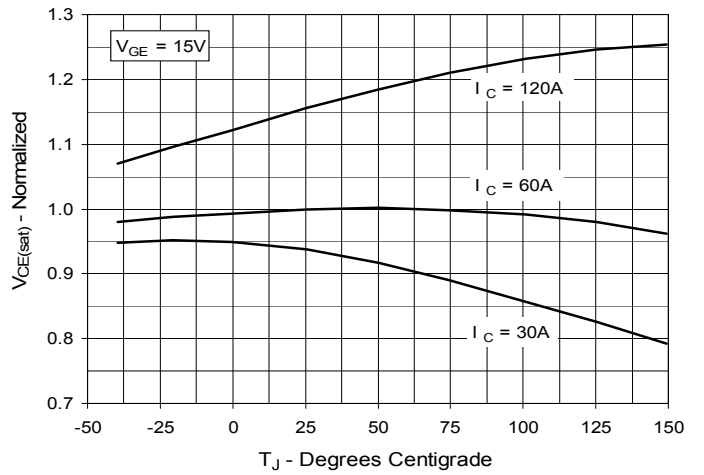


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter Voltage

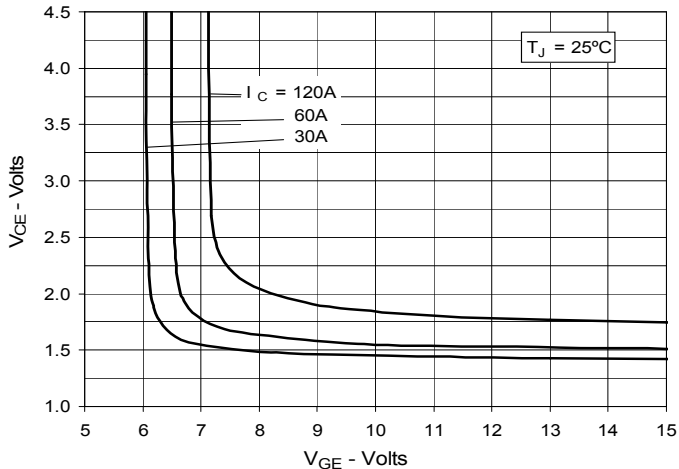


Fig. 6. Input Admittance

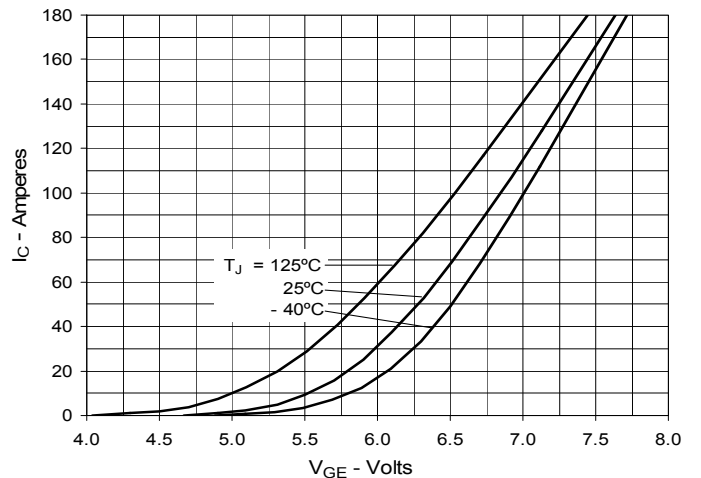


Fig. 7. Transconductance

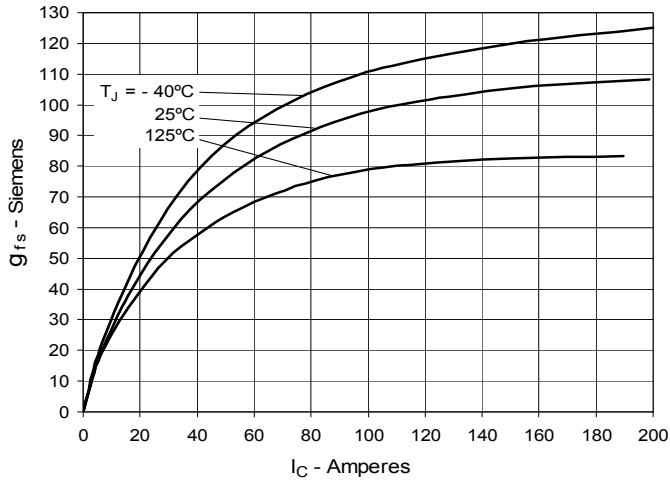


Fig. 8. Gate Charge

