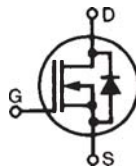


## Depletion Mode MOSFET

**IXTH10N100D**  
**IXTT10N100D**

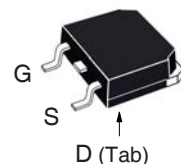
$$\begin{aligned} V_{DSX} &= 1000V \\ I_{D25} &= 10A \\ R_{DS(on)} &\leq 1.4\Omega \end{aligned}$$

## N-Channel

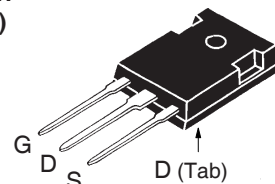


| Symbol     | Test Conditions                                                   | Maximum Ratings |                  |
|------------|-------------------------------------------------------------------|-----------------|------------------|
| $V_{DSX}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                    | 1000            | V                |
| $V_{DGX}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GS} = 1M\Omega$ | 1000            | V                |
| $V_{GSX}$  | Continuous                                                        | $\pm 30$        | V                |
| $V_{GSM}$  | Transient                                                         | $\pm 40$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                          | 10              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$        | 20              | A                |
| $P_D$      | $T_C = 25^\circ\text{C}$                                          | 400             | 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             | $^\circ\text{C}$ |
| $T_{SOLD}$ | 1.6 mm (0.062in.) from Case for 10s                               | 260             | $^\circ\text{C}$ |
| $M_d$      | Mounting Torque (TO-247)                                          | 1.13 / 10       | Nm/lb.in.        |
| Weight     | TO-268                                                            | 4               | g                |
|            | TO-247                                                            | 6               | g                |

**TO-268  
(IXTT)**



**TO-247  
(IXTH)**



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

## Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies meet UL 94 V-0 Flammability Classification

## Advantages

- Easy to Mount
- Space Savings
- High Power Density

## Applications

- Level Shifting
- Triggers
- Solid State Relays
- Current Regulators
- Active Load

| Symbol         | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                           |
|----------------|-----------------------------------------------------------------------------|-----------------------|------|---------------------------|
|                |                                                                             | Min.                  | Typ. | Max.                      |
| $BV_{DSX}$     | $V_{GS} = -10V, I_D = 250\mu A$                                             | 1000                  |      | V                         |
| $V_{GS(off)}$  | $V_{DS} = 25V, I_D = 250\mu A$                                              | -1.5                  |      | - 3.5 V                   |
| $I_{GSX}$      | $V_{GS} = \pm 30V, V_{DS} = 0V$                                             |                       |      | $\pm 100$ nA              |
| $I_{DSX(off)}$ | $V_{DS} = V_{DSX}, V_{GS} = -10V$<br>$T_J = 125^\circ\text{C}$              |                       |      | 25 $\mu A$<br>500 $\mu A$ |
| $R_{DS(on)}$   | $V_{GS} = 10V, I_D = 10A$ , Note 1                                          |                       |      | 1.4 $\Omega$              |
| $I_{D(on)}$    | $V_{GS} = 0V, V_{DS} = 25V$ , Note 1                                        |                       | 1.0  | A                         |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                           | Characteristic Values |      |                         |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                                       | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 30\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                                                                                            | 3.0                   | 5.4  | S                       |
| $C_{iss}$    | $V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                    |                       | 2500 | pF                      |
| $C_{oss}$    |                                                                                                                                                       |                       | 300  | pF                      |
| $C_{rss}$    |                                                                                                                                                       |                       | 100  | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSX}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 4.7\Omega$ (External) |                       | 35   | ns                      |
| $t_r$        |                                                                                                                                                       |                       | 85   | ns                      |
| $t_{d(off)}$ |                                                                                                                                                       |                       | 110  | ns                      |
| $t_f$        |                                                                                                                                                       |                       | 75   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSX}$ , $I_D = 0.5 \cdot I_{D25}$                                                                      |                       | 130  | nC                      |
| $Q_{gs}$     |                                                                                                                                                       |                       | 27   | nC                      |
| $Q_{gd}$     |                                                                                                                                                       |                       | 58   | nC                      |
| $R_{thJC}$   | TO-247                                                                                                                                                |                       |      | 0.31 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                                       | 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.  |
| $V_{SD}$ | $I_F = I_{D25}$ , $V_{GS} = -10\text{V}$ , Note 1                                                       |                       | 1.1  | 1.5 V |
| $t_{rr}$ | $I_F = 10\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$ |                       | 850  | ns    |

