## Features

- Split Gate Trench Mosfet Technology
- Excellent Package For Good Heat Dissipation
- 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)

# P-CHANNEL MOSFET

## Maximum Ratings

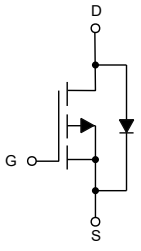
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 50°C/W Junction to Ambient(Note2)
- Thermal Resistance: 1.4°C/W Junction to Case

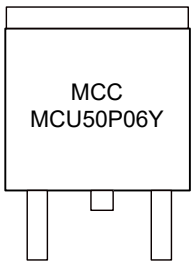
| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -60 | V |
| Gate-Source Volltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | -50 | A |
| | $T_C$=100°C | | -31 | |
| Pulsed Drain Current (Note3) | | $I_{DM}$ | -200 | A |
| Total Power Dissipation(Note4) | | $P_D$ | 89 | W |
| Single Pulse Avalanche Energy (Note5) | | $E_{AS}$ | 169 | mJ |

Note:

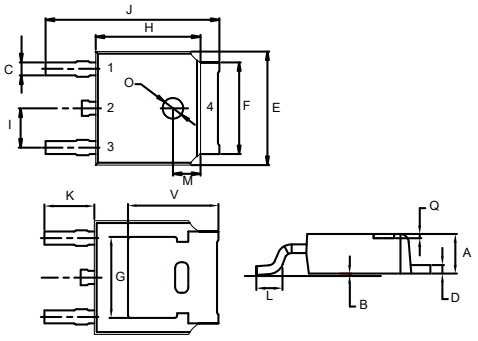
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°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. $V_{DD}$=-50V, $V_{GS}$= -10V, L= 0.5mH.

## Internal Structure and Marking Code




## DPAK(TO-252)




1. Gate
2,4. Drain
3. Source

| 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 | 0.055 | 0.067 | 1.40 | 1.70 | |
| 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 | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -60 | | | V |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$ =±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-60V, $V_{GS}$=0V | | | -1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1.0 | -2.0 | -3.0 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-25A | | 9 | 12 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-20A | | 11 | 15 | |
| Gate Resistance | $R_g$ | f=1 MHz, Open drain | | 8.5 | | Ω |
| **Diode Characteristics** | | | | | | |
| 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, $dI_F/dt$=100A/μs | | 52 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | | 67 | | nC |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-25V,$V_{GS}$=0V,f=1MHz | | 4600 | | pF |
| Output Capacitance | $C_{oss}$ | | | 1040 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 46 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-30V,$V_{GS}$=-10V,$I_D$=-25A | | 79 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 18 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 18 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=-30V, $V_{GS}$=-10V, $R_{GEN}$=3Ω, $I_{DS}$=-25A | | 13 | | ns |
| Turn-On Rise Time | $t_r$ | | | 38 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 140 | | |
| Turn-Off Fall Time | $t_f$ | | | 54 | | |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

