

# PolarHT™ Power MOSFET

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

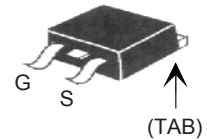
$V_{DSS} = 150 \text{ V}$   
 $I_{D25} = 62 \text{ A}$   
 $R_{DS(on)} \leq 40 \text{ m}\Omega$

N-Channel Enhancement Mode  
Avalanche Rated

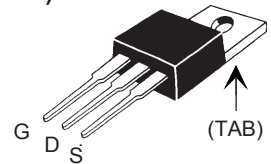


| Symbol        | Test Conditions  | Maximum Ratings |                  |
|---------------|--|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$   | 150             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$   | 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            | $^\circ\text{C}$ |
| <b>Md</b>     | 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                |

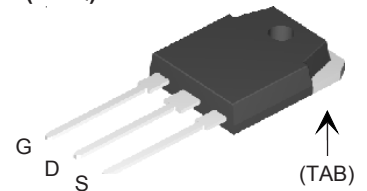
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



G = Gate      D = Drain  
S = Source      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 $\mu\text{A}$     |
|              |   |                       |      | 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

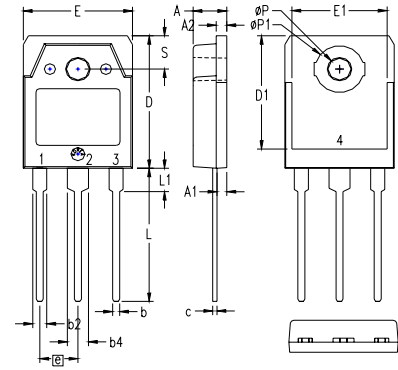
- <sup>1</sup> International standard packages
- <sup>1</sup> Unclamped Inductive Switching (UIS) rated
- <sup>1</sup> Low package inductance
- easy to drive and to protect

## Advantages

- <sup>1</sup> Easy to mount
- <sup>1</sup> Space savings
- <sup>1</sup> High power density

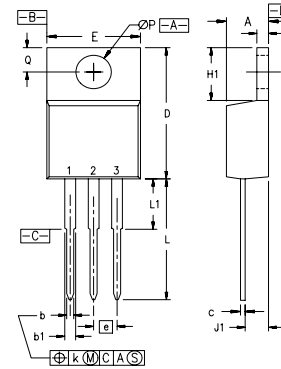
| Symbol       | Test Conditions  | Characteristic Values  |      |                        |
|--------------|--|--|------|------------------------|
|              |  | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |                        |
|              |  | Min.   | Typ. | 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                     |
| $R_{thJC}$   |  |  |      | $0.42^\circ\text{C/W}$ |
| $R_{thCS}$   | (TO-3P)  | 0.21   |      | $^\circ\text{C/W}$     |
|              | (TO-220)   | 0.25   |      | $^\circ\text{C/W}$     |

| Symbol   | Test Conditions   | Characteristic Values  |      |               |
|----------|---|--|------|---------------|
|          |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |               |
|          |   | 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-3P (IXTQ) Outline**


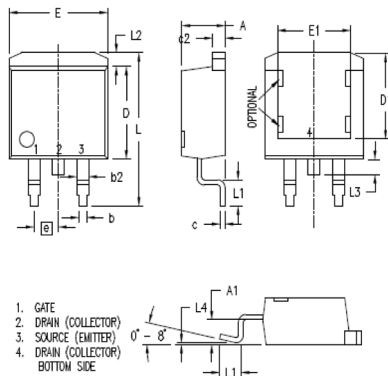
- 1 - GATE  
2 - DRAIN (COLLECTOR)  
3 - SOURCE (EMITTER)  
4 - DRAIN (COLLECTOR)

| 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**


- Pins: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| 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  |

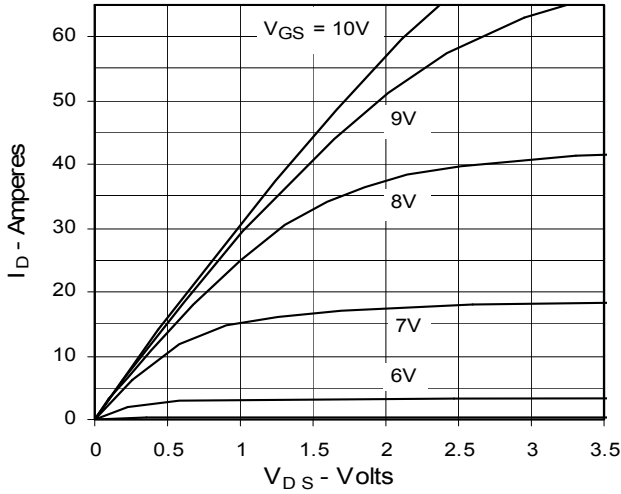
**TO-263 (IXTA) Outline**


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .160     | .190 | 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  |

