

# BiMOSFET™ Monolithic Bipolar MOS Transistor High Voltage, High Frequency

## IXBF50N360



$$V_{CES} = 3600V$$

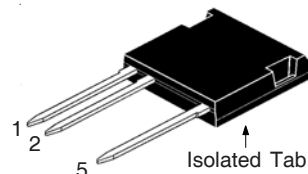
$$I_{C110} = 28A$$

$$V_{CE(sat)} \leq 2.9V$$

(Electrically Isolated Tab)

| Symbol                                       | Test Conditions  | Maximum Ratings                       |            |
|--|--|---------------------------------------|------------|
| $V_{CES}$                                    | $T_J = 25^\circ C$ to $150^\circ C$  | 3600                                  | V          |
| $V_{CGR}$                                    | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$                                      | 3600                                  | V          |
| $V_{GES}$                                    | Continuous   | $\pm 20$                              | V          |
| $V_{GEM}$                                    | Transient  | $\pm 30$                              | V          |
| $I_{C25}$                                    | $T_C = 25^\circ C$   | 70                                    | A          |
| $I_{C110}$                                   | $T_C = 110^\circ C$  | 28                                    | A          |
| $I_{CM}$                                     | $T_C = 25^\circ C$ , 1ms   | 420                                   | A          |
| <b>SSOA</b><br><b>(RBSOA)</b>                | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 5\Omega$<br>Clamped Inductive Load            | $I_{CM} = 200$<br>$0.8 \cdot V_{CES}$ | A<br>V     |
| <b><math>T_{SC}</math></b><br><b>(SCSOA)</b> | $V_{GE} = 15V$ , $T_J = 125^\circ C$ ,<br>$R_G = 10\Omega$ , $V_{CE} = 1500V$ , Non-Repetitive | 10                                    | $\mu s$    |
| $P_C$  | $T_C = 25^\circ C$   | 290                                   | W          |
| $T_J$  |  | - 55 ... +150                         | $^\circ C$ |
| $T_{JM}$                                     |  | 150                                   | $^\circ C$ |
| $T_{stg}$                                    |  | - 55 ... +150                         | $^\circ C$ |
| $T_L$  | Maximum Lead Temperature for Soldering   | 300                                   | $^\circ C$ |
| $T_{SOLD}$                                   | Plastic Body for 10s   | 260                                   | $^\circ C$ |
| $F_C$  | Mounting Force with Clip   | 30..170 / 7..36                       | N/lb       |
| $V_{ISOL}$                                   | 50/60Hz, 5 Seconds   | 4000                                  | V~         |
| <b>Weight</b>                                |  | 8                                     | g          |

### ISOPLUS i4-Pak™



1 = Gate  
2 = Emitter  
5 = Collector

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Frequency Operation

### Advantages

- Low Gate Drive Requirement
- High Power Density

### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified)         | Characteristic Values |            |                       |
|---------------|---|-----------------------|------------|-----------------------|
|               |   | Min.                  | Typ.       | Max.                  |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$  | 3600                  |            | V                     |
| $V_{GE(th)}$  | $I_C = 250\mu A$ , $V_{CE} = V_{GE}$  | 3.0                   |            | 5.0 V                 |
| $I_{CES}$     | $V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$<br>Note 2, $T_J = 100^\circ C$ |                       | 50         | 25 $\mu A$<br>$\mu A$ |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$  |                       |            | $\pm 200$ nA          |
| $V_{CE(SAT)}$ | $I_C = 50A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 125^\circ C$                |                       | 2.4<br>3.0 | V<br>V                |

