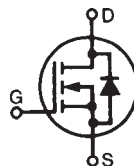


# PolarHT™ Power MOSFET

**IXTA 62N15P**  
**IXTP 62N15P**  
**IXTQ 62N15P**

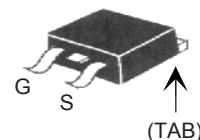
$$\begin{aligned} V_{DSS} &= 150 \text{ V} \\ I_{D25} &= 62 \text{ A} \\ R_{DS(on)} &\leq 40 \text{ m}\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated

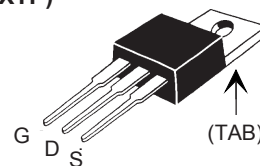


| Symbol        | Test Conditions                                                                                                                          | Maximum Ratings |                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$                                                                                           | 150             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$                                                               | 150             | V                |
| $V_{GS}$      | Continuous                                                                                                                               | $\pm 20$        | V                |
| $V_{GSM}$     | Transient                                                                                                                                | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$                                                                                                                 | 62              | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                               | 150             | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                                 | 50              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                                 | 30              | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$                                                                                                                 | 1.0             | J                |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 10 \Omega$ | 10              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$                                                                                                                 | 350             | W                |
| $T_J$         |                                                                                                                                          | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$      |                                                                                                                                          | 175             | $^\circ\text{C}$ |
| $T_{stg}$     |                                                                                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$         | 1.6 mm (0.062 in.) from case for 10 s                                                                                                    | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic body for 10 s                                                                                                                    | 2600            | $^\circ\text{C}$ |
| $Md$          | Mounting torque (TO-3P / TO-220)                                                                                                         | 1.13/10         | Nm/lb.in.        |
| <b>Weight</b> | TO-3P                                                                                                                                    | 5.5             | g                |
|               | TO-220                                                                                                                                   | 4               | g                |
|               | TO-263                                                                                                                                   | 3               | g                |

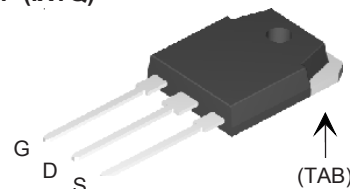
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



G = Gate  
S = Source

D = Drain  
TAB = Drain

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                      | Characteristic Values |      |                                       |
|--------------|------------------------------------------------------------------------------------------------------------------|-----------------------|------|---------------------------------------|
|              |                                                                                                                  | Min.                  | Typ. | Max.                                  |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                 | 150                   |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                                                                      | 3.0                   |      | 5.5 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                  |                       |      | $\pm 100 \text{ nA}$                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$<br>$T_J = 150^\circ\text{C}$                                        |                       |      | 25 $\mu\text{A}$<br>250 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ | 33                    |      | 40 $\text{m}\Omega$                   |

## Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

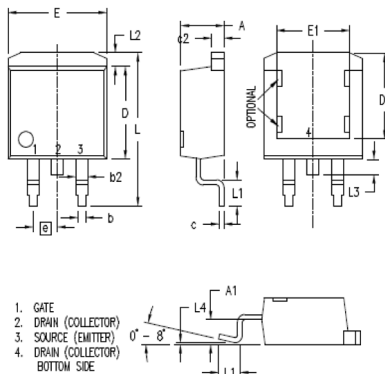
## Advantages

- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions                                                                                        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |              |                                              |
|--------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------|----------------------------------------------|
|              |                                                                                                        | Min.                                                                              | Typ.         | Max.                                         |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = 0.5 I_{D25}$ , pulse test                                              | 14                                                                                | 24           | S                                            |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                    |                                                                                   | 2250         | pF                                           |
| $C_{oss}$    |                                                                                                        |                                                                                   | 660          | pF                                           |
| $C_{rss}$    |                                                                                                        |                                                                                   | 185          | pF                                           |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$<br>$R_G = 10\ \Omega$ (External) |                                                                                   | 27           | ns                                           |
| $t_r$        |                                                                                                        |                                                                                   | 38           | ns                                           |
| $t_{d(off)}$ |                                                                                                        |                                                                                   | 76           | ns                                           |
| $t_f$        |                                                                                                        |                                                                                   | 35           | ns                                           |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$                                  |                                                                                   | 70           | nC                                           |
| $Q_{gs}$     |                                                                                                        |                                                                                   | 20           | nC                                           |
| $Q_{gd}$     |                                                                                                        |                                                                                   | 38           | nC                                           |
| $R_{thJC}$   | (TO-3P)<br>(TO-220)                                                                                    |                                                                                   | 0.21<br>0.25 | $0.42^\circ\text{C/W}$<br>$^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                        |                                                                                   |              | $^\circ\text{C/W}$                           |

