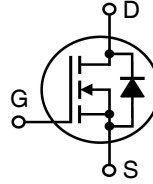


**Q3-Class  
HiperFET™  
Power MOSFET**

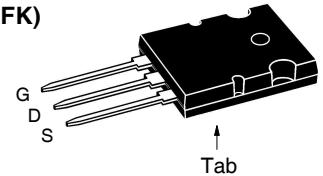
**IXFK32N100Q3  
IXFX32N100Q3**

$V_{DSS} = 1000V$   
 $I_{D25} = 32A$   
 $R_{DS(on)} \leq 320m\Omega$   
 $t_{rr} \leq 300ns$

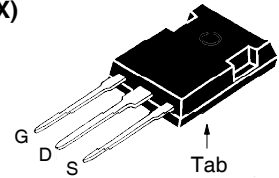
N-Channel Enhancement Mode  
Fast Intrinsic Rectifier



TO-264  
(IXFK)



PLUS247  
(IXFX)



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

| Symbol         | Test Conditions  | Maximum Ratings   |            |
|----------------|--|-------------------|------------|
| $V_{DSS}$      | $T_J = 25^\circ C$ to $150^\circ C$                                | 1000              | V          |
| $V_{DGR}$      | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 1000              | V          |
| $V_{GSS}$      | Continuous   | $\pm 30$          | V          |
| $V_{GSM}$      | Transient  | $\pm 40$          | V          |
| $I_{D25}$      | $T_C = 25^\circ C$   | 32                | A          |
| $I_{DM}$       | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 96                | A          |
| $I_A$          | $T_C = 25^\circ C$   | 32                | A          |
| $E_{AS}$       | $T_C = 25^\circ C$   | 2                 | J          |
| $dv/dt$        | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 50                | V/ns       |
| $P_D$          | $T_C = 25^\circ C$   | 1250              | W          |
| $T_J$          |  | -55 ... +150      | $^\circ C$ |
| $T_{JM}$       |  | 150               | $^\circ C$ |
| $T_{stg}$      |  | -55 ... +150      | $^\circ C$ |
| $L_{T_{SOLD}}$ | Maximum Lead Temperature for Soldering                             | 300               | $^\circ C$ |
|                | Plastic Body for 10s   | 260               | $^\circ C$ |
| $M_d$          | Mounting Torque (TO-264)   | 1.13/10           | Nm/lb.in.  |
| $F_C$          | Mounting Force (PLUS247)   | 20..120 / 4.5..27 | N/lb.      |
| <b>Weight</b>  | TO-264   | 10                | g          |
|                | PLUS247  | 6                 | g          |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values |      |                    |
|--------------|---|-----------------------|------|--------------------|
|              |   | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3mA$   | 1000                  |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8mA$                                     | 3.5                   |      | 6.5 V              |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                  |                       |      | $\pm 200$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$           |                       |      | 50 $\mu A$<br>3 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                 |                       |      | 320 $m\Omega$      |

**Features**

- International Standard Packages
- Low Intrinsic Gate Resistance
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$  and  $Q_G$

**Advantages**

- High Power Density
- Easy to Mount
- Space Savings

**Applications**

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperature and Lighting Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)  | Characteristic Values |       |                         |
|--------------|--|-----------------------|-------|-------------------------|
|              |  | Min.                  | Typ.  | Max.                    |
| $g_{fs}$     | $V_{DS} = 20\text{V}, I_D = 0.5 \cdot I_{D25}$ , Note 1  | 20                    | 32    | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$   |                       | 10990 | pF                      |
| $C_{oss}$    |  |                       | 745   | pF                      |
| $C_{rss}$    |  |                       | 67    | pF                      |
| $R_{Gi}$     | Gate Input Resistance  |                       | 0.20  | $\Omega$                |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 1\Omega$ (External) |                       | 45    | ns                      |
| $t_r$        |  |                       | 15    | ns                      |
| $t_{d(off)}$ |  |                       | 54    | ns                      |
| $t_f$        |  |                       | 12    | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$   |                       | 195   | nC                      |
| $Q_{gs}$     |  |                       | 60    | nC                      |
| $Q_{gd}$     |  |                       | 78    | nC                      |
| $R_{thJC}$   |  |                       |       | 0.10 $^\circ\text{C/W}$ |
| $R_{thCS}$   |  | 0.15                  |       | $^\circ\text{C/W}$      |

#### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)                       | Characteristic Values |      |               |
|----------|---|-----------------------|------|---------------|
|          |   | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$  |                       |      | 32 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$   |                       |      | 128 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{V}$ , Note 1  |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 16\text{A}, -di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}, V_{GS} = 0\text{V}$ |                       |      | 300 ns        |
| $Q_{RM}$ |   |                       | 1.2  | $\mu\text{C}$ |
| $I_{RM}$ |   |                       | 12.3 | A             |

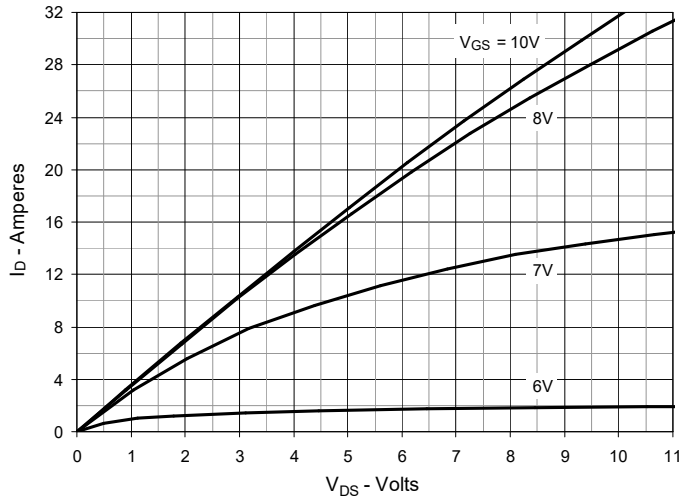
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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

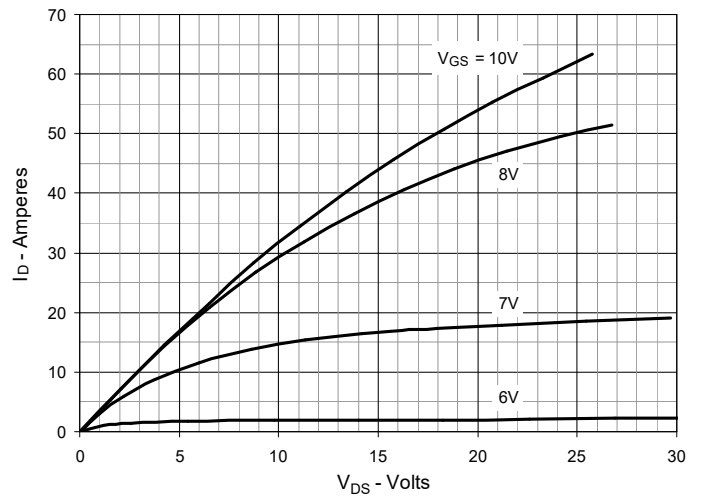
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

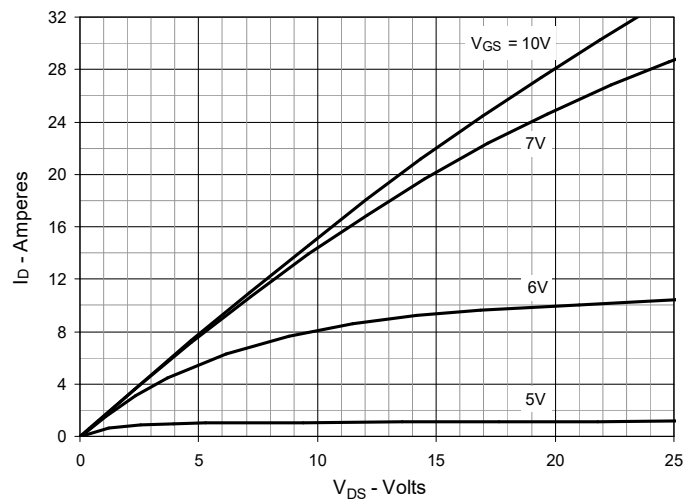
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



