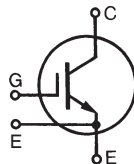


650V XPT™ IGBT GenX3™

IXYN300N65A3

Ultra Low-Vsat PT IGBT

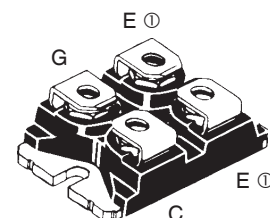


$$\begin{aligned} V_{CES} &= 650V \\ I_{C110} &= 270A \\ V_{CE(sat)} &\leq 1.60V \\ t_{fi(typ)} &= 160ns \end{aligned}$$

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|---|---|--------------------------|
| V_{CES} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$ | 650 | V |
| V_{CGR} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GE} = 1M\Omega$ | 650 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ (Chip Capability) | 470 | A |
| $I_{L(RMS)}$ | External Lead Current Limit | 200 | A |
| I_{C110} | $T_C = 110^\circ\text{C}$ | 270 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, 1\text{ms}$ | 1600 | A |
| I_A | $T_C = 25^\circ\text{C}$ | 100 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 2 | J |
| SSOA (RBSOA) | $V_{GE} = 15V, T_{VJ} = 150^\circ\text{C}, R_G = 1\Omega$ Clamped Inductive Load | $I_{CM} = 600$ $V_{CE} \leq V_{CES}$ | A |
| t_{sc} (SCSOA) | $V_{GE} = 15V, V_{CE} = 360V, T_J = 150^\circ\text{C}$ $R_G = 82\Omega, \text{Non Repetitive}$ | 8 | μs |
| P_C | $T_C = 25^\circ\text{C}$ | 1500 | W |
| T_J | | -55 ... +175 | $^\circ\text{C}$ |
| T_{JM} | | 175 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +175 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60Hz $I_{ISOL} \leq 1\text{mA}$ | $t = 1\text{min}$ $t = 1\text{s}$ | 2500 3000 V~ V~ |
| M_d | Mounting Torque Terminal Connection Torque | 1.5/13 1.3/11.5 | Nm/lb.in Nm/lb.in |
| Weight | | 30 | g |

SOT-227B, miniBLOC

E153432



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

Features

- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- Square RBSOA
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- UPS
- Motor Drives
- SMPS
- Battery Chargers
- Low Frequency Power Inverters

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|--------------|--------------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu\text{A}, V_{GE} = 0V$ | 650 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu\text{A}, V_{CE} = V_{GE}$ | 3.0 | | V |
| I_{CES} | $V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ\text{C}$ | | | 25 μA 1 mA |
| I_{GES} | $V_{CE} = 0V, V_{GE} = \pm 20V$ | | | ± 200 nA |
| $V_{CE(sat)}$ | $I_C = 100A, V_{GE} = 15V, \text{Note 1}$ $T_J = 150^\circ\text{C}$ | | 1.32 1.35 | 1.60 V 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 | 60 | 100 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 14 | nF |
| C_{oes} | | | 836 | pF |
| C_{res} | | | 310 | pF |
| $Q_{g(on)}$ | $I_C = 300\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$ | | 565 | nC |
| Q_{ge} | | | 83 | nC |
| Q_{gc} | | | 230 | nC |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 1\Omega$ Note 2 | | 42 | ns |
| t_{ri} | | | 125 | ns |
| E_{on} | | | 7.8 | mJ |
| $t_{d(off)}$ | | | 190 | ns |
| t_{fi} | | | 160 | ns |
| E_{off} | | | 4.7 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 1\Omega$ Note 2 | | 40 | ns |
| t_{ri} | | | 115 | ns |
| E_{on} | | | 8.8 | mJ |
| $t_{d(off)}$ | | | 260 | ns |
| t_{fi} | | | 175 | ns |
| E_{off} | | | 7.3 | mJ |
| R_{thJC} | | | | 0.10 $^\circ\text{C/W}$ |
| R_{thCS} | | 0.05 | | $^\circ\text{C/W}$ |

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 .

