

Features

- Split Gate Trench 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 ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

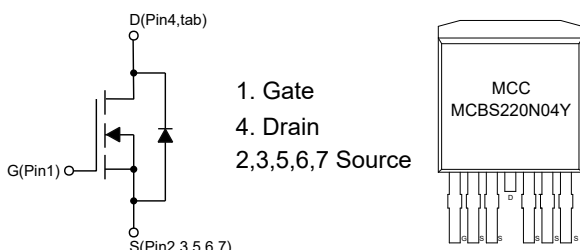
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance:40°C/W Junction to Ambient^(Note2)
- Thermal Resistance:0.8°C/W Junction to Case

| Parameter | Symbol | Rating | Unit |
|--|----------|-------------------------|------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | I_D | $T_C=25^\circ\text{C}$ | 220 |
| | | $T_C=100^\circ\text{C}$ | 156 |
| Pulsed Drain Current ^(Note3) | I_{DM} | 880 | A |
| Total Power Dissipation ^(Note4) | P_D | 188 | W |
| Avalanche Energy ^(Note5) | E_{AS} | 760 | mJ |

Note:

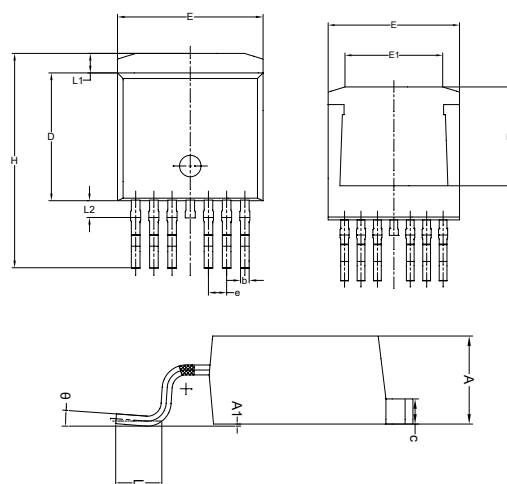
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} t \leq 10\text{s}$ and the maximum allowed junction temperature of 175°C. The value in any given application depends on the user's specific board design.
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. $T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $L=1\text{mH}$

Internal Structure and Marking Code

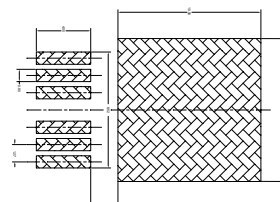


N-CHANNEL MOSFET

TO-263-7



| DIM | DIMENSIONS | | | | NOTE |
|----------|------------|-------|-------|-------|------|
| | INCHES | | MM | | |
| | MIN | MAX | MIN | MAX | |
| A | 0.167 | 0.183 | 4.24 | 4.64 | |
| A1 | 0.000 | 0.010 | 0.00 | 0.25 | |
| b | 0.020 | 0.035 | 0.50 | 0.90 | |
| c | 0.045 | 0.055 | 1.15 | 1.40 | |
| D | 0.347 | 0.364 | 8.82 | 9.25 | |
| D1 | 0.270 | | 6.86 | | |
| E | 0.392 | 0.408 | 9.96 | 10.36 | |
| E1 | 0.256 | 0.310 | 6.50 | 7.89 | |
| e | 0.050 | | 1.27 | | TYP. |
| H | 0.575 | 0.625 | 14.61 | 15.88 | |
| L | 0.070 | 0.110 | 1.78 | 2.79 | |
| L1 | 0.039 | 0.056 | 0.98 | 1.42 | |
| L2 | | 0.070 | | 1.78 | |
| θ | | | 0° | 8° | |



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 | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | 3.1 | 4.0 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$ | | 0.85 | 1.1 | m Ω |
| | | $V_{GS}=6V, I_D=20A$ | | 2 | 2.6 | |
| Gate Resistance | R_g | f=1 MHz, Open drain | | 1.1 | | Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | | | | 220 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=30A$ | | | 1.3 | V |
| Reverse Recovery Time | t_{rr} | $I_S=50A, di/dt=100A/\mu s$ | | 71 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 96 | | nC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V, f=1MHz$ | | 7967 | | pF |
| Output Capacitance | C_{oss} | | | 2402 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 277 | | |
| Total Gate Charge | Q_g | $V_{DS}=20V, V_{GS}=10V, I_D=50A$ | | 132 | | nC |
| Gate-Source Charge | Q_{gs} | | | 38 | | |
| Gate-Drain Charge | Q_{gd} | | | 43 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=20V, V_{GS}=10V, R_G=4.7\Omega, I_{DS}=50A$ | | 32 | | ns |
| Turn-On Rise Time | t_r | | | 153 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 47 | | |
| Turn-Off Fall Time | t_f | | | 70 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