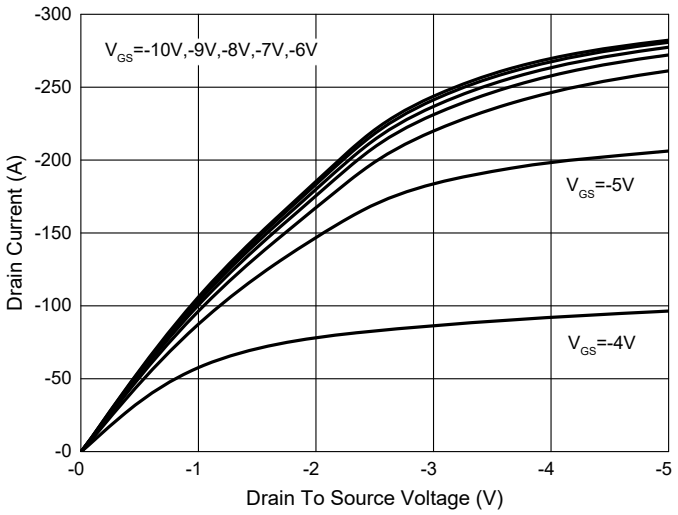



Fig. 2 - Transfer Characteristics

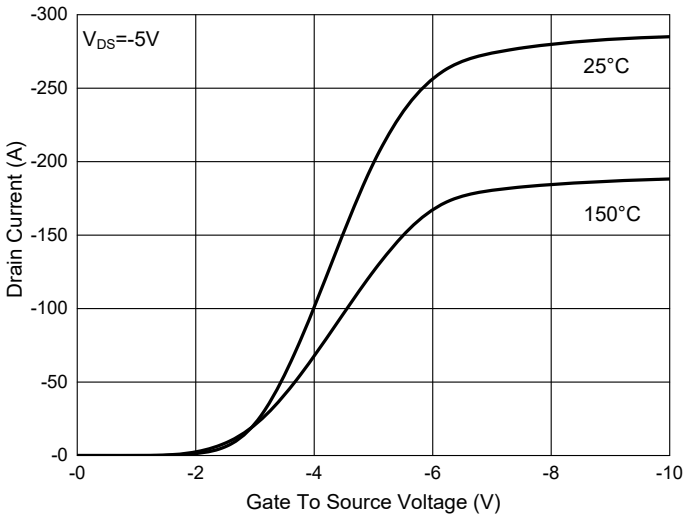



Fig. 3 - $R_{DS(ON)}$—$V_{GS}$

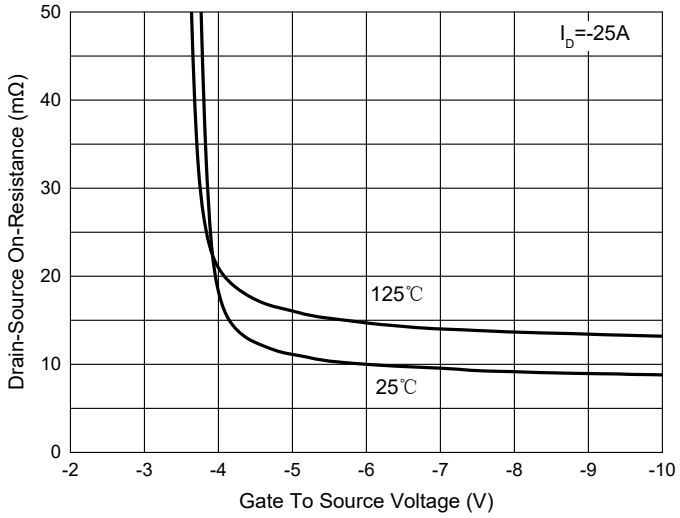



