

### Features

- Split Gate Trench MOSFET Technology
- Excellent package for heat dissipation
- 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

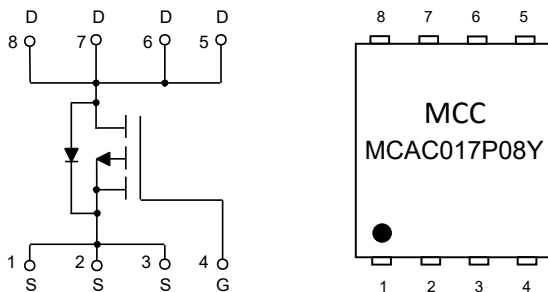
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance:50°C/W Junction to Ambient (Note2)
- Thermal Resistance:1.2°C/W Junction to Case

| Parameter                              | Symbol   | Rating            | Unit |
|--|----------|-------------------|------|
| Drain-Source Voltage                   | $V_{DS}$ | -80               | V    |
| Gate-Source Voltage                    | $V_{GS}$ | ±18               | V    |
| Continuous Drain Current               | $I_D$    | $T_C=25^\circ C$  | -50  |
|  |          | $T_C=100^\circ C$ | -31  |
| Pulsed Drain Current (Note3)           | $I_{DM}$ | -200              | A    |
| Total Power Dissipation (Note4)        | $P_D$    | 104               | W    |
| Single Pulse Avalanche Energy (Note 5) | $E_{AS}$ | 600               | mJ   |

Note:

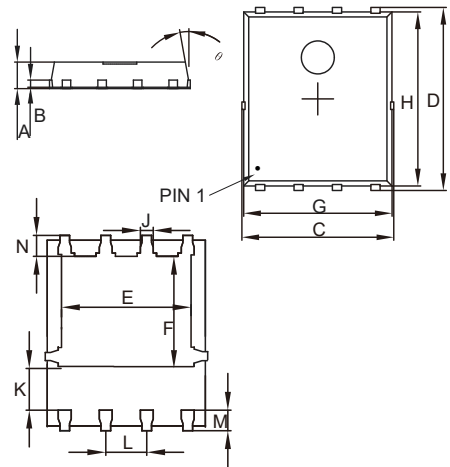
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ C$ .
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.  $T_J=25^\circ C$ ,  $V_{DD}=-50V$ ,  $V_{GS}=-10V$ ,  $R_G=25\Omega$ ,  $L=3mH$ .

Symbolic representation of the device.



## P-CHANNEL MOSFET

### DFN5060



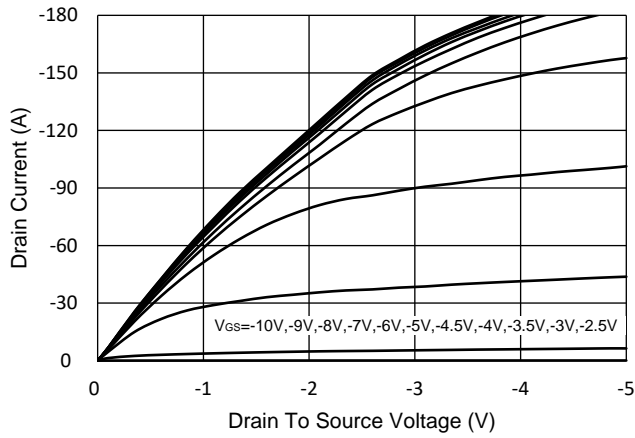
| DIM | DIMENSIONS |       |       |      | NOTE |
|-----|------------|-------|-------|------|------|
|     | INCHES     |       | MM    |      |      |
|     | MIN        | MAX   | MIN   | MAX  |      |
| A   | 0.039      | 0.047 | 0.80  | 1.20 |      |
| B   | 0.010      |       | 0.254 |      | TYP. |
| C   | 0.203      | 0.219 | 5.15  | 5.55 |      |
| D   | 0.234      | 0.250 | 5.95  | 6.35 |      |
| E   | 0.154      | 0.170 | 3.92  | 4.32 |      |
| F   | 0.139      | 0.154 | 3.52  | 3.92 |      |
| G   | 0.197      | 0.213 | 5.00  | 5.40 |      |
| H   | 0.223      | 0.239 | 5.66  | 6.06 |      |
| K   | 0.0444     | 0.052 | 1.12  | 1.32 |      |
| J   | 0.016      | 0.020 | 0.41  | 0.51 |      |
| L   | 0.046      | 0.054 | 1.17  | 1.37 |      |
| M   | 0.022      | 0.030 | 0.56  | 0.76 |      |
| N   | 0.016      | 0.024 | 0.40  | 0.60 |      |

