

## Features

- Split Gate Trench MOSFET Technology
- Excellent Package For Heat Dissipation
- High Density Cell Design For Low  $R_{ds(on)}$
- 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

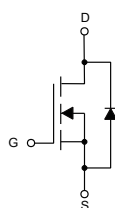
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 140°C/W Junction to Ambient (Note 2)

| Parameter                        | Symbol   | Rating | Unit |
|----------------------------------|----------|--------|------|
| Drain-Source Voltage             | $V_{DS}$ | 100    | V    |
| Gate-Source Voltage              | $V_{GS}$ | ±20    | V    |
| Continuous Drain Current         | $I_D$    | 3      | A    |
|                                  |          | 2.4    |      |
| Pulsed Drain Current (Note 3)    | $I_{DM}$ | 12     | A    |
| Total Power Dissipation (Note 4) | $P_D$    | 0.9    | W    |

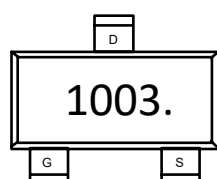
Note:

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

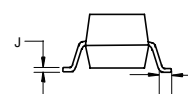
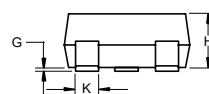
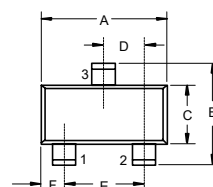


1. GATE
2. SOURCE
3. DRAIN



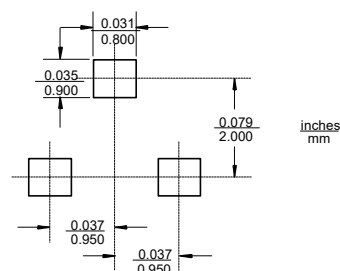
## N-CHANNEL MOSFET

### SOT-23



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | MIN    | MAX   | MIN  | MAX  |      |
| A   | 0.110  | 0.120 | 2.80 | 3.04 |      |
| B   | 0.083  | 0.104 | 2.10 | 2.64 |      |
| C   | 0.047  | 0.055 | 1.20 | 1.40 |      |
| D   | 0.034  | 0.041 | 0.85 | 1.05 |      |
| E   | 0.067  | 0.083 | 1.70 | 2.10 |      |
| F   | 0.018  | 0.024 | 0.45 | 0.60 |      |
| G   | 0.0004 | 0.006 | 0.01 | 0.15 |      |
| H   | 0.035  | 0.043 | 0.90 | 1.10 |      |
| J   | 0.003  | 0.007 | 0.08 | 0.18 |      |
| K   | 0.012  | 0.020 | 0.30 | 0.51 |      |
| L   | 0.007  | 0.020 | 0.20 | 0.50 |      |

