

Features

- Very Low FOM $R_{DS(on)} \times Q_g$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

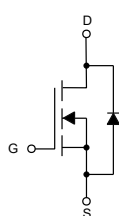
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 62.5°C/W Junction to Ambient^(Note2)
- Thermal Resistance: 1.5°C/W Junction to Case

| Parameter | Symbol | Rating | Unit |
|--|----------|-------------------------|------|
| Drain-Source Voltage | V_{DS} | 650 | V |
| Gate-Source Voltage | V_{GS} | ±30 | V |
| Continuous Drain Current | I_D | $T_C=25^\circ\text{C}$ | 11 |
| | | $T_C=100^\circ\text{C}$ | 7 |
| Pulsed Drain Current ^(Note3) | I_{DM} | 44 | A |
| Total Power Dissipation ^(Note4) | P_D | 83 | W |
| Single Pulse Avalanche Energy ^(Note5) | E_{AS} | 142 | mJ |

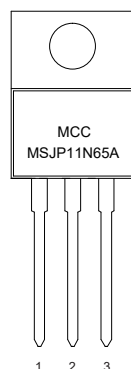
Note:

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. $T_J=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=79\text{mH}$

Internal Structure and Marking Code

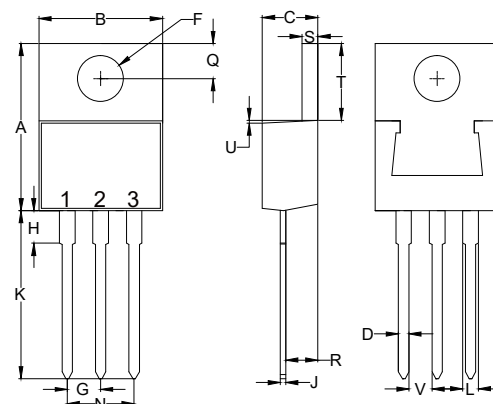


1. Gate
2. Drain
3. Source



N-CHANNEL Super-Junction Power MOSFET

TO-220



| DIM | DIMENSIONS | | | | NOTE |
|-----|------------|-------|-------|-------|------|
| | INCHES | | MM | | |
| | MIN | MAX | MIN | MAX | |
| A | 0.560 | 0.625 | 14.22 | 15.88 | |
| B | 0.380 | 0.420 | 9.65 | 10.67 | |
| C | 0.140 | 0.190 | 3.56 | 4.82 | |
| D | 0.020 | 0.045 | 0.51 | 1.14 | |
| F | 0.139 | 0.161 | 3.53 | 4.09 | Φ |
| G | 0.090 | 0.110 | 2.29 | 2.79 | |
| H | ----- | 0.250 | ----- | 6.35 | |
| J | 0.012 | 0.025 | 0.30 | 0.64 | |
| K | 0.500 | 0.580 | 12.70 | 14.73 | |
| L | 0.045 | 0.060 | 1.14 | 1.52 | |
| N | 0.190 | 0.210 | 4.83 | 5.33 | |
| Q | 0.100 | 0.135 | 2.54 | 3.43 | |
| R | 0.080 | 0.115 | 2.04 | 2.92 | |
| S | 0.045 | 0.055 | 1.14 | 1.39 | |
| T | 0.230 | 0.270 | 5.84 | 6.86 | |
| U | ----- | 0.050 | ----- | 1.27 | |
| V | 0.045 | ----- | 1.15 | ----- | |

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------|---------------|---|-----|------|-----------|----------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 650 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 30V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=650V, V_{GS}=0V$ | | | 1 | μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 3.4 | 4 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=3.2A$ | | 0.33 | 0.38 | Ω |
| Gate Resistance | R_g | $f=1MHz, \text{Open drain}$ | | 22 | | Ω |
| Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | | | | 11 | A |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=11A$ | | | 1.4 | V |
| Reverse Recovery Time | t_{rr} | $I_F=11A, di_F/dt=550A/\mu s$ | | 175 | | ns |
| Reverse Recovery Charge | Q_{rr} | | | 4.4 | | μC |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V, f=1MHz$ | | 774 | | pF |
| Output Capacitance | C_{oss} | | | 890 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 26 | | |
| Total Gate Charge | Q_g | $V_{DS}=520V, V_{GS}=10V, I_D=11A$ | | 20 | | nC |
| Gate-Source Charge | Q_{gs} | | | 3 | | |
| Gate-Drain Charge | Q_{gd} | | | 10 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}=10V, V_{DD}=320V, I_D=11A, R_G=2.2\Omega$ | | 45 | | ns |
| Turn-On Rise Time | t_r | | | 14 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 71 | | |
| Turn-Off Fall Time | t_f | | | 20 | | |