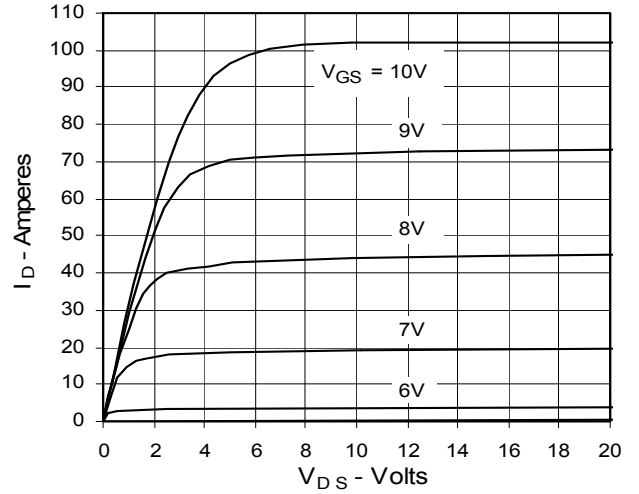
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IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585  
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692  
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

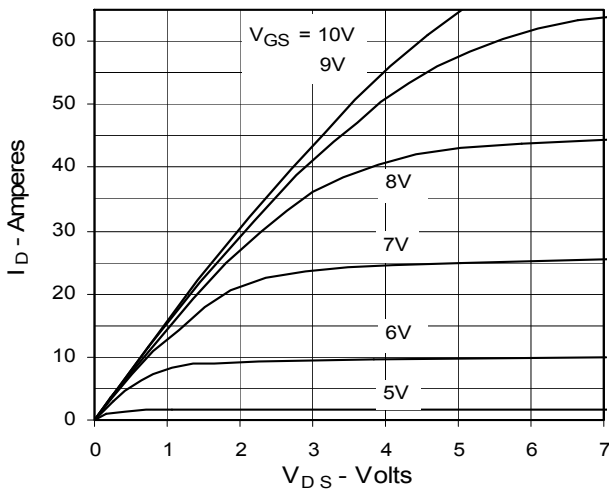
**Fig. 1. Output Characteristics  
@ 25°C**



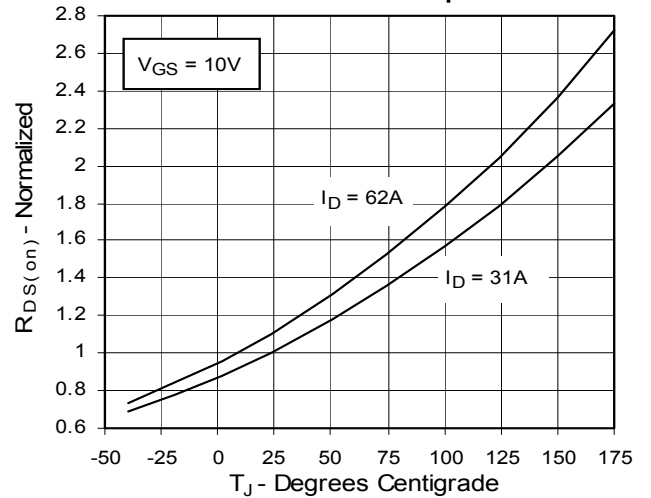
**Fig. 2. Extended Output Characteristics  
@ 25°C**



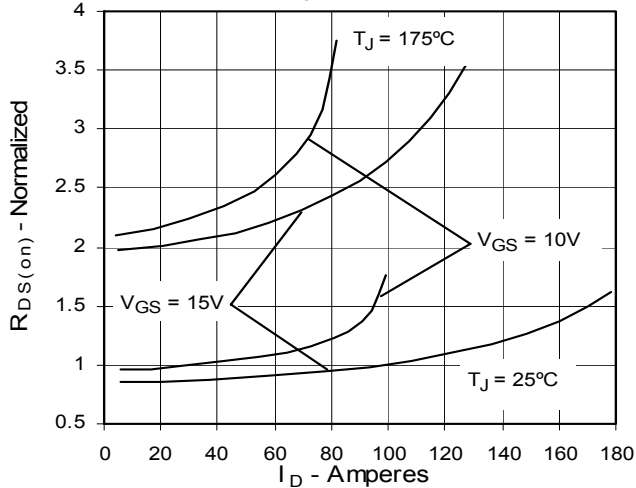
**Fig. 3. Output Characteristics  
@ 150°C**



