



THE DATASHEET OF MCU20N10-TP



Features

- Trench Power LV MOSFET Technology
- 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

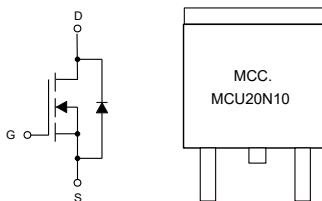
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 40°C/W Junction to ambient^(Note2)
- Thermal Resistance: 1.6°C/W Junction to Case

| Parameter | | Symbol | Rating | Unit |
|---|-------------------------|----------|--------|------|
| Drain-Source Voltage | | V_{DS} | 100 | V |
| Gate-Source Voltage | | V_{GS} | ±20 | V |
| Continuous Drain Current | $T_C=25^\circ\text{C}$ | I_D | 20 | A |
| | $T_C=100^\circ\text{C}$ | | 13 | |
| Pulsed Drain Current ^(Note2) | | I_{DM} | 80 | A |
| Total Power Dissipation ^(Note4) | | P_D | 78 | W |
| Single Pulsed Avalanche Energy ^(Note5) | | EAS | 10 | mJ |

Note:

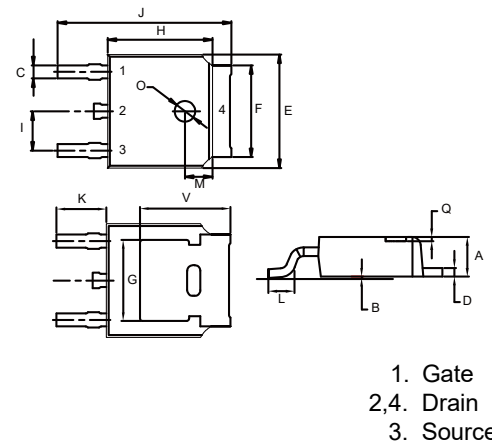
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
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. $T_J=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $L=0.5\text{mH}$

⚠️ Warning: This device is not to be used in applications where failure could result in death or serious injury.



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 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 100 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=100V, V_{GS}=0V$ | | | 1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.1 | 1.8 | 3.0 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=10A$ | | 43 | 48 | m Ω |
| | | $V_{GS}=4.5V, I_D=8A$ | | 45 | 53 | |
| Gate Resistance | R_g | F=1 MHz, Open drain | | 1.1 | | Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | | | | 20 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=10A$ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | IF=10A, di/dt=100A/ μs | | 32 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 43 | | nC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=50V, V_{GS}=0V, f=1MHz$ | | 2097 | | pF |
| Output Capacitance | C_{oss} | | | 57 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 52 | | |
| Total Gate Charge | Q_g | $V_{DS}=50V, V_{GS}=10V, I_D=10A$ | | 52 | | nC |
| Gate-Source Charge | Q_{gs} | | | 5.3 | | |
| Gate-Drain Charge | Q_{gd} | | | 12.2 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}=10V, V_{DD}=50V,$ $R_{GEN}=3\Omega, I_D=10A$ | | 9 | | ns |
| Turn-On Rise Time | t_r | | | 5.4 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 42.3 | | |
| Turn-Off Fall Time | t_f | | | 7 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

