

Features

- High Density Cell Design for Ultra Low $R_{DS(on)}$
- Fully Characterized Avalanche Voltage and Current
- Excellent Package for Good 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

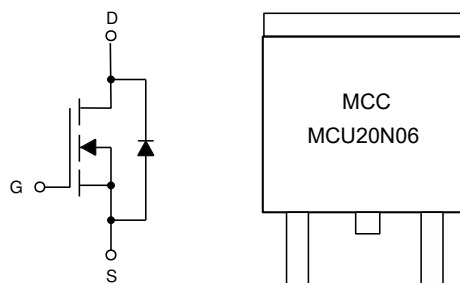
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 60°C/W Junction to Ambient^(Note2)
- Thermal Resistance: 3.1°C/W Junction to Case

| Parameter | | Symbol | Rating | Unit |
|---|-----------------------|-----------------|--------|------|
| Drain-Source Voltage | | V _{DS} | 60 | V |
| Gate-Source Voltlage | | V _{GS} | ±20 | V |
| Continuous Drain Current | T _C =25°C | I _D | 20 | A |
| | T _C =100°C | | 12.6 | |
| Pulsed Drain Current ^(Note3) | | I _{DM} | 60 | A |
| Total Power Dissipation ^(Note4) | | P _D | 40 | W |
| Single Pulse Avalanche Energy ^(Note 5) | | E _{AS} | 30 | mJ |

Note:

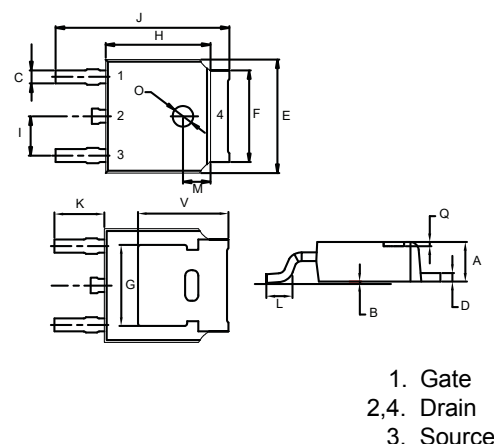
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} t \leq 10\text{s}$ and the maximum allowed junction temperature of 150°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. $T_J = 25^\circ\text{C}$, $V_{DD} = 40\text{V}$, $R_G = 25\Omega$, $L = 0.5\text{mH}$.

Internal Structure and Marking Code



N-CHANNEL MOSFET

DPAK(TO-252)



| DIMENSIONS | | | | | |
|------------|--------|-------|------|-------|------|
| 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 =250μA | 60 | | | V |
| Gate-Source Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | | | 1 | μA |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 1 | 1.5 | 3 | V |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =20A | | 23 | 45 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | | 25 | 47 | |
| Gate Resistance | R _g | F=1 MHz, Open drain | | 1.6 | | Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I _S | | | | 20 | A |
| Diode Forward Voltage | V _{SD} | V _{GS} =0V, I _S =20A | | | 1.2 | V |
| Reverse Recovery Time | t _{rr} | I _F =20A, dI _F /dt=100A/μs | | 23.5 | | ns |
| Reverse Recovery Charge | Q _{rr} | | | 17.5 | | nC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =30V,V _{GS} =0V,f=1MHz | | 1117 | | pF |
| Output Capacitance | C _{oss} | | | 69 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 56 | | |
| Total Gate Charge | Q _g | V _{DS} =48V,V _{GS} =10V,I _D =15A | | 24.5 | | nC |
| Gate-Source Charge | Q _{gs} | | | 2.8 | | |
| Gate-Drain Charge | Q _{gd} | | | 6.3 | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} =30V, V _{GS} =10V, I _{DS} =2A,R _G =3Ω | | 6.4 | | ns |
| Turn-On Rise Time | t _r | | | 3.4 | | |
| Turn-Off Delay Time | t _{d(off)} | | | 24.5 | | |
| Turn-Off Fall Time | t _f | | | 4.6 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

