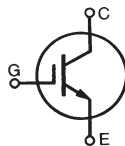


GenX3™ 600V IGBT

Ultra Low V_{sat} PT IGBT for up to 5kHz switching

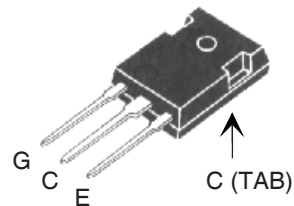
IXGH72N60A3 IXGT72N60A3



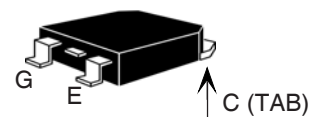
V_{CES} = 600V
I_{C110} = 72A
V_{CE(sat)} ≤ 1.35V
t_{fi(typ)} = 250ns

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|--|-----------------------|-----------|
| V _{CES} | T _C = 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 (limited by leads) | 75 | A |
| I _{C110} | T _C = 110°C | 72 | A |
| I _{CM} | T _C = 25°C, 1ms | 400 | A |
| SSOA (RBSOA) | V _{GE} = 15V, T _{VJ} = 125°C, R _G = 3Ω Clamped inductive load @ ≤ 600V | I _{CM} = 150 | A |
| P _C | T _C = 25°C | 540 | W |
| T _J | | -55 ... +150 | °C |
| T _{JM} | | 150 | °C |
| T _{stg} | | -55 ... +150 | °C |
| T _L | 1.6mm (0.062 in.) from case for 10s | 300 | °C |
| T _{SOLD} | Plastic body for 10 seconds | 260 | °C |
| M _d | Mounting torque (TO-247) | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-268 | 4 | g |

TO-247 (IXGH)



TO-268 (IXGT)



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

Features

- Optimized for low conduction losses
- Square RBSOA
- International standard packages

Advantages

- High power density
- Low gate drive requirement

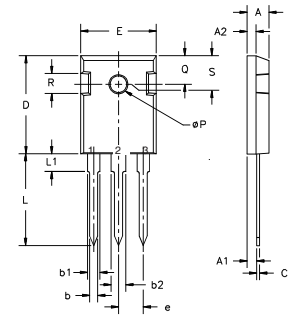
Applications

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

| Symbol | Test Conditions (T _J = 25°C unless otherwise specified) | Characteristic Values | | |
|----------------------|--|-----------------------|------|-----------------|
| | | Min. | Typ. | Max. |
| BV _{CES} | I _C = 250μA, V _{GE} = 0V | 600 | | V |
| V _{GE(th)} | I _C = 250μA, V _{CE} = V _{GE} | 3.0 | | V |
| I _{CES} | V _{CE} = V _{CES} V _{GE} = 0V T _J = 125°C | | | 75 μA 750 μA |
| I _{GES} | V _{CE} = 0V, V _{GE} = ± 20V | | | ±100 nA |
| V _{CE(sat)} | I _C = 60A, V _{GE} = 15V, Note 1 | | | 1.35 V |

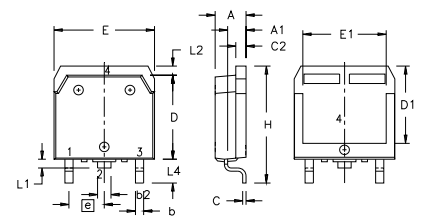
| Symbol | Test Conditions | Characteristic Values | | |
|--------------|--|-----------------------|------|--------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 60A, V_{CE} = 10V$, Note 1 | 48 | 76 | S |
| C_{ies} | $V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$ | | 6600 | pF |
| C_{oes} | | | 360 | pF |
| C_{res} | | | 80 | pF |
| Q_g | $I_C = I_{C110}, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$ | | 230 | nC |
| Q_{ge} | | | 40 | nC |
| Q_{gc} | | | 78 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ C$ $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 480V, R_G = 3\Omega$ | | 31 | ns |
| t_{ri} | | | 34 | ns |
| E_{on} | | | 1.38 | mJ |
| $t_{d(off)}$ | | | 320 | ns |
| t_{fi} | | | 250 | ns |
| E_{off} | | | 3.5 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ C$ $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 480V, R_G = 3\Omega$ | | 29 | ns |
| t_{ri} | | | 32 | ns |
| E_{on} | | | 2.6 | mJ |
| $t_{d(off)}$ | | | 510 | ns |
| t_{fi} | | | 375 | ns |
| E_{off} | | | 6.5 | mJ |
| R_{thJC} | | | 0.23 | $^\circ C/W$ |
| R_{thCS} | | 0.15 | | $^\circ C/W$ |

