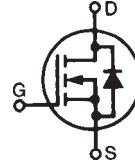


# High Current Power MOSFET

**IXTH 75N15**  
**IXTT 75N15**

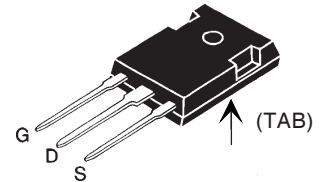
$V_{DSS} = 150 \text{ V}$   
 $I_{D25} = 75 \text{ A}$   
 $R_{DS(on)} = 23 \text{ m}\Omega$

N-Channel Enhancement Mode

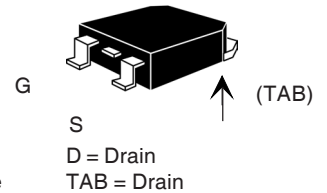


| Symbol    | Test Conditions                                                                                                                         | Maximum Ratings |                  |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 150             | V                |
| $V_{DGR}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 150             | V                |
| $V_{GS}$  | Continuous                                                                                                                              | $\pm 20$        | V                |
| $V_{GSM}$ | Transient                                                                                                                               | $\pm 30$        | V                |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                                                                                                | 75              | A                |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 300             | A                |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 75              | A                |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 60              | mJ               |
| $E_{AS}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 1.5             | J                |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5               | V/ns             |
| $P_D$     | $T_C = 25^\circ\text{C}$                                                                                                                | 330             | W                |
| $T_J$     |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$  |                                                                                                                                         | 150             | $^\circ\text{C}$ |
| $T_{stg}$ |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$     | 1.6 mm (0.062 in.) from case for 10 s                                                                                                   | 300             | $^\circ\text{C}$ |
| $M_d$     | Mounting torque                                                                                                                         | 1.13/10         | Nm/lb.in.        |
| Weight    | TO-247 AD                                                                                                                               | 6               | g                |
|           | TO-268                                                                                                                                  | 4               | g                |

TO-247 AD (IXTH)



TO-268 (IXTT)



## Features

- International standard packages
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

## Advantages

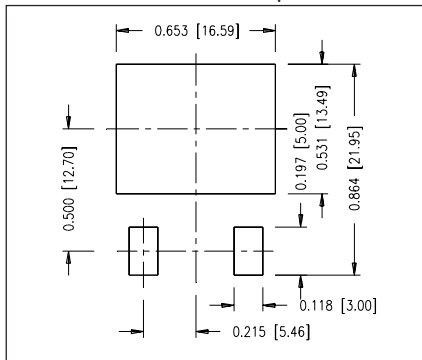
- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                     | Characteristic Values |      |                      |
|--------------|-----------------------------------------------------------------------------------------------------------------|-----------------------|------|----------------------|
|              |                                                                                                                 | Min.                  | Typ. | Max.                 |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                | 150                   |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                                                                     | 2.0                   |      | 4.0 V                |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                 |                       |      | $\pm 100 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$                                                                   |                       |      | 25 $\mu\text{A}$     |
|              | $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$                                                              |                       |      | 250 $\mu\text{A}$    |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$ |                       |      | 23 $\text{m}\Omega$  |

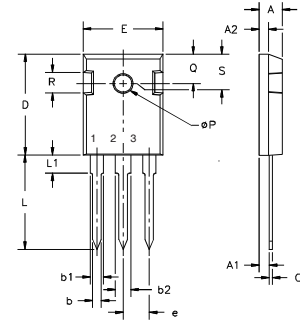
| Symbol       | Test Conditions                                                                                 | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------|
|              |                                                                                                 | Min.                                                                              | Typ. | Max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test                                          | 34                                                                                | 45   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                   |                                                                                   | 5400 | pF       |
| $C_{oss}$    |                                                                                                 |                                                                                   | 1100 | pF       |
| $C_{rss}$    |                                                                                                 |                                                                                   | 420  | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 2\ \Omega$ (External) |                                                                                   | 24   | ns       |
| $t_r$        |                                                                                                 |                                                                                   | 33   | ns       |
| $t_{d(off)}$ |                                                                                                 |                                                                                   | 70   | ns       |
| $t_f$        |                                                                                                 |                                                                                   | 17   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                 |                                                                                   | 210  | nC       |
| $Q_{gs}$     |                                                                                                 |                                                                                   | 45   | nC       |
| $Q_{gd}$     |                                                                                                 |                                                                                   | 90   | nC       |
| $R_{thJC}$   | (TO-247)                                                                                        |                                                                                   | 0.21 | 0.35 K/W |
| $R_{thCK}$   |                                                                                                 |                                                                                   |      | K/W      |

