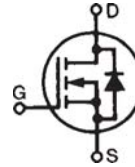


# Linear Power MOSFET IXTK22N100L With Extended FBSOA IXTX22N100L

N-Channel Enhancement Mode



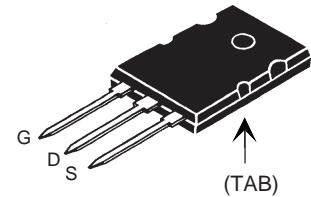
$$V_{DSS} = 1000 \text{ V}$$

$$I_{D25} = 22 \text{ A}$$

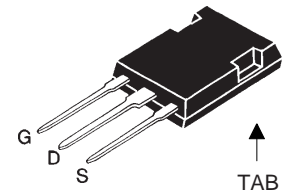
$$R_{DS(on)} \leq 0.60 \text{ } \Omega$$

| Symbol     | Test Conditions  | Maximum Ratings   |                  |
|------------|--|-------------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                | 1000              | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$ | 1000              | V                |
| $V_{GS}$   | Continuous   | $\pm 30$          | V                |
| $V_{GSM}$  | Transient  | $\pm 40$          | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$   | 22                | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                     | 50                | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$   | 22                | A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$   | 60                | mJ               |
| $E_{AS}$   |  | 1.5               | J                |
| $P_D$      | $T_C = 25^\circ\text{C}$   | 700               | W                |
| $T_J$      |  | -55 to +150       | $^\circ\text{C}$ |
| $T_{JM}$   |  | 150               | $^\circ\text{C}$ |
| $T_{stg}$  |  | -55 to +150       | $^\circ\text{C}$ |
| $T_L$      | 1.6 mm (0.063 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-264)   | 1.13/10           | Nm/lb.in.        |
| $F_c$      | Mounting force (PLUS247™)  | 20...120/4.5...27 | N/lb.            |
| Weight     | PLUS247  | 6                 | g                |
|            | TO-264   | 10                | g                |

TO-264 (IXTK)



PLUS247™ (IXTX)



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

## Features

- Designed for linear operation
- International standard package
- Unclamped Inductive switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

## Applications

- Programmable loads
- Current regulators
- DC-DC converters
- Battery chargers
- DC choppers
- Temperature and lighting controls

## 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.                 |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$          | 1000  |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \text{ } \mu\text{A}$   | 3   |      | V                    |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$   |   |      | $\pm 200 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$           | $T_J = 25^\circ\text{C}$  |      | 50 $\mu\text{A}$     |
|              |  | $T_J = 125^\circ\text{C}$   |      | 1 mA                 |
| $R_{DS(on)}$ | $V_{GS} = 20 \text{ V}$ , $I_D = 0.5 I_{D25}$ , Note 1 |   |      | 0.60 $\Omega$        |

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

| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                    | S |
|--------------|--|---|------|--------------------|---|
|              |  | Min.  | Typ. | Max.               |   |
| $g_{fs}$     | $V_{DS} = 20\text{ V}$ ; $I_D = 0.5 \cdot I_{D25}$ , Note 1  | 4.5   | 7.0  | 9.5                | S |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$  | 7050  |      | pF                 |   |
| $C_{oss}$    |  | 600   |      | pF                 |   |
| $C_{rss}$    |  | 100   |      | pF                 |   |
| $t_{d(on)}$  | $V_{GS} = 15\text{ V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2\ \Omega$ (External), | 36  |      | ns                 |   |
| $t_r$        |  | 35  |      | ns                 |   |
| $t_{d(off)}$ |  | 80  |      | ns                 |   |
| $t_f$        |  | 50  |      | ns                 |   |
| $Q_{g(on)}$  | $V_{GS} = 15\text{ V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                  | 270   |      | nC                 |   |
| $Q_{gs}$     |  | 70  |      | nC                 |   |
| $Q_{gd}$     |  | 110   |      | nC                 |   |
| $R_{thJC}$   |  | 0.18  |      | $^\circ\text{C/W}$ |   |
| $R_{thCS}$   |  | 0.15  |      | $^\circ\text{C/W}$ |   |

### Safe Operating Area Specification

| Symbol | Test Conditions   | Min. | Typ. | Max. |
|--------|---|------|------|------|
| SOA    | $V_{DS} = 800\text{ V}$ , $I_D = 0.3\text{ A}$ , $T_C = 90^\circ\text{C}$ | 240  |      | W    |

