



M-MOS Semiconductor Hong Kong Limited

N-Channel Enhancement-Mode MOSFET

$V_{DS} = 25V$

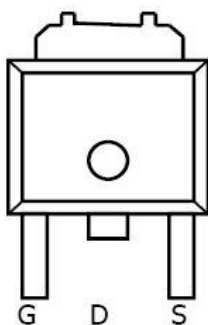
$R_{DS(ON)}, V_{GS}@10V, I_{ds}@30A = 6m\Omega$

$R_{DS(ON)}, V_{GS}@4.5V, I_{ds}@30A = 9m\Omega$

Features

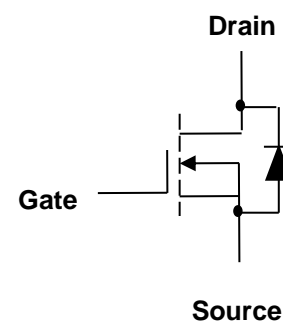
- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance
- Specially Designed for DC/DC Converters and Motor Drivers
- Fully Characterized Avalanche Voltage and Current
- Improved Shoot-Through FOM

TO-252 (D-PAK)



Top View

Internal Schematic Diagram



N-Channel MOSFET

Maximum Ratings and Thermal Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit | |
|--|-----------------|--------------------|--------------|---|
| Drain-Source Voltage | V_{DS} | 25 | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | |
| Continuous Drain Current | I_D | 55 | A | |
| Pulsed Drain Current ¹⁾ | I_{DM} | 200 | | |
| Maximum Power Dissipation | P_D | $T_A = 25^\circ C$ | 70 | W |
| | | $T_A = 75^\circ C$ | 42 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | $^\circ C$ | |
| Avalanche Energy with Single Pulse | EAS | 200 | mJ | |
| Junction-to-Case Thermal Resistance | $R_{\theta JC}$ | 1.8 | $^\circ C/W$ | |
| Junction-to-Ambient Thermal Resistance (PCB mounted) ²⁾ | $R_{\theta JA}$ | 50 | | |

Note: 1. Repetitive Rating: Pulse width limited by the maximum junction temperature

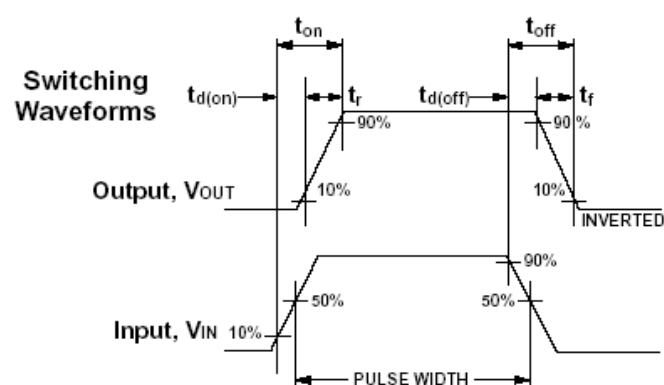
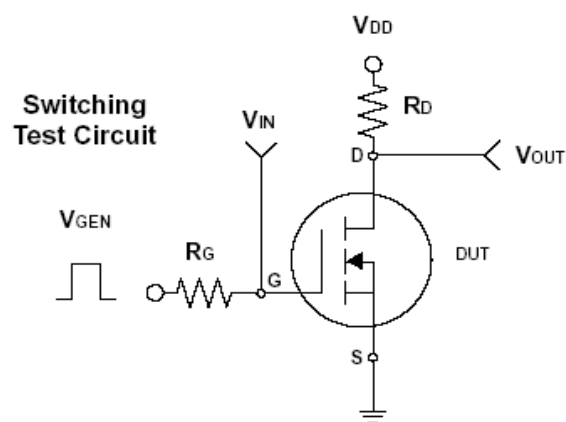
2. 1-in² 2oz Cu PCB board

N-Channel Enhancement-Mode MOSFET
ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|----------------------------------|--------------|--|-----|--------|-----------|------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 25 | | | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 30A$ | | 4.5 | 6.0 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS} = 4.5V, I_D = 30A$ | | 6.5 | 9.0 | m Ω |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.3 | 1.9 | 3 | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 25V, V_{GS} = 0V$ | | | 1 | μA |
| Gate Body Leakage | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 100 | nA |
| Dynamic³⁾ | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 15V, I_D = 16A$ $V_{GS} = 5V$ | | 16.8 | | nC |
| Gate-Source Charge | Q_{gs} | | | 6.08 | | |
| Gate-Drain Charge | Q_{gd} | | | 4.93 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15V, R_L = 15\Omega$ $I_D = 1A, V_{GEN} = 10V$ $R_G = 6\Omega$ | | 15.13 | | ns |
| Turn-On Rise Time | t_r | | | 4 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 45.27 | | |
| Turn-Off Fall Time | t_f | | | 7.6 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0\text{ MHz}$ | | 2325.9 | | pF |
| Output Capacitance | C_{oss} | | | 330.55 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 173.91 | | |
| Source-Drain Diode | | | | | | |
| Max. Diode Forward Current | I_S | | | | 20 | A |
| Diode Forward Voltage | V_{SD} | $I_S = 20A, V_{GS} = 0V$ | | | 1.3 | V |

