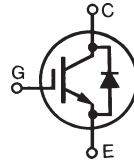
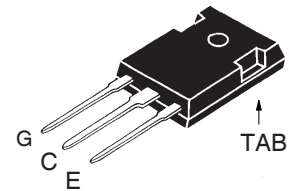


GenX3™ 1200V IGBT
IXGH30N120C3H1
**High speed PT IGBTs for
10-50kHz Switching**


$$\begin{aligned}
 V_{CES} &= 1200V \\
 I_{C100} &= 24A \\
 V_{CE(sat)} &\leq 4.2V \\
 t_{fi(typ)} &= 42ns
 \end{aligned}$$

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|--|---------------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 1200 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C , $R_{GE} = 1M\Omega$ | 1200 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 48 | A |
| I_{C100} | $T_C = 100^\circ\text{C}$ | 24 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1ms | 115 | A |
| I_A | $T_C = 25^\circ\text{C}$ | 20 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 250 | mJ |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_J = 125^\circ\text{C}$, $R_G = 5\Omega$ Clamped Inductive Load | $I_{CM} = 60$ @ $V_{CE} \leq 1200$ | A V |
| P_C | $T_C = 25^\circ\text{C}$ | 250 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| M_d | Mounting Torque | 1.13/10 | Nm/lb.in. |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ\text{C}$ |
| T_{SOLD} | 1.6mm (0.062 in.) from Case for 10s | 260 | $^\circ\text{C}$ |
| Weight | | 6 | g |

TO-247AD


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

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- Anti-Parallel Ultra Fast Diode
- Avalanche Rated
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

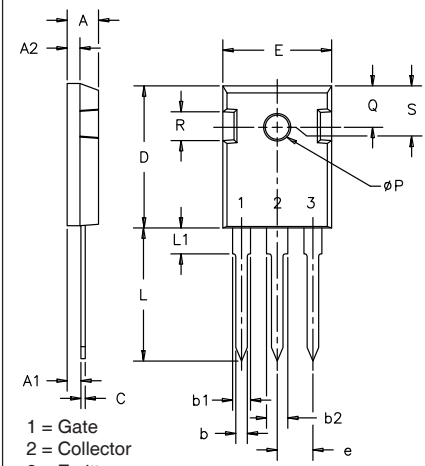
Applications

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

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------------|-----------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu\text{A}$, $V_{GE} = 0V$ | 1200 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$ | 3.0 | | 5.0 V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$ | | | 100 μA 1.5 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 24A$, $V_{GE} = 15V$, Note 2 $T_J = 125^\circ\text{C}$ | | 3.6 3.2 | 4.2 V V |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--|---|-----------------------|------|---|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 24\text{A}, V_{CE} = 10\text{V}$, Note 2 | 10 | 17 | S |
| C_{ies} C_{oes} C_{res} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 1810 | pF |
| | | | 185 | pF |
| | | | 50 | pF |
| Q_g Q_{ge} Q_{gc} | $I_C = 24\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$ | | 80 | nC |
| | | | 11 | nC |
| | | | 37 | nC |
| $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off} | Inductive Load, $T_J = 25^\circ\text{C}$ $I_C = 24\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 5\Omega$ Note 1 | | 18 | ns |
| | | | 33 | ns |
| | | | 1.45 | mJ |
| | | | 106 | ns |
| | | | 42 | ns |
| | | | 0.47 | 0.85 mJ |
| $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off} | Inductive Load, $T_J = 125^\circ\text{C}$ $I_C = 24\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 5\Omega$ Note 1 | | 20 | ns |
| | | | 40 | ns |
| | | | 2.50 | mJ |
| | | | 135 | ns |
| | | | 280 | ns |
| | | | 1.30 | 2.10 mJ |
| R_{thJC} R_{thCK} | | | | 0.50 $^\circ\text{C/W}$ $^\circ\text{C/W}$ |

