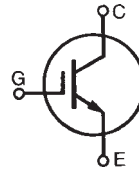


## HiPerFAST™ IGBT B2-Class High Speed IGBTs

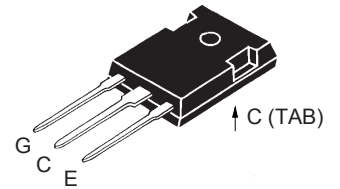
IXGH 50N90B2  
IXGT 50N90B2

$$\begin{aligned} V_{CES} &= 900 \text{ V} \\ I_{C25} &= 75 \text{ A} \\ V_{CE(sat)} &= 2.7 \text{ V} \\ t_{fityp} &= 200 \text{ ns} \end{aligned}$$

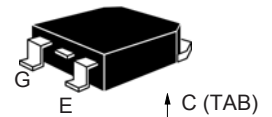


| Symbol                                                                          | Test Conditions                                                                                                             | Maximum Ratings  |                  |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| $V_{CES}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                             | 900              | V                |
| $V_{CGR}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$                                              | 900              | V                |
| $V_{GES}$                                                                       | Continuous                                                                                                                  | $\pm 20$         | V                |
| $V_{GEM}$                                                                       | Transient                                                                                                                   | $\pm 30$         | V                |
| $I_{C25}$                                                                       | $T_C = 25^\circ\text{C}$ (limited by leads)                                                                                 | 75               | A                |
| $I_{C110}$                                                                      | $T_C = 110^\circ\text{C}$                                                                                                   | 50               | A                |
| $I_{CM}$                                                                        | $T_C = 25^\circ\text{C}$ , 1 ms                                                                                             | 200              | A                |
| <b>SSOA</b><br><b>(RBSOA)</b>                                                   | $V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 10 \Omega$<br>Clamped inductive load @ $\leq 600 \text{ V}$ | $I_{CM} = 100$   | A                |
| $P_C$                                                                           | $T_C = 25^\circ\text{C}$                                                                                                    | 400              | W                |
| $T_J$                                                                           |                                                                                                                             | -55 ... +150     | $^\circ\text{C}$ |
| $T_{JM}$                                                                        |                                                                                                                             | 150              | $^\circ\text{C}$ |
| $T_{stg}$                                                                       |                                                                                                                             | -55 ... +150     | $^\circ\text{C}$ |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |                                                                                                                             | 300              | $^\circ\text{C}$ |
| $M_d$                                                                           | Mounting torque (TO-247)                                                                                                    | 1.13/10Nm/lb.in. |                  |
| <b>Weight</b>                                                                   |                                                                                                                             | TO-247 AD        | 6 g              |
|                                                                                 |                                                                                                                             | TO-268           | 4 g              |

TO-247  
(IXGH)



TO-268  
(IXGT)



G = Gate,  
E = Emitter,

C = Collector,  
TAB = Collector

### Features

- High frequency IGBT
- High current handling capability
- MOS Gate turn-on  
- drive simplicity

### Applications

- PFC circuits
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

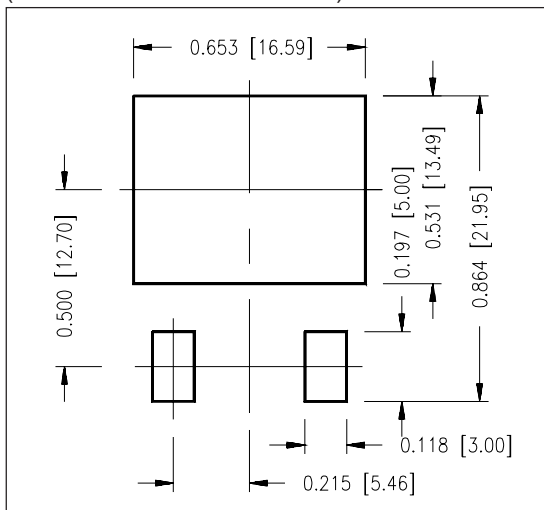
### Advantages

- High power density
- Very fast switching speeds for high frequency applications

