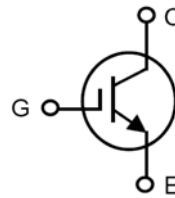


**1200V XPT™  
GenX4™ IGBT**
**IXYH30N120B4**

 High-Speed Low-Vsat PT IGBT  
for up to 5-30kHz Switching


$$V_{CES} = 1200V$$

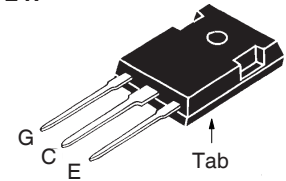
$$I_{C110} = 30A$$

$$V_{CE(sat)} \leq 2.1V$$

$$t_{fi(typ)} = 108ns$$

| 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  | $\pm 20$   | V          |
| $V_{GEM}$                     | Transient   | $\pm 30$   | V          |
| $I_{C25}$                     | $T_C = 25^\circ C$  | 100  | A          |
| $I_{C110}$                    | $T_C = 110^\circ C$   | 30   | A          |
| $I_{CM}$                      | $T_C = 25^\circ C$ , 1ms  | 174  | A          |
| <b>SSOA</b><br><b>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 150^\circ C$ , $R_G = 5\Omega$<br>Clamped Inductive Load | $I_{CM} = 60$<br>$V_{CE} \leq 0.8 \cdot V_{CES}$ | A          |
| $P_C$                         | $T_C = 25^\circ C$  | 500  | W          |
| $T_J$                         |   | -55 ... +175                                     | $^\circ C$ |
| $T_{JM}$                      |   | 175  | $^\circ C$ |
| $T_{stg}$                     |   | -55 ... +175                                     | $^\circ C$ |
| $T_L$                         | Maximum Lead Temperature for Soldering  | 300  | $^\circ C$ |
| $T_{SOLD}$                    | 1.6 mm (0.062in.) from Case for 10s   | 260  | $^\circ C$ |
| $M_d$                         | Mounting Torque   | 1.13/10  | Nm/lb.in.  |
| <b>Weight</b>                 |   | 6  | g          |

TO-247



G = Gate      C = Collector  
E = Emitter    Tab = Collector

**Features**

- Optimized for Low Conduction Switching Losses
- Positive Thermal Coefficient of  $V_{ce(sat)}$
- International Standard Package

**Advantages**

- High Power Density
- Low Gate Drive Requirement

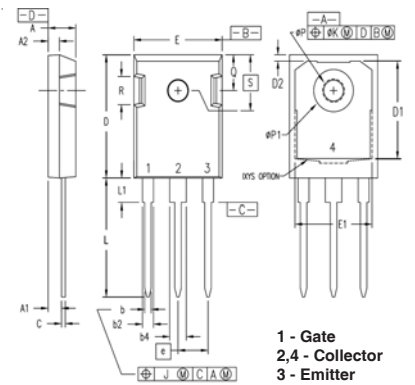
**Applications**

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

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |            |                           |
|---------------|---|-----------------------|------------|---------------------------|
|               |   | Min.                  | Typ.       | Max.                      |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                      | 1200                  |            | V                         |
| $V_{GE(th)}$  | $I_C = 250\mu A$ , $V_{CE} = V_{GE}$                                  | 4.0                   |            | 6.5 V                     |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 150^\circ C$             |                       |            | 10 $\mu A$<br>500 $\mu A$ |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                    |                       |            | $\pm 100$ nA              |
| $V_{CE(sat)}$ | $I_C = 25A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 150^\circ C$          |                       | 1.8<br>2.2 | 2.1 V<br>V                |

