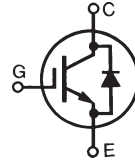


**High Voltage, High Gain
BIMOSFET™ Monolithic
Bipolar MOS Transistor**

**IXBH6N170
IXBT6N170**



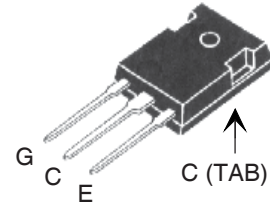
$V_{CES} = 1700V$

$I_{C90} = 6A$

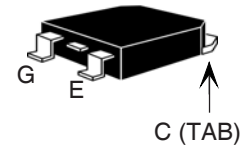
$V_{CE(sat)} \leq 3.4V$

| Symbol | Test Conditions | Maximum Ratings | |
|----------------|--|---------------------|------------|
| V_{CES} | $T_C = 25^\circ C$ 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 | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 12 | A |
| I_{C90} | $T_C = 90^\circ C$ | 6 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 36 | A |
| SSOA | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 24\Omega$ | $I_{CM} = 16$ | A |
| (RBSOA) | Clamped inductive load | $V_{CES} \leq 1350$ | V |
| P_C | $T_C = 25^\circ C$ | 75 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10 seconds | 260 | $^\circ C$ |
| M_d | Mounting torque (TO-247) | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-268 | 4 | g |

TO-247 (IXBH)



TO-268 (IXBT)



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

Features

- High blocking voltage
- Integrated Anti-parallel diode
- International standard packages
- Low conduction losses

Advantages

- Low gate drive requirement
- High power density

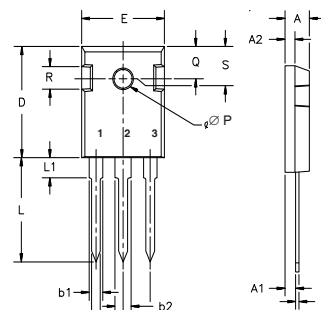
Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- Laser generator
- Capacitor discharge circuit
- AC switches

| Symbol | Test Conditions ($T_J = 25^\circ C$, unless otherwise specified) | Characteristic Values | | |
|---------------|---|-----------------------|------|---------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 1700 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 2.5 | | 5.5 V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 10 μA 100 μA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 6A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$ | 2.84 | | V |
| | | 3.46 | | V |

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------|
| | | Min. | Typ. | Max. |
| g_{fS} | $I_C = 6A, V_{CE} = 10V$, Note 1 | 2.0 | 3.5 | S |
| C_{ies} | $V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$ | | 378 | pF |
| C_{oes} | | | 25 | pF |
| C_{res} | | | 9 | pF |
| Q_g | $I_C = 6A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$ | | 17.0 | nC |
| Q_{ge} | | | 2.5 | nC |
| Q_{gc} | | | 9.6 | nC |
| $t_{d(on)}$ | Resistive Switching times, $T_J = 25^\circ C$ $I_C = 6A, V_{GE} = 15V$ $V_{CE} = 850V, R_G = 24\Omega$ | | 32 | ns |
| t_r | | | 59 | ns |
| $t_{d(off)}$ | | | 105 | ns |
| t_f | | | 690 | ns |
| $t_{d(on)}$ | Resistive Switching times, $T_J = 125^\circ C$ $I_C = 6A, V_{GE} = 15V$ $V_{CE} = 850V, R_G = 24\Omega$ | | 35 | ns |
| t_r | | | 69 | ns |
| $t_{d(off)}$ | | | 100 | ns |
| t_f | | | 600 | ns |
| R_{thJC} | | | 1.65 | $^\circ C/W$ |
| R_{thCS} | | 0.25 | | $^\circ C/W$ |

TO-247 (IXBH) Outline



Terminals: 1 - Gate
2 - Drain
3 - Source

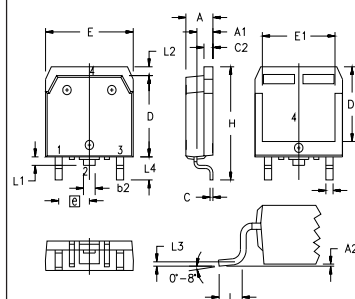
| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 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 |