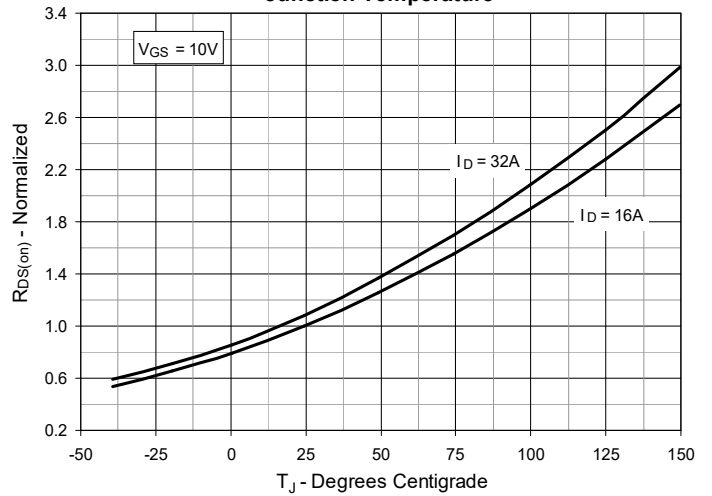
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



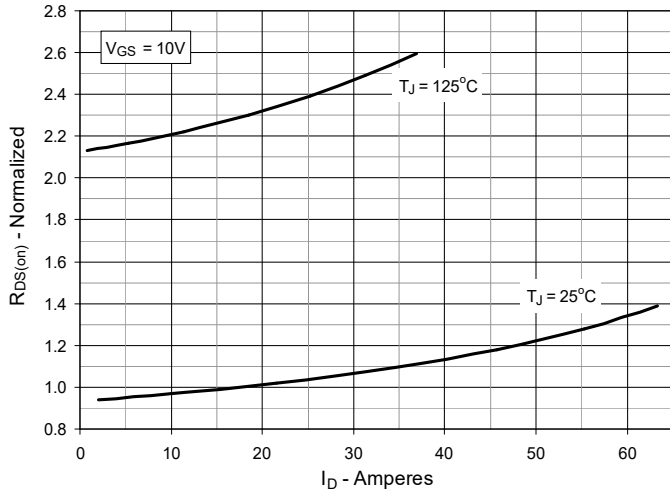
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



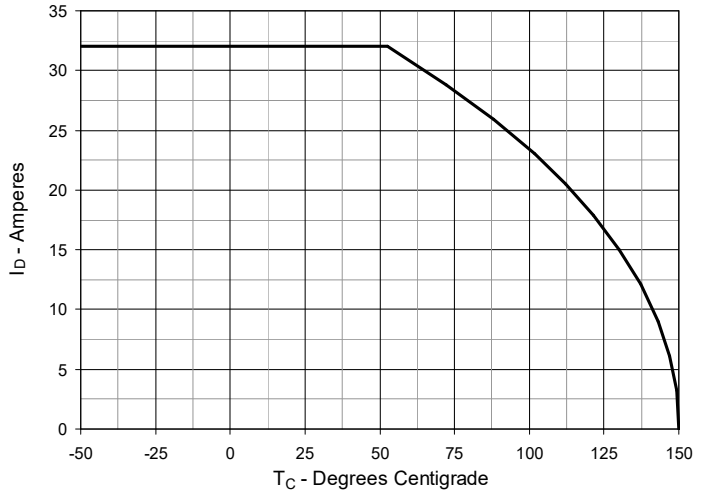
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 16\text{A}$  Value vs. Junction Temperature**



