

Features

- Trench Power LV MOSFET Technology
- Excellent Package for Heat Dissipation
- High Density Cell Design for Low $R_{DS(ON)}$
- 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)
- Moisture Sensitivity Level 1

Maximum Ratings

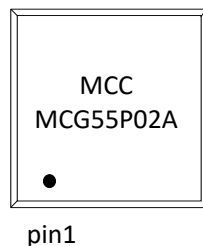
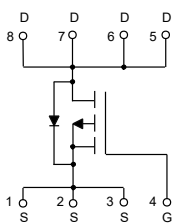
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 3.3°C/W Junction to Case⁽²⁾
- Thermal Resistance: 39°C/W Junction to Ambient⁽²⁾

| Parameter | Symbol | Rating | Unit |
|-------------------------------------|------------------------|--------|------|
| Drain-Source Voltage | V_{DS} | -20 | V |
| Gate-Source Voltage | V_{GS} | ±10 | V |
| Continuous Drain Current | I_D | -55 | A |
| Pulsed Drain Current ⁽³⁾ | I_{DM} | -160 | A |
| Total Power Dissipation | $T_C=25^\circ\text{C}$ | 38 | W |
| | $T_A=25^\circ\text{C}$ | 3.2 | W |
| Single Pulsed Avalanche Energy | E_{AS} | 75 | mJ |

Note:

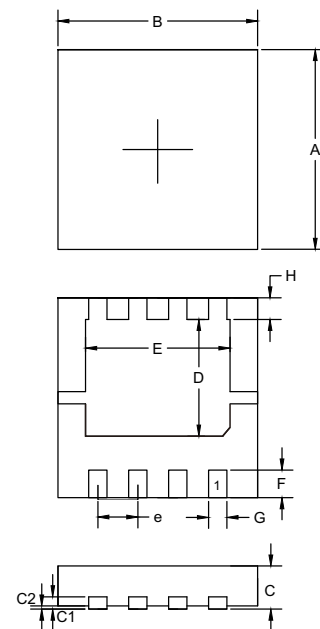
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in² pad of 2oz copper.
3. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

Internal Structure and Marking Code



P-CHANNEL MOSFET

DFN3333



| DIM | DIMENSIONS | | | | NOTE |
|-----|------------|-------|------|------|------|
| | INCHES | | MM | | |
| | MIN | MAX | MIN | MAX | |
| A | 0.126 | 0.130 | 3.20 | 3.30 | |
| B | 0.126 | 0.130 | 3.20 | 3.30 | |
| C | 0.030 | 0.033 | 0.75 | 0.85 | |
| C1 | 0.007 | 0.009 | 0.18 | 0.22 | |
| C2 | --- | 0.002 | --- | 0.05 | |
| D | 0.071 | 0.079 | 1.80 | 2.00 | |
| E | 0.087 | 0.098 | 2.20 | 2.50 | |
| F | 0.016 | 0.020 | 0.40 | 0.50 | |
| G | 0.010 | 0.014 | 0.25 | 0.35 | |
| H | 0.012 | 0.016 | 0.30 | 0.40 | |
| e | 0.024 | 0.028 | 0.60 | 0.70 | |

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------|---------------|--|------|-------|-----------|------------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$ | -20 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 10V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-20V, V_{GS}=0V$ | | | -1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.4 | -0.62 | -1.0 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-15A$ | | 6.5 | 8.3 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-10A$ | | 8 | 10 | m Ω |
| | | $V_{GS}=-1.8V, I_D=-8A$ | | 10.3 | 15 | m Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | | | | -55 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=-20A$ | | | -1.3 | V |
| Reverse Recovery Time | t_{rr} | $I_F=-6A, dI_F/dt=100A/\mu s$ | | 46 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 25.2 | | nC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V, f=1MHz$ | | 6358 | | pF |
| Output Capacitance | C_{oss} | | | 690 | | |
| Reverse Transfer Capacitance | C_{riss} | | | 477 | | |
| Total Gate Charge | Q_g | $V_{DS}=-15V, V_{GS}=-10V, I_D=-9.1A$ | | 149 | | nC |
| Gate-Source Charge | Q_{gs} | | | 12.7 | | |
| Gate-Drain Charge | Q_{gd} | | | 21 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}=-15V, V_{GEN}=-10V, R_G=2.5\Omega, I_{DS}=-6A$ | | 11 | | ns |
| Turn-On Rise Time | t_r | | | 36 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 182 | | |
| Turn-Off Fall Time | t_f | | | 191 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