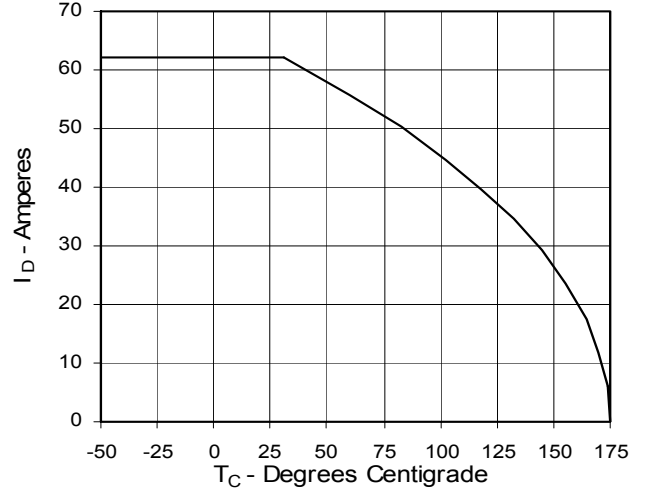
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$   
Value vs. Junction Temperature**



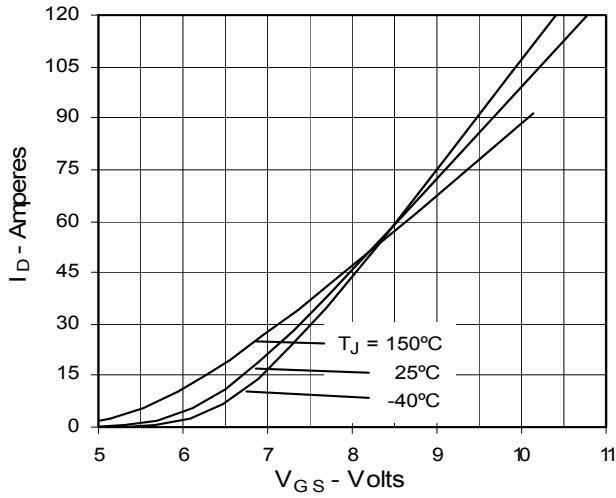
**Fig. 5.  $R_{DS(on)}$  Normalized to  
0.5  $I_{D25}$  Value vs.  $I_D$**



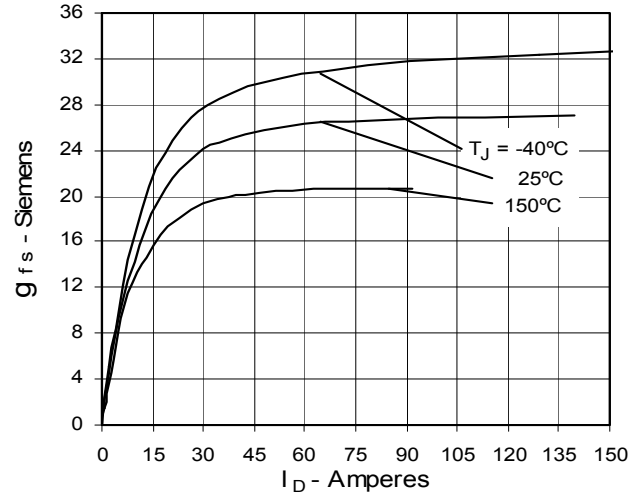
**Fig. 6. Drain Current vs. Case  
Temperature**