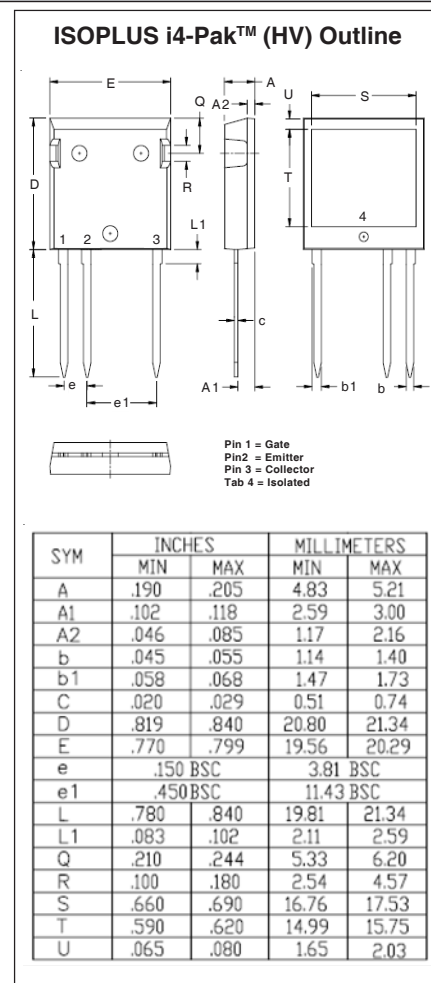
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values                   |      |                         |
|--------------|---|---|------|-------------------------|
|              |   | Min.                                    | Typ. | Max.                    |
| $g_{fs}$     | $I_C = 50\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$                    | 24                                      | 40   | S                       |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$                |   | 3990 | pF                      |
| $C_{oes}$    |   |   | 195  | pF                      |
| $C_{res}$    |   |   | 100  | pF                      |
| $Q_{g(on)}$  | $I_C = 50\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$            |   | 210  | nC                      |
| $Q_{ge}$     |   |   | 27   | nC                      |
| $Q_{gc}$     |   |   | 77   | nC                      |
| $t_{d(on)}$  | <b>Resistive load, <math>T_J = 25^\circ\text{C}</math></b>                |   | 46   | ns                      |
| $t_r$        |   | $I_C = 50\text{A}, V_{GE} = 15\text{V}$ | 420  | ns                      |
| $t_{d(off)}$ | $V_{CE} = 960\text{V}, R_G = 5\Omega$                                     |   | 205  | ns                      |
| $t_f$        |   |   | 1750 | ns                      |
| $t_{d(on)}$  | <b>Resistive load, <math>T_J = 125^\circ\text{C}</math></b>               |   | 44   | ns                      |
| $t_r$        |   | $I_C = 50\text{A}, V_{GE} = 15\text{V}$ | 845  | ns                      |
| $t_{d(off)}$ | $V_{CE} = 960\text{V}, R_G = 5\Omega$                                     |   | 210  | ns                      |
| $t_f$        |   |   | 1670 | ns                      |
| $R_{thJC}$   |   |   |      | 0.43 $^\circ\text{C/W}$ |
| $R_{thCS}$   |   | 0.15                                    |      | $^\circ\text{C/W}$      |

## Reverse Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)  | Characteristic Values                   |      |               |
|----------|--|---|------|---------------|
|          |  | Min.                                    | Typ. | Max.          |
| $V_F$    | $I_F = 50\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$                      |   |      | 3.0 V         |
| $t_{rr}$ | $I_F = 25\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ |   | 1.7  | $\mu\text{s}$ |
| $I_{RM}$ |  | $V_R = 100\text{V}, V_{GE} = 0\text{V}$ |      | 48            |
| $Q_{RM}$ |  |   | 40   | $\mu\text{C}$ |

## Notes:

1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.