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 | |

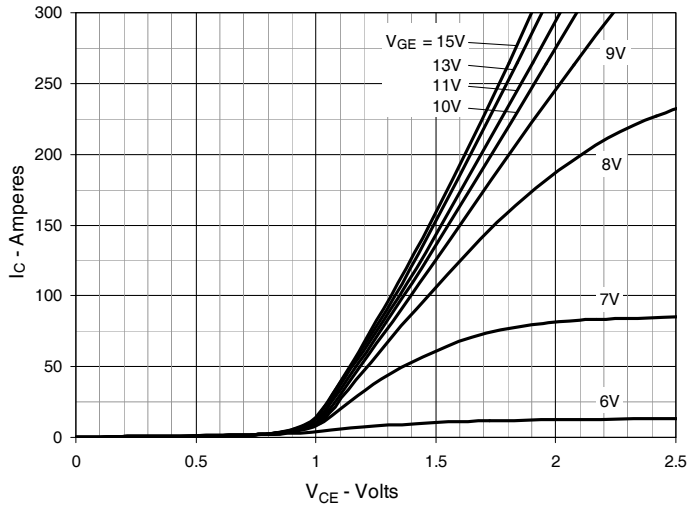
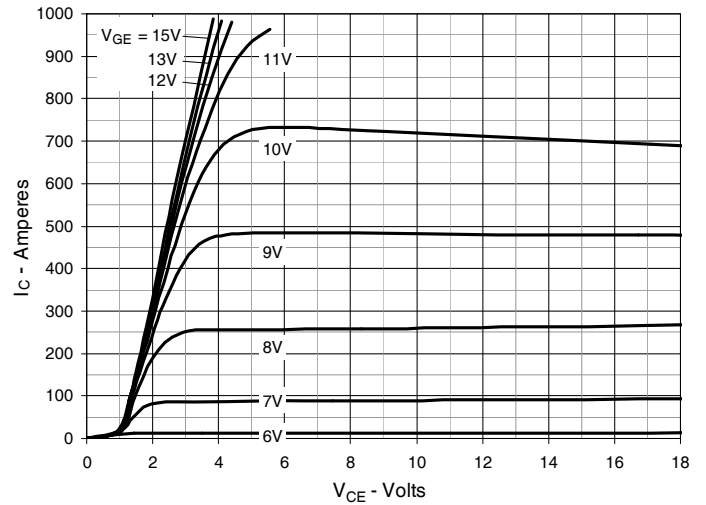
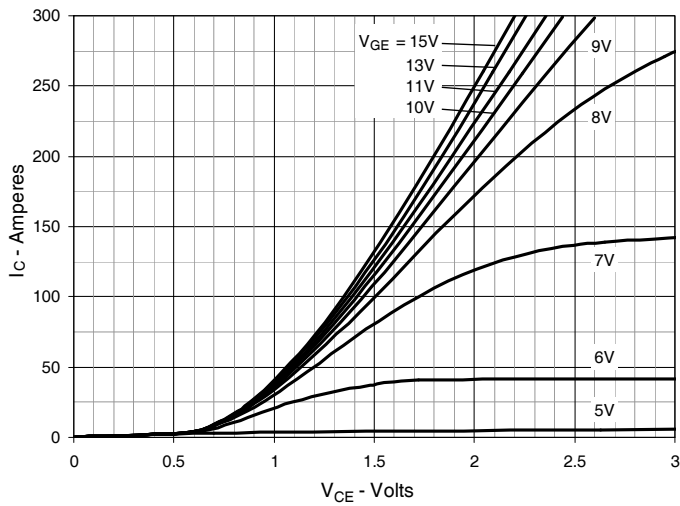
