

**Features**

- Trench Power LV MOSFET Technology
- High Density Cell Design for Low  $R_{DS(ON)}$
- High Speed Switching
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device<sup>(Note 1)</sup>
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings**

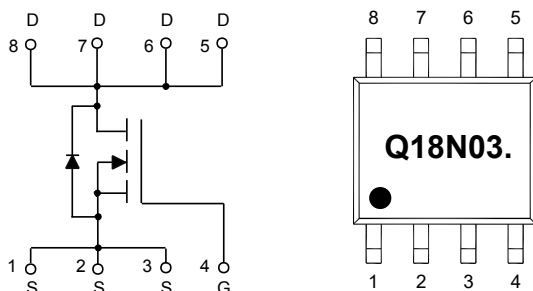
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 60°C/W Junction to Ambient<sup>(Note 2)</sup>

| Parameter  | Symbol   | Rating                 | Unit |
|--|----------|------------------------|------|
| Drain-Source Voltage                               | $V_{DS}$ | 30                     | V    |
| Gate-Source Voltage                                | $V_{GS}$ | ±20                    | V    |
| Continuous Drain Current                           | $I_D$    | $T_A=25^\circ\text{C}$ | 18   |
|  |          | $T_A=70^\circ\text{C}$ | 14.5 |
| Pulsed Drain Current <sup>(Note 3)</sup>           | $I_{DM}$ | 65                     | A    |
| Total Power Dissipation <sup>(Note 4)</sup>        | $P_D$    | 2.1                    | W    |
| Single Pulsed Avalanche Energy <sup>(Note 5)</sup> | $E_{AS}$ | 121                    | mJ   |

Note:

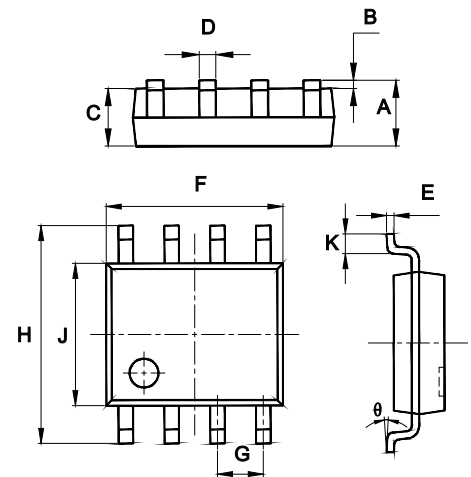
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA} \leq 10\text{s}$  and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-Ambient thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=25\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.5\text{mH}$ .

**Internal Structure and Marking Code**



**N-CHANNEL MOSFET**

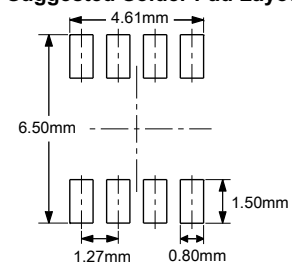
**SOP-8**



**DIMENSIONS**

| DIM | INCHES |       | MM    |      | NOTE |
|-----|--------|-------|-------|------|------|
|     | MIN    | MAX   | MIN   | MAX  |      |
| A   | 0.053  | 0.069 | 1.35  | 1.75 |      |
| B   | 0.004  | 0.010 | 0.10  | 0.25 |      |
| C   | 0.053  | 0.061 | 1.35  | 1.55 |      |
| D   | 0.013  | 0.020 | 0.33  | 0.51 |      |
| E   | 0.007  | 0.010 | 0.17  | 0.25 |      |
| F   | 0.185  | 0.200 | 4.70  | 5.10 |      |
| G   | 0.050  |       | 1.270 |      | TYP. |
| H   | 0.228  | 0.244 | 5.80  | 6.20 |      |
| J   | 0.150  | 0.157 | 3.80  | 4.00 |      |
| K   | 0.016  | 0.050 | 0.40  | 1.27 |      |
| θ   | 0°     | 8°    | 0°    | 8°   |      |