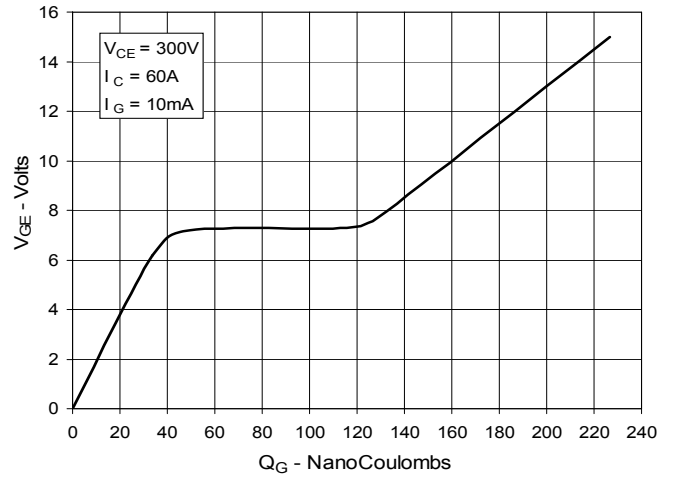


Fig. 9. Capacitance

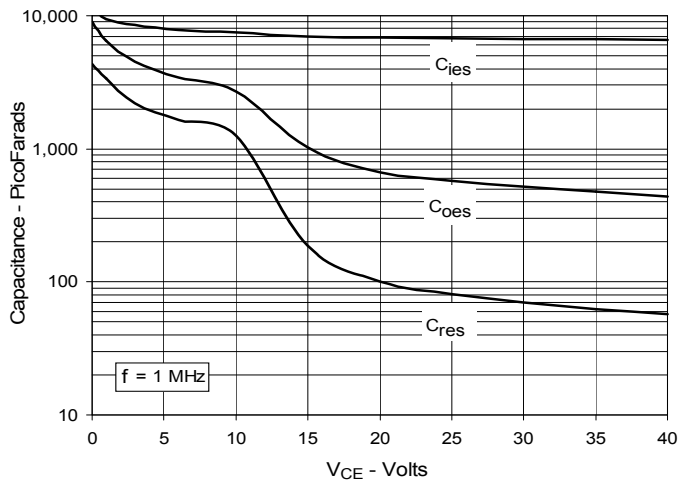


Fig. 10. Reverse-Bias Safe Operating Area

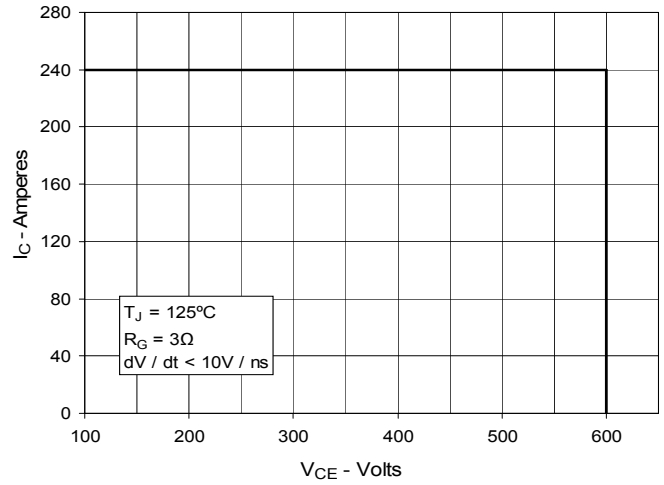


Fig. 11. Maximum Transient Thermal Impedance

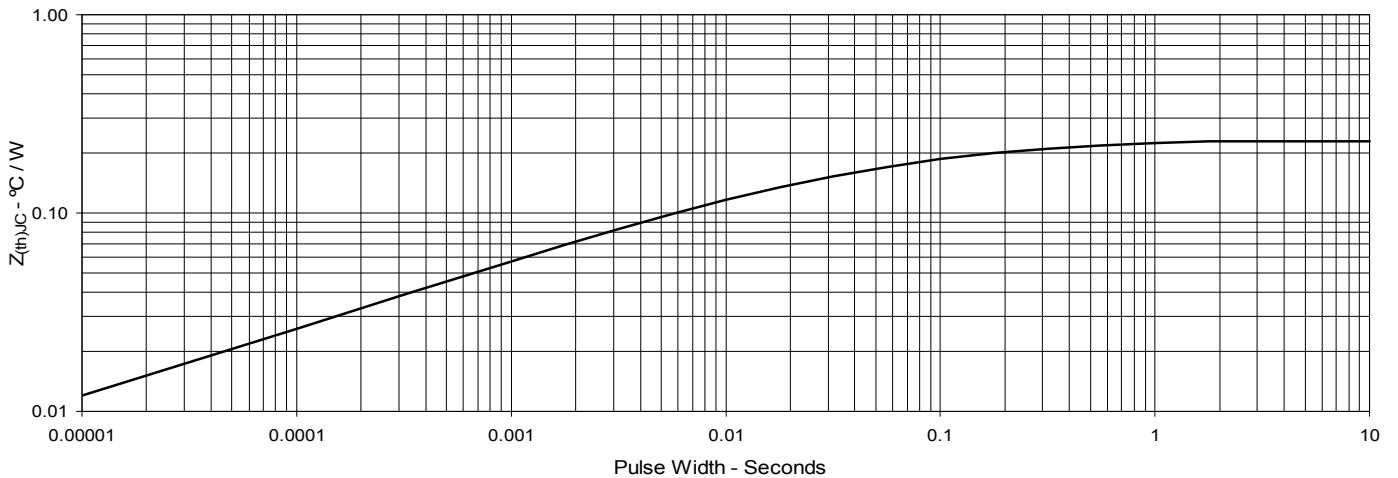