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

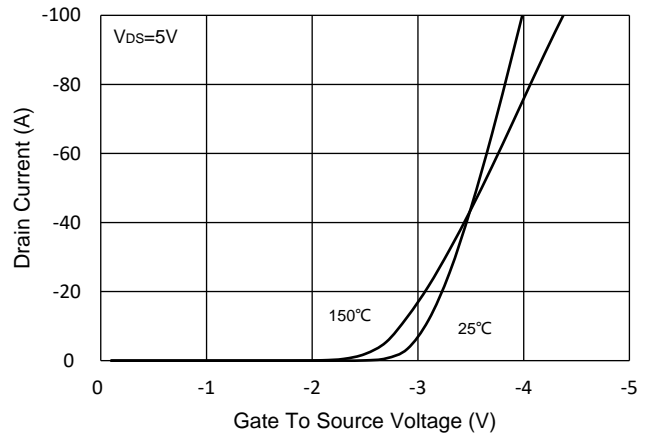
| Parameter                       | Symbol        | Test Conditions                                   | Min  | Typ  | Max       | Unit       |
|---------------------------------|---------------|---|------|------|-----------|------------|
| <b>Static Characteristics</b>   |               |   |      |      |           |            |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$                        | -80  |      |           | V          |
| Gate-Source Leakage Current     | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 18V$                       |      |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=-80V, V_{GS}=0V$                          |      |      | -1        | $\mu A$    |
| Gate-Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=-250\mu A$                    | -1.2 | -2.1 | -3        | V          |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=-10V, I_D=-25A$                           |      | 13.5 | 17        | m $\Omega$ |
|                                 |               | $V_{GS}=-4.5V, I_D=-20A$                          |      | 16   | 22        |            |
| Gate Resistance                 | $R_G$         | f=1MHz, Open drain                                |      | 8    |           | $\Omega$   |
| <b>Diode Characteristics</b>    |               |   |      |      |           |            |
| Continuous Body Diode Current   | $I_S$         |   |      |      | -50       | A          |
| Diode Forward Voltage           | $V_{SD}$      | $V_{GS}=0V, I_S=-25A$                             |      |      | -1.2      | V          |
| Reverse Recovery Time           | $t_{rr}$      | $I_F=-25A, di/dt=100A/\mu s$                      |      | 63   |           | ns         |
| Reverse Recovery Charge         | $Q_{rr}$      |   |      | 124  |           | nC         |
| <b>Dynamic Characteristics</b>  |               |   |      |      |           |            |
| Input Capacitance               | $C_{iss}$     | $V_{DS}=-40V, V_{GS}=0V, f=1MHz$                  |      | 5330 |           | pF         |
| Output Capacitance              | $C_{oss}$     |   |      | 490  |           |            |
| Reverse Transfer Capacitance    | $C_{riss}$    |   |      | 45   |           |            |
| Total Gate Charge               | $Q_g$         | $V_{DS}=-40V, V_{GS}=-10V, I_D=-25A$              |      | 93   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$      |   |      | 25   |           |            |
| Gate-Drain Charge               | $Q_{gd}$      |   |      | 16   |           |            |
| Turn-On Delay Time              | $t_{d(on)}$   | $V_{DD}=-40V, V_{GS}=-10V, R_G=3\Omega, I_D=-25A$ |      | 14   |           | ns         |
| Turn-On Rise Time               | $t_r$         |   |      | 81   |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$  |   |      | 137  |           |            |
| Turn-Off Fall Time              | $t_f$         |   |      | 84   |           |            |