TO-247 (IXGH) AD Outline



| SYM | INCHES | | MILLIMETERS | |
|----------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.7 | 5.3 |
| A1 | .087 | .102 | 2.2 | 2.54 |
| A2 | .059 | .098 | 2.2 | 2.6 |
| b | .040 | .055 | 1.0 | 1.4 |
| b1 | .065 | .084 | 1.65 | 2.13 |
| b2 | .113 | .123 | 2.87 | 3.12 |
| C | .016 | .031 | .4 | .8 |
| D | .819 | .845 | 20.80 | 21.46 |
| E | .610 | .640 | 15.75 | 16.26 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | | .177 | | 4.50 |
| ϕP | .140 | .144 | 3.55 | 3.65 |
| Q | .212 | .244 | 5.4 | 6.2 |
| R | .170 | .216 | 4.32 | 5.49 |
| S | .242 BSC | | 6.15 BSC | |

Reverse Diode (FRED)

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------------------|---|-----------------------|------|------------------------|
| | | Min. | Typ. | Max. |
| V_F | $I_F = 20\text{A}, V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$ | | | 3.0 V 2.8 V |
| I_{RM} t_{rr} | $I_F = 20\text{A}, -di_F/dt = 750\text{A}/\mu\text{s}, V_R = 800\text{V}$ $V_{GE} = 0\text{V}$ | | 19 | A |
| | | | 70 | ns |
| R_{thJC} | | | | 0.9 $^\circ\text{C/W}$ |

- Notes:
- Switching Times May Increase for V_{CE} (Clamp) $> 0.5 \cdot V_{CES}$, Higher T_J or Increased R_G .
 - Pulse Test, $t \leq 300\mu\text{s}$; Duty Cycle, $d \leq 2\%$.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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

