

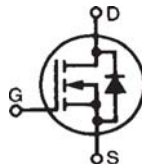
**High Voltage  
Power MOSFET**
**IXTT3N200P3HV  
IXTH3N200P3HV**

$$V_{DSS} = 2000V$$

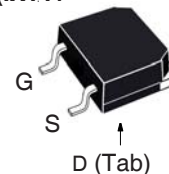
$$I_{D25} = 3A$$

$$R_{DS(on)} \leq 8\Omega$$

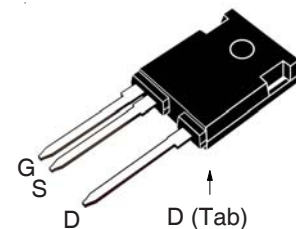
N-Channel Enhancement Mode



TO-268HV (IXTT)



TO-247HV (IXTH)


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

| Symbol        | Test Conditions   | Maximum Ratings |                  |
|---------------|---|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                       | 2000            | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$ | 2000            | V                |
| $V_{GSS}$     | Continuous  | $\pm 20$        | V                |
| $V_{GSM}$     | Transient   | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$  | 3.0             | A                |
| $I_{D110}$    | $T_C = 110^\circ\text{C}$   | 2.6             | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$            | 9.0             | A                |
| $P_D$         | $T_C = 25^\circ\text{C}$  | 520             | W                |
| $T_J$         |   | - 55 ... +150   | $^\circ\text{C}$ |
| $T_{JM}$      |   | 150             | $^\circ\text{C}$ |
| $T_{stg}$     |   | - 55 ... +150   | $^\circ\text{C}$ |
| $T_L$         | Maximum Lead Temperature for Soldering                                | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic Body for 10s  | 260             | $^\circ\text{C}$ |
| $M_d$         | Mounting Torque   | 1.13/10         | Nm/lb.in         |
| <b>Weight</b> | TO-268HV  | 4               | g                |
|               | TO-247HV  | 6               | g                |

**Features**

- High Blocking Voltage
- High Voltage Packages

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits
- Laser and X-Ray Generation Systems

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                                       |
|--------------|---|-----------------------|------|---------------------------------------|
|              |   | Min.                  | Typ. | Max.                                  |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu\text{A}$                                      | 2000                  |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$                                  | 3.0                   |      | 5.0 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$  |                       |      | $\pm 100$ nA                          |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$             |                       |      | 10 $\mu\text{A}$<br>250 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 1.5A$ , Note 1                                      |                       |      | 8 $\Omega$                            |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)  | Characteristic Values |      |                    |
|--------------|--|-----------------------|------|--------------------|
|              |  | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 50\text{V}$ , $I_D = 1.5\text{A}$ , Note 1   | 2.3                   | 3.8  | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$   |                       | 1860 | pF                 |
| $C_{oss}$    |  |                       | 133  | pF                 |
| $C_{rss}$    |  |                       | 58   | pF                 |
| $R_{Gi}$     | Gate Input Resistance  |                       | 3.8  | $\Omega$           |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 500\text{V}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 5\Omega$ (External) |                       | 21   | ns                 |
| $t_r$        |  |                       | 27   | ns                 |
| $t_{d(off)}$ |  |                       | 67   | ns                 |
| $t_f$        |  |                       | 60   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 1\text{kV}$ , $I_D = 0.5 \cdot I_{D25}$  |                       | 70   | nC                 |
| $Q_{gs}$     |  |                       | 8    | nC                 |
| $Q_{gd}$     |  |                       | 39   | nC                 |
| $R_{thJC}$   |  |                       | 0.24 | $^\circ\text{C/W}$ |
| $R_{thCS}$   | TO-247HV   | 0.21                  |      | $^\circ\text{C/W}$ |

**Source-Drain Diode**

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                            | Characteristic Values |      |       |
|----------|--|-----------------------|------|-------|
|          |  | Min.                  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{V}$   |                       |      | 3 A   |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$  |                       |      | 12 A  |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1  |                       |      | 1.5 V |
| $t_{rr}$ | $I_F = 1.5\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 420  | ns    |
| $Q_{RM}$ |  |                       | 380  | nC    |
| $I_{RM}$ |  |                       | 1.8  | A     |

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

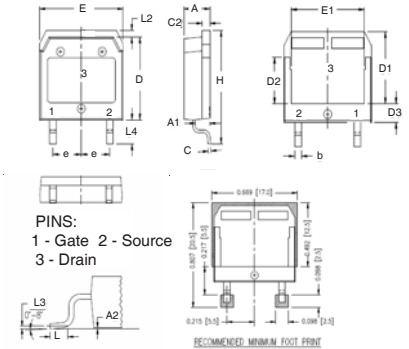
**ADVANCE TECHNICAL INFORMATION**

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.