## Curve Characteristics

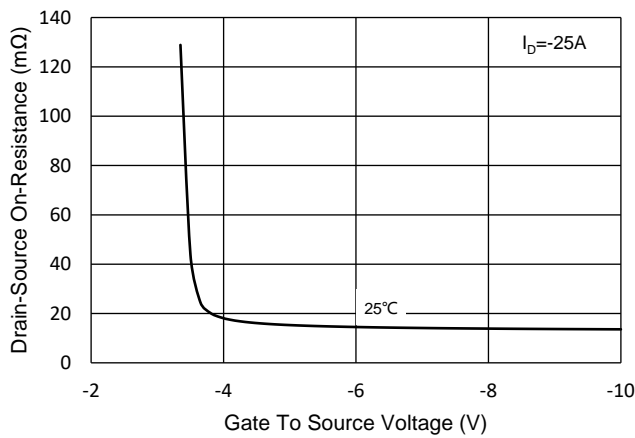
**Fig.1 - Typical Output Characteristics**



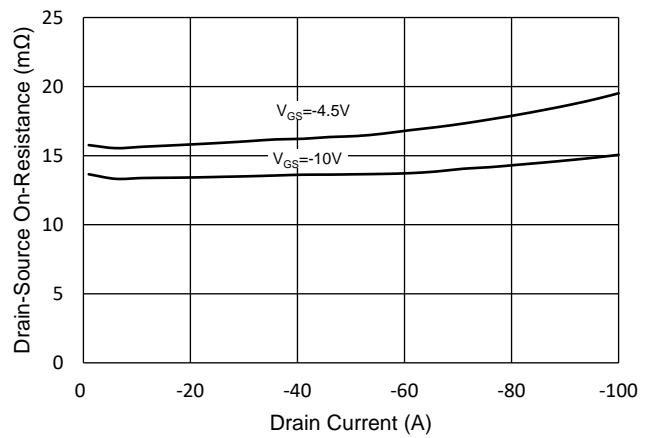
**Fig.2 - Transfer Characteristics**



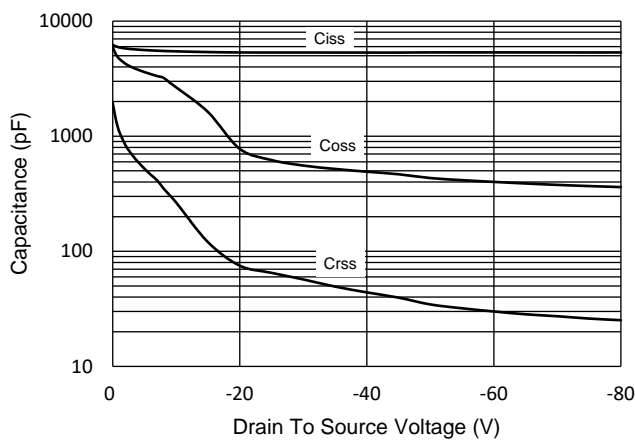
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



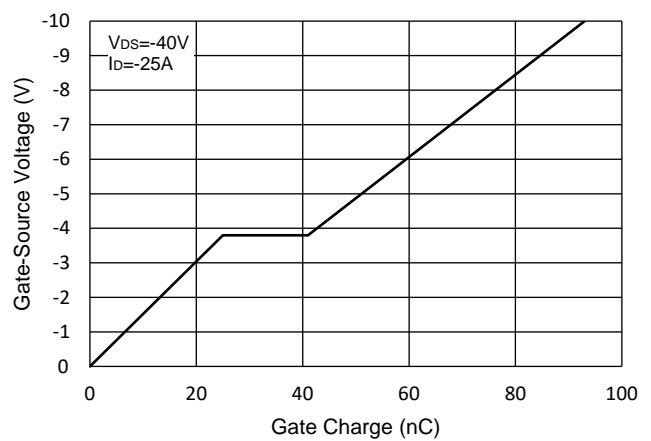
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