Fig. 4 - $R_{DS(ON)}$—$I_D$

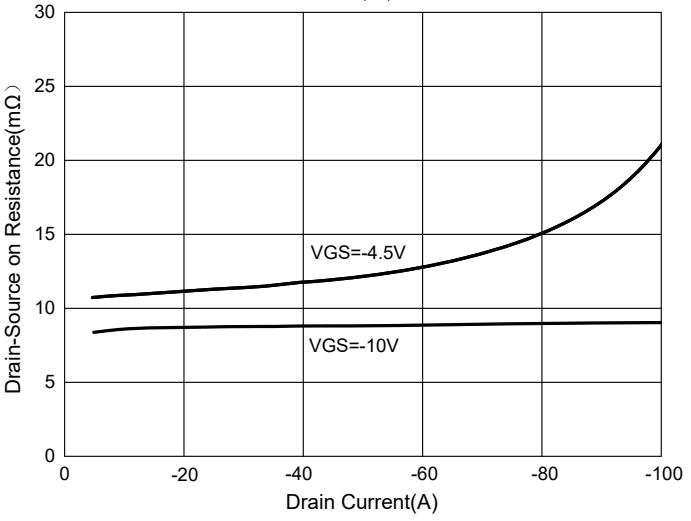



Fig. 5 - Capacitance Characteristics

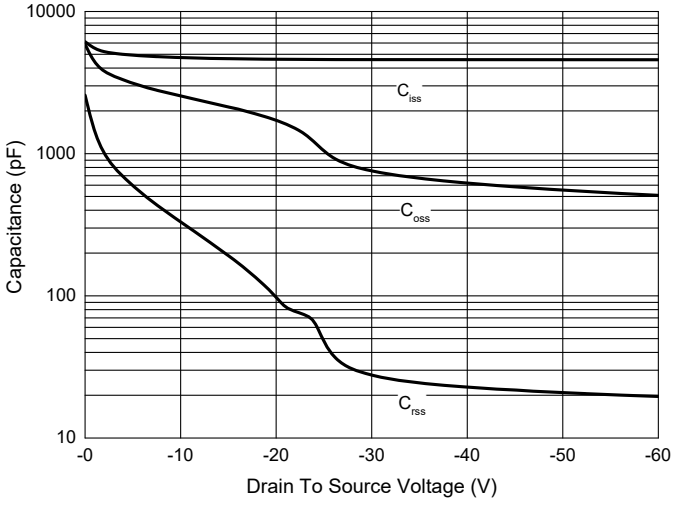
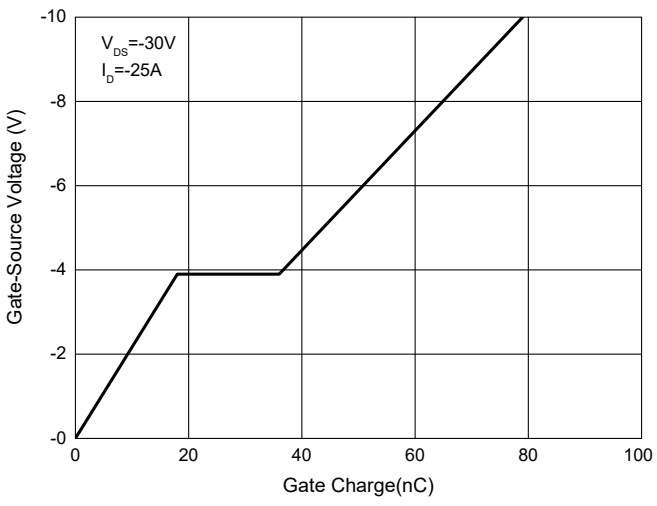



Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Nomalized Threshold Voltage

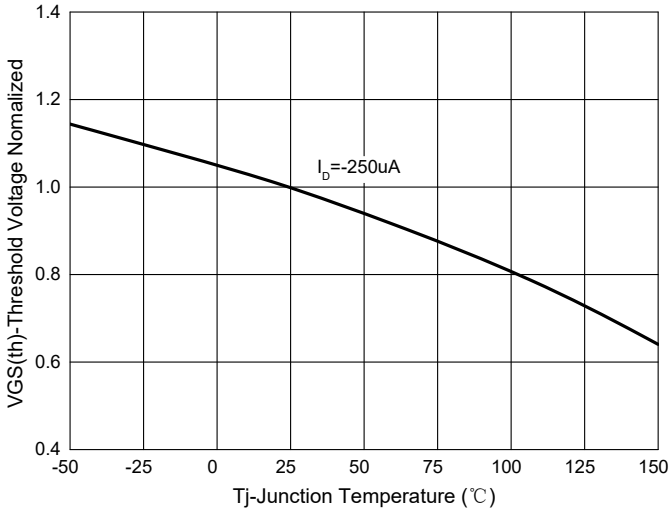



Fig.8-Normalized On Resistance Characteristics

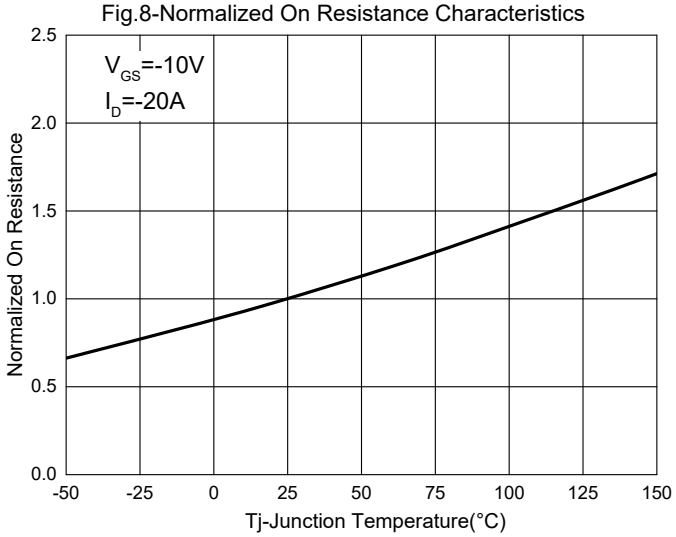



Fig. 9- $I_S$—$V_{SD}$

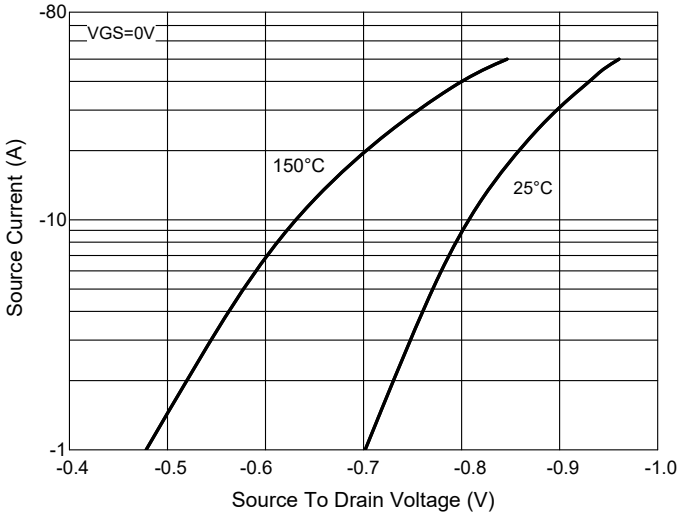



Fig. 10 - Drain Current

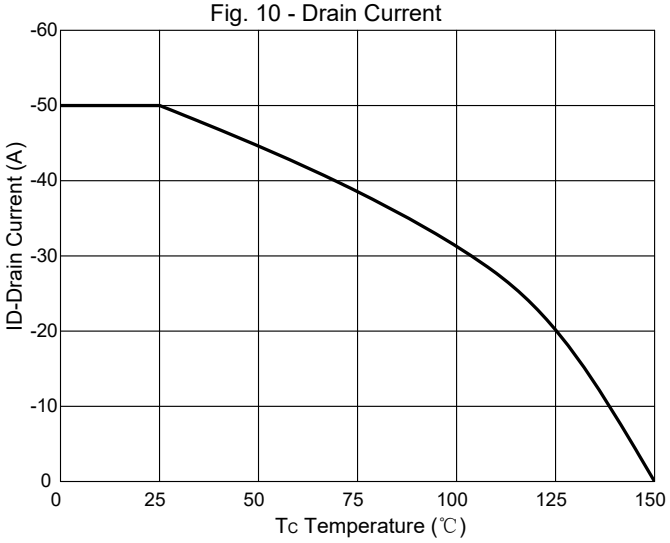
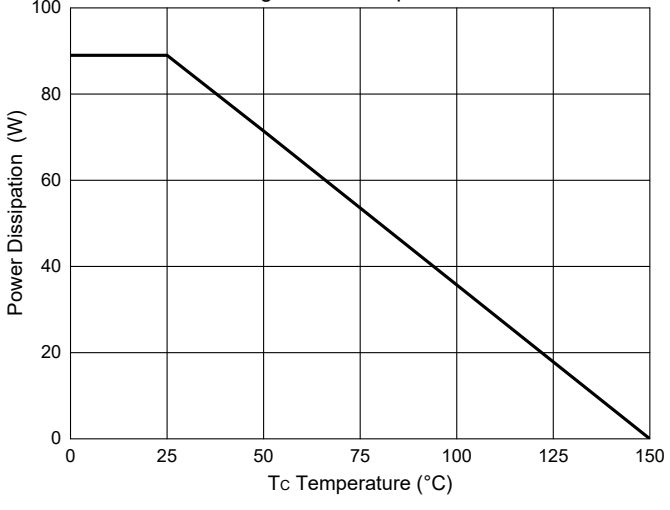



Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

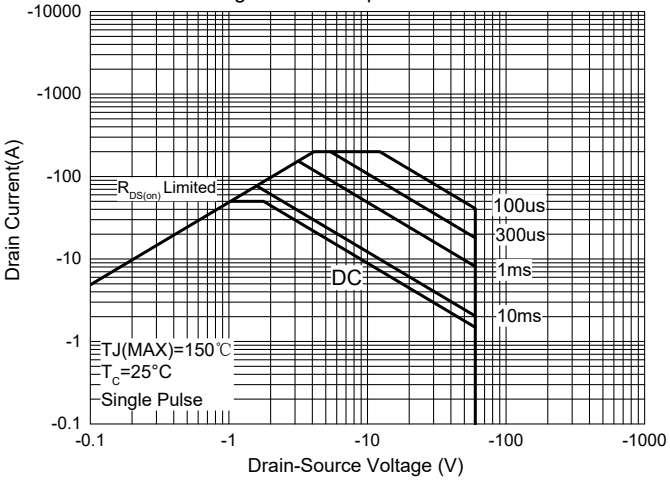
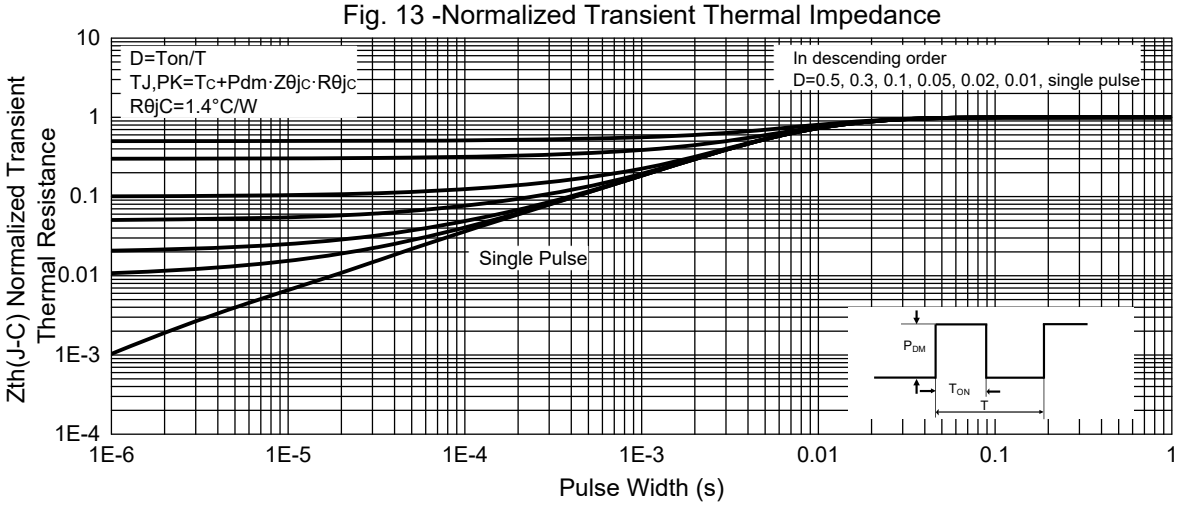



Fig. 13 -Normalized Transient Thermal Impedance



## Ordering Information

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