

## Features

- Fast Switching
- Improved dv/dt Capability
- Excellent Package for Good Heat Dissipation
- 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: 1.5°C/W Junction to Case

| Parameter                                         |                       | Symbol          | Rating | Unit |
|---------------------------------------------------|-----------------------|-----------------|--------|------|
| Drain-Source Voltage                              |                       | V <sub>DS</sub> | 80     | V    |
| Gate-Source Voltage                               |                       | V <sub>GS</sub> | ±20    | V    |
| Continuous Drain Current                          | T <sub>C</sub> =25°C  | I <sub>D</sub>  | 110    | A    |
|                                                   | T <sub>C</sub> =100°C |                 | 69     | A    |
| Pulsed Drain Current <sup>(Note 2)</sup>          |                       | I <sub>DM</sub> | 400    | A    |
| Single Pulse Avalanche Energy <sup>(Note 3)</sup> |                       | E <sub>AS</sub> | 361    | mJ   |
| Total Power Dissipation                           |                       | P <sub>D</sub>  | 83     | W    |

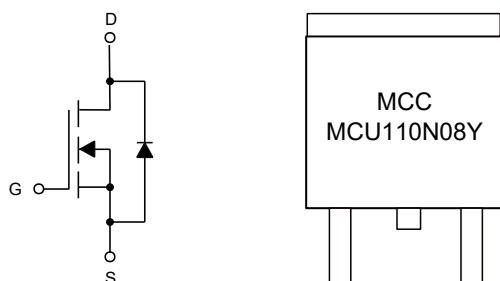
### Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

2. Pulse Width Limited by Maximum Junction Temperature.

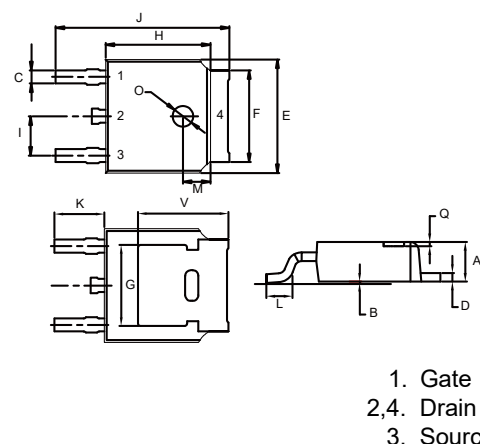
3. EAS Condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=50\text{V}$ ,  $V_G=10\text{V}$ ,  $R_g=25\Omega$ ,  $L=0.5\text{mH}$ ,  $I_{AS}=38\text{A}$ .

## Internal Structure and Marking Code



## N-CHANNEL MOSFET

### DPAK(TO-252)



| DIMENSIONS |        |       |      |       |      |
|------------|--------|-------|------|-------|------|
| DIM        | INCHES |       | MM   |       | NOTE |
|            | MIN    | MAX   | MIN  | MAX   |      |
| A          | 0.087  | 0.094 | 2.20 | 2.40  |      |
| B          | 0.000  | 0.005 | 0.00 | 0.13  |      |
| C          | 0.026  | 0.034 | 0.66 | 0.86  |      |
| D          | 0.018  | 0.023 | 0.46 | 0.58  |      |
| E          | 0.256  | 0.264 | 6.50 | 6.70  |      |
| F          | 0.201  | 0.215 | 5.10 | 5.46  |      |
| G          | 0.190  |       | 4.83 |       | TYP. |
| H          | 0.236  | 0.244 | 6.00 | 6.20  |      |
| I          | 0.086  | 0.094 | 2.18 | 2.39  |      |
| J          | 0.386  | 0.409 | 9.80 | 10.40 |      |
| K          | 0.114  |       | 2.90 |       | TYP. |
| L          | 0.047  | 0.069 | 1.20 | 1.75  |      |
| M          | 0.063  |       | 1.60 |       | TYP. |
| O          | 0.043  | 0.051 | 1.10 | 1.30  |      |
| Q          | 0.000  | 0.012 | 0.00 | 0.30  |      |
| V          | 0.211  |       | 5.35 |       | TYP. |

