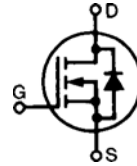


## HiPerFET™

### Power MOSFETs Q Class

IXFH/IXFT12N100Q  
IXFH/IXFT10N100Q

N-Channel Enhancement Mode  
Avalanche Rated  
Low  $Q_g$ , High  $dv/dt$



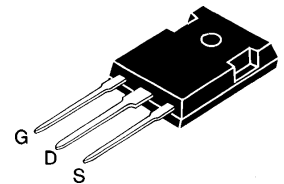
| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$  |
|-----------|-----------|---------------|
| 1000 V    | 12 A      | 1.05 $\Omega$ |
| 1000 V    | 10 A      | 1.20 $\Omega$ |

$$t_{rr} \leq 250 \text{ ns}$$

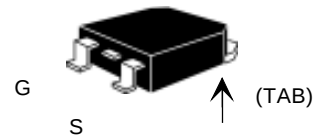
| Symbol    | Test Conditions                                                                                                                         | Maximum Ratings     |                  |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 1000                | V                |
| $V_{DGR}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 1000                | V                |
| $V_{GS}$  | Continuous                                                                                                                              | $\pm 20$            | V                |
| $V_{GSM}$ | Transient                                                                                                                               | $\pm 30$            | V                |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$                                                                                                                | 12N100Q<br>10N100Q  | 12<br>10 A       |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ ,<br>pulse width limited by $T_{JM}$                                                                           | 12N100Q<br>10N100Q  | 48<br>40 A       |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 12N100Q<br>10N100Q  | 12<br>10 A       |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 30                  | mJ               |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5                   | V/ns             |
| $P_D$     | $T_C = 25^\circ\text{C}$                                                                                                                | 300                 | 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 (0.063 in) from case for 10 s                                                                                                    | 300                 | $^\circ\text{C}$ |
| $M_d$     | Mounting torque                                                                                                                         | 1.13/10             | Nm/lb.in.        |
| Weight    |                                                                                                                                         | TO-247 AD<br>TO-268 | 6<br>4 g         |

| Symbol                                                          | Test Conditions                                        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                                |
|-----------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------|------|--------------------------------|
|                                                                 |                                                        | min.                                                                              | typ. | max.                           |
| $V_{DSS}$                                                       | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$          | 1000                                                                              |      | V                              |
| $V_{GS(th)}$                                                    | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$               | 2.5                                                                               |      | 5.5 V                          |
| $I_{GSS}$                                                       | $V_{GS} = \pm 20 V_{DC}$ , $V_{DS} = 0$                |                                                                                   |      | $\pm 100 \text{ nA}$           |
| $I_{DSS}$                                                       | $V_{DS} = 0.8 \cdot V_{DSS}$<br>$V_{GS} = 0 \text{ V}$ | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                             |      | 50 $\mu\text{A}$<br>1 mA       |
| $R_{DS(on)}$                                                    | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$          | 12N100Q<br>10N100Q                                                                |      | 1.05 $\Omega$<br>1.20 $\Omega$ |
| Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                                                        |                                                                                   |      |                                |

TO-247 AD (IXFH)



TO-268 (D3) (IXFT)



G = Gate      D = Drain  
S = Source    TAB = Drain

#### Features

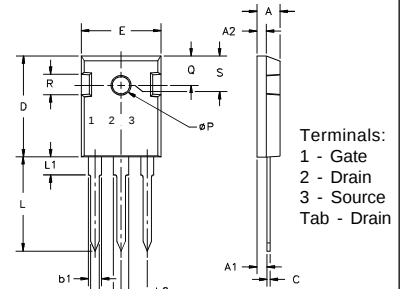
- IXYS advanced low  $Q_g$  process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- International standard packages
- Low  $R_{DS(on)}$
- Unclamped Inductive Switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