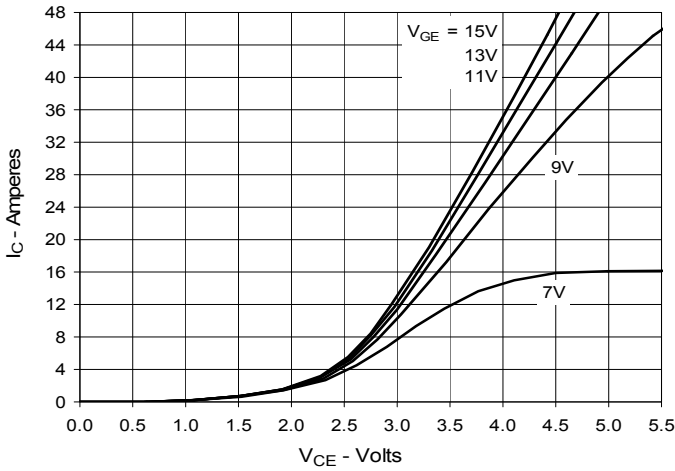


Fig. 2. Extended Output Characteristics @ 25°C

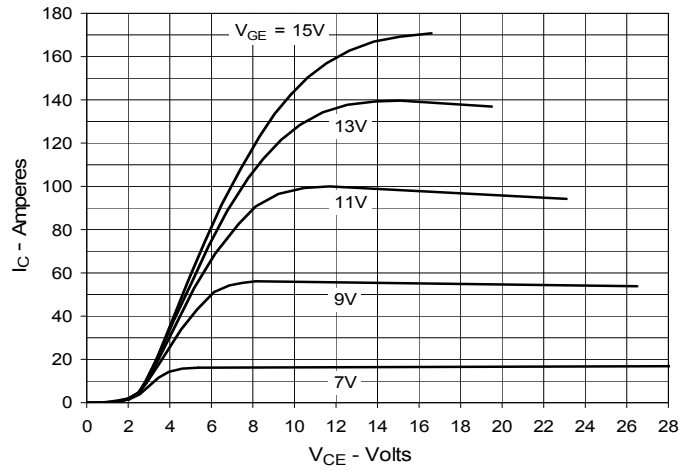


Fig. 3. Output Characteristics @ 125°C

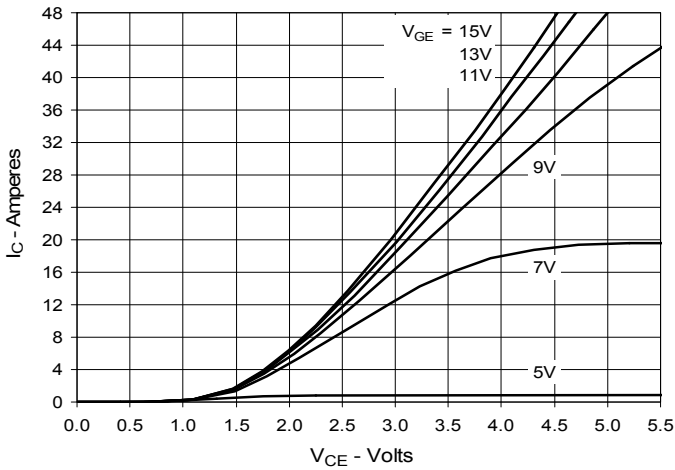


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