### Suggested Solder Pad Layout

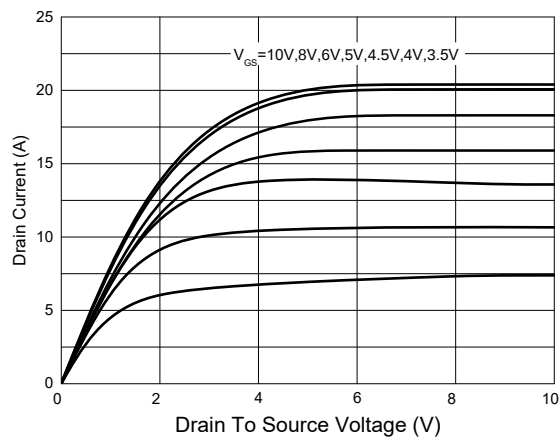


**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

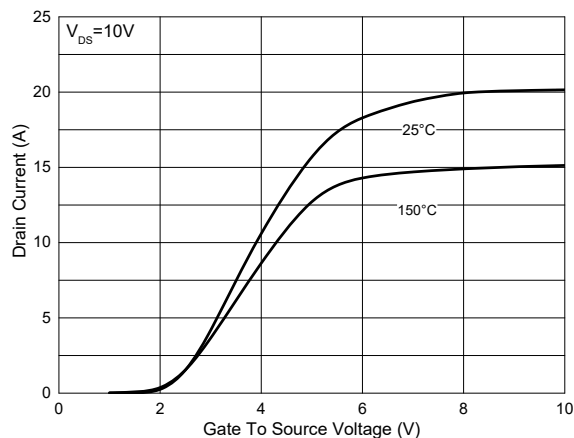
| Parameter                       | Symbol               | Test Conditions                                                                      | Min | Typ  | Max  | Unit |
|---------------------------------|----------------------|--------------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics          |                      |                                                                                      |     |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                           | 100 |      |      | V    |
| Gate-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                           |     |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V                                           |     |      | 1    | μA   |
| Gate-Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                             | 1   | 1.8  | 2.5  | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =3A                                             |     | 110  | 140  | mΩ   |
|                                 |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A                                            |     | 160  | 300  |      |
| Gate Resistance                 | R <sub>g</sub>       | f=1 MHz, Open drain                                                                  |     | 2.0  |      | Ω    |
| Diode Characteristics           |                      |                                                                                      |     |      |      |      |
| Continuous Body Diode Current   | I <sub>S</sub>       |                                                                                      |     |      | 3    | A    |
| Diode Forward Voltage           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =3A                                              |     | 0.8  | 1.2  | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>S</sub> =3A, di/dt=100A/μs                                                    |     | 30   |      | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                                      |     | 25   |      | nC   |
| Dynamic Characteristics         |                      |                                                                                      |     |      |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz                                    |     | 135  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                      |     | 28   |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                      |     | 1.2  |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A                       |     | 3.2  |      | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                      |     | 0.5  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                      |     | 1.1  |      |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =3.0A, R <sub>G</sub> =2Ω |     | 3    |      | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                                      |     | 18   |      |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                                      |     | 10   |      |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                                      |     | 18.6 |      |      |

## Curve Characteristics

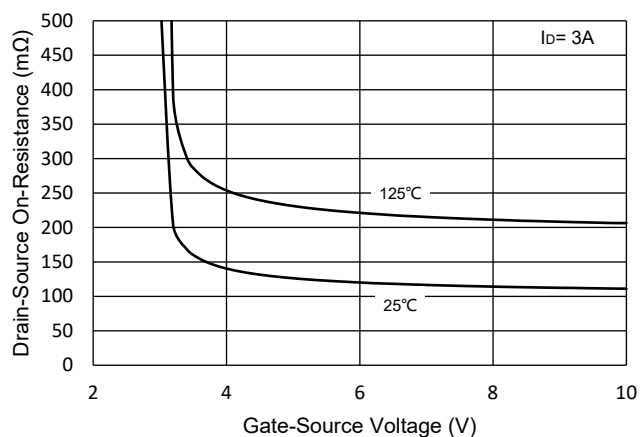
**Fig. 1 - Typical Output Characteristics**



