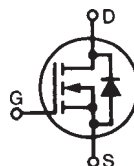


## PolarHT™ Power MOSFET

IXTA 36N30P  
IXTP 36N30P  
IXTQ 36N30P

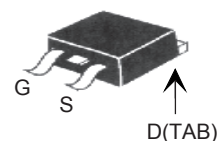
$$\begin{aligned} V_{DSS} &= 300 \text{ V} \\ I_{D25} &= 36 \text{ A} \\ R_{DS(on)} &\leq 110 \text{ m}\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated

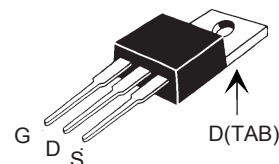


| Symbol     | Test Conditions                                                                                                                          | Maximum Ratings |                  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                                                                                           | 300             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$                                                               | 300             | V                |
| $V_{GS}$   | Continuous                                                                                                                               | $\pm 30$        | V                |
| $V_{GSM}$  | Transient                                                                                                                                | $\pm 40$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                 | 36              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                               | 90              | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                 | 36              | 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             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                 | 300             | W                |
| $T_J$      |                                                                                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                          | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                          | -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                                                                                                                    | 260             | $^\circ\text{C}$ |
| $M_d$      | Mounting torque (TO-3P / TO-220)                                                                                                         | 1.13/10         | Nm/lb.in.        |
| Weight     | TO-3P                                                                                                                                    | 5.5             | g                |
|            | TO-220                                                                                                                                   | 4               | g                |
|            | TO-263                                                                                                                                   | 3               | g                |

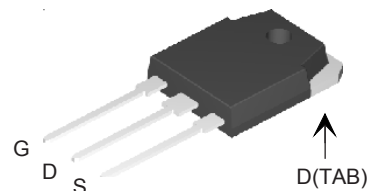
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



G = Gate  
S = Source

D = Drain  
TAB = Drain

### Features

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

### Advantages

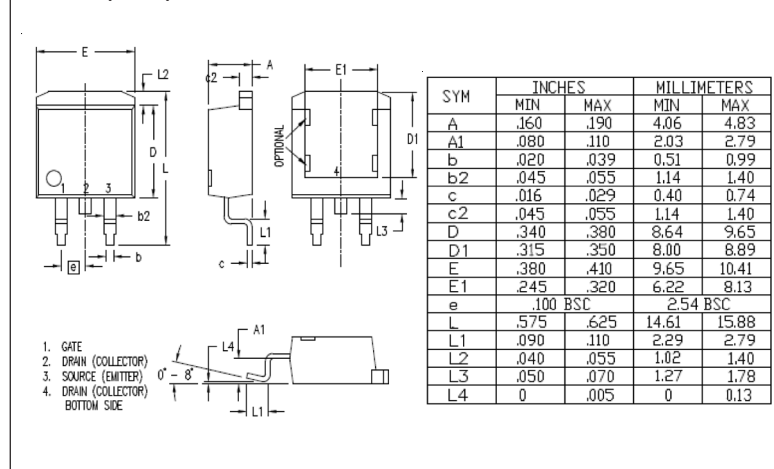
- † Easy to mount
- † Space savings
- † High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                     | Characteristic Values |      |                                      |
|--------------|-----------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------------------------|
|              |                                                                                                                 | Min.                  | Typ. | Max.                                 |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                | 300                   |      | 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>$T_J = 125^\circ\text{C}$                                       |                       |      | 1 $\mu\text{A}$<br>200 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$ | 92                    | 110  | $\text{m}\Omega$                     |