#### Advantages

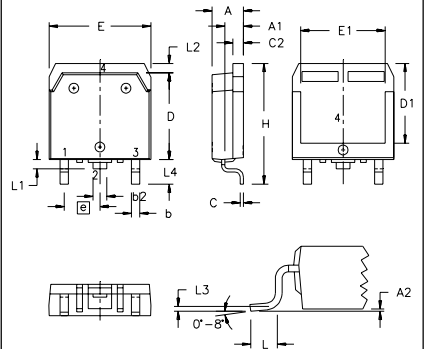
- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions                                                                                              | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------|
|              |                                                                                                              | min.                                                                              | typ. | max.     |
| $g_{fs}$     | $V_{DS} = 15\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test                                                 | 4                                                                                 | 10   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                                |                                                                                   | 2900 | pF       |
| $C_{oss}$    |                                                                                                              |                                                                                   | 315  | pF       |
| $C_{rss}$    |                                                                                                              |                                                                                   | 50   | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2\ \Omega$ (External), |                                                                                   | 20   | ns       |
| $t_r$        |                                                                                                              |                                                                                   | 23   | ns       |
| $t_{d(off)}$ |                                                                                                              |                                                                                   | 40   | ns       |
| $t_f$        |                                                                                                              |                                                                                   | 15   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                  |                                                                                   | 90   | nC       |
| $Q_{gs}$     |                                                                                                              |                                                                                   | 30   | nC       |
| $Q_{gd}$     |                                                                                                              |                                                                                   | 40   | nC       |
| $R_{thJC}$   | (TO-247)                                                                                                     |                                                                                   | 0.25 | 0.42 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.          |
| $I_S$              | $V_{GS} = 0\text{ V}$                                                                                 |                                                                                   |      | 12 A          |
| $I_{SM}$           | Repetitive; pulse width limited by $T_{JM}$                                                           |                                                                                   |      | 48 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         |
| $t_{rr}$           | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                    |                                                                                   | 200  | ns            |
| $Q_{RM}$           |                                                                                                       |                                                                                   | 0.6  | $\mu\text{C}$ |
| $I_{RM}$           |                                                                                                       |                                                                                   | 7    | A             |

**TO-247 AD (IXFH) Outline**


| Dim.           | Millimeter<br>Min. | Max.  | Inches<br>Min. | Max.  |
|----------------|--------------------|-------|----------------|-------|
| A              | 4.7                | 5.3   | .185           | .209  |
| A <sub>1</sub> | 2.2                | 2.54  | .087           | .102  |
| A <sub>2</sub> | 2.2                | 2.6   | .059           | .098  |
| b              | 1.0                | 1.4   | .040           | .055  |
| b <sub>1</sub> | 1.65               | 2.13  | .065           | .084  |
| b <sub>2</sub> | 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  |
| L <sub>1</sub> |                    | 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**


| SYM            | INCHES |      | MILLIMETERS |       |
|----------------|--------|------|-------------|-------|
|                | MIN    | MAX  | MIN         | MAX   |
| A              | .193   | .201 | 4.90        | 5.10  |
| A <sub>1</sub> | .106   | .114 | 2.70        | 2.90  |
| A <sub>2</sub> | .001   | .010 | 0.02        | 0.25  |
| b              | .045   | .057 | 1.15        | 1.45  |
| b <sub>2</sub> | .075   | .083 | 1.90        | 2.10  |
| C              | .016   | .026 | 0.40        | 0.65  |
| C <sub>2</sub> | .057   | .063 | 1.45        | 1.60  |
| D              | .543   | .551 | 13.80       | 14.00 |
| D <sub>1</sub> | .488   | .500 | 12.40       | 12.70 |
| E              | .624   | .632 | 15.85       | 16.05 |
| E <sub>1</sub> | .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  |
| L <sub>1</sub> | .047   | .055 | 1.20        | 1.40  |
| L <sub>2</sub> | .039   | .045 | 1.00        | 1.15  |
| L <sub>3</sub> | .010   | BSC  | 0.25        | BSC   |
| L <sub>4</sub> | .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 | 5,486,715 | 6,306,728B1 |
|                                                                                  | 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,381,025 |             |

