

Features

- High Current Load Applications
- Load Switching
- Hard Switched and High Frequency Circuits
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

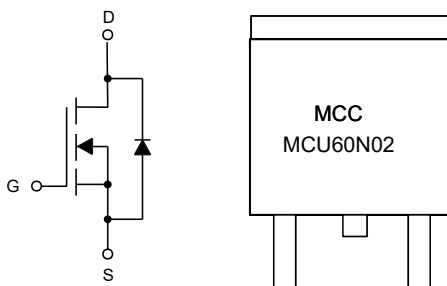
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 4.3°C/W Junction to Case^(Note3)

| Parameter | Symbol | Rating | Unit |
|---|----------|--------|------|
| Drain-Source Voltage | V_{DS} | 20 | V |
| Gate-Source Voltage | V_{GS} | ±10 | V |
| Drain Current ($T_C=25^\circ\text{C}$) | I_D | 60 | A |
| Drain Current ($T_C=100^\circ\text{C}$) | I_D | 42 | A |
| Pulsed Drain Current ^(Note 1) | I_{DM} | 210 | A |
| Total Power Dissipation ($T_C=25^\circ\text{C}$) | P_D | 35 | W |
| Total Power Dissipation ($T_C=100^\circ\text{C}$) | P_D | 18 | W |
| Single Pulsed Avalanche Energy ^(Note2) | E_{AS} | 195 | mJ |

Note:

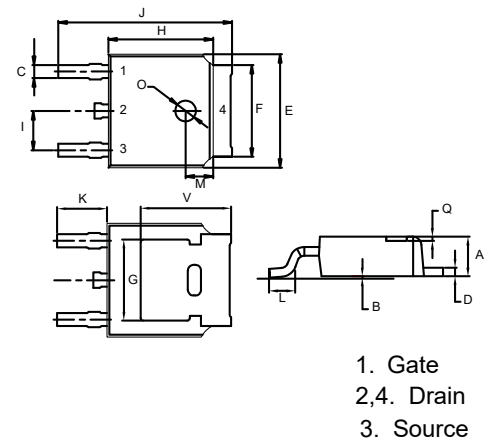
1. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
2. $T_J=25^\circ\text{C}$, $V_{DD}=15\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$
3. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder 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 in 2 pad of 2oz copper.

Internal Structure and Marking Code



N-CHANNEL MOSFET

DPAK(TO-252)



| DIM | DIMENSIONS | | | | NOTE |
|-----|------------|-------|------|-------|------|
| | INCHES | | MM | | |
| | 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 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 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 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=20A$ | | 4.5 | 6.0 | m Ω |
| | | $V_{GS}=2.5V, I_D=15A$ | | 5.5 | 8.8 | m Ω |
| | | $V_{GS}=1.8V, I_D=10A$ | | 8.0 | 14 | m Ω |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=10V, V_{GS}=0V, f=1MHz$ | | 2450 | | pF |
| Output Capacitance | C_{oss} | | | 430 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 205 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}=4.5V, V_{DD}=10V, I_D=10A, R_L=1\Omega, R_{GEN}=3\Omega$ | | 12 | | ns |
| Turn-On Rise Time | t_r | | | 26 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 35 | | |
| Turn-Off Fall Time | t_f | | | 10 | | |
| Total Gate Charge | Q_g | $V_{DS}=10V, V_{GS}=4.5V, I_D=15A$ | | 65 | | nC |
| Gate-Source Charge | Q_{gs} | | | 15 | | |
| Gate-Drain Charge | Q_{gd} | | | 13 | | |
| Body Diode Characteristics | | | | | | |
| Diode Forward Current | I_S | | | | 60 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=20A$ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $I_F=15A, di/dt=100A/\mu s$ | | 35 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | | 39 | |