Reverse Diode

| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|-----------------------|------|---------|
| | | Min. | Typ. | Max. |
| V_F | $I_F = 6A, V_{GE} = 0V$, Note 1 | | | 3.0 V |
| t_{rr} | $I_F = 6A, V_{GE} = 0V, -di_F/dt = 100A/\mu s$ $V_R = 100V, V_{GE} = 0V$ | | 1.08 | μs |
| I_{RM} | | | 12.0 | A |

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

TO-268 (IXBT) Outline



| SYM | INCHES | | MILLIMETERS | |
|----------------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A ₁ | .106 | .114 | 2.70 | 2.90 |
| A ₂ | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b ₂ | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C ₂ | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D ₁ | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E ₁ | .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 |
| L ₁ | .047 | .055 | 1.20 | 1.40 |
| L ₂ | .039 | .045 | 1.00 | 1.15 |
| L ₃ | .010 BSC | | 0.25 BSC | |
| L ₄ | .150 | .161 | 3.80 | 4.10 |

IXYS reserves the right to change limits, test conditions and dimensions.

IXYS MOSFETs and IGBTs are covered 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
by one or more of the following U.S. patents: 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

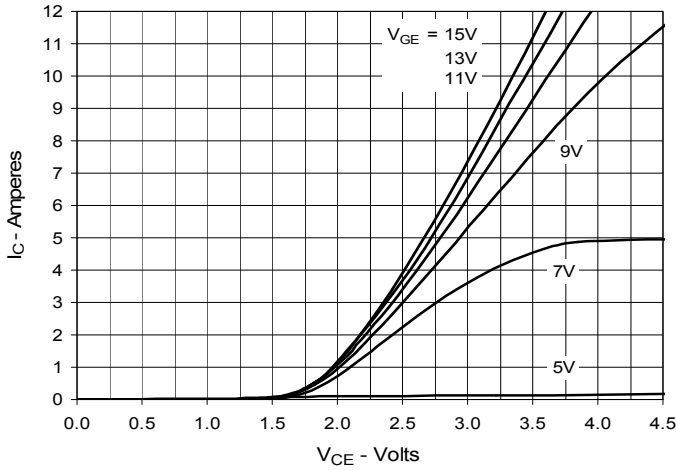


Fig. 2. Extended Output Characteristics @ 25°C

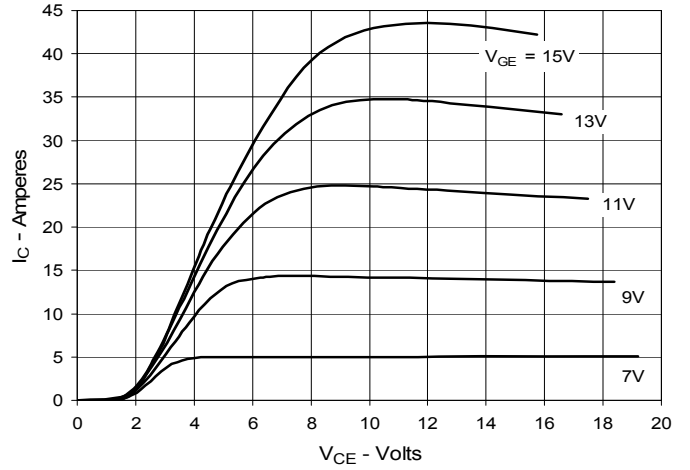


Fig. 3. Output Characteristics @ 125°C

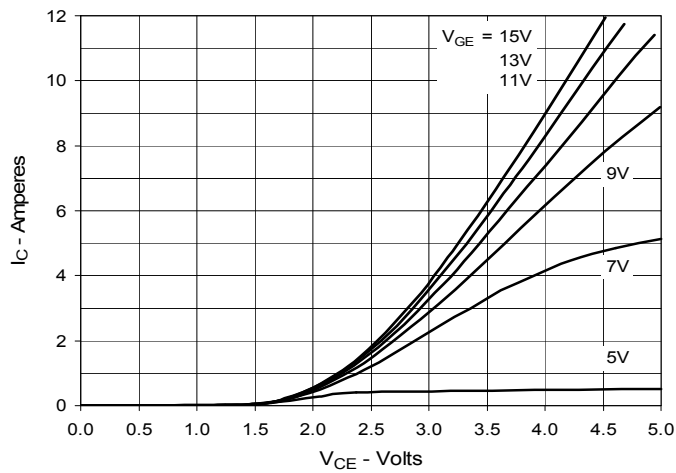


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