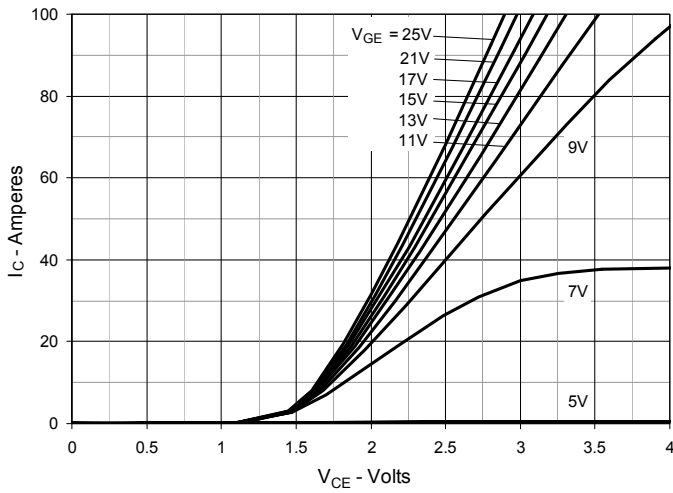
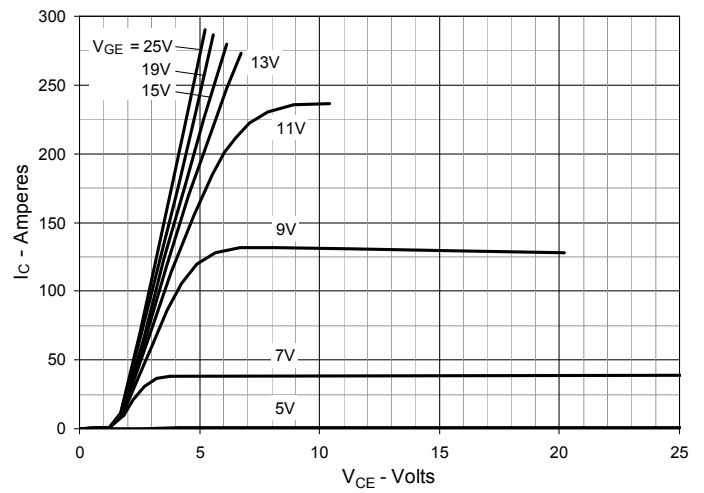
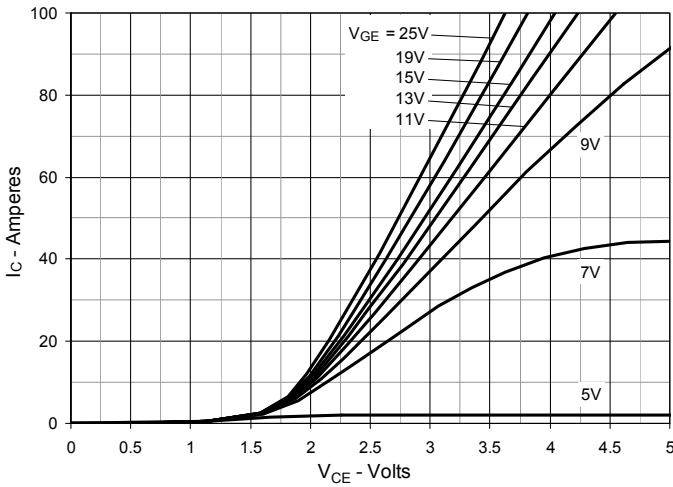
