

## Features

- ESD Protected Up To 2KV(HBM)
- Very Low FOM  $R_{DS(on)} \times Q_g$
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

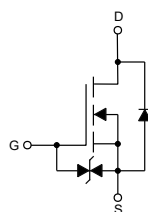
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 40°C/W Junction to Ambient (Note2)
- Thermal Resistance: 1°C/W Junction to Case

| Parameter                              | Symbol   | Rating | Unit |
|----------------------------------------|----------|--------|------|
| Drain-Source Voltage                   | $V_{DS}$ | 800    | V    |
| Gate-Source Voltage                    | $V_{GS}$ | ±30    | V    |
| Continuous Drain Current               | $I_D$    | 6      | A    |
|                                        |          | 3.8    |      |
| Pulsed Drain Current (Note3)           | $I_{DM}$ | 24     | A    |
| Total Power Dissipation (Note4)        | $P_D$    | 125    | W    |
| Single Pulsed Avalanche Energy (Note5) | $E_{AS}$ | 50     | mJ   |

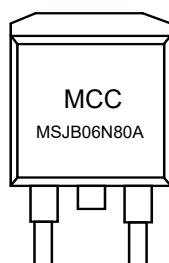
Note:

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  $T_A = 25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10\text{V}$ ,  $L = 50\text{mH}$ .

## Internal Structure and Marking Code

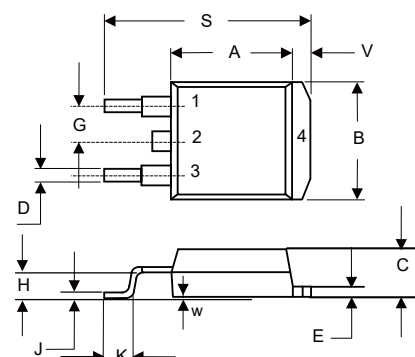


1. Gate
- 2,4. Drain
3. Source



# N-CHANNEL Super-Junction Power MOSFET

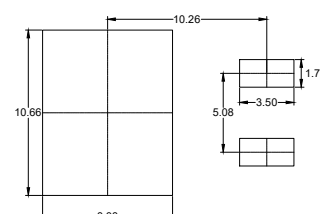
## D<sup>2</sup>-PAK



| DIM | INCHES |       | MM    |       | NOTE |
|-----|--------|-------|-------|-------|------|
|     | MIN    | MAX   | MIN   | MAX   |      |
| A   | 0.331  | 0.370 | 8.40  | 9.40  |      |
| B   | 0.378  | 0.417 | 9.60  | 10.60 |      |
| C   | 0.165  | 0.189 | 4.20  | 4.80  |      |
| D   | 0.027  | 0.037 | 0.68  | 0.94  |      |
| E   | 0.045  | 0.055 | 1.14  | 1.40  |      |
| G   | 0.10   |       | 2.54  |       | TYP. |
| H   | 0.096  | 0.134 | 2.43  | 3.40  |      |
| J   | 0.011  | 0.025 | 0.28  | 0.64  |      |
| K   | 0.071  | 0.131 | 1.80  | 3.32  |      |
| S   | 0.575  | 0.625 | 14.60 | 15.87 |      |
| V   | 0.042  | 0.058 | 1.07  | 1.47  |      |
| W   | 0.000  | 0.010 | 0.00  | 0.25  |      |

## Suggested Solder Pad Layout

Unit:mm



# 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                                             | 800 |      |     | V    |
| Gate-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                             |     |      | ±10 | μA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =800V, 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                               | 2.5 | 3.5  | 4.5 | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A                                             |     | 0.97 | 1.2 | Ω    |
| Gate Resistance                 | R <sub>G</sub>       | f=1MHz, Open drain                                                                     |     | 21   |     | Ω    |
| Diode Characteristics           |                      |                                                                                        |     |      |     |      |
| Continuous Body Diode Current   | I <sub>S</sub>       |                                                                                        |     |      | 6   | A    |
| Diode Forward Voltage           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =4.5A                                              |     |      | 1.4 | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>S</sub> =6A, di/dt=100A/μs                                                      |     | 563  |     | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                                        |     | 3.3  |     | μC   |
| Dynamic Characteristics         |                      |                                                                                        |     |      |     |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, f=400KHz                                   |     | 386  |     | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                        |     | 13   |     |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                        |     | 0.9  |     |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =640V, V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A                      |     | 13   |     | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                        |     | 2    |     |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                        |     | 8.8  |     |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>DD</sub> =400V, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω, I <sub>D</sub> =4.5A |     | 7.5  |     | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                                        |     | 15   |     |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                                        |     | 55   |     |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                                        |     | 11   |     |      |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