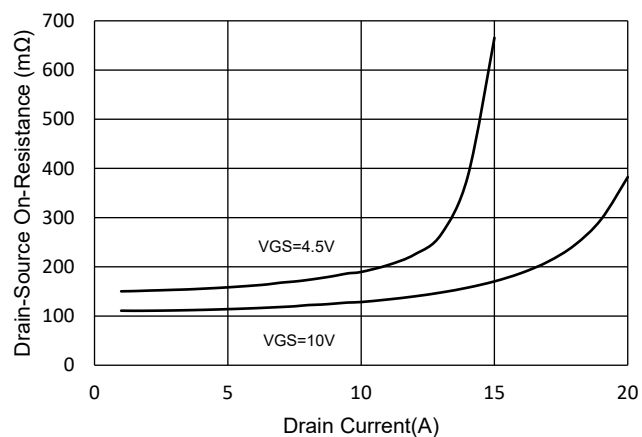
**Fig.2 Transfer Characteristic**



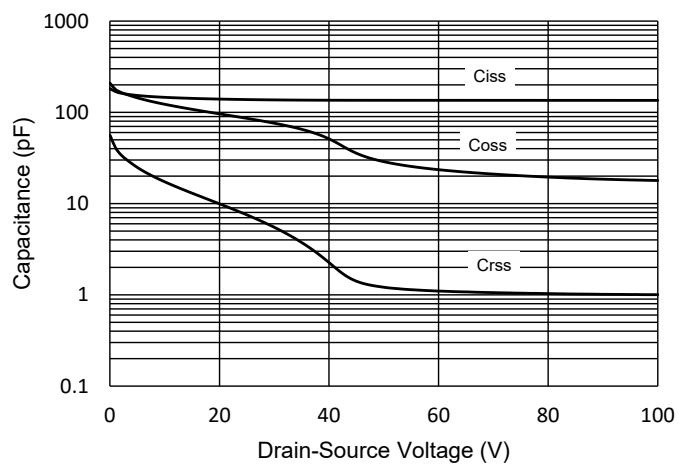
**Fig.3 Rds(on)-Vgs**



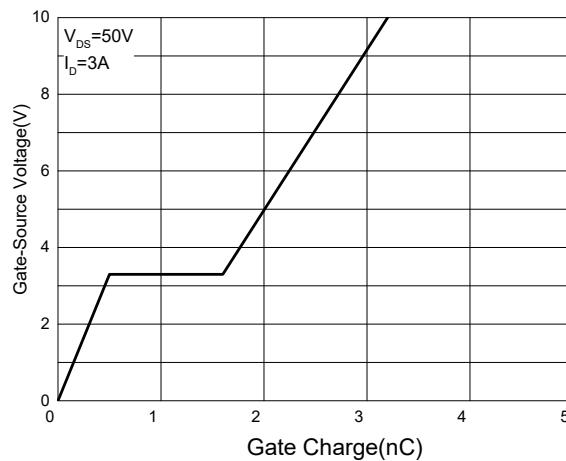
**Fig.4 RDS(ON)-Id**



**Fig.5 Capacitance Characteristics**



**Fig. 6 - Gate Charge**



## Curve Characteristics

Fig.7 Normalized Threshold Voltage

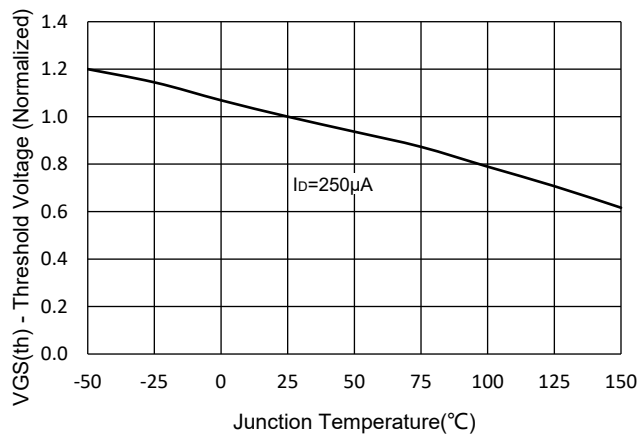


Fig.8 Normalized On Resistance Characteristics