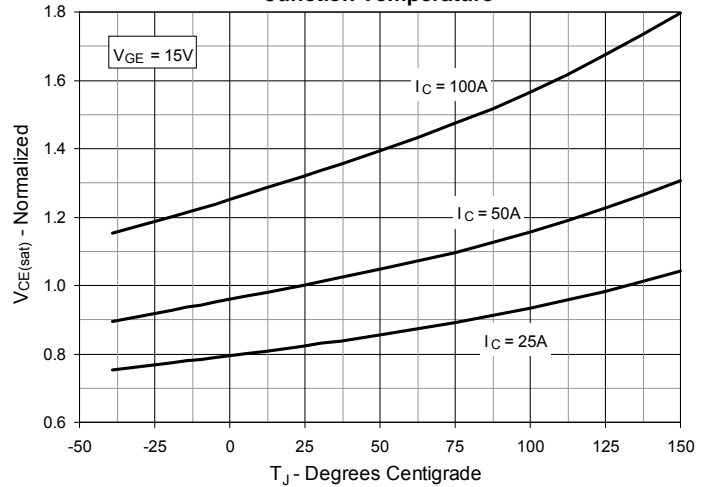
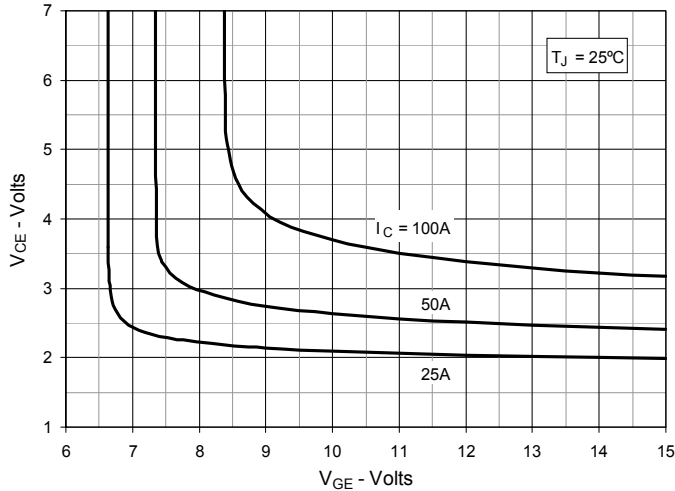
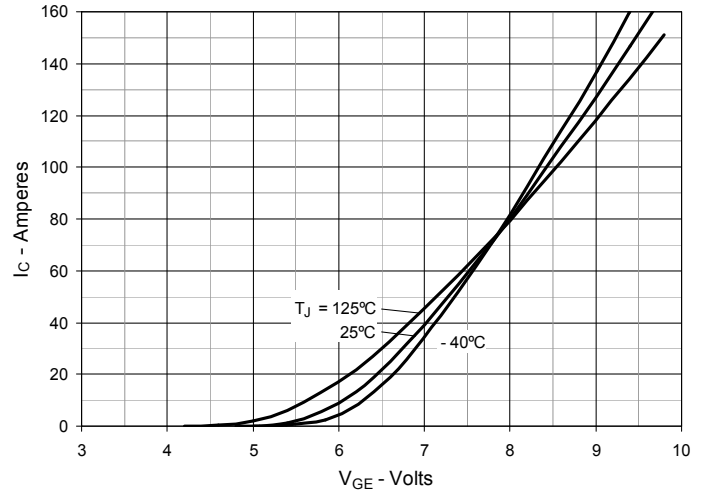
## ADVANCE TECHNICAL INFORMATION

