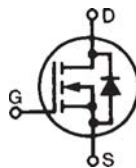


### Depletion Mode MOSFET

**IXTY08N100D2**  
**IXTA08N100D2**  
**IXTP08N100D2**

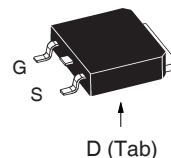
$V_{DSX} = 1000V$   
 $I_{D(on)} \geq 800mA$   
 $R_{DS(on)} \leq 21\Omega$

### N-Channel

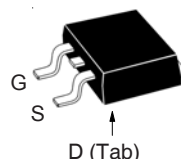


| Symbol     | Test Conditions                     | Maximum Ratings |            |
|------------|-------------------------------------|-----------------|------------|
| $V_{DSX}$  | $T_J = 25^\circ C$ to $150^\circ C$ | 1000            | V          |
| $V_{GSX}$  | Continuous                          | $\pm 20$        | V          |
| $V_{GSM}$  | Transient                           | $\pm 30$        | V          |
| $P_D$      | $T_C = 25^\circ C$                  | 60              | W          |
| $T_J$      |                                     | - 55 ... +150   | $^\circ C$ |
| $T_{JM}$   |                                     | 150             | $^\circ C$ |
| $T_{stg}$  |                                     | - 55 ... +150   | $^\circ C$ |
| $T_L$      | 1.6mm (0.062 in.) from Case for 10s | 300             | $^\circ C$ |
| $T_{SOLD}$ | Plastic Body for 10s                | 260             | $^\circ C$ |
| $M_d$      | Mounting Torque (TO-220)            | 1.13 / 10       | Nm/lb.in.  |
| Weight     | TO-252                              | 0.35            | g          |
|            | TO-263                              | 2.50            | g          |
|            | TO-220                              | 3.00            | g          |

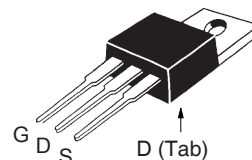
#### TO-252 (IXTY)



#### TO-263 AA (IXTA)



#### TO-220AB (IXTP)



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

| Symbol         | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                         |
|----------------|-----------------------------------------------------------------------|-----------------------|------|-------------------------|
|                |                                                                       | Min.                  | Typ. | Max.                    |
| $BV_{DSX}$     | $V_{GS} = -5V, I_D = 25\mu A$                                         | 1000                  |      | V                       |
| $V_{GS(off)}$  | $V_{DS} = 25V, I_D = 25\mu A$                                         | - 2.0                 |      | V                       |
| $I_{GSX}$      | $V_{GS} = \pm 20V, V_{DS} = 0V$                                       |                       |      | $\pm 50$ nA             |
| $I_{DSX(off)}$ | $V_{DS} = V_{DSX}, V_{GS} = -5V$<br>$T_J = 125^\circ C$               |                       |      | 1 $\mu A$<br>15 $\mu A$ |
| $R_{DS(on)}$   | $V_{GS} = 0V, I_D = 400mA$ , Note 1                                   |                       |      | 21 $\Omega$             |
| $I_{D(on)}$    | $V_{GS} = 0V, V_{DS} = 50V$ , Note 1                                  | 800                   |      | mA                      |

### 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

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                 | Characteristic Values |      |                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                             | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 30\text{V}$ , $I_D = 400\text{mA}$ , Note 1                                                                                       | 330                   | 560  | mS                      |
| $C_{iss}$    | $V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                          |                       | 325  | pF                      |
| $C_{oss}$    |                                                                                                                                             |                       | 24   | pF                      |
| $C_{rss}$    |                                                                                                                                             |                       | 6.5  | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = \pm 5\text{V}$ , $V_{DS} = 500\text{V}$ , $I_D = 400\text{mA}$<br>$R_G = 10\Omega$ (External) |                       | 28   | ns                      |
| $t_r$        |                                                                                                                                             |                       | 57   | ns                      |
| $t_{d(off)}$ |                                                                                                                                             |                       | 34   | ns                      |
| $t_f$        |                                                                                                                                             |                       | 48   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 5\text{V}$ , $V_{DS} = 500\text{V}$ , $I_D = 400\text{mA}$                                                                        |                       | 14.6 | nC                      |
| $Q_{gs}$     |                                                                                                                                             |                       | 1.2  | nC                      |
| $Q_{gd}$     |                                                                                                                                             |                       | 8.3  | nC                      |
| $R_{thJC}$   | TO-220                                                                                                                                      |                       | 0.50 | 2.08 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                             |                       |      |                         |

