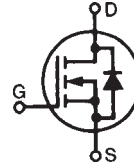


# PolarHT™ Power MOSFET

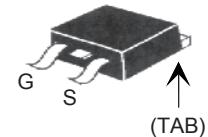
**IXTA 75N10P**  
**IXTP 75N10P**  
**IXTQ 75N10P**

$V_{DSS} = 100 \text{ V}$   
 $I_{D25} = 75 \text{ A}$   
 $R_{DS(on)} \leq 25 \text{ m}\Omega$

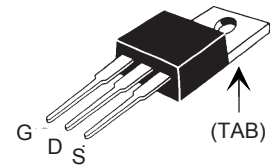
N-Channel Enhancement Mode  
Avalanche Rated



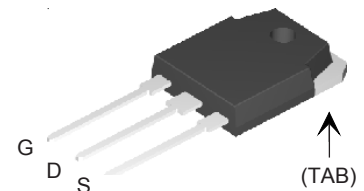
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



G = Gate      D = Drain  
S = Source      TAB = Drain

| Symbol     | Test Conditions  | Maximum Ratings |                  |
|------------|--|-----------------|------------------|
|            |  |                 |                  |
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$   | 100             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$   | 100             | V                |
| $V_{GS}$   | Continuous   | $\pm 20$        | V                |
| $V_{GSM}$  | Transient  | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$   | 75              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$   | 200             | 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             |
| $P_D$      | $T_C = 25^\circ\text{C}$   | 360             | W                |
| $T_J$      |  | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$   |  | 175             | $^\circ\text{C}$ |
| $T_{stg}$  |  | -55 ... +175    | $^\circ\text{C}$ |
| $T_L$      | 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                |

## Features

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

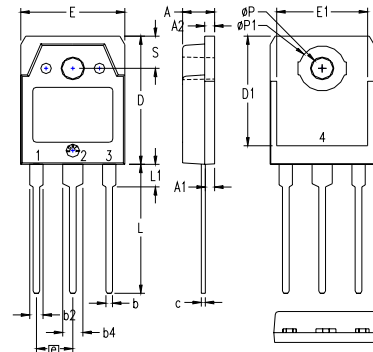
## Advantages

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

| Symbol       | Test Conditions  | Characteristic Values |      |                      |
|--------------|--|-----------------------|------|----------------------|
|              |  | Min.                  | Typ. | Max.                 |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$   | 100                   |      | 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>$T_J = 125^\circ\text{C}$  |                       |      | 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 $d \leq 2 \%$ | 21                    |      | 25 $\text{m}\Omega$  |

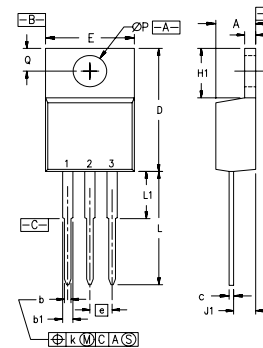
| Symbol       | Test Conditions  | Characteristic Values  |      |           |
|--------------|--|--|------|-----------|
|              |  | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |           |
|              |  | Min.   | Typ. | Max.      |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test   | 20   | 28   | S         |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                    |  | 2250 | pF        |
| $C_{oss}$    |  | 890  | pF   |           |
| $C_{rss}$    |  | 275  | 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        |
| $t_r$        |  | 53   | ns   |           |
| $t_{d(off)}$ |  | 66   | ns   |           |
| $t_f$        |  | 45   | ns   |           |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                  |  | 74   | nC        |
| $Q_{gs}$     |  | 18   | nC   |           |
| $Q_{gd}$     |  | 40   | nC   |           |
| $R_{thJC}$   |  |  |      | 0.42 °C/W |
| $R_{thCK}$   | (TO-3P)  | 0.21   |      | °C/W      |
|              | (TO-220)   | 0.25   |      | °C/W      |

| Symbol   | Test Conditions   | Characteristic Values  |      |               |
|----------|---|--|------|---------------|
|          |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |               |
|          |   | Min.   | Typ. | Max.          |
| $I_s$    | $V_{GS} = 0\text{ V}$   |  |      | 75 A          |
| $I_{SM}$ | Repetitive  |  |      | 200 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         |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$  |  | 120  | ns            |
| $Q_{RM}$ | $V_R = 50\text{ V}$   |  | 2.0  | $\mu\text{C}$ |