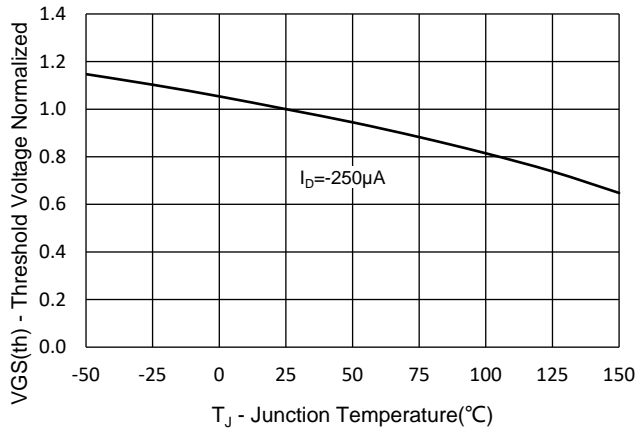


**Fig.6 - Gate Charge**

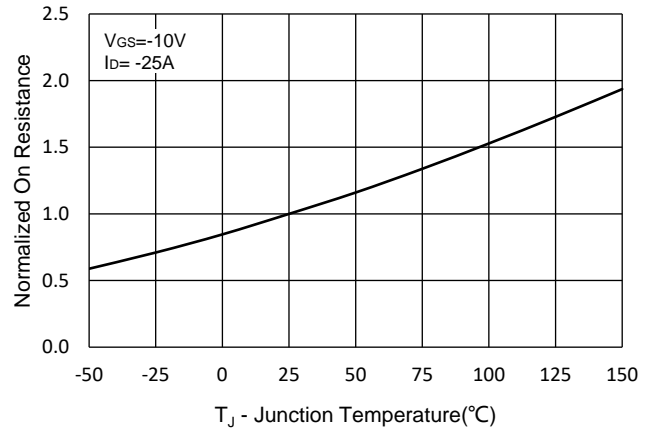


## Curve Characteristics

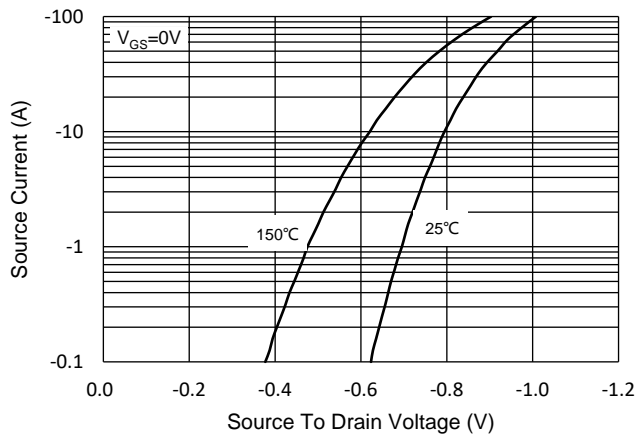
**Fig.7 - Normalized Threshold Voltage**



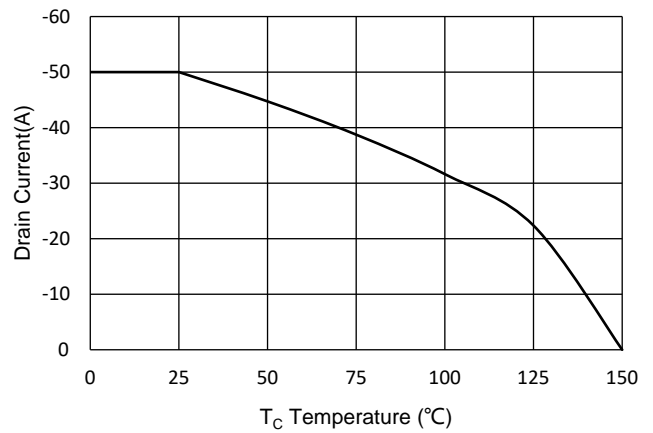
**Fig.8 - Normalized On Resistance Characteristics**



