

## Features

- Excellent  $R_{DS(ON)}$
- TrenchFET Power Mosfet
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

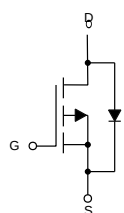
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 113°C/W Junction to Ambient (Note 2)

| Parameter                        | Symbol   | Rating                  | Unit |
|----------------------------------|----------|-------------------------|------|
| Drain-Source Voltage             | $V_{DS}$ | -15                     | V    |
| Gate-Source Voltage              | $V_{GS}$ | ±8                      | V    |
| Continuous Drain Current         | $I_D$    | $T_A=25^\circ\text{C}$  | A    |
|                                  |          | $T_A=100^\circ\text{C}$ |      |
| Pulsed Drain Current (Note 3)    | $I_{DM}$ | 22.4                    | A    |
| Total Power Dissipation (Note 4) | $P_D$    | 1.1                     | W    |

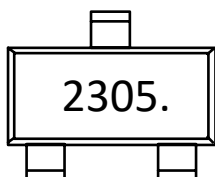
Note:

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

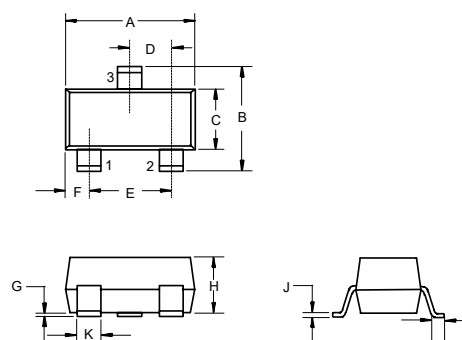


1. GATE
2. SOURCE
3. DRAIN



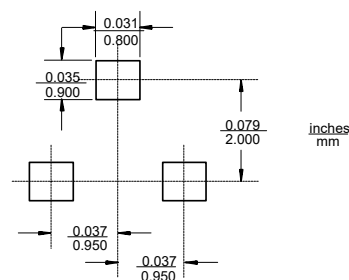
## P-CHANNEL MOSFET

## 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   | 0.014  | 0.020 | 0.35 | 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                                                                 | -15  |      |      | V    |
| Gate-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V                                                                   |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =-15V, 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                                                   | -0.4 |      | -1   | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.8A                                                               |      | 28   | 40   | mΩ   |
|                                 |                      | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.8A                                                               |      | 35   | 53   |      |
| Forward Tranconductance         | g <sub>FS</sub>      | V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A                                                                   |      | 18.7 |      | S    |
| Gate Resistance                 | R <sub>g</sub>       | f=1MHz                                                                                                      |      | 16   |      | Ω    |
| Diode Characteristics           |                      |                                                                                                             |      |      |      |      |
| Continuous Body Diode Current   | I <sub>S</sub>       | T <sub>A</sub> =25°C                                                                                        |      |      | -5.6 | A    |
| Body Diode Voltage              | V <sub>SD</sub>      | I <sub>S</sub> =-4A, V <sub>GS</sub> =0V                                                                    |      |      | -1.2 | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>F</sub> =-4A,di/dt=100A/μs                                                                           |      | 33.7 |      | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                                                             |      | 14.4 |      | nC   |
| Dynamic Characteristics         |                      |                                                                                                             |      |      |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =-6V,V <sub>GS</sub> =0V,f=1MHz                                                             |      | 810  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                                             |      | 143  |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                                             |      | 115  |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =-6V,V <sub>GS</sub> =-4.5V,I <sub>D</sub> =-5A                                             |      | 9.5  |      | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                                             |      | 1.6  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                                             |      | 1.7  |      |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>DD</sub> =-6V,V <sub>GEN</sub> =-4.5V,I <sub>D</sub> =-4A<br>R <sub>L</sub> =6Ω,R <sub>GEN</sub> =1Ω |      | 7.1  |      | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                                                             |      | 5.4  |      |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                                                             |      | 52   |      |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                                                             |      | 26   |      |      |