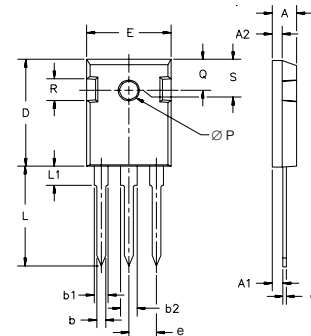
| Symbol        | Test Conditions                                      | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                          |
|---------------|------------------------------------------------------|-----------------------------------------------------------------------------------|------|--------------------------|
|               |                                                      | min.                                                                              | typ. | max.                     |
| $V_{GE(th)}$  | $I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$          | 3.0                                                                               |      | 5.0 V                    |
| $I_{CES}$     | $V_{CE} = V_{CES}$<br>$V_{GE} = 0 \text{ V}$         |                                                                                   |      | 50 $\mu\text{A}$<br>1 mA |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$ |                                                                                   |      | $\pm 100 \text{ nA}$     |
| $V_{CE(sat)}$ | $I_C = I_{C110}$ , $V_{GE} = 15 \text{ V}$           |                                                                                   | 2.2  | 2.7 V<br>V               |
|               | $T_J = 125^\circ\text{C}$                            |                                                                                   |      |                          |

| Symbol       | Test Conditions                                                                                                           | Characteristic Values<br>(T <sub>J</sub> = 25°C, unless otherwise specified) |      |         |
|--------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------|---------|
|              |                                                                                                                           | min.                                                                         | typ. | max.    |
| $g_{fs}$     | $I_C = I_{C110} A; V_{CE} = 10 V,$<br>Pulse test, $t \leq 300 \mu s$ , duty cycle $\leq 2 \%$                             | 25                                                                           | 40   | S       |
| $C_{ies}$    | $V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz$                                                                                  |                                                                              | 2500 | pF      |
| $C_{oes}$    |                                                                                                                           |                                                                              | 180  | pF      |
| $C_{res}$    |                                                                                                                           |                                                                              | 75   | pF      |
| $Q_g$        | $I_C = I_{C110} A, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}$                                                                   |                                                                              | 135  | nC      |
| $Q_{ge}$     |                                                                                                                           |                                                                              | 23   | nC      |
| $Q_{gc}$     |                                                                                                                           |                                                                              | 50   | nC      |
| $t_{d(on)}$  | Inductive load, T <sub>J</sub> = 25°C<br>$I_C = I_{C110} A, V_{GE} = 15 V$<br>$V_{CE} = 720 V, R_G = R_{off} = 5 \Omega$  |                                                                              | 20   | ns      |
| $t_{ri}$     |                                                                                                                           |                                                                              | 28   | ns      |
| $t_{d(off)}$ |                                                                                                                           |                                                                              | 350  | ns      |
| $t_{fi}$     |                                                                                                                           |                                                                              | 200  | ns      |
| $E_{off}$    |                                                                                                                           |                                                                              | 4.7  | 7.5 mJ  |
| $t_{d(on)}$  | Inductive load, T <sub>J</sub> = 125°C<br>$I_C = I_{C110} A, V_{GE} = 15 V$<br>$V_{CE} = 720 V, R_G = R_{off} = 5 \Omega$ |                                                                              | 20   | ns      |
| $t_{ri}$     |                                                                                                                           |                                                                              | 28   | ns      |
| $E_{on}$     |                                                                                                                           |                                                                              | 0.7  | mJ      |
| $t_{d(off)}$ |                                                                                                                           |                                                                              | 400  | ns      |
| $t_{fi}$     |                                                                                                                           |                                                                              | 420  | ns      |
| $E_{off}$    |                                                                                                                           |                                                                              | 8.7  | mJ      |
| $R_{thJC}$   |                                                                                                                           |                                                                              |      | 0.31 KW |
| $R_{thCK}$   | (TO-247)                                                                                                                  |                                                                              | 0.25 | KW      |

## Min. Recommended Footprint (Dimensions in inches and mm)

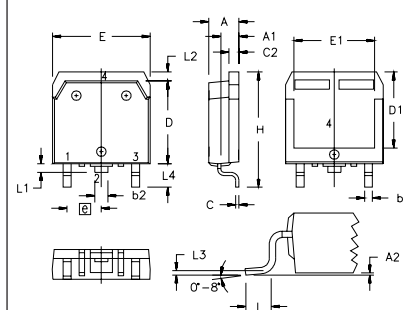


## TO-247 AD Outline



| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | Max.  |
| A              | 4.7        | 5.3   | .185   | .209  |
| A <sub>1</sub> | 2.2        | 2.54  | .087   | .102  |
| A <sub>2</sub> | 2.2        | 2.6   | .059   | .098  |
| b              | 1.0        | 1.4   | .040   | .055  |
| b <sub>1</sub> | 1.65       | 2.13  | .065   | .084  |
| b <sub>2</sub> | 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  |
| L1             |            | 4.50  |        | .177  |
| ØP             | 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   |