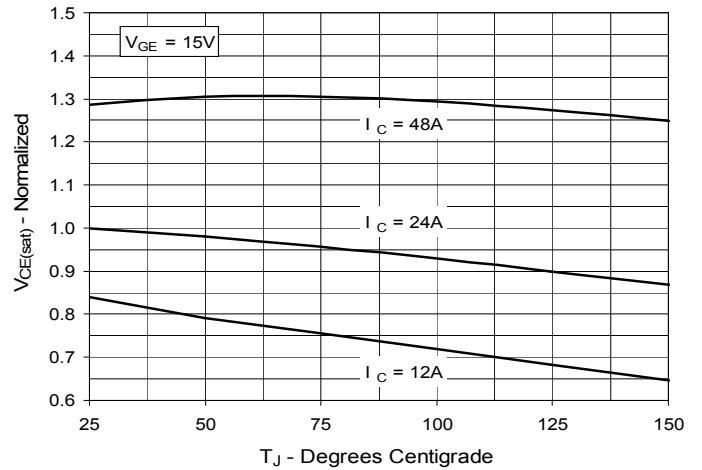


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

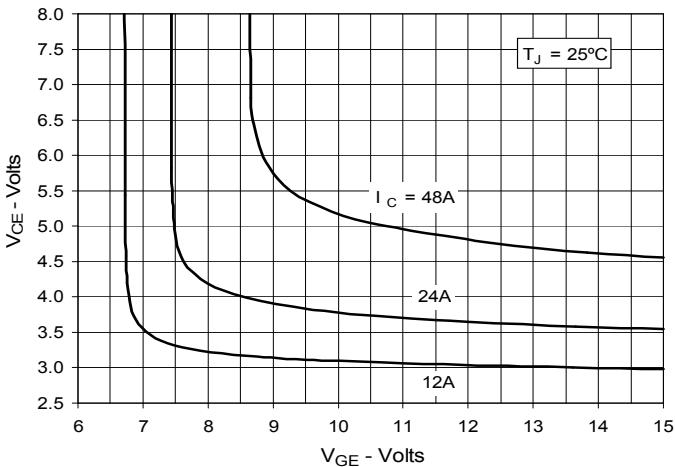


Fig. 6. Input Admittance

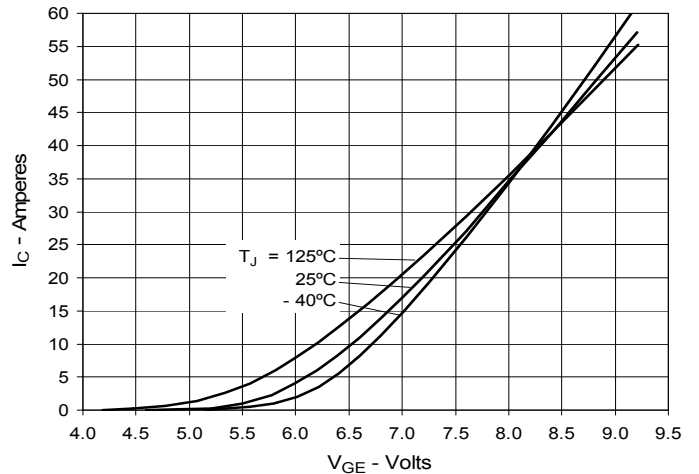


Fig. 7. Transconductance

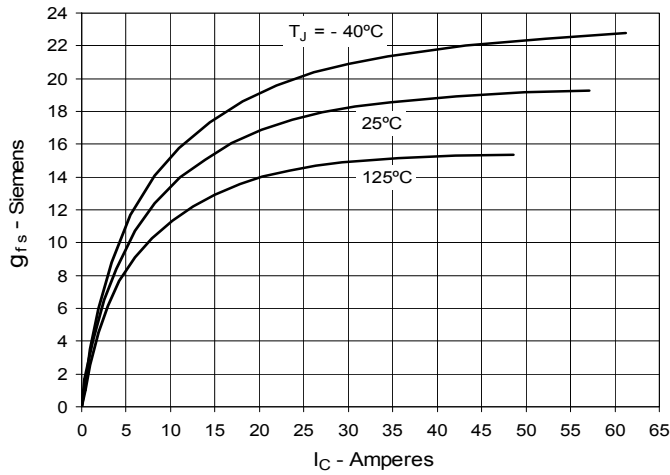


