

## Features

- Trench LV MOSFET Technology
- ESD Protected Up To 2KV(HBM)
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

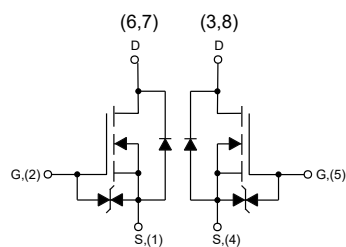
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Maximum Thermal Resistance: 300°C/W Junction to Ambient<sup>(Note 2)</sup>

| Parameter                                  |                       | Symbol          | Rating | Unit |
|--------------------------------------------|-----------------------|-----------------|--------|------|
| Drain-Source Voltage                       |                       | V <sub>DS</sub> | 20     | V    |
| Gate-Source Voltage                        |                       | V <sub>GS</sub> | ±10    | V    |
| Drain Current-Continuous                   | T <sub>A</sub> =25°C  | I <sub>D</sub>  | 0.75   | A    |
|                                            | T <sub>A</sub> =100°C |                 | 0.47   |      |
| Pulsed Drain Current <sup>t</sup> (Note 3) |                       | I <sub>DM</sub> | 3      | A    |
| Power Dissipation <sup>(Note 4)</sup>      |                       | P <sub>D</sub>  | 0.42   | W    |

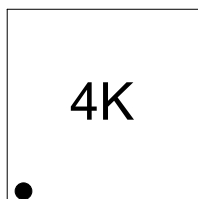
Note:

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  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-ambient thermal resistance.

## Internal Structure and Marking Code



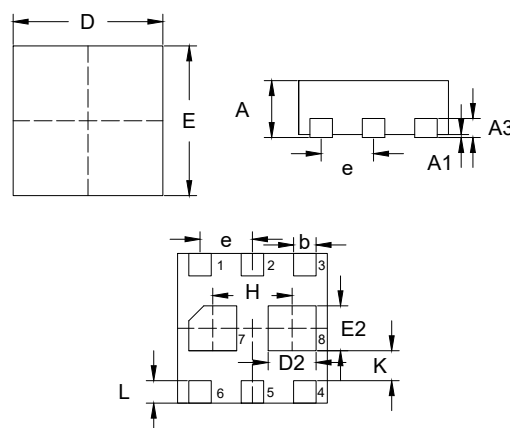
1,4. Source  
2,5. Gate  
3,6,7,8. Drain



PIN1

## N-Channel MOSFET

### DFN1010B-6



| DIMENSIONS |        |       |       |      |      |
|------------|--------|-------|-------|------|------|
| DIM        | INCHES |       | MM    |      | NOTE |
|            | MIN    | MAX   | MIN   | MAX  |      |
| A          | 0.012  | 0.016 | 0.31  | 0.40 |      |
| A1         | 0.000  | 0.002 | 0.00  | 0.05 |      |
| A3         | 0.005  |       | 0.127 |      | TYP. |
| b          | 0.004  | 0.008 | 0.10  | 0.20 |      |
| D          | 0.037  | 0.041 | 0.95  | 1.05 |      |
| E          | 0.037  | 0.041 | 0.95  | 1.05 |      |
| e          | 0.014  |       | 0.350 |      | TYP. |
| D2         | 0.011  | 0.015 | 0.27  | 0.37 |      |
| E2         | 0.010  | 0.014 | 0.25  | 0.35 |      |
| H          | 0.021  |       | 0.530 |      | TYP. |
| L          | 0.004  | 0.008 | 0.10  | 0.20 |      |
| K          | 0.008  | -     | 0.20  | -    |      |