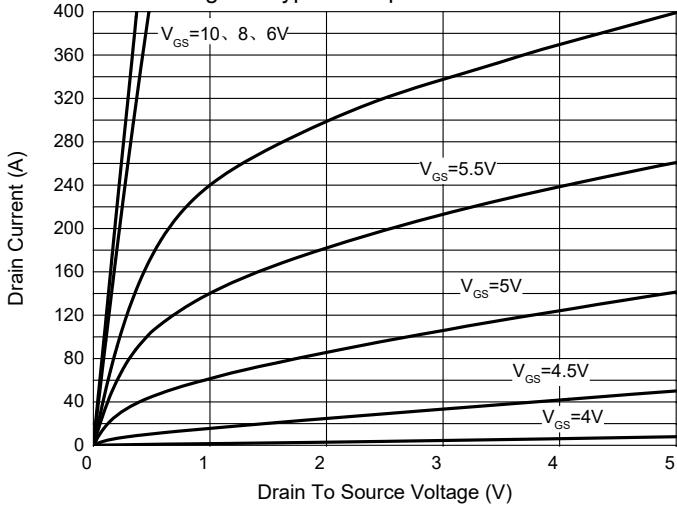


Fig. 2 - Transfer Characteristics

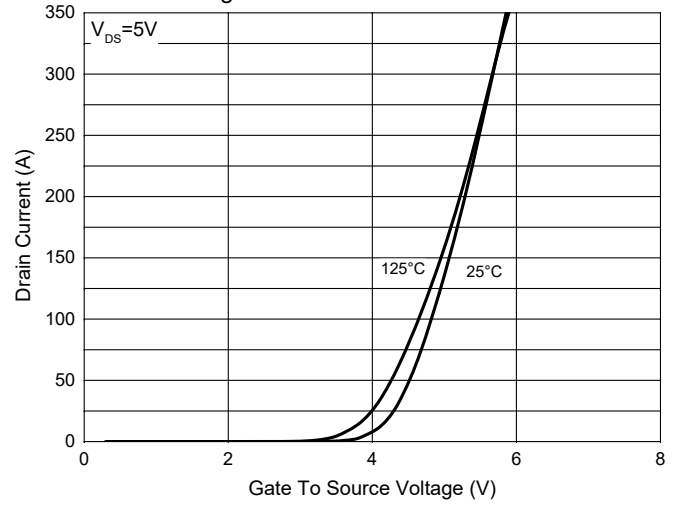


Fig. 3 - $R_{DS(ON)} - V_{GS}$

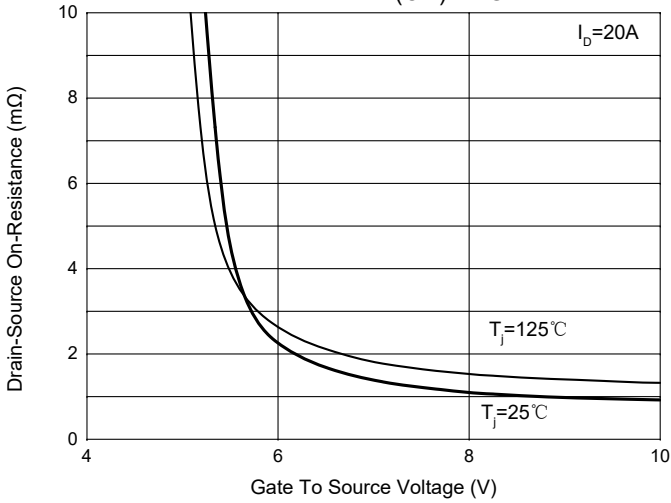