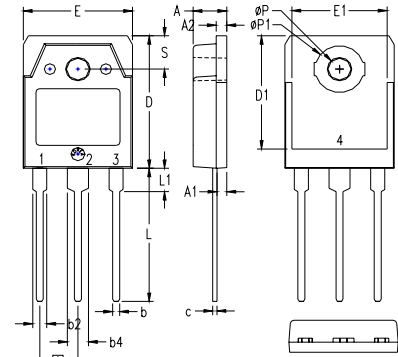
| Symbol   | Test Conditions                                                                                          | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
|          |                                                                                                          | Min.                                                                              | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                    |                                                                                   |      | 62 A          |
| $I_{SM}$ | Repetitive                                                                                               |                                                                                   |      | 150 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{ A}$ , $-di/dt = 100\text{ A}/\mu\text{s}$                                                |                                                                                   | 150  | ns            |
| $Q_{RM}$ | $V_R = 100\text{ V}$ , $V_{GS} = 0\text{ V}$                                                             |                                                                                   | 2.0  | $\mu\text{C}$ |

### TO-263 (IXTA) Outline



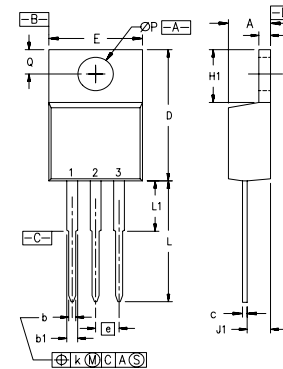
| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .360     | .390 | 4.06        | 4.83  |
| A1  | .080     | .110 | 2.03        | 2.79  |
| b   | .020     | .039 | 0.51        | 0.99  |
| b2  | .045     | .055 | 1.14        | 1.40  |
| c   | .016     | .029 | 0.40        | 0.74  |
| c2  | .045     | .055 | 1.14        | 1.40  |
| D   | .340     | .380 | 8.64        | 9.65  |
| D1  | .315     | .350 | 8.00        | 8.89  |
| E   | .380     | .410 | 9.65        | 10.41 |
| E1  | .245     | .320 | 6.22        | 8.13  |
| e   | .100 BSC |      | 2.54 BSC    |       |
| L   | .575     | .625 | 14.61       | 15.88 |
| L1  | .090     | .110 | 2.29        | 2.79  |
| L2  | .040     | .055 | 1.02        | 1.40  |
| L3  | .050     | .070 | 1.27        | 1.78  |
| L4  | 0        | .005 | 0           | 0.13  |

### TO-3P (IXTQ) Outline



| SYM       | INCHES   |      | MILLIMETERS |       |
|-----------|----------|------|-------------|-------|
|           | MIN      | MAX  | MIN         | MAX   |
| A         | .185     | .193 | 4.70        | 4.90  |
| A1        | .051     | .059 | 1.30        | 1.50  |
| A2        | .057     | .065 | 1.45        | 1.65  |
| b         | .035     | .045 | 0.90        | 1.15  |
| b2        | .075     | .087 | 1.90        | 2.20  |
| b4        | .114     | .126 | 2.90        | 3.20  |
| c         | .022     | .031 | 0.55        | 0.80  |
| D         | .780     | .799 | 19.80       | 20.30 |
| D1        | .665     | .677 | 16.90       | 17.20 |
| E         | .610     | .622 | 15.50       | 15.80 |
| E1        | .531     | .539 | 13.50       | 13.70 |
| e         | .215 BSC |      | 5.45 BSC    |       |
| L         | .779     | .795 | 19.80       | 20.20 |
| L1        | .134     | .142 | 3.40        | 3.60  |
| $\phi P$  | .126     | .134 | 3.20        | 3.40  |
| $\phi P1$ | .272     | .280 | 6.90        | 7.10  |
| S         | .193     | .201 | 4.90        | 5.10  |