Curve Characteristics

Fig. 1 - Typical Output Characteristics

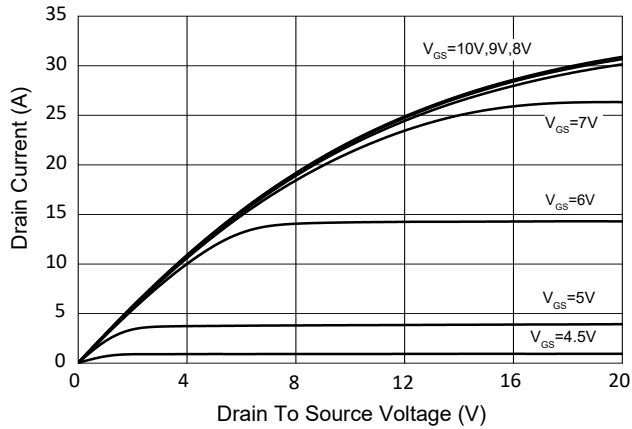


Fig.2 - Transfer Characteristic

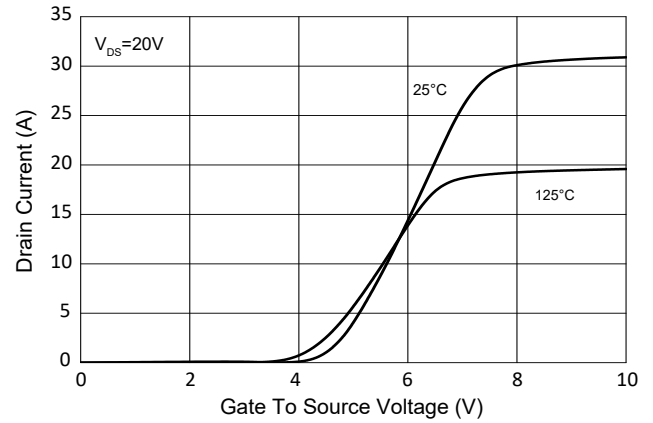


Fig.3 - $R_{DS(ON)}$ - V_{GS}

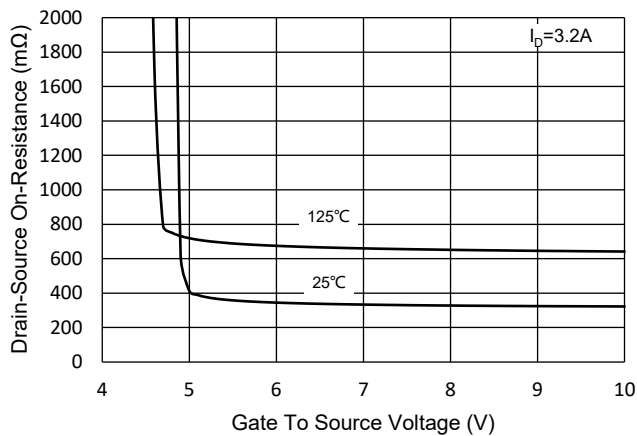


Fig.4 - $R_{DS(ON)}$ - I_D

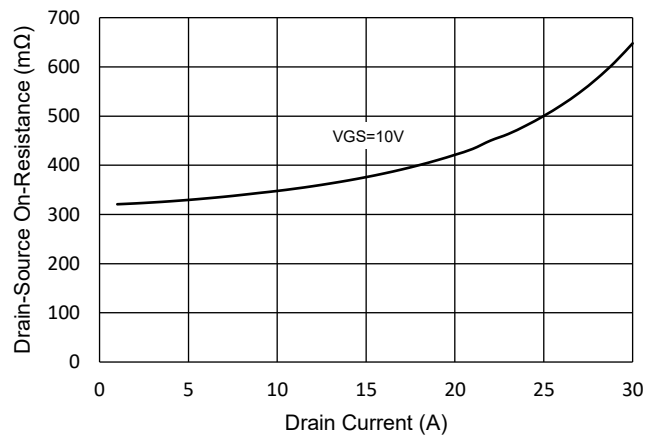


Fig.5 - Capacitance Characteristics

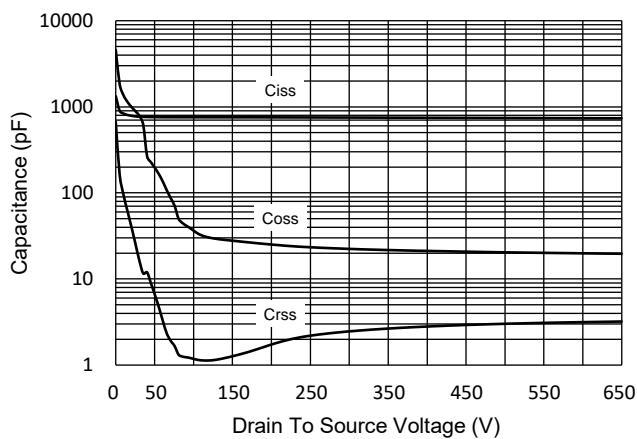
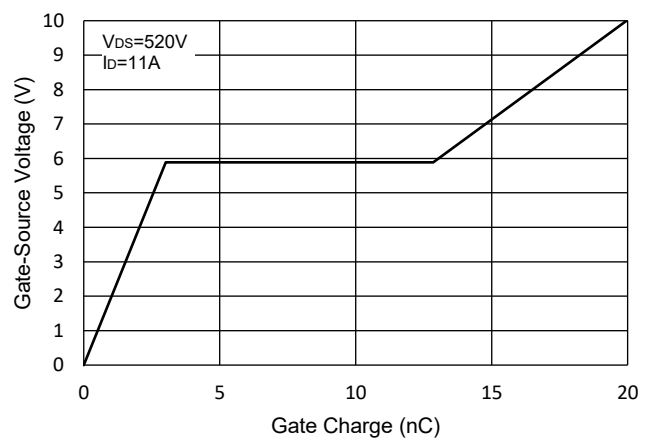