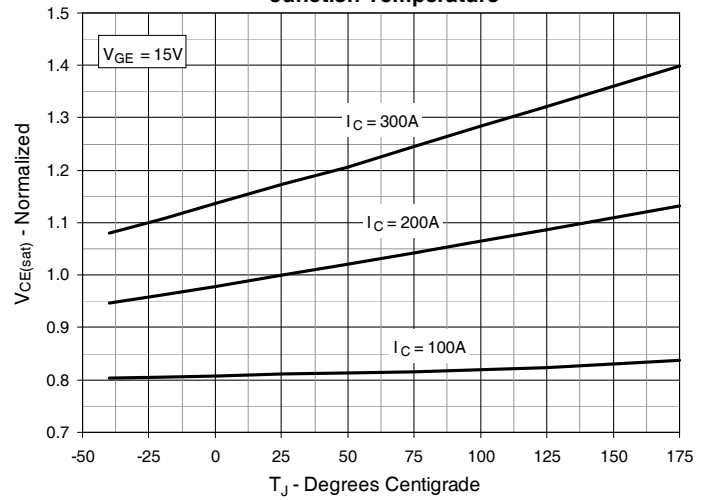
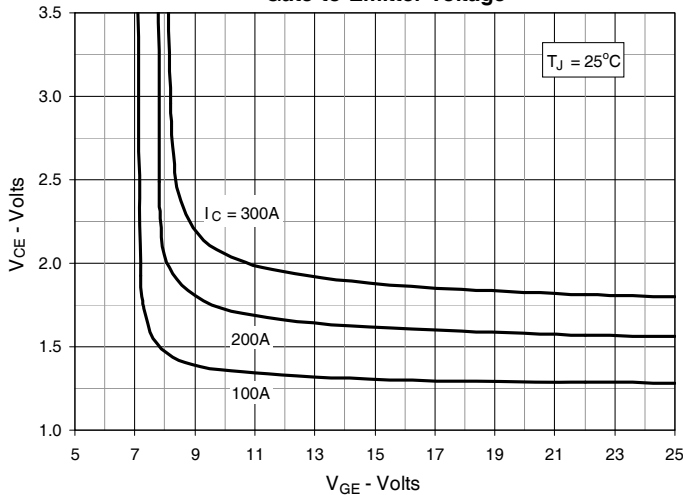
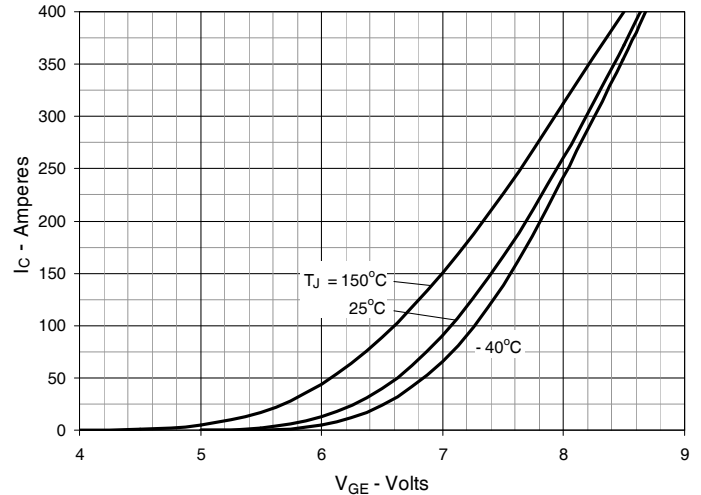
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