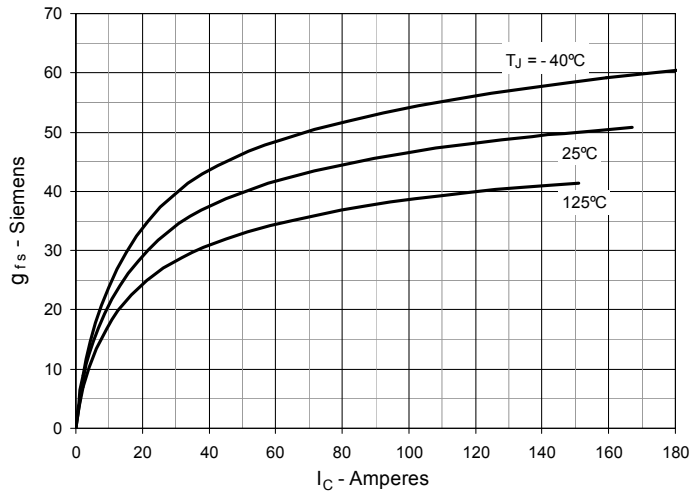
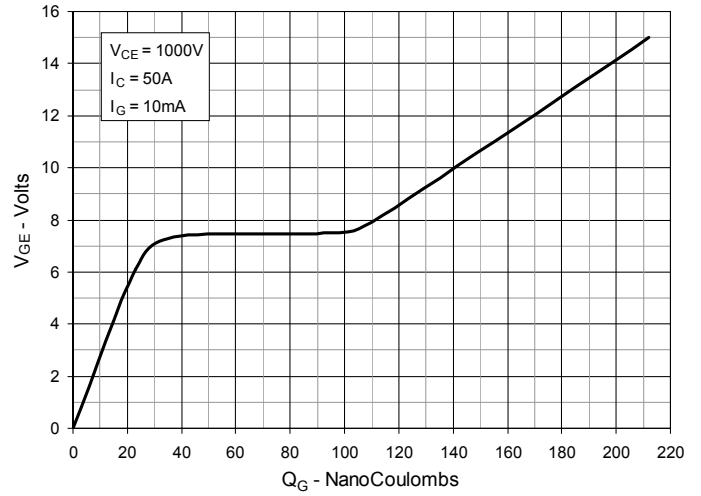
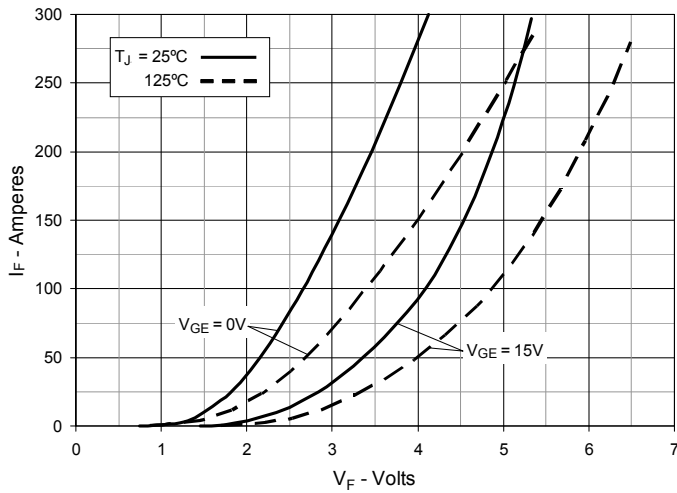
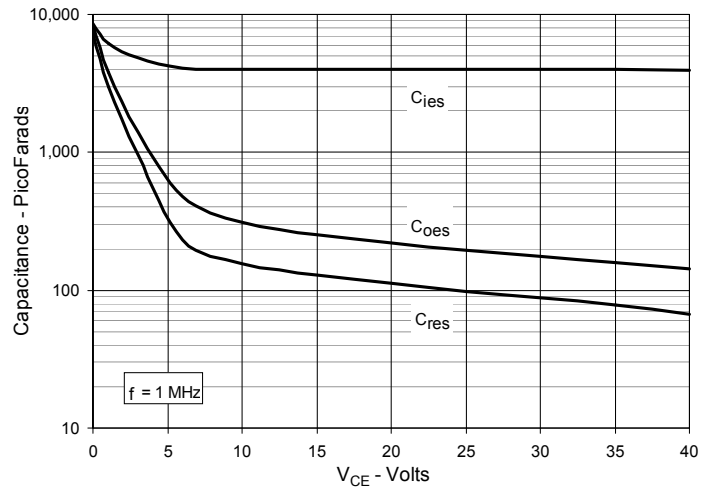
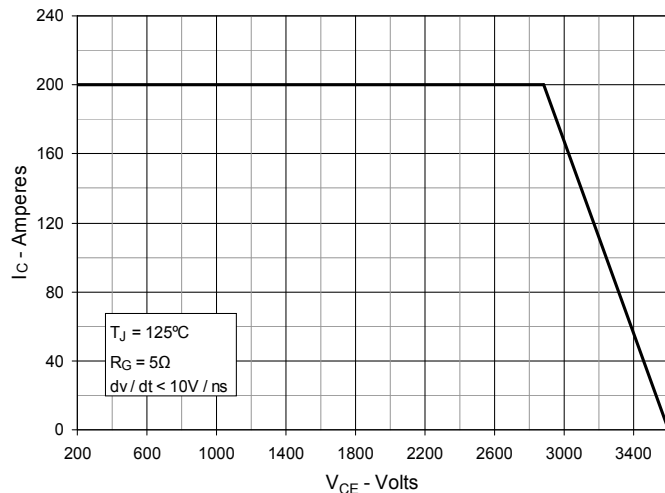
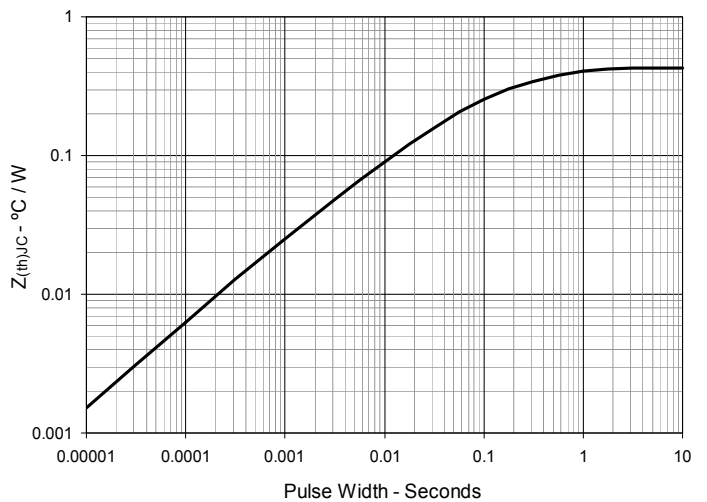
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