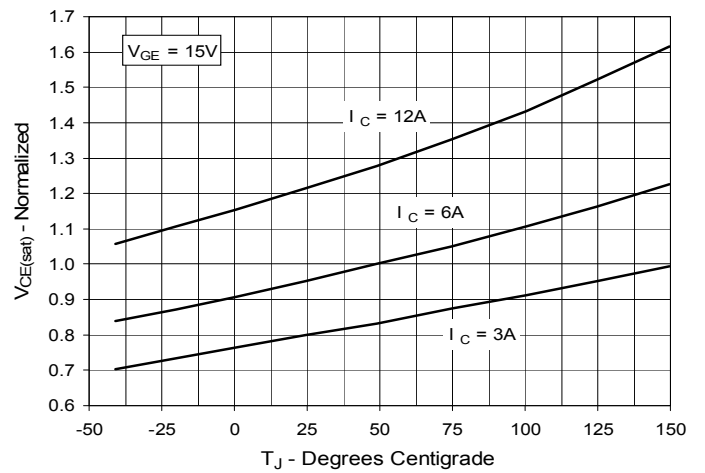


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

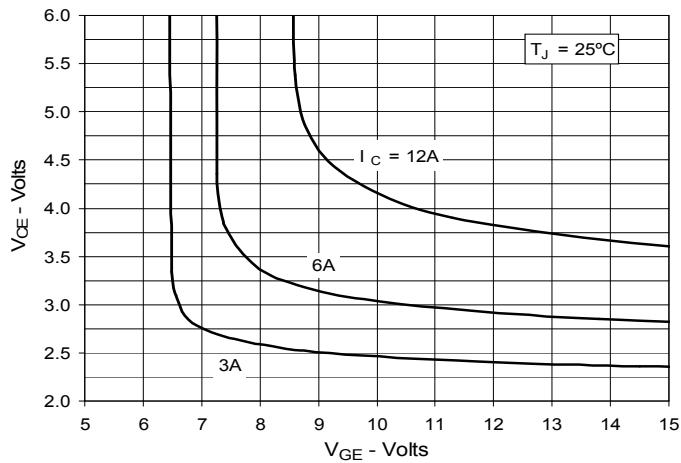


Fig. 6. Input Admittance

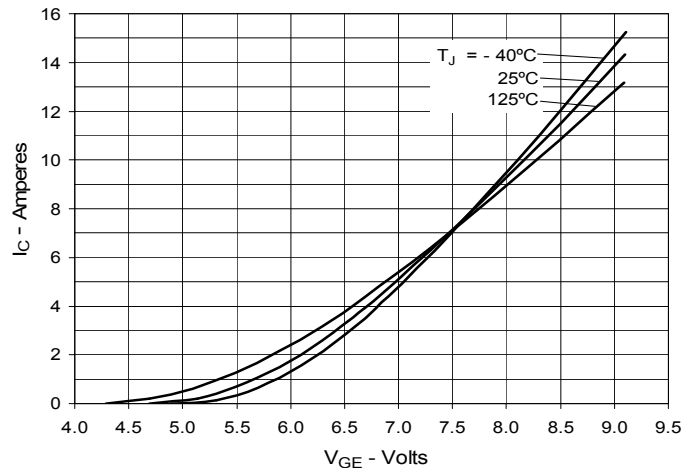


Fig. 7. Transconductance

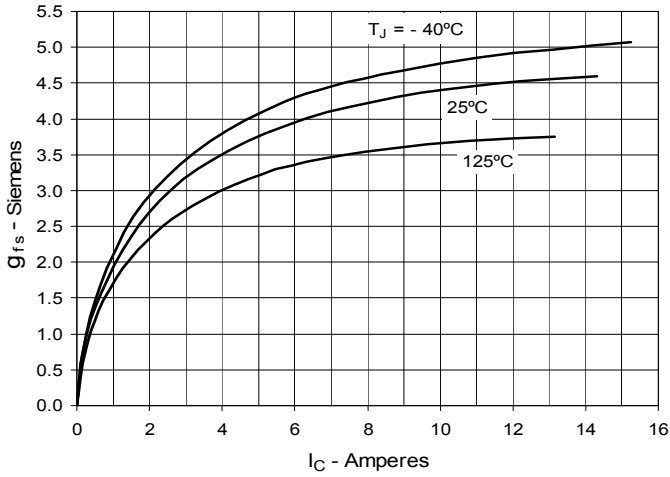


Fig. 8. Forward Voltage Drop of Intrinsic Diode

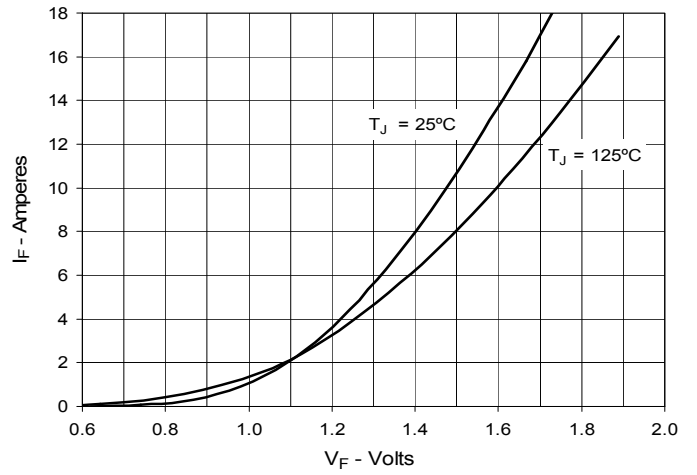


Fig. 9. Gate Charge

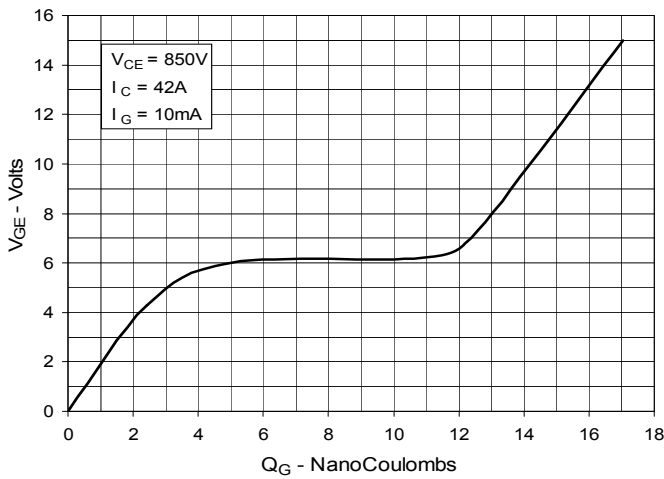


Fig. 10. Capacitance

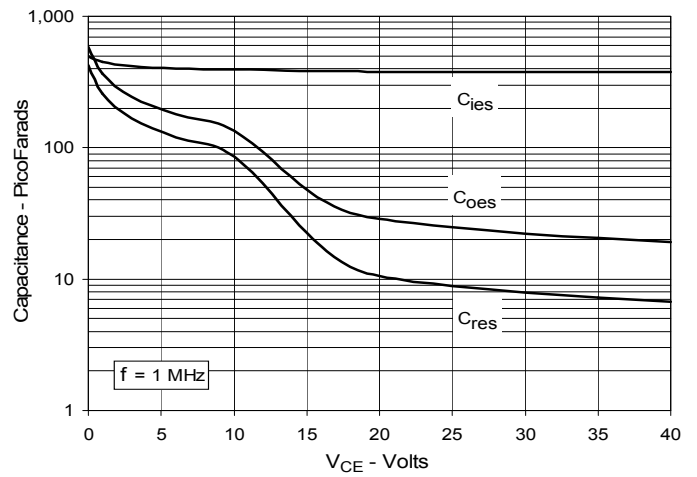


Fig. 11. Reverse-Bias Safe Operating Area

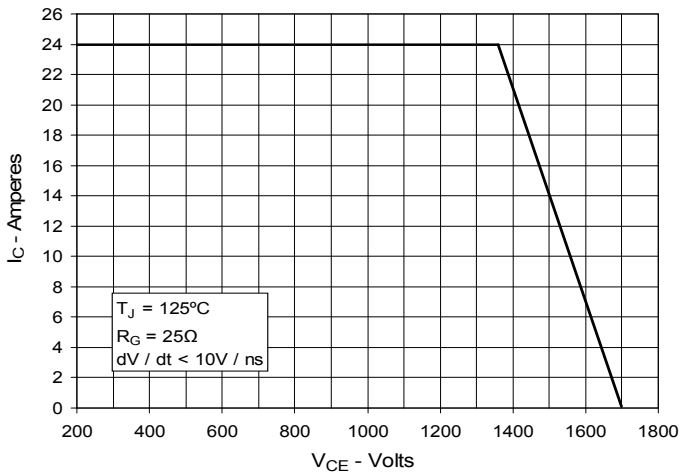
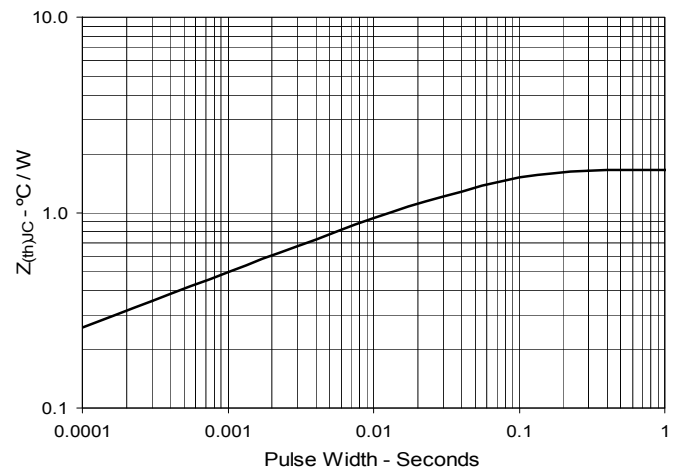


Fig. 12. Maximum Transient Thermal Impedance



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Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