| Symbol Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) |   | Characteristic Values |      |                           |
|--|---|-----------------------|------|---------------------------|
|  |   | Min.                  | Typ. | Max.                      |
| $g_{fs}$   | $I_C = 25\text{A}, V_{CE} = 10\text{V}$ , Note 1  | 9.0                   | 15.5 | S                         |
| $C_{ies}$  | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$  |                       | 1140 | pF                        |
| $C_{oes}$  |   |                       | 70   | pF                        |
| $C_{res}$  |   |                       | 42   | pF                        |
| $Q_{g(on)}$  | $I_C = 25\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$   |                       | 58   | nC                        |
| $Q_{ge}$   |   |                       | 9    | nC                        |
| $Q_{gc}$   |   |                       | 25   | nC                        |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 25\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 5\Omega$<br>Note 2  |                       | 20   | ns                        |
| $t_{ri}$   |   |                       | 60   | ns                        |
| $E_{on}$   |   |                       | 4.4  | mJ                        |
| $t_{d(off)}$   |   |                       | 245  | ns                        |
| $t_{fi}$   |   |                       | 108  | ns                        |
| $E_{off}$  |   |                       | 2.6  | mJ                        |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 25\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 5\Omega$<br>Note 2 |                       | 17   | ns                        |
| $t_{ri}$   |   |                       | 40   | ns                        |
| $E_{on}$   |   |                       | 5.4  | mJ                        |
| $t_{d(off)}$   |   |                       | 290  | ns                        |
| $t_{fi}$   |   |                       | 190  | ns                        |
| $E_{off}$  |   |                       | 4.0  | mJ                        |
| $R_{thJC}$   |   |                       | 0.30 | $^\circ\text{C}/\text{W}$ |
| $R_{thCS}$   |   | 0.21                  |      | $^\circ\text{C}/\text{W}$ |

TO-247 (IXYH) Outline



| SYM       | INCHES   |      | MILLIMETERS |       |
|-----------|----------|------|-------------|-------|
|           | MIN      | MAX  | MIN         | MAX   |
| A         | .190     | .205 | 4.83        | 5.21  |
| A1        | .090     | .100 | 2.29        | 2.54  |
| A2        | .075     | .085 | 1.91        | 2.16  |
| b         | .045     | .055 | 1.14        | 1.40  |
| b2        | .075     | .087 | 1.91        | 2.20  |
| b4        | .115     | .126 | 2.92        | 3.20  |
| C         | .024     | .031 | 0.61        | 0.80  |
| D         | .819     | .840 | 20.80       | 21.34 |
| D1        | .650     | .690 | 16.51       | 17.53 |
| D2        | .035     | .050 | 0.89        | 1.27  |
| E         | .620     | .635 | 15.75       | 16.13 |
| E1        | .545     | .565 | 13.84       | 14.35 |
| e         | .215 BSC |      | 5.45 BSC    |       |
| J         | --       | .010 | --          | 0.25  |
| K         | --       | .025 | --          | 0.64  |
| L         | .780     | .810 | 19.81       | 20.57 |
| L1        | .150     | .170 | 3.81        | 4.32  |
| L2        | .140     | .144 | 3.55        | 3.65  |
| $\phi P1$ | .275     | .290 | 6.99        | 7.37  |
| Q         | .220     | .244 | 5.59        | 6.20  |
| R         | .170     | .190 | 4.32        | 4.83  |
| S         | .242 BSC |      | 6.15 BSC    |       |

Notes:

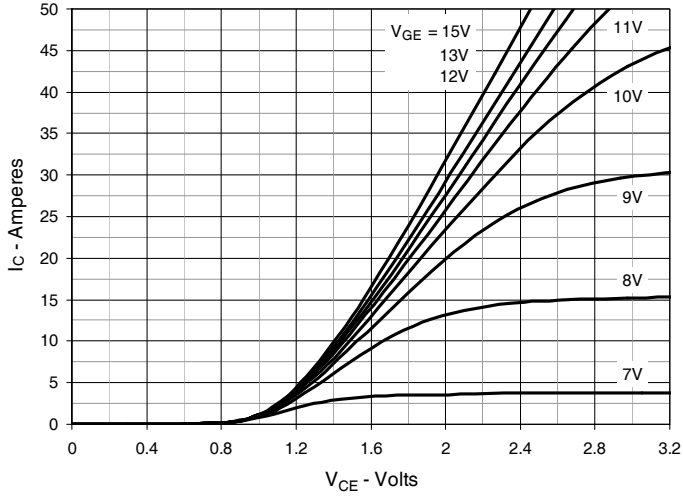
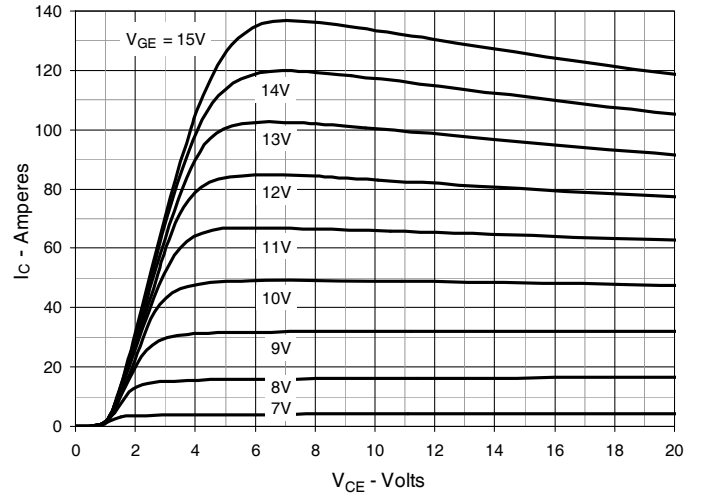
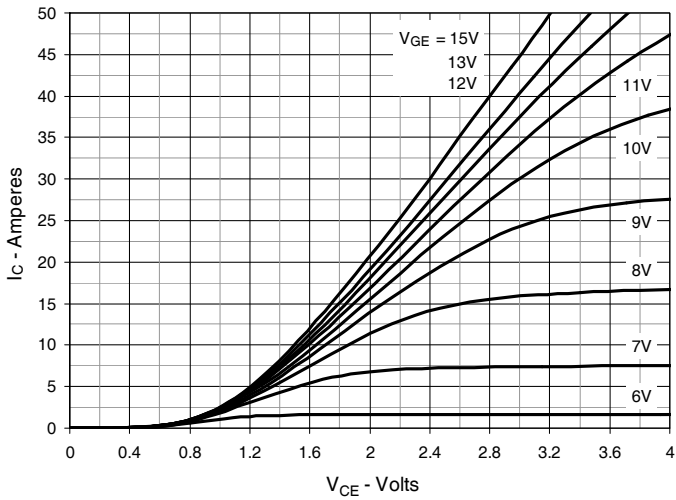
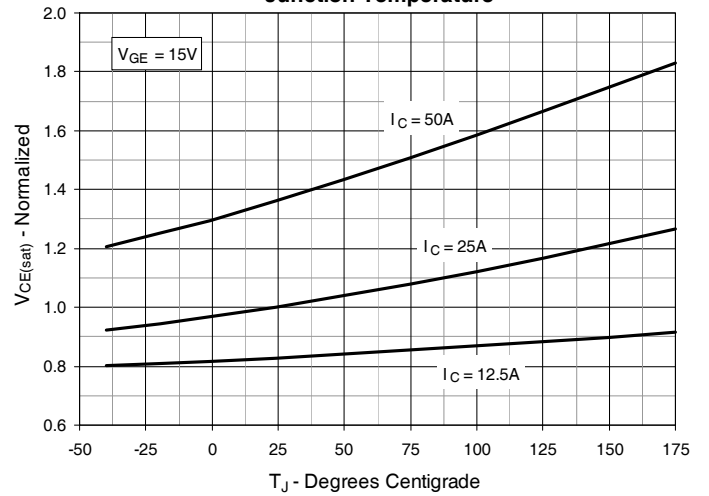
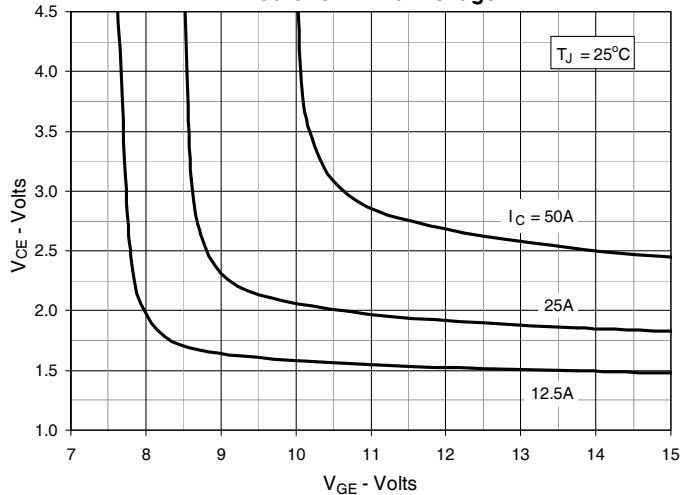