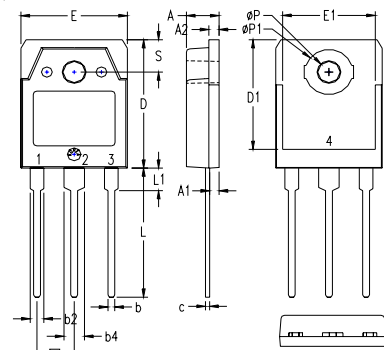
| Symbol       | Test Conditions                                                                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                        |
|--------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------------------------|
|              |                                                                                                    | Min.                                                                              | Typ. | Max.                   |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = 0.5 I_{D25}$ , pulse test                                          | 12                                                                                | 22   | S                      |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                |                                                                                   | 2250 | pF                     |
| $C_{oss}$    |                                                                                                    |                                                                                   | 370  | pF                     |
| $C_{rss}$    |                                                                                                    |                                                                                   | 90   | pF                     |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = I_{D25}$<br>$R_G = 10\ \Omega$ (External) |                                                                                   | 24   | ns                     |
| $t_r$        |                                                                                                    |                                                                                   | 30   | ns                     |
| $t_{d(off)}$ |                                                                                                    |                                                                                   | 97   | ns                     |
| $t_f$        |                                                                                                    |                                                                                   | 28   | ns                     |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$                              |                                                                                   | 70   | nC                     |
| $Q_{gs}$     |                                                                                                    |                                                                                   | 17   | nC                     |
| $Q_{gd}$     |                                                                                                    |                                                                                   | 35   | nC                     |
| $R_{thJC}$   |                                                                                                    |                                                                                   |      | $0.42^\circ\text{C/W}$ |
| $R_{thCS}$   | (TO-3P)                                                                                            | 0.21                                                                              |      | $^\circ\text{C/W}$     |
|              | (TO-220)                                                                                           | 0.25                                                                              |      | $^\circ\text{C/W}$     |

| Source-Drain Diode |                                                                                                          | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|--------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
| Symbol             | Test Conditions                                                                                          | Min.                                                                              | Typ. | Max.          |
| $I_S$              | $V_{GS} = 0\text{ V}$                                                                                    |                                                                                   |      | 36 A          |
| $I_{SM}$           | Repetitive                                                                                               |                                                                                   |      | 90 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         |
| $t_{rr}$           | $I_F = 25\text{ A}$ , $-di/dt = 100\text{ A}/\mu\text{s}$                                                |                                                                                   | 250  | ns            |
| $Q_{RM}$           | $V_R = 100\text{ V}$ , $V_{GS} = 0\text{ V}$                                                             |                                                                                   | 2.0  | $\mu\text{C}$ |

### TO-263 (IXTA) Outline

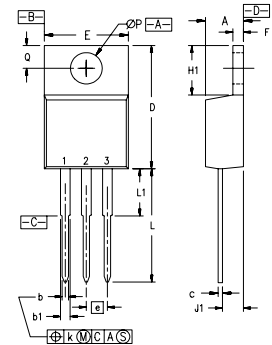


### TO-3P (IXTQ) Outline



| 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  |
| ØP  | .126     | .134 | 3.20        | 3.40  |
| ØP1 | .272     | .280 | 6.90        | 7.10  |
| S   | .193     | .201 | 4.90        | 5.10  |

### TO-220 (IXTP) Outline

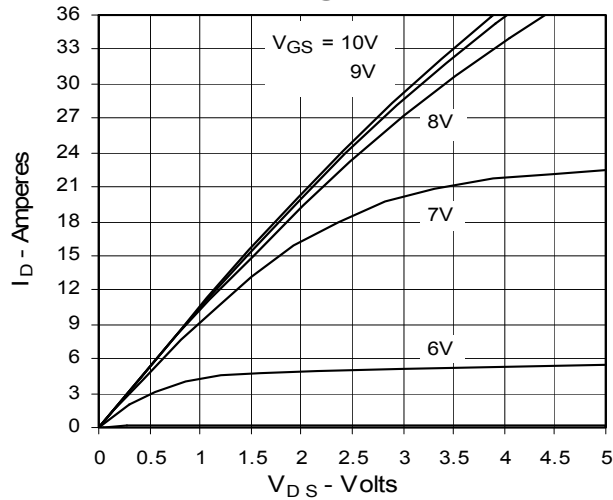


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .170     | .190 | 4.32        | 4.83  |
| b   | .025     | .040 | 0.64        | 1.02  |
| b1  | .045     | .065 | 1.15        | 1.65  |
| c   | .014     | .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  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| Q   | .100     | .125 | 2.54        | 3.18  |

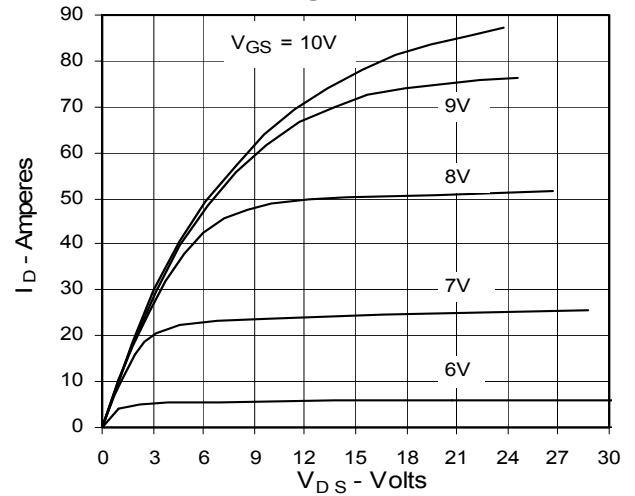
IXYS reserves the right to change limits, test conditions, and dimensions.