## TO-268 Outline

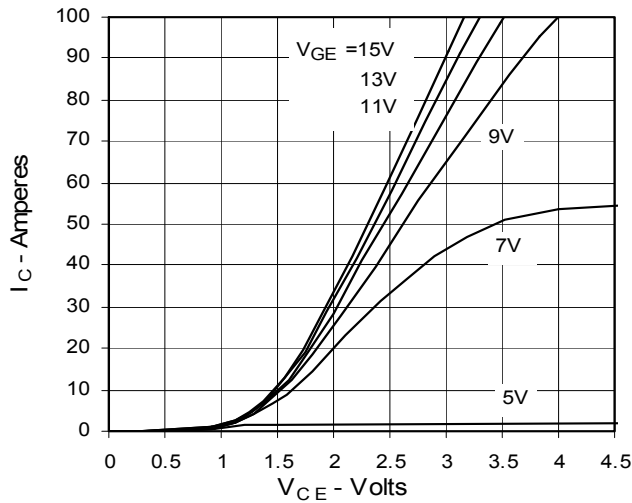


| SYM            | INCHES |      | MILLIMETERS |       |
|----------------|--------|------|-------------|-------|
|                | MIN    | MAX  | MIN         | MAX   |
| A              | .193   | .201 | 4.90        | 5.10  |
| A <sub>1</sub> | .106   | .114 | 2.70        | 2.90  |
| A <sub>2</sub>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

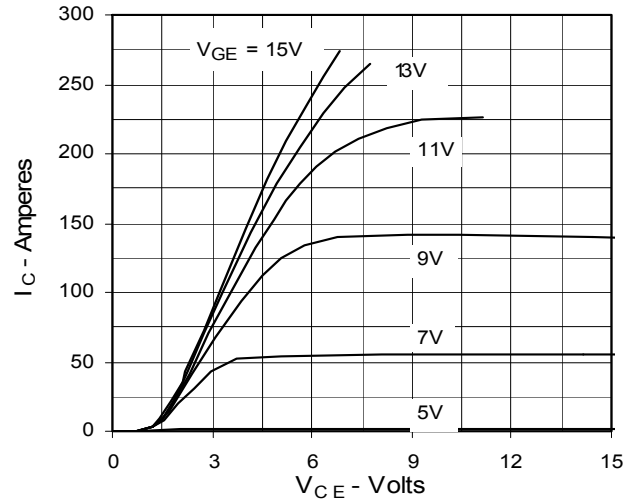
IXYS reserves the right to change limits, test conditions, and dimensions.

|                                                                                  |           |           |           |           |           |           |             |             |             |           |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-----------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,381,025 | 6,404,065B1 | 6,162,665   | 6,534,343   | 6,583,505 |
|                                                                                  | 4,835,592 | 4,881,106 | 5,017,508 | 5,049,961 | 5,187,117 | 5,486,715 | 6,306,728B1 | 6,259,123B1 | 6,306,728B1 | 6,683,344 |

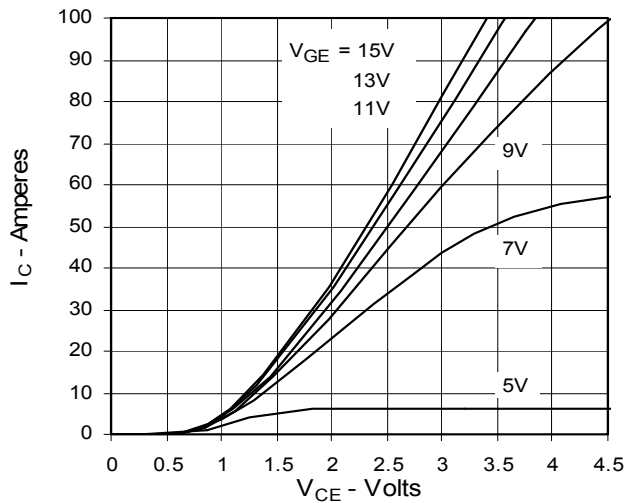
**Fig. 1. Output Characteristics**  
@ 25 °C