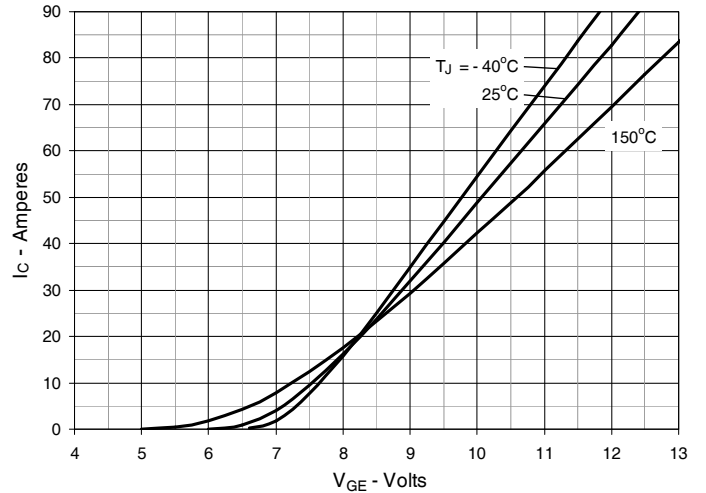
1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
2. Switching times & energy losses may increase for higher  $V_{CE}$  (clamp),  $T_J$  or  $R_G$ .