# 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                                            | 80  |      |      | 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> =80V, V <sub>GS</sub> =0V                                             |     |      | 1    | μA   |
|                                                |                      | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C                      |     |      | 100  |      |
| Gate-Threshold Voltage <sup>(Note 4)</sup>     | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              | 1.4 | 1.8  | 2.5  | V    |
| Drain-Source On-Resistance <sup>(Note 4)</sup> | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =55A                                             |     | 4.2  | 6    | mΩ   |
|                                                |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A                                            |     | 5.5  | 7    |      |
| Gate resistance                                | R <sub>G</sub>       | f=1MHz, Open drain                                                                    |     | 1.9  |      | Ω    |
| Dynamic Characteristics <sup>(Note 5)</sup>    |                      |                                                                                       |     |      |      |      |
| Input Capacitance                              | C <sub>iss</sub>     | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz                                     |     | 6500 |      | pF   |
| Output Capacitance                             | C <sub>oss</sub>     |                                                                                       |     | 850  |      |      |
| Reverse Transfer Capacitance                   | C <sub>rss</sub>     |                                                                                       |     | 35   |      |      |
| Total Gate Charge                              | Q <sub>g</sub>       | V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>D</sub> =55A                       |     | 95   |      | nC   |
| Gate-Source Charge                             | Q <sub>gs</sub>      |                                                                                       |     | 18   |      |      |
| Gate-Drain Charge                              | Q <sub>gd</sub>      |                                                                                       |     | 16   |      |      |
| Turn-On Delay Time                             | t <sub>d(on)</sub>   | V <sub>DS</sub> =40V, I <sub>D</sub> =55A, V <sub>GS</sub> =10V, R <sub>G</sub> =2.2Ω |     | 17   |      | ns   |
| Turn-On Rise Time                              | t <sub>r</sub>       |                                                                                       |     | 90   |      |      |
| Turn-Off Delay Time                            | t <sub>d(off)</sub>  |                                                                                       |     | 47   |      |      |
| Turn-Off Fall Time                             | t <sub>f</sub>       |                                                                                       |     | 10.5 |      |      |
| Drain-Source Body Diode Characteristics        |                      |                                                                                       |     |      |      |      |
| Continuous Body Diode Current                  | I <sub>S</sub>       | T <sub>C</sub> =25°C                                                                  |     |      | 110  | A    |
| Body Diode Voltage                             | V <sub>SD</sub>      | I <sub>SD</sub> =55A, V <sub>GS</sub> =0V                                             |     | 0.9  | 1.2  | V    |
| Reverse Recovery Time                          | t <sub>rr</sub>      | I <sub>F</sub> =55A, di/dt=400A/μs                                                    |     | 33   |      | ns   |
| Reverse Recovery Charge                        | Q <sub>rr</sub>      |                                                                                       |     | 83   |      | nC   |

Note 4. Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle  $\leq 1.5\%$ .