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

| Parameter                       | Symbol        | Test conditions                                       | Min  | Typ  | Max      | Unit       |
|---------------------------------|---------------|-------------------------------------------------------|------|------|----------|------------|
| Static Characteristics          |               |                                                       |      |      |          |            |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                             | 20   |      |          | V          |
| Gate-Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                         | 0.35 | 0.7  | 1.2      | V          |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=20V, V_{GS}=0V$                               |      |      | 1.0      | $\mu A$    |
| Gate-body Leakage Current       | $I_{GSS}$     | $V_{GS}=\pm 10V, V_{DS}=0V$                           |      |      | $\pm 10$ | $\mu A$    |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=4.5V, I_D=0.5A$                               |      | 173  | 250      | m $\Omega$ |
|                                 |               | $V_{GS}=2.5V, I_D=0.4A$                               |      | 250  | 340      |            |
|                                 |               | $V_{GS}=1.8V, I_D=0.2A$                               |      | 405  | 950      |            |
| Gate Resistance                 | $R_g$         | f=1 MHz, Open drain                                   |      | 44   |          | $\Omega$   |
| Diode Characteristics           |               |                                                       |      |      |          |            |
| Continuous Body Diode Current   | $I_S$         |                                                       |      |      | 0.75     | A          |
| Diode Forward Voltage           | $V_{SD}$      | $V_{GS}=0V, I_S=0.5A$                                 |      |      | 1.2      | V          |
| Reverse Recovery Time           | $t_{rr}$      | $I_F=0.1A, dI_F/dt=100A/\mu s$                        |      | 5.5  |          | ns         |
| Reverse Recovery Charge         | $Q_{rr}$      |                                                       |      | 0.8  |          | nC         |
| Dynamic Characteristics         |               |                                                       |      |      |          |            |
| Input Capacitance               | $C_{iss}$     | $V_{DS}=16V, V_{GS}=0V, f=1MHz$                       |      | 33   |          | pF         |
| Output Capacitance              | $C_{oss}$     |                                                       |      | 10   |          |            |
| Reverse Transfer Capacitance    | $C_{rss}$     |                                                       |      | 5.6  |          |            |
| Total Gate Charge               | $Q_g$         | $V_{DS}=10V, V_{GS}=4.5V, I_D=0.1A$                   |      | 1.2  |          | nC         |
| Gate-Source Charge              | $Q_{gs}$      |                                                       |      | 0.2  |          |            |
| Gate-Drain Charge               | $Q_{gd}$      |                                                       |      | 0.2  |          |            |
| Turn-on Delay Time              | $t_{d(on)}$   | $V_{DD}=10V, V_{GS}=4.5V$<br>$I_D=0.5A, R_G=10\Omega$ |      | 5.4  |          | ns         |
| Turn-on Rise Time               | $t_r$         |                                                       |      | 5.2  |          |            |
| Turn-off Delay Time             | $t_{d(off)}$  |                                                       |      | 10.5 |          |            |
| Turn-off Fall Time              | $t_f$         |                                                       |      | 5.7  |          |            |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