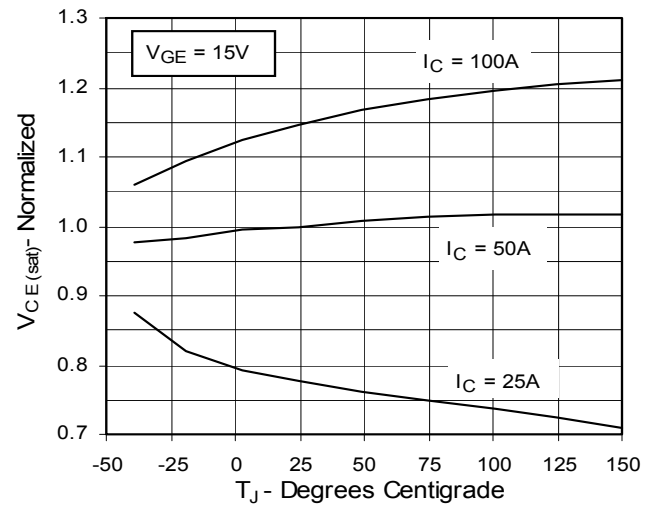
**Fig. 2. Extended Output Characteristics**  
@ 25 °C



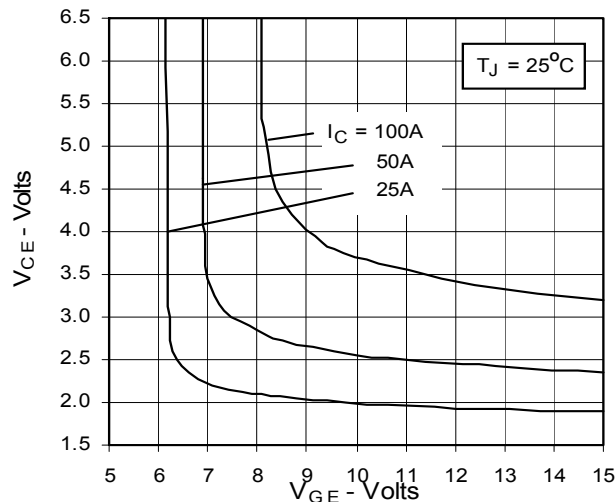
**Fig. 3. Output Characteristics**  
@ 125 °C



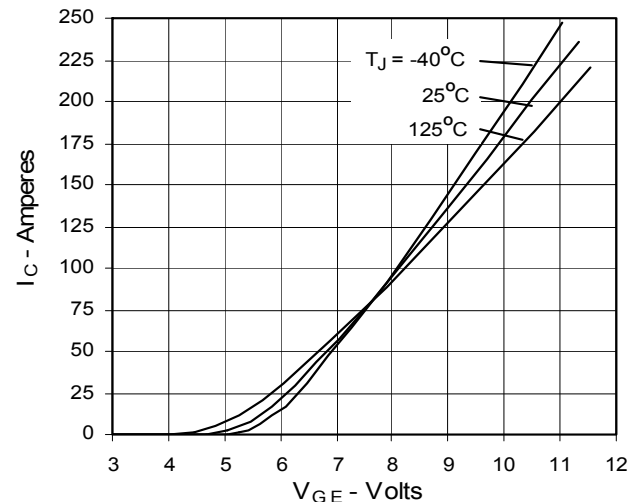
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Temperature**