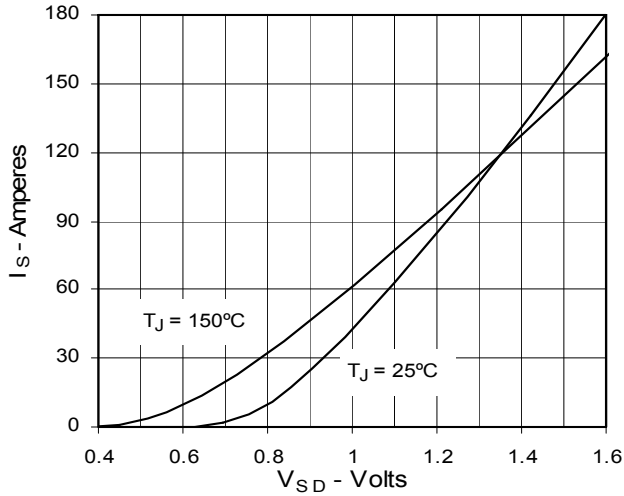
**Fig. 7. Input Admittance**



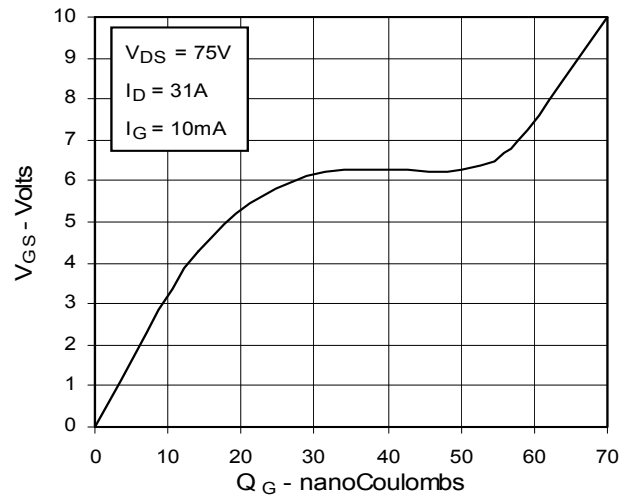
**Fig. 8. Transconductance**



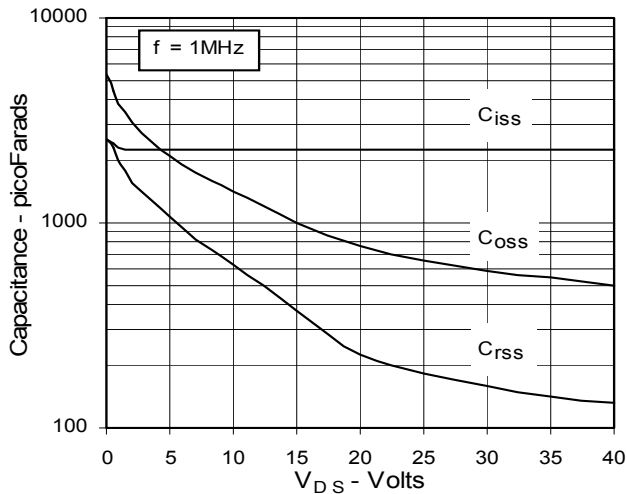
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

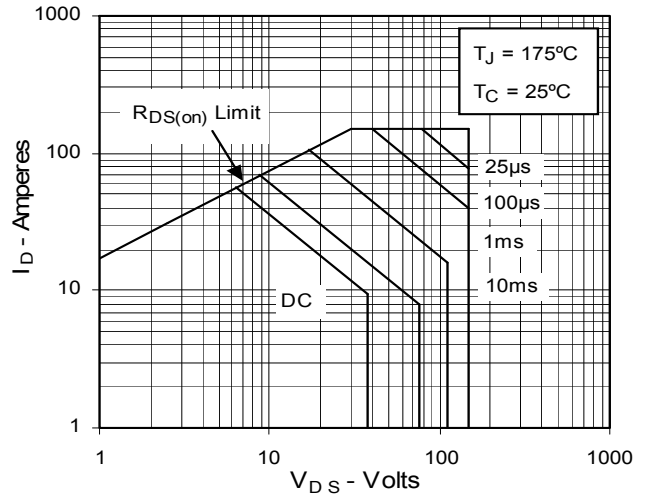
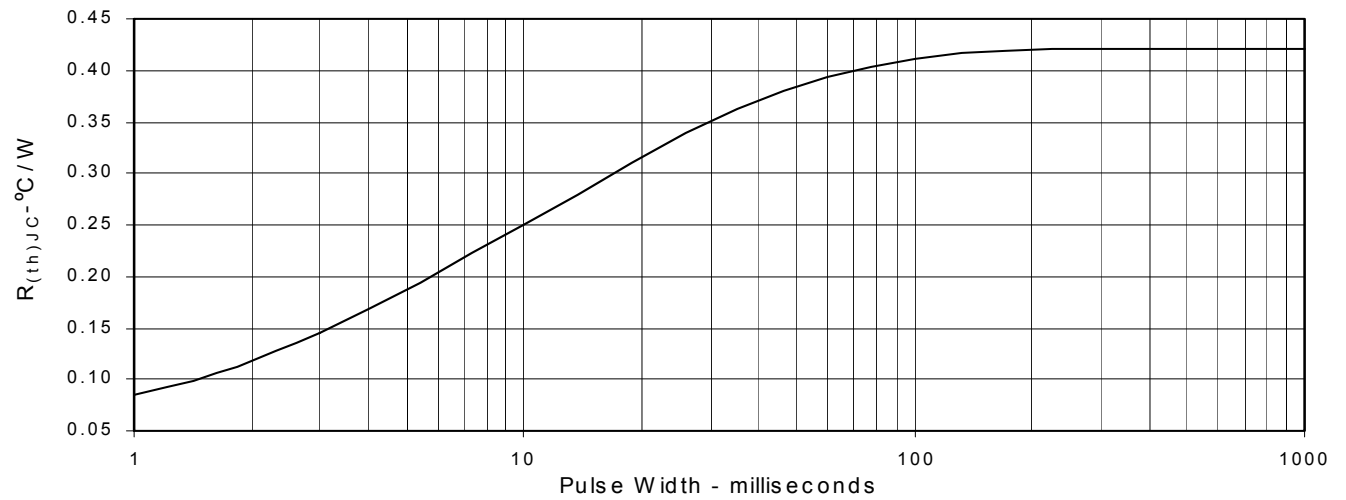


Fig. 13. Maximum Transient Thermal Resistance





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