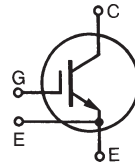


1200V XPT™ IGBTs
GenX3™
IXYN120N120C3

 High-Speed IGBTs
 for 20-50 kHz Switching


$$V_{CES} = 1200V$$

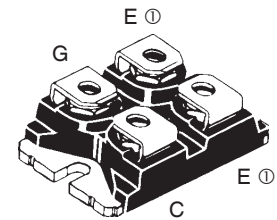
$$I_{C110} = 120A$$

$$V_{CE(sat)} \leq 3.20V$$

$$t_{fi(typ)} = 96ns$$

SOT-227B, miniBLOC

E153432


 G = Gate, C = Collector, E = Emitter
 ① either emitter terminal can be used as
 Main or Kelvin Emitter

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|---|---|------------|
| V_{CES} | $T_J = 25^\circ C$ to $175^\circ C$ | 1200 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $175^\circ C$, $R_{GE} = 1M\Omega$ | 1200 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ (Chip Capability) | 240 | A |
| I_{LRMS} | Terminal Current Limit | 200 | A |
| I_{C110} | $T_C = 110^\circ C$ | 120 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 700 | A |
| I_A | $T_C = 25^\circ C$ | 60 | A |
| E_{AS} | $T_C = 25^\circ C$ | 2 | J |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 150^\circ C$, $R_G = 1\Omega$ Clamped Inductive Load | $I_{CM} = 240$ $V_{CE} \leq V_{CES}$ | A |
| P_C | $T_C = 25^\circ C$ | 1200 | W |
| T_J | | -55 ... +175 | $^\circ C$ |
| T_{JM} | | 175 | $^\circ C$ |
| T_{stg} | | -55 ... +175 | $^\circ C$ |
| V_{ISOL} | 50/60Hz | $t = 1min$ | 2500 V~ |
| | $I_{ISOL} \leq 1mA$ | $t = 1s$ | 3000 V~ |
| M_d | Mounting Torque | 1.5/13 | Nm/lb.in |
| | Terminal Connection Torque | 1.3/11.5 | Nm/lb.in |
| Weight | | 30 | g |

Features

- Optimized for Low Switching Losses
- Square RBSOA
- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- Positive Thermal Coefficient of $V_{ce(sat)}$
- Avalanche Rated
- High Current Handling Capability

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} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 1200 | | V |
| $V_{GE(th)}$ | $I_C = 500\mu A$, $V_{CE} = V_{GE}$ | 3.0 | | V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 150^\circ C$ | | | 25 μA |
| | | | | 1.5 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = I_{C110}$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ C$ | | 2.55 | 3.20 V |
| | | | 3.40 | V |

| 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 | 40 | 68 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 9850 | pF |
| C_{oes} | | | 580 | pF |
| C_{res} | | | 218 | pF |
| $Q_{g(on)}$ | $I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$ | | 412 | nC |
| Q_{ge} | | | 73 | nC |
| Q_{gc} | | | 180 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 1\Omega$ Note 2 | | 35 | ns |
| t_{ri} | | | 77 | ns |
| E_{on} | | | 6.75 | mJ |
| $t_{d(off)}$ | | | 176 | ns |
| t_{fi} | | | 96 | ns |
| E_{off} | | | 5.10 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 1\Omega$ Note 2 | | 33 | ns |
| t_{ri} | | | 72 | ns |
| E_{on} | | | 10.30 | mJ |
| $t_{d(off)}$ | | | 226 | ns |
| t_{fi} | | | 120 | ns |
| E_{off} | | | 7.20 | mJ |
| R_{thJC} | | | 0.125 | $^\circ\text{C}/\text{W}$ |
| R_{thCS} | | 0.05 | | $^\circ\text{C}/\text{W}$ |