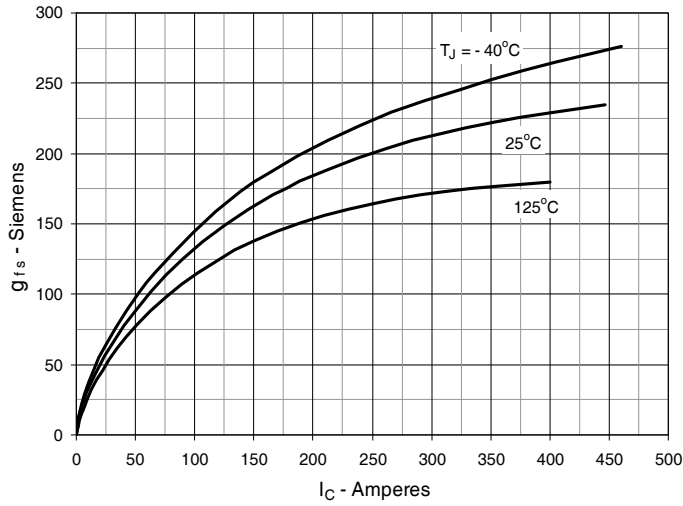
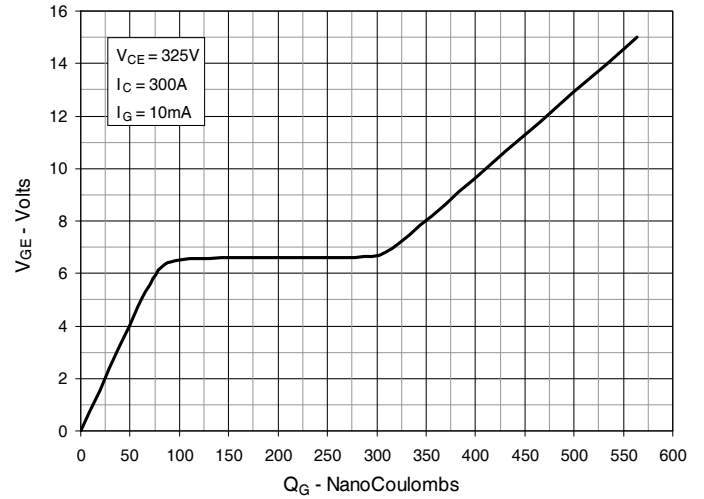
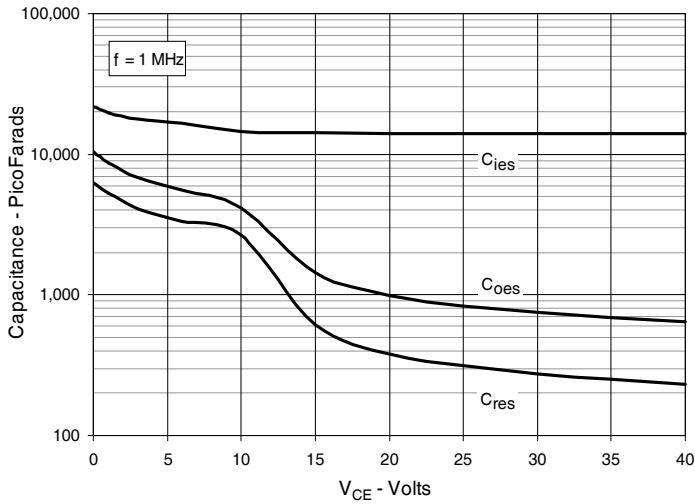
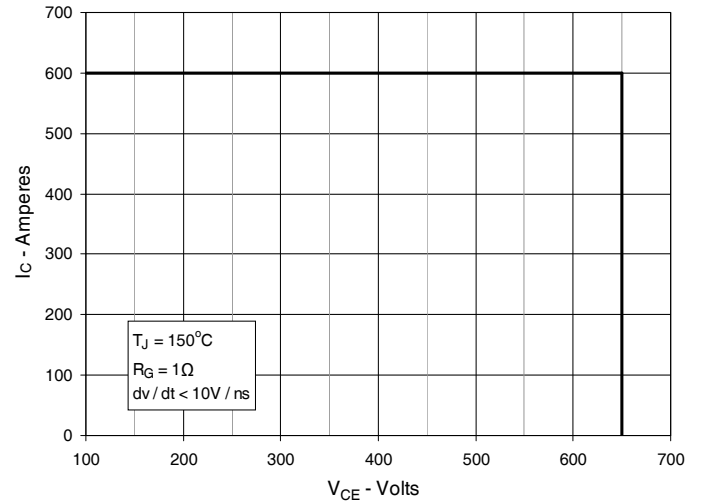
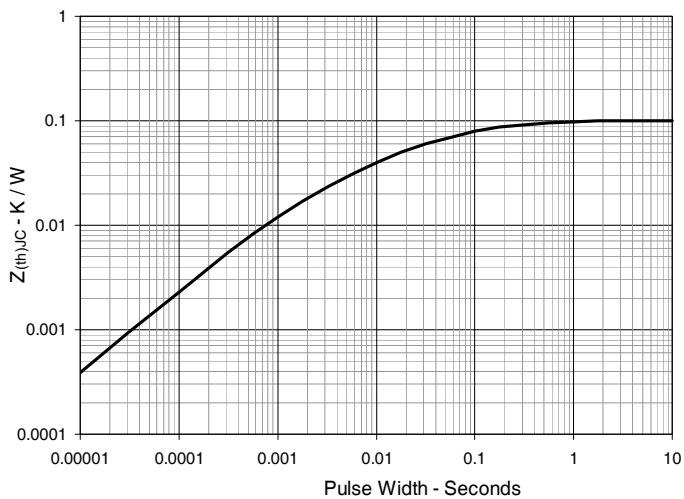
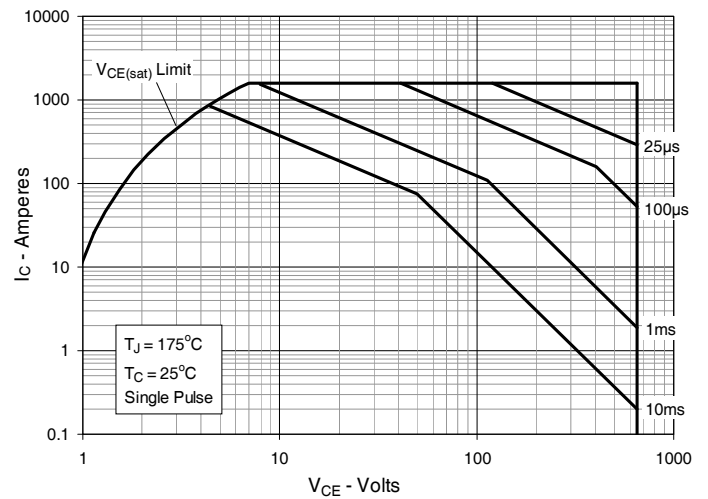
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance