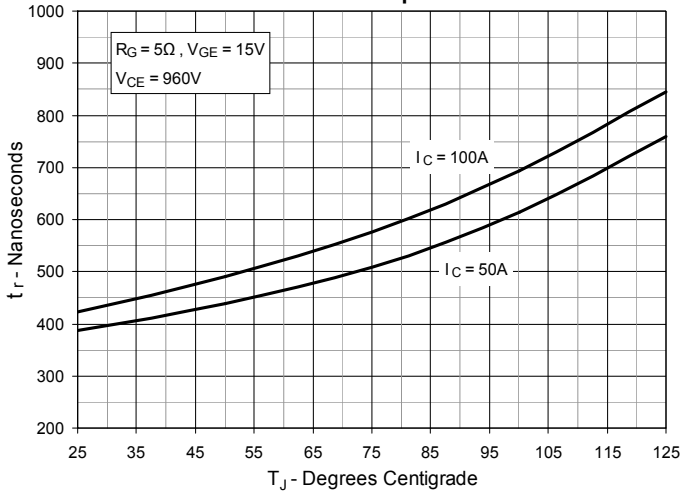
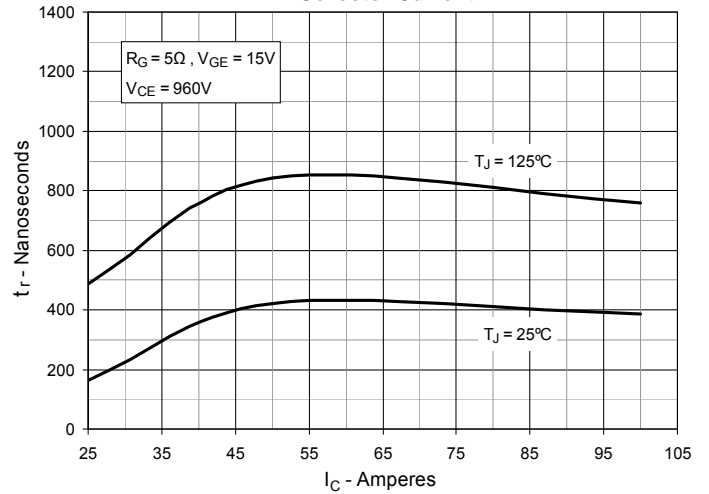
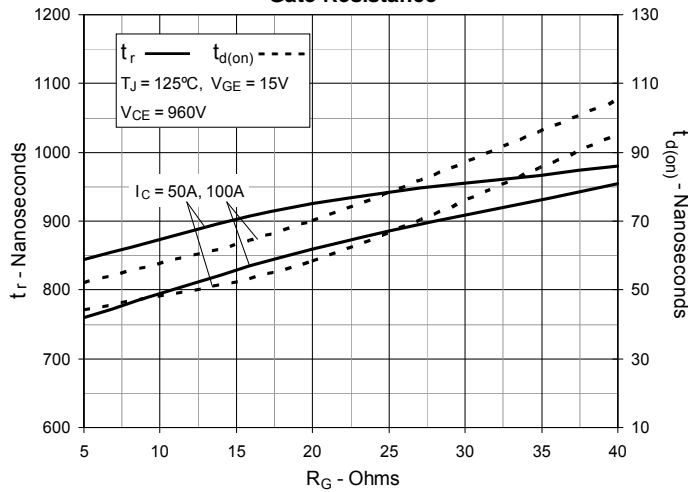
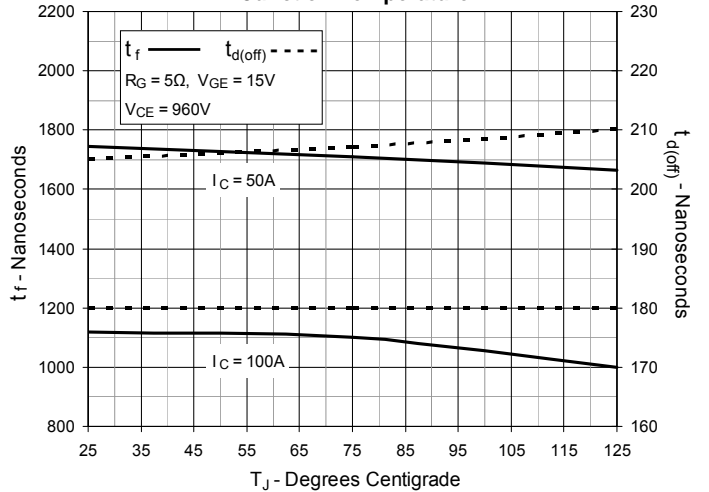