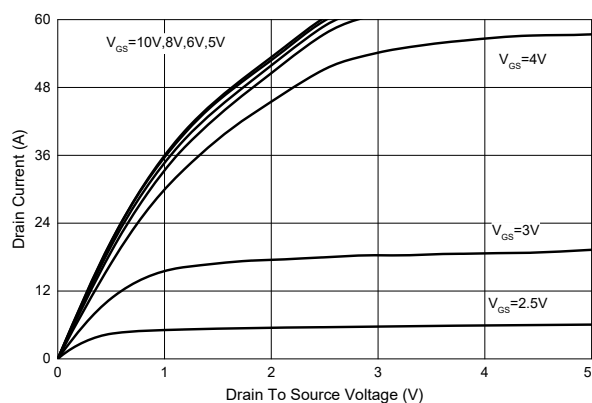


Fig. 2 - Transfer Characteristics

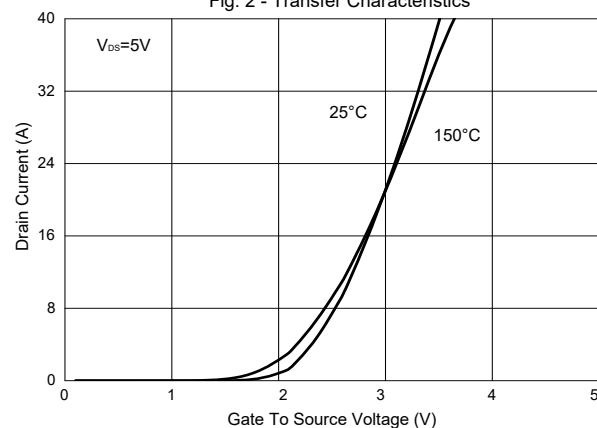


Fig. 3 - $R_{DS(ON)} - V_{GS}$

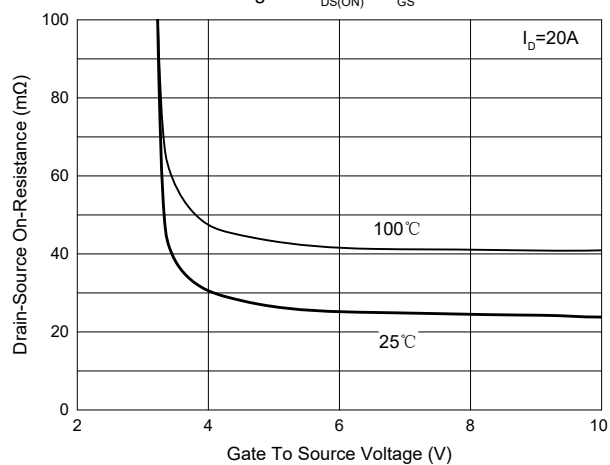


Fig. 4 - $R_{DS(ON)} - I_D$

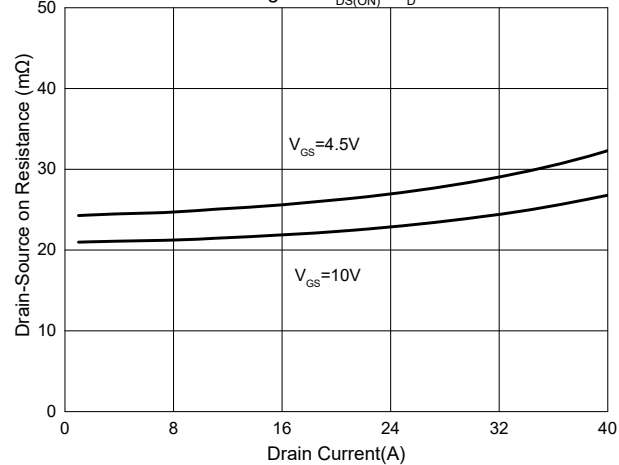


Fig. 5 - Capacitance Characteristics

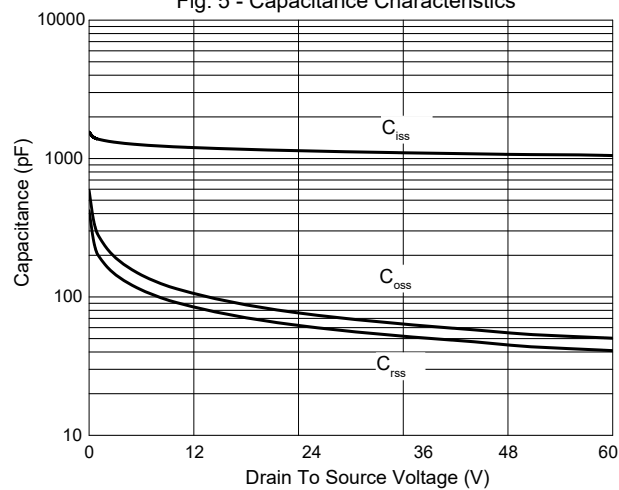
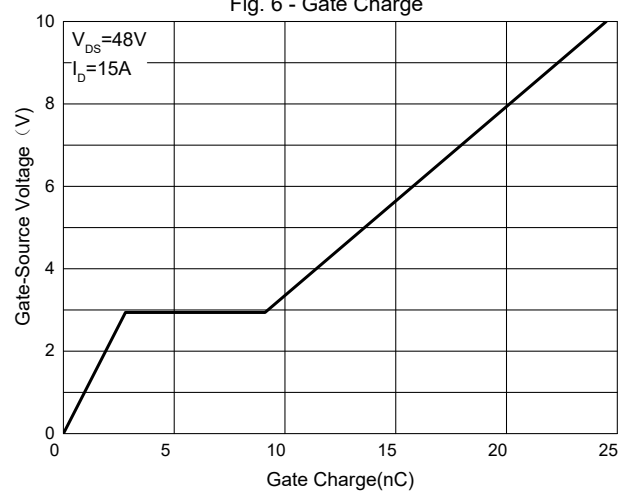