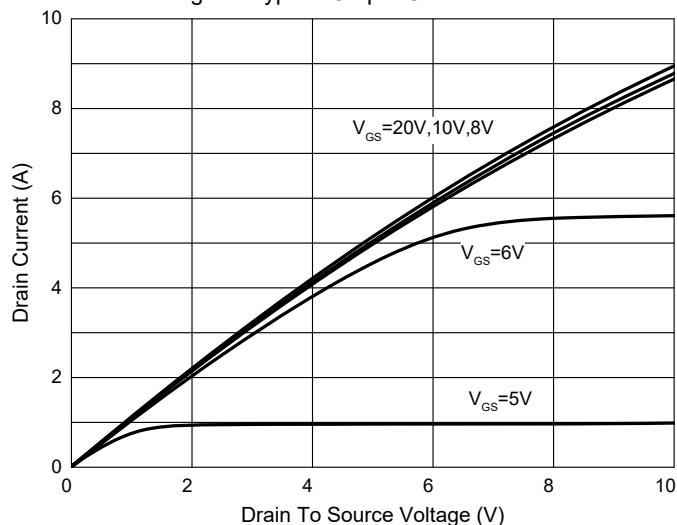


Fig. 2 - Transfer Characteristics

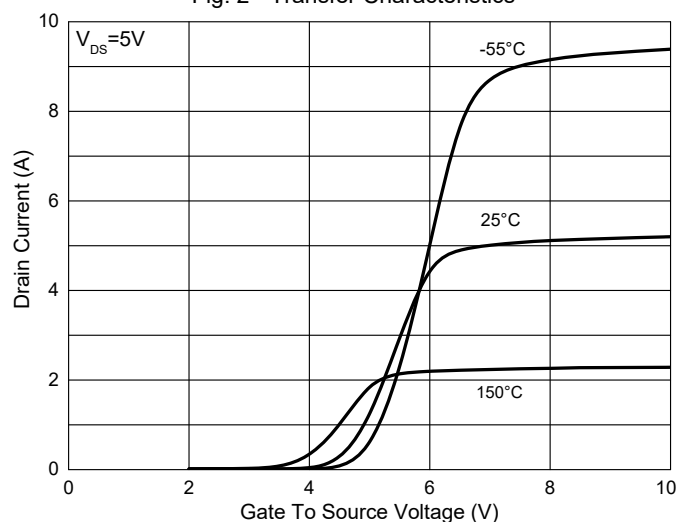


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

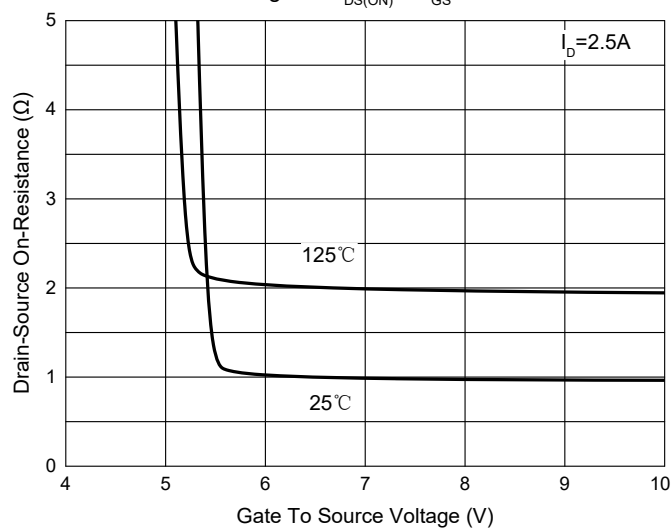