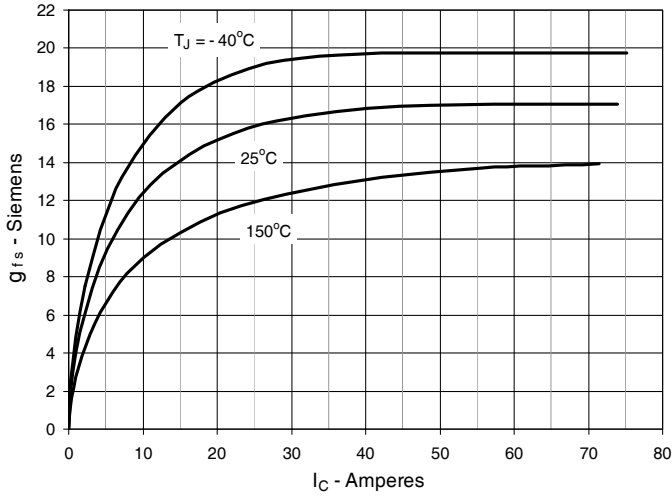
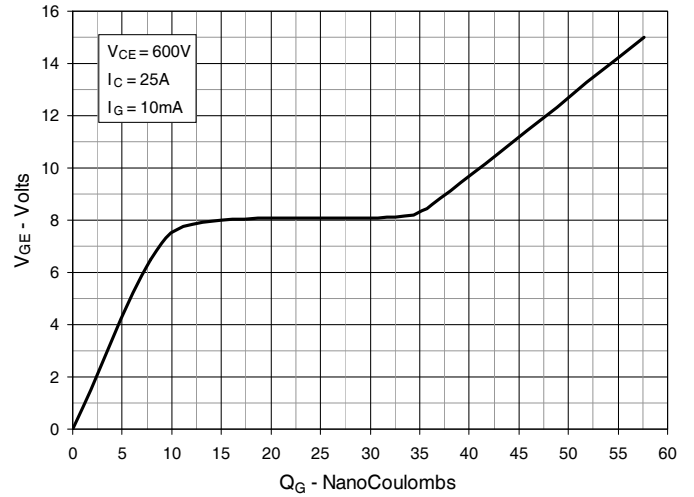
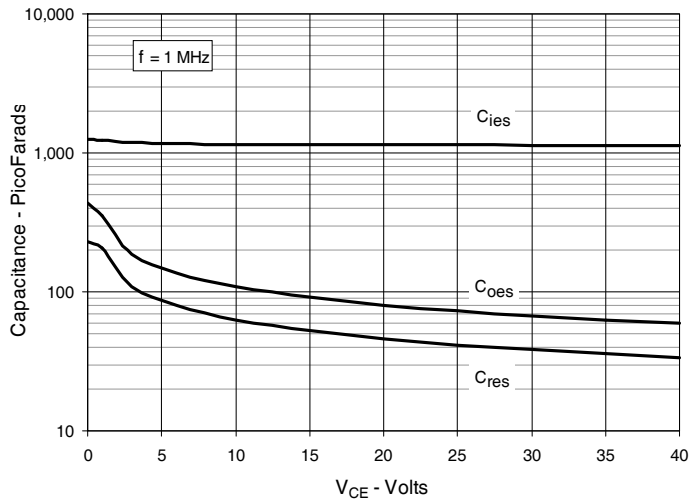