**Suggested Solder Pad Layout**



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

| Parameter                       | Symbol        | Test Conditions                                   | Min | Typ  | Max       | Unit       |
|---------------------------------|---------------|---|-----|------|-----------|------------|
| <b>Static Characteristics</b>   |               |   |     |      |           |            |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                         | 30  |      |           | V          |
| Gate-Source Leakage Current     | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 20V$                       |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=30V, V_{GS}=0V$                           |     |      | 1         | $\mu A$    |
| Gate-Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                     | 1   | 1.3  | 2.5       | V          |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=10V, I_D=18A$                             |     | 4.8  | 7         | m $\Omega$ |
|                                 |               | $V_{GS}=4.5V, I_D=10A$                            |     | 7    | 10        |            |
| Gate Resistance                 | $R_g$         | F=1MHZ, Open drain                                |     | 2.3  |           | $\Omega$   |
| <b>Diode Characteristics</b>    |               |   |     |      |           |            |
| Continuous Body Diode Current   | $I_S$         |   |     |      | 18        | A          |
| Diode Forward Voltage           | $V_{SD}$      | $V_{GS}=0V, I_S=12A$                              |     | 0.85 | 1.2       | V          |
| Reverse Recovery Time           | $t_{rr}$      | $I_S=12A, di/dt=100A/\mu s$                       |     | 23   |           | ns         |
| Reverse Recovery Charge         | $Q_{rr}$      |   |     | 10   |           | nC         |
| <b>Dynamic Characteristics</b>  |               |   |     |      |           |            |
| Input Capacitance               | $C_{iss}$     | $V_{DS}=15V, V_{GS}=0V, f=1MHz$                   |     | 1765 |           | pF         |
| Output Capacitance              | $C_{oss}$     |   |     | 298  |           |            |
| Reverse Transfer Capacitance    | $C_{rss}$     |   |     | 266  |           |            |
| Total Gate Charge               | $Q_g$         | $V_{DS}=15V, V_{GS}=10V, I_D=12A$                 |     | 38   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$      |   |     | 4    |           |            |
| Gate-Drain Charge               | $Q_{gd}$      |   |     | 10   |           |            |
| Turn-On Delay Time              | $t_{d(on)}$   | $V_{GS}=10V, V_{DD}=20V, I_D=4A, R_{GEN}=3\Omega$ |     | 7.8  |           | ns         |
| Turn-On Rise Time               | $t_r$         |   |     | 10   |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$  |   |     | 35   |           |            |
| Turn-Off Fall Time              | $t_f$         |   |     | 20   |           |            |