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|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 | 7,157,338B2 |
|  | 4,860,072 | 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    |             |

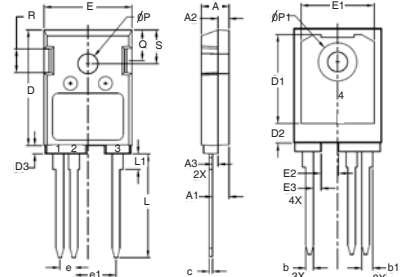
**TO-268HV Outline**



PINS:  
1 - Gate 2 - Source  
3 - Drain

| SYM | INCHES |      | MILLIMETER |       |
|-----|--------|------|------------|-------|
|     | MIN    | MAX  | MIN        | MAX   |
| A   | .193   | .201 | 4.90       | 5.10  |
| A1  | .106   | .114 | 2.70       | 2.90  |
| A2  | .001   | .010 | 0.02       | 0.25  |
| b   | .045   | .057 | 1.15       | 1.45  |
| C   | .016   | .026 | 0.40       | 0.65  |
| C2  | .057   | .063 | 1.45       | 1.60  |
| D   | .543   | .551 | 13.80      | 14.00 |
| D1  | .465   | .476 | 11.80      | 12.10 |
| D2  | .295   | .307 | 7.50       | 7.80  |
| D3  | .114   | .126 | 2.90       | 3.20  |
| E   | .624   | .632 | 15.85      | 16.05 |
| E1  | .524   | .535 | 13.30      | 13.60 |
| E   | .215   | BSC  | 5.45       | BSC   |
| H   | .736   | .752 | 18.70      | 19.10 |
| L   | .067   | .079 | 1.70       | 2.00  |
| L2  | .039   | .045 | 1.00       | 1.15  |
| L3  | .010   | BSC  | 0.25       | BSC   |
| L4  | .150   | .161 | 3.80       | 4.10  |

**TO-247HV Outline**



PINS:  
1 - Gate 2 - Source  
3, 4 - Drain

| SYM | INCHES |      | MILLIMETERS |       |
|-----|--------|------|-------------|-------|
|     | MIN    | MAX  | MIN         | MAX   |
| A   | .193   | .201 | 4.90        | 5.10  |
| A1  | .114   | .122 | 2.90        | 3.10  |
| A2  | .075   | .083 | 1.90        | 2.10  |
| A3  | .035   | .043 | 0.90        | 1.10  |
| b   | .053   | .059 | 1.35        | 1.50  |
| b1  | .075   | .083 | 1.90        | 2.10  |
| c   | .022   | .030 | 0.55        | 0.75  |
| D   | .819   | .843 | 20.80       | 21.40 |
| D1  | .638   | .646 | 16.20       | 16.40 |
| D2  | .134   | .146 | 3.40        | 3.70  |
| D3  | .055   | .063 | 1.40        | 1.60  |
| E   | .622   | .638 | 15.80       | 16.20 |
| E1  | .520   | .528 | 13.20       | 13.40 |
| E2  | .118   | .126 | 3.00        | 3.20  |
| E3  | .051   | .059 | 1.30        | 1.50  |
| e   | .100   | BSC  | 2.54        | BSC   |
| e1  | .300   | BSC  | 7.62        | BSC   |
| L   | .732   | .748 | 18.60       | 19.00 |
| L1  | .106   | .118 | 2.70        | 3.00  |
| øP  | .138   | .142 | 3.50        | 3.60  |
| øP1 | .272   | .280 | 6.90        | 7.10  |
| Q   | .216   | .224 | 5.50        | 5.70  |
| R   | .165   | .169 | 4.20        | 4.30  |
| S   | .240   | .248 | 6.10        | 6.30  |

Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

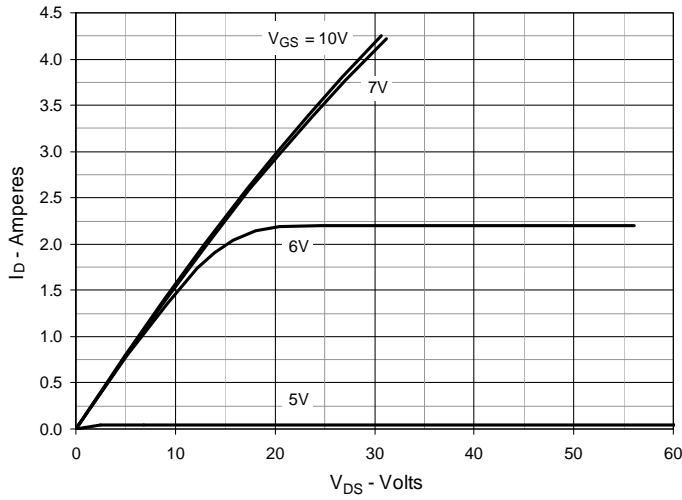


Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$

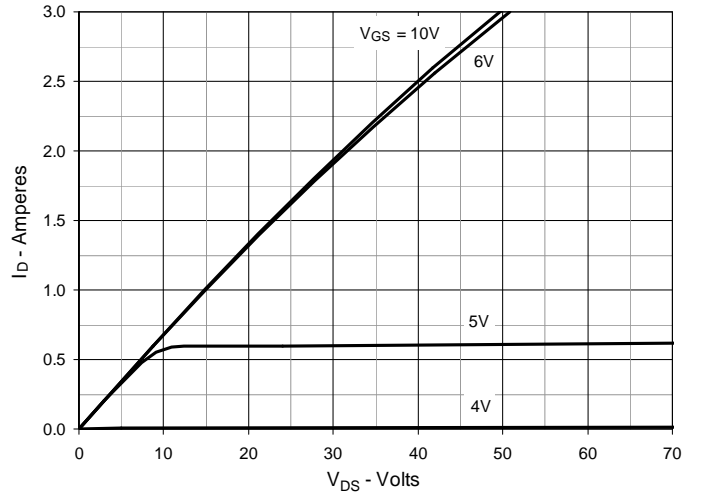


Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Junction Temperature

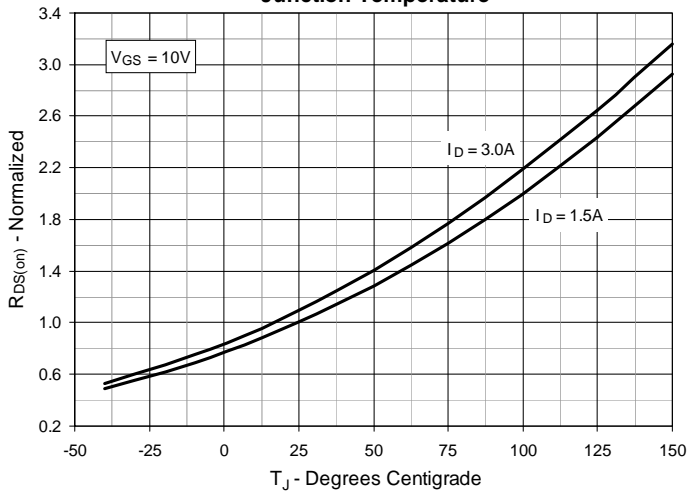