5. Guaranteed by Design, Not Subject to Production Testing.

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

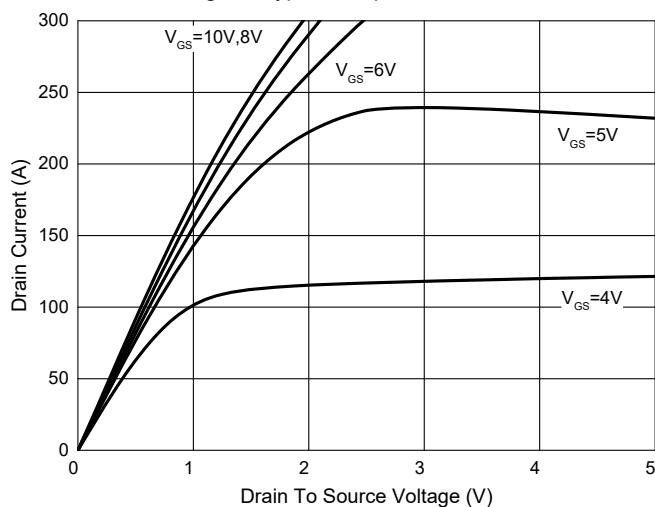


Fig. 2 - Transfer Characteristics

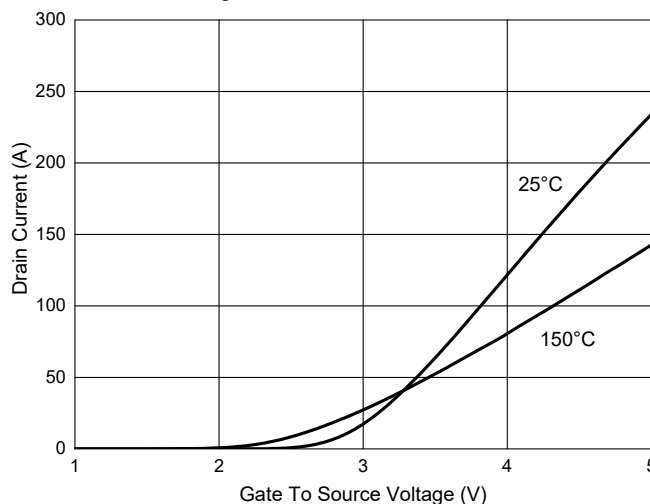