### TO-220 (IXTP) Outline

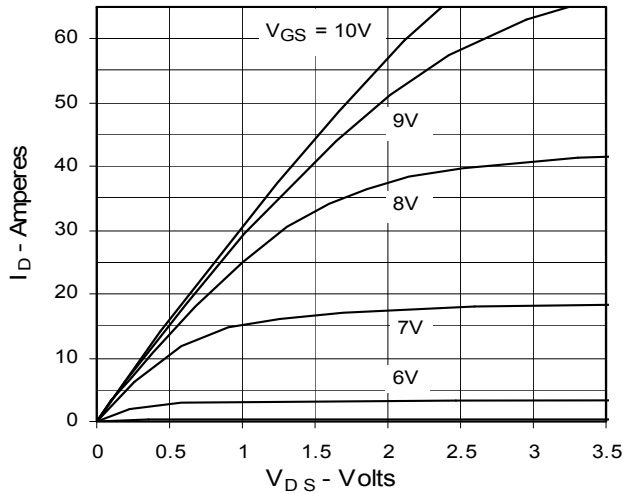


| SYM      | INCHES   |      | MILLIMETERS |       |
|----------|----------|------|-------------|-------|
|          | MIN      | MAX  | MIN         | MAX   |
| A        | .170     | .190 | 4.32        | 4.83  |
| b        | .025     | .040 | 0.64        | 1.02  |
| b1       | .045     | .065 | 1.15        | 1.65  |
| c        | .014     | .022 | 0.35        | 0.56  |
| D        | .580     | .630 | 14.73       | 16.00 |
| E        | .390     | .420 | 9.91        | 10.66 |
| e        | .100 BSC |      | 2.54 BSC    |       |
| F        | .045     | .055 | 1.14        | 1.40  |
| H1       | .230     | .270 | 5.85        | 6.85  |
| J1       | .090     | .110 | 2.29        | 2.79  |
| k        | 0        | .015 | 0           | 0.38  |
| L        | .500     | .550 | 12.70       | 13.97 |
| L1       | .110     | .230 | 2.79        | 5.84  |
| $\phi P$ | .139     | .161 | 3.53        | 4.08  |
| Q        | .100     | .125 | 2.54        | 3.18  |

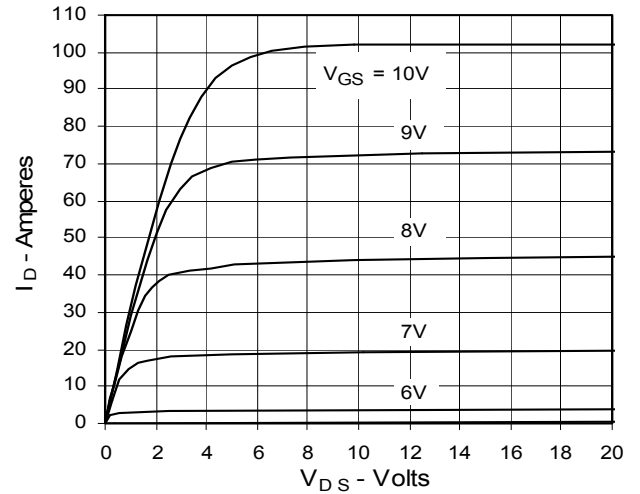
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 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  
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692  
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

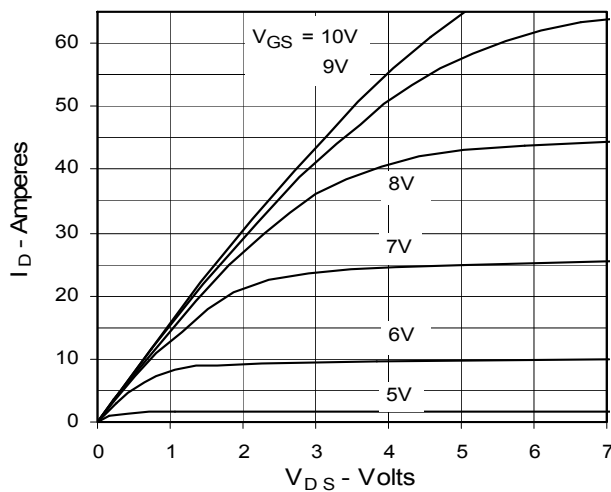
**Fig. 1. Output Characteristics  
@ 25°C**