Fig. 4 - $R_{DS(ON)} - I_D$

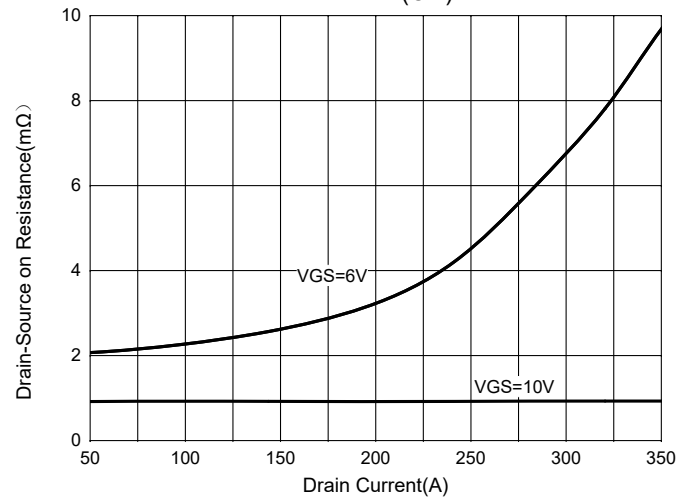


Fig. 5 - Capacitance Characteristics

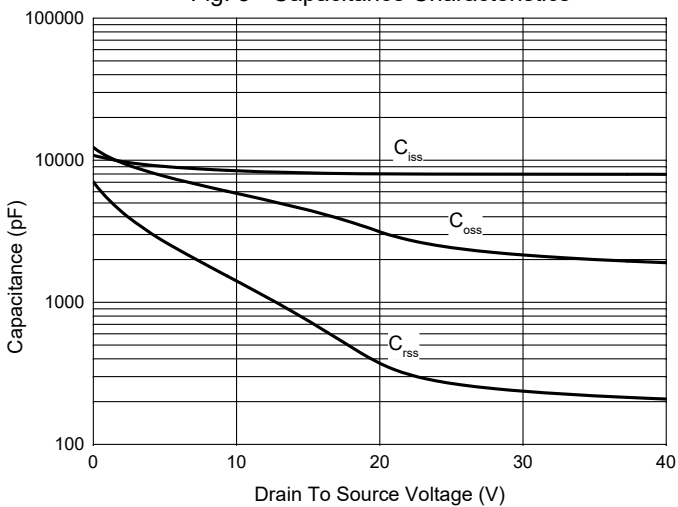
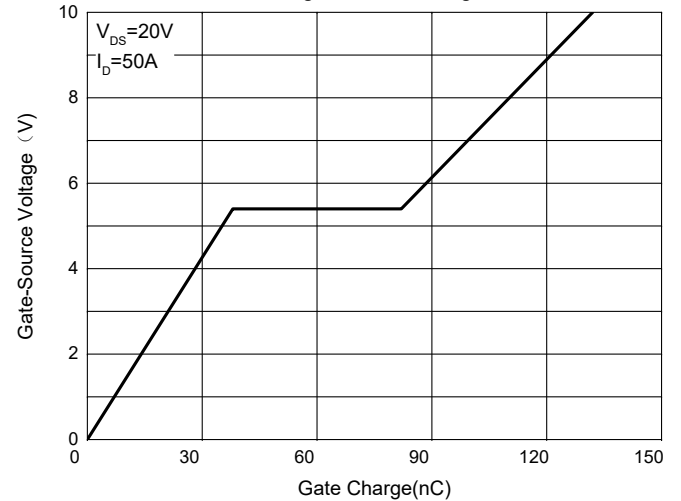