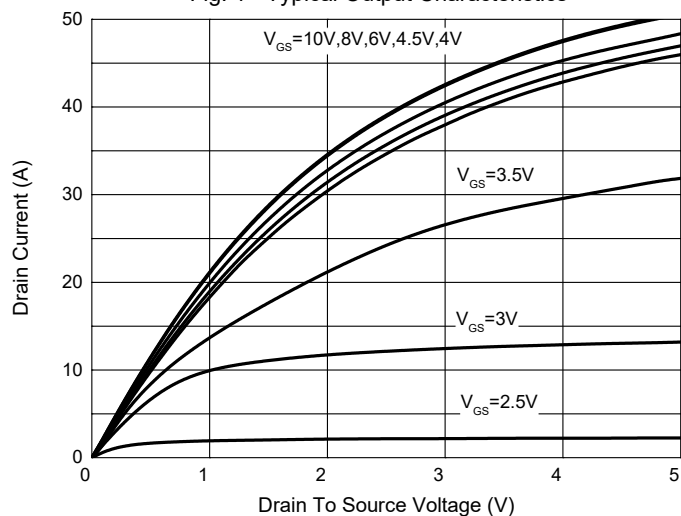


Fig. 2 - Transfer Characteristics

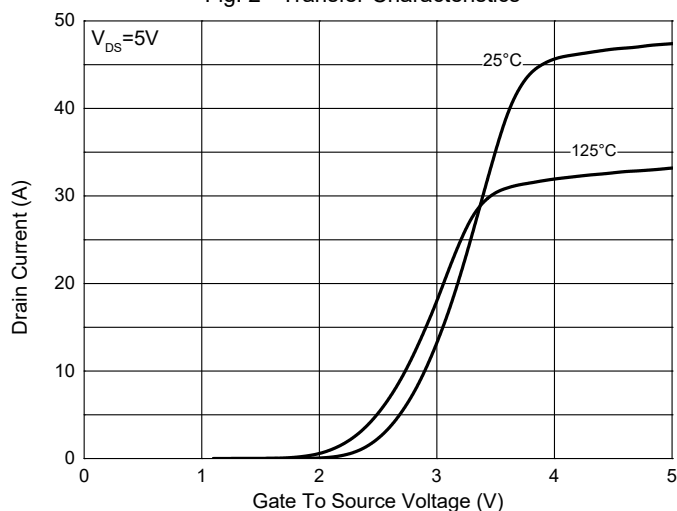


Fig. 3 - $R_{DS(ON)} - V_{GS}$

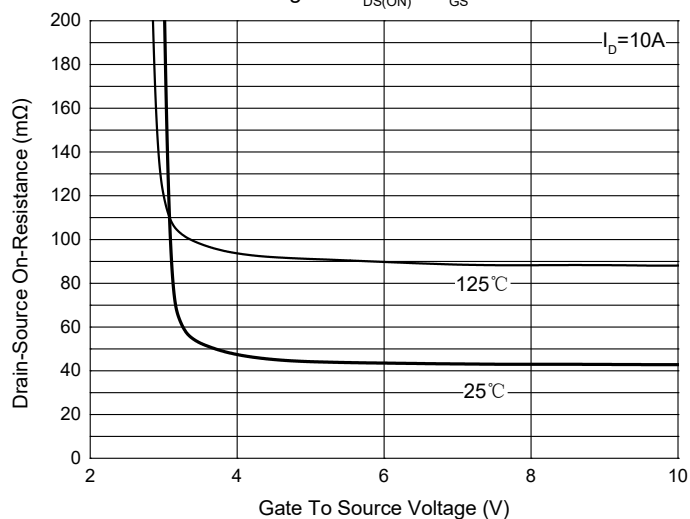