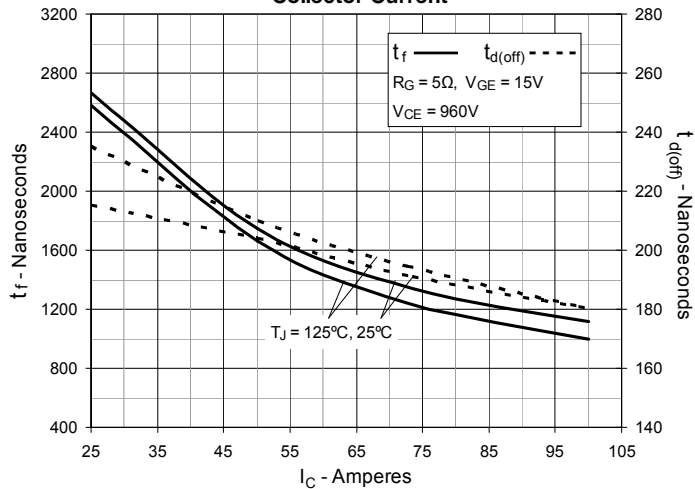
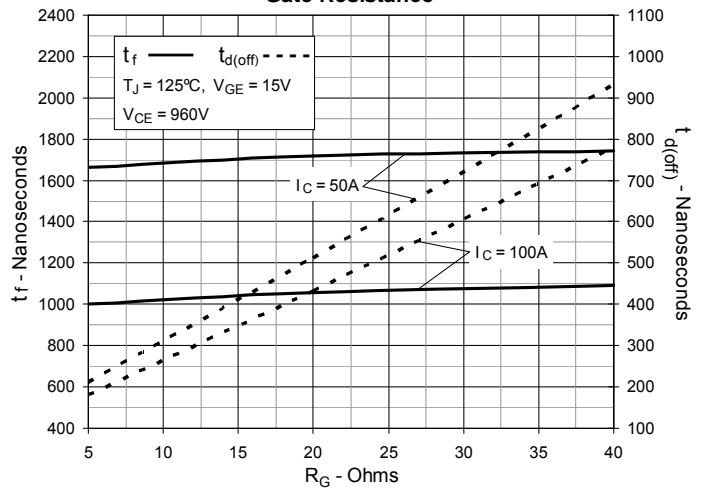
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

