## Features

- Trench Power LV MOSFET Technology
- Excellent Package for Heat Dissipation
- Moisture Sensitivity Level 1
- Halogen Free. “Green” Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant(Note2)("P" Suffix Designates RoHS Compliant. See Ordering Information)

# P-CHANNEL MOSFET

## Maximum Ratings

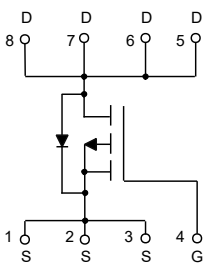
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 50°C/W Junction to Ambient(Note3)
- Thermal Resistance: 2°C/W Junction to Case

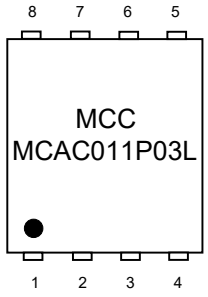
| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Volltage | | $V_{GS}$ | ±25 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | -50 | A |
| | $T_C$=100°C | | -32 | |
| Pulsed Drain Current(Note4) | | $I_{DM}$ | -200 | A |
| Total Power Dissipation(Note5) | | $P_D$ | 62.5 | W |
| Single Pulse Avalanche Energy (Note6) | | $E_{AS}$ | 100 | mJ |

Note:

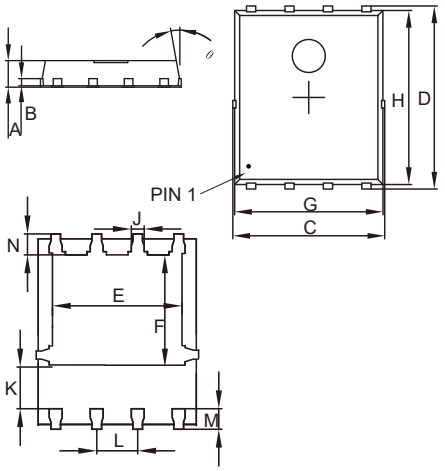
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.
4. Repetitive rating; pulse width limited by max. junction temperature.
5. $P_D$ is based on max. junction temperature, using junction-case thermal resistance.
6. $T_J$=25°C, $V_{DD}$=-25V, $V_{GS}$=-10V, $R_G$=25Ω, L=0.5mH.

## Internal Structure and Marking Code




## DFN5060




| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| DIM | INCHES | | MM | | NOTE |
| | MIN | MAX | MIN | MAX | |
| A | 0.031 | 0.047 | 0.80 | 1.20 | |
| B | 0.010 | | 0.254 | | TYP. |
| C | 0.193 | 0.222 | 4.90 | 5.64 | |
| D | 0.232 | 0.250 | 5.90 | 6.35 | |
| E | 0.148 | 0.167 | 3.75 | 4.25 | |
| F | 0.126 | 0.154 | 3.20 | 3.92 | |
| G | 0.189 | 0.213 | 4.80 | 5.40 | |
| H | 0.222 | 0.239 | 5.65 | 6.06 | |
| K | 0.045 | 0.059 | 1.15 | 1.50 | |
| J | 0.012 | 0.020 | 0.30 | 0.50 | |
| L | 0.046 | 0.054 | 1.17 | 1.37 | |
| M | 0.012 | 0.028 | 0.30 | 0.71 | |
| N | 0.016 | 0.028 | 0.40 | 0.71 | |

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

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -30 | | | V |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$ =±25V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-30V, $V_{GS}$=0V | | | -1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1.2 | -1.8 | -2.8 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-15A | | 8.2 | 10.5 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-10A | | 14 | 20 | |
| Gate Resistance | $R_g$ | f=1 MHz, Open drain | | 17 | | Ω |
| **Diode Characteristics** | | | | | | |
| Continuous Body Diode Current | $I_S$ | | | | -50 | A |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=-20A | | | -1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=-20A, $dI_F/dt$=100A/μs | | 43 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | | 22 | | nC |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-15V,$V_{GS}$=0V,f=1MHz | | 1860 | | pF |
| Output Capacitance | $C_{oss}$ | | | 310 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 280 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-15V,$V_{GS}$=-10V,$I_D$=-20A | | 38 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 6 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 10 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=-15V, $V_{GS}$=-10V, $R_G$=2.3Ω, $I_{DS}$=-20A | | 8 | | ns |
| Turn-On Rise Time | $t_r$ | | | 6 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 108 | | |
| Turn-Off Fall Time | $t_f$ | | | 69 | | |