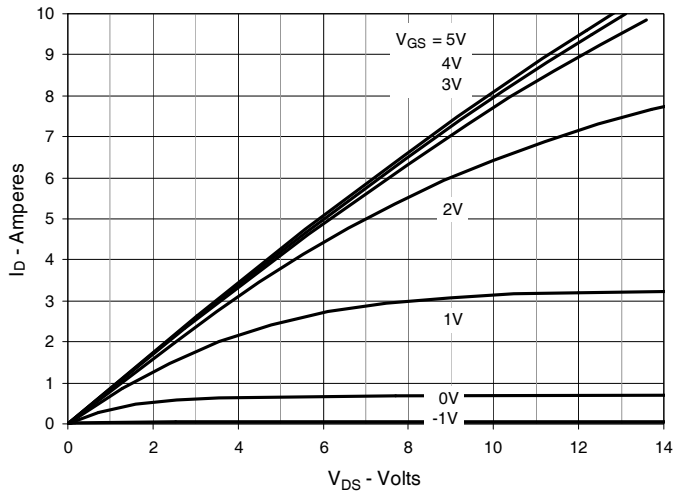
Note 1: Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

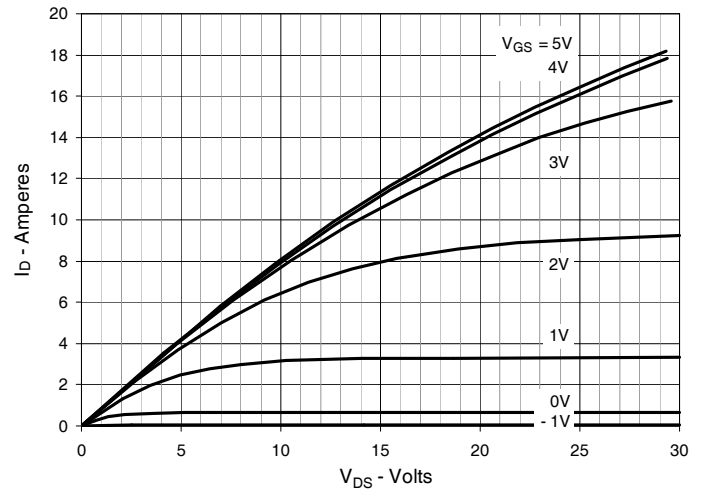
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 | 7,157,338B2 |
| 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    |             |

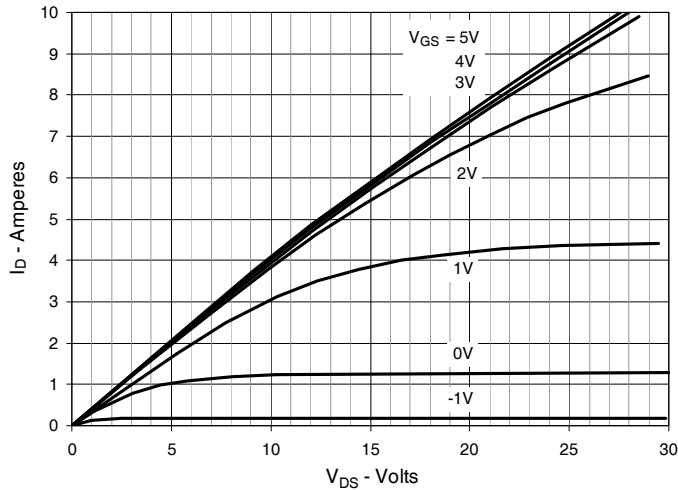
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