Fig. 8. Gate Charge

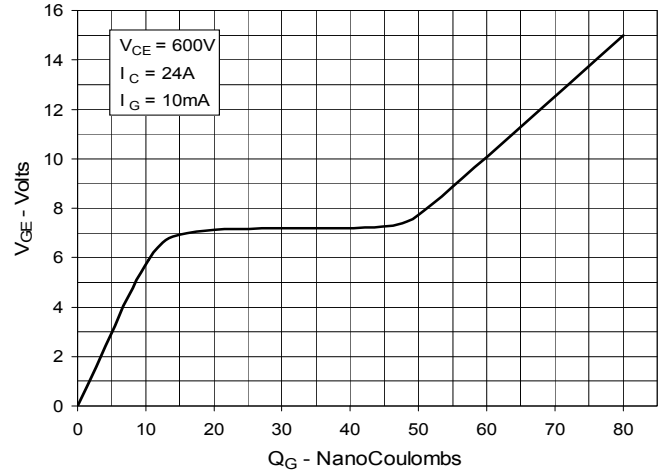


Fig. 9. Capacitance

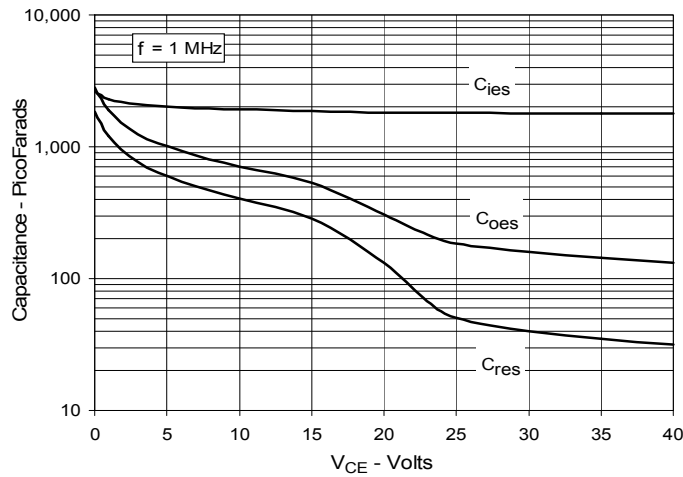


Fig. 10. Reverse-Bias Safe Operating Area

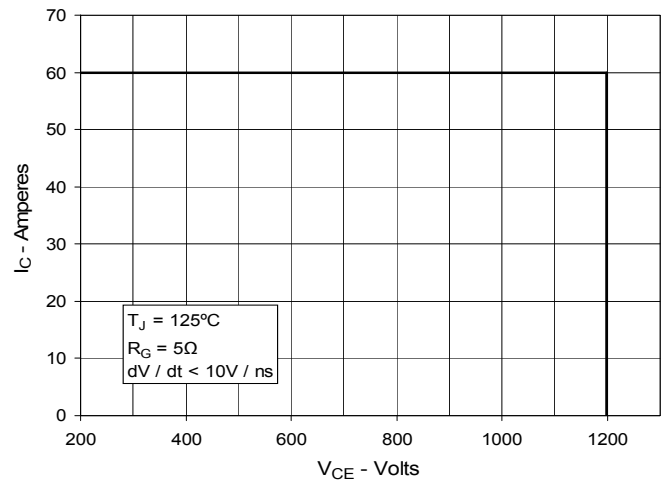
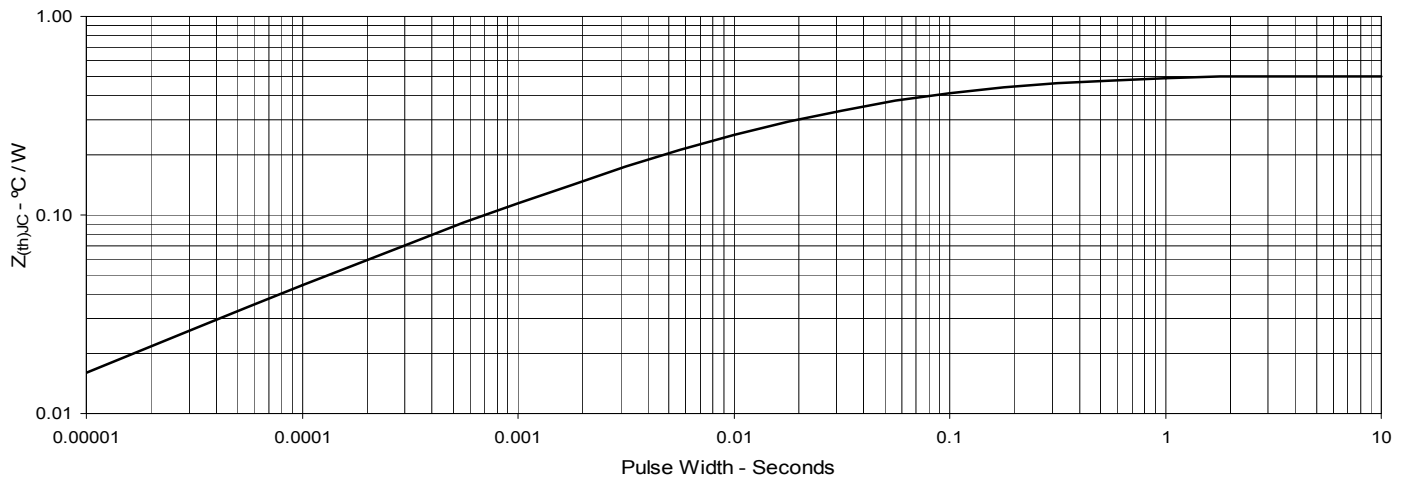


