

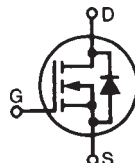
# High Current MegaMOS™FET

**IXTK 120N25**

$$\begin{aligned} V_{DSS} &= 250 \text{ V} \\ I_{D25} &= 120 \text{ A} \\ R_{DS(on)} &= 20 \text{ m}\Omega \end{aligned}$$

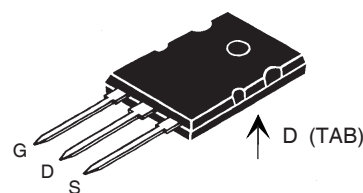
N-Channel Enhancement Mode

Preliminary Data Sheet



| Symbol        | Test conditions                                                                                                                       | Maximum ratings |                  |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                       | 250             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1.0 \text{ M}\Omega$                                                      | 250             | V                |
| $V_{GS}$      | Continuous                                                                                                                            | $\pm 20$        | V                |
| $V_{GSM}$     | Transient                                                                                                                             | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$ MOSFET chip capability                                                                                       | 120             | A                |
| $I_{D(RMS)}$  | External lead current limit                                                                                                           | 75              | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                            | 480             | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                              | 90              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                              | 80              | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$                                                                                                              | 4.0             | J                |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 10              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$                                                                                                              | 730             | 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 (0.063 in.) from case for 10 s                                                                                                 | 300             | $^\circ\text{C}$ |
| $M_d$         | Mounting torque                                                                                                                       | 0.7/6           | Nm/lb.in.        |
| <b>Weight</b> | TO-264                                                                                                                                | 10              | g                |

TO-264 AA (IXTK)



G = Gate      D = Drain  
S = Source      Tab = Drain

## Features

- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- International standard package
- Fast switching times

## Applications

- Motor controls
- DC choppers
- Switched-mode power supplies

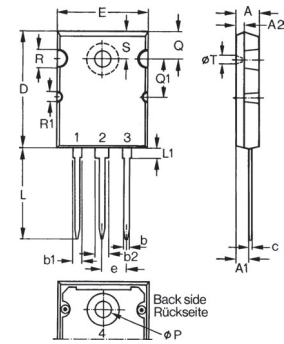
## Advantages

- Easy to mount with one screw (isolated mounting screw hole)
- Space savings
- High power density

| Symbol       | Test Conditions                                                                                                | Characteristic Values |      |                          |
|--------------|----------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                                                                | Min.                  | Typ. | Max.                     |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$                                                                  | 250                   |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                                                                    | 2.0                   |      | 4.0 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V DC}$ , $V_{DS} = 0$                                                                  |                       |      | $\pm 200 \text{ nA}$     |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$                                                                    |                       |      | 50 $\mu\text{A}$<br>3 mA |
|              | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                                                          |                       |      |                          |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \text{ ms}$ , duty cycle $d \leq 2\%$ |                       |      | 20 m $\Omega$            |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified)                         | Characteristic values |      |          |
|--------------|---------------------------------------------------------------------------------------------------|-----------------------|------|----------|
|              |                                                                                                   | Min.                  | Typ. | Max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test                                            | 65                    | 98   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                     |                       | 7700 | pF       |
| $C_{oss}$    |                                                                                                   |                       | 1700 | pF       |
| $C_{rss}$    |                                                                                                   |                       | 600  | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1.5\ \Omega$ (External) |                       | 35   | ns       |
| $t_r$        |                                                                                                   |                       | 38   | ns       |
| $t_{d(off)}$ |                                                                                                   |                       | 175  | ns       |
| $t_f$        |                                                                                                   |                       | 35   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                   |                       | 360  | nC       |
| $Q_{gs}$     |                                                                                                   |                       | 63   | nC       |
| $Q_{gd}$     |                                                                                                   |                       | 180  | nC       |
| $R_{thJC}$   |                                                                                                   |                       | 0.15 | 0.17 K/W |
| $R_{thCK}$   |                                                                                                   |                       |      | K/W      |