Fig.6 - Gate Charge



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

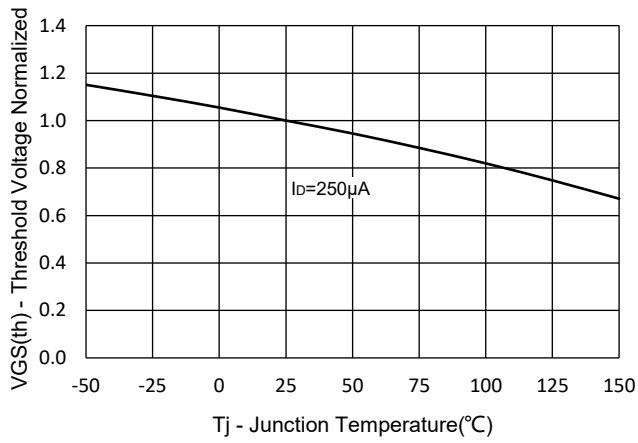


Fig.8 - Normalized On Resistance Characteristics

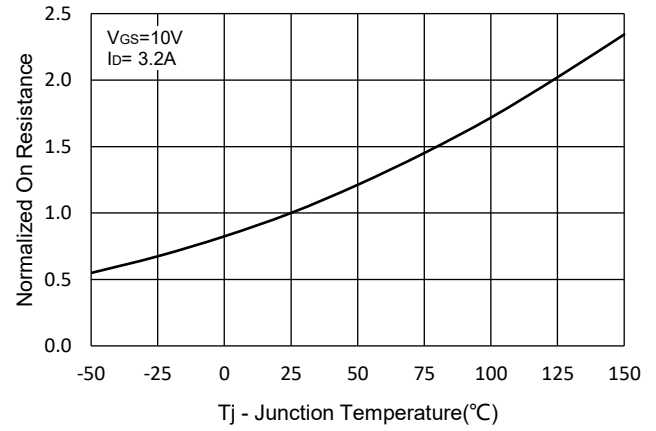


Fig.9 - $I_S - V_{SD}$

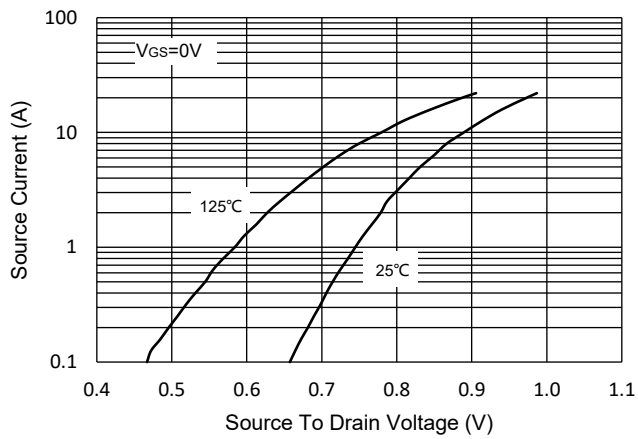


Fig.10 - Drain Current

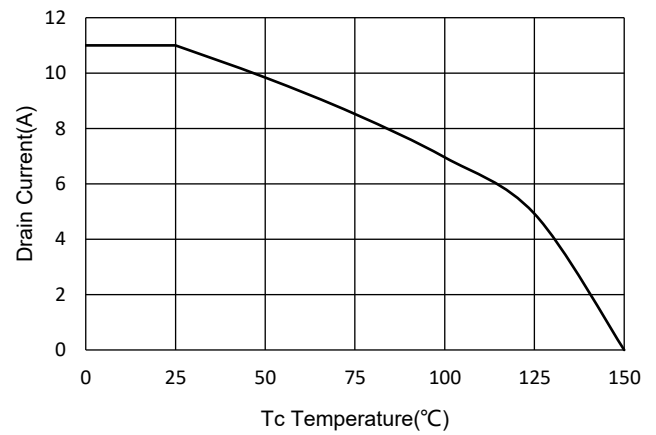
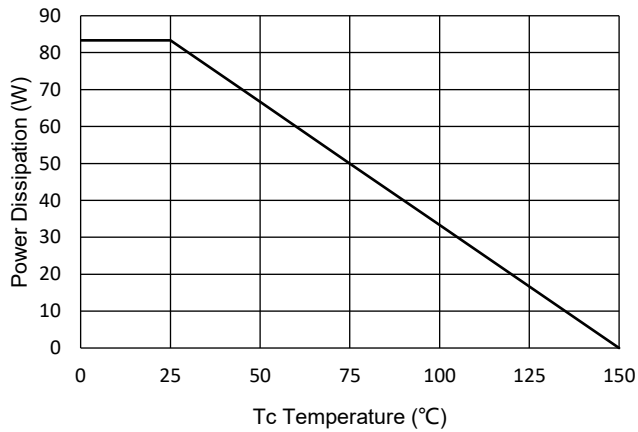