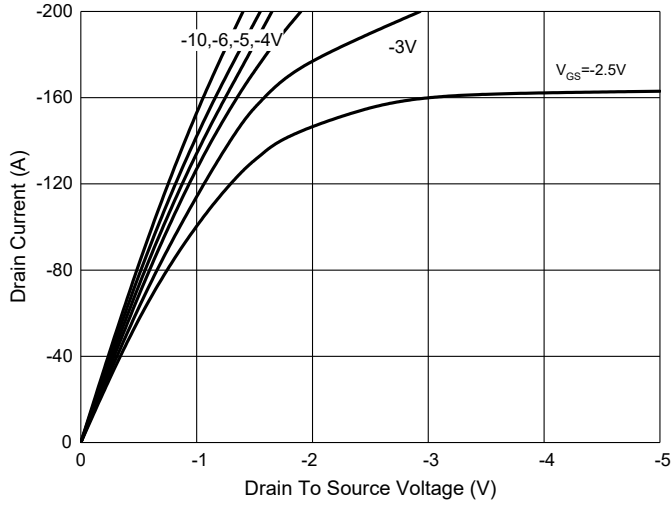


Fig. 2 - Transfer Characteristics

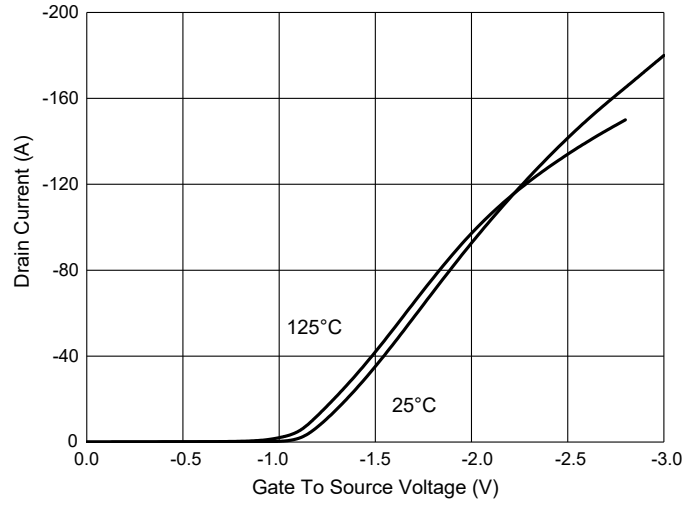


Fig. 3 - $R_{DS(ON)} - I_D$

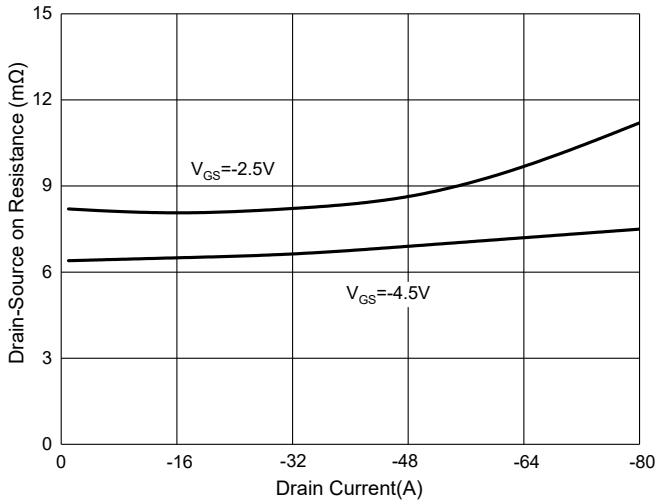


Fig. 4 - Normalized On Resistance Characteristics

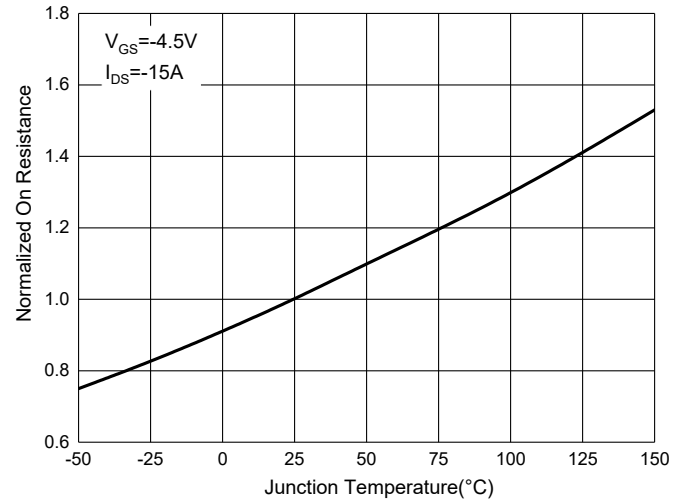


Fig. 5 - Capacitance Characteristics

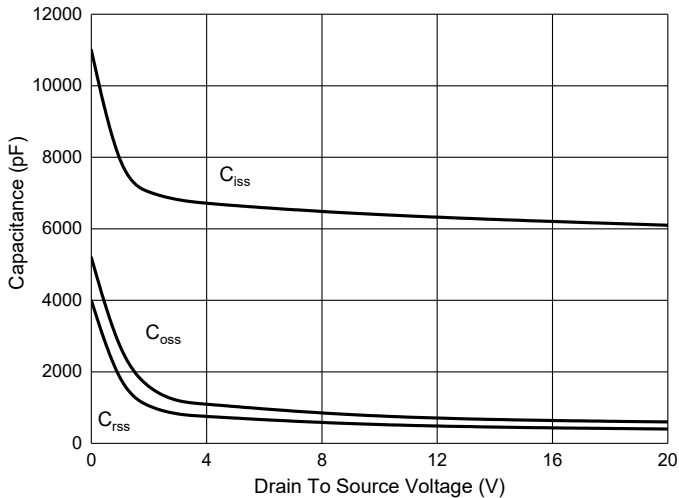