TO-264 AA Outline



| Dim. | Millimeter |       | Inches   |       |
|------|------------|-------|----------|-------|
|      | Min.       | Max.  | Min.     | Max.  |
| A    | 4.82       | 5.13  | .190     | .202  |
| A1   | 2.54       | 2.89  | .100     | .114  |
| A2   | 2.00       | 2.10  | .079     | .083  |
| b    | 1.12       | 1.42  | .044     | .056  |
| b1   | 2.39       | 2.69  | .094     | .106  |
| b2   | 2.90       | 3.09  | .114     | .122  |
| c    | 0.53       | 0.83  | .021     | .033  |
| D    | 25.91      | 26.16 | 1.020    | 1.030 |
| E    | 19.81      | 19.96 | .780     | .786  |
| e    | 5.46 BSC   |       | .215 BSC |       |
| J    | 0.00       | 0.25  | .000     | .010  |
| K    | 0.00       | 0.25  | .000     | .010  |
| L    | 20.32      | 20.83 | .800     | .820  |
| L1   | 2.29       | 2.59  | .090     | .102  |
| P    | 3.17       | 3.66  | .125     | .144  |
| Q    | 6.07       | 6.27  | .239     | .247  |
| Q1   | 8.38       | 8.69  | .330     | .342  |
| R    | 3.81       | 4.32  | .150     | .170  |
| R1   | 1.78       | 2.29  | .070     | .090  |
| S    | 6.04       | 6.30  | .238     | .248  |
| T    | 1.57       | 1.83  | .062     | .072  |

### Source-Drain Diode

### Ratings and Characteristics ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

| Symbol   | Test Conditions                                                                                       | Min. | Typ. | Max.          |
|----------|-------------------------------------------------------------------------------------------------------|------|------|---------------|
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                 |      |      | 120 A         |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$                                                           |      |      | 480 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         |
| $t_{rr}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                            |      | 350  | ns            |
| $Q_{rr}$ |                                                                                                       |      | 4    | $\mu\text{C}$ |

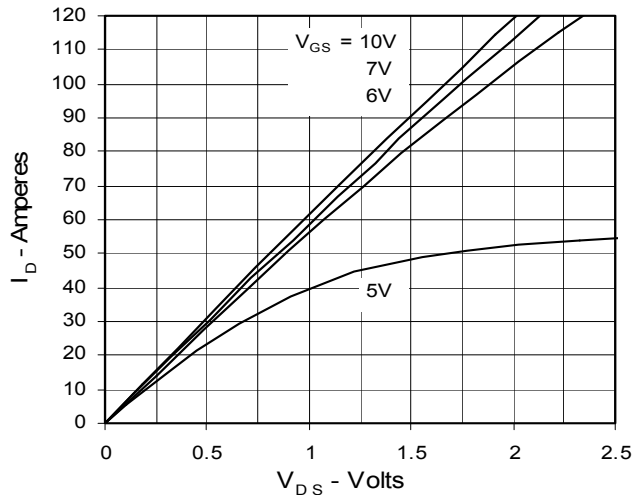
IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:

4,835,592    4,881,106    5,017,508    5,049,961    5,187,117    5,486,715  
4,850,072    4,931,844    5,034,796    5,063,307    5,237,481    5,381,025