Fig. 12. Forward-Bias Safe Operating Area


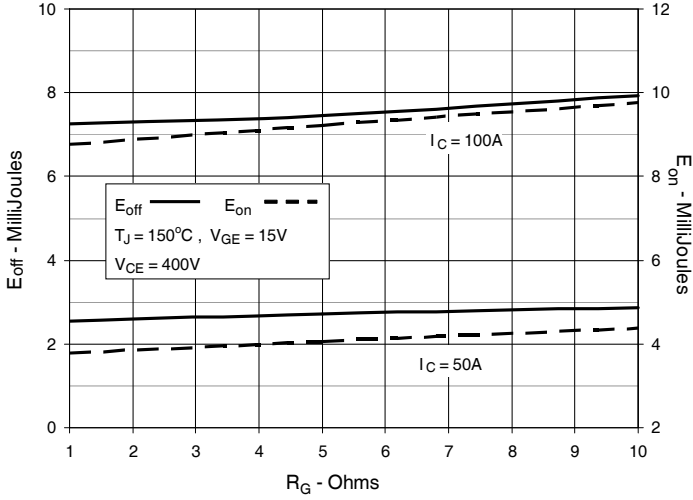
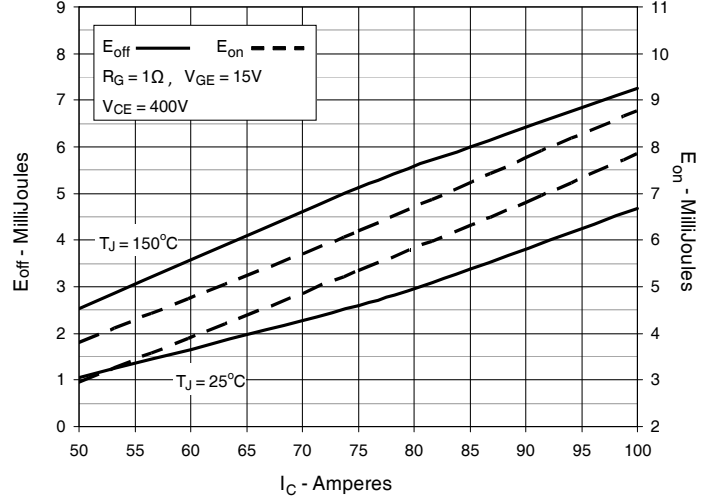
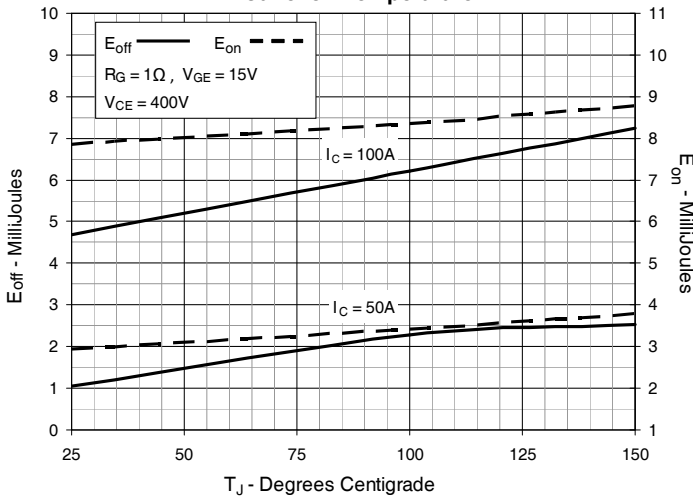