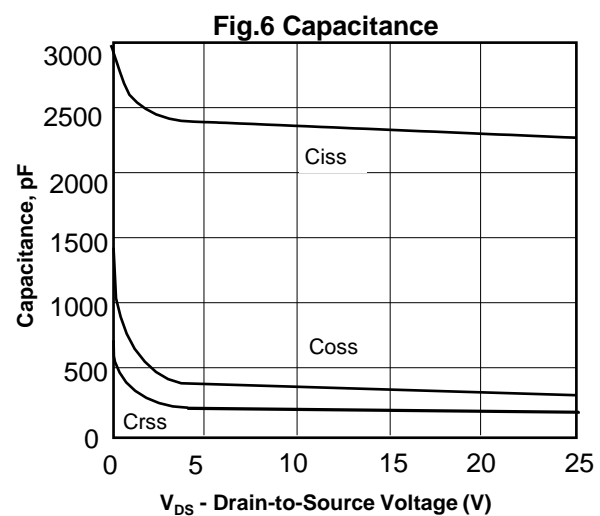
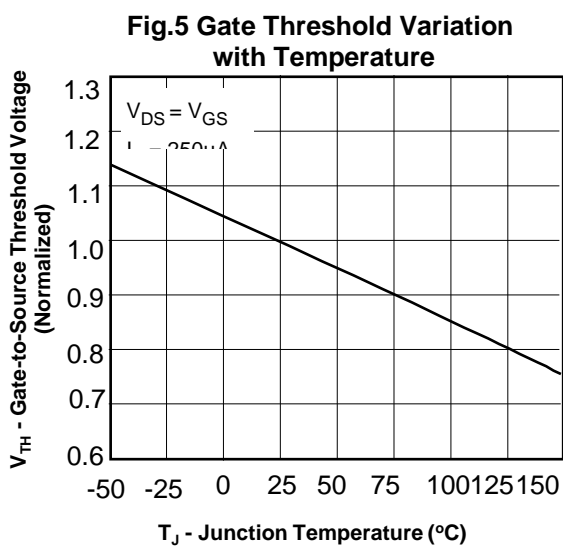
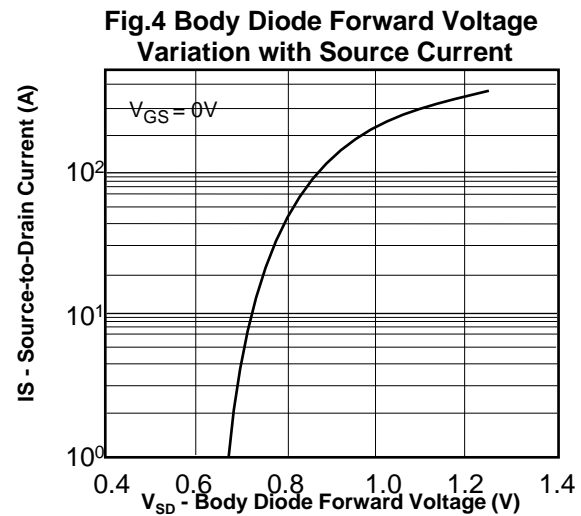
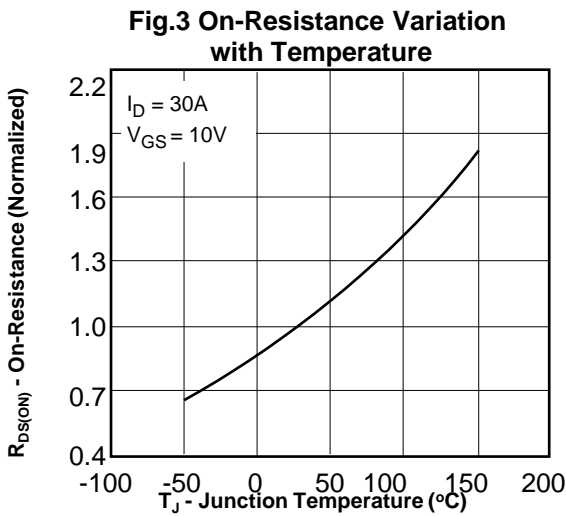
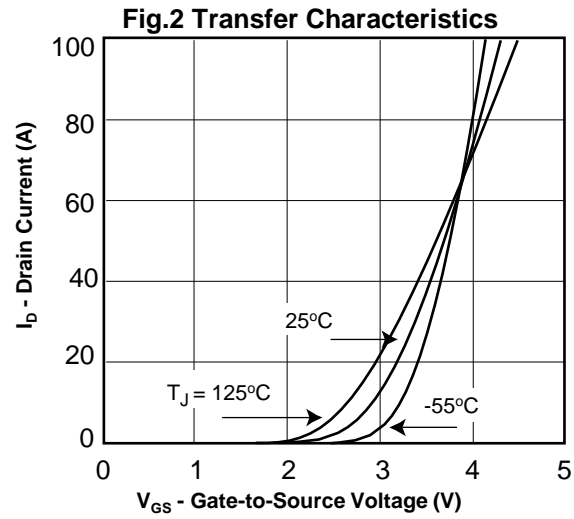