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

TO-247 AD Outline


Terminals: 1 - Gate 2 - Drain

| 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 |

TO-268 Outline


Terminals: 1 - Gate 2 - Drain

| 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 |

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

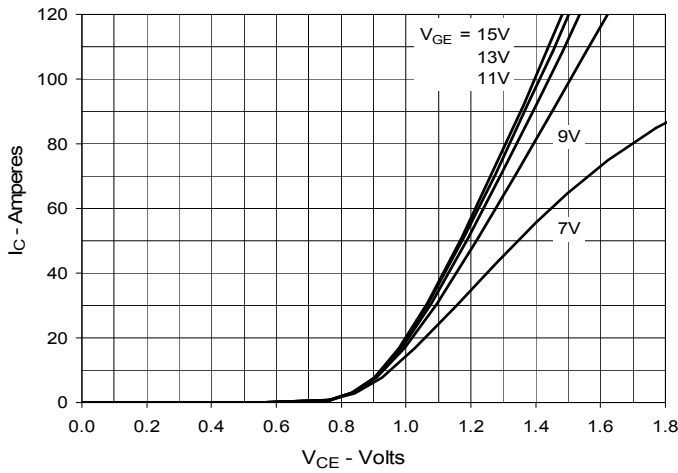


Fig. 2. Extended Output Characteristics @ 25°C

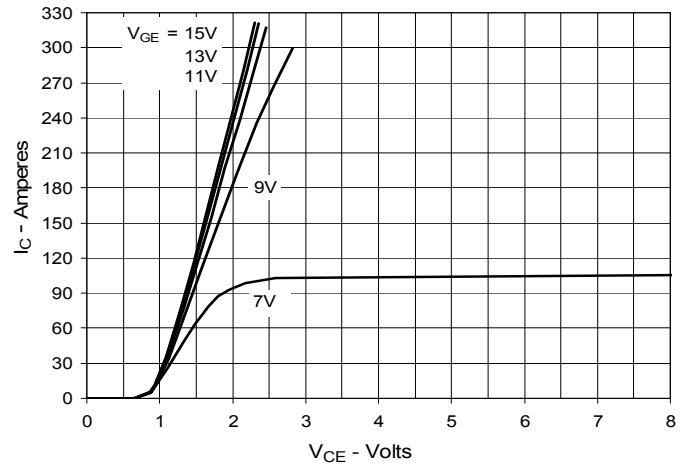


Fig. 3. Output Characteristics @ 125°C

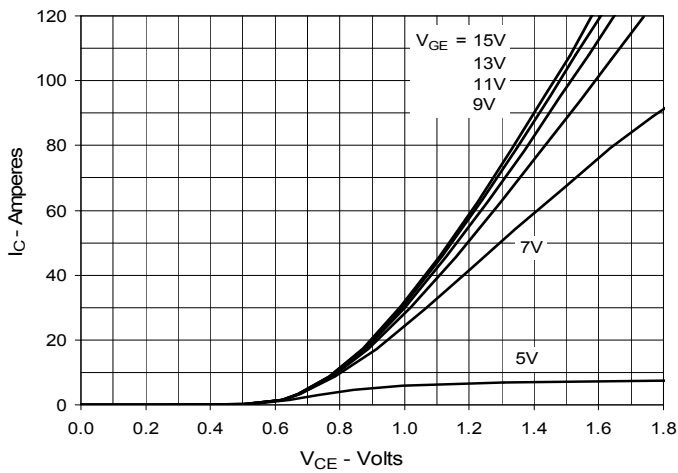


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

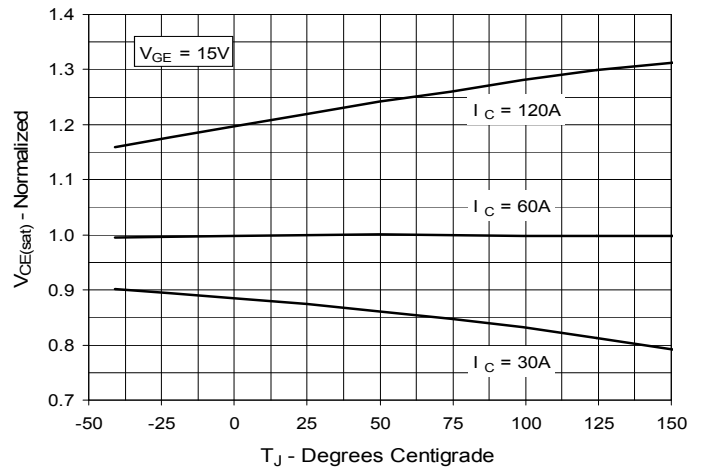


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

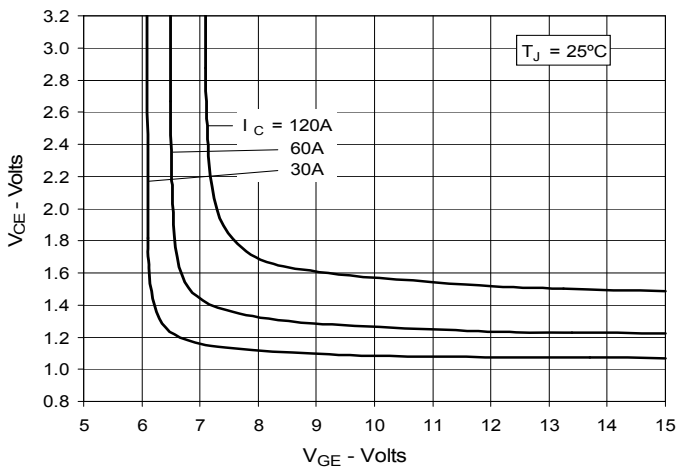


Fig. 6. Input Admittance