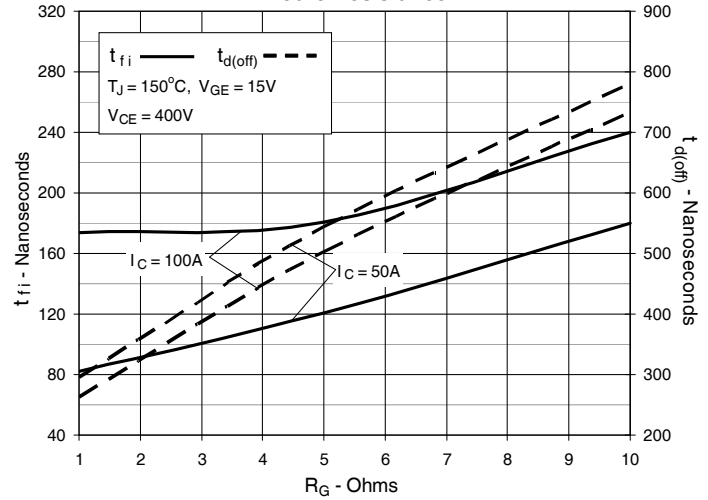
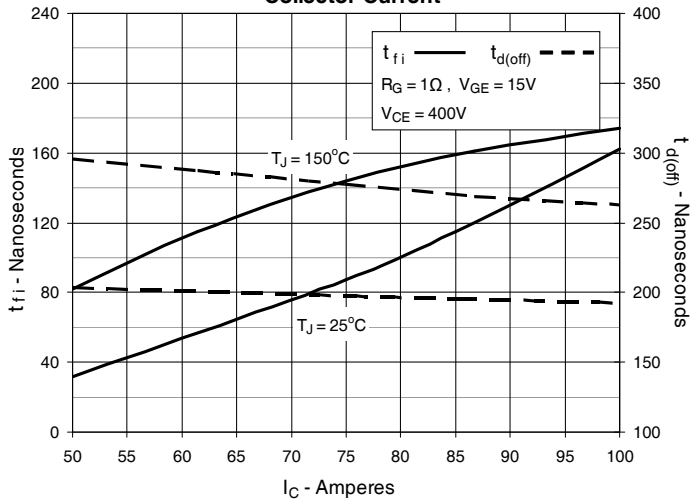
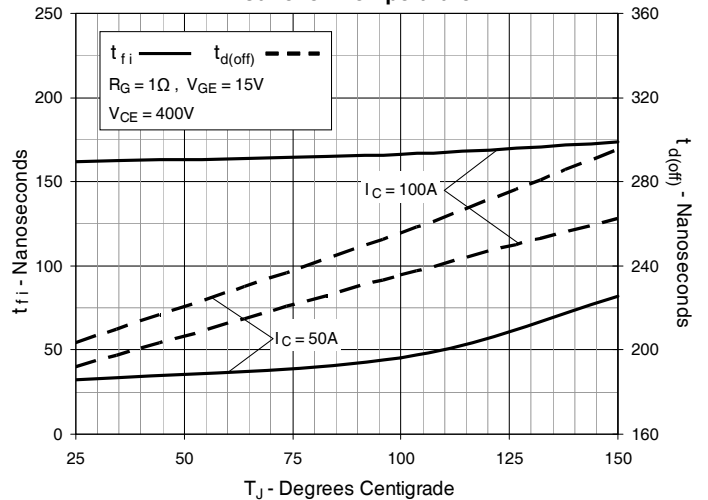
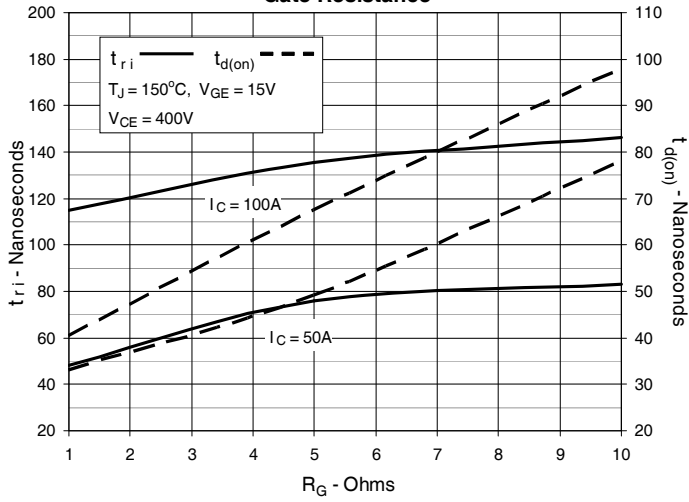