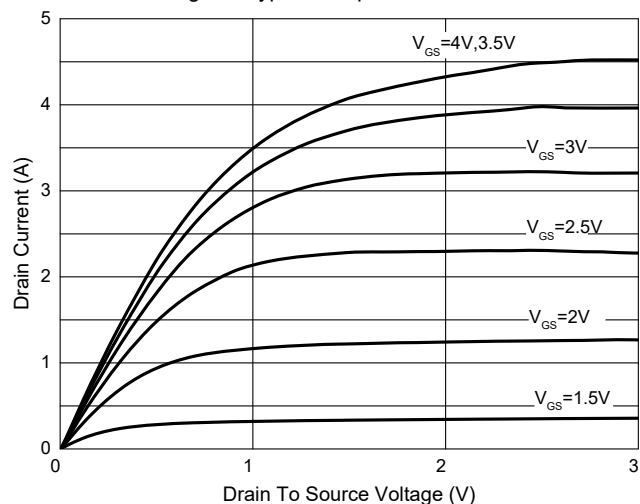


Fig. 2 - Transfer Characteristics

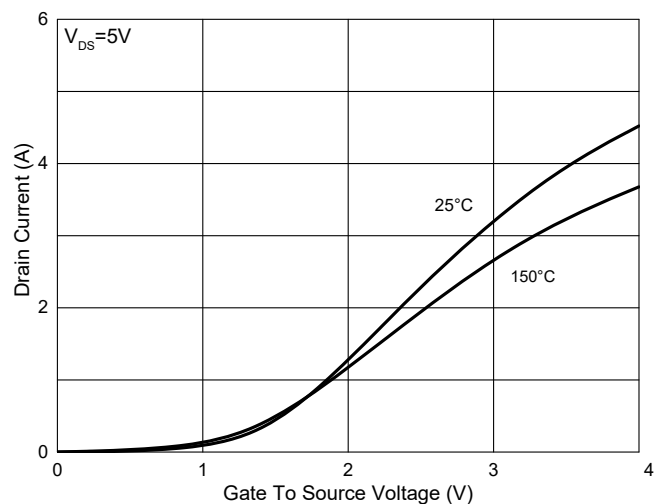


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

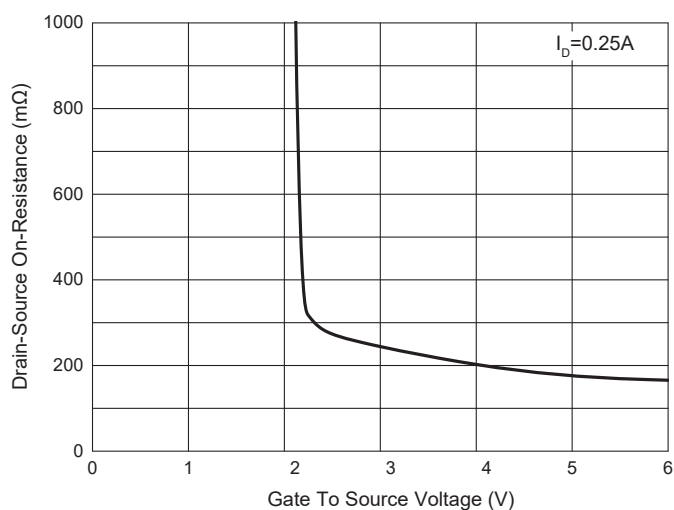