SOT-227B miniBLOC (IXYN)



| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.240 | 1.255 | 31.50 | 31.88 |
| B | .307 | .323 | 7.80 | 8.20 |
| C | .161 | .169 | 4.09 | 4.29 |
| D | .161 | .169 | 4.09 | 4.29 |
| E | .161 | .169 | 4.09 | 4.29 |
| F | .587 | .595 | 14.91 | 15.11 |
| G | 1.186 | 1.193 | 30.12 | 30.30 |
| H | 1.489 | 1.505 | 37.80 | 38.23 |
| J | .460 | .481 | 11.68 | 12.22 |
| K | .351 | .378 | 8.92 | 9.60 |
| L | .030 | .033 | 0.76 | 0.84 |
| M | .496 | .506 | 12.60 | 12.85 |
| N | .990 | 1.001 | 25.15 | 25.42 |
| O | .078 | .084 | 1.98 | 2.13 |
| P | .195 | .235 | 4.95 | 5.97 |
| Q | 1.045 | 1.059 | 26.54 | 26.90 |
| R | .155 | .174 | 3.94 | 4.42 |
| S | .186 | .191 | 4.72 | 4.85 |
| T | .968 | .987 | 24.59 | 25.07 |
| U | -.002 | .004 | -0.05 | 0.1 |
| V | .130 | .180 | 3.30 | 4.57 |
| W | .780 | .830 | 19.81 | 21.08 |

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, 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.

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 |
| | 4,860,072 | 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 @ $T_J = 25^\circ\text{C}$