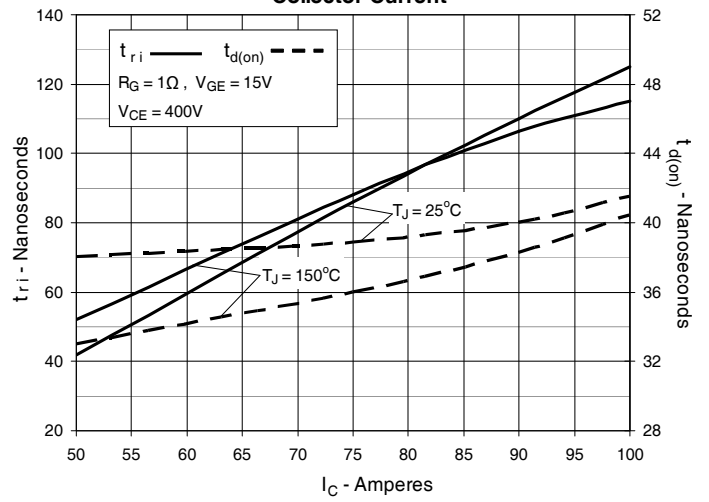
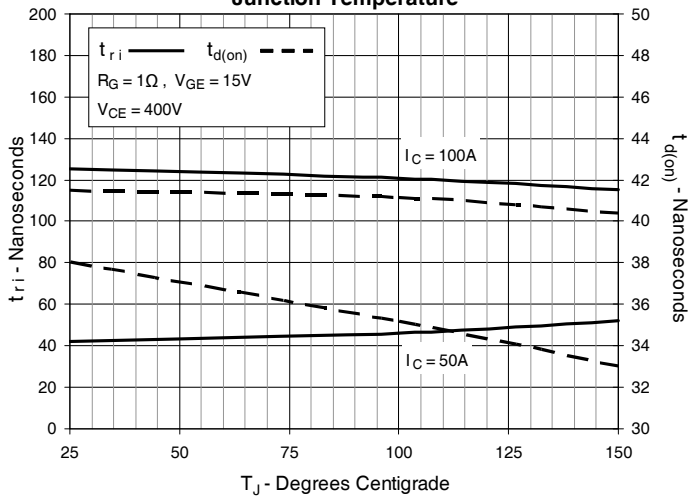
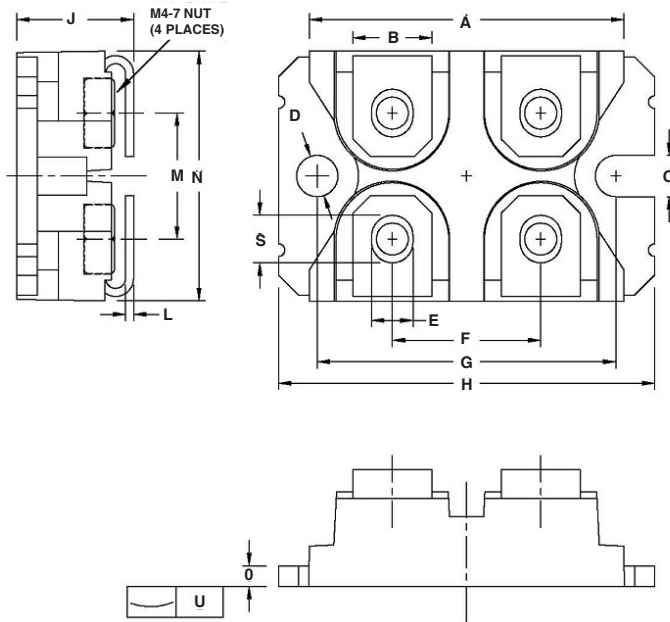
Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