## Safe-Operating-Area Specification

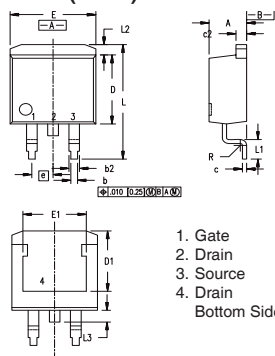
| Symbol | Test Conditions                                                                             | Characteristic Values |      |      |
|--------|---------------------------------------------------------------------------------------------|-----------------------|------|------|
|        |                                                                                             | Min.                  | Typ. | Max. |
| SOA    | $V_{DS} = 800\text{V}$ , $I_D = 45\text{mA}$ , $T_C = 75^\circ\text{C}$ , $T_p = 5\text{s}$ | 36                    |      | W    |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                               | Characteristic Values |      |               |
|----------|-----------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                           | Min.                  | Typ. | Max.          |
| $V_{SD}$ | $I_F = 800\text{mA}$ , $V_{GS} = -10\text{V}$ , Note 1                                                    |                       | 0.8  | 1.3 V         |
| $t_{rr}$ | $I_F = 800\text{mA}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$ |                       | 1.03 | $\mu\text{s}$ |
| $I_{RM}$ |                                                                                                           |                       | 7.40 | A             |
| $Q_{RM}$ |                                                                                                           |                       | 3.80 | $\mu\text{C}$ |

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

## TO-263 (IXTA) Outline

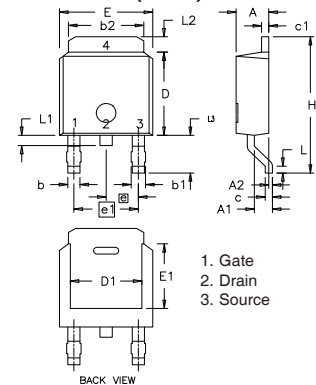


| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 4.06       | 4.83  | .160   | .190 |
| b    | 0.51       | 0.99  | .020   | .039 |
| b2   | 1.14       | 1.40  | .045   | .055 |
| c    | 0.40       | 0.74  | .016   | .029 |
| c2   | 1.14       | 1.40  | .045   | .055 |
| D    | 8.64       | 9.65  | .340   | .380 |
| D1   | 8.00       | 8.89  | .280   | .320 |
| E    | 9.65       | 10.41 | .380   | .405 |
| E1   | 6.22       | 8.13  | .270   | .320 |
| e    | 2.54       | BSC   | .100   | BSC  |
| L    | 14.61      | 15.88 | .575   | .625 |
| L1   | 2.29       | 2.79  | .090   | .110 |
| L2   | 1.02       | 1.40  | .040   | .055 |
| L3   | 1.27       | 1.78  | .050   | .070 |
| L4   | 0          | 0.13  | 0      | .005 |

## PRELIMINARY TECHNICAL INFORMATION

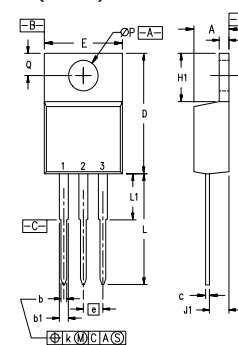
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

## TO-252 AA (IXTY) Outline



| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | Min.       | Max.  | Min.      | Max.  |
| A    | 2.19       | 2.38  | 0.086     | 0.094 |
| A1   | 0.89       | 1.14  | 0.035     | 0.045 |
| A2   | 0          | 0.13  | 0         | 0.005 |
| b    | 0.64       | 0.89  | 0.025     | 0.035 |
| b1   | 0.76       | 1.14  | 0.030     | 0.045 |
| b2   | 5.21       | 5.46  | 0.205     | 0.215 |
| c    | 0.46       | 0.58  | 0.018     | 0.023 |
| c1   | 0.46       | 0.58  | 0.018     | 0.023 |
| D    | 5.97       | 6.22  | 0.235     | 0.245 |
| D1   | 4.32       | 5.21  | 0.170     | 0.205 |
| E    | 6.35       | 6.73  | 0.250     | 0.265 |
| E1   | 4.32       | 5.21  | 0.170     | 0.205 |
| e    | 2.28 BSC   |       | 0.090 BSC |       |
| e1   | 4.57 BSC   |       | 0.180 BSC |       |
| H    | 9.40       | 10.42 | 0.370     | 0.410 |
| L    | 0.51       | 1.02  | 0.020     | 0.040 |
| L1   | 0.64       | 1.02  | 0.025     | 0.040 |
| L2   | 0.89       | 1.27  | 0.035     | 0.050 |
| L3   | 2.54       | 2.92  | 0.100     | 0.115 |