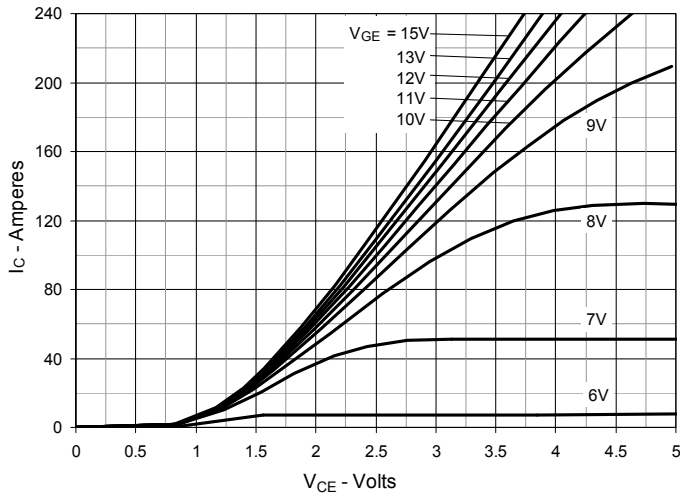


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

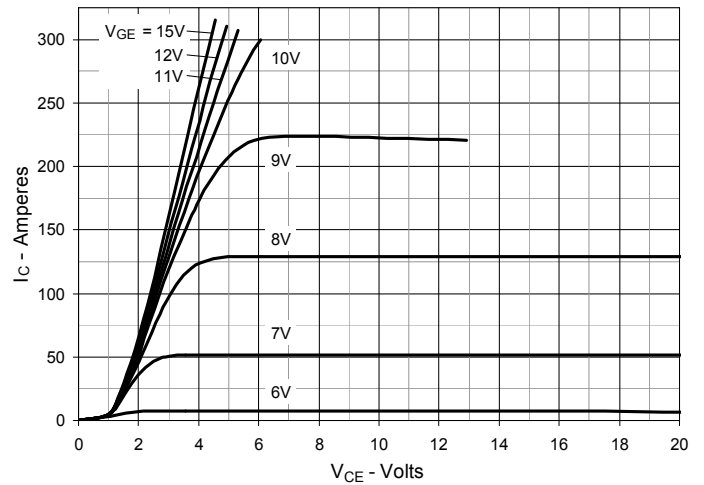


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

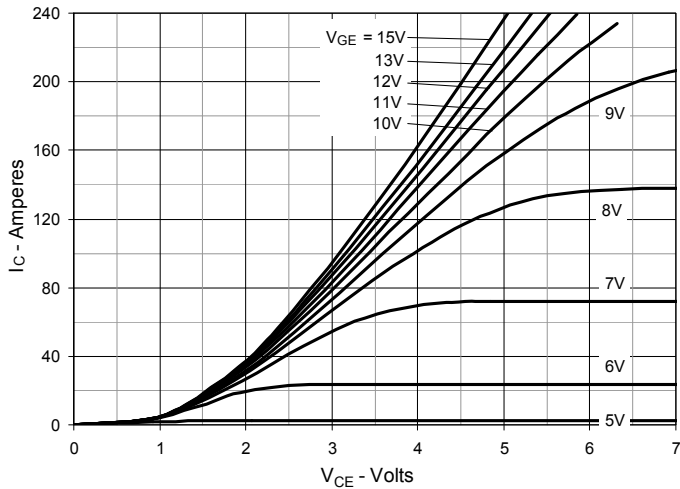