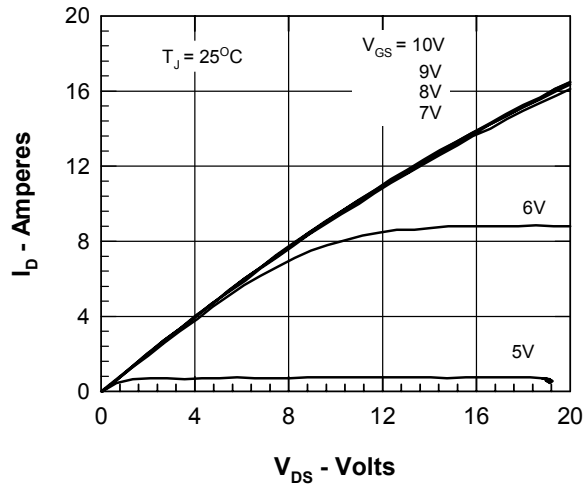


Figure 1. Output Characteristics at 25°C

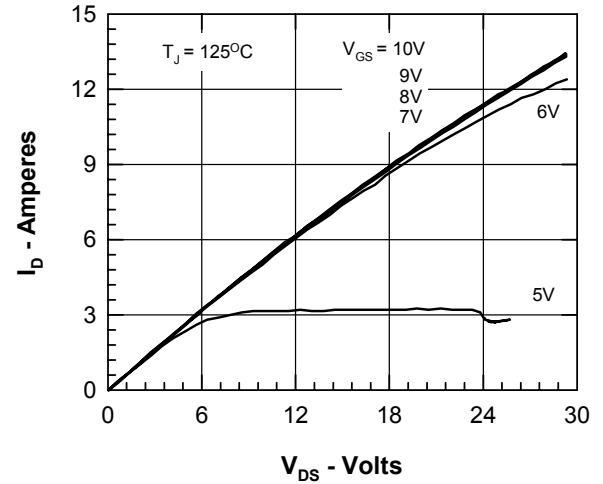


Figure 2. Output Characteristics at 125°C

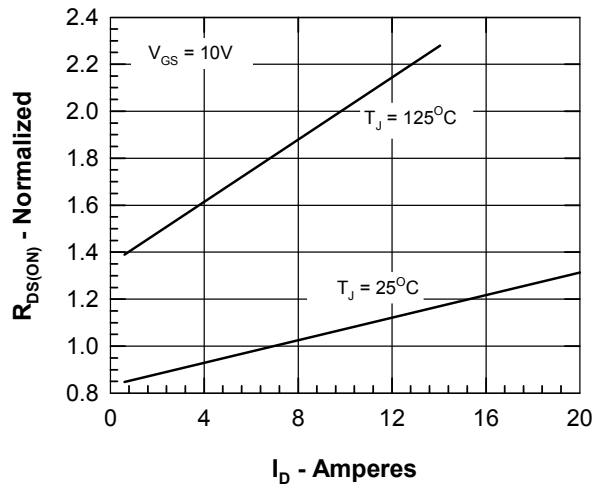


Figure 3.  $R_{DS(on)}$  normalized to value at  $I_D = 12A$

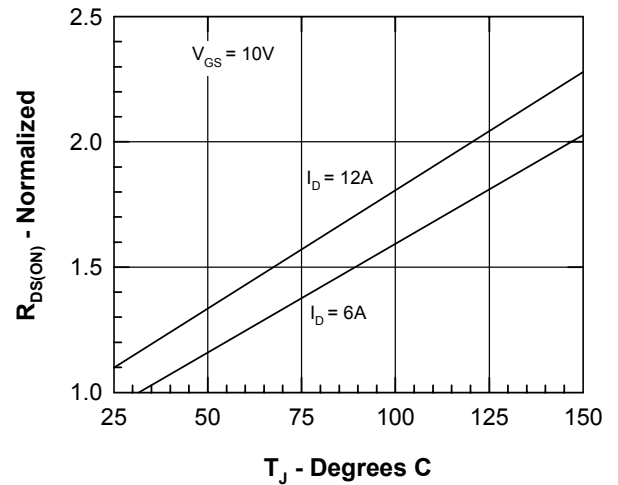