Fig. 3 -  $R_{DS(ON)}$  —  $V_{GS}$

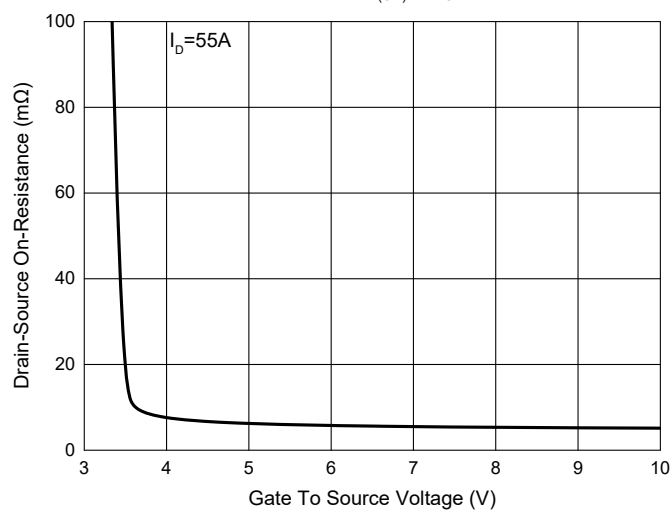


Fig. 4 -  $I_S$  —  $V_{SD}$

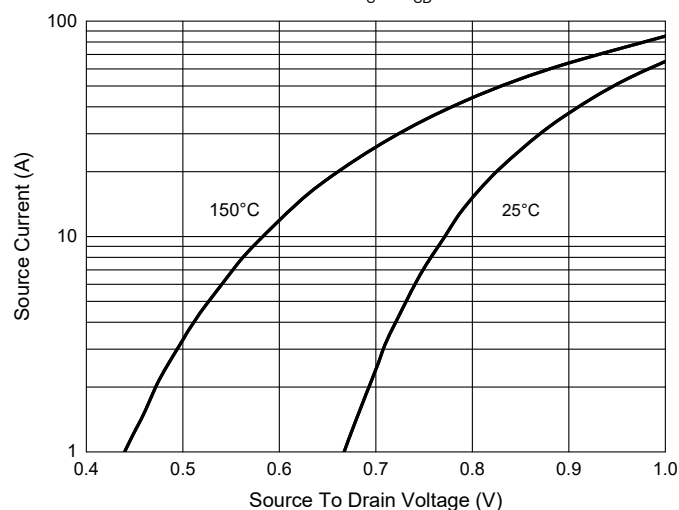


Fig. 5 -  $R_{DS(ON)}$  —  $I_D$

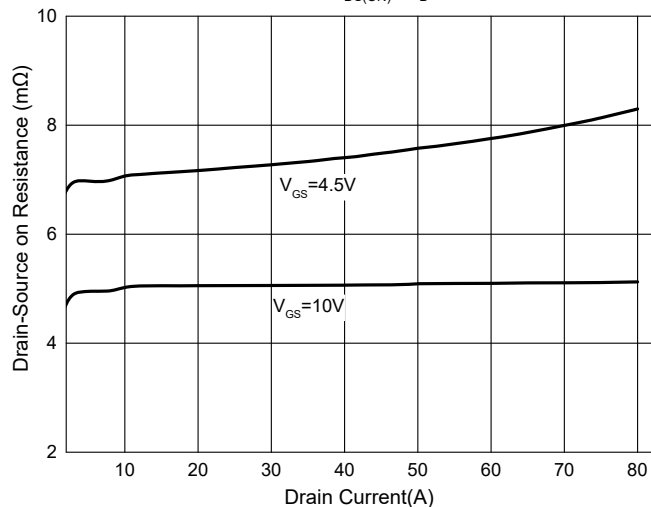
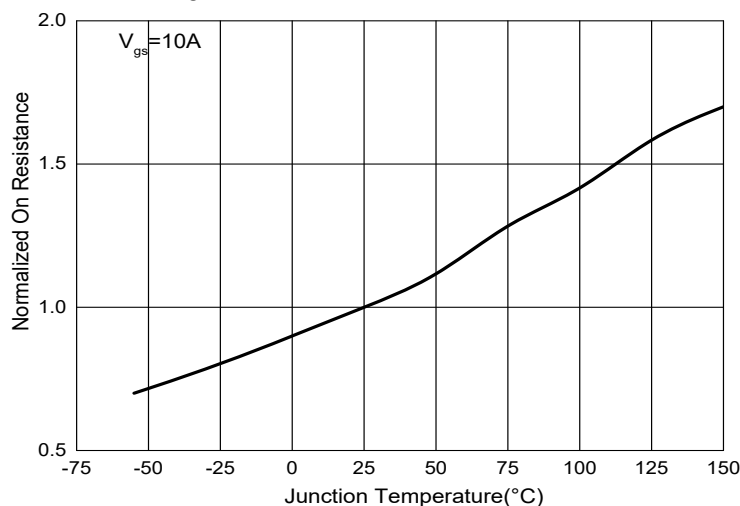