Fig. 4 -  $R_{DS(ON)} - I_D$

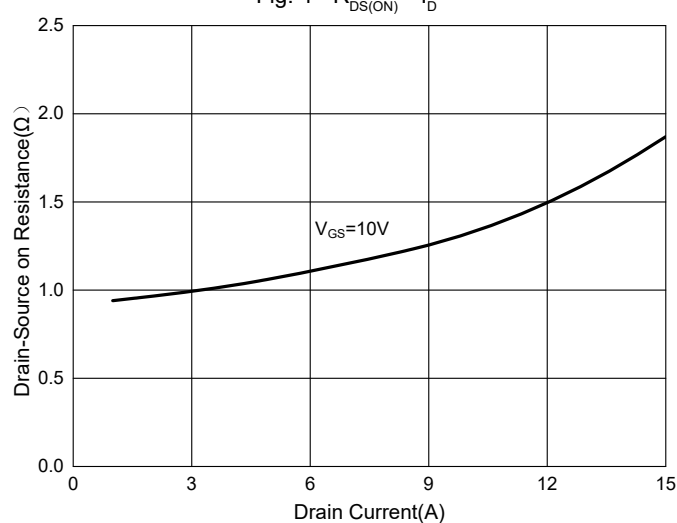


Fig. 5 - Capacitance Characteristics

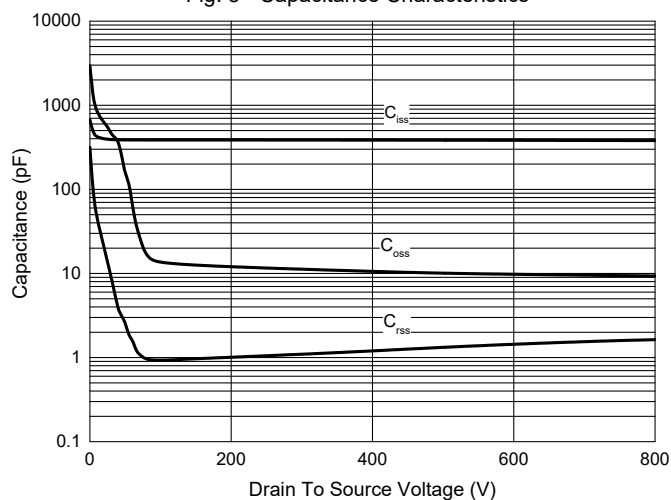
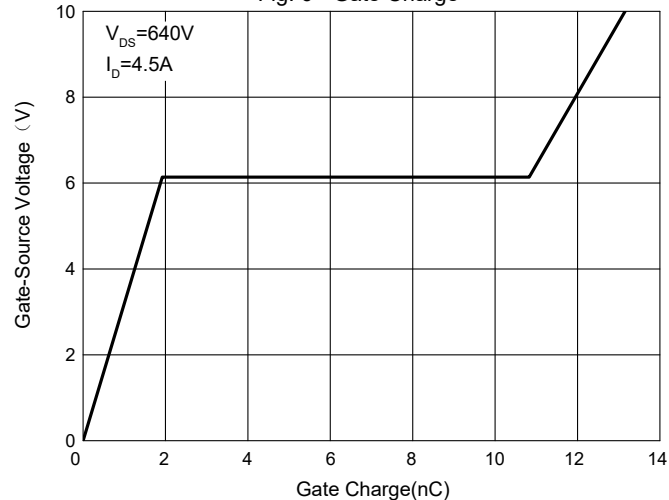