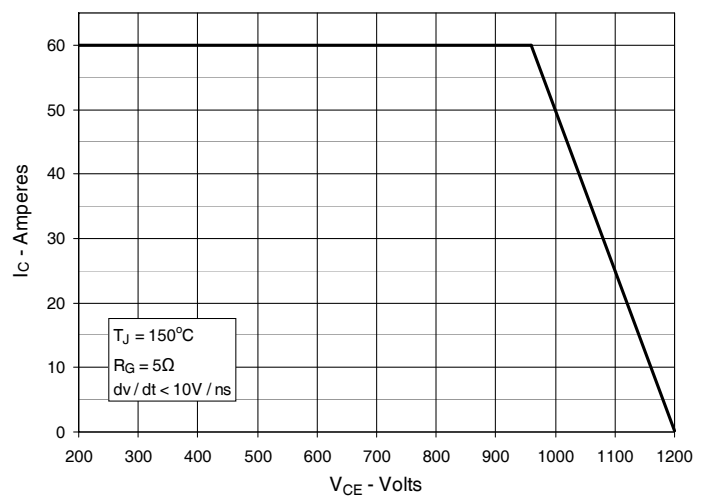
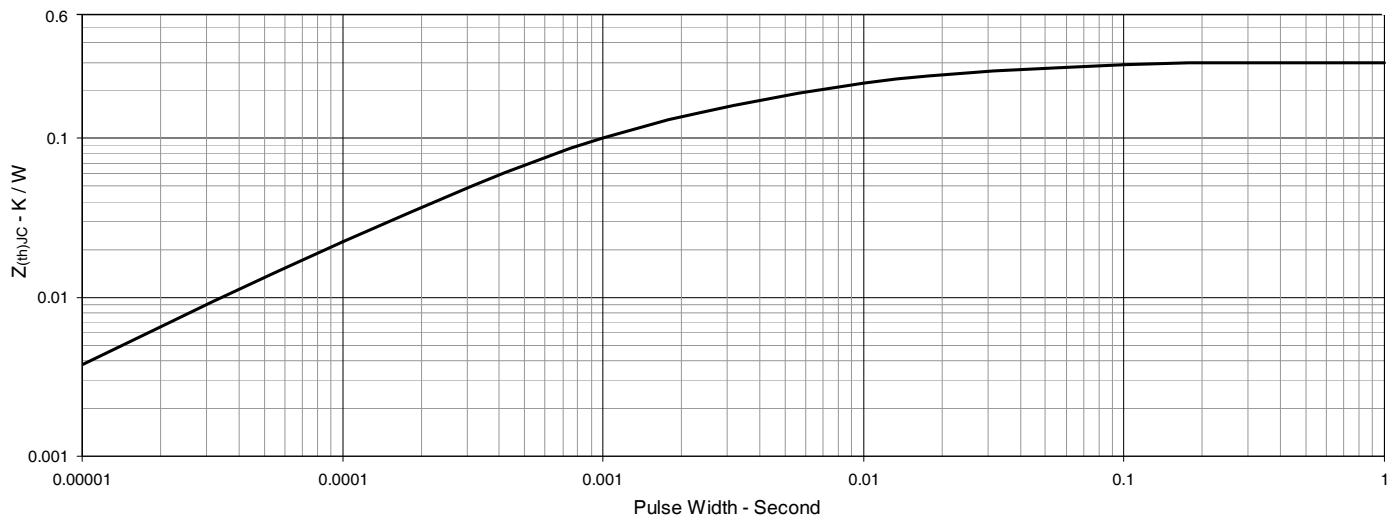
**ADVANCE TECHNICAL INFORMATION**