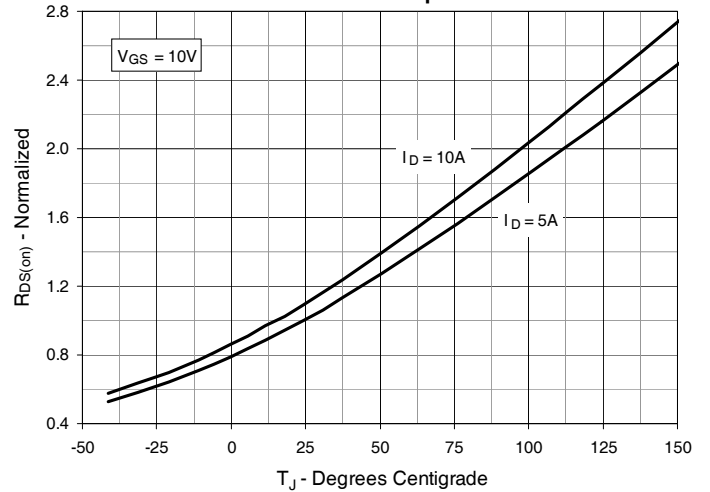
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



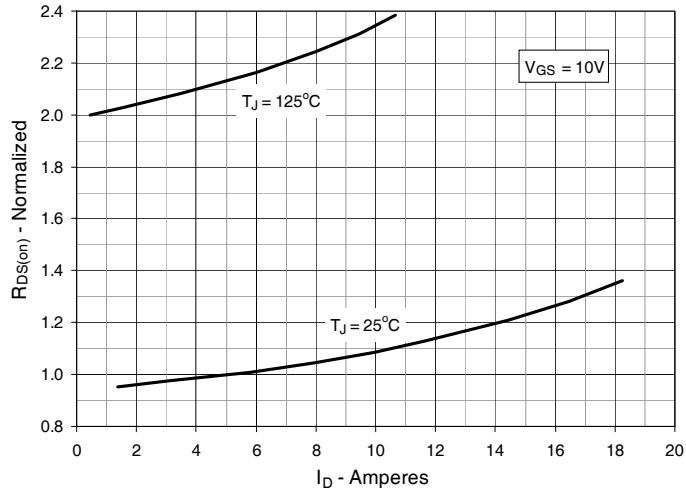
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



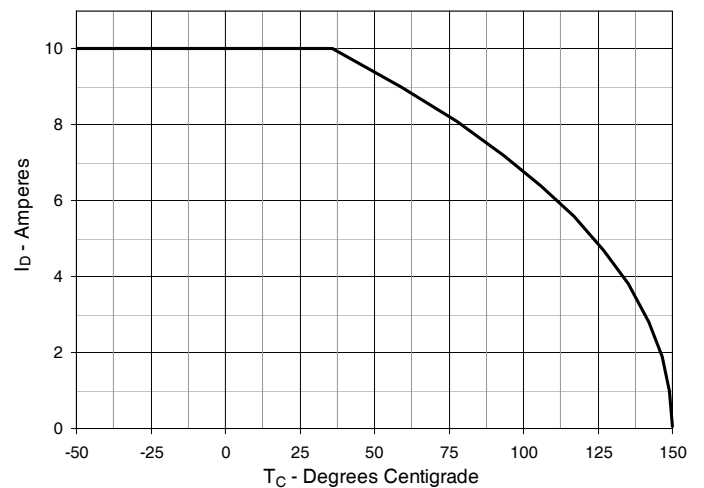
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 5\text{A}$  Value vs. Junction Temperature**



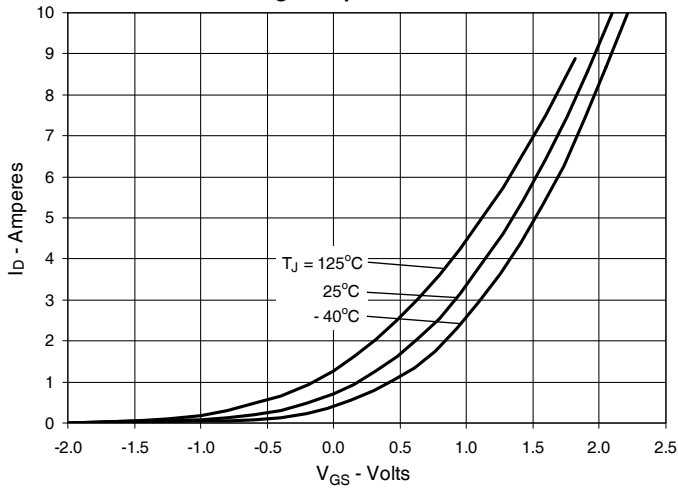
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 5\text{A}$  Value vs. Drain Current**



