

Features

- Trench Power LV MOSFET Technology
- Excellent Package for Heat Dissipation
- High Density Cell Design for Low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

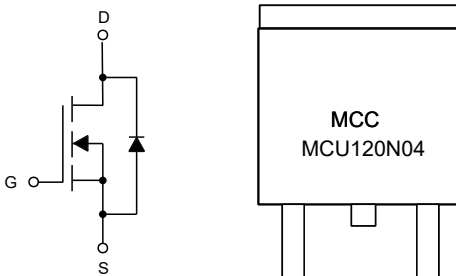
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 20°C/W Junction to Ambient
- Thermal Resistance: 2.5°C/W Junction to Case

| Parameter | Symbol | Rating | Unit |
|-----------------------------------------------|----------|--------|------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | I_D | 120 | A |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | 390 | A |
| Total Power Dissipation ⁽²⁾ | P_D | 110 | W |
| Single Pulsed Avalanche Energy ⁽³⁾ | E_{AS} | 272 | mJ |

Note:

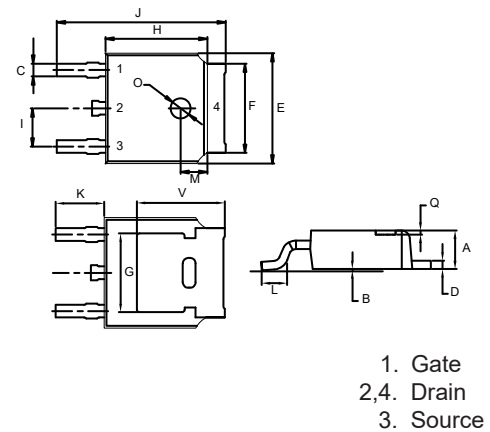
1. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.
2. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. $T_J=25^\circ\text{C}$, $V_{DD}=40\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$.

Internal Structure and Marking Code



N-CHANNEL MOSFET

DPAK(TO-252)



| 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 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 40 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=40V, V_{GS}=0V$ | | | 1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | 1.5 | 2.5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=15A$ | | 2.8 | 3.5 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | | 4 | 4.8 | m Ω |
| Gate Resistance | R_g | f=1MHz, Open drain | | 3.1 | | Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | | | | 120 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=15A$ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $I_S=20A, dI_F/dt=100A/\mu s$ | | 22.3 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 7.4 | | nC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=20V, V_{GS}=0V, f=1MHz$ | | 4645 | | pF |
| Output Capacitance | C_{oss} | | | 436 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 360 | | |
| Total Gate Charge | Q_g | $V_{DS}=20V, V_{GS}=10V, I_D=20A$ | | 102 | | nC |
| Gate-Source Charge | Q_{gs} | | | 15.8 | | |
| Gate-Drain Charge | Q_{gd} | | | 21.9 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}=20V, V_{GEN}=10V, R_G=3\Omega, I_{DS}=20A$ | | 12 | | ns |
| Turn-On Rise Time | t_r | | | 54 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 120 | | |
| Turn-Off Fall Time | t_f | | | 80 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