## Curve Characteristics

**Fig.1 - Typical Output Characteristics**

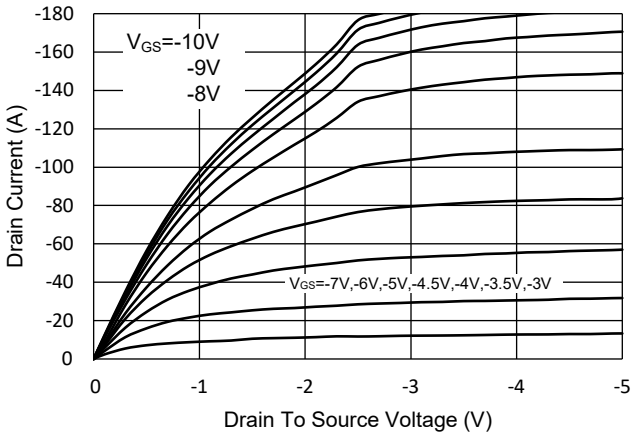



**Fig.2 - Transfer Characteristics**

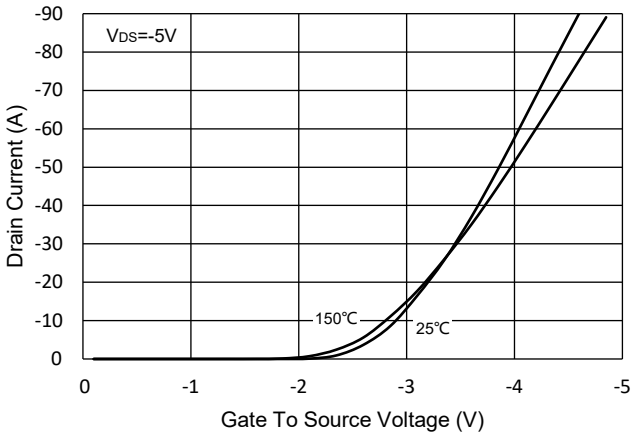



**Fig.3 - $R_{DS(ON)}$ - $V_{GS}$**

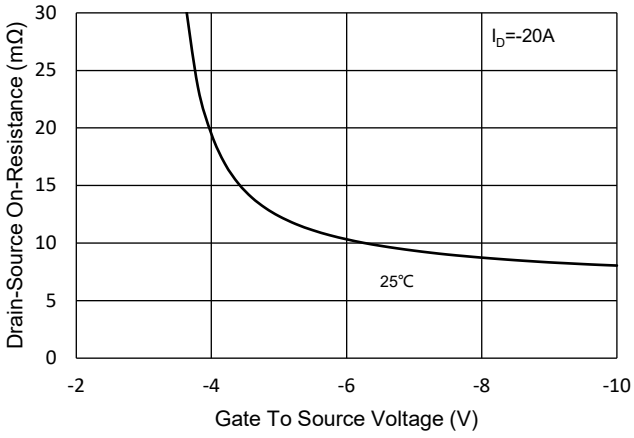



**Fig.4 - $R_{DS(ON)}$ - $I_D$**

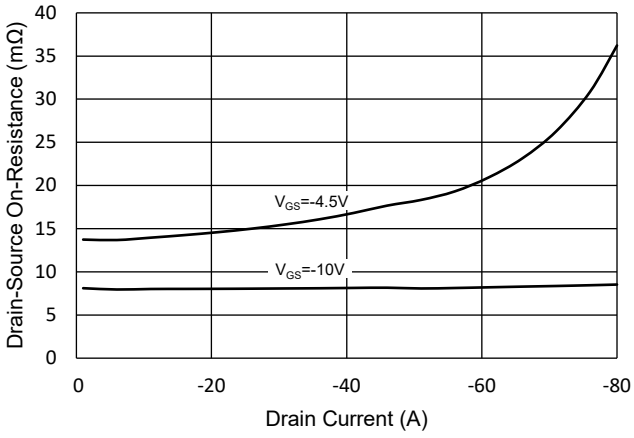



**Fig.5 - Capacitance Characteristics**

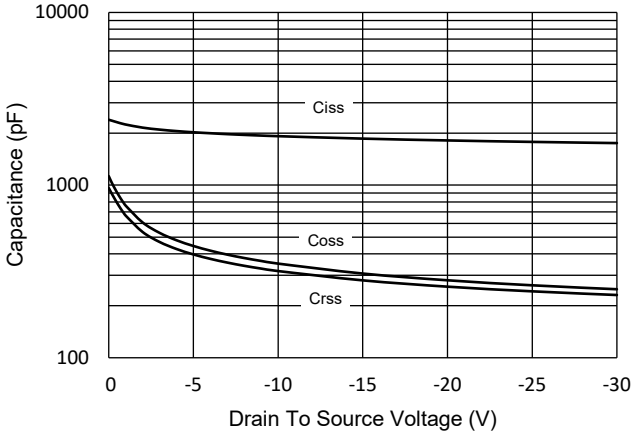
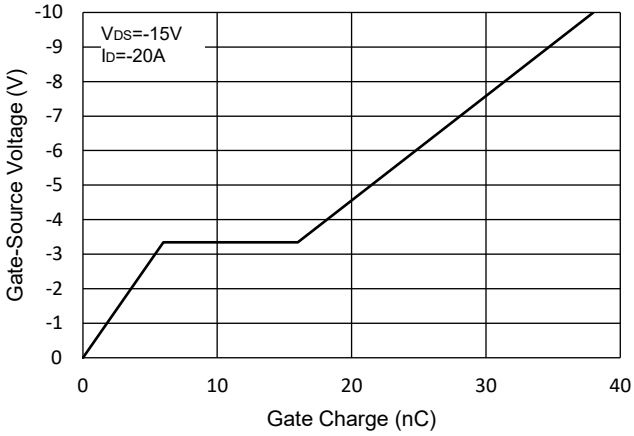