## 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  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| Q   | .100     | .125 | 2.54        | 3.18  |

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 |
|                                                                                  | 4,850,072 | 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 @  $T_J = 25^\circ\text{C}$

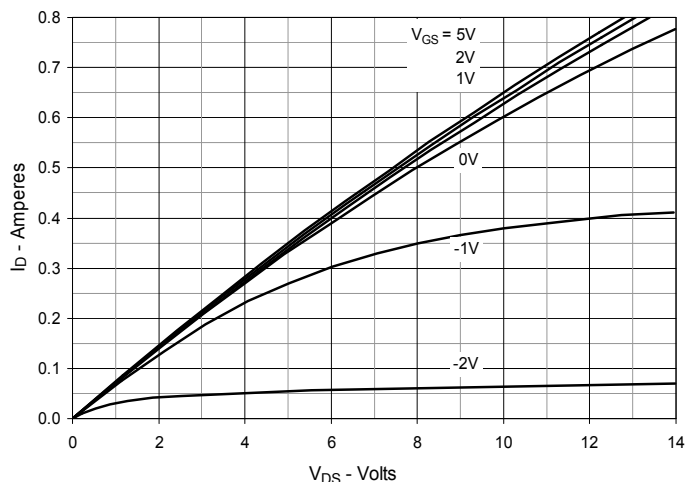


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

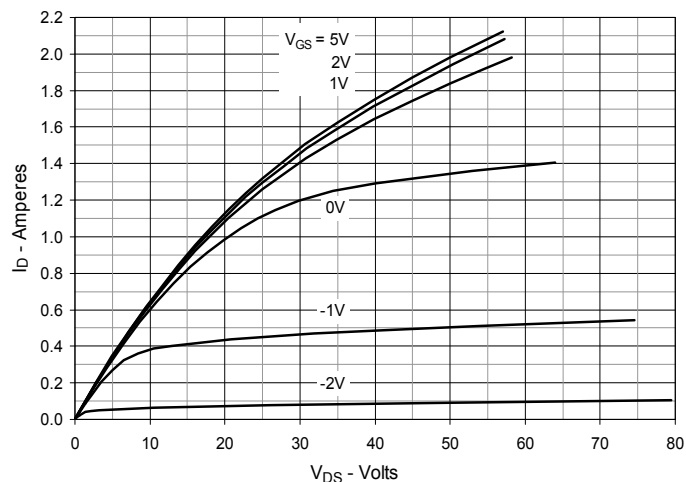


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

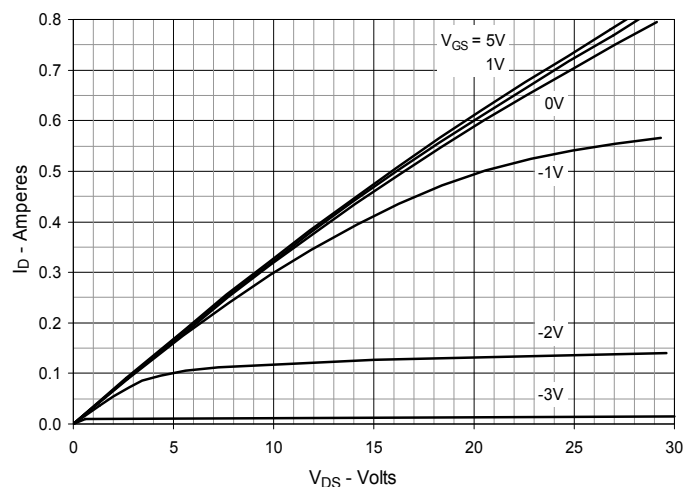


Fig. 4. Drain Current @  $T_J = 25^\circ\text{C}$

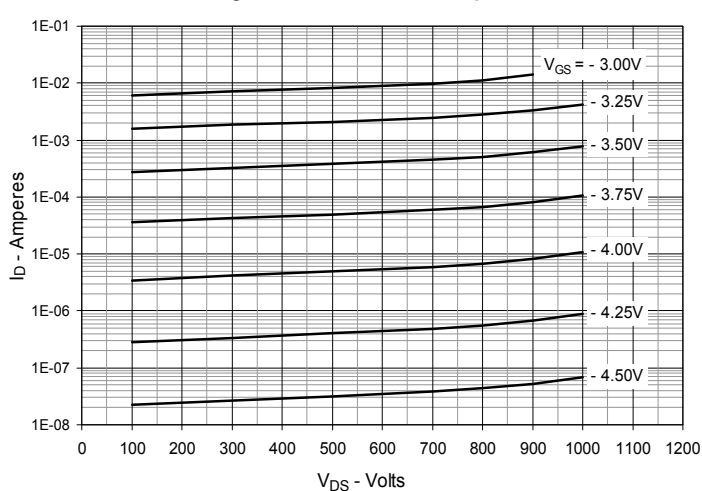


Fig. 5. Drain Current @  $T_J = 100^\circ\text{C}$