**TO-3P (IXTQ) Outline**


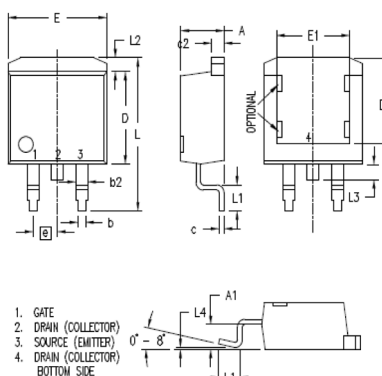
- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - DRAIN (COLLECTOR)

| 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
- 4 - 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  |

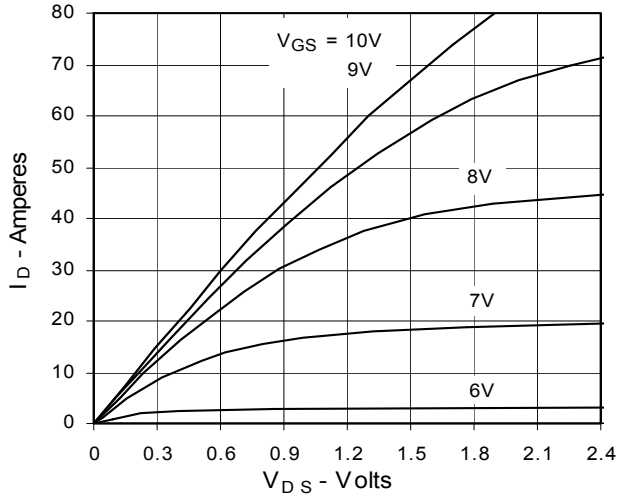
**TO-263 (IXTA) Outline**


| 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  |

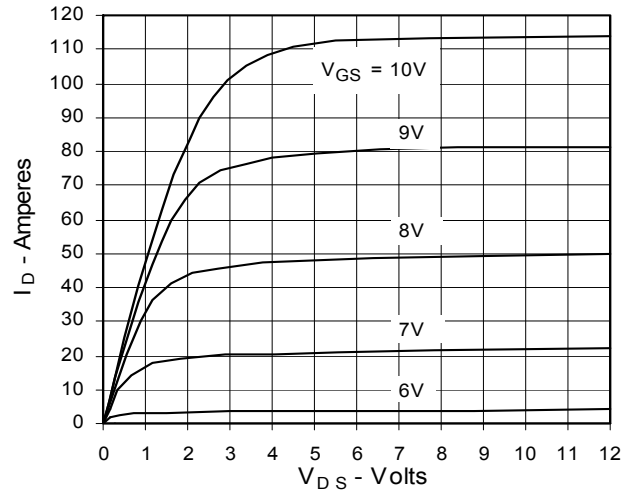
IXYS reserves the right to change limits, test conditions, and dimensions.

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 6,710,405B2 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

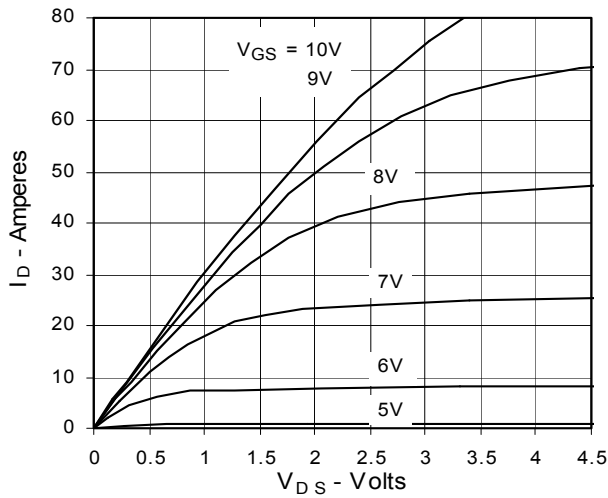
**Fig. 1. Output Characteristics**  
@ 25°C