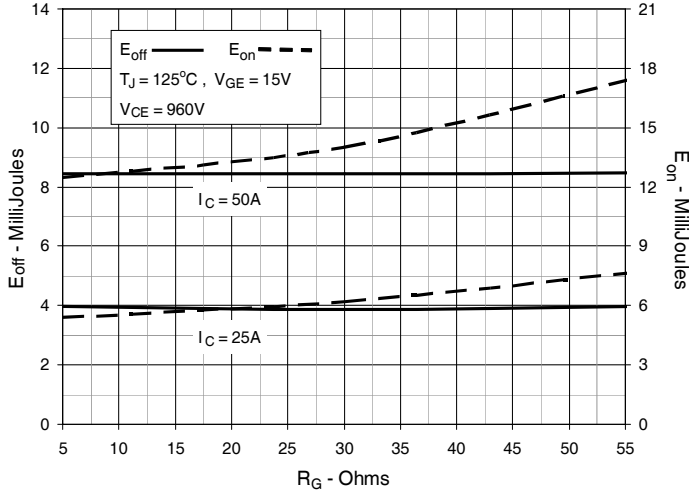
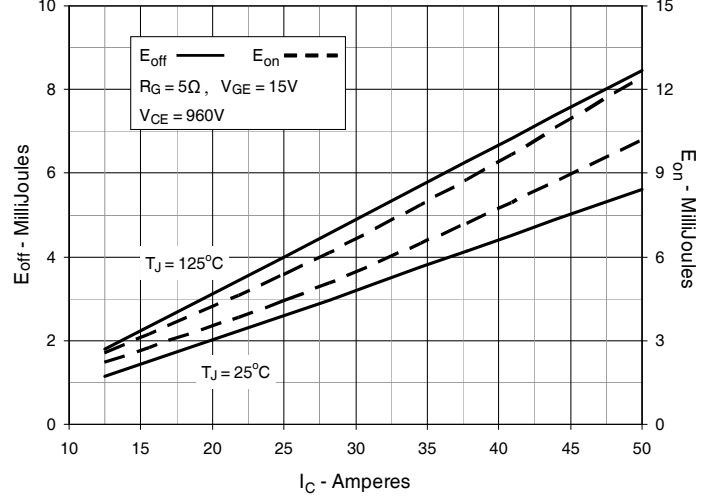
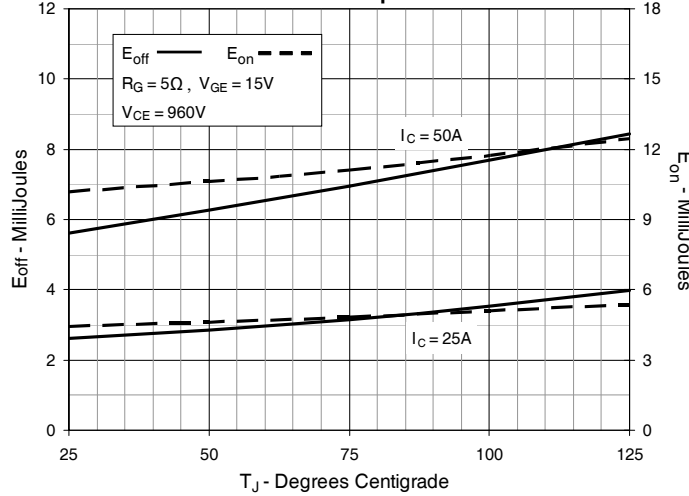
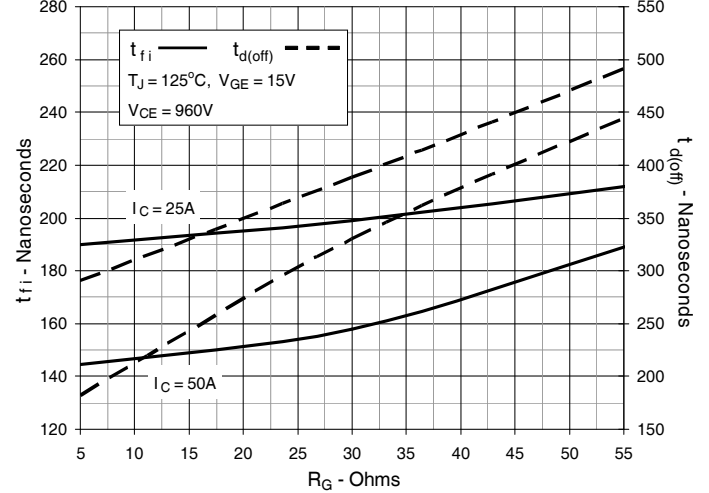
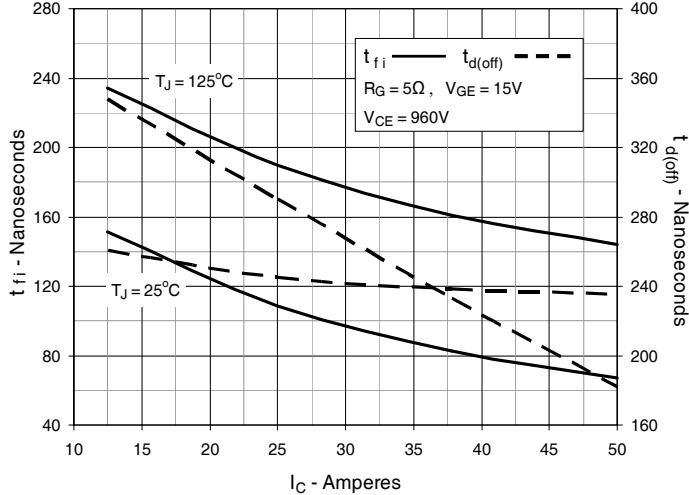
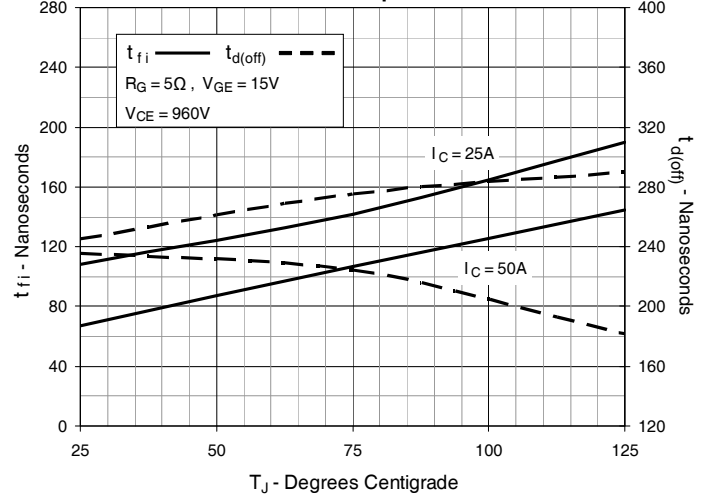
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