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

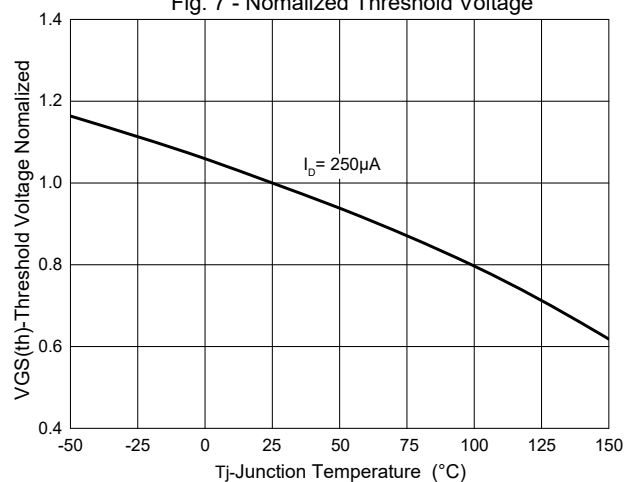


Fig. 8 - Normalized On Resistance Characteristics

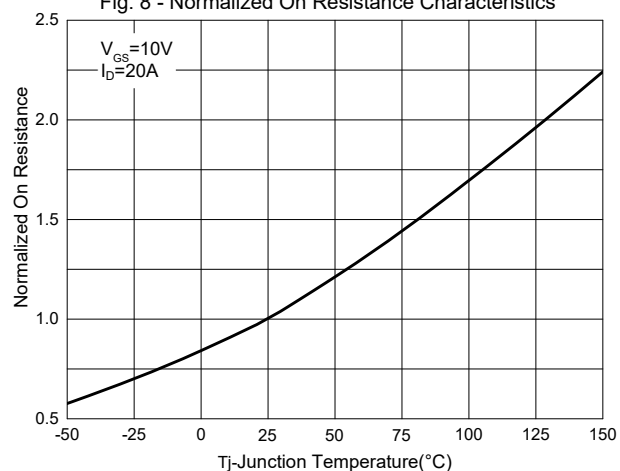


Fig. 9 - $I_S - V_{SD}$

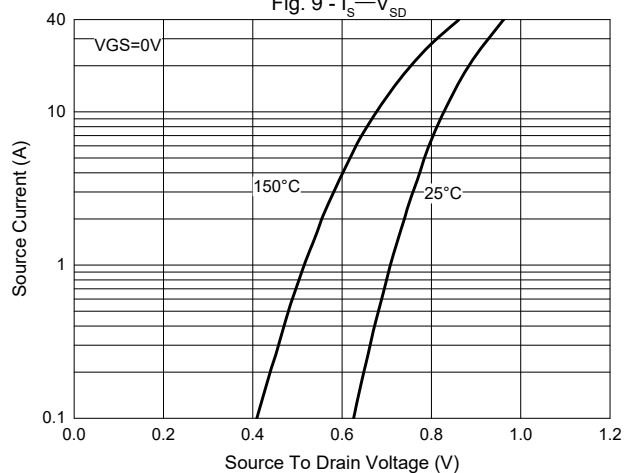


Fig. 10 - Drain Current

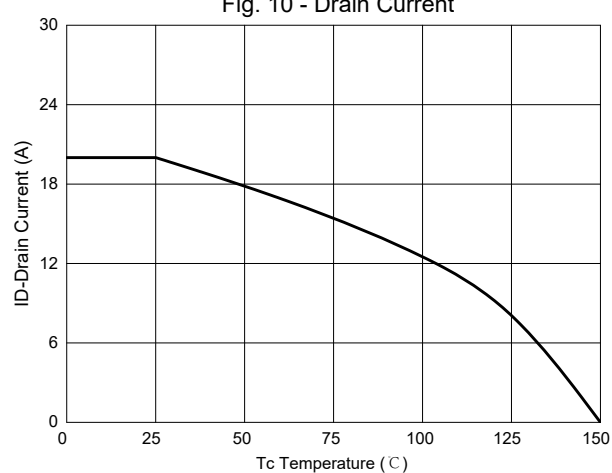