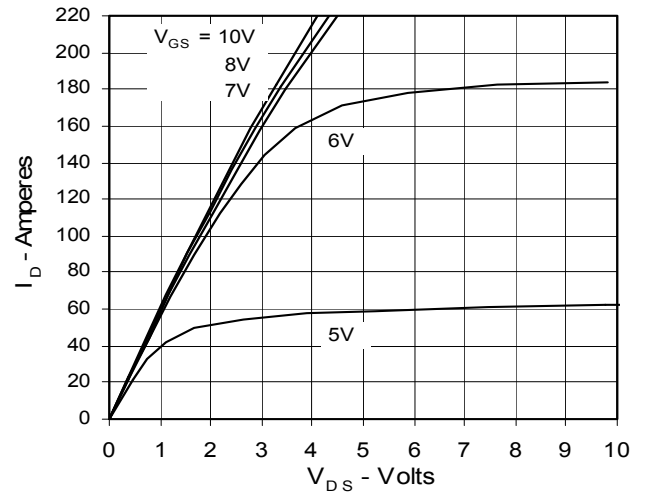
6,306,728B1

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

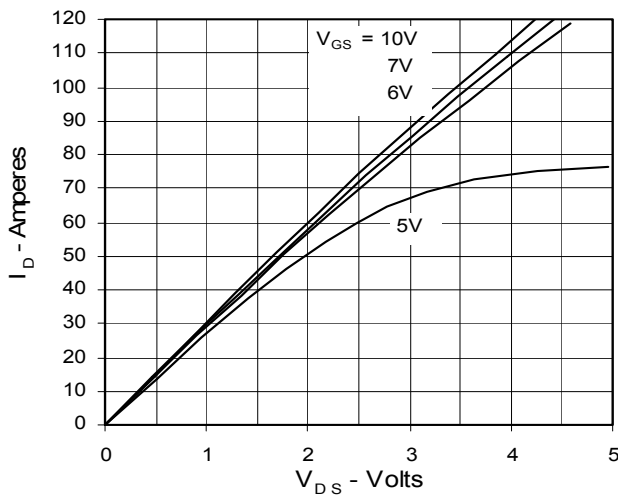
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



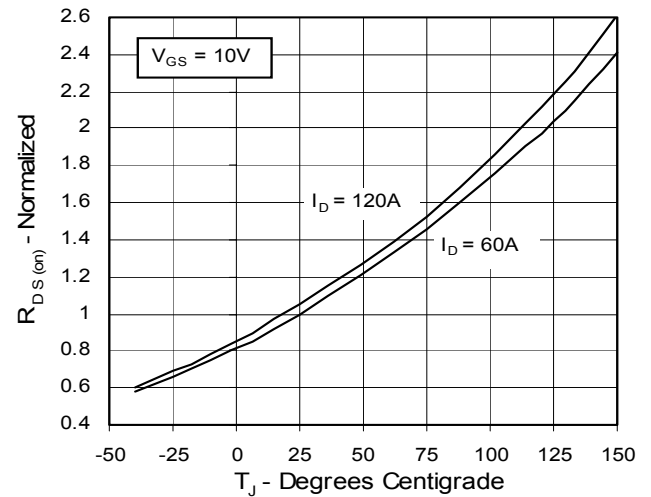
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



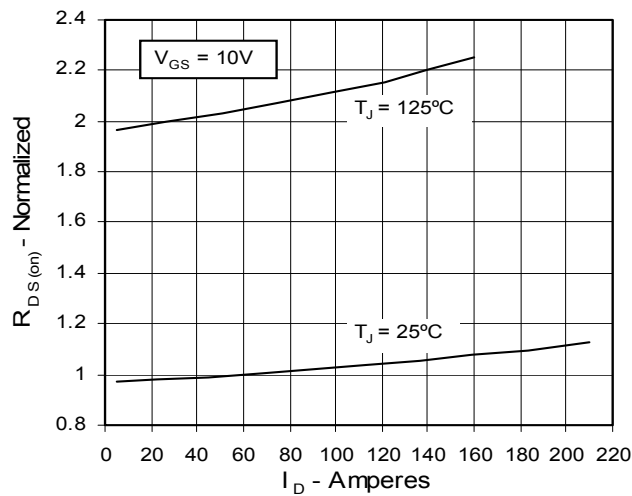
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



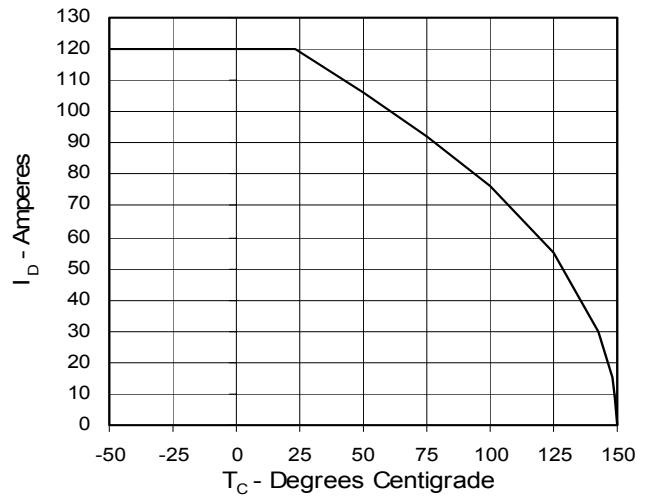
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  
Junction Temperature**