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

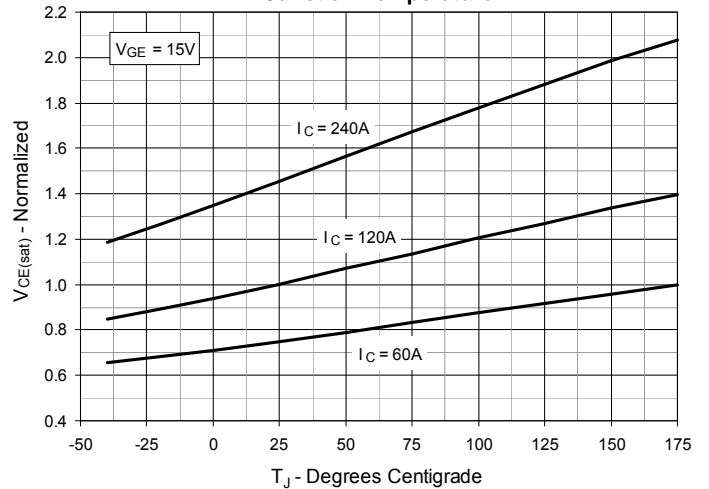


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

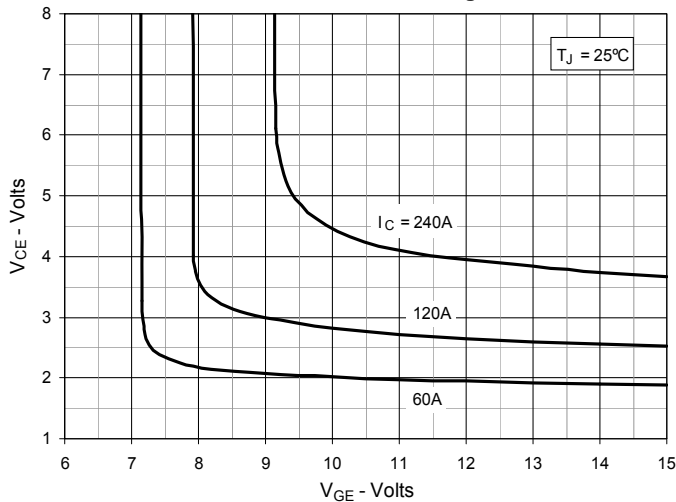


Fig. 6. Input Admittance

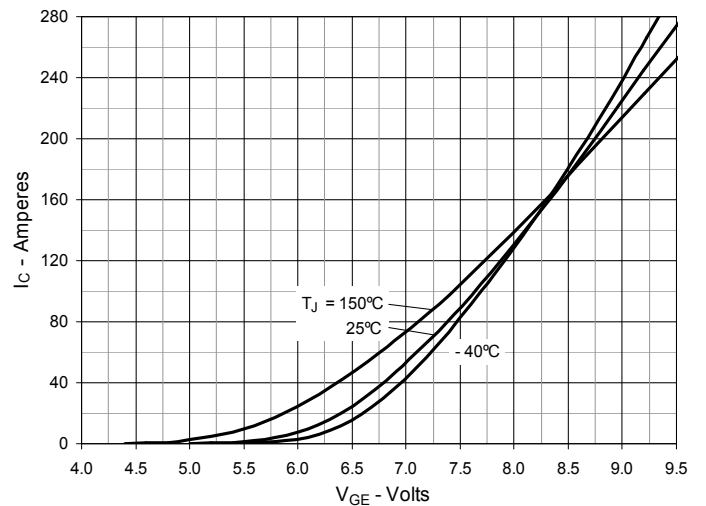