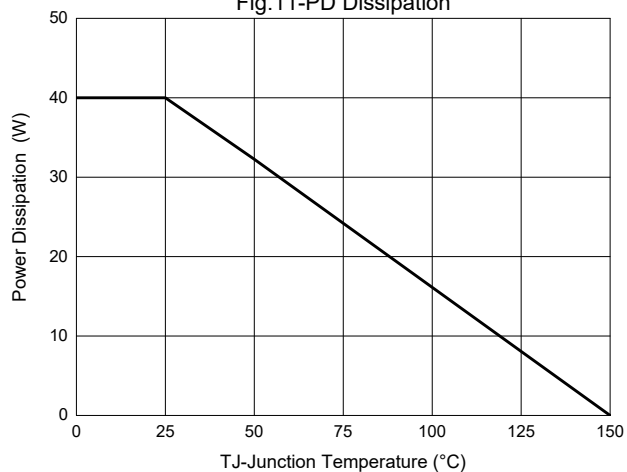


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

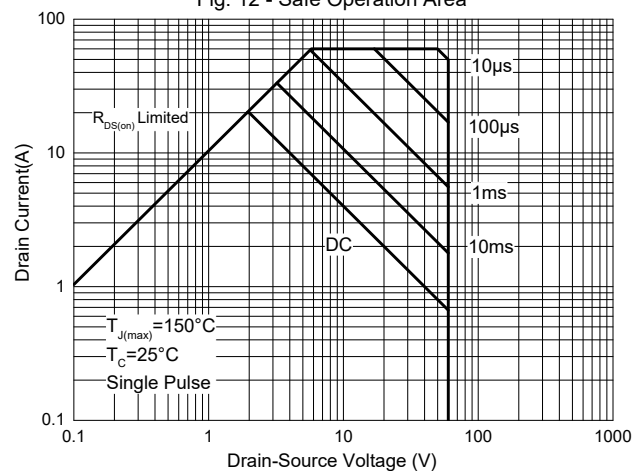
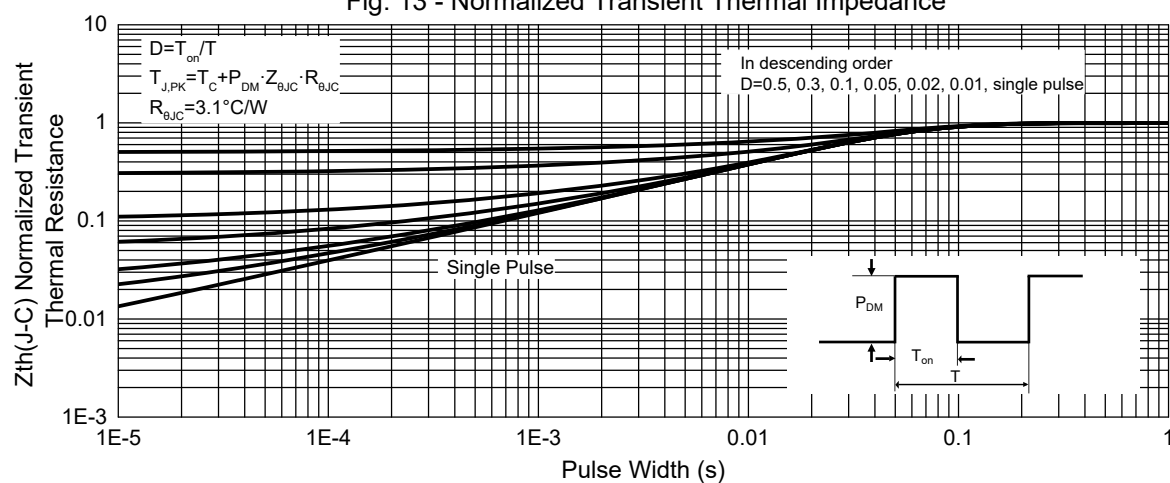


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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

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