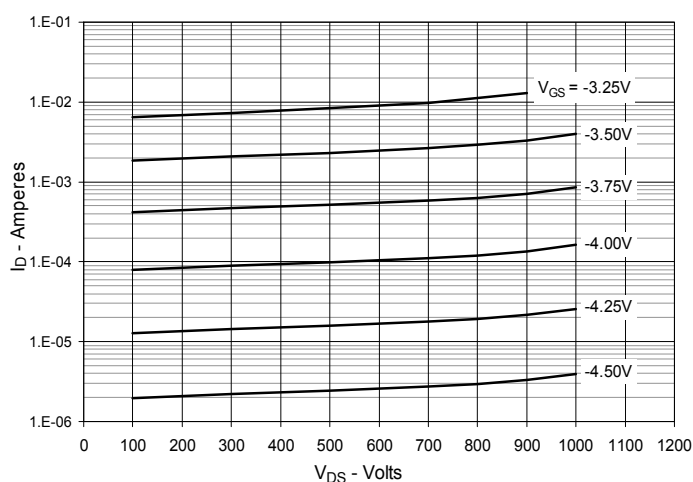


Fig. 6. Dynamic Resistance vs. Gate Voltage

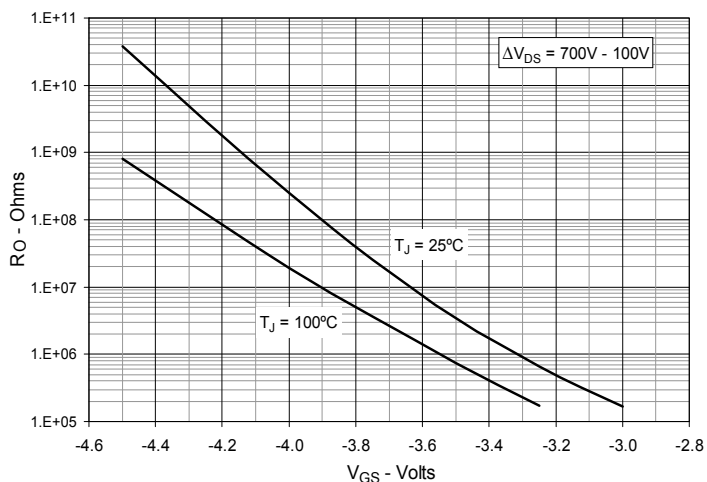


Fig. 7. Normalized  $R_{DS(on)}$  vs. Junction Temperature

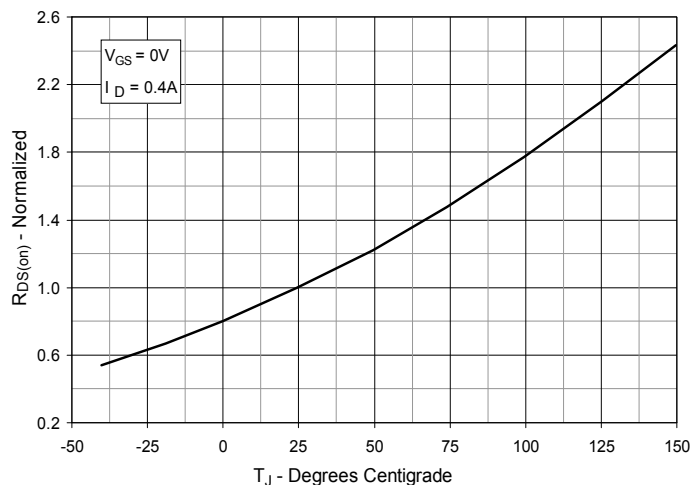


Fig. 8.  $R_{DS(on)}$  Normalized to  $I_D = 0.4A$  Value vs. Drain Current

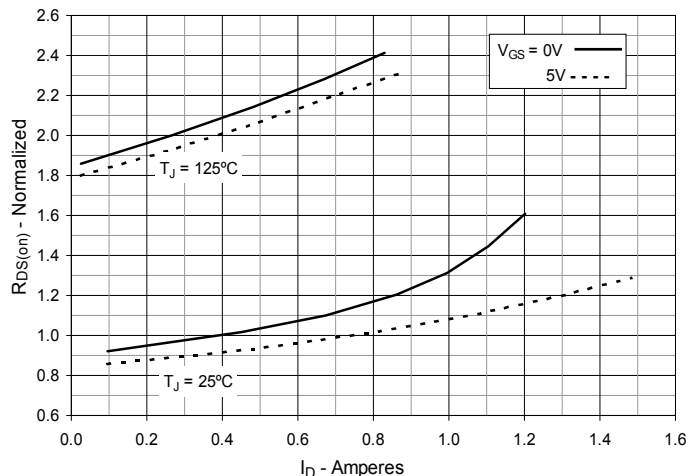


Fig. 9. Input Admittance