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

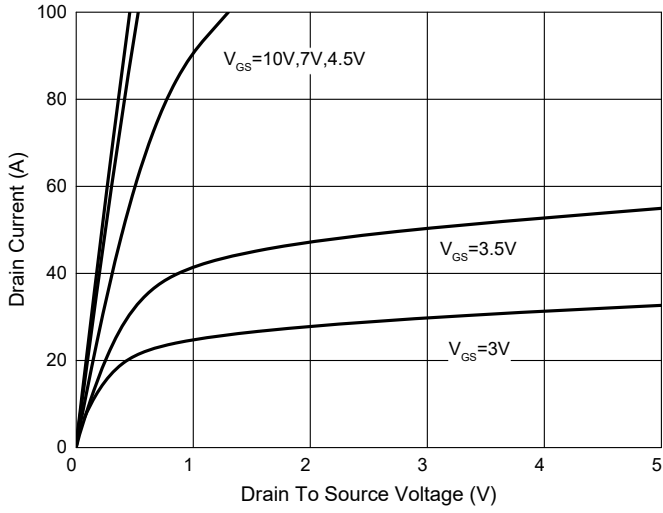


Fig. 2 - Transfer Characteristics

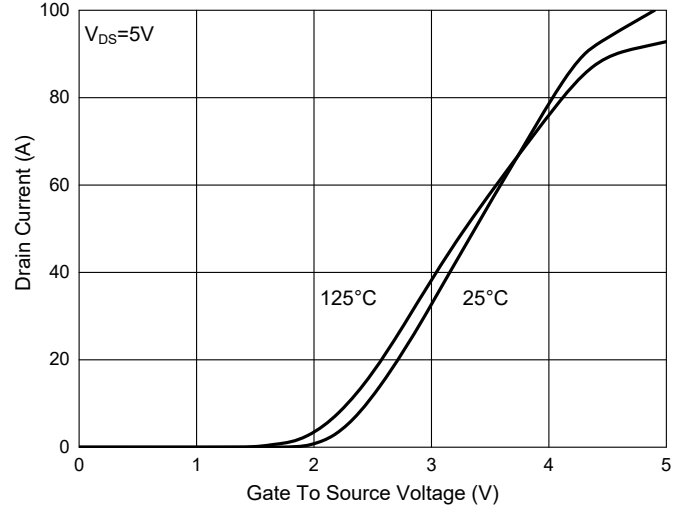


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

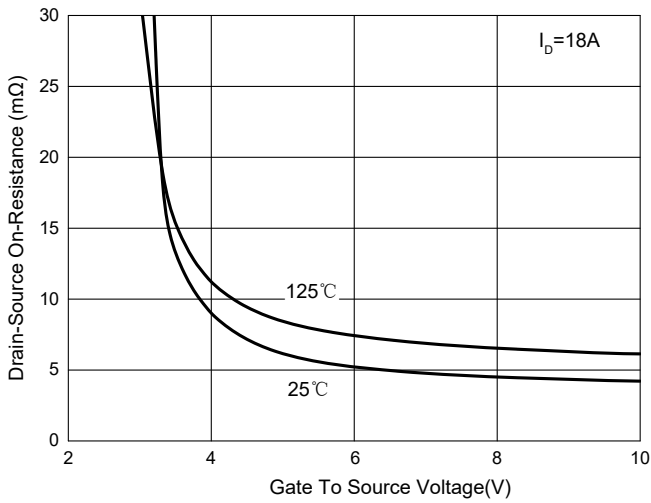