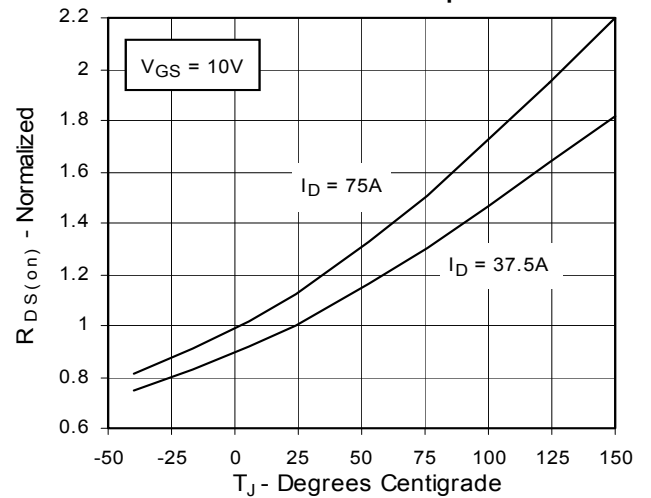
**Fig. 2. Extended Output Characteristics**  
@ 25°C



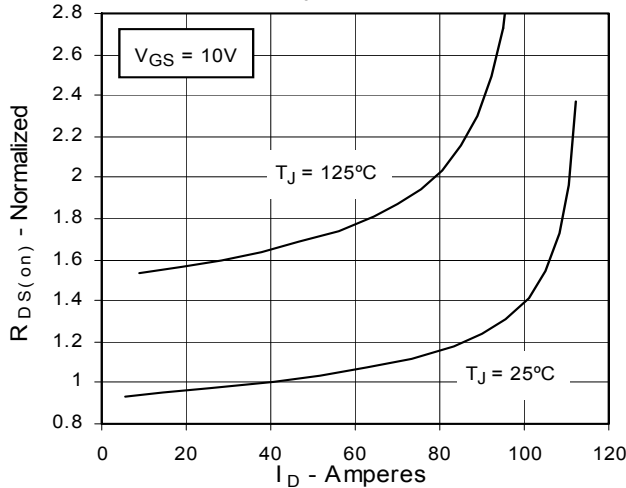
**Fig. 3. Output Characteristics**  
@ 125°C



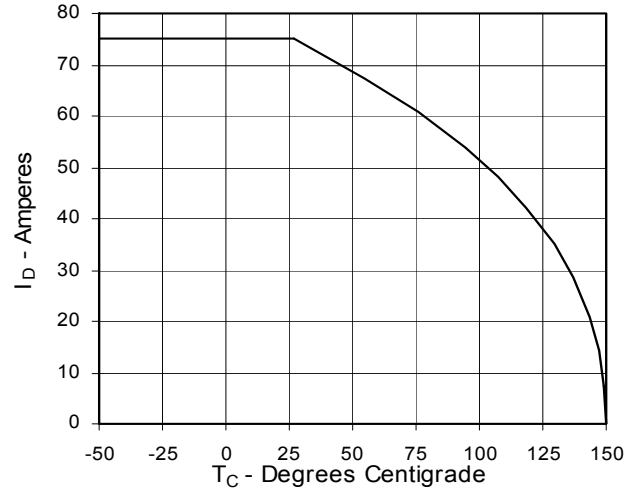
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**



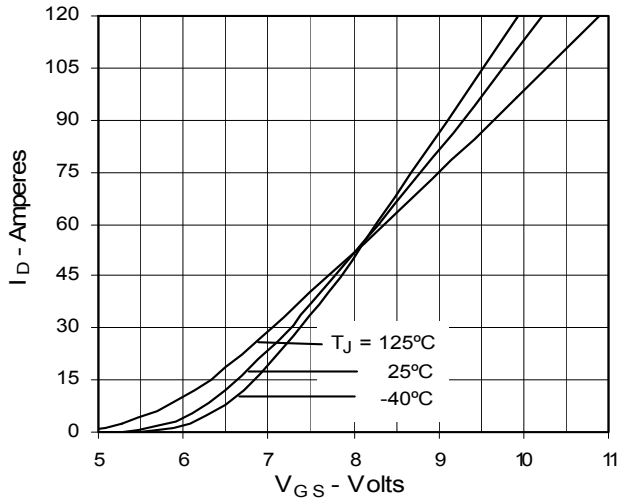
**Fig. 5.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