### Source-Drain Diode

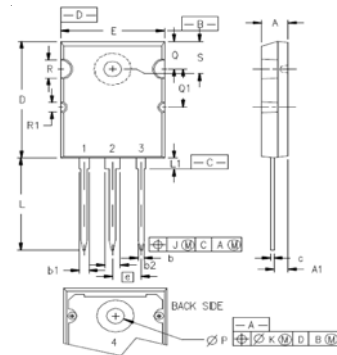
| Symbol   | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |       |
|----------|--|---|------|-------|
|          |  | Min.  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{ V}$  |   |      | 22 A  |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$                              |   |      | 50 A  |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{ V}$ , Note 1                             |   |      | 1.5 V |
| $t_{rr}$ | $I_F = I_S$ , $-di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$ |   | 1000 | ns    |

Note 1: Pulse test,  $t < 300\ \mu\text{s}$ , duty cycle,  $d \leq 2\%$

### ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

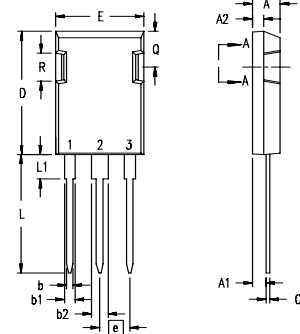
### TO-264 (IXTK) Outline



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

| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | .185     | .209  | 4.70        | 5.31  |
| A1  | .102     | .118  | 2.59        | 3.00  |
| b   | .037     | .055  | 0.94        | 1.40  |
| b1  | .087     | .102  | 2.21        | 2.59  |
| b2  | .110     | .126  | 2.79        | 3.20  |
| c   | .017     | .029  | 0.43        | 0.74  |
| D   | 1.007    | 1.047 | 25.58       | 26.59 |
| E   | .760     | .799  | 19.30       | 20.29 |
| e   | .215 BSC |       | 5.46 BSC    |       |
| J   | .000     | .010  | 0.00        | 0.25  |
| K   | .000     | .010  | 0.00        | 0.25  |
| L   | .779     | .842  | 19.79       | 21.39 |
| L1  | .087     | .102  | 2.21        | 2.59  |
| ØP  | .122     | .138  | 3.10        | 3.51  |
| Q   | .240     | .256  | 6.10        | 6.50  |
| Q1  | .330     | .346  | 8.38        | 8.79  |
| ØR  | .155     | .187  | 3.94        | 4.75  |
| ØR1 | .085     | .093  | 2.16        | 2.36  |
| S   | .243     | .253  | 6.17        | 6.43  |

### PLUS247™ (IXTX) Outline



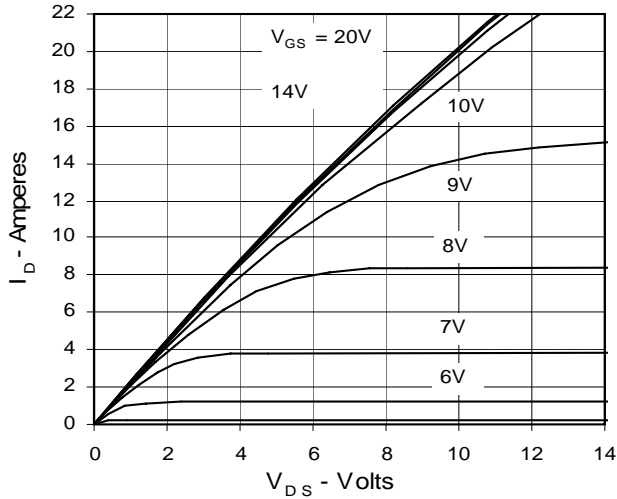
- Terminals: 1 - Gate  
2 - Drain (Collector)  
3 - Source (Emitter)  
4 - Drain (Collector)