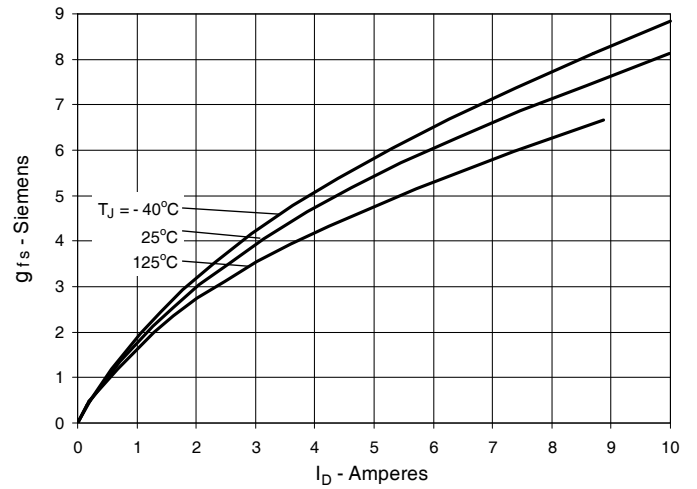
**Fig. 6. Maximum Drain Current vs. Case Temperature**



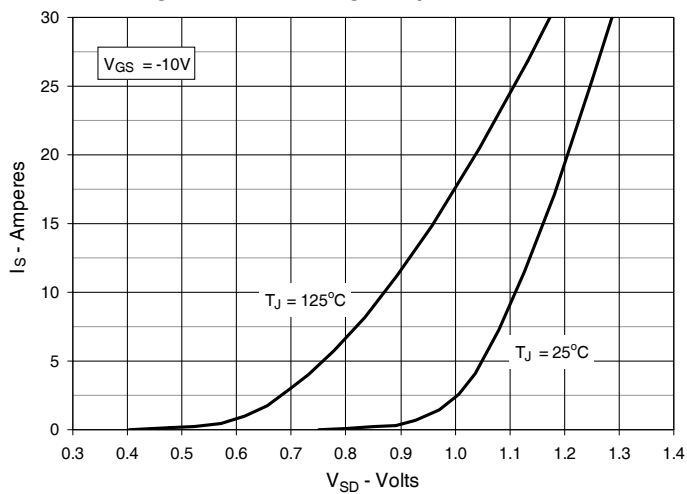
**Fig. 7. Input Admittance**



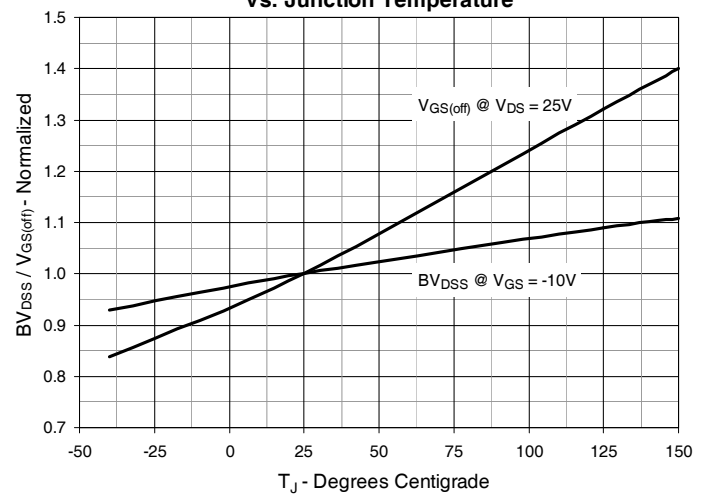
**Fig. 8. Transconductance**



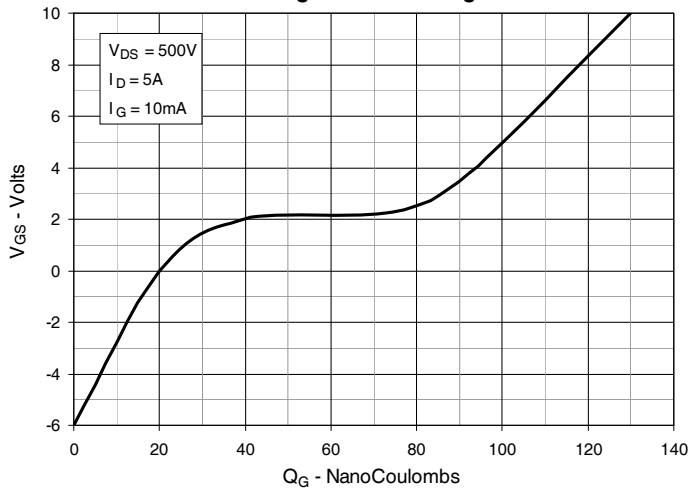
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



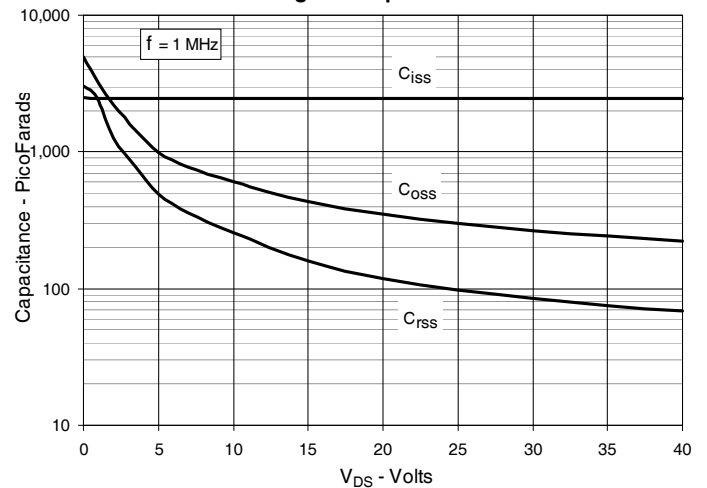
**Fig. 10. Breakdown & Threshold Voltages vs. Junction Temperature**