Fig.11 - PD Dissipation



Curve Characteristics

Fig.12 - Safe Operation Area

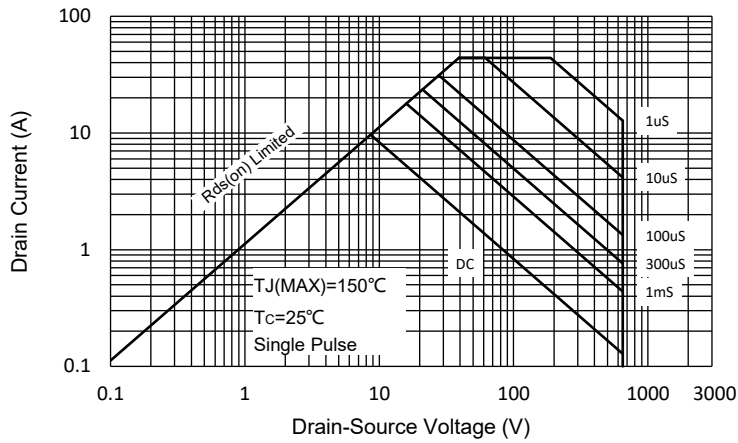
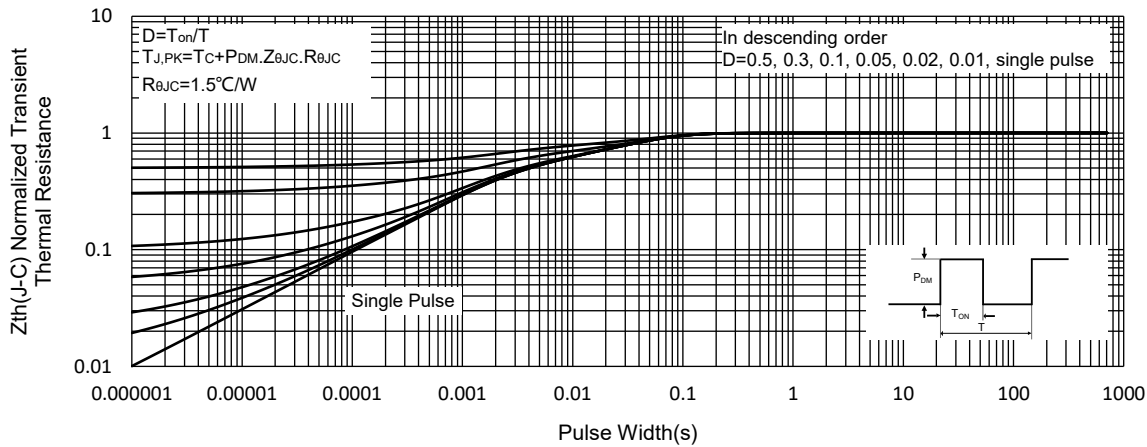


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

| Device | Packing |
|----------------|---|
| Part Number-BP | Bulk:50pcs/Tube, 1Kpcs/Box,5Kpcs/Carton |

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