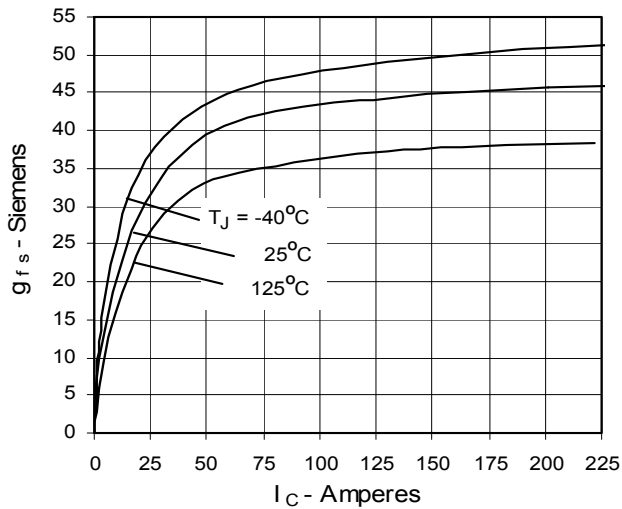
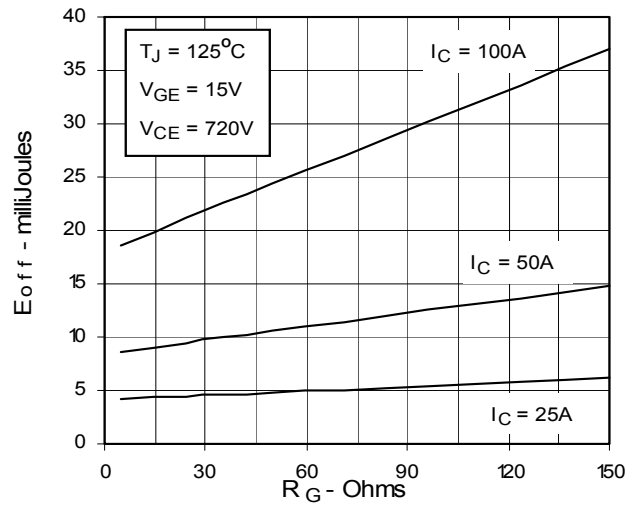
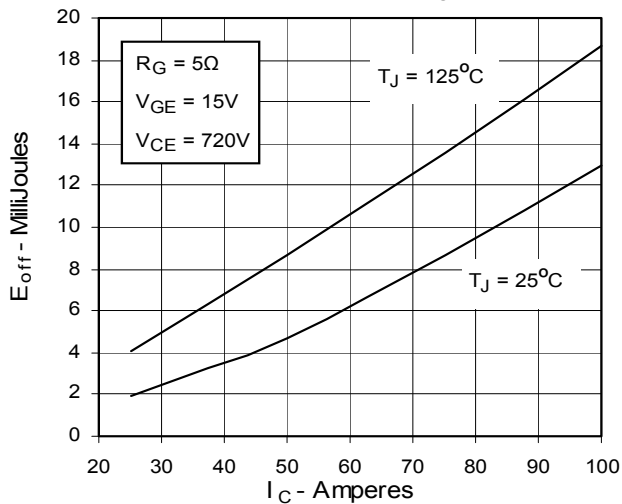
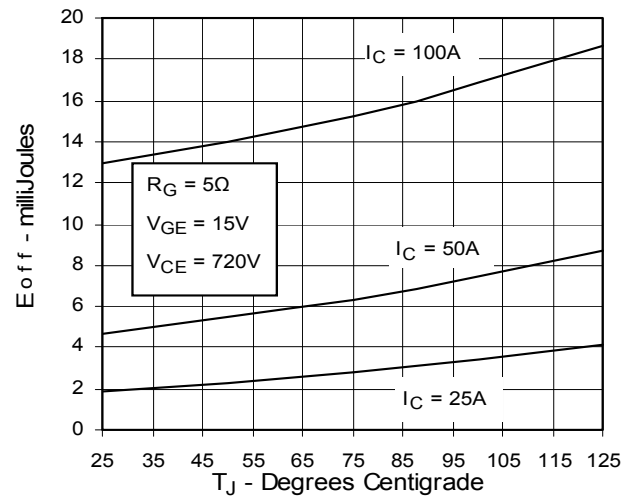
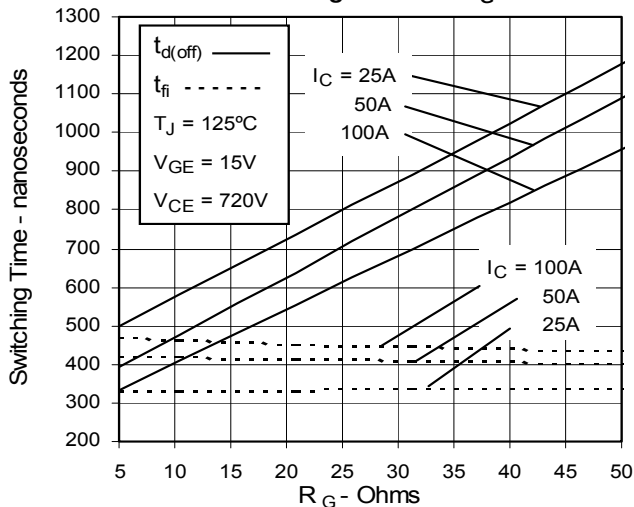
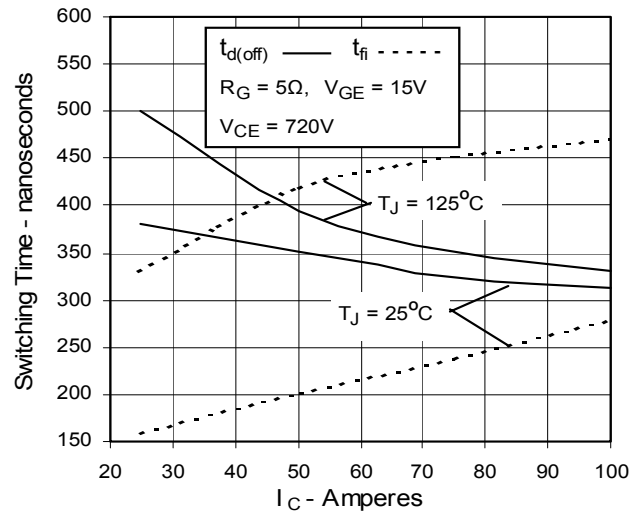