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

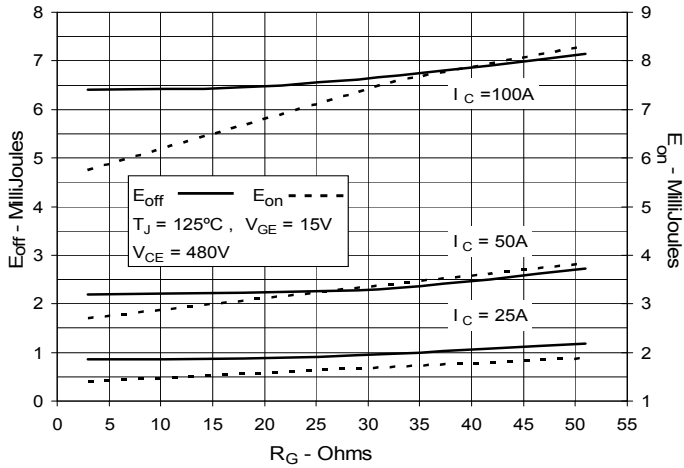


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

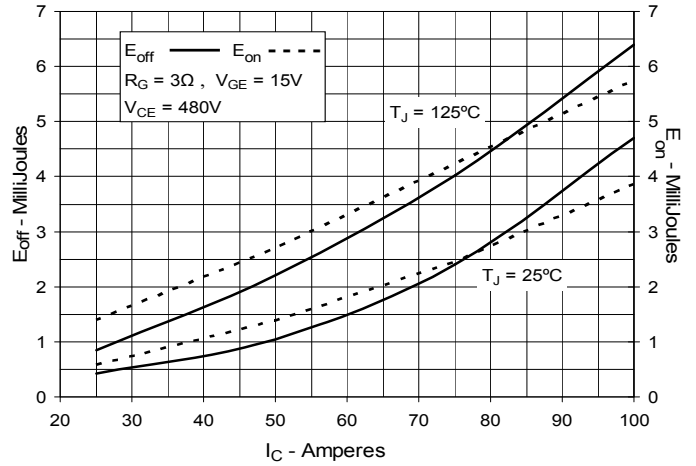


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

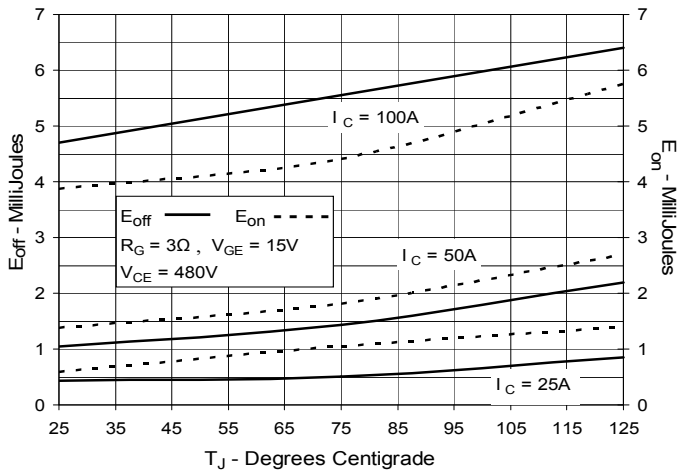


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