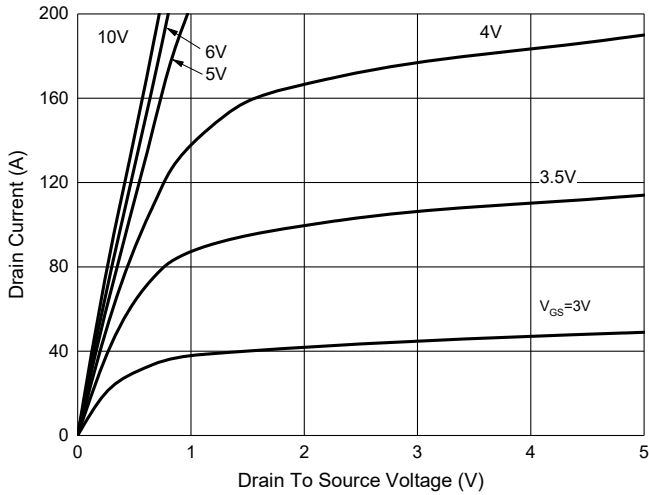


Fig. 2 - Transfer Characteristics

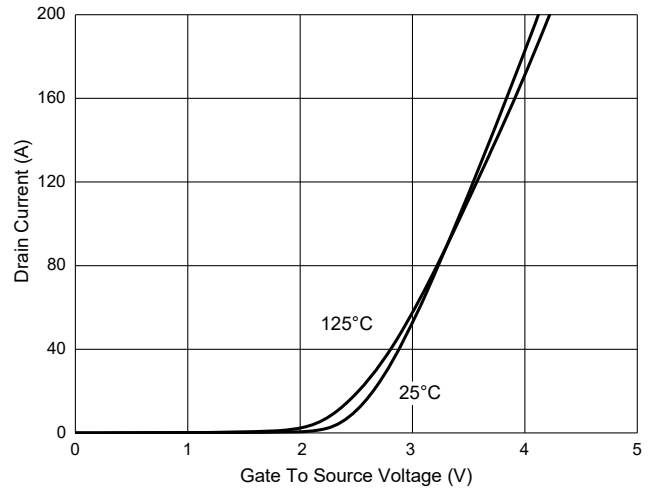


Fig. 3 - $R_{DS(ON)} - I_D$

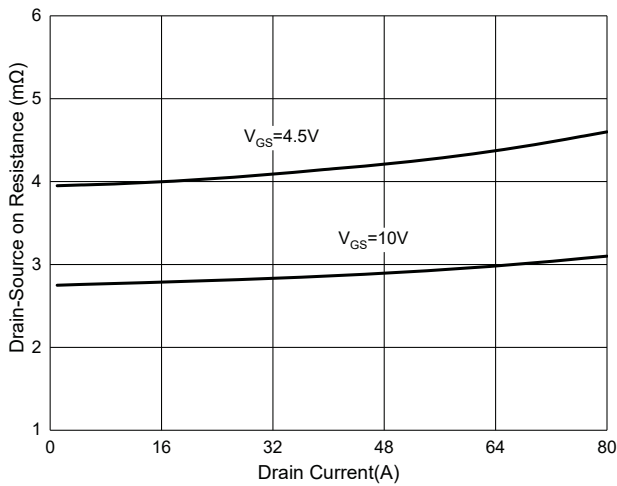


Fig. 4 - Normalized On Resistance Characteristics

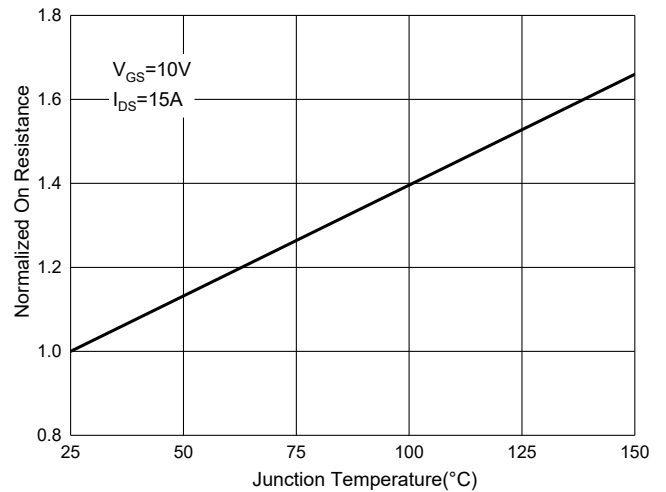


Fig. 5 - Capacitance Characteristics

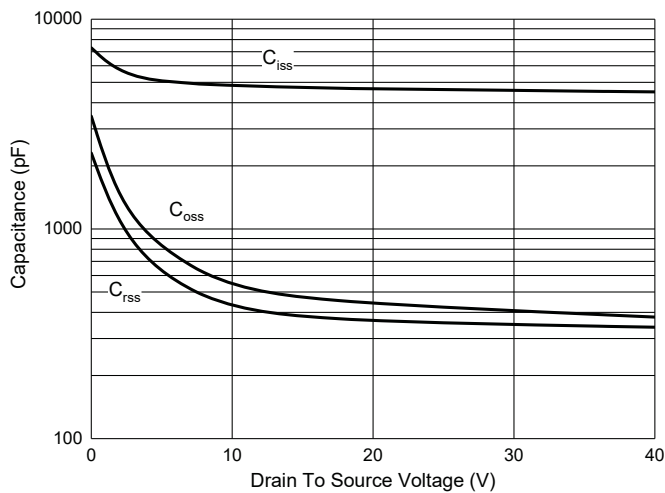
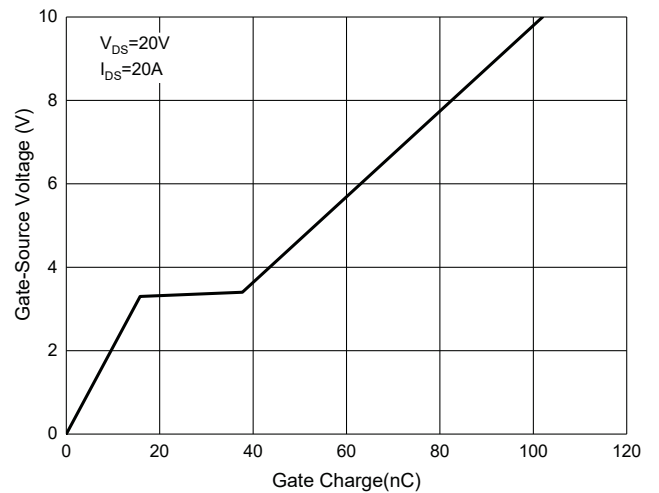