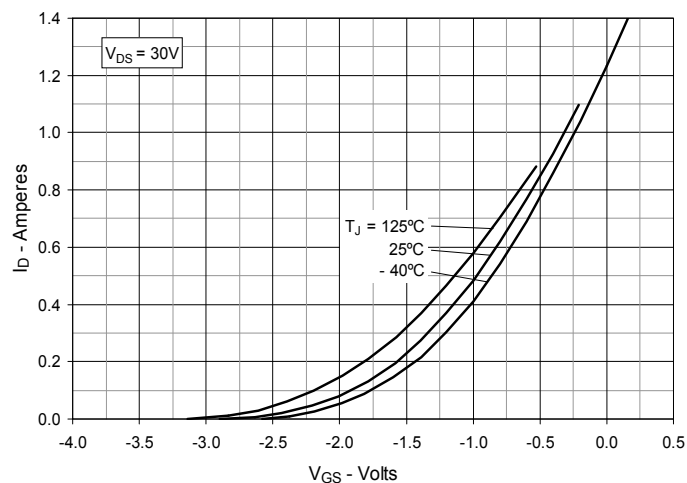


Fig. 10. Transconductance

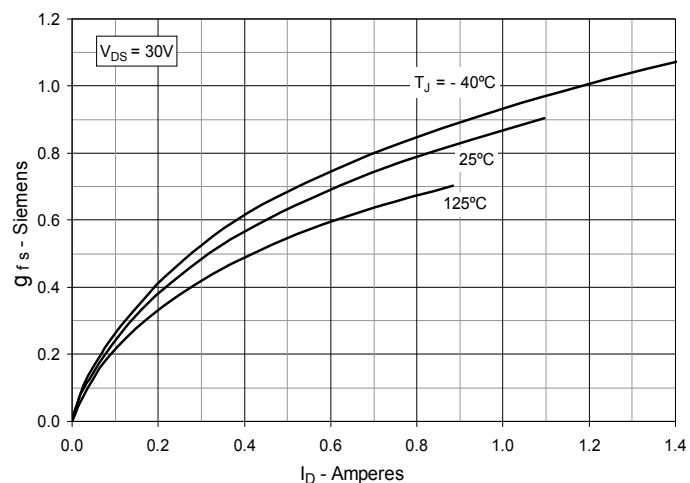


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

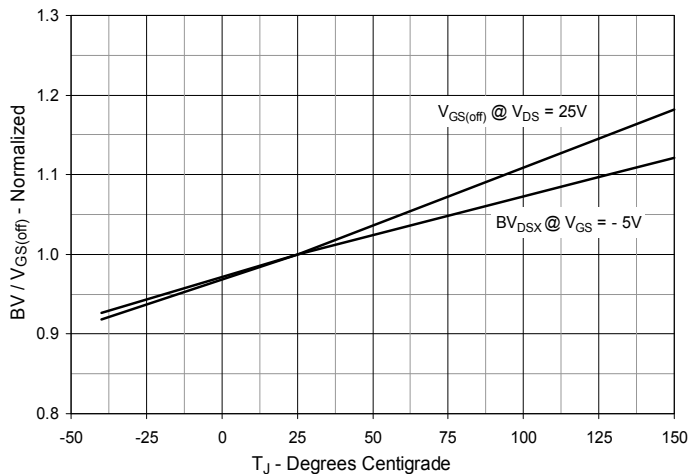


Fig. 12. Forward Voltage Drop of Intrinsic Diode

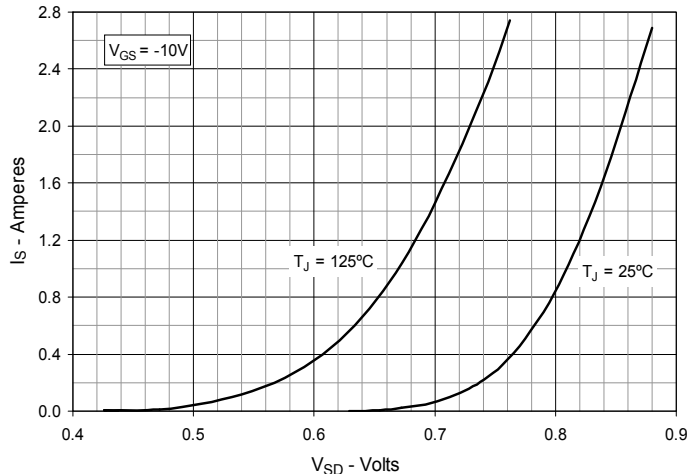


Fig. 13. Capacitance

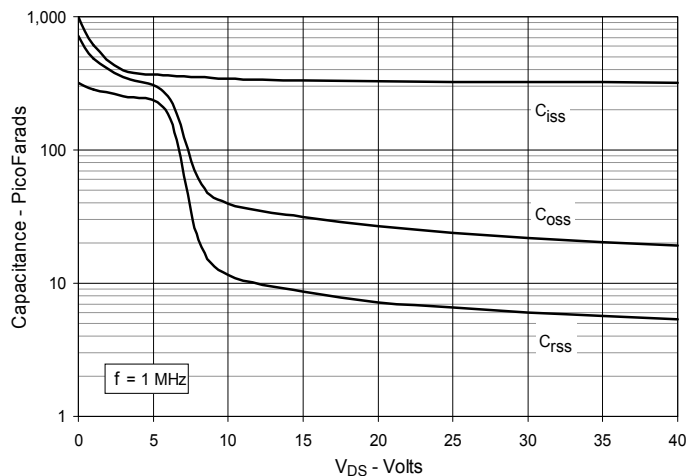


Fig. 14. Gate Charge

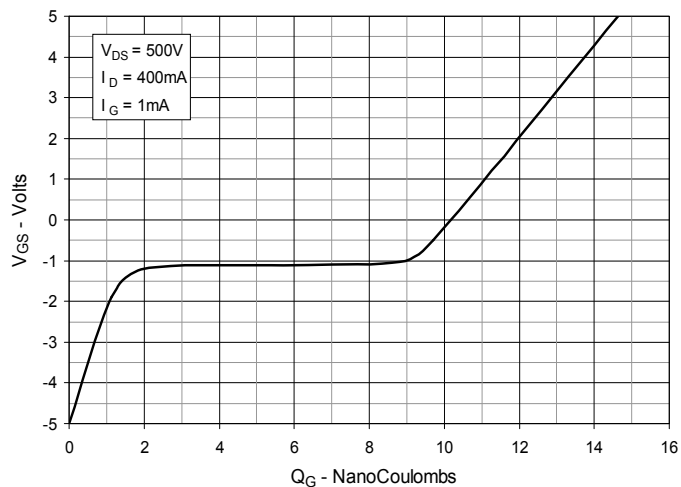