Fig. 14. Inductive Switching Energy Loss vs. Collector Current

Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature


SOT-227 Outline


| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.224 | 1.260 | 31.10 | 32.00 |
| B | .303 | .327 | 7.70 | 8.30 |
| C | .161 | .173 | 4.10 | 4.40 |
| D | .161 | .173 | 4.10 | 4.40 |
| E | .161 | .173 | 4.10 | 4.40 |
| F | .587 | .598 | 14.90 | 15.20 |
| G | 1.181 | 1.201 | 30.00 | 30.50 |
| H | 1.488 | 1.508 | 37.80 | 38.30 |
| J | .461 | .484 | 11.70 | 12.30 |
| L | .030 | .033 | 0.75 | 0.85 |
| M | .492 | .512 | 12.50 | 13.00 |
| N | .984 | 1.004 | 25.00 | 25.50 |
| O | .075 | .087 | 1.90 | 2.20 |
| S | .181 | .193 | 4.60 | 4.90 |
| U | .000 | .005 | 0.00 | 0.13 |

- NUT MATERIAL:
 STANDARD - Low carbon steel with Ni plating.
 OPTIONAL - Brass Nut is available.
 PART NUMBER-BN
- ALL METAL SURFACE ARE PRE NI PLATED EXCEPT TRIM AREA.



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.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.