| Dim.           | Millimeter |       | Inches   |       |
|----------------|------------|-------|----------|-------|
|                | Min.       | Max.  | Min.     | Max.  |
| A              | 4.83       | 5.21  | .190     | .205  |
| A <sub>1</sub> | 2.29       | 2.54  | .090     | .100  |
| A <sub>2</sub> | 1.91       | 2.16  | .075     | .085  |
| b              | 1.14       | 1.40  | .045     | .055  |
| b <sub>1</sub> | 1.91       | 2.13  | .075     | .084  |
| b <sub>2</sub> | 2.92       | 3.12  | .115     | .123  |
| C              | 0.61       | 0.80  | .024     | .031  |
| D              | 20.80      | 21.34 | .819     | .840  |
| E              | 15.75      | 16.13 | .620     | .635  |
| e              | 5.45 BSC   |       | .215 BSC |       |
| L              | 19.81      | 20.32 | .780     | .800  |
| L1             | 3.81       | 4.32  | .150     | .170  |
| Q              | 5.59       | 6.20  | .220     | 0.244 |
| R              | 4.32       | 4.83  | .170     | .190  |

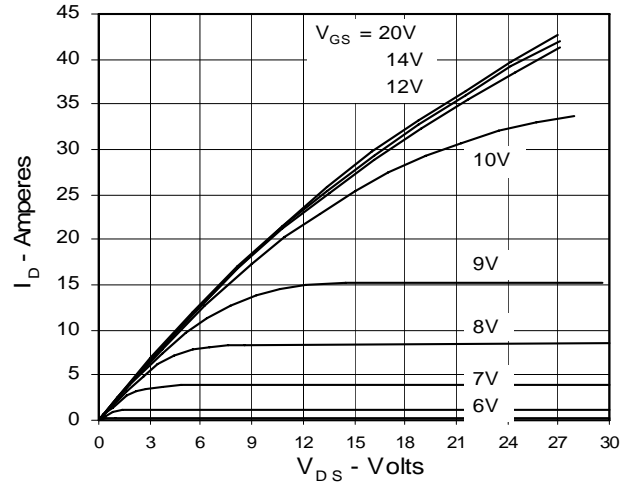
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 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 7,005,734 B2 7,157,338 B2  
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 7,063,975 B2  
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 7,071,537

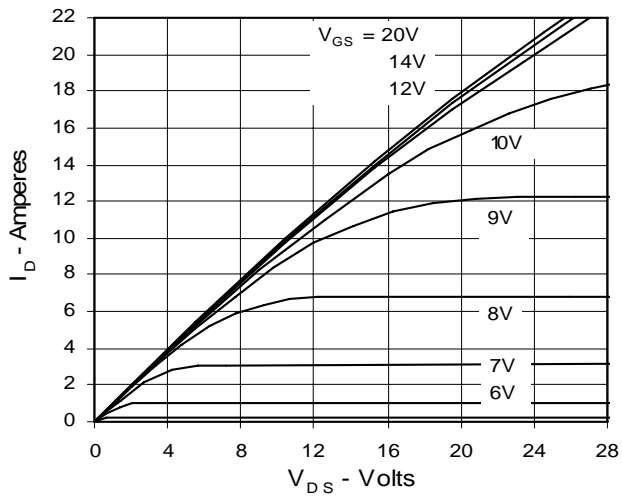
**Fig. 1. Output Characteristics  
@ 25°C**



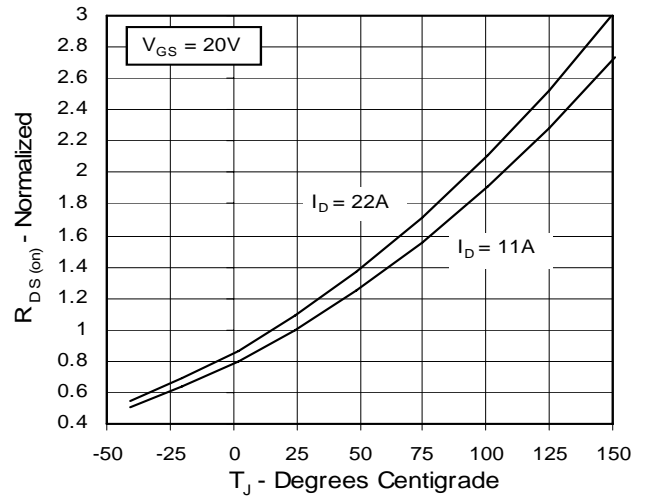
**Fig. 2. Extended Output Characteristics  
@ 25°C**