Fig. 4 -  $R_{DS(ON)} - I_D$

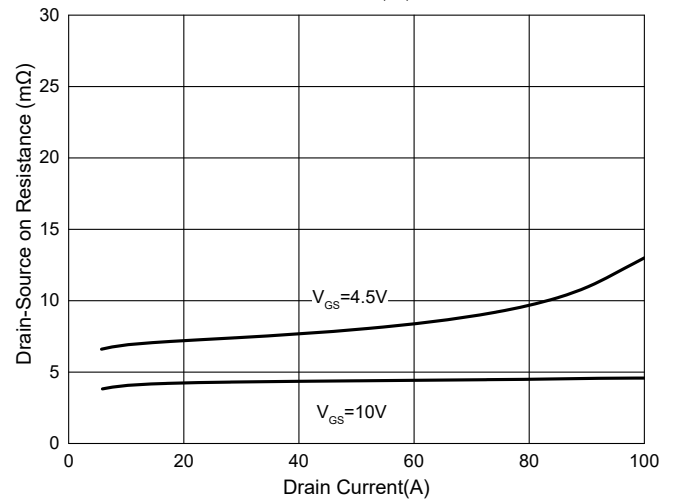


Fig. 5 - Capacitance Characteristics

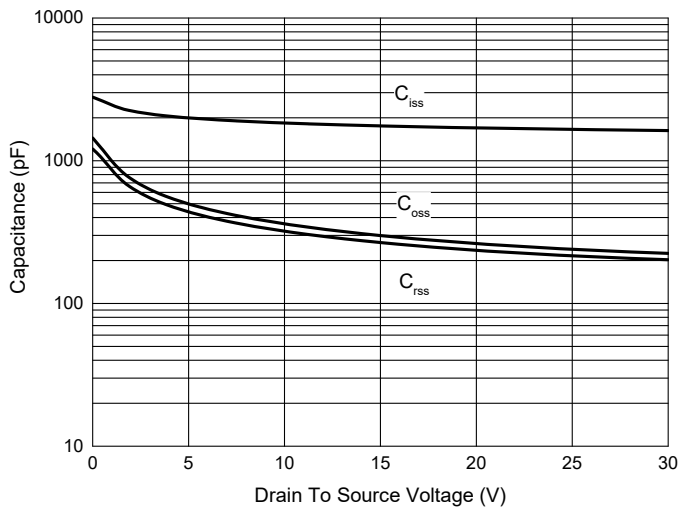
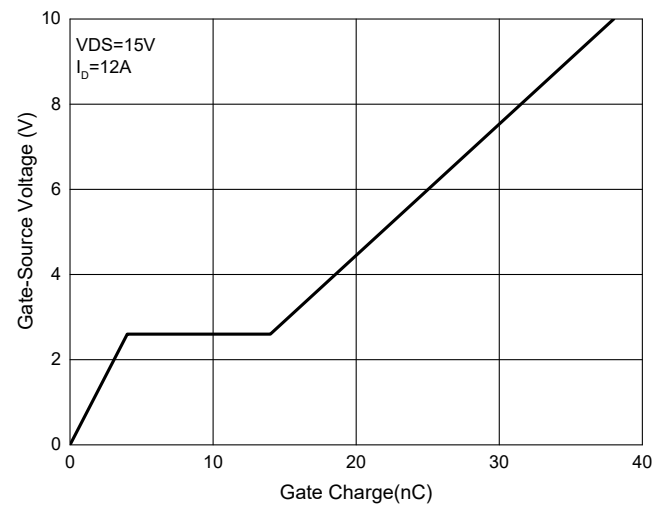


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized On Resistance Characteristics