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Drain Current

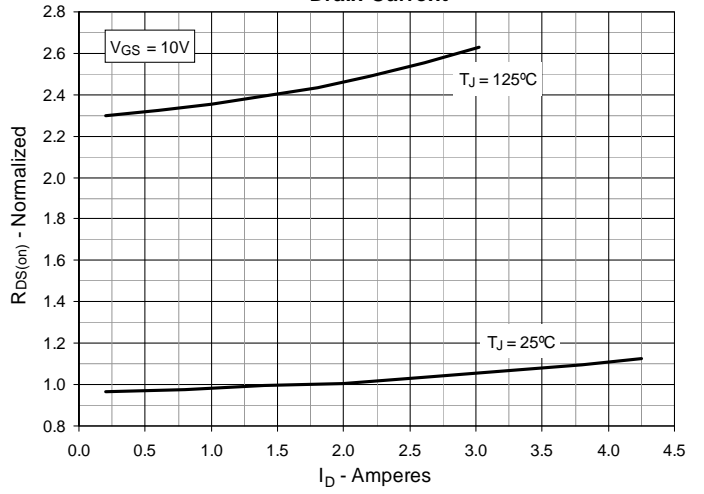


Fig. 5. Maximum Drain Current vs. Case Temperature

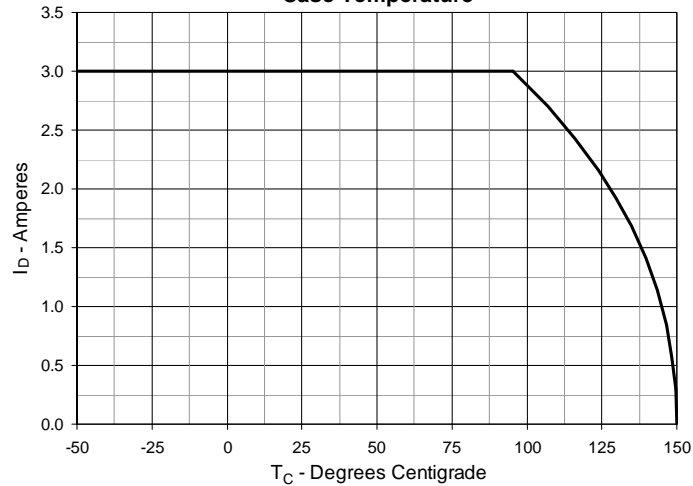
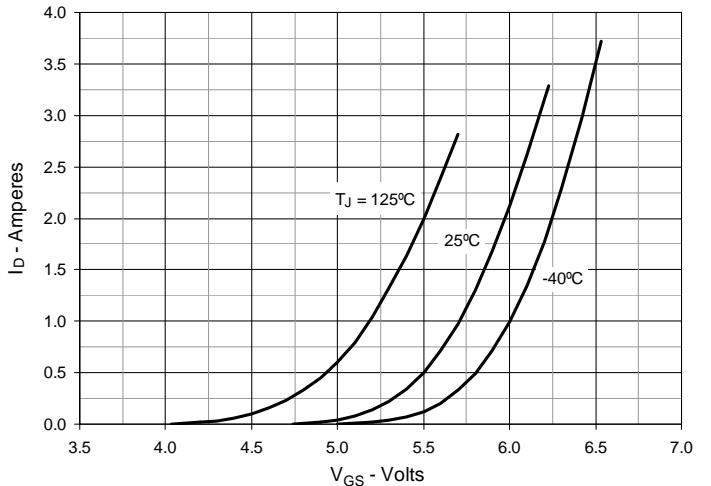
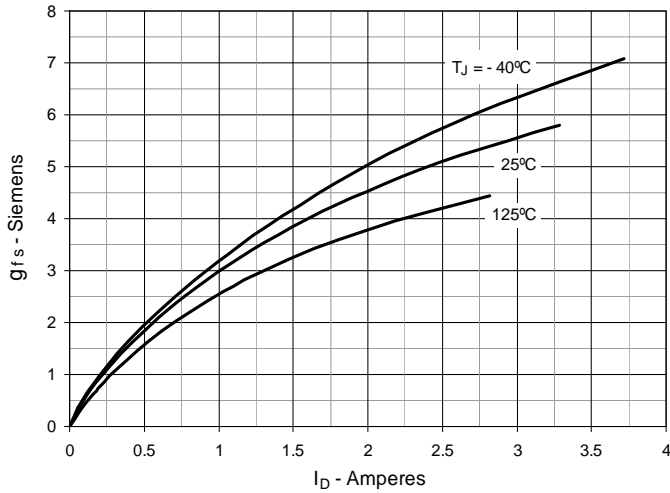