| Source-Drain Diode |                                                                                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|--------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
| Symbol             | Test Conditions                                                                                       | min.                                                                              | typ. | max.          |
| $I_S$              | $V_{GS} = 0\text{ V}$                                                                                 |                                                                                   |      | 75 A          |
| $I_{SM}$           | Repetitive                                                                                            |                                                                                   |      | 300 A         |
| $V_{SD}$           | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.5 V         |
| $T_{rr}$           | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$                    |                                                                                   | 150  | ns            |
| $Q_{RM}$           |                                                                                                       |                                                                                   | 2.0  | $\mu\text{C}$ |

## Min Recommended Footprint



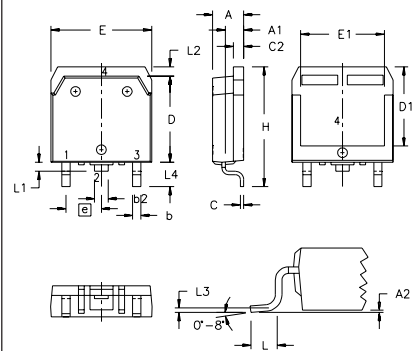
## TO-247 AD Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| Dim. | Millimeter Min. | Millimeter Max. | Inches Min. | Inches Max. |
|------|-----------------|-----------------|-------------|-------------|
| A    | 4.7             | 5.3             | .185        | .209        |
| A1   | 2.2             | 2.54            | .087        | .102        |
| A2   | 2.2             | 2.6             | .059        | .098        |
| b    | 1.0             | 1.4             | .040        | .055        |
| b1   | 1.65            | 2.13            | .065        | .084        |
| b2   | 2.87            | 3.12            | .113        | .123        |
| C    | .4              | .8              | .016        | .031        |
| D    | 20.80           | 21.46           | .819        | .845        |
| E    | 15.75           | 16.26           | .610        | .640        |
| e    | 5.20            | 5.72            | 0.205       | 0.225       |
| L    | 19.81           | 20.32           | .780        | .800        |
| L1   |                 | 4.50            |             | .177        |
| ØP   | 3.55            | 3.65            | .140        | .144        |
| Q    | 5.89            | 6.40            | 0.232       | 0.252       |
| R    | 4.32            | 5.49            | .170        | .216        |
| S    | 6.15 BSC        |                 | .242 BSC    |             |

## TO-268 Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

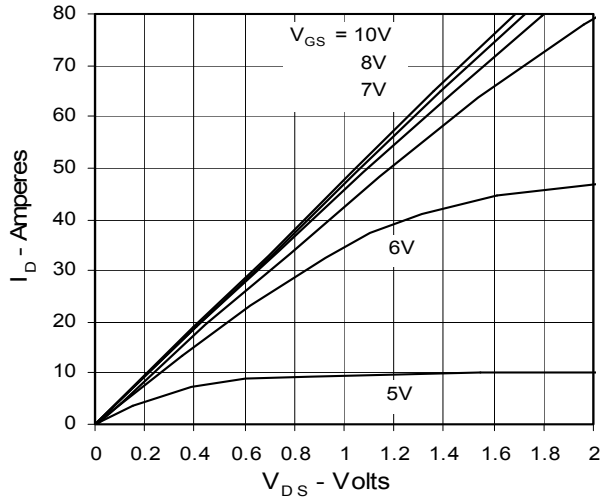
| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .193     | .201 | 4.90        | 5.10  |
| A1  | .106     | .114 | 2.70        | 2.90  |
| A2  | .001     | .010 | 0.02        | 0.25  |
| b   | .045     | .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 |
| 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   | .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  |