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



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



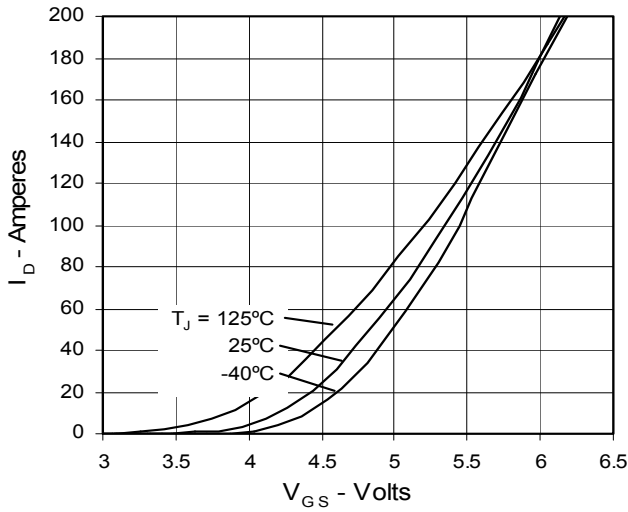
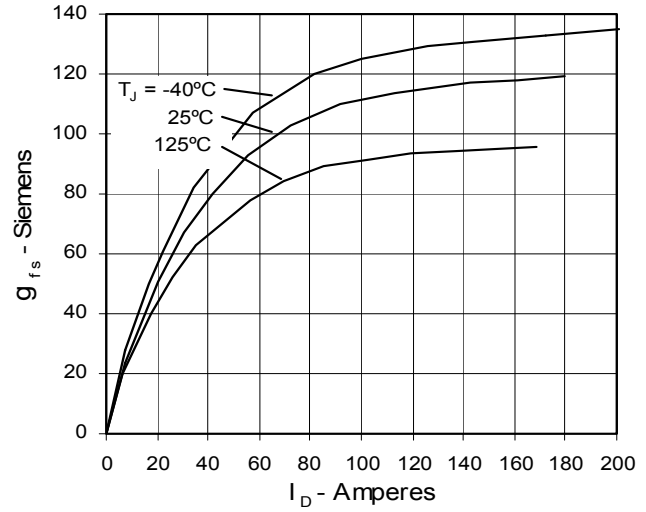
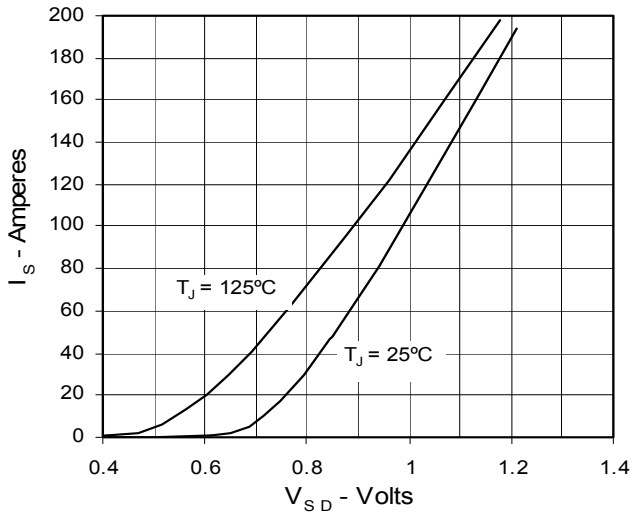
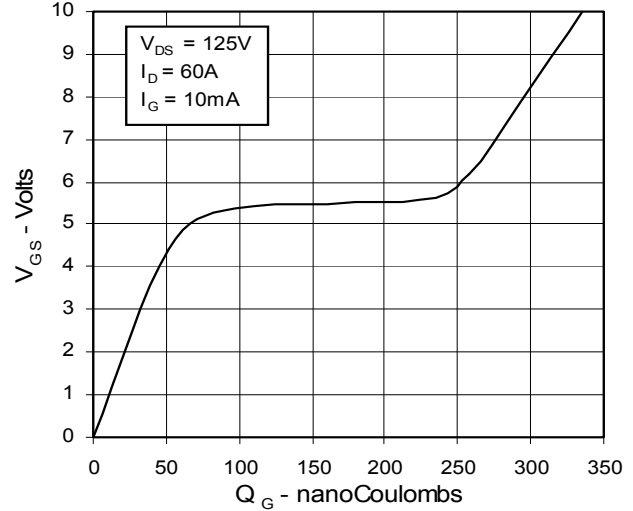