Fig. 11. Maximum Transient Thermal Impedance



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

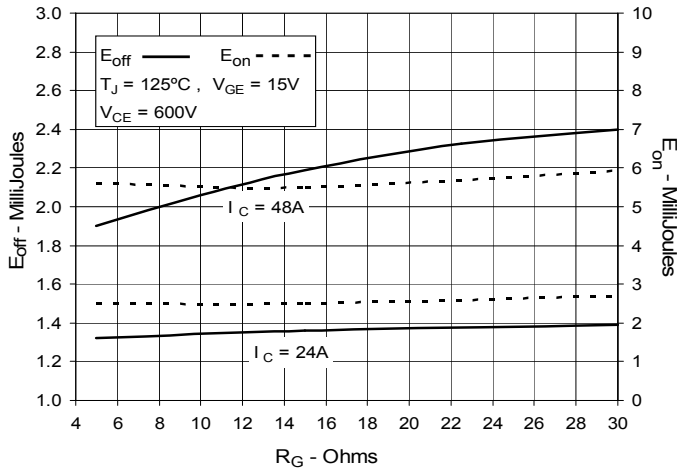
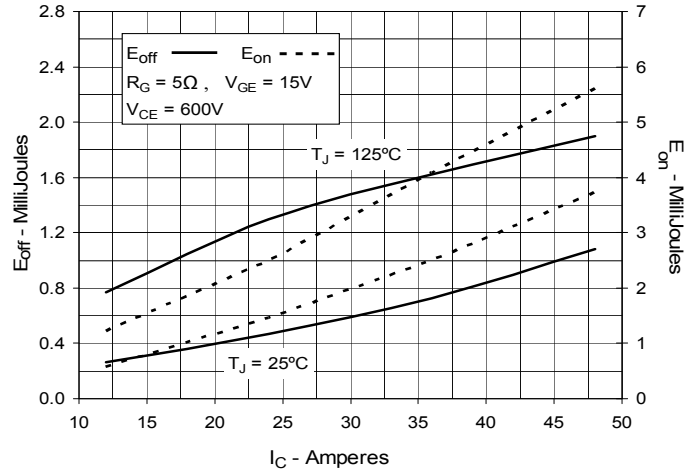
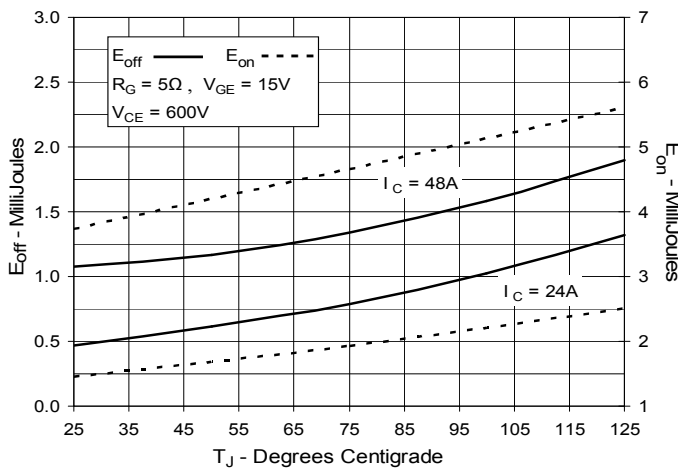
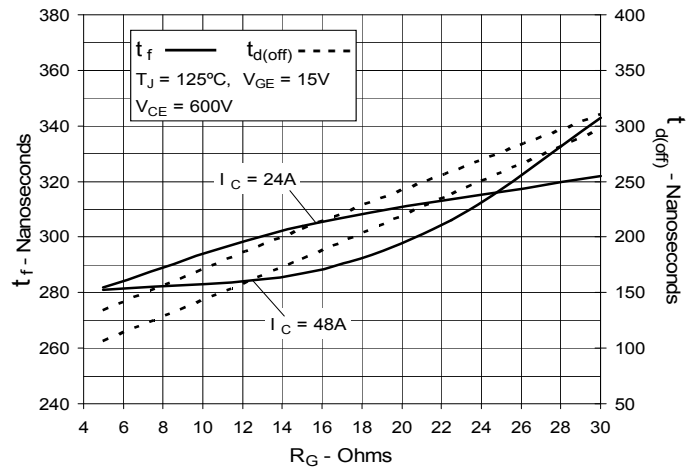
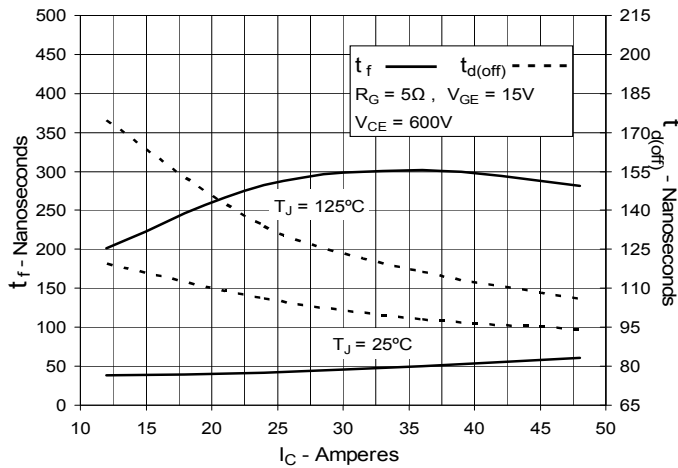
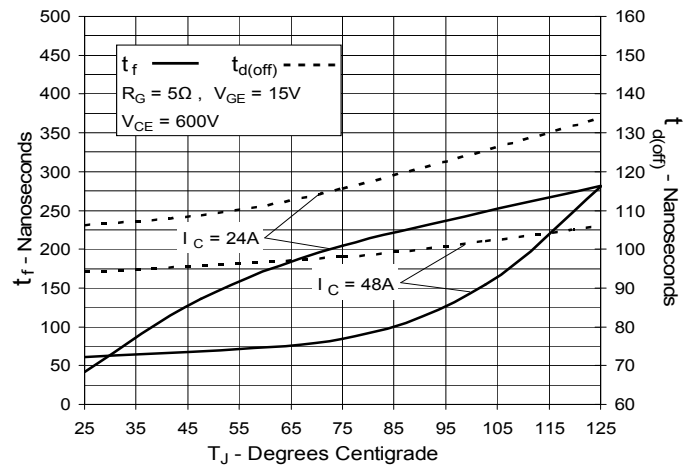
**Fig. 12. Inductive Switching
Energy Loss vs. Gate Resistance**