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

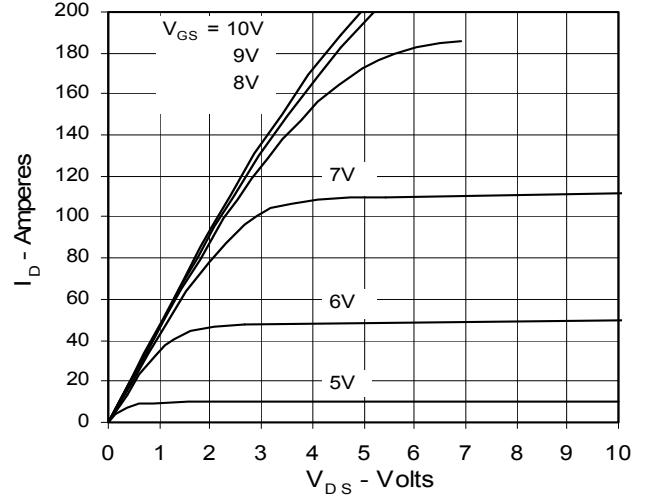
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |           |           |              |              |           |              |
|-----------|-----------|-----------|-----------|-----------|-----------|--------------|--------------|-----------|--------------|
| 4,835,592 | 4,881,106 | 5,017,508 | 5,049,961 | 5,187,117 | 5,381,025 | 6,162,665    | 6,306,728 B1 | 6,534,343 | 6,683,344    |
| 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,486,715 | 6,259,123 B1 | 6,404,065 B1 | 6,583,505 | 6,710,405 B2 |

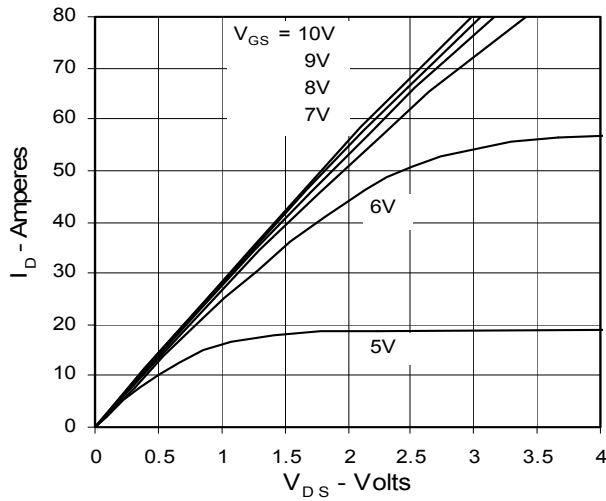
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



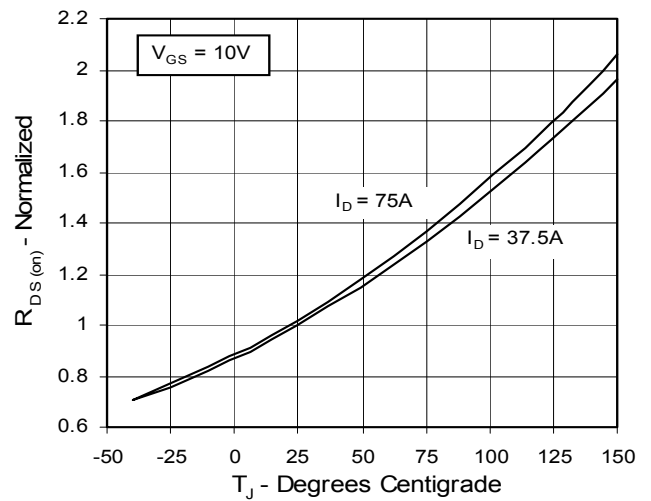
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



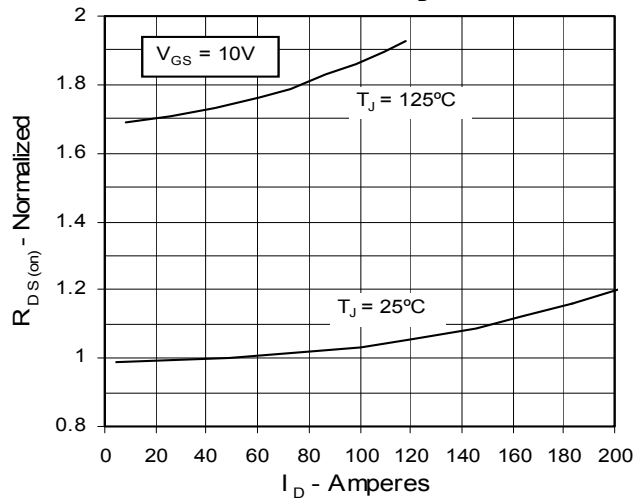
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