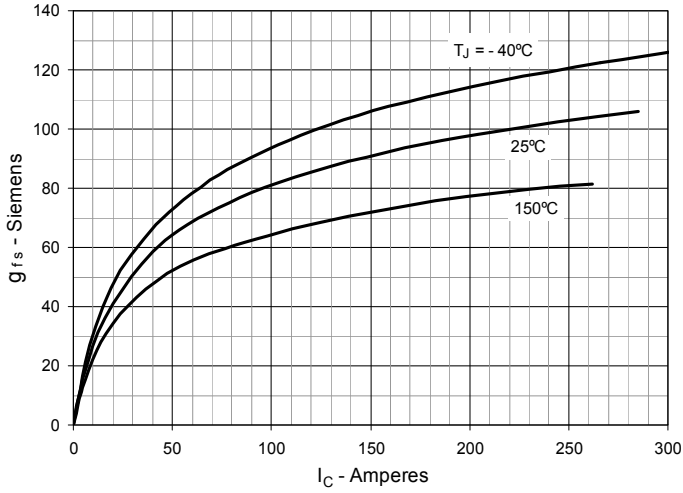
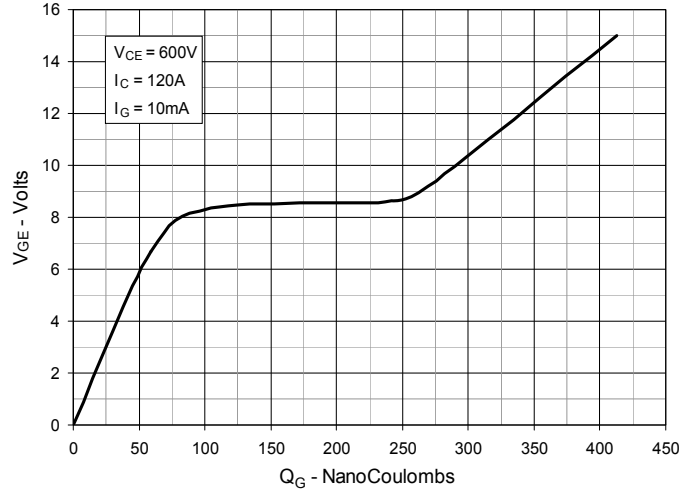
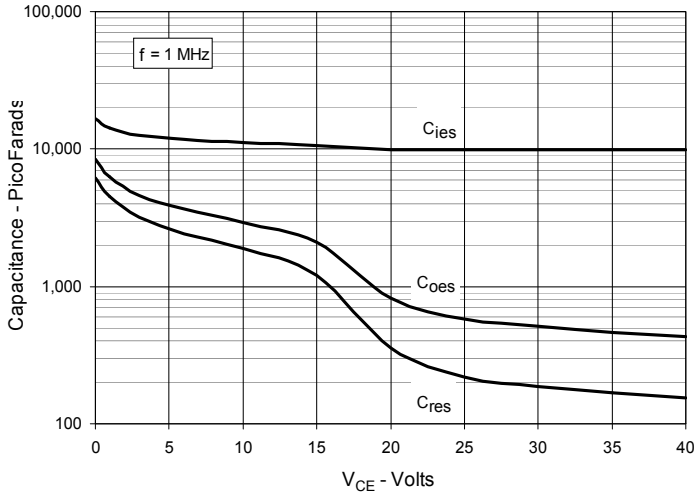
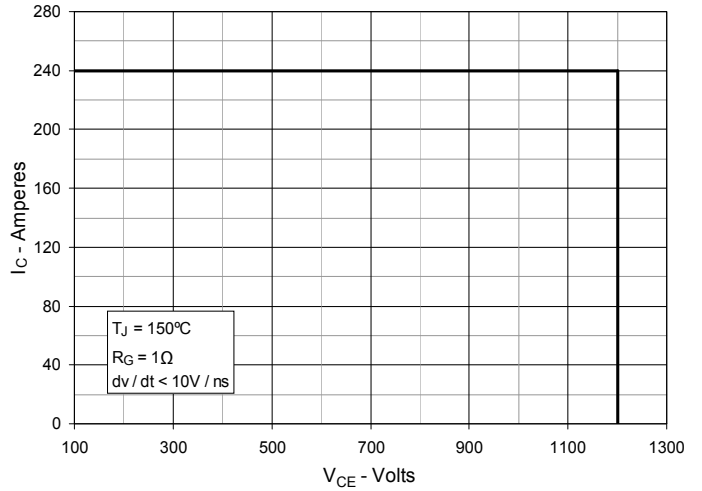
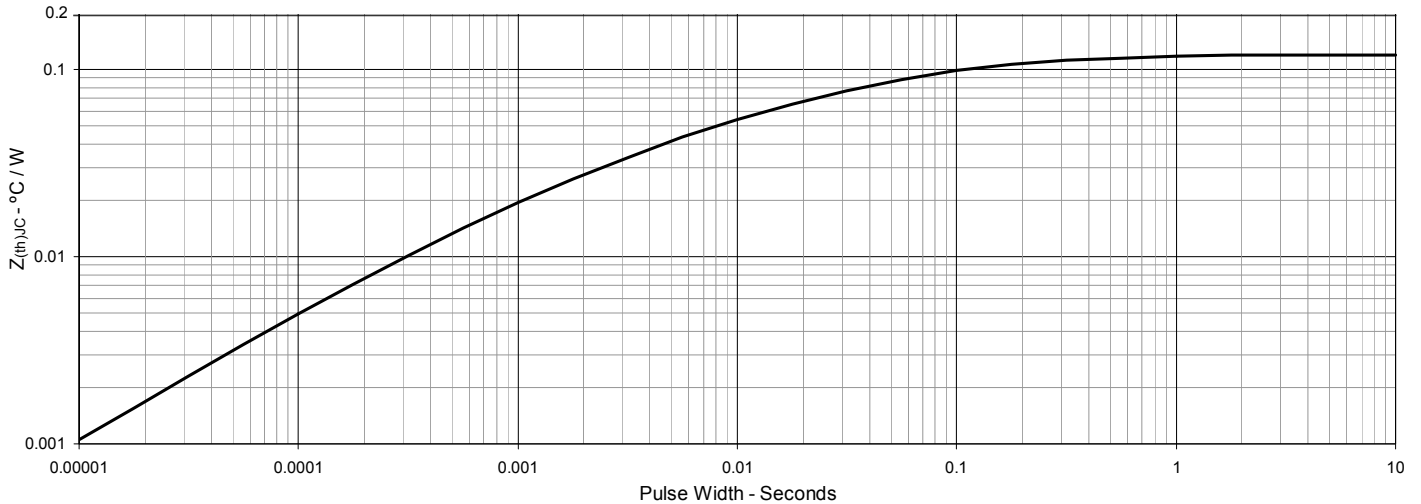
Fig. 7. Transconductance