**Fig. 11. Gate Charge**

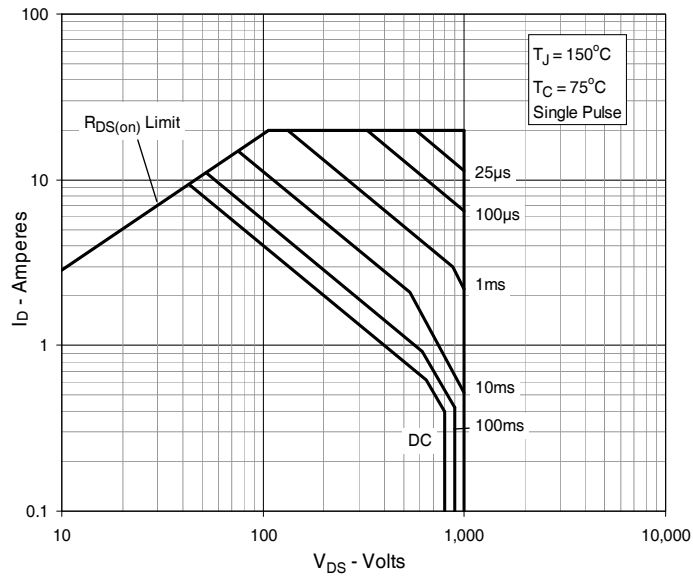


**Fig. 12. Capacitance**



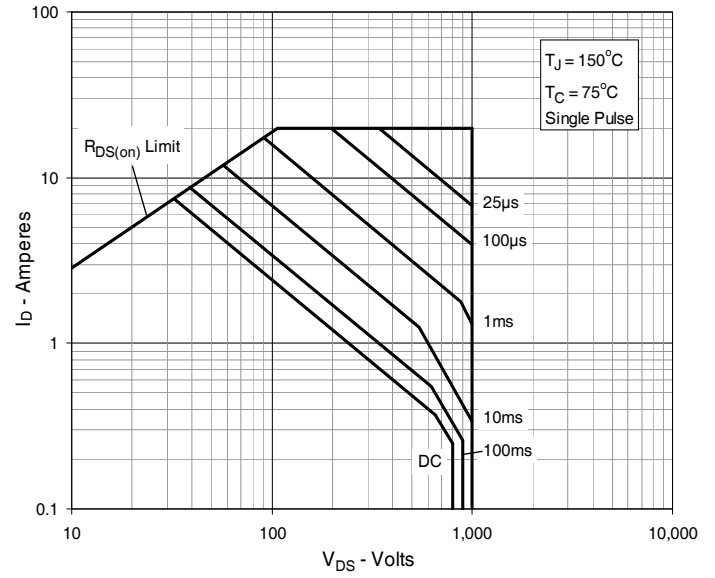
**Fig. 13. Forward-Bias Safe Operating Area**