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Safe Operation Area

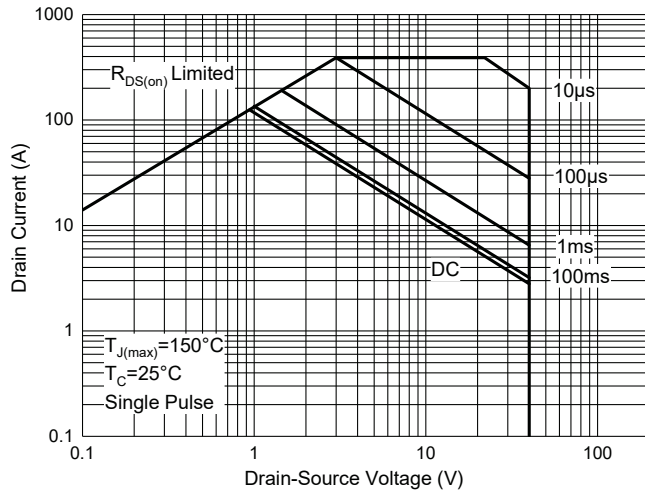
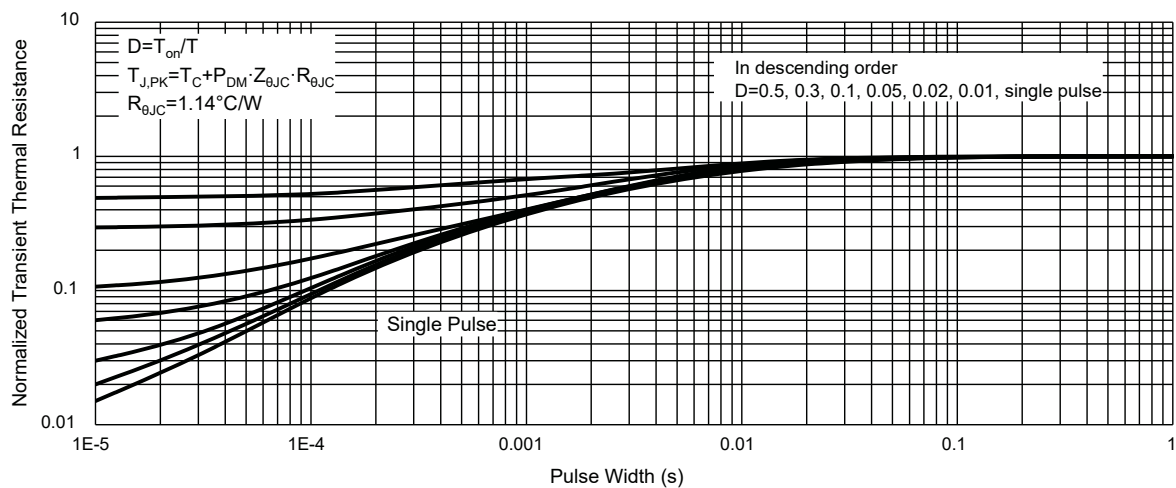


Fig. 8 - Normalized Maximum Transient Thermal Impedance



Ordering Information

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

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

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