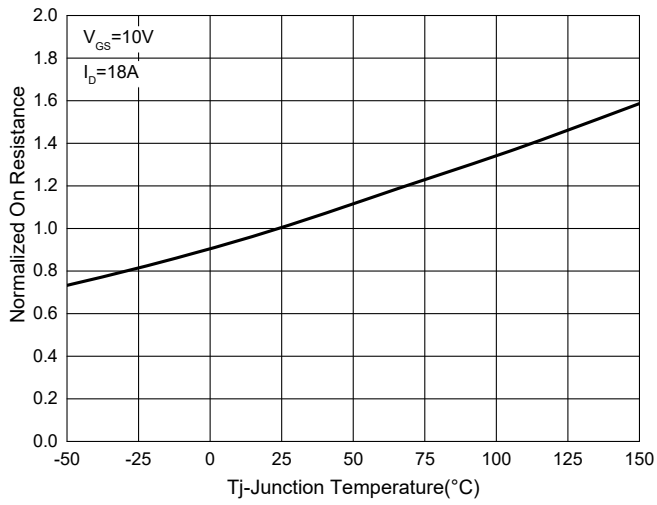


Fig. 8 - Normalized Threshold voltage

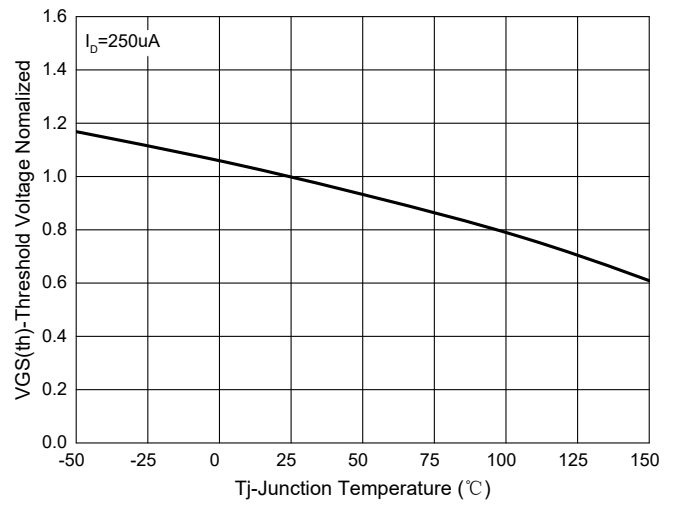


Fig. 9 -  $I_S - V_{SD}$

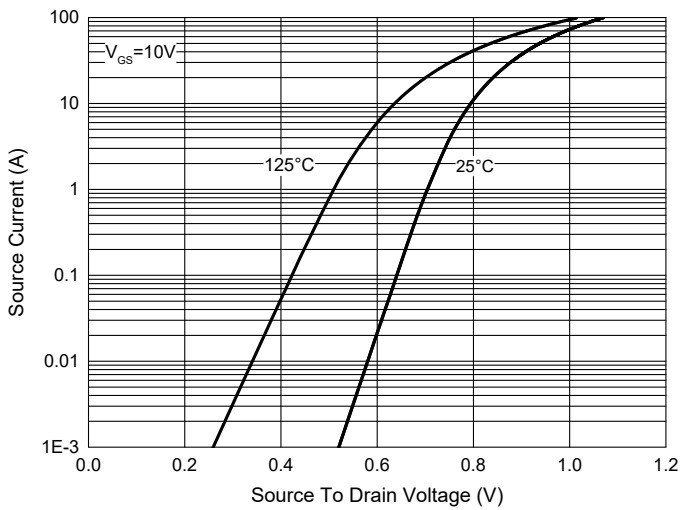


Fig. 10 - Drain Current

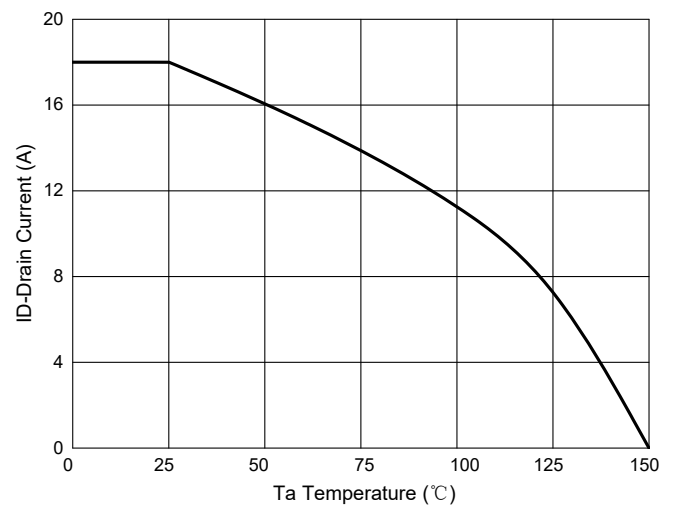
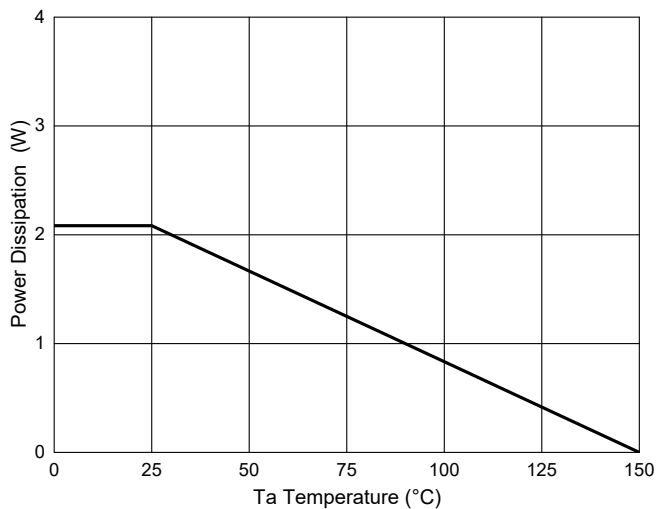