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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

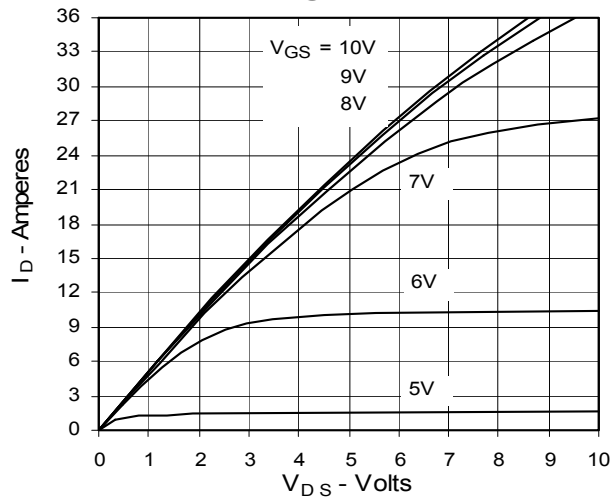
**Fig. 1. Output Characteristics**  
**@ 25°C**



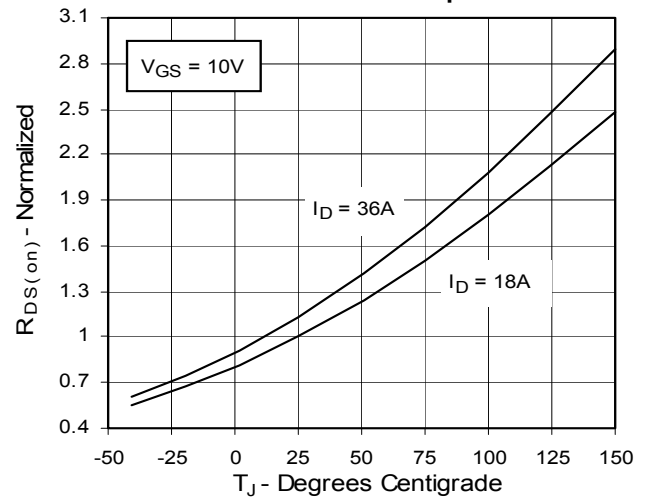
**Fig. 2. Extended Output Characteristics**  
**@ 25°C**



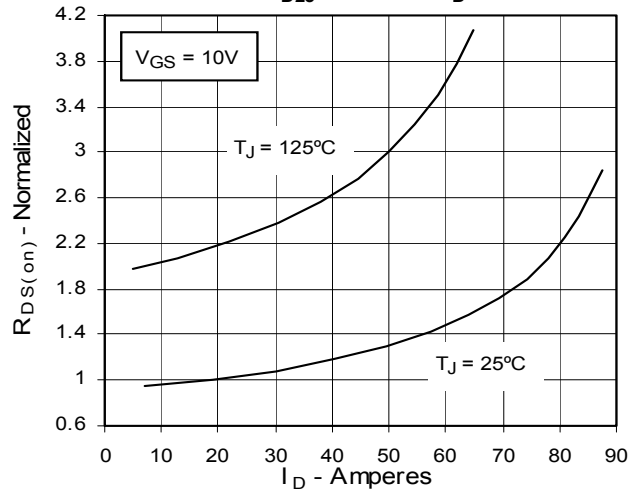
**Fig. 3. Output Characteristics**  
**@ 125°C**



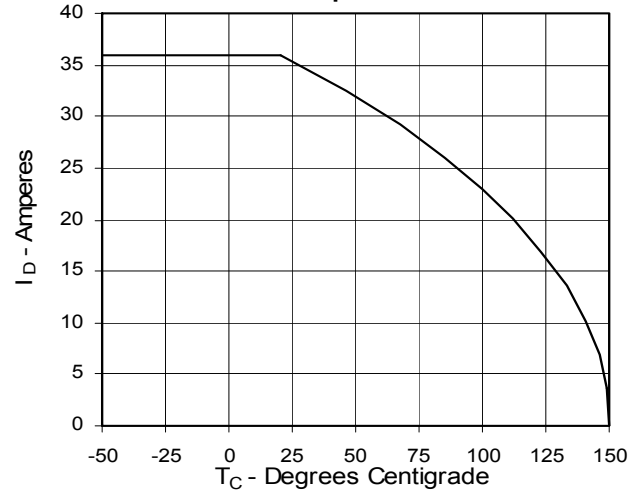
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**