Figure 4.  $R_{DS(on)}$  normalized to value at  $I_D = 12A$

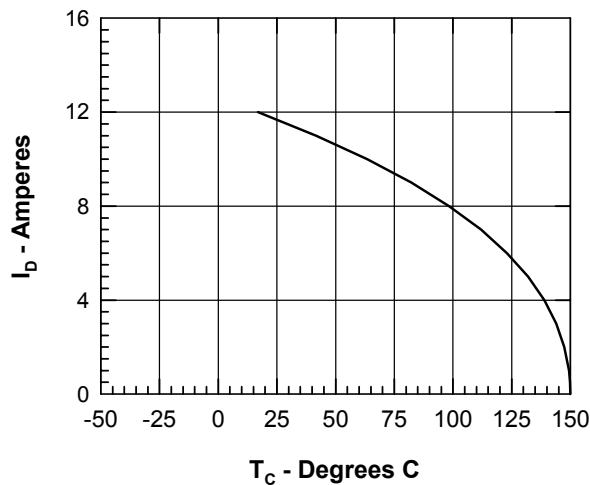


Figure 5. Drain Current vs. Case Temperature

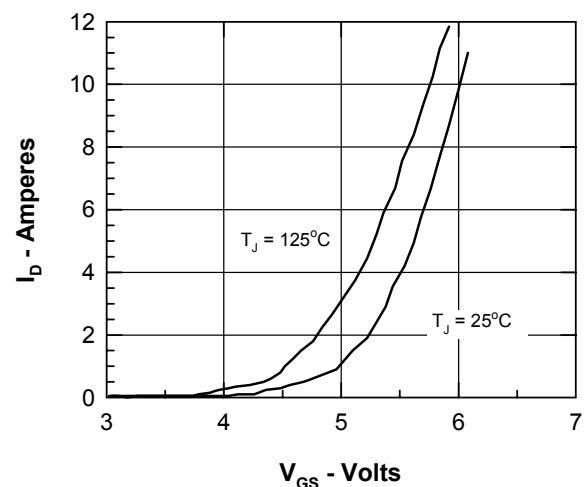


Figure 6. Admittance Curves

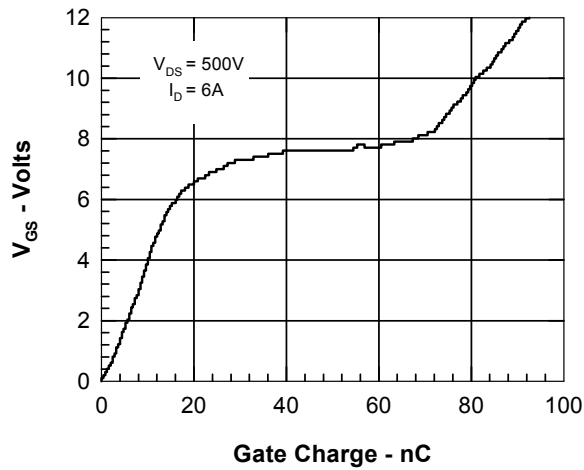


Figure 7. Gate Charge

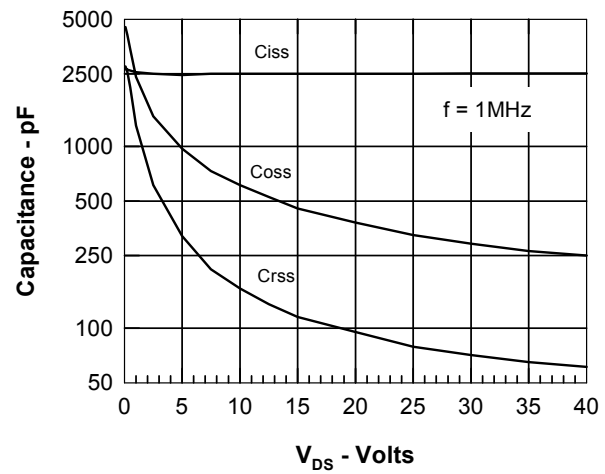