Fig. 4 - $R_{DS(ON)} - I_D$

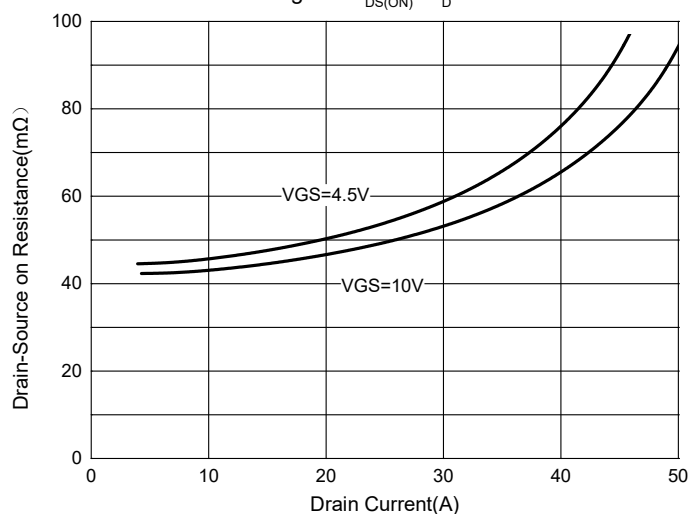


Fig. 5 - Capacitance Characteristics

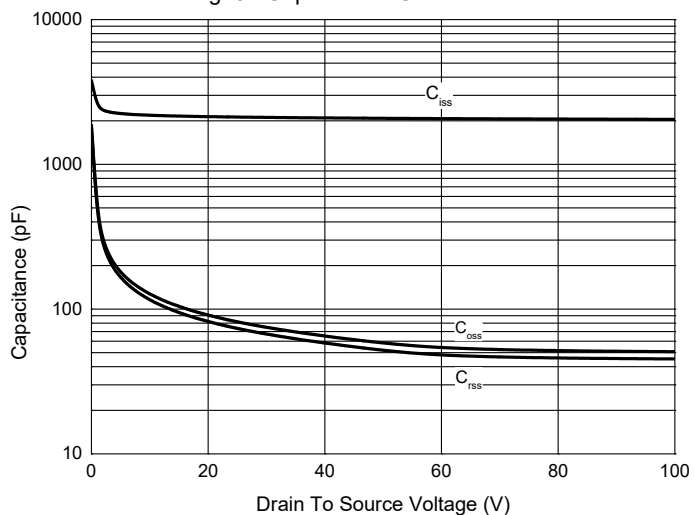
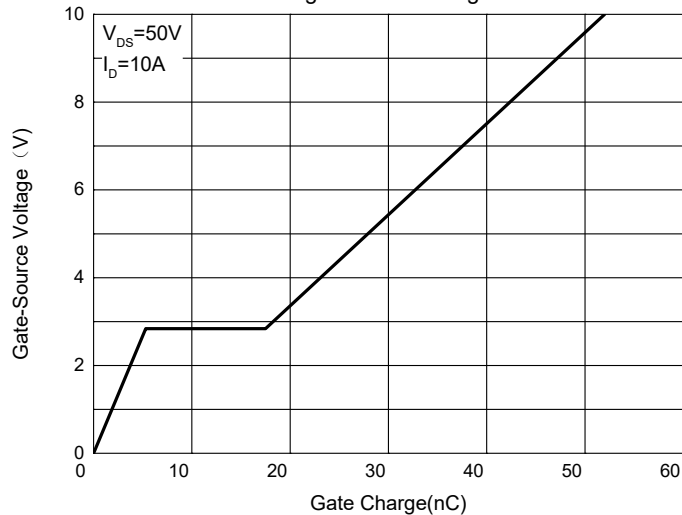