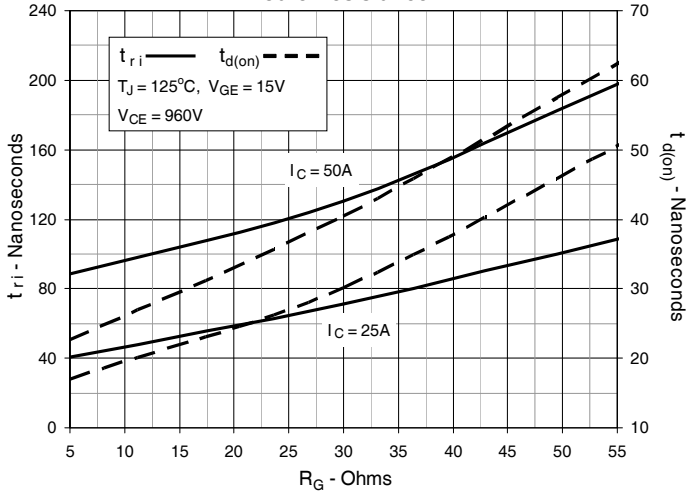
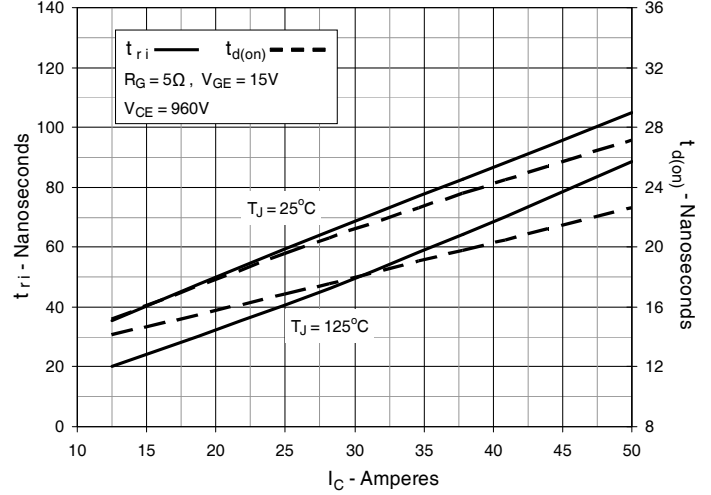
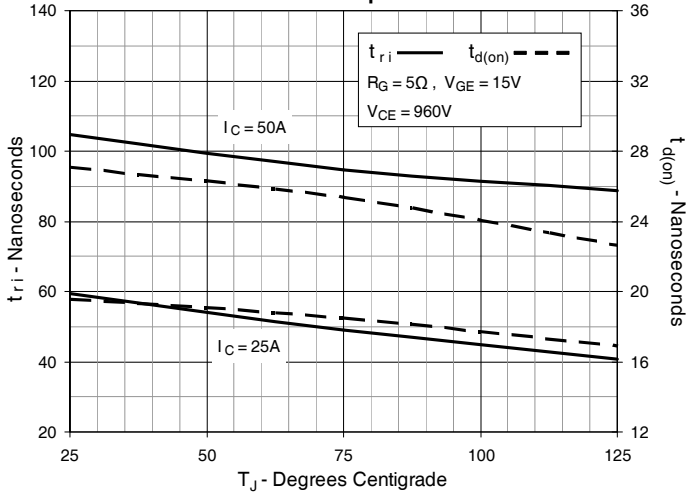
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|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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**




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