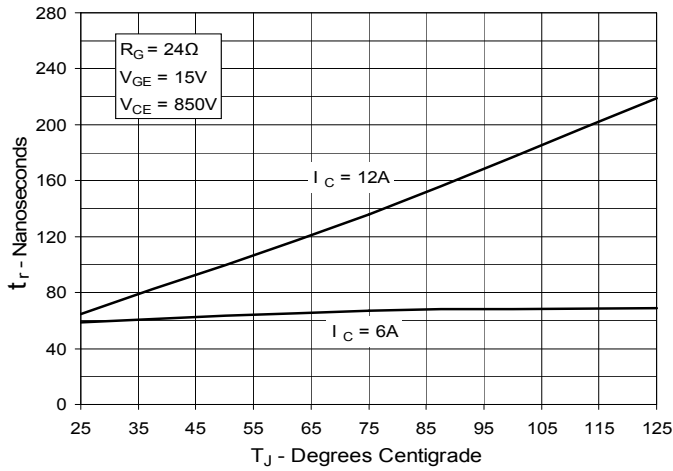


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

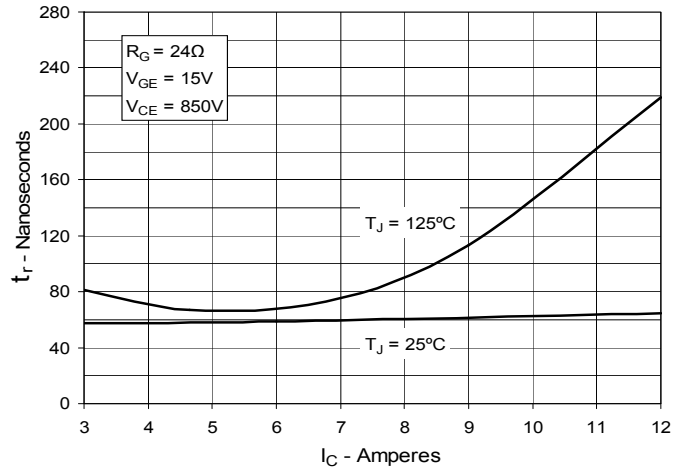


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

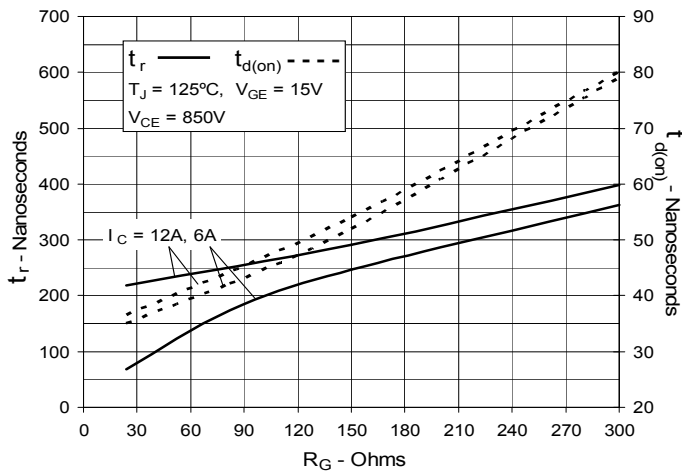


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