Fig. 4 -  $R_{DS(ON)} - I_D$

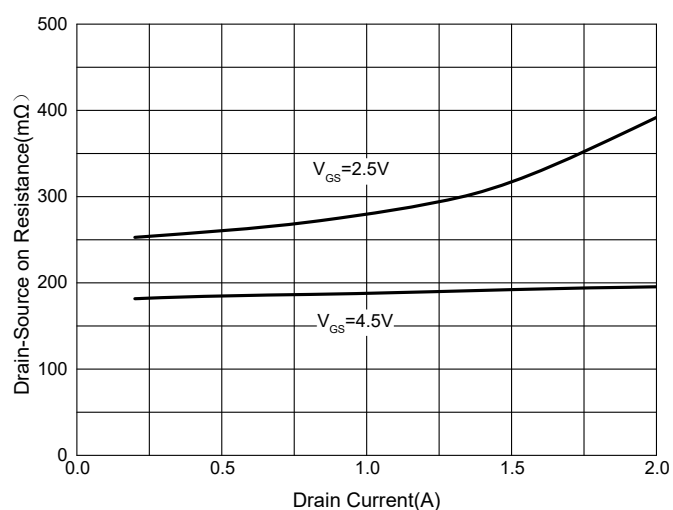


Fig. 5 - Capacitance Characteristics

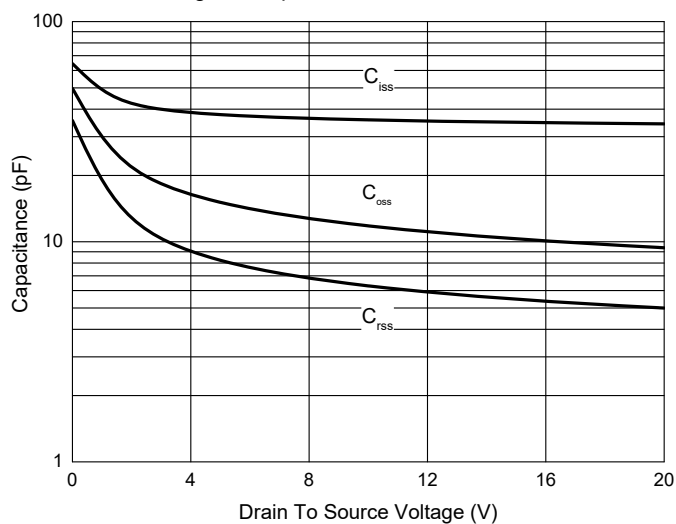
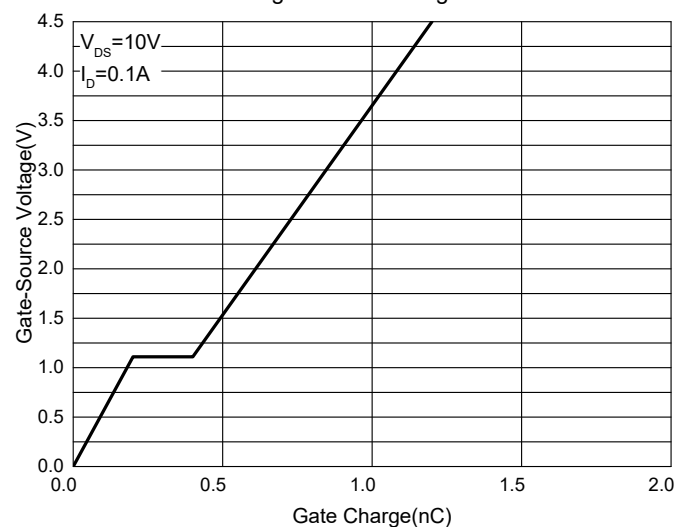