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

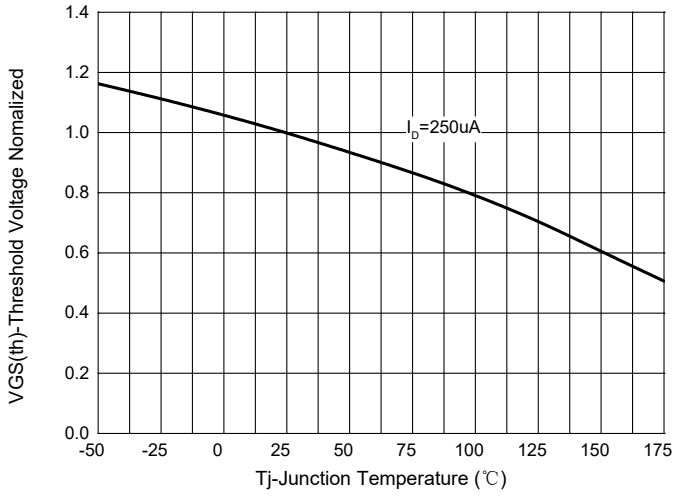


Fig.8-Normalized On Resistance Characteristics

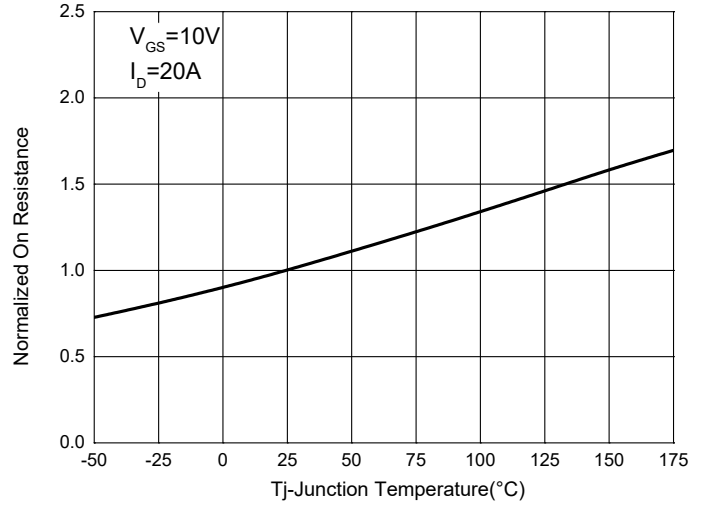


Fig.9- I_S—V_{SD}

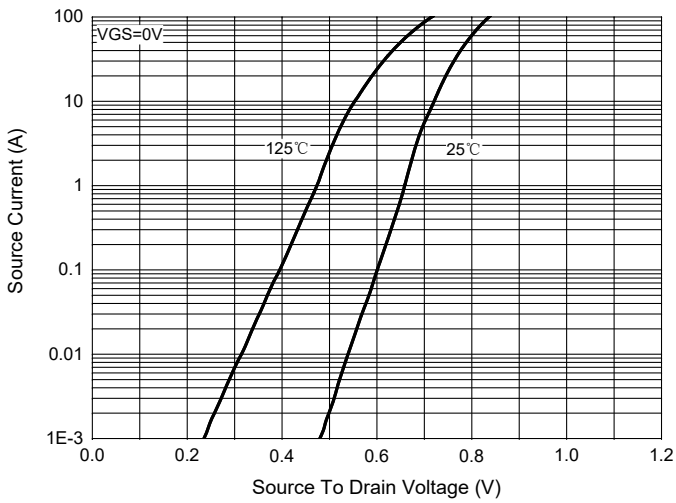


Fig. 10 - Drain Current

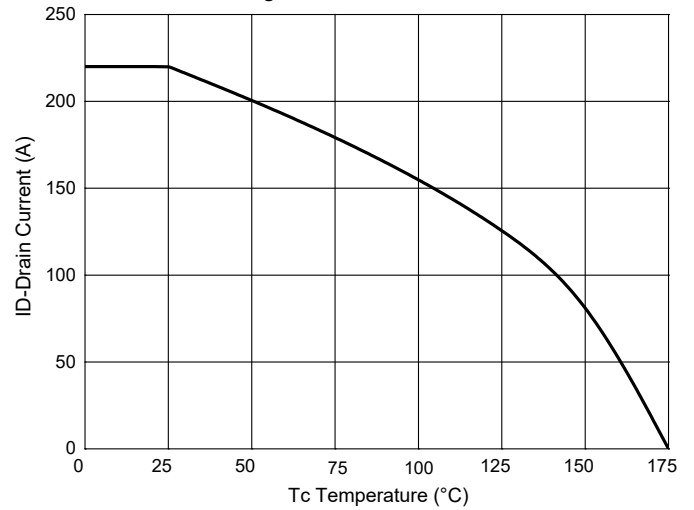
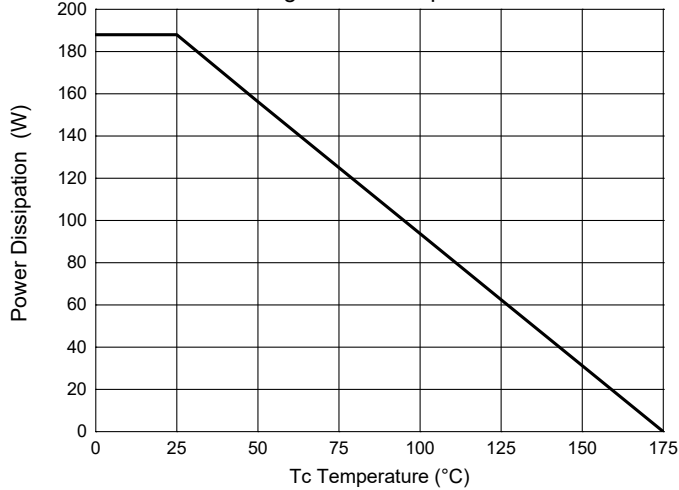