## Curve Characteristics

Fig.1 - Typical Output Characteristics

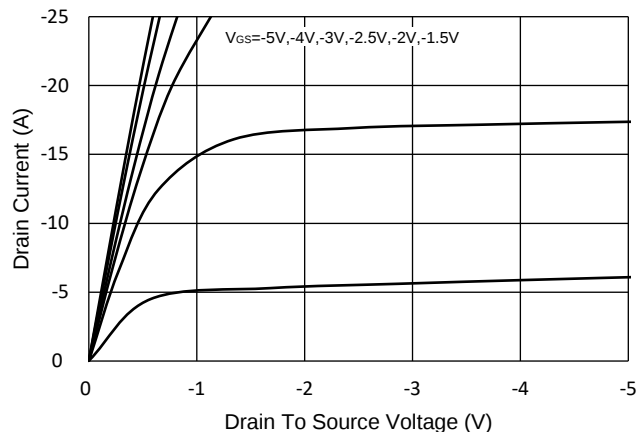


Fig.2 - Transfer Characteristic

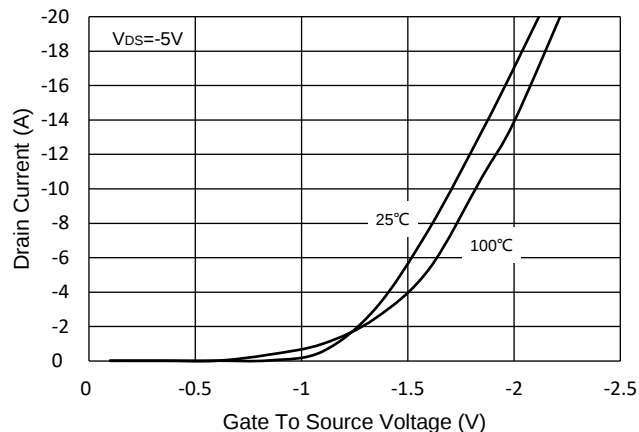


Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$

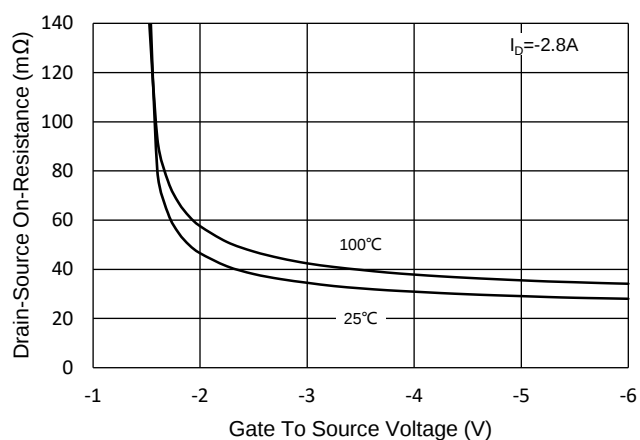


Fig.4 -  $R_{DS(ON)}$  -  $I_D$

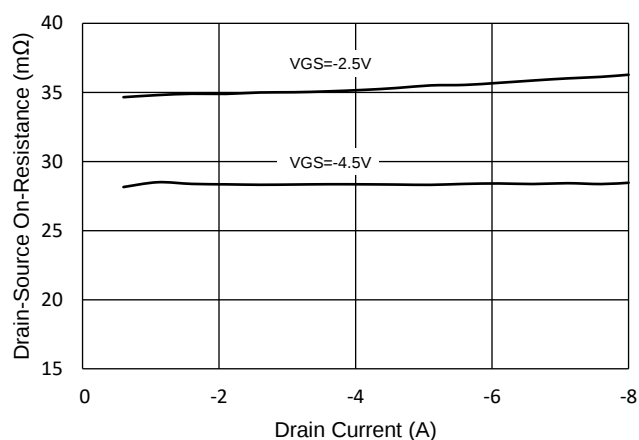


Fig.5 - Capacitance Characteristics

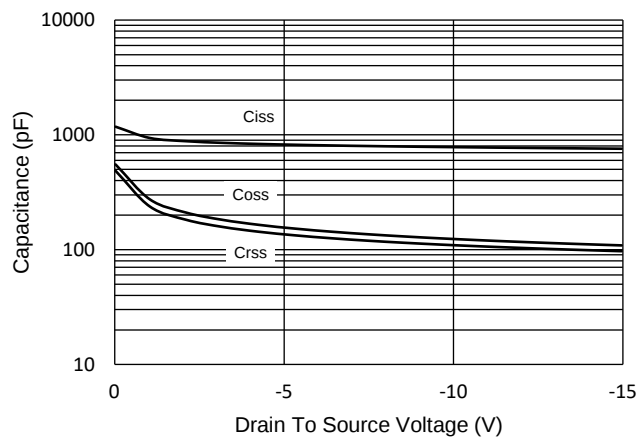
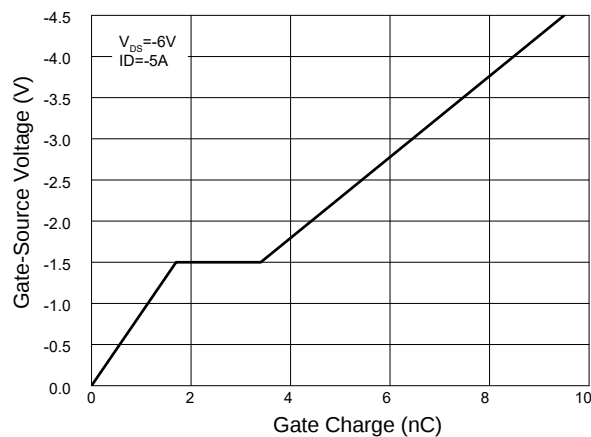