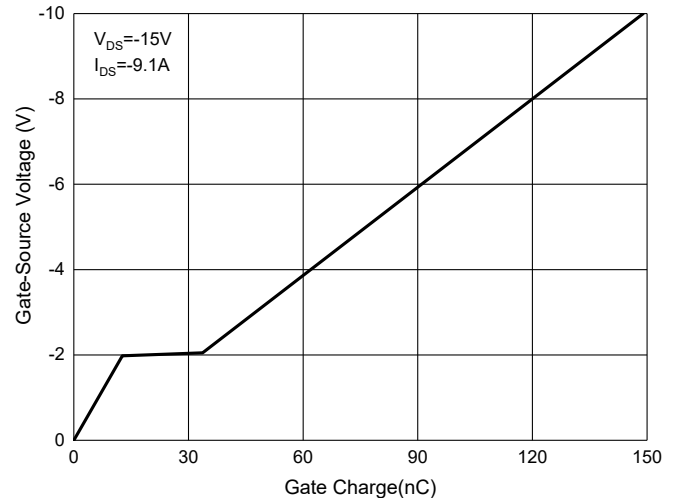


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Safe Operation Area

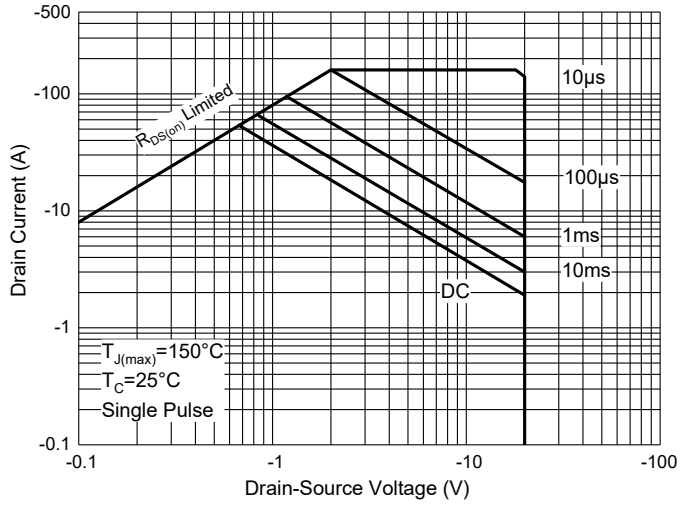
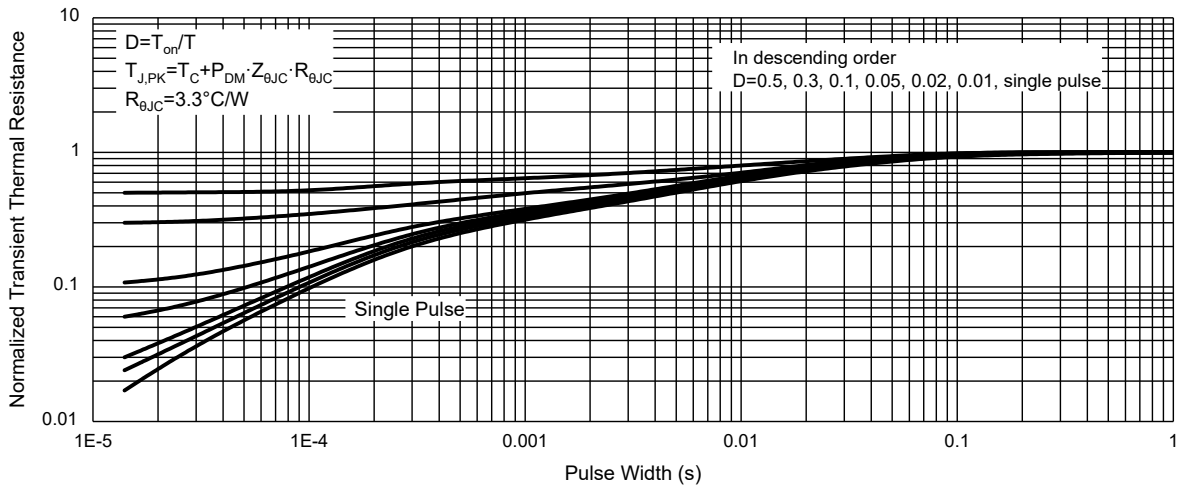


Fig. 8 - Normalized Maximum Transient Thermal Impedance



Ordering Information

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

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