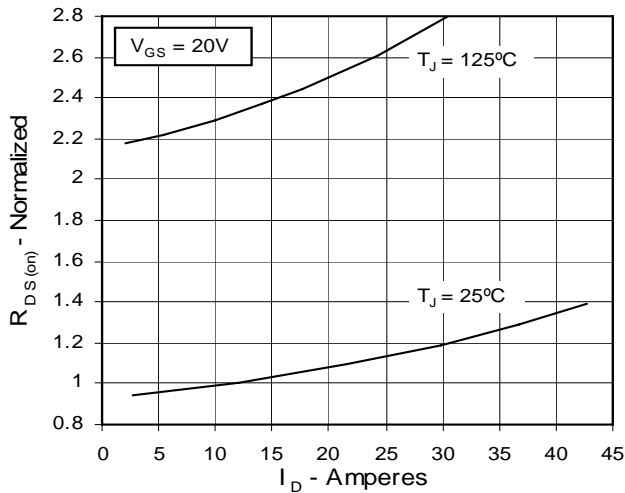
**Fig. 3. Output Characteristics  
@ 125°C**



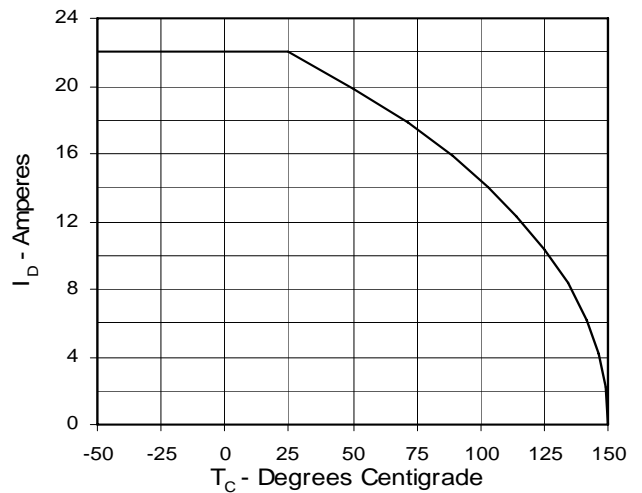
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value  
vs. Junction Temperature**



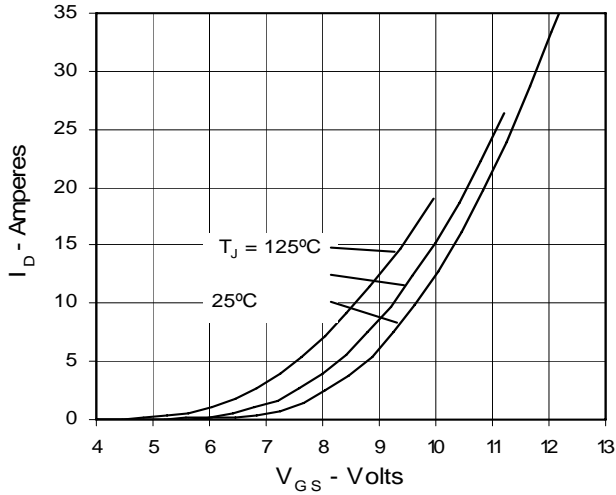
**Fig. 5.  $R_{DS(on)}$  Normalized to  
0.5  $I_{D25}$  Value vs.  $I_D$**



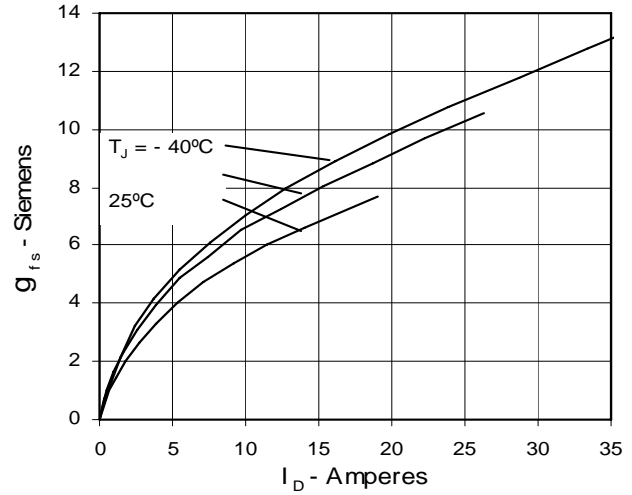
**Fig. 6. Drain Current vs. Case Temperature**