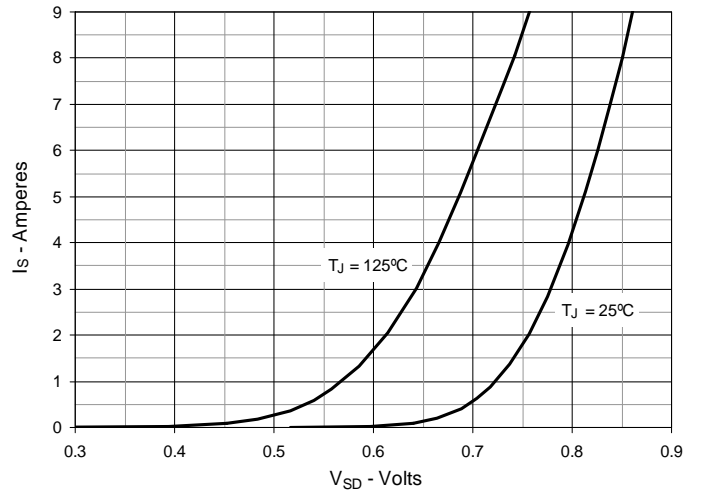
Fig. 6. Input Admittance



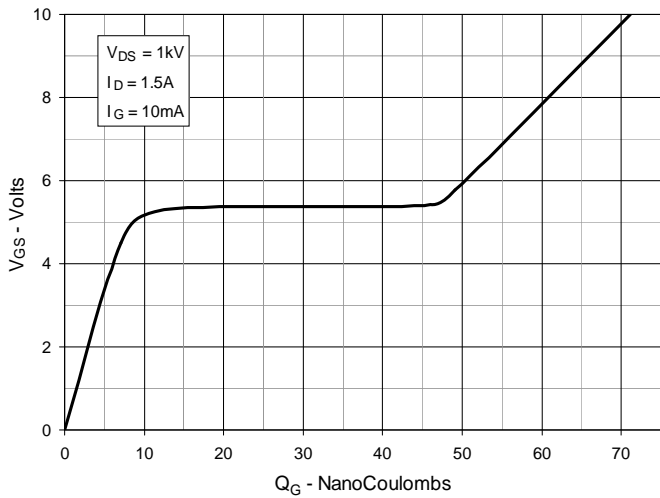
**Fig. 7. Transconductance**



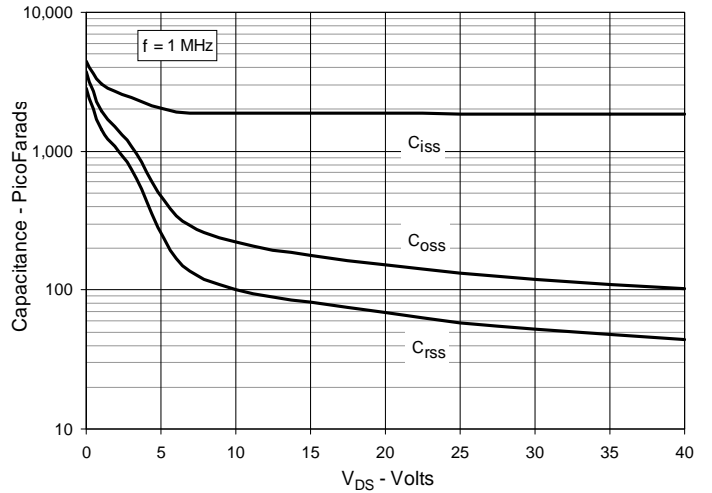
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



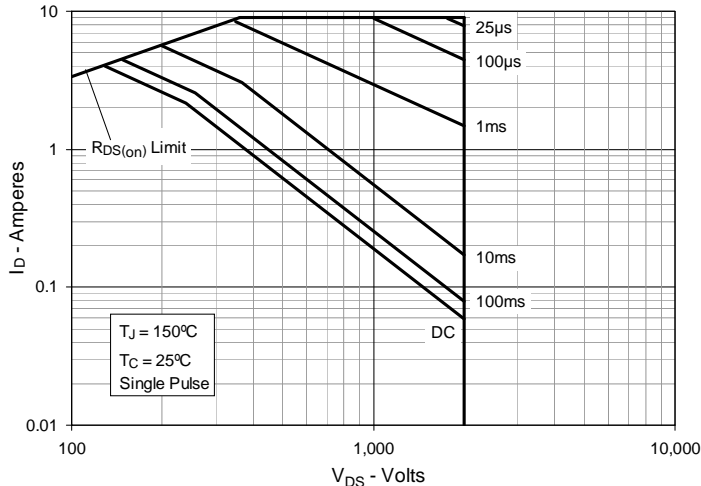
**Fig. 9. Gate Charge**



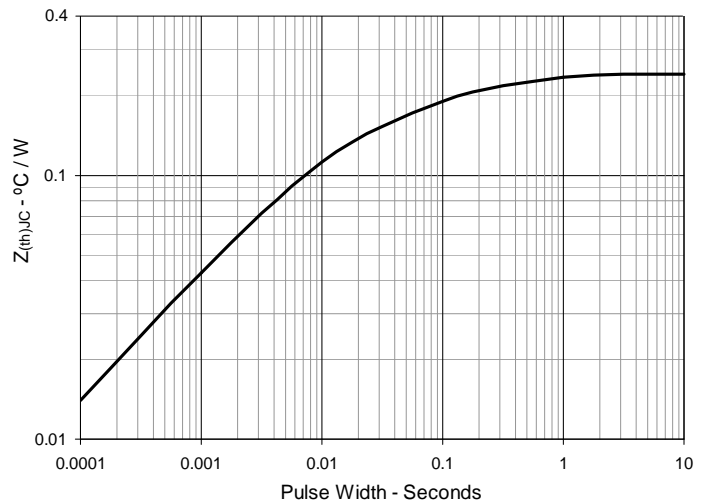
**Fig. 10. Capacitance**



**Fig. 11. Forward-Bias Safe Operating Area**



**Fig. 12 Maximum Transient Thermal Impedance**





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