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

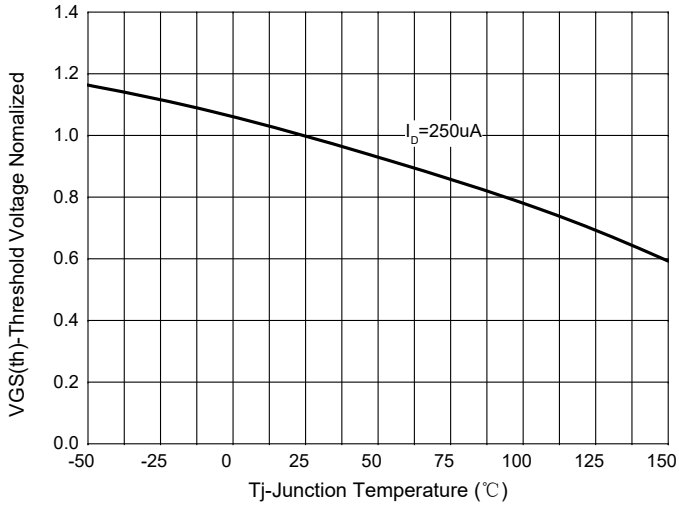


Fig.8-Normalized On Resistance Characteristics

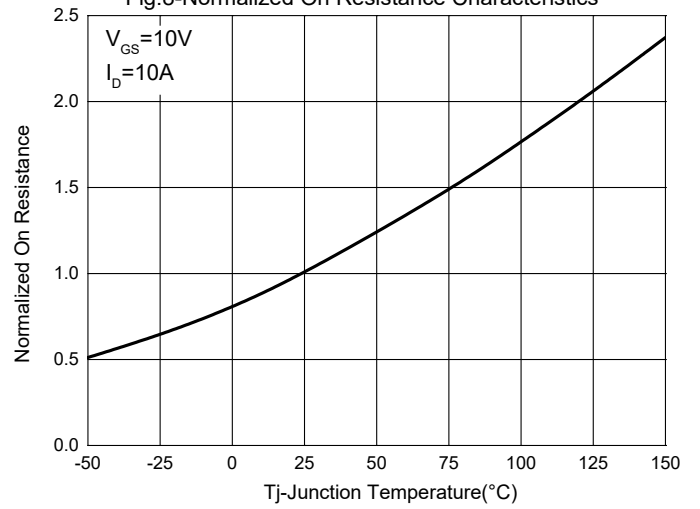


Fig.9 - $I_s - V_{SD}$

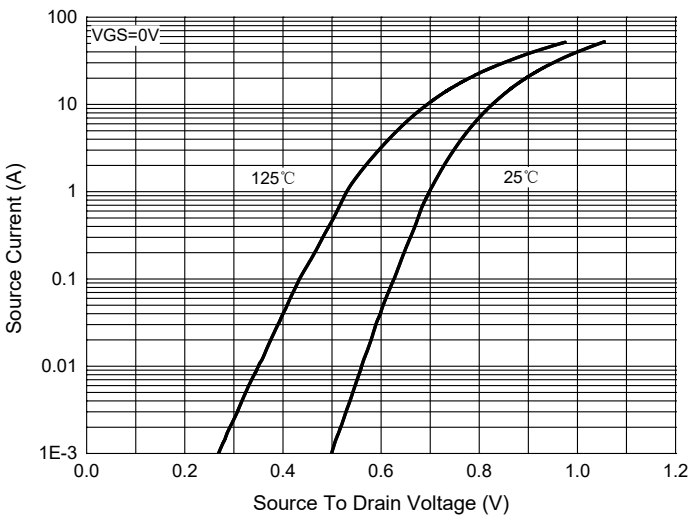


Fig. 10 - Drain Current

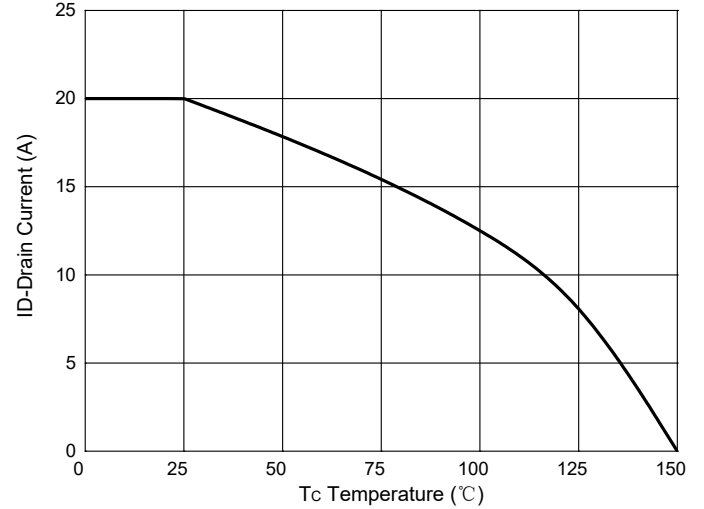
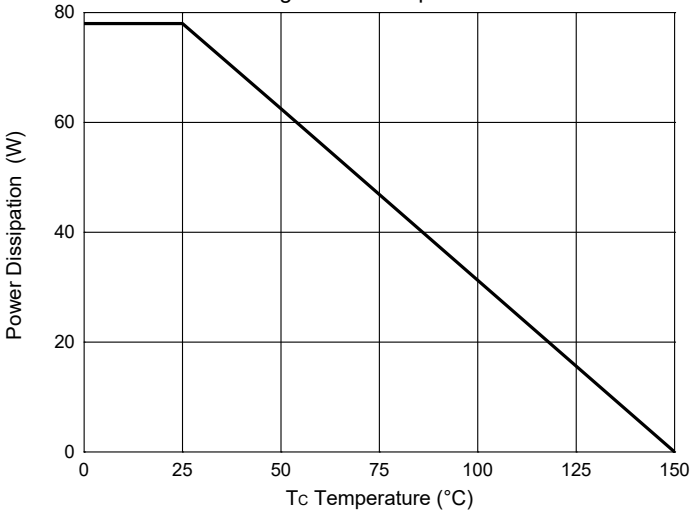