Fig. 6 - Normalized On Resistance Characteristics



## Curve Characteristics

Fig. 7 - Capacitance Characteristics

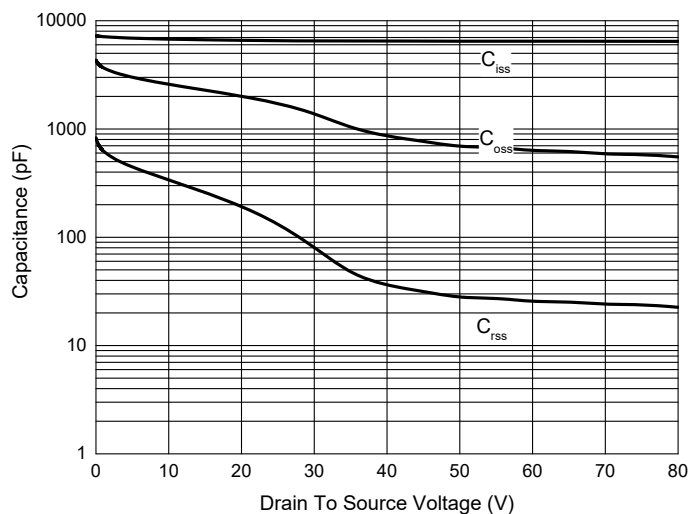


Fig. 8 - Safe Operation Area

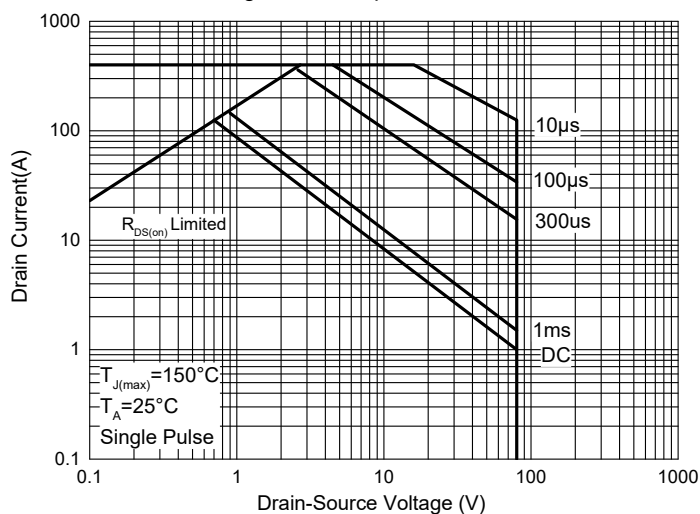
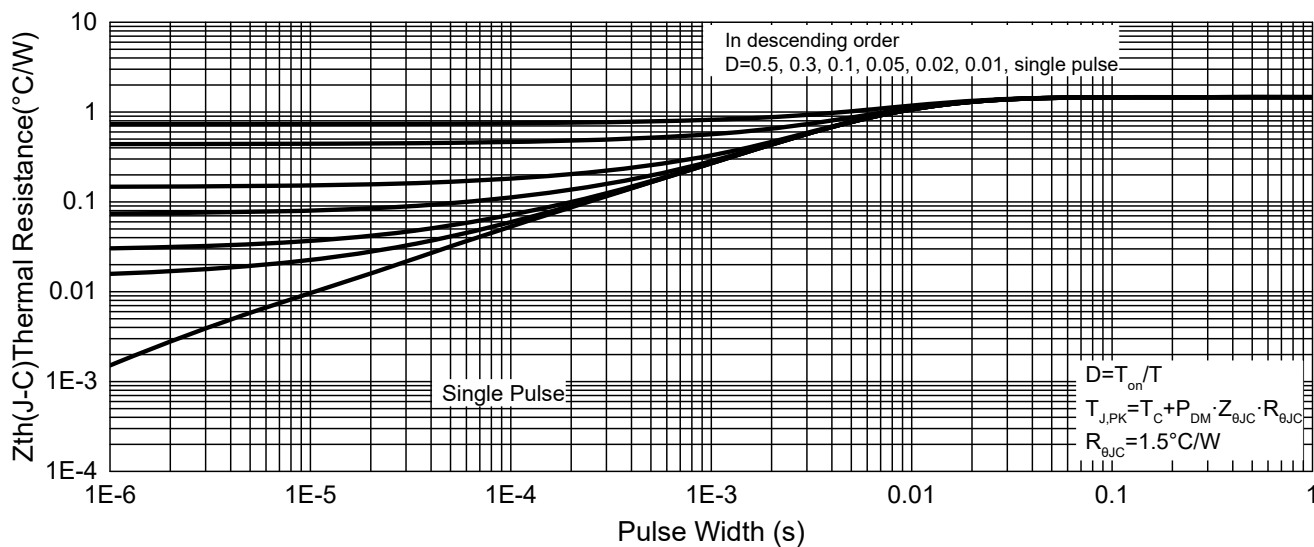


Fig. 9 - Maximum Transient Thermal Impedance



## Ordering Information

| Device         | Packing                 |
|----------------|-------------------------|
| Part Number-TP | Tape&Reel: 2.5Kpcs/Reel |

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