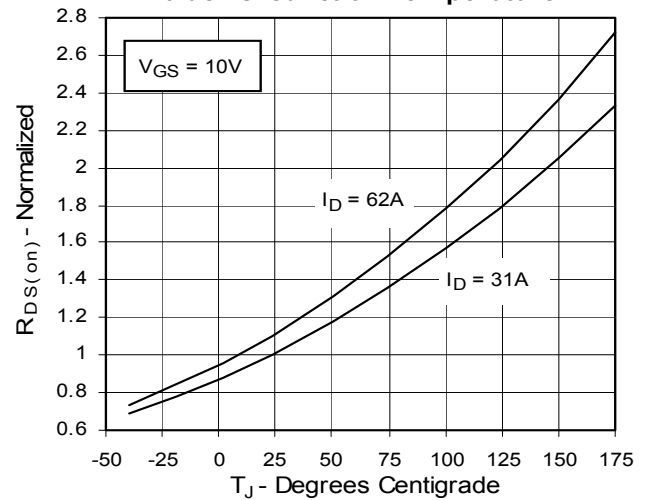
**Fig. 2. Extended Output Characteristics  
@ 25°C**



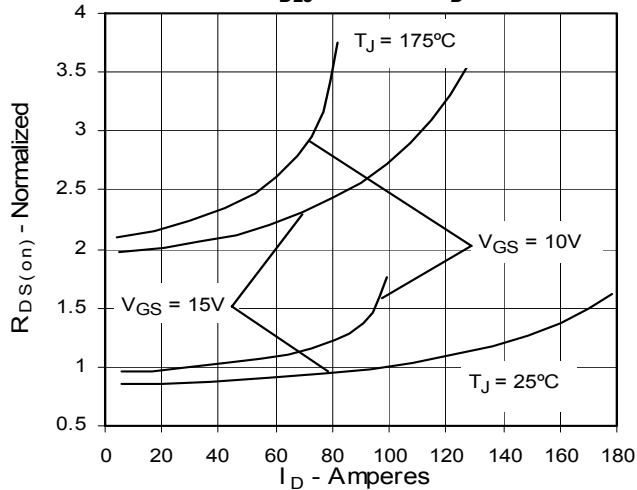
**Fig. 3. Output Characteristics  
@ 150°C**



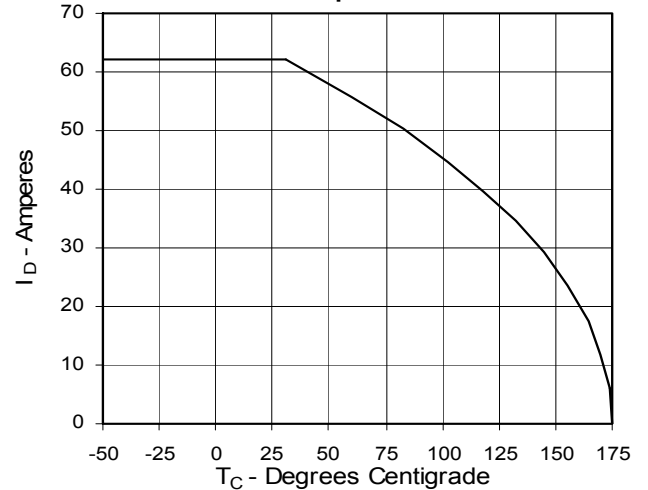
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$   
Value vs. Junction Temperature**