Curve Characteristics

Fig. 1 - Output Characteristics

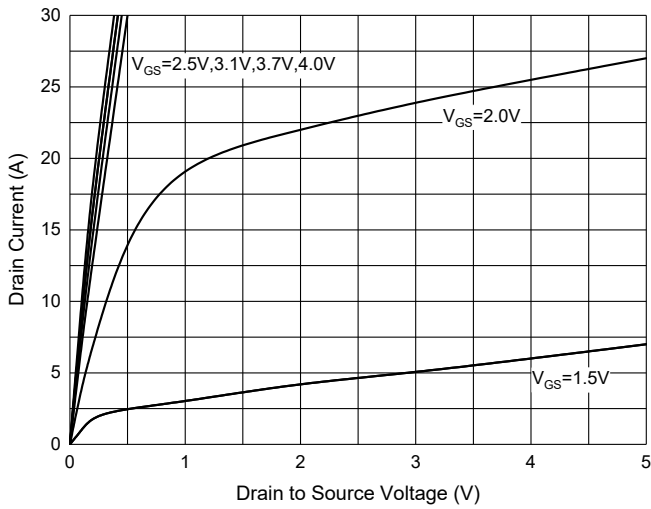


Fig. 2 - Transfer Characteristics

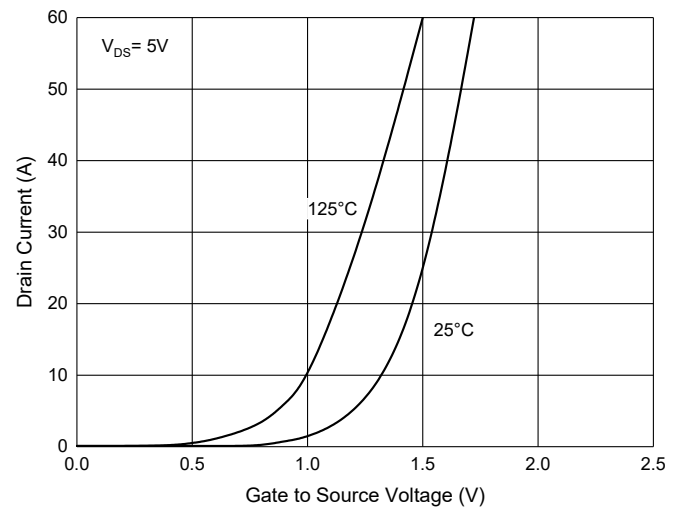


Fig. 3 - Capacitance Characteristics

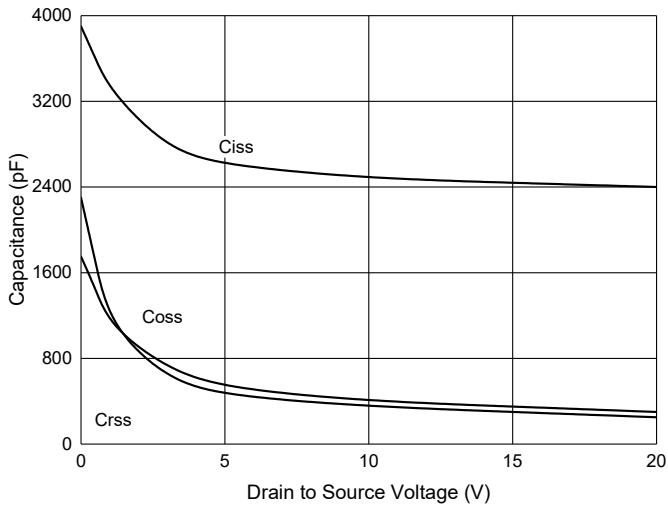


Fig. 4 - Gate Charge

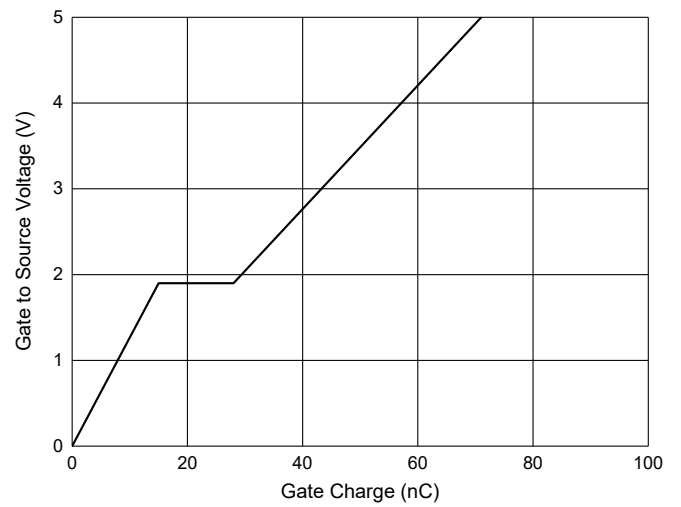


Fig. 5 - $R_{DS(ON)} - I_D$

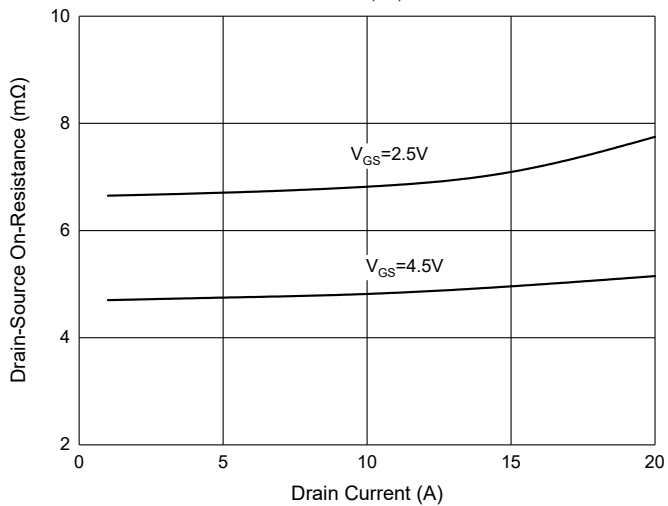
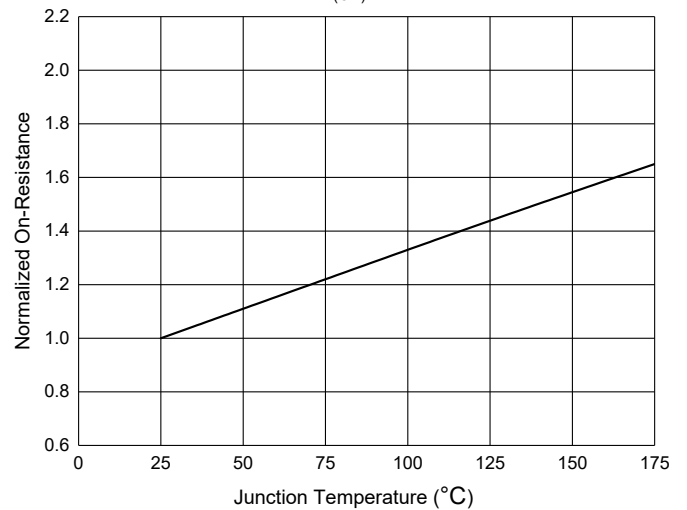


Fig. 6 - $R_{DS(ON)} - \text{Temperature}$



Ordering Information

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

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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