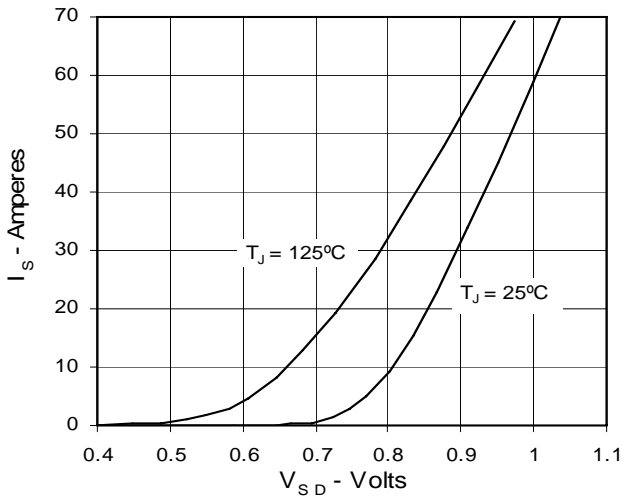
**Fig. 7. Input Admittance**



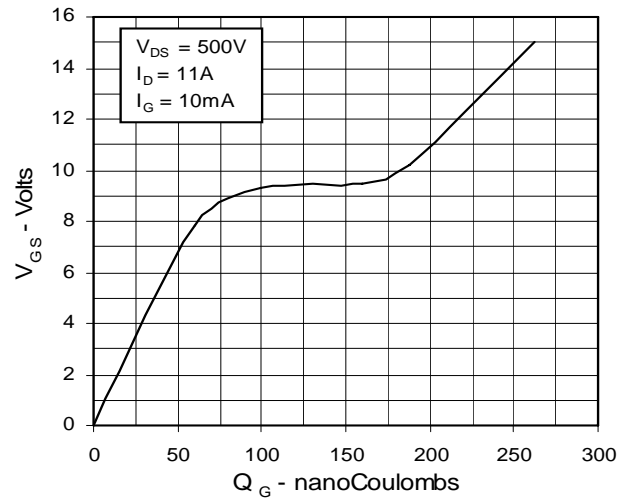
**Fig. 8. Transconductance**



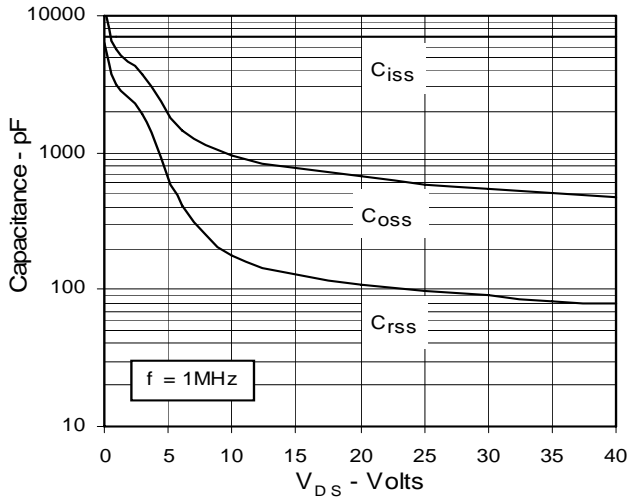
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