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

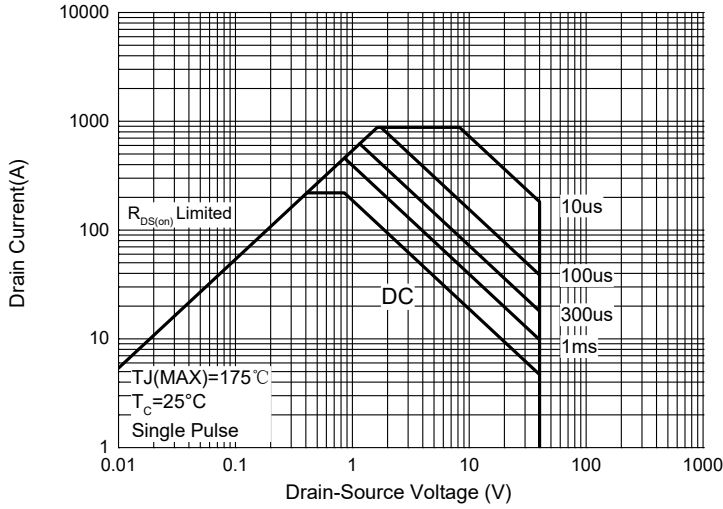
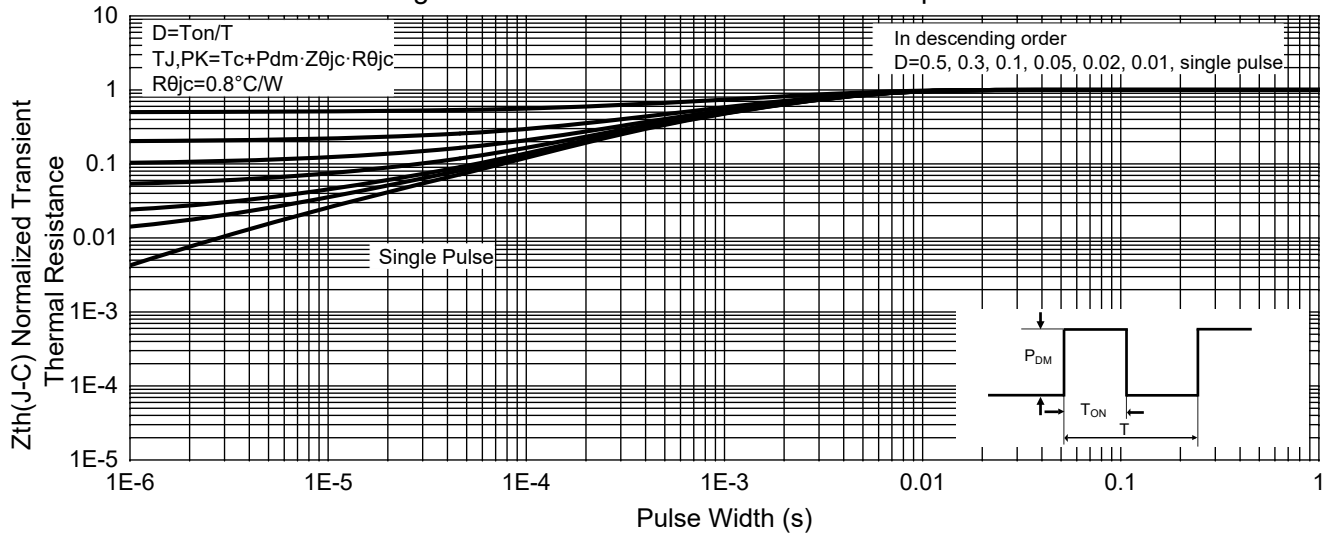


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

| Device | Packing |
|----------------|------------------------|
| Part Number-TP | Tape&Reel: 800pcs/Reel |

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