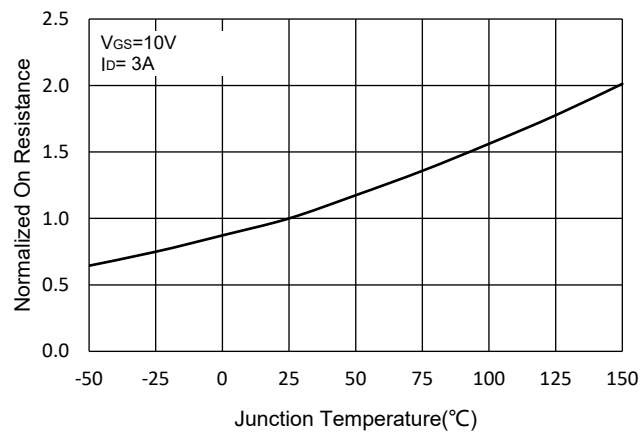


Fig.9 IS-VSD

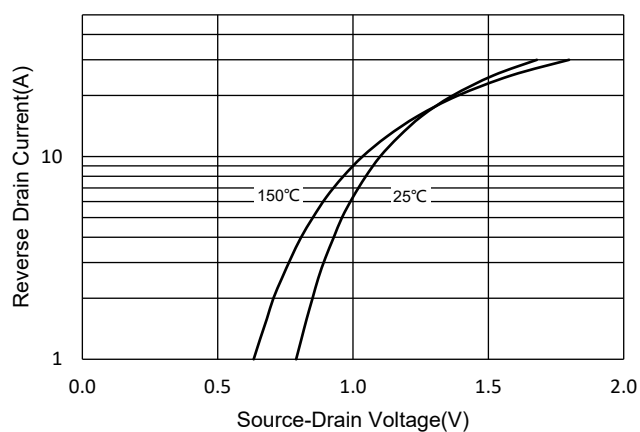


Fig.10 Drain Current

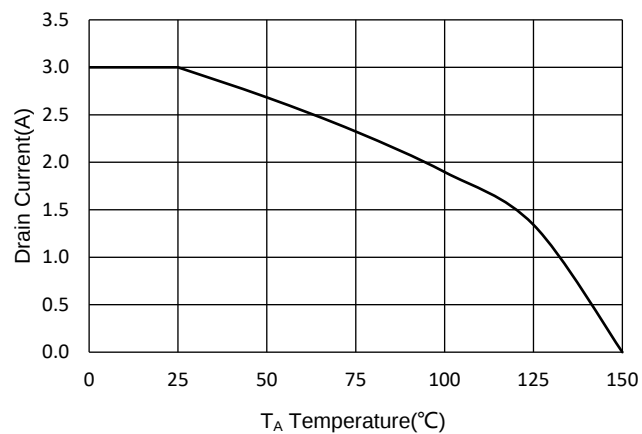
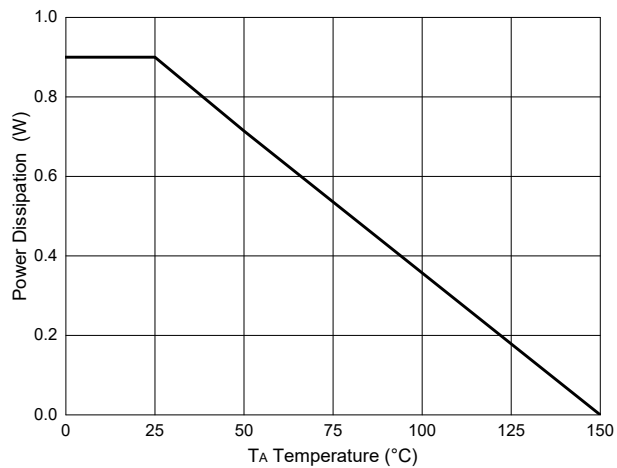


Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

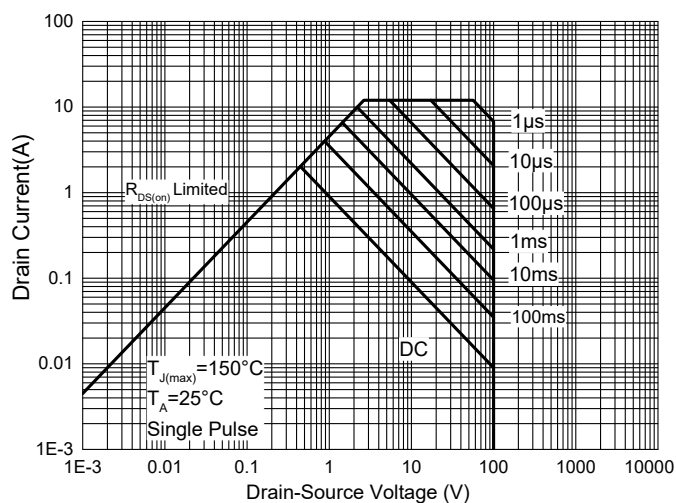
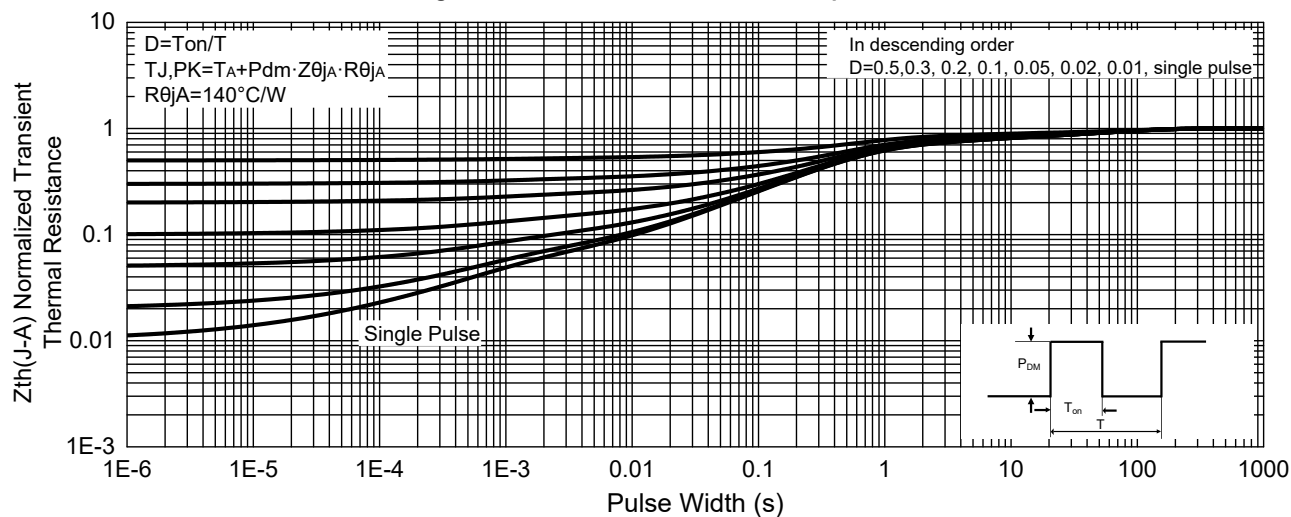


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

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