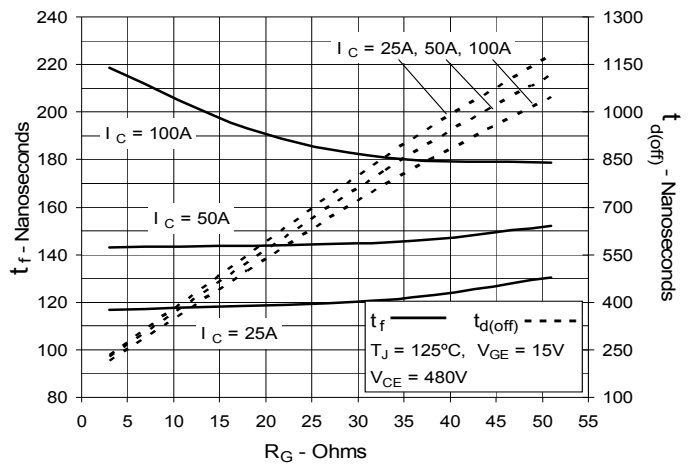


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

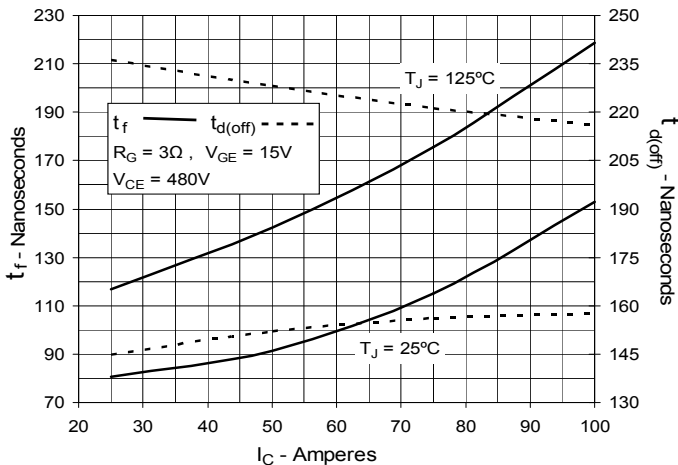


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

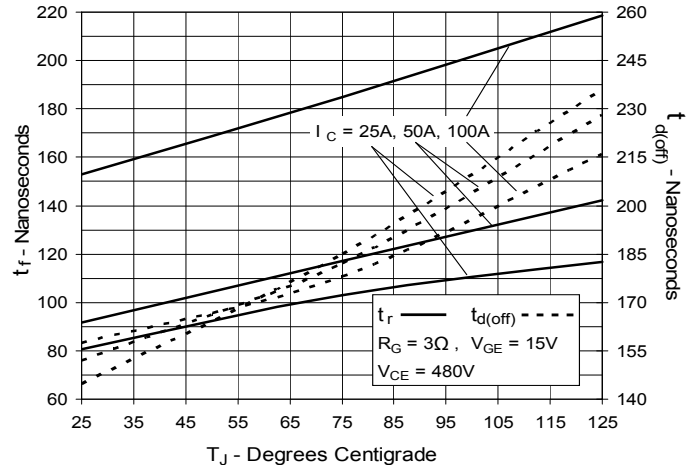


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