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage**



**Fig. 6. Input Admittance**



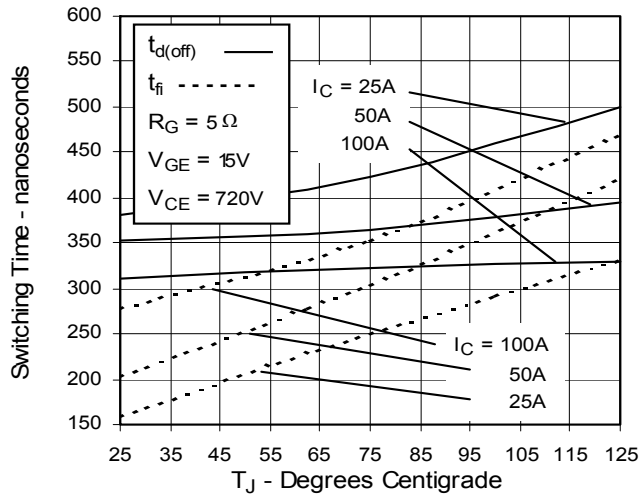
**Fig. 7. Transconductance**

**Fig. 8. Dependence of Turn-off Energy Loss on  $R_G$** 

**Fig. 9. Dependence of Turn-Off Energy Loss on  $I_C$** 

**Fig. 10. Dependence of Turn-off Energy Loss on Temperature**

**Fig. 11. Dependence of Turn-off Switching Time on  $R_G$** 

**Fig. 12. Dependence of Turn-off Switching Time on  $I_C$** 


IXYS reserves the right to change dimensions, test conditions, and tolerances

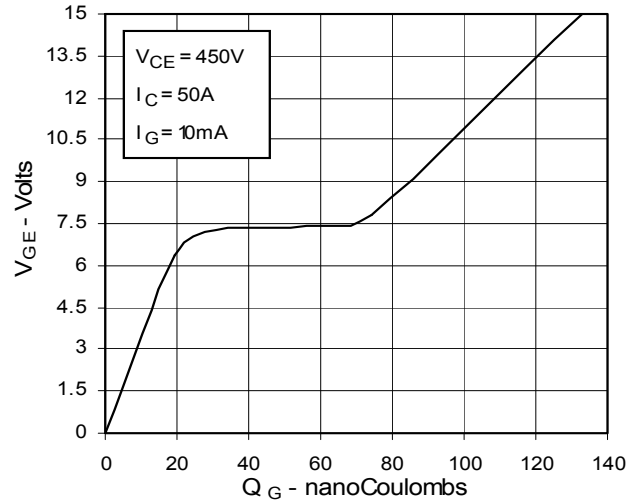
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |           |           |             |             |             |           |
|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-----------|
| 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,381,025 | 6,404,065B1 | 6,162,665   | 6,534,343   | 6,583,505 |
| 4,835,592 | 4,881,106 | 5,017,508 | 5,049,961 | 5,187,117 | 5,486,715 | 6,306,728B1 | 6,259,123B1 | 6,306,728B1 | 6,683,344 |