Fig.11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

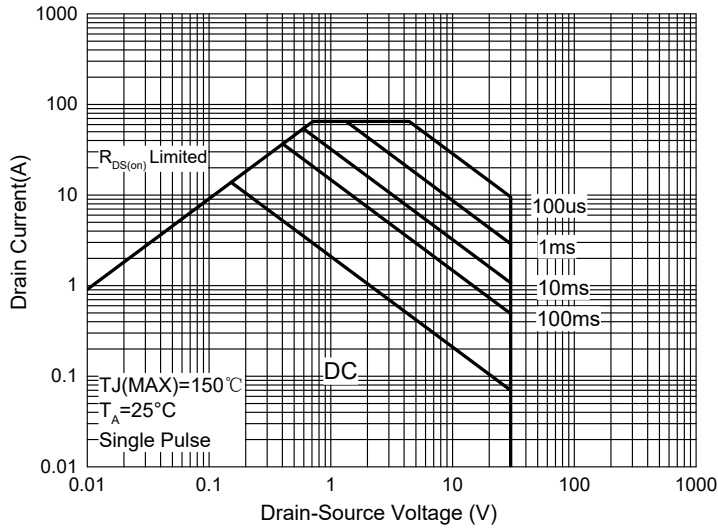
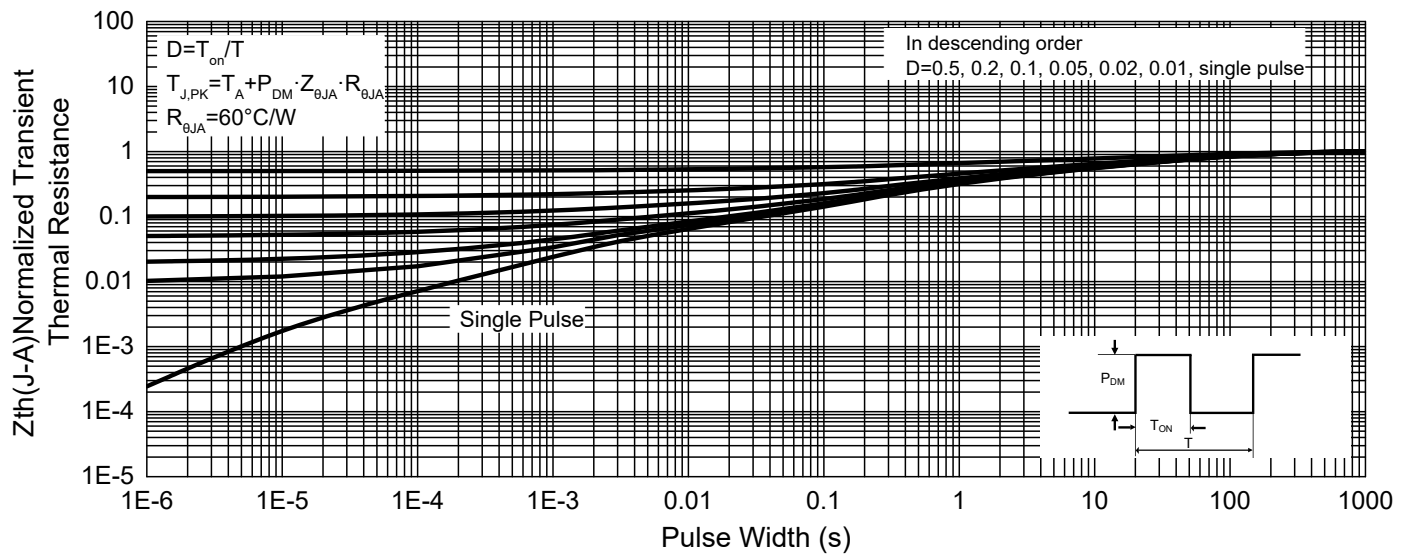


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 4Kpcs/Reel |

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