**Fig.6 - Gate Charge**



## Curve Characteristics

**Fig.7 - Normalized Threshold Voltage**

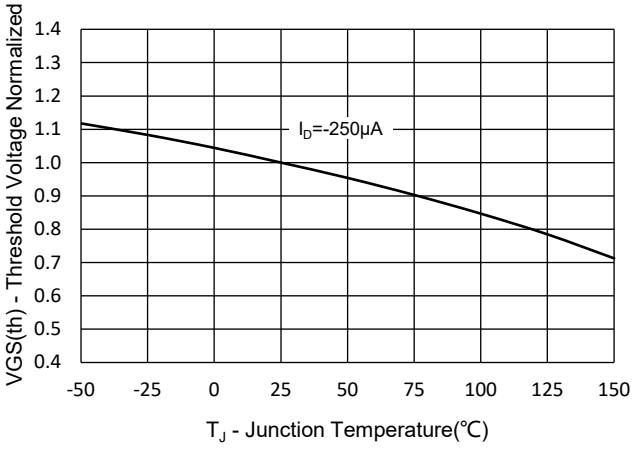



**Fig.8 - Normalized On Resistance Characteristics**

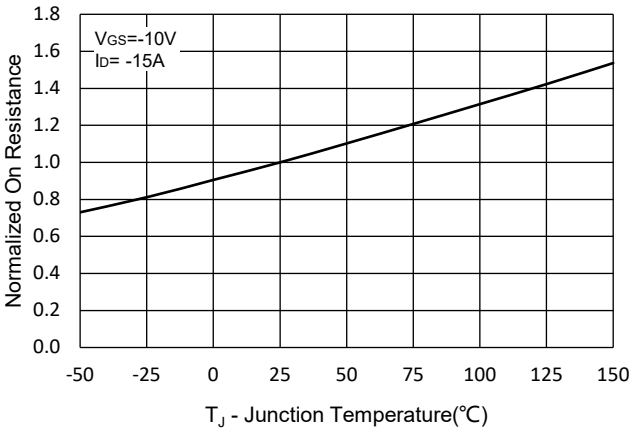



**Fig.9 - $I_S$ - $V_{SD}$**

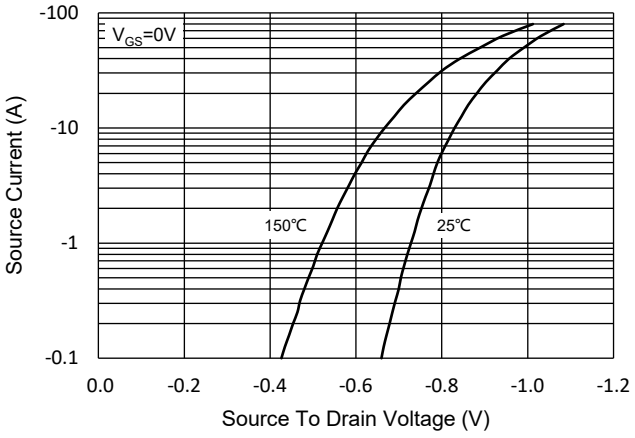



**Fig.10 - Drain Current**

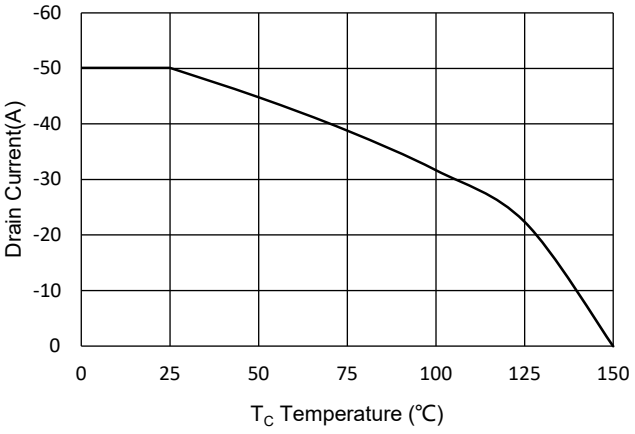