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

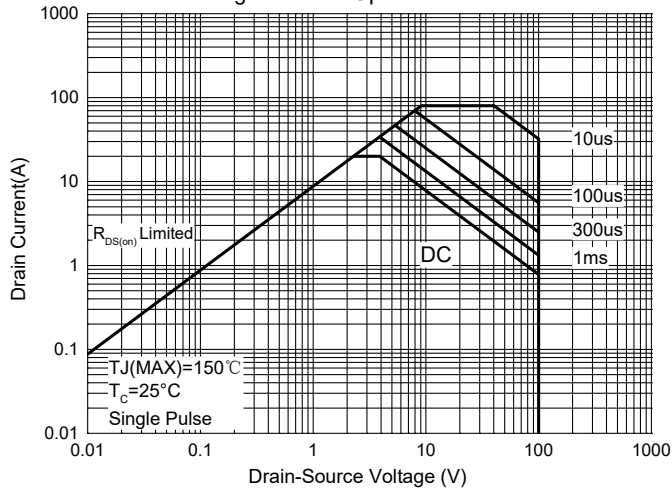
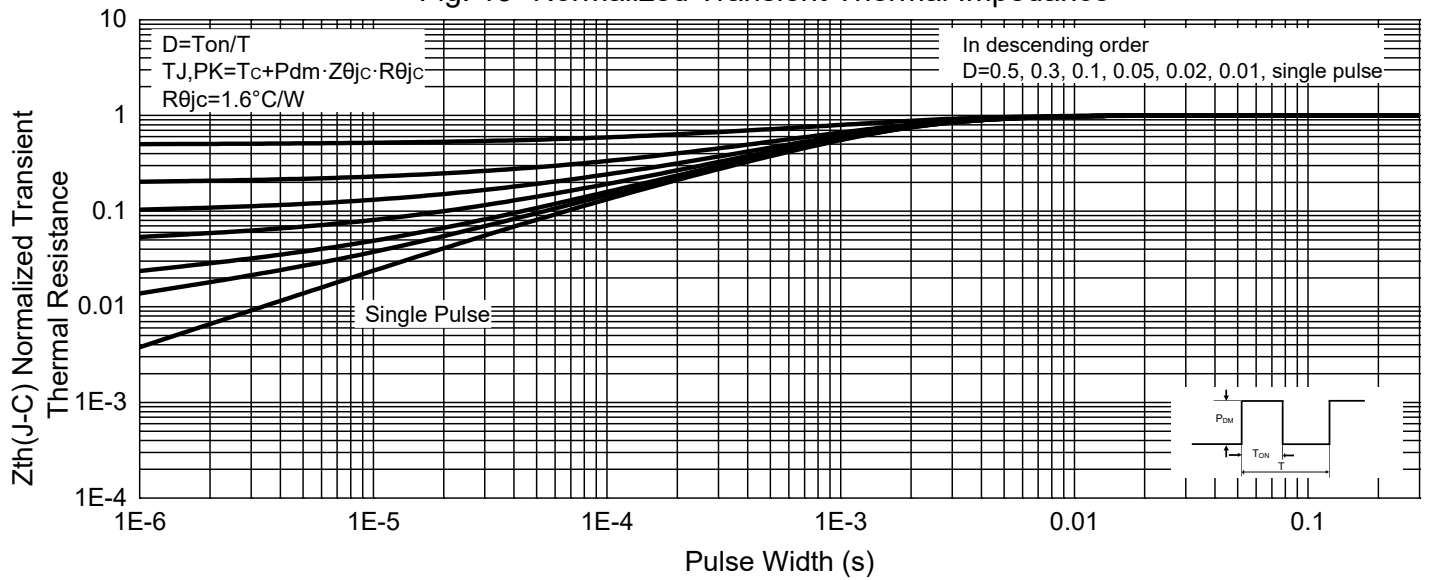


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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

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