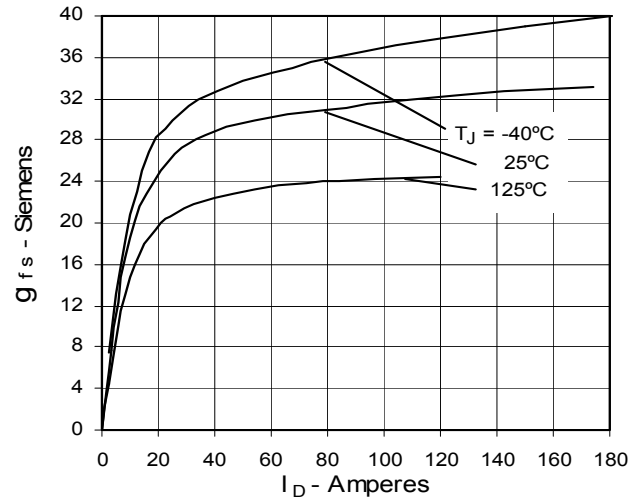
**Fig. 6. Drain Current vs. Case Temperature**



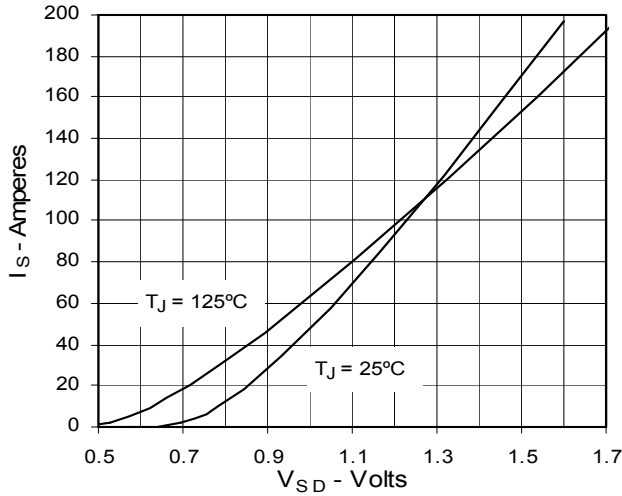
**Fig. 7. Input Admittance**



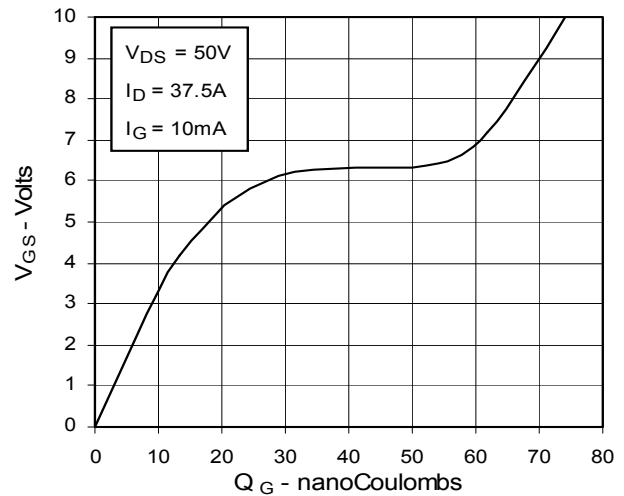
**Fig. 8. Transconductance**



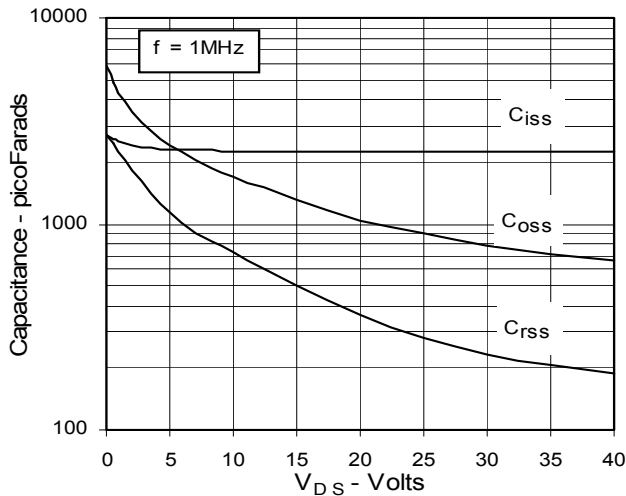