Fig.6 - Gate Charge



## Curve Characteristics

Fig.7 - Normalized Threshold Voltage

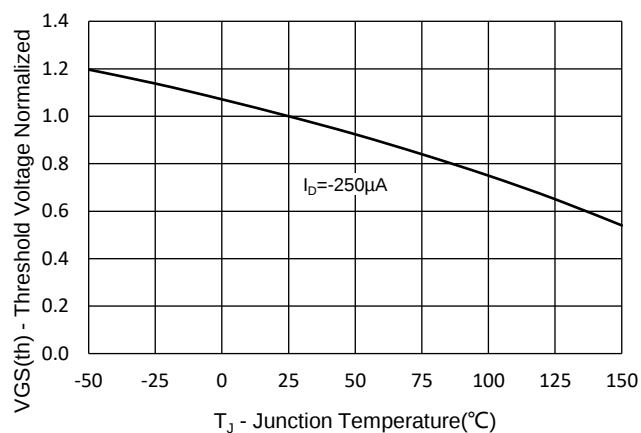


Fig.8 - Normalized On Resistance Characteristics

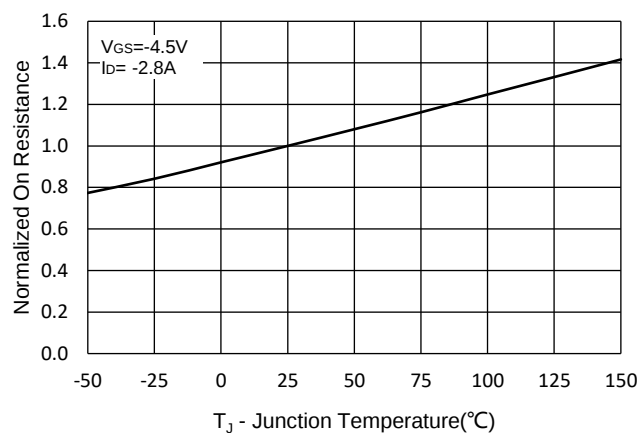


Fig.9 -  $I_S$  -  $V_{SD}$

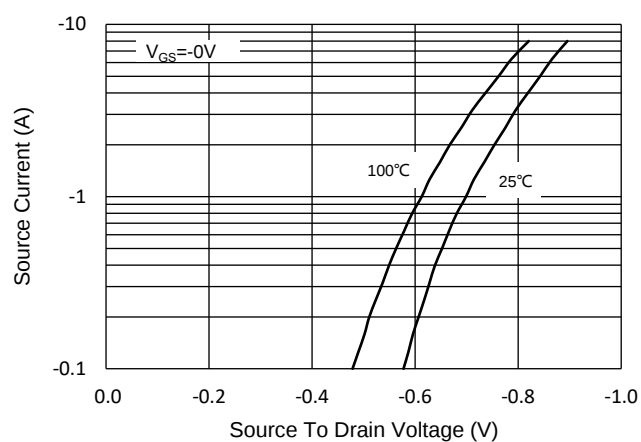


Fig.10 - Drain Current