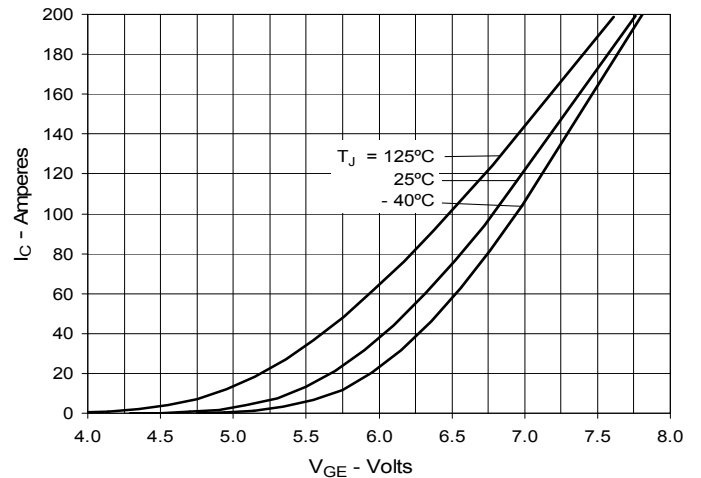


Fig. 7. Transconductance

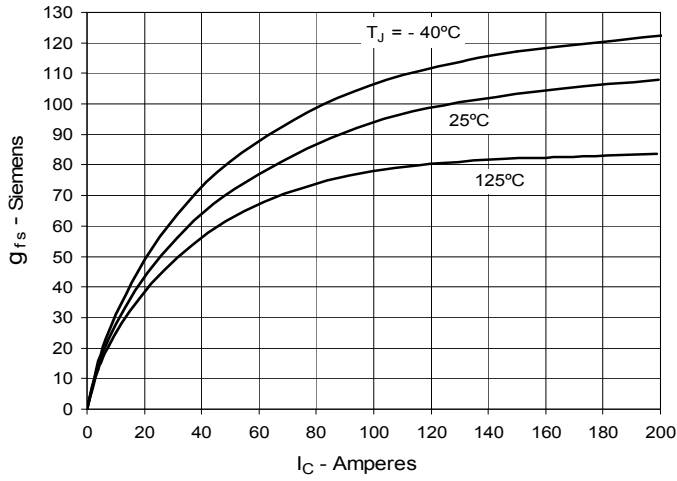


Fig. 8. Gate Charge

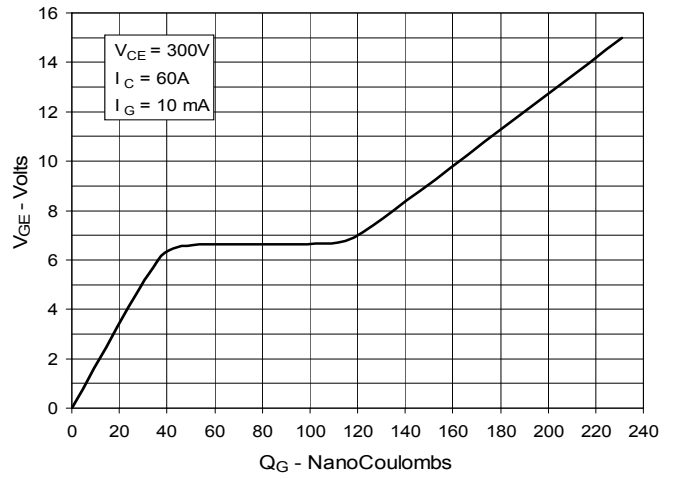


Fig. 9. Capacitance

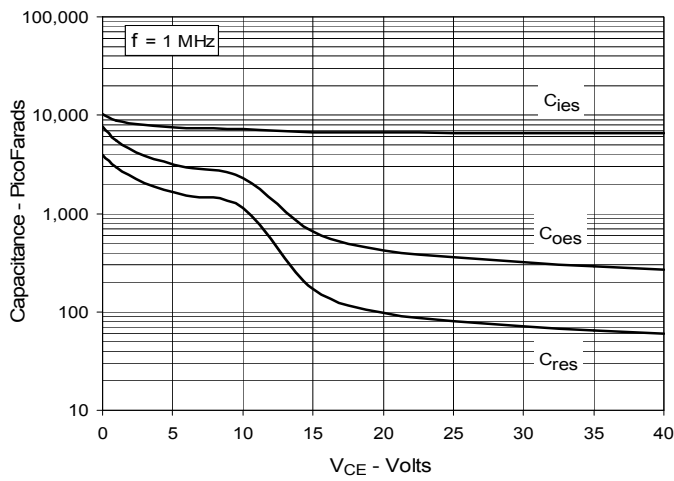


Fig. 10. Reverse-Bias Safe Operating Area

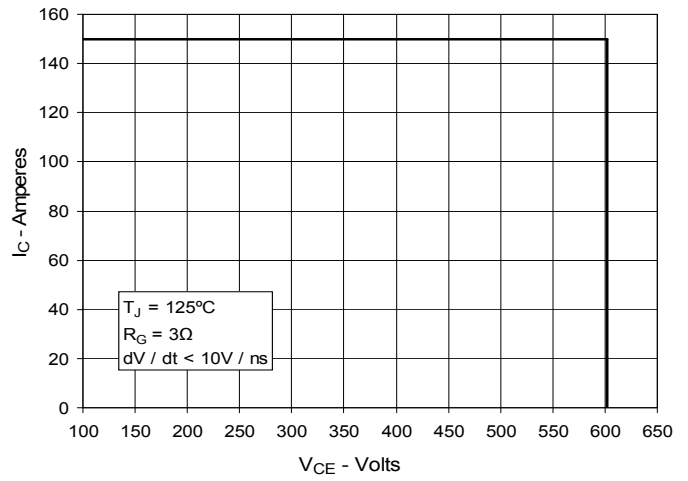
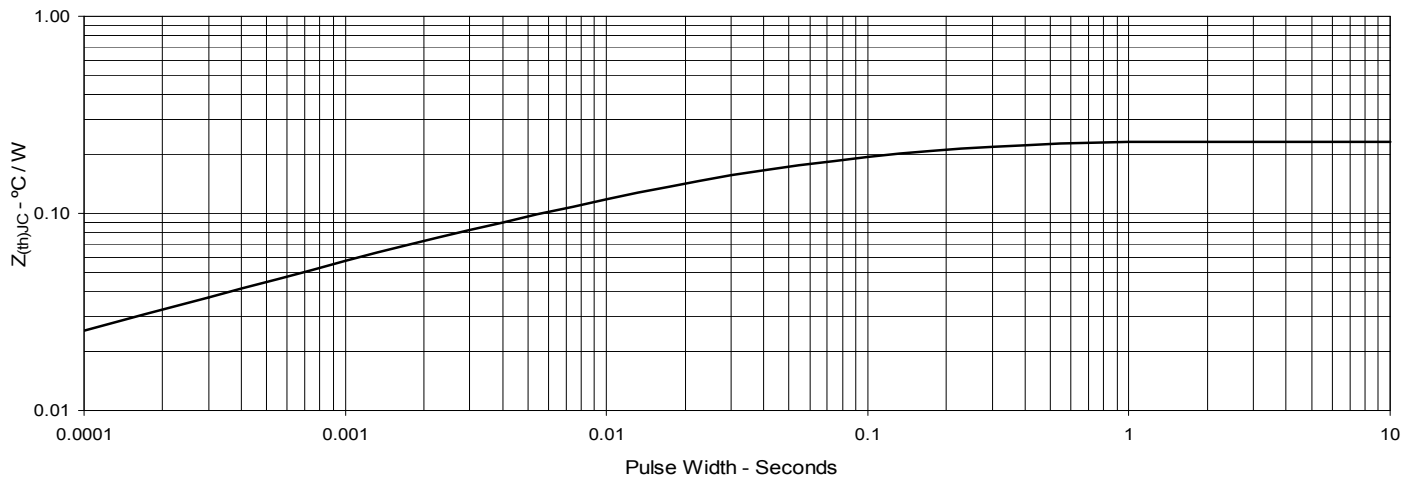