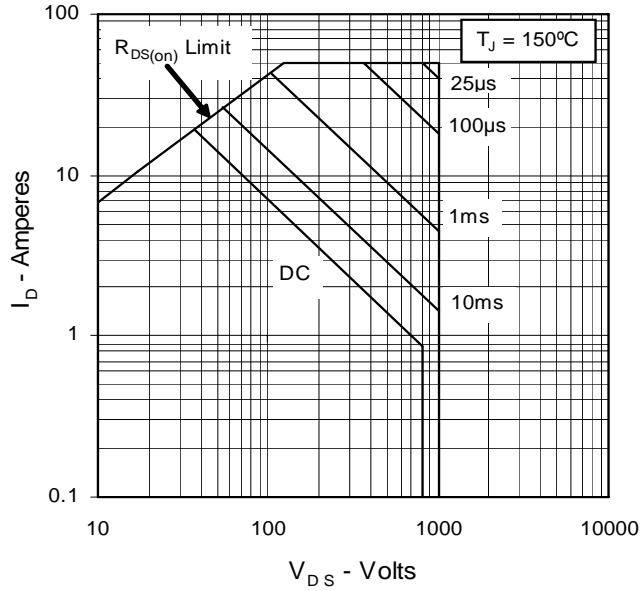
**Fig. 10. Gate Charge**



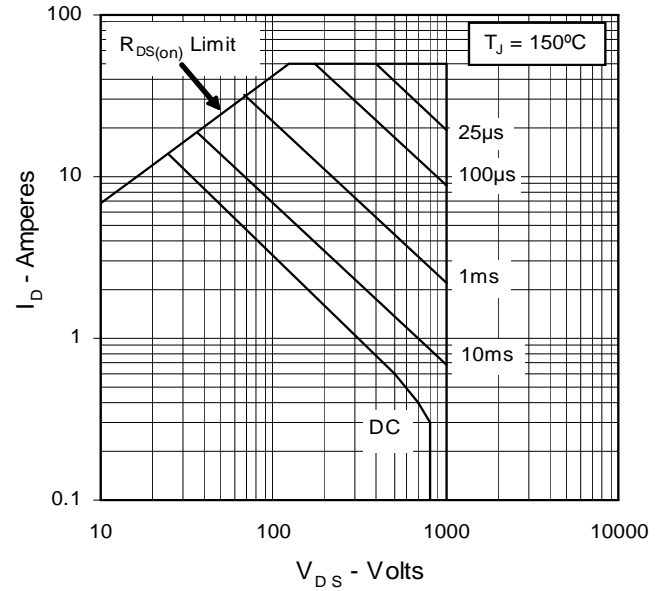
**Fig. 11. Capacitance**



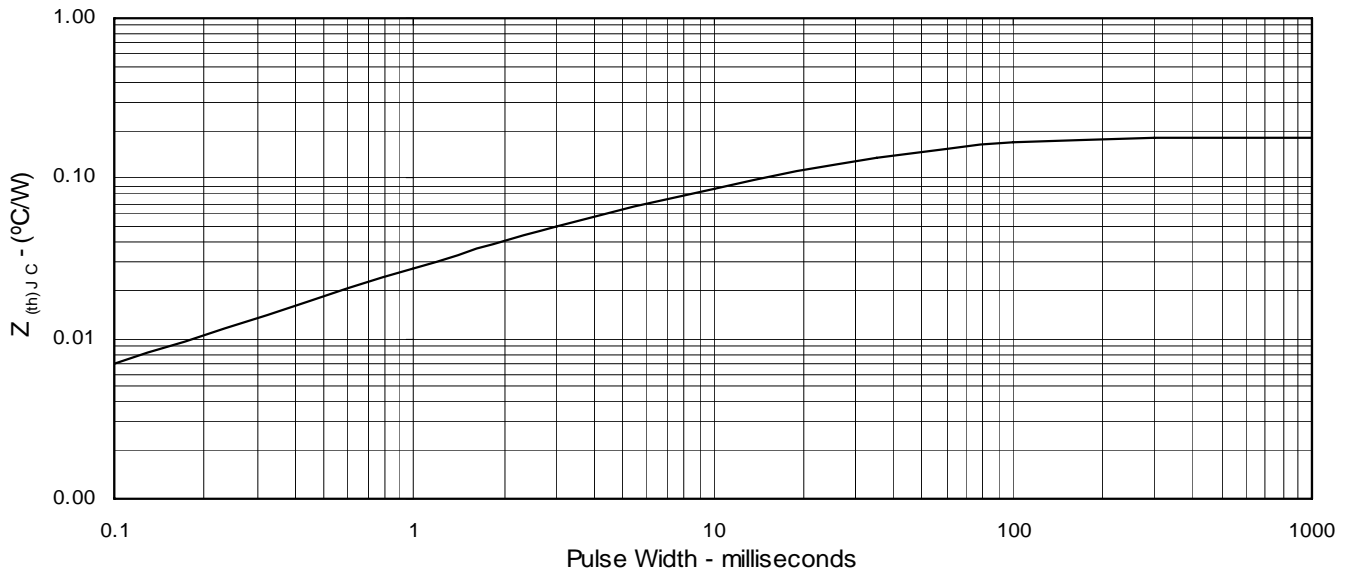
**Fig. 12. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$**



**Fig. 13. Forward-Bias Safe Operating Area @  $T_C = 90^\circ\text{C}$**



**Fig. 14. Maximum Transient Thermal Impedance**



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