@  $T_C = 25^\circ\text{C}$

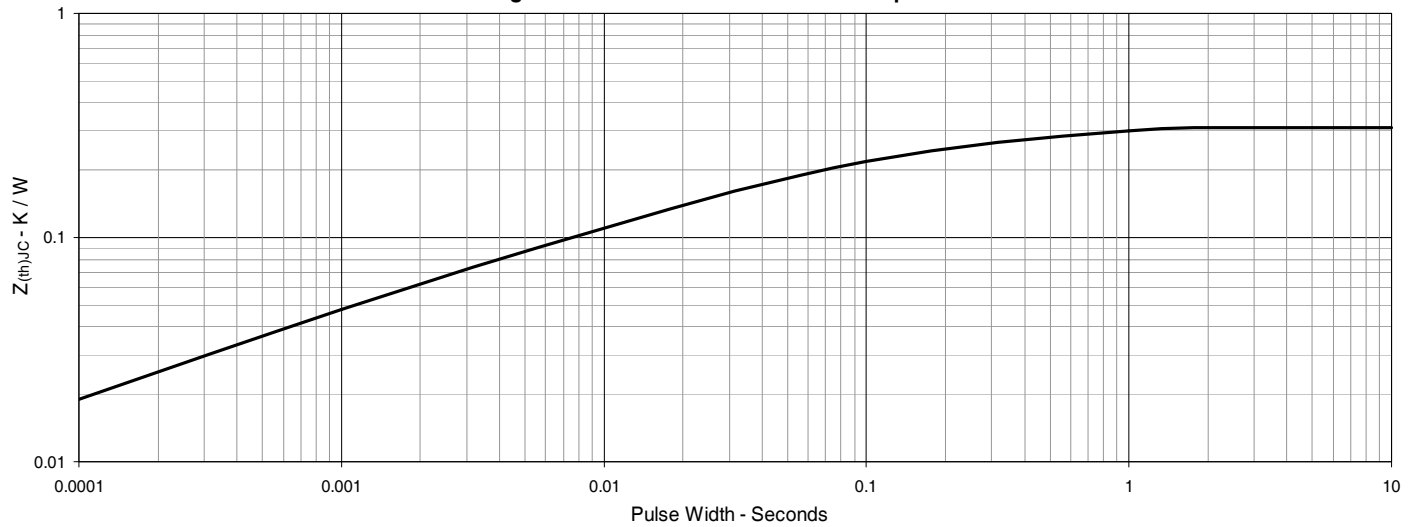


**Fig. 14. Forward-Bias Safe Operating Area**

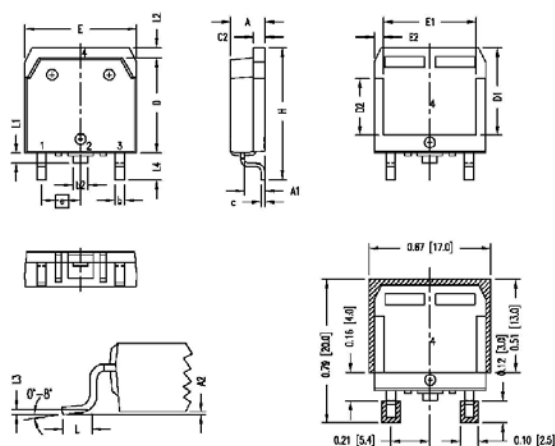
@  $T_C = 75^\circ\text{C}$



**Fig. 15. Maximum Transient Thermal Impedance**



## TO-268 Outline



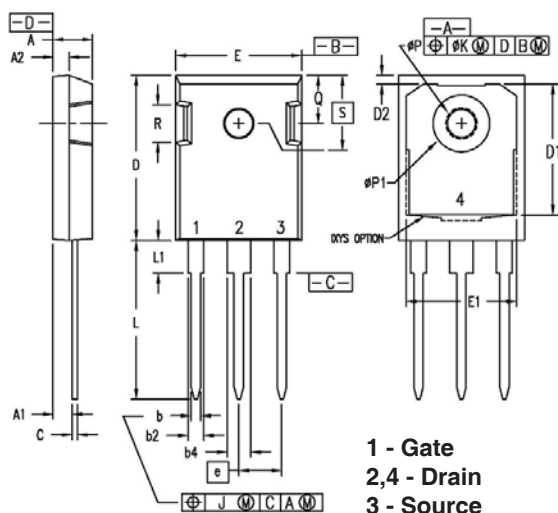
1 - Gate  
2,4 - Drain  
3 - Source

RECOMMENDED MINIMUM FOOT PRINT FOR SMD

| SYMBOL | INCHES   |      | MILLIMETERS |       |
|--------|----------|------|-------------|-------|
|        | 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  |
| b2     | .075     | .083 | 1.90        | 2.10  |
| C      | .016     | .026 | 0.40        | 0.65  |
| C2     | .057     | .063 | 1.45        | 1.60  |
| D      | .543     | .551 | 13.80       | 14.00 |
| D1     | .488     | .500 | 12.40       | 12.70 |
| D2     | .320     | .335 | 8.13        | 8.50  |
| E      | .624     | .632 | 15.85       | 16.05 |
| E1     | .524     | .535 | 13.30       | 13.60 |
| E2     | .045     | .055 | 1.14        | 1.39  |
| e      | .215 BSC |      | 5.45 BSC    |       |
| H      | .736     | .752 | 18.70       | 19.10 |
| L      | .094     | .106 | 2.40        | 2.70  |
| L1     | .047     | .055 | 1.20        | 1.40  |
| L2     | .039     | .045 | 1.00        | 1.15  |