Fig. 11. Maximum Transient Thermal Impedance



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

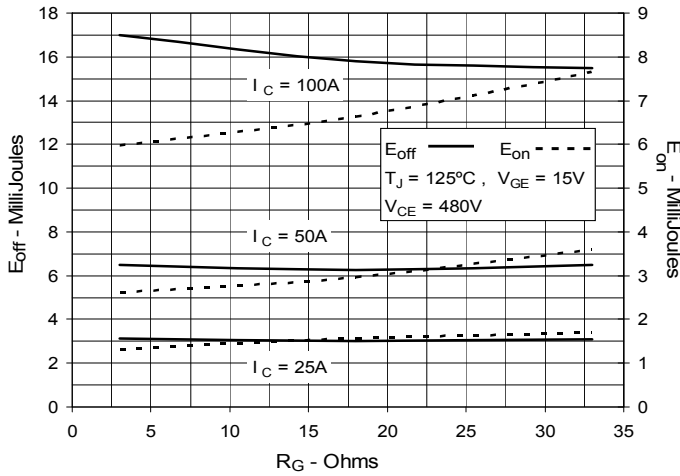


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

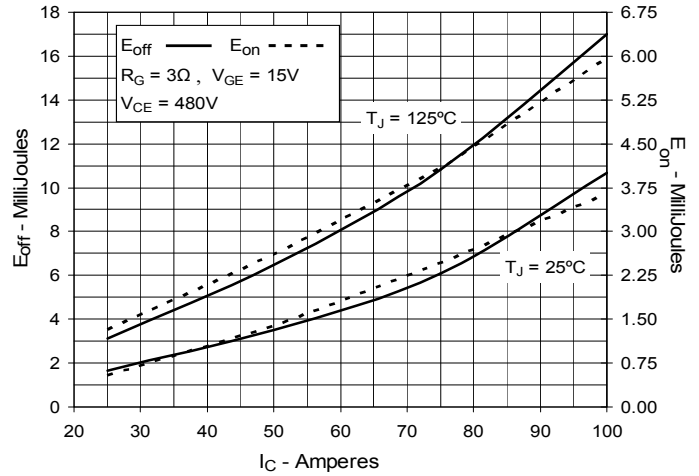


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

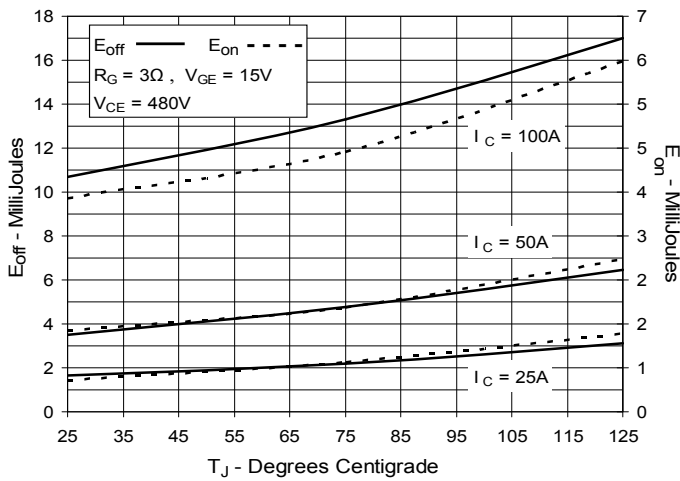