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

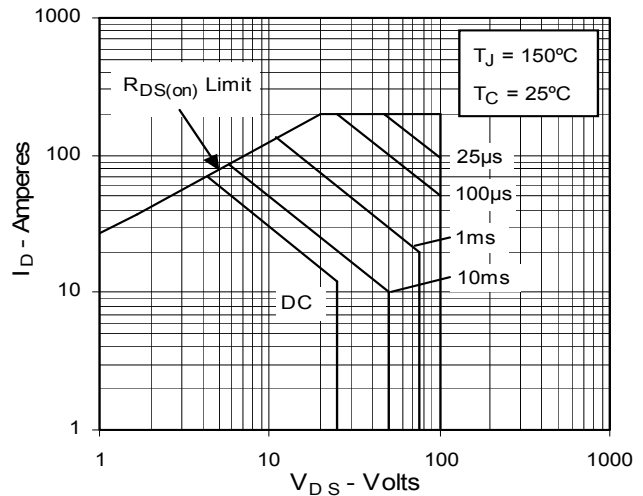
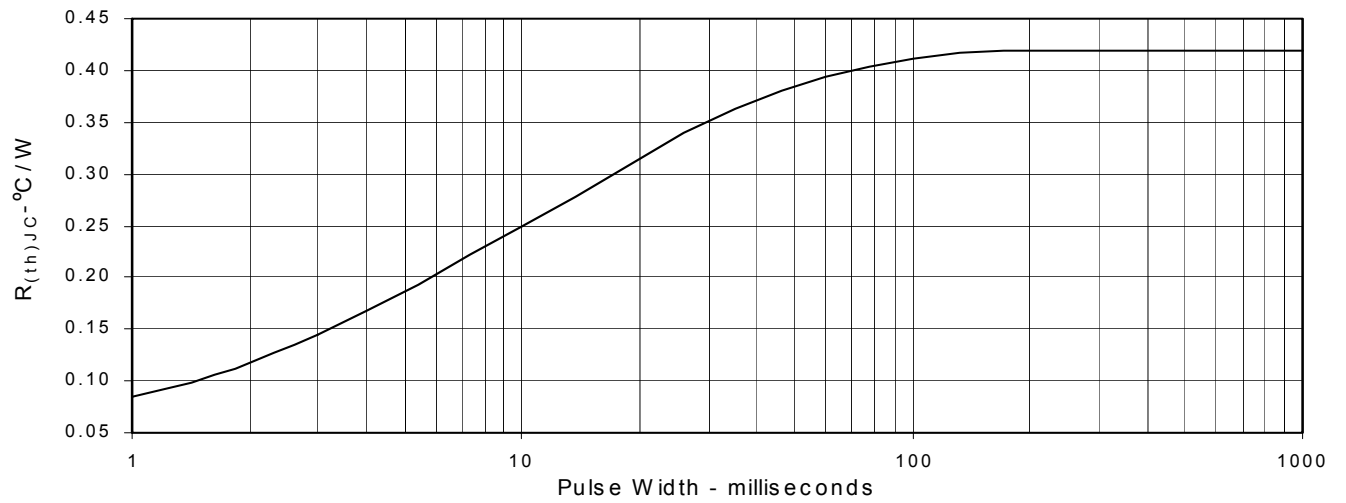


Fig. 13. Maximum Transient Thermal Resistance





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