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

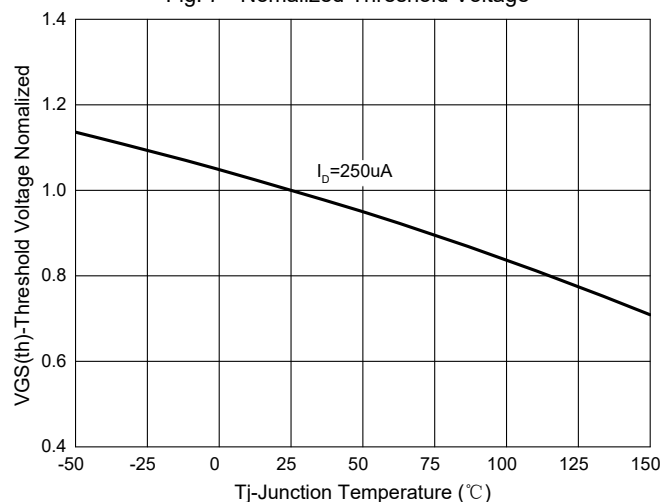


Fig.8-Normalized On Resistance Characteristics

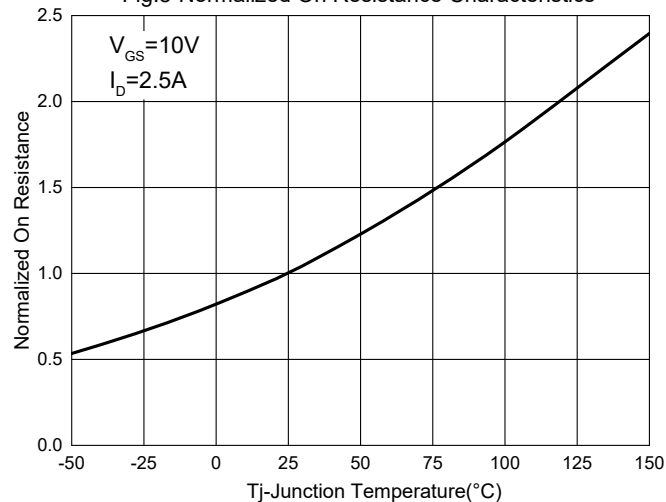


Fig.9 -  $I_S - V_{SD}$

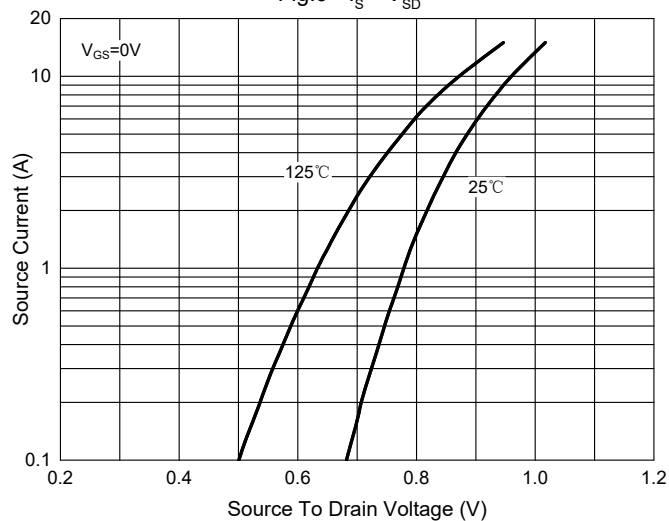


Fig. 10 - Drain Current

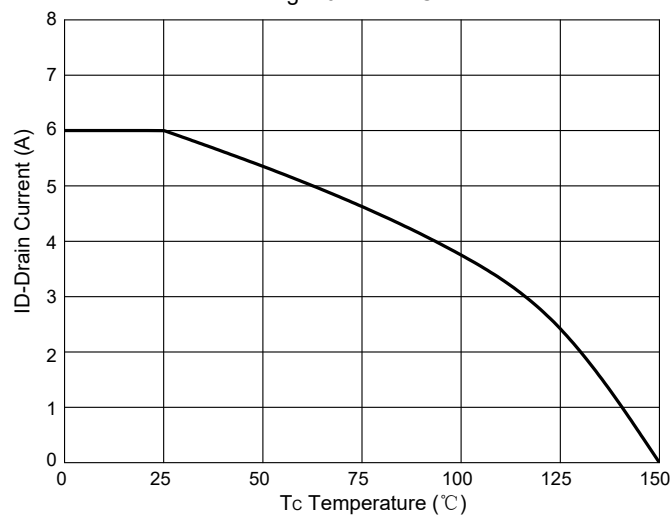
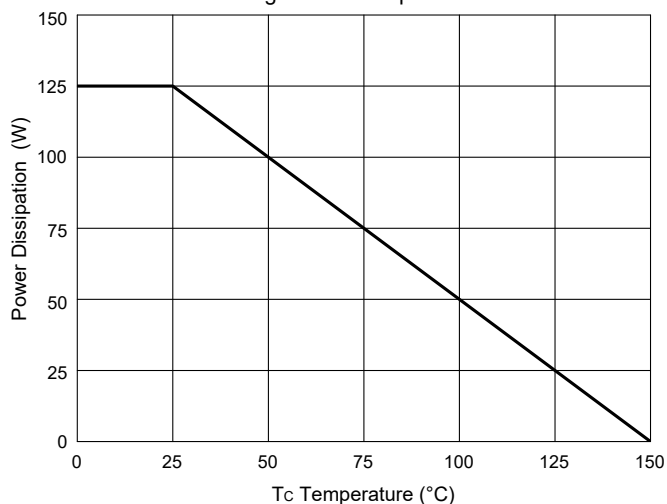


Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

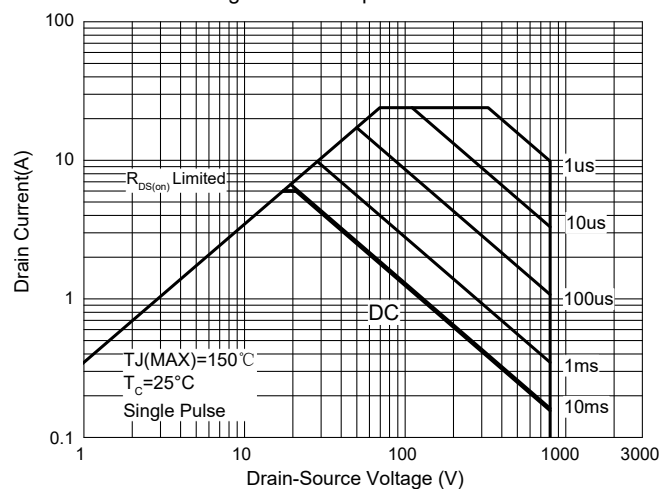
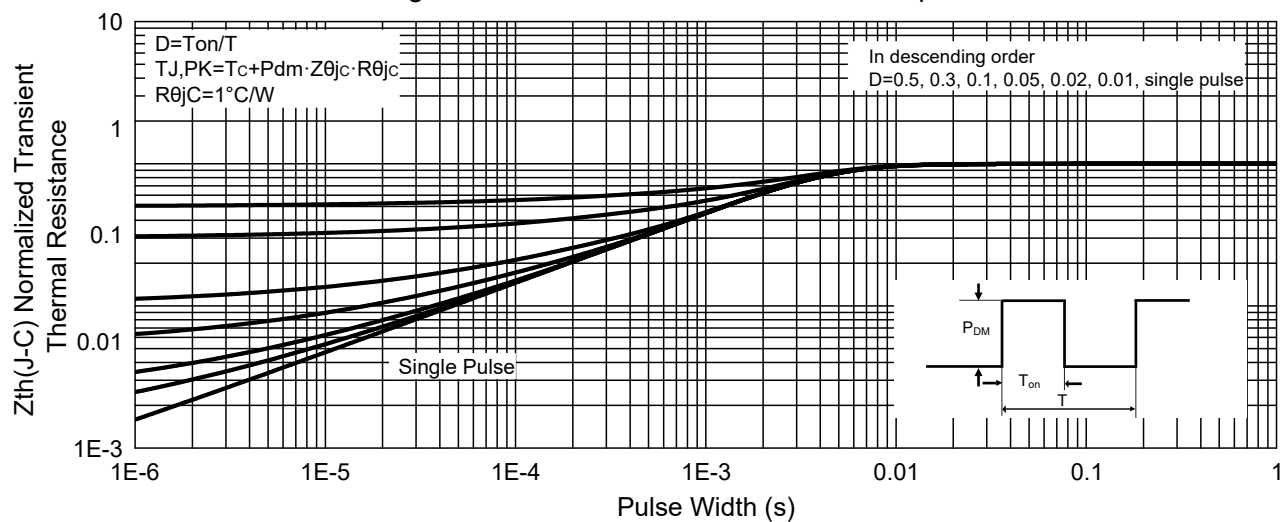


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing                |
|----------------|------------------------|
| Part Number-TP | Tape&Reel: 800pcs/Reel |

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