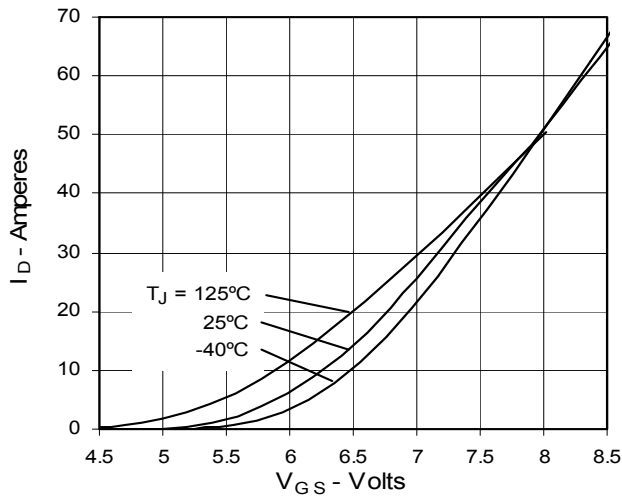
**Fig. 5.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



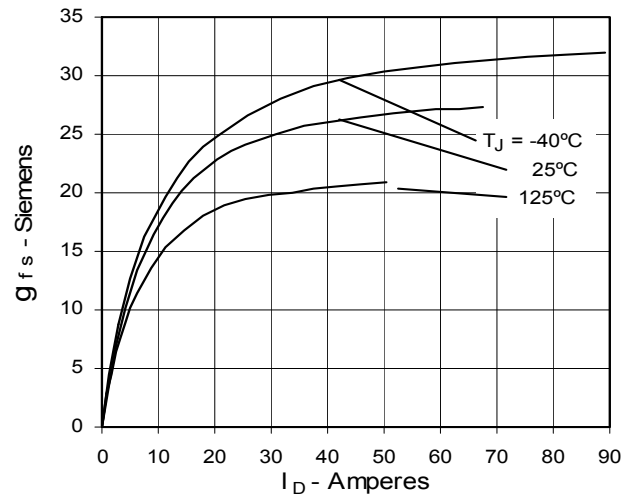
**Fig. 6. Drain Current vs. Case Temperature**