**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

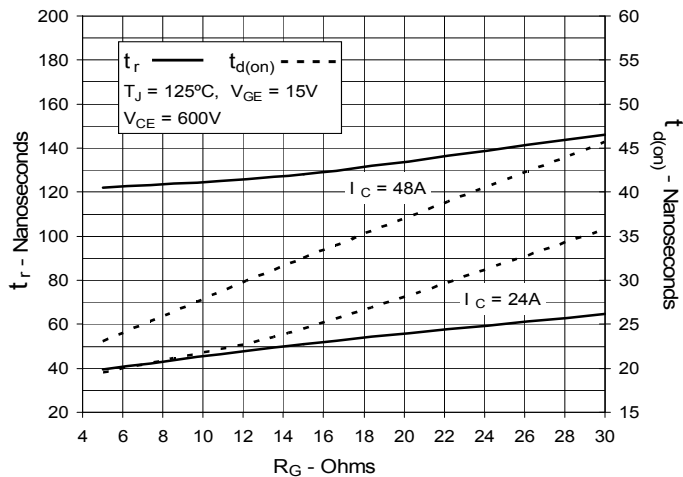


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

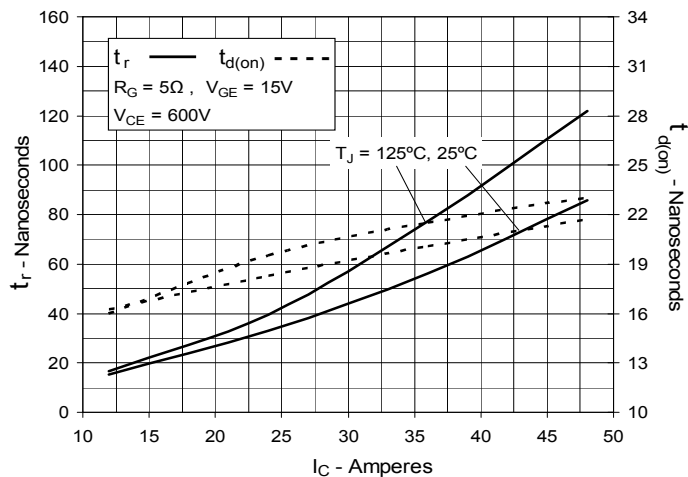


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