| L3     | .010 BSC |      | 0.25 BSC    |       |
| L4     | .150     | .161 | 3.80        | 4.10  |

NOTE: ALL METAL SURFACES ARE MATTE PURE TIN PLATED EXCEPT TRIM AREA.  
Pb PLATING THICKNESS (4 - 20 um)

## TO-247 Outline



1 - Gate  
2,4 - Drain  
3 - Source

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .055 | 1.14        | 1.40  |
| b2  | .075     | .087 | 1.91        | 2.20  |
| b4  | .115     | .126 | 2.92        | 3.20  |
| C   | .024     | .031 | 0.61        | 0.80  |
| D   | .819     | .840 | 20.80       | 21.34 |
| D1  | .650     | .690 | 16.51       | 17.53 |
| D2  | .035     | .050 | 0.89        | 1.27  |
| E   | .620     | .635 | 15.75       | 16.13 |
| E1  | .545     | .565 | 13.84       | 14.35 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| J   | --       | .010 | --          | 0.25  |
| K   | --       | .025 | --          | 0.64  |
| L   | .780     | .810 | 19.81       | 20.57 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| øP  | .140     | .144 | 3.55        | 3.65  |
| øP1 | .275     | .290 | 6.99        | 7.37  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |
| S   | .242 BSC |      | 6.15 BSC    |       |

NOTE: This drawing will meet all dimensions requirement of JEDEC outlines TO-247 AD (R-PSIP-F3)