Figure 8. Capacitance Curves

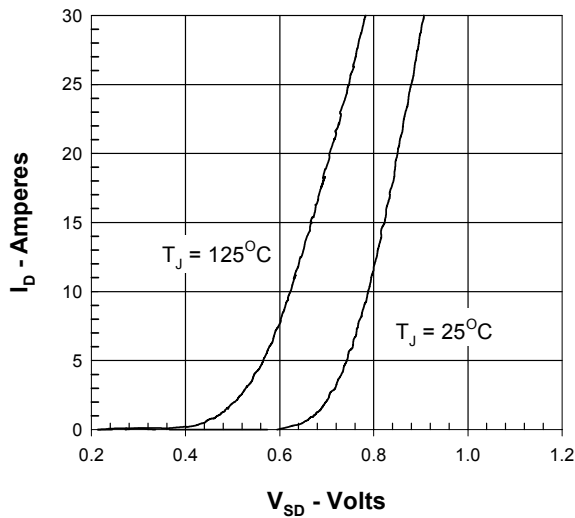


Figure 9. Source Current vs. Source to Drain Voltage

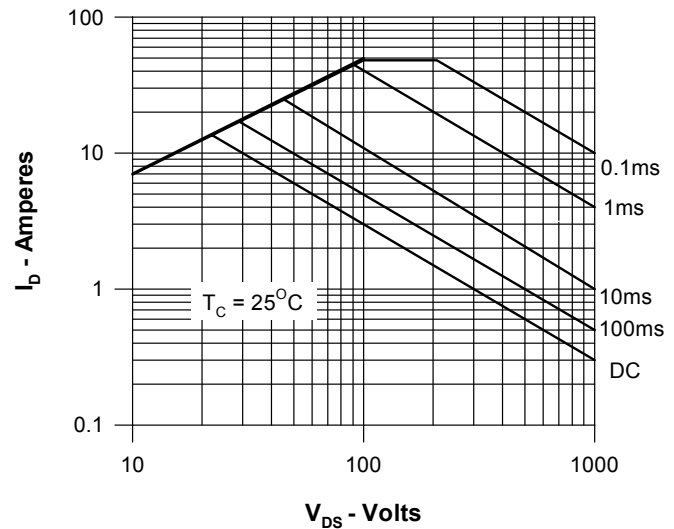


Figure 10. Forward Bias Safe Operating Area

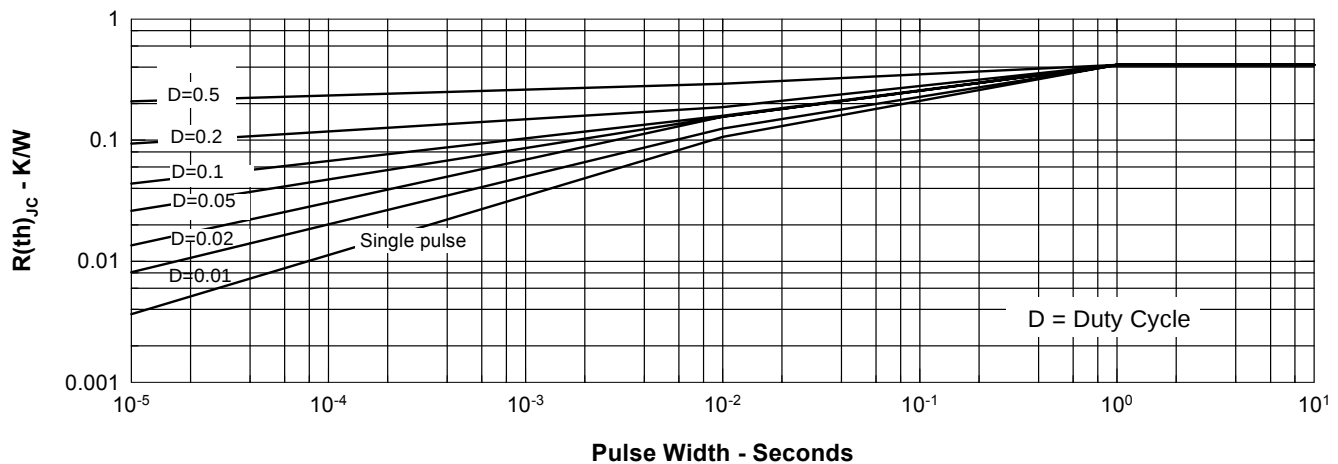


Figure 11. Transient Thermal Resistance