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

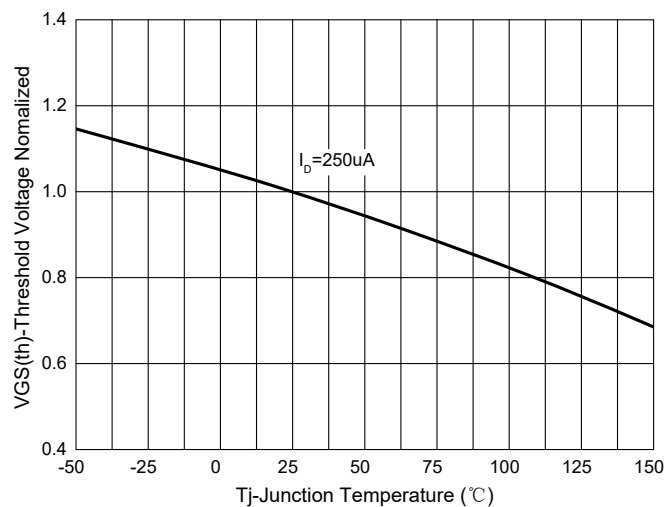


Fig.8-Normalized On Resistance Characteristics

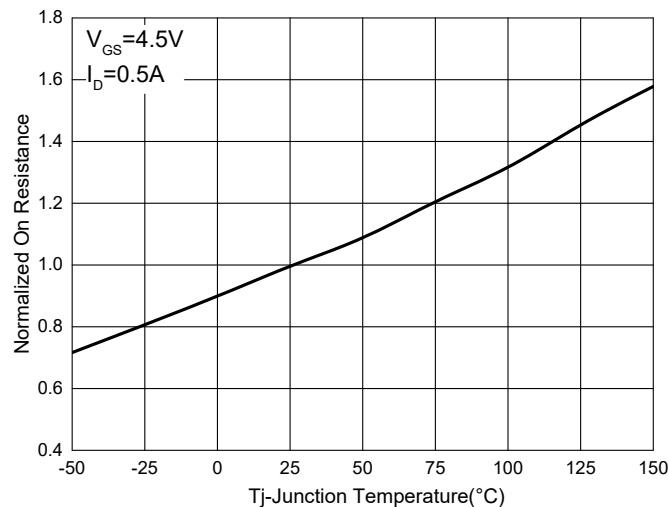


Fig.9 - I<sub>S</sub>—V<sub>SD</sub>

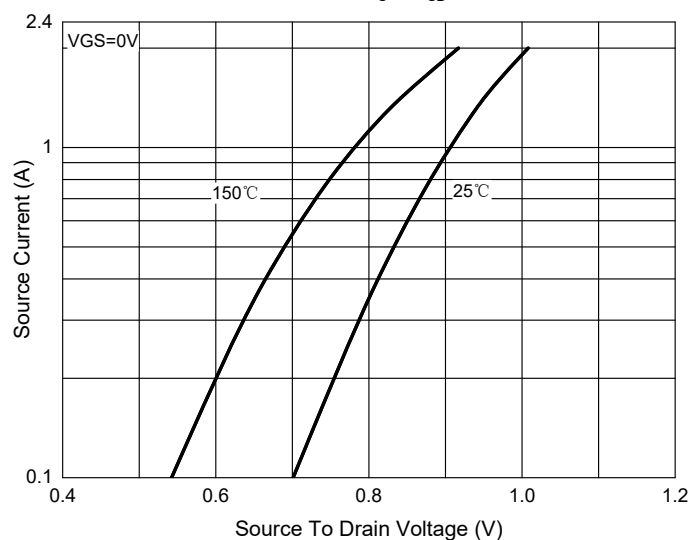


Fig. 10 - Drain Current

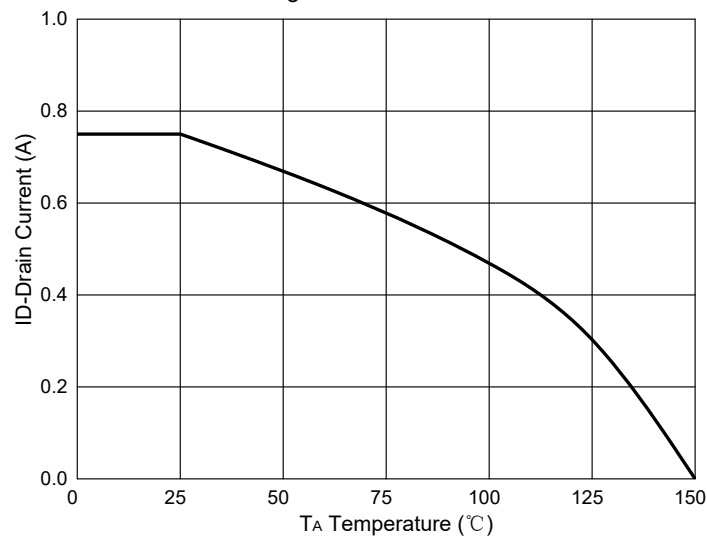
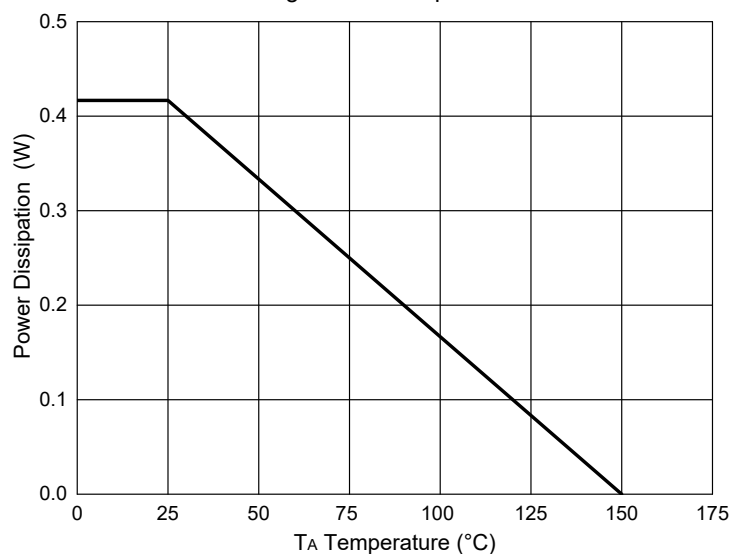


Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

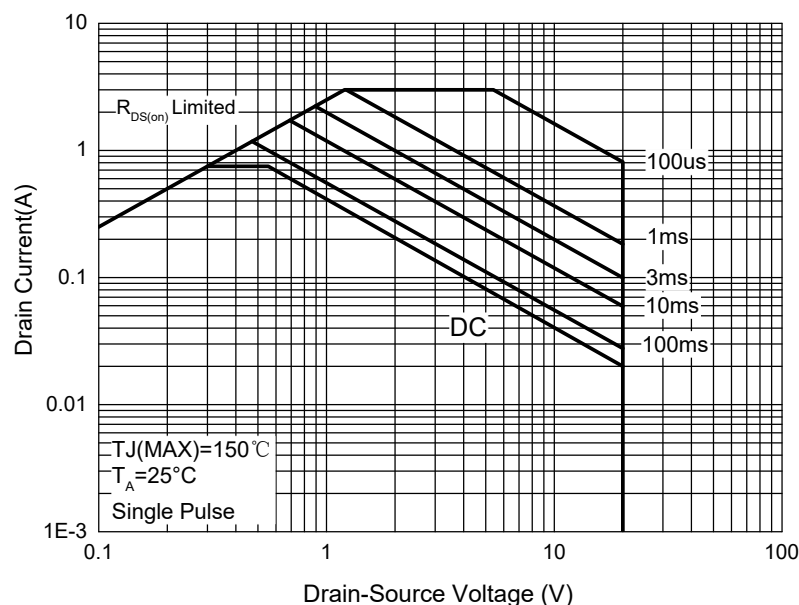
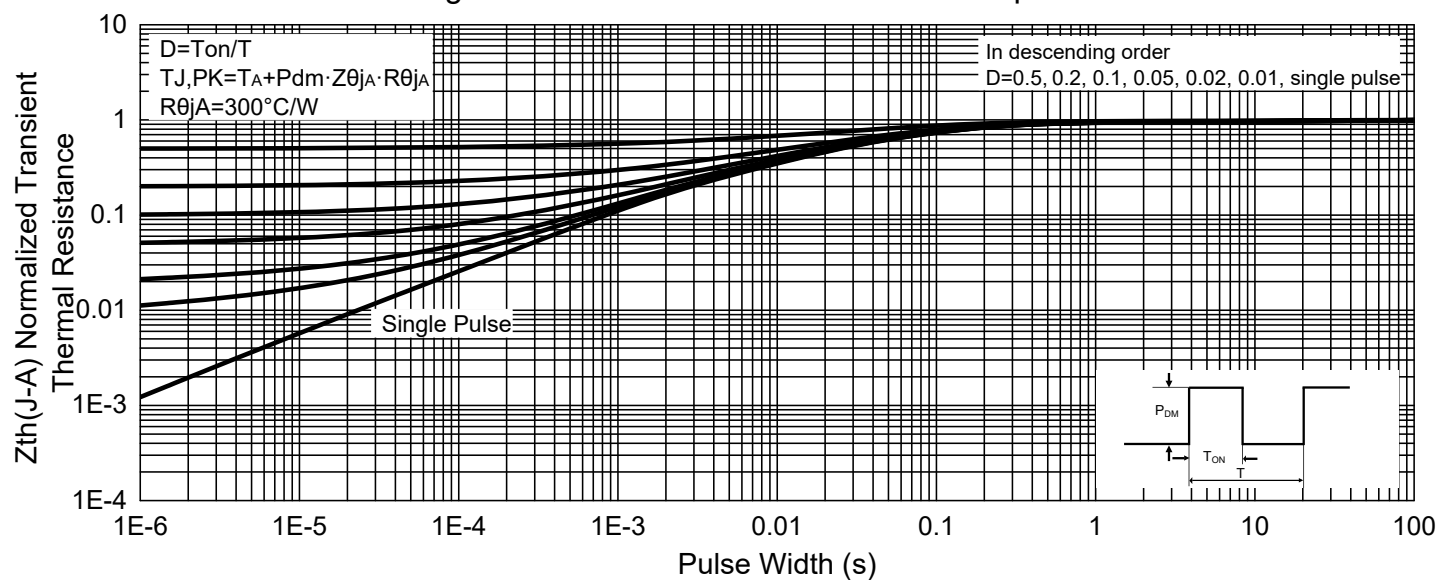


Fig. 13 -Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:5Kpcs/Reel |

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