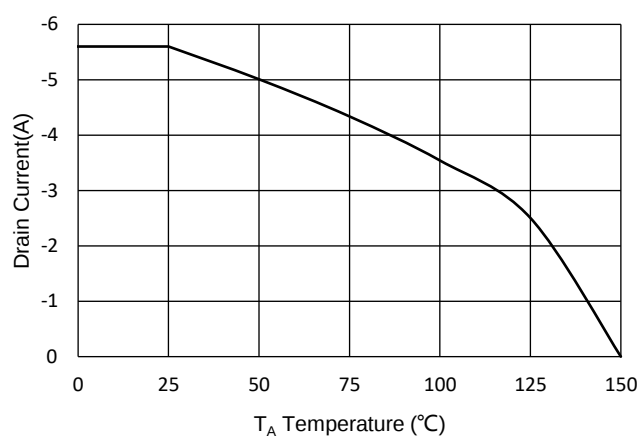
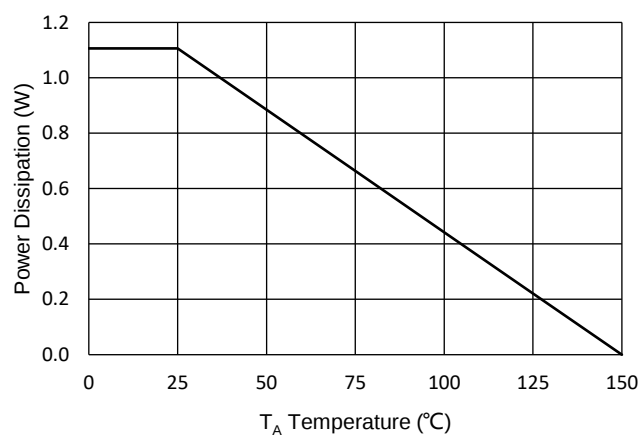


Fig.11 - PD Dissipation



## Curve Characteristics

Fig.12 - Safe Operation Area

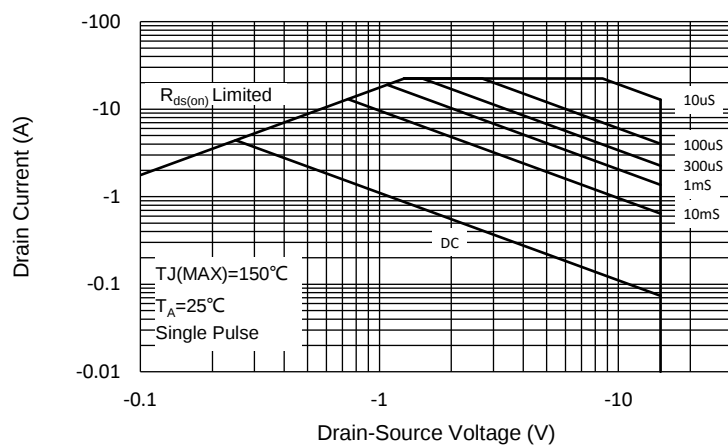
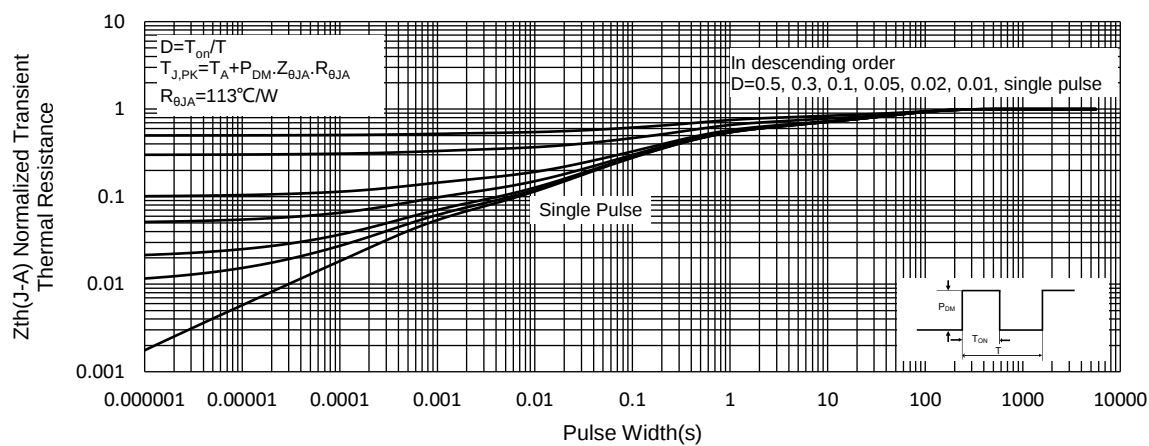


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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