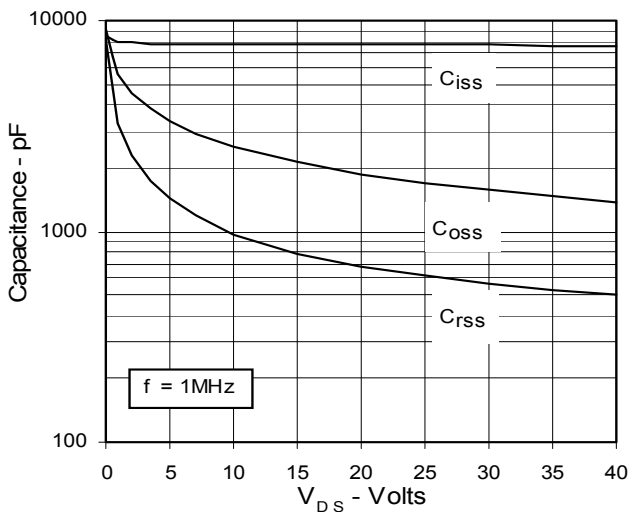
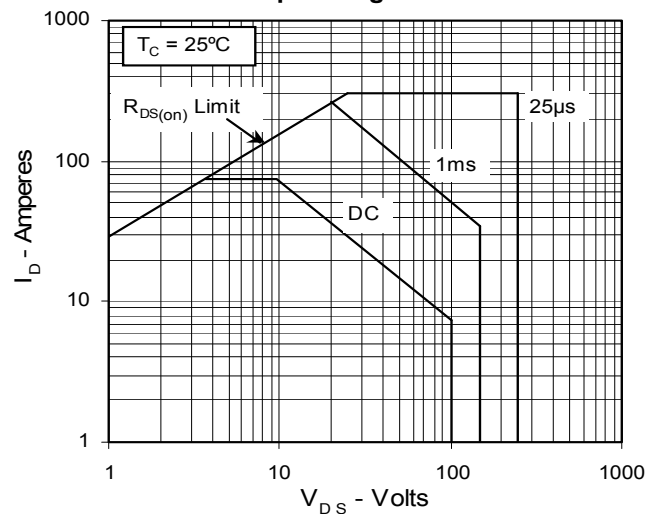
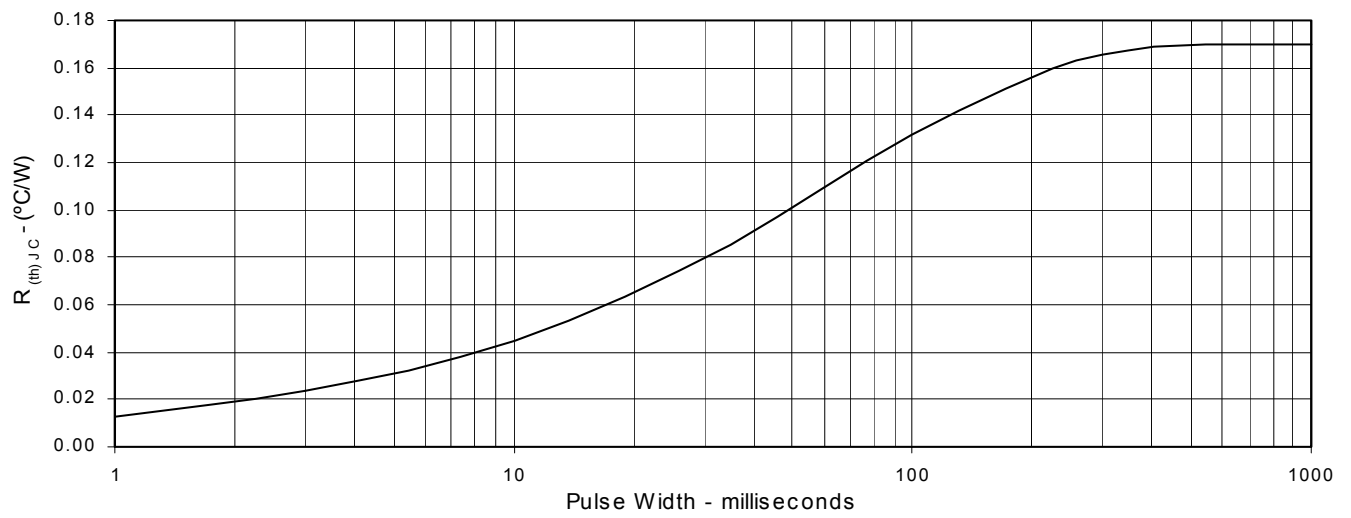
**Fig. 7. Input Admittance**

**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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