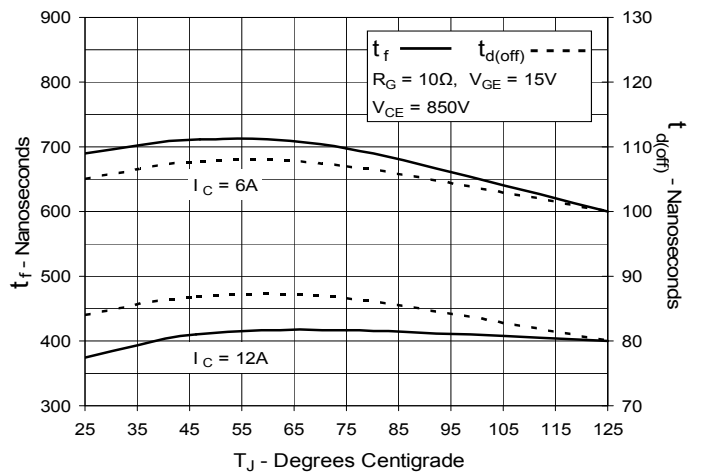


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

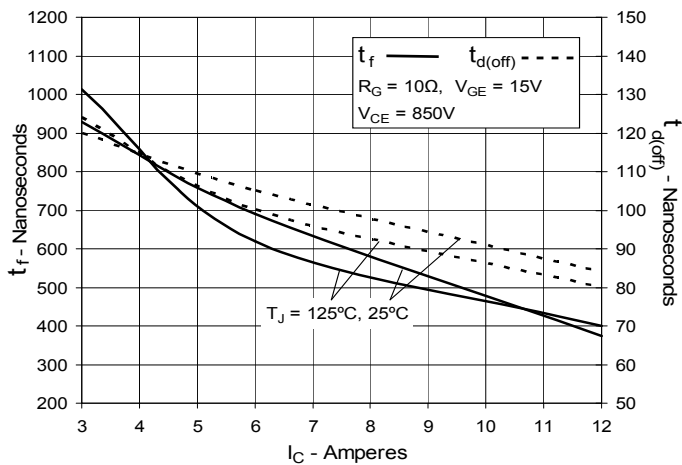
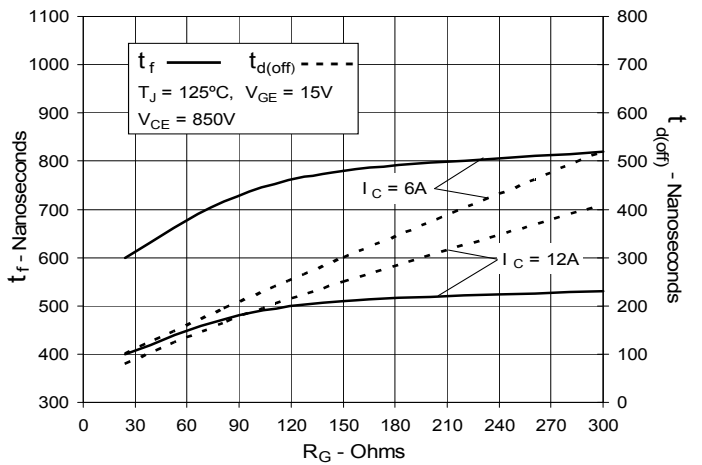


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance





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