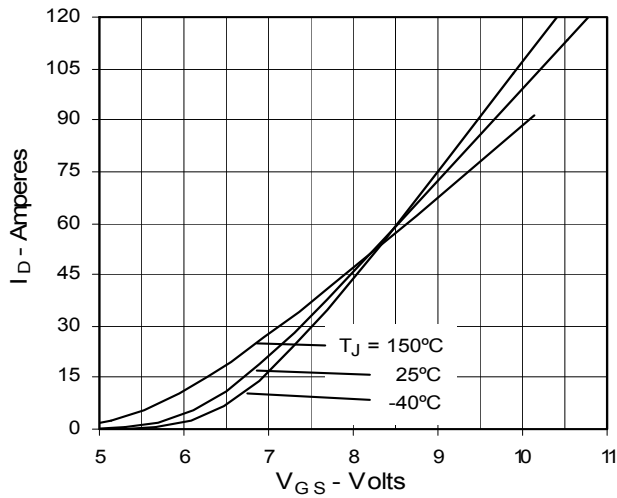
**Fig. 5.  $R_{DS(on)}$  Normalized to  
0.5  $I_{D25}$  Value vs.  $I_D$**



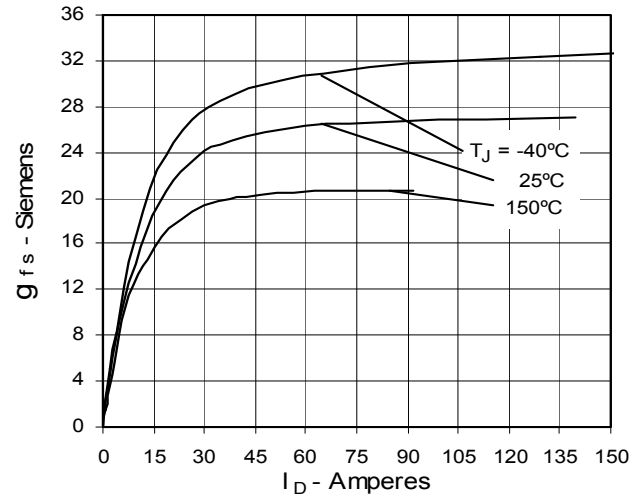
**Fig. 6. Drain Current vs. Case  
Temperature**