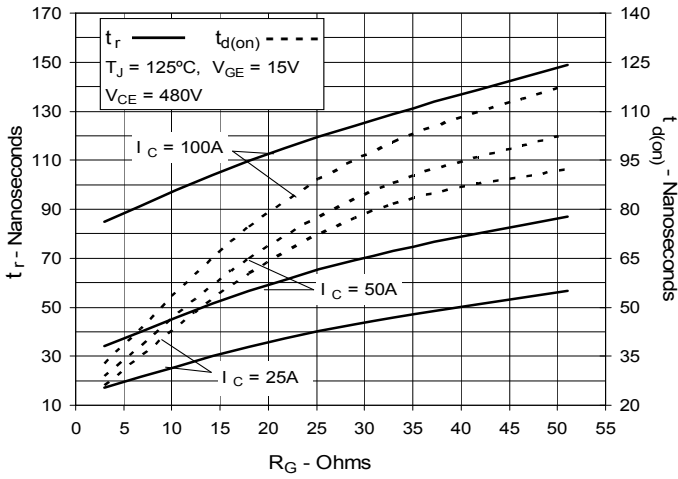


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

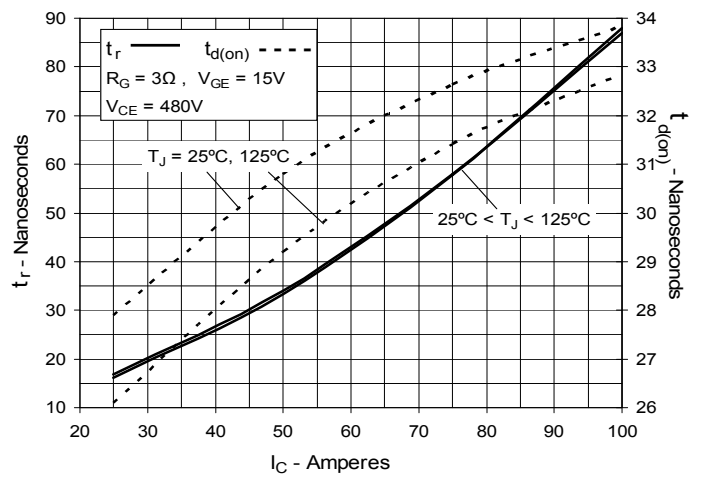
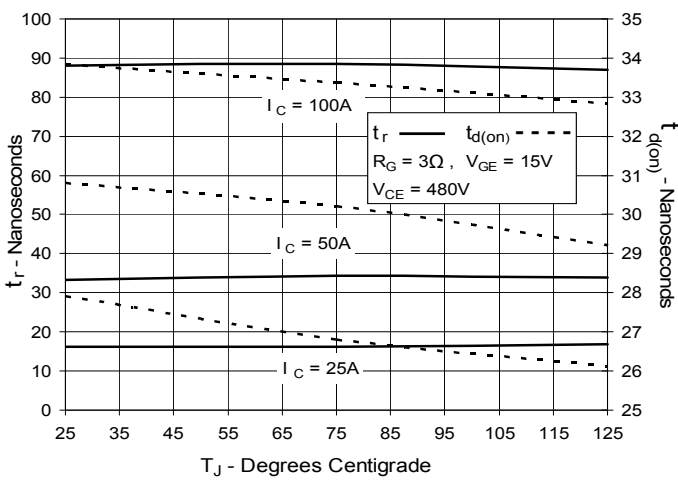


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature





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