Fig. 15. Forward-Bias Safe Operating Area  
@  $T_C = 25^\circ\text{C}$

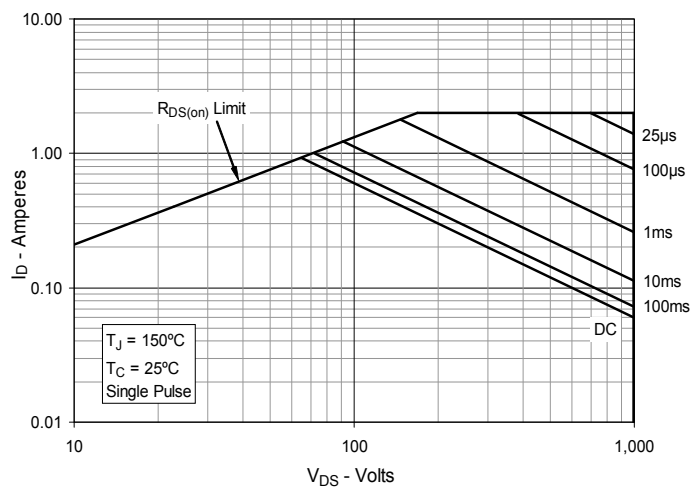


Fig. 16. Forward-Bias Safe Operating Area  
@  $T_C = 75^\circ\text{C}$

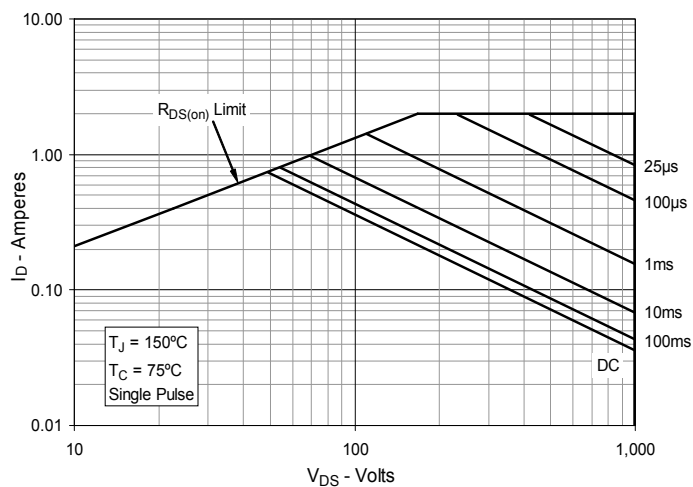
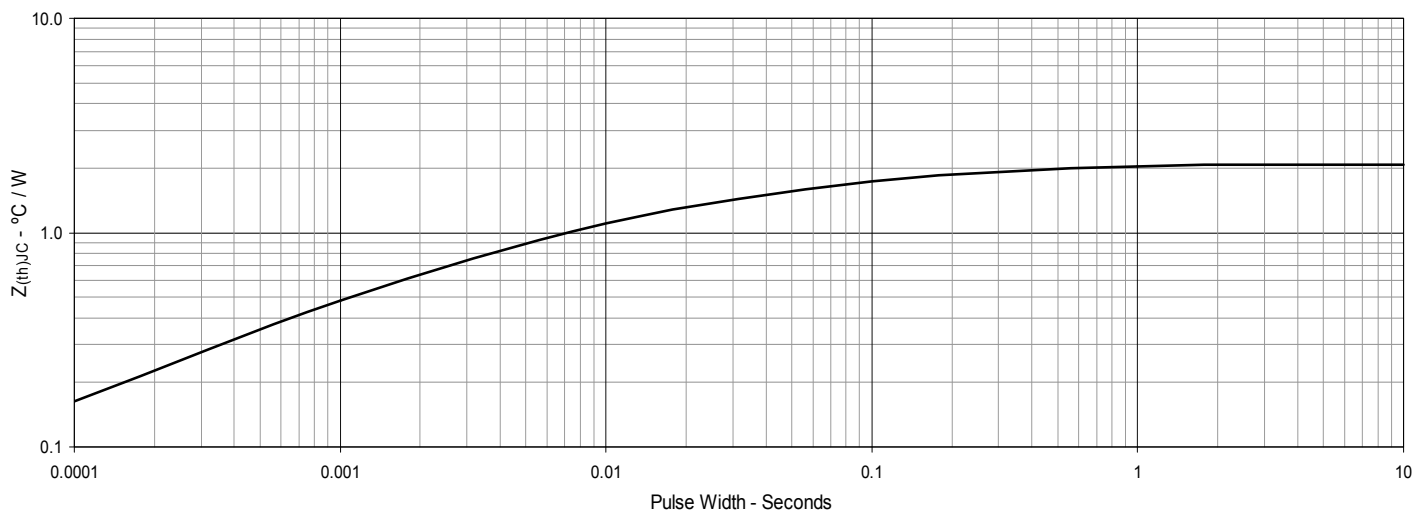


Fig. 17. Maximum Transient Thermal Impedance



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