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

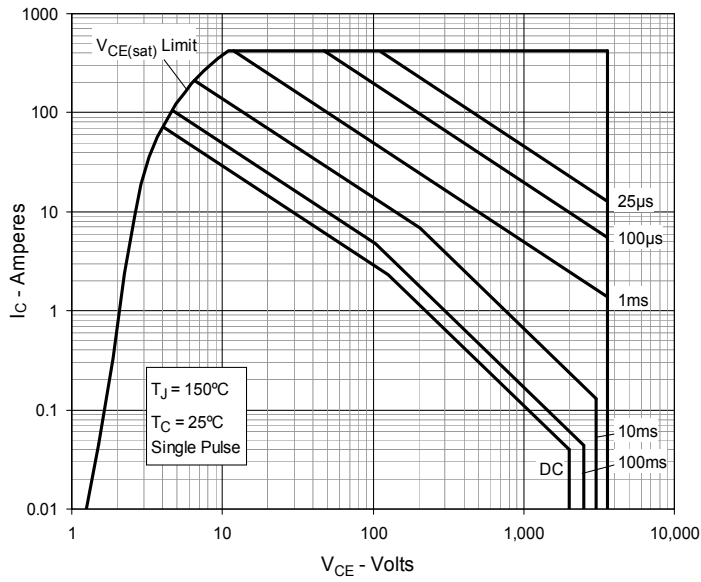
|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 4,835,592 | 4,931,844 | 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 @  $T_J = 125^\circ\text{C}$** 

**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**


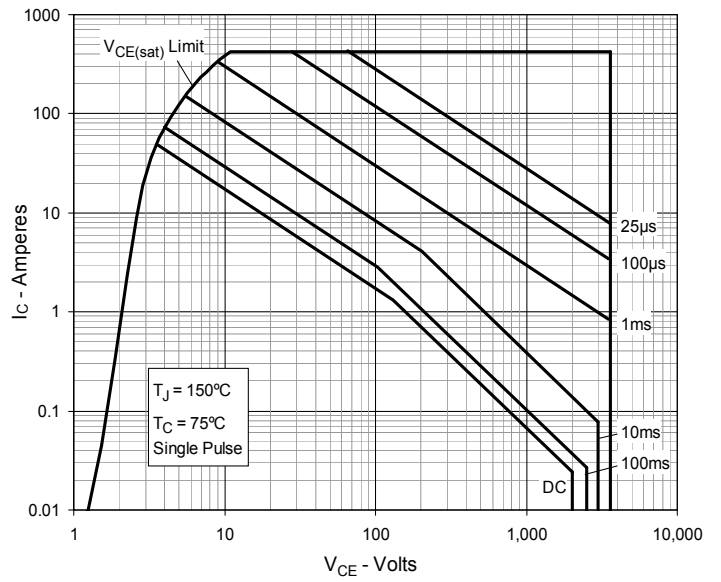
**Fig. 7. Transconductance**

**Fig. 8. Gate Charge**

**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

**Fig. 10. Capacitance**

**Fig. 11. Reverse-Bias Safe Operating Area**

**Fig. 12. Maximum Transient Thermal Impedance**


**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

**Fig. 14. Resistive Turn-on Rise Time vs. Collector Current**

**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**

**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**

**Fig. 17. Resistive Turn-off Switching Times vs. Collector Current**

**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**


**Fig. 19. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$**



**Fig. 20. Forward-Bias Safe Operating Area @  $T_C = 75^\circ\text{C}$**





## Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331