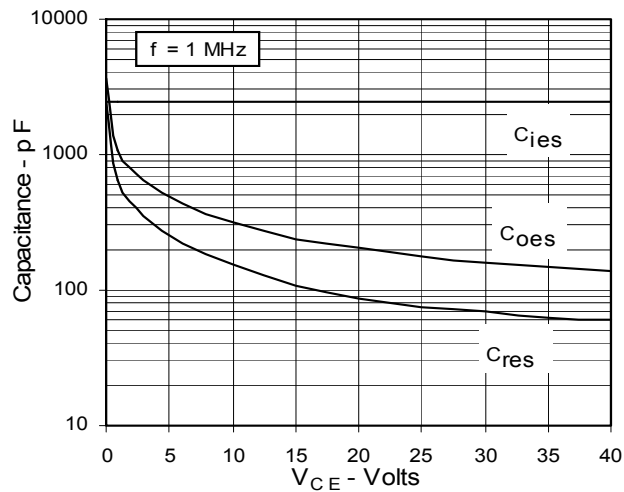
**Fig. 13. Dependence of Turn-off Switching Time on Temperature**



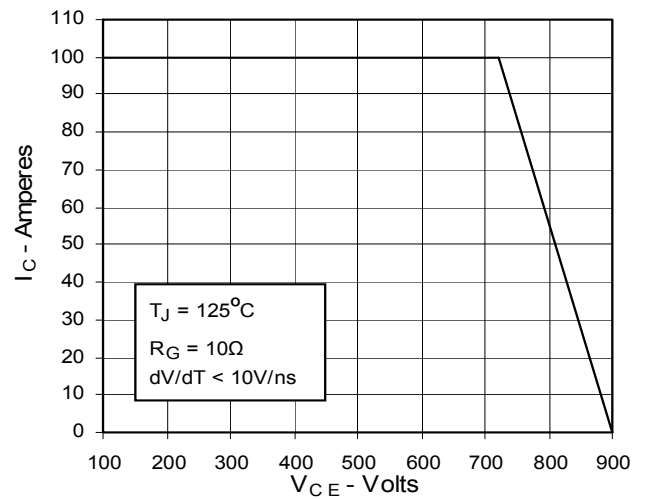
**Fig. 14. Gate Charge**



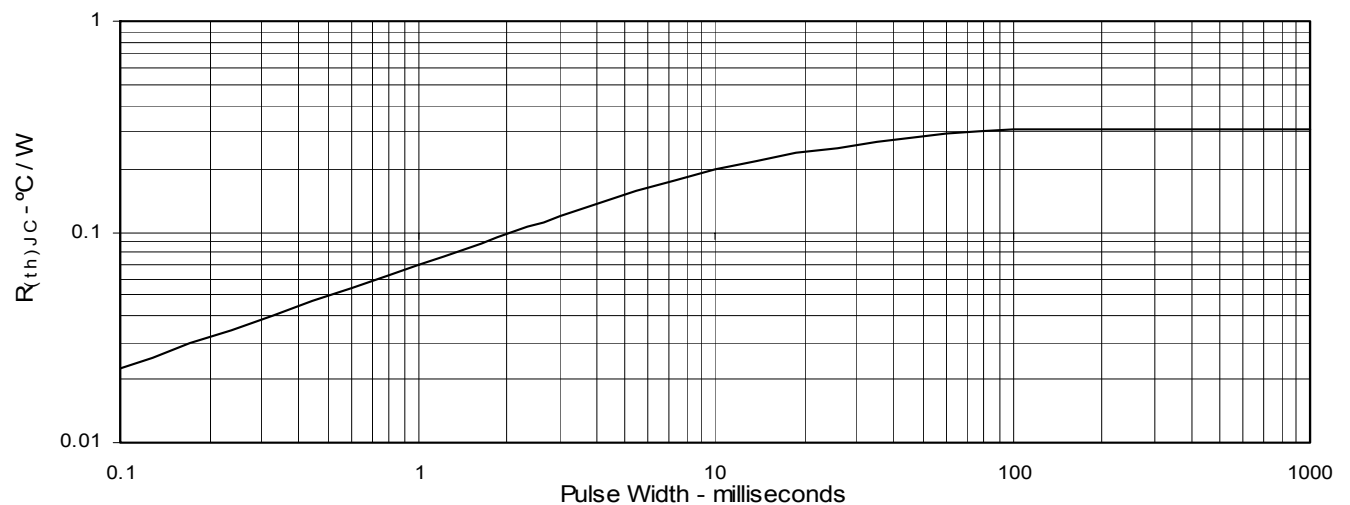
**Fig. 15. Capacitance**



**Fig. 16. Reverse-Bias Safe Operating Area**



**Fig. 17. Maximum Transient Thermal Resistance**



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[IXYS:](#)

[IXGT50N90B2](#)