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

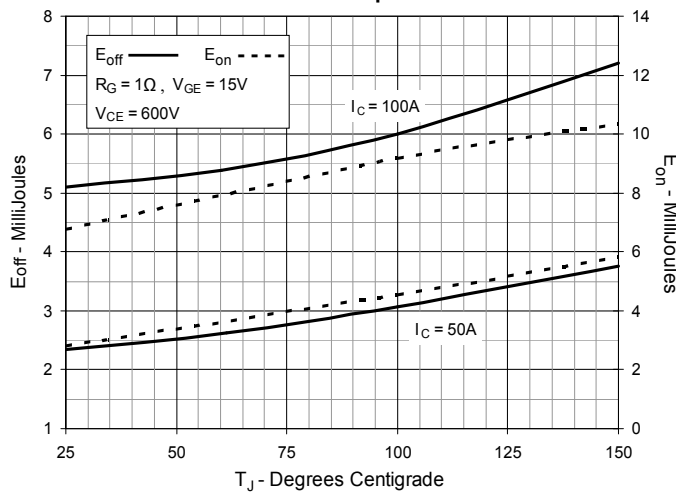
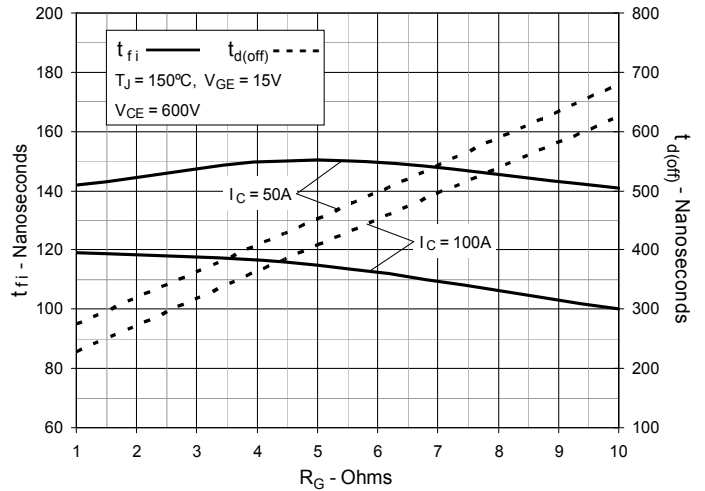
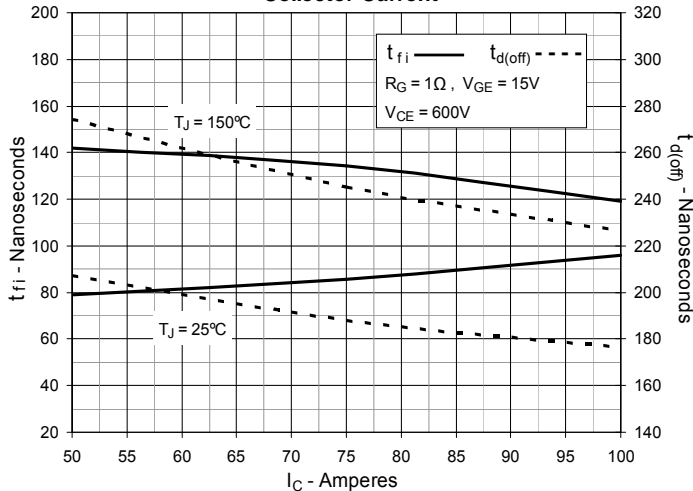
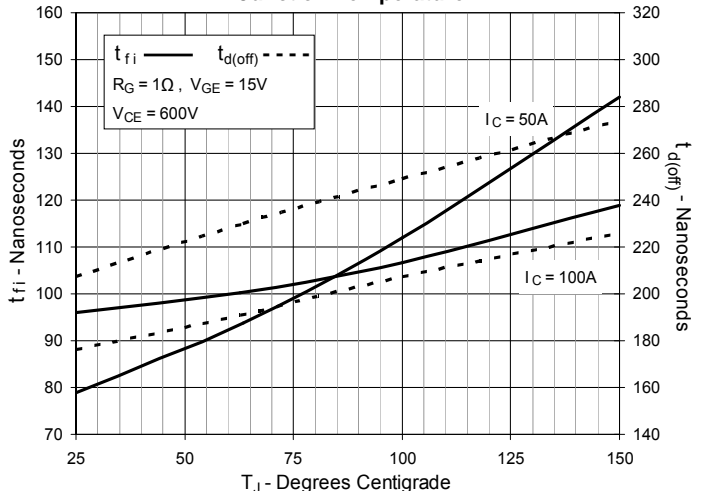
Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