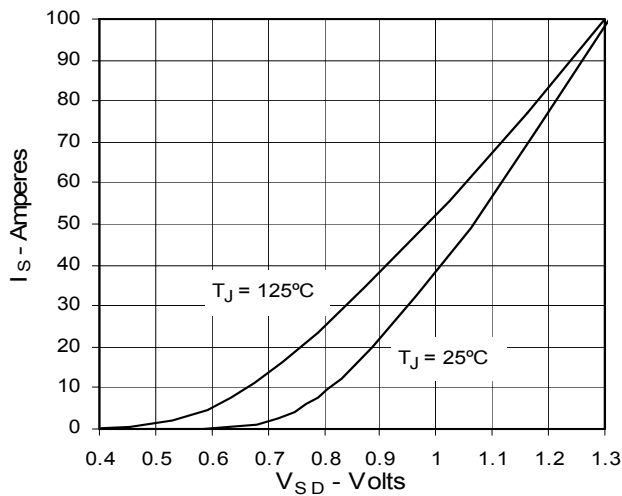
**Fig. 7. Input Admittance**



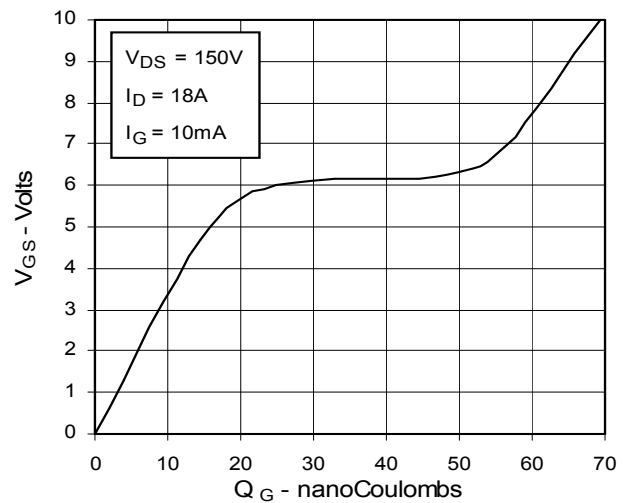
**Fig. 8. Transconductance**



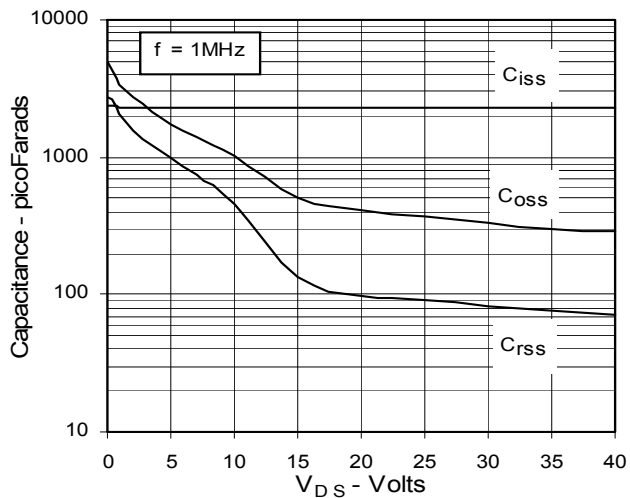
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

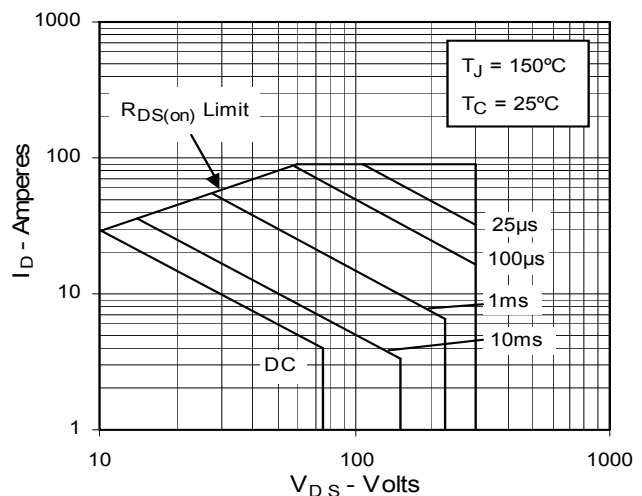
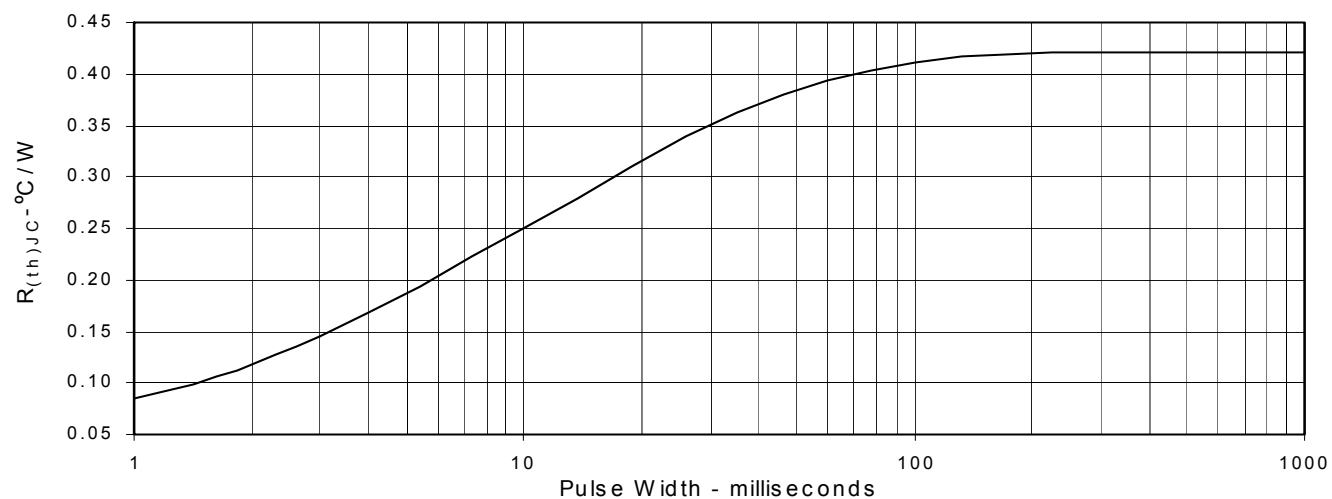


Fig. 13. Maximum Transient Thermal Resistance





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