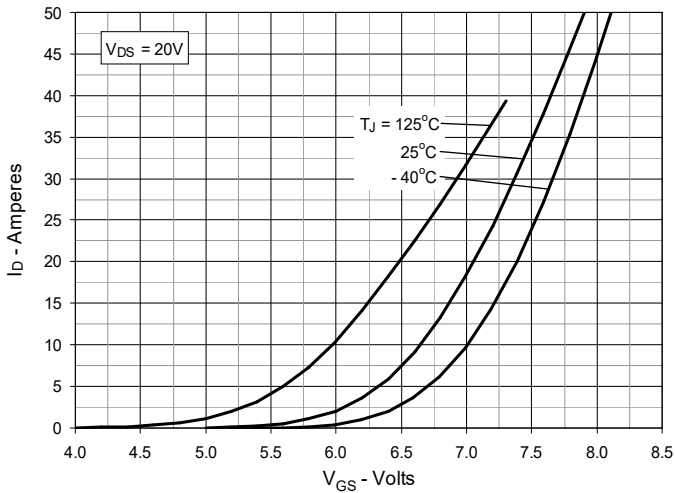
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 16\text{A}$  Value vs. Drain Current**



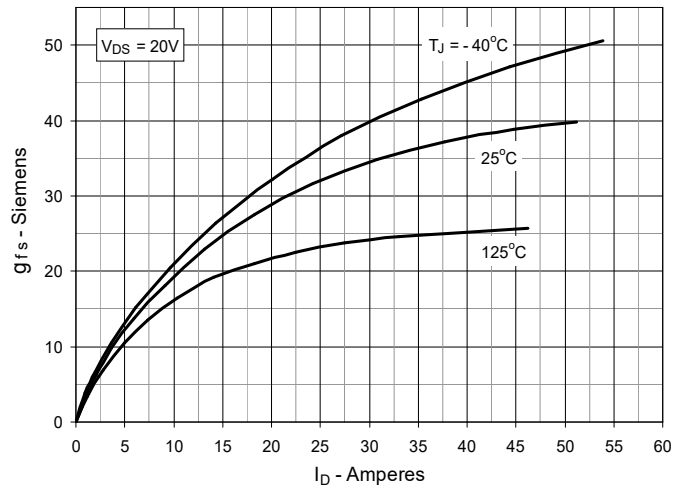
**Fig. 6. Maximum Drain Current vs. Case Temperature**



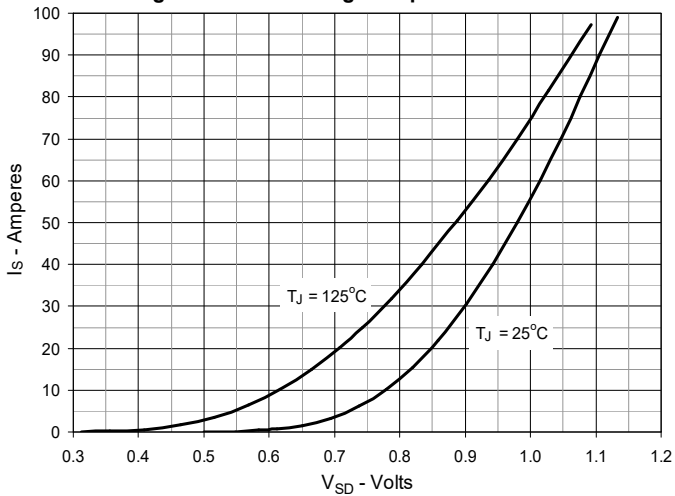
**Fig. 7. Input Admittance**



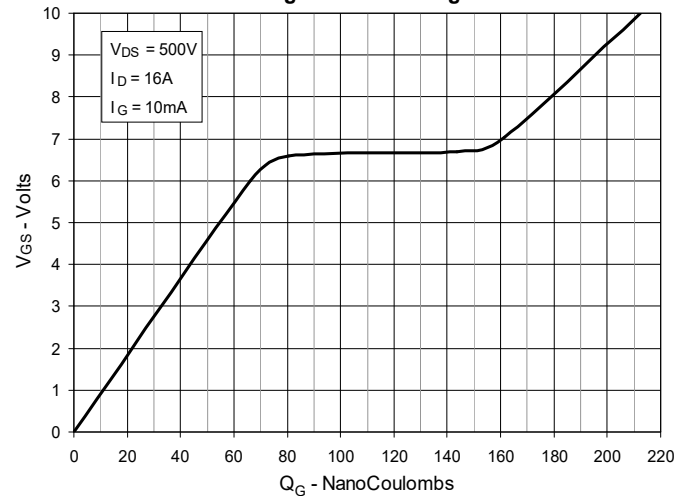
**Fig. 8. Transconductance**



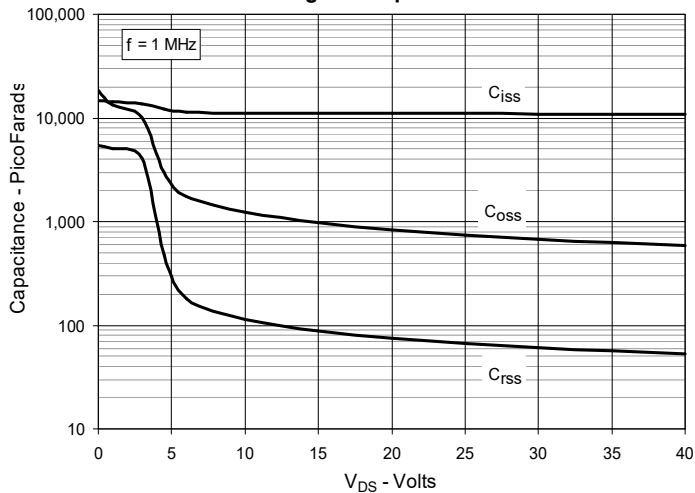
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**

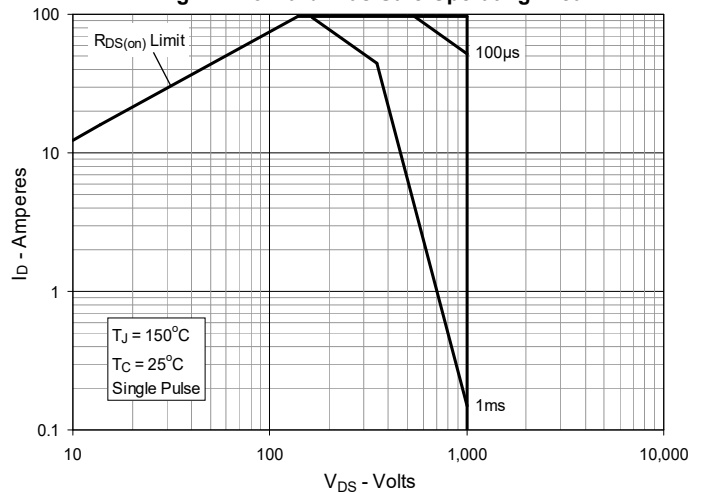
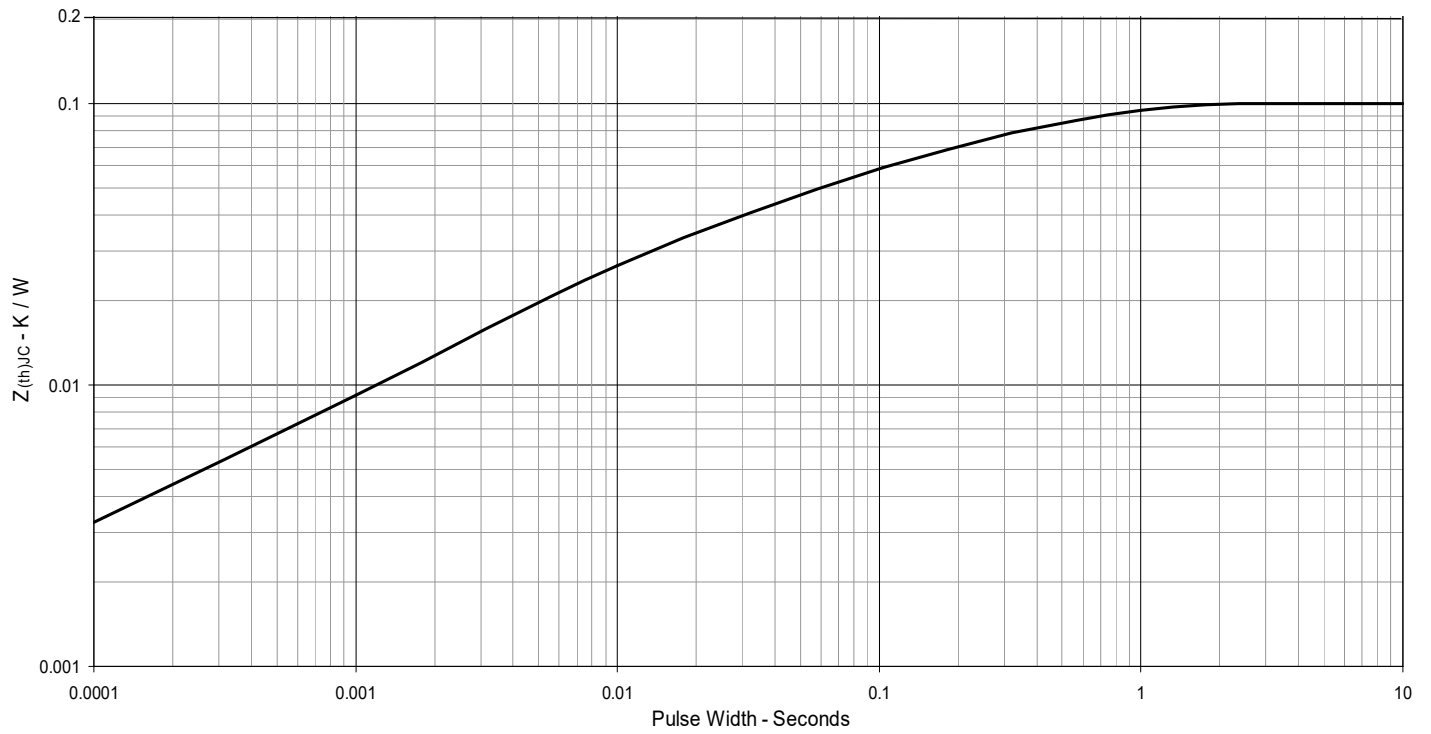
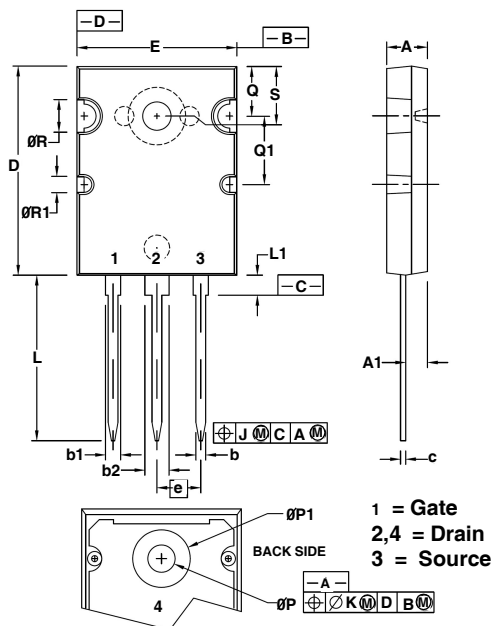
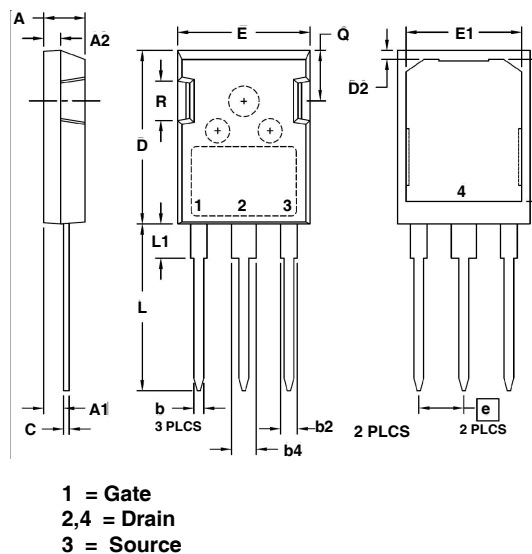


Fig. 13. Maximum Transient Thermal Impedance



**TO-264 Outline**


| SYMBOL | 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  |
| ØP1    | .270     | .290  | 6.86        | 7.37  |
| 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™ Outline**


| 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  | .520     | .560 | 13.08       | 14.22 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .810 | 19.81       | 20.57 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |



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