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

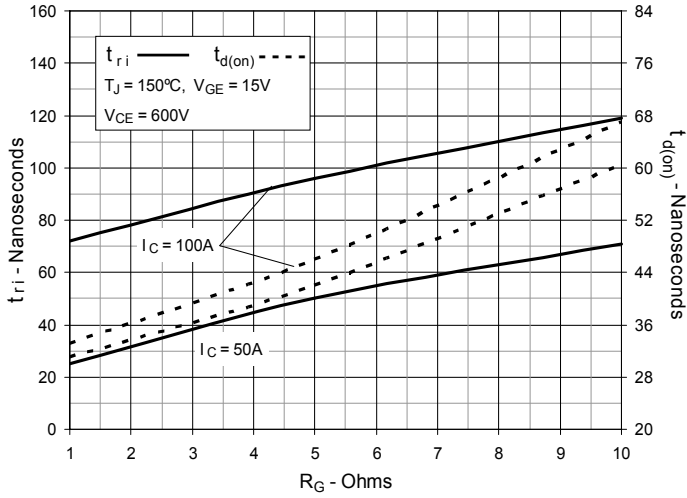


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

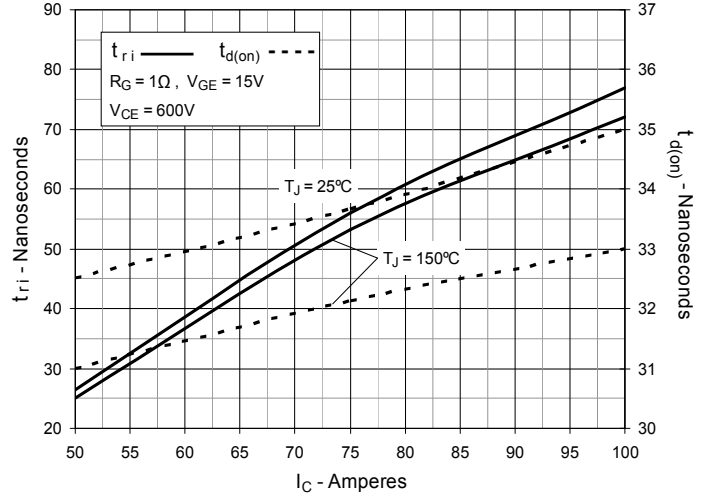


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

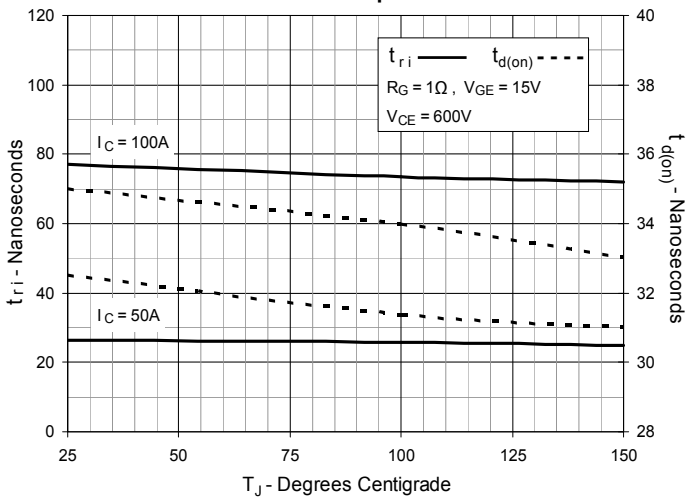
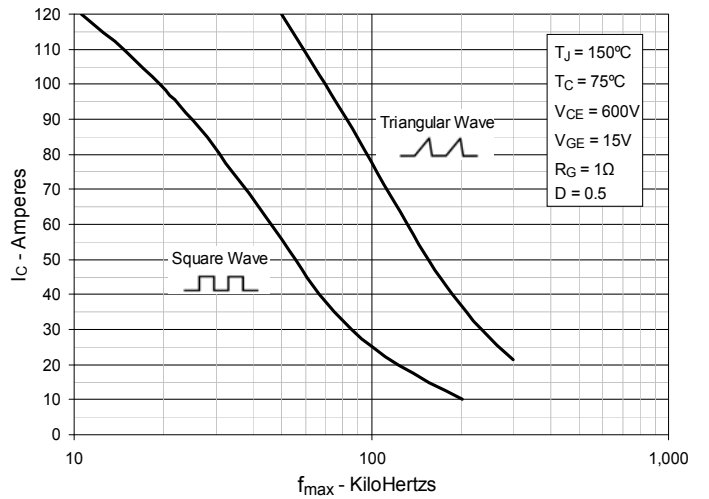


Fig. 21. Maximum Peak Load Current vs. Frequency





Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.