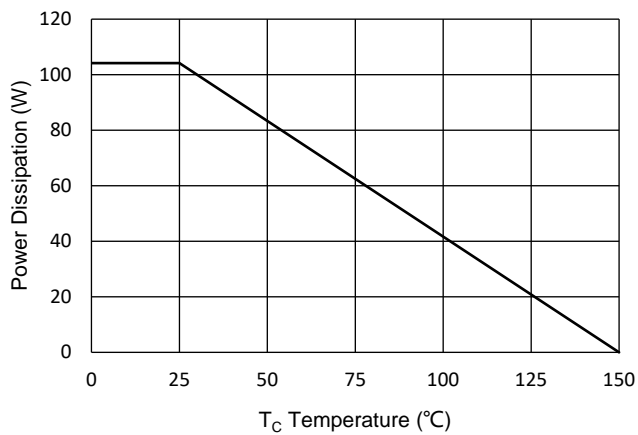
**Fig.9 -  $I_S$  -  $V_{SD}$**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



## Curve Characteristics

Fig.12 - Safe Operation Area

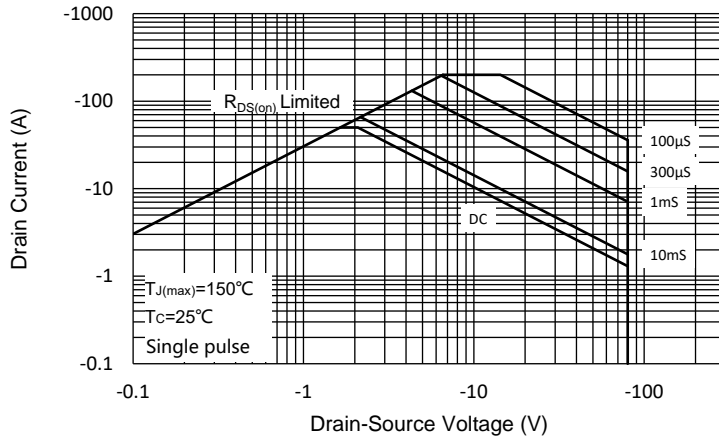
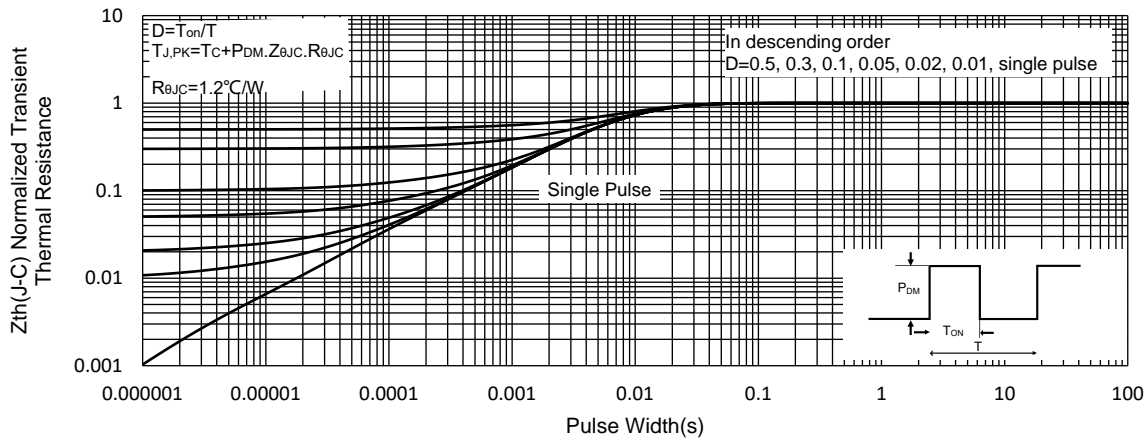


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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