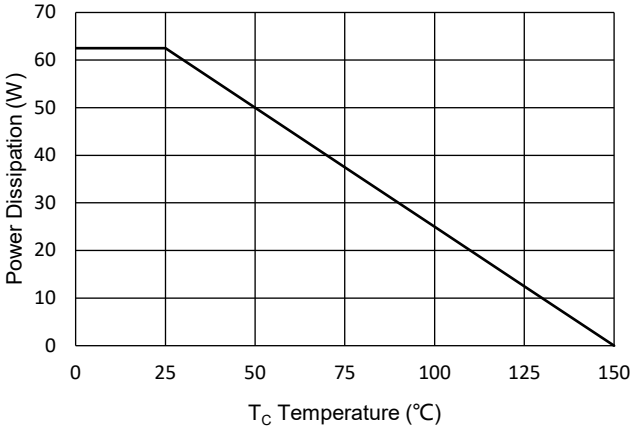



**Fig.11 - PD Dissipation**



## Curve Characteristics

**Fig. 12 - Safe Operation Area**

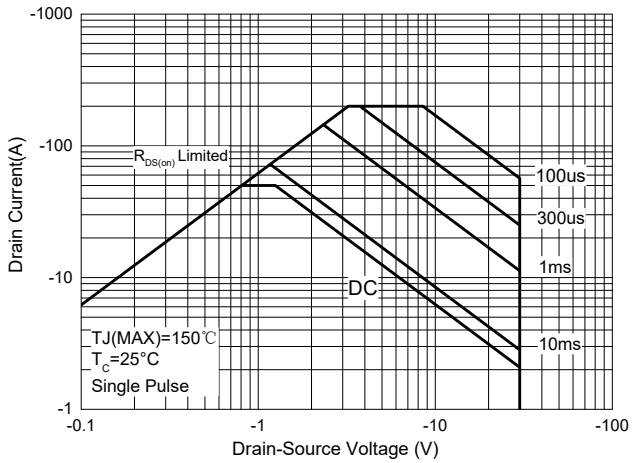
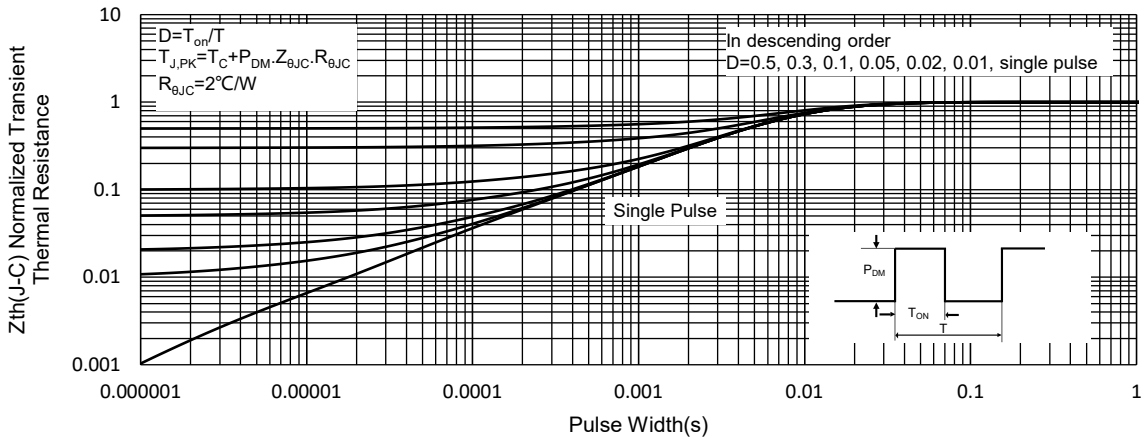



**Fig.13 - Normalized Transient Thermal Impedance**



## Ordering Information

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