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

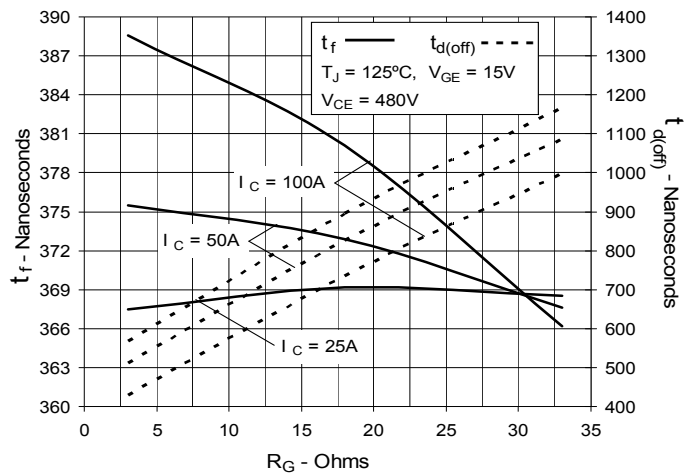


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

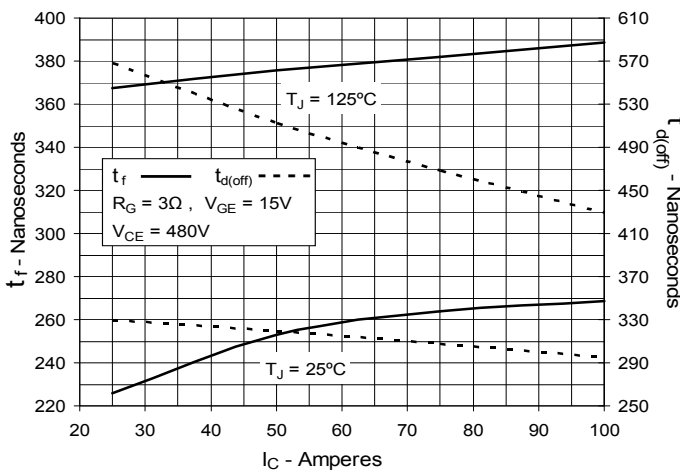
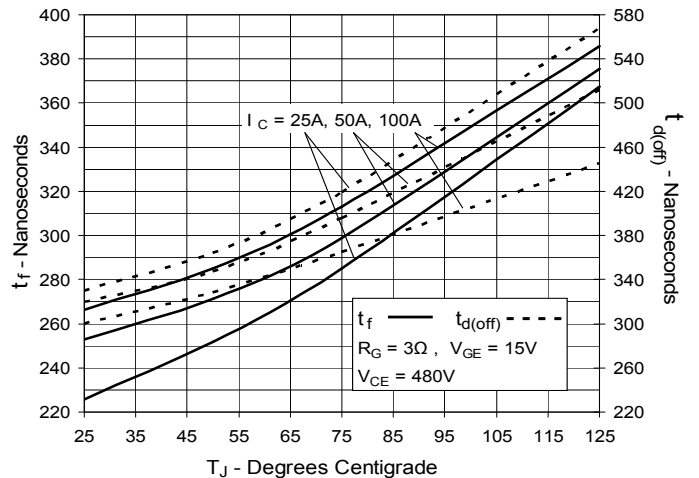
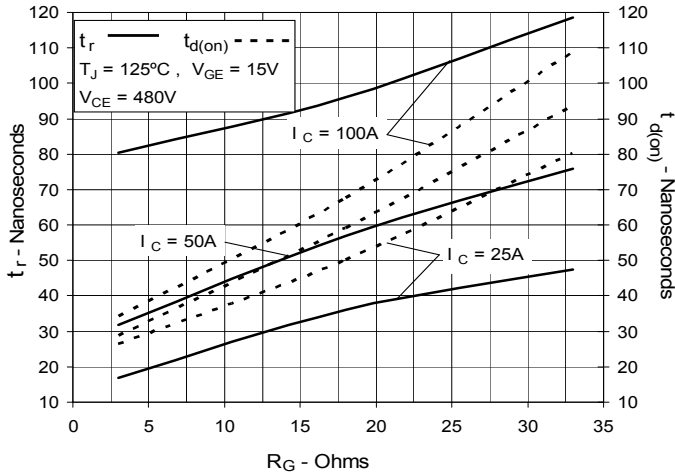


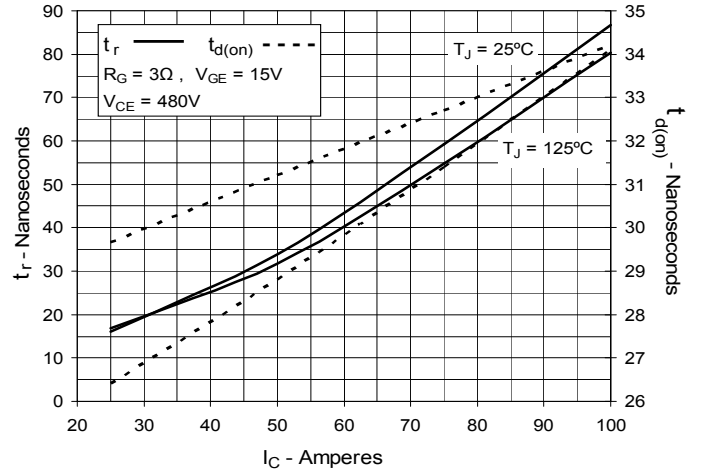
Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



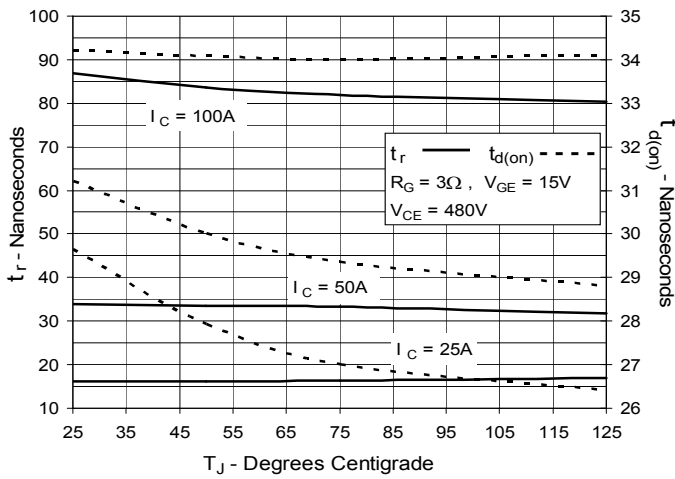
**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



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



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





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