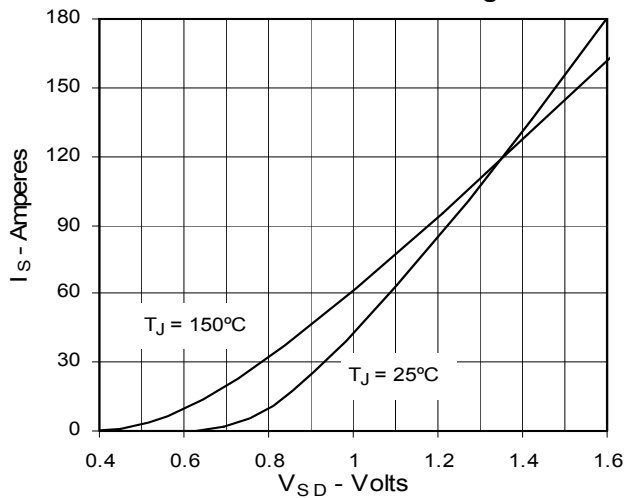
**Fig. 7. Input Admittance**



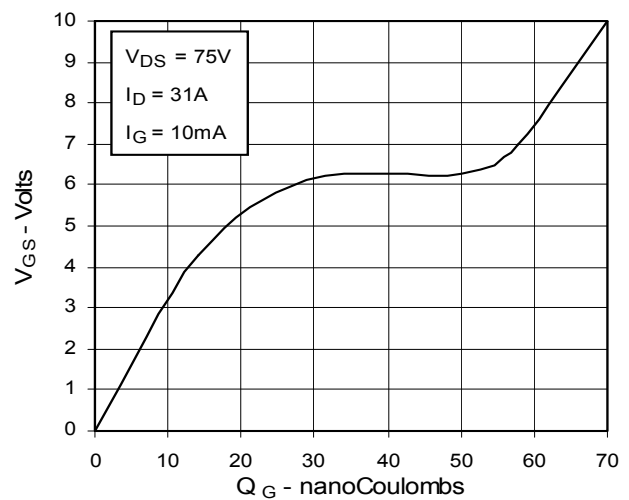
**Fig. 8. Transconductance**



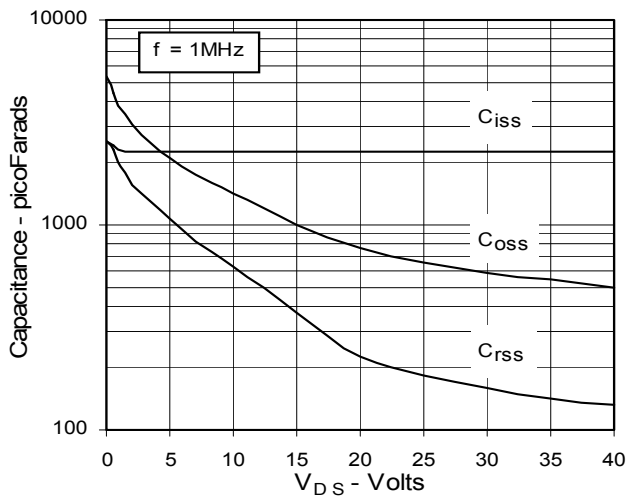
**Fig. 9. Source Current vs.  
Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias  
Safe Operating Area**

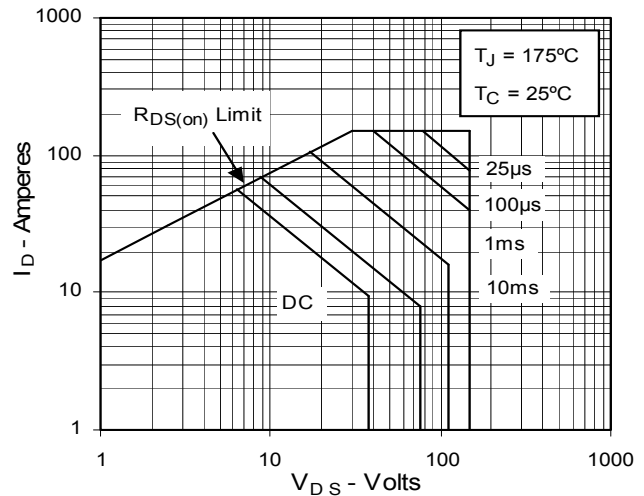
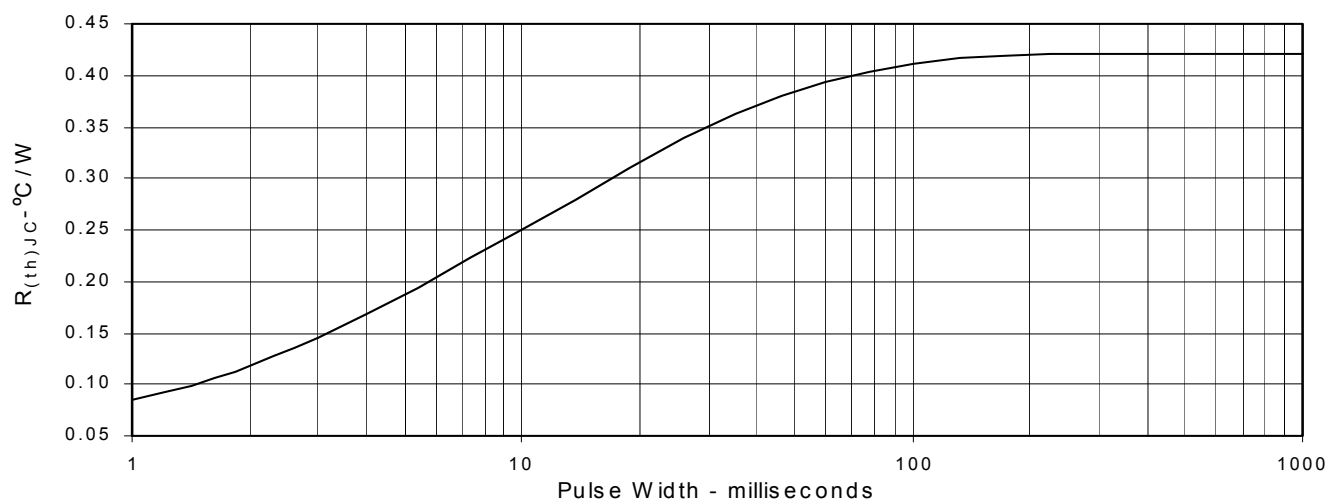


Fig. 13. Maximum Transient Thermal Resistance





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