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



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



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

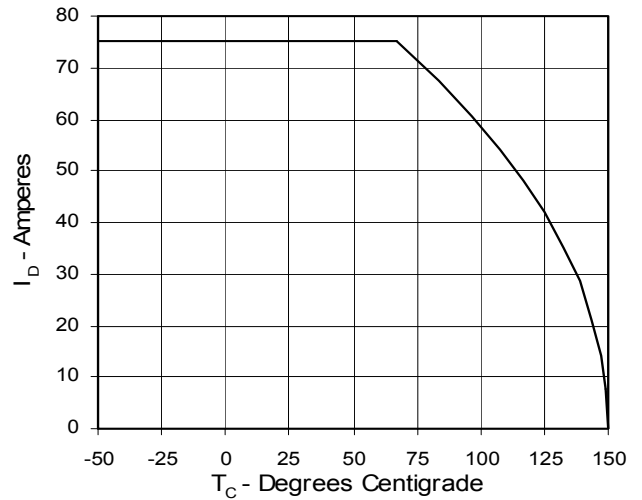


Fig. 7. Input Admittance

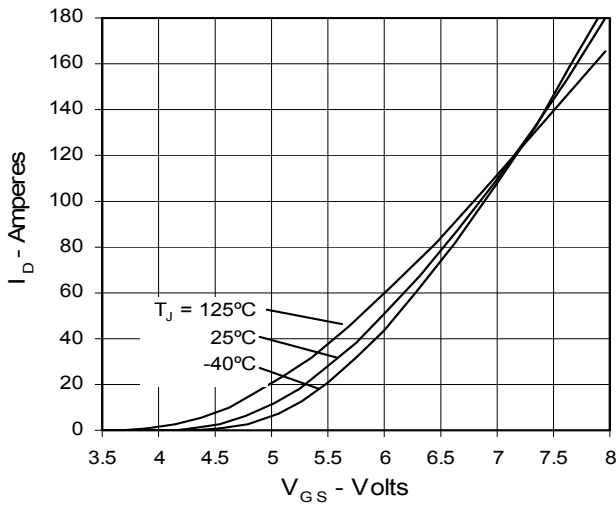


Fig. 8. Transconductance

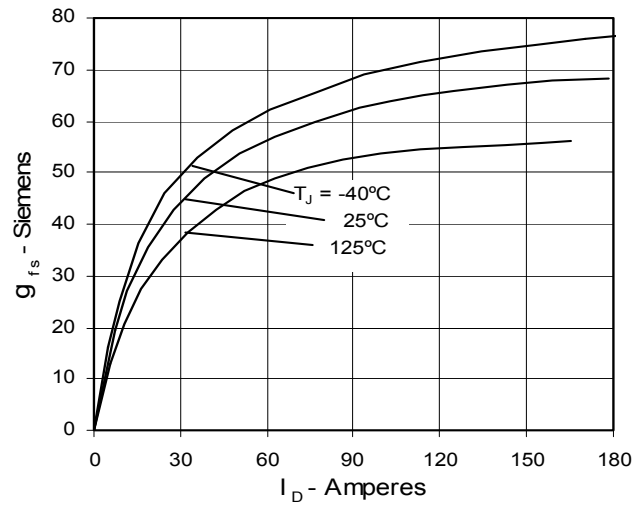


Fig. 9. Source Current vs. Source-To-Drain Voltage

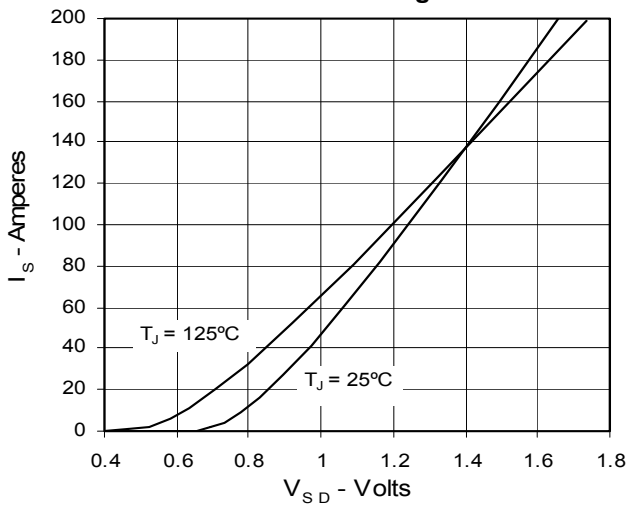


Fig. 10. Gate Charge

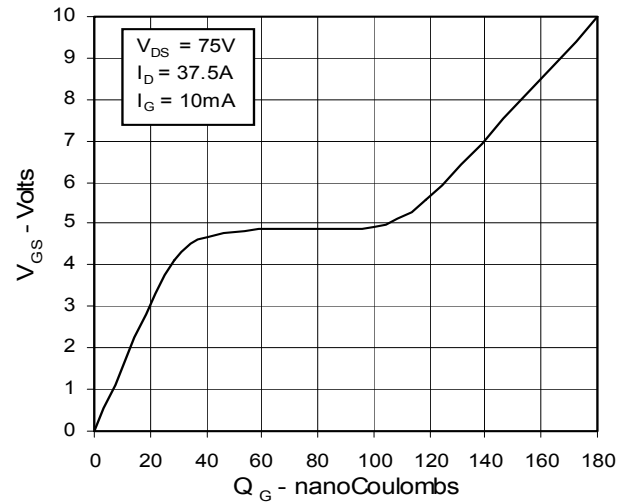


Fig. 11. Capacitance

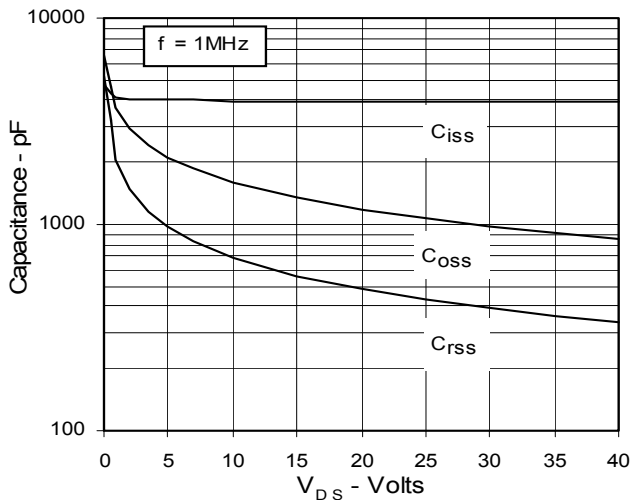
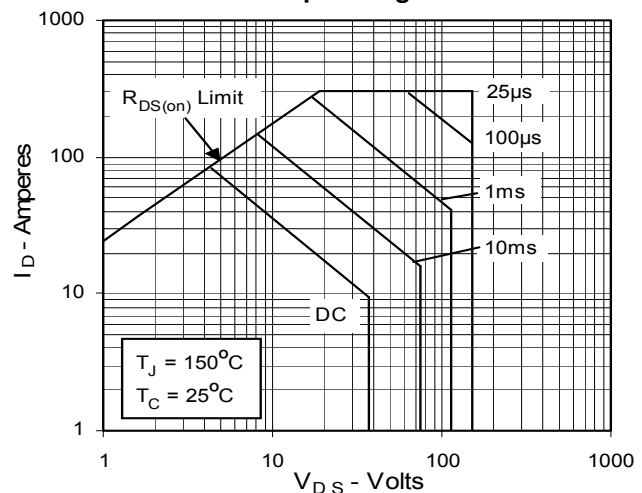


Fig. 12. Forward-Bias Safe Operating Area



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

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|           |           |           |           |           |           |              |              |           |              |
|-----------|-----------|-----------|-----------|-----------|-----------|--------------|--------------|-----------|--------------|
| 4,835,592 | 4,881,106 | 5,017,508 | 5,049,961 | 5,187,117 | 5,381,025 | 6,162,665    | 6,306,728 B1 | 6,534,343 | 6,683,344    |
| 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,486,715 | 6,259,123 B1 | 6,404,065 B1 | 6,583,505 | 6,710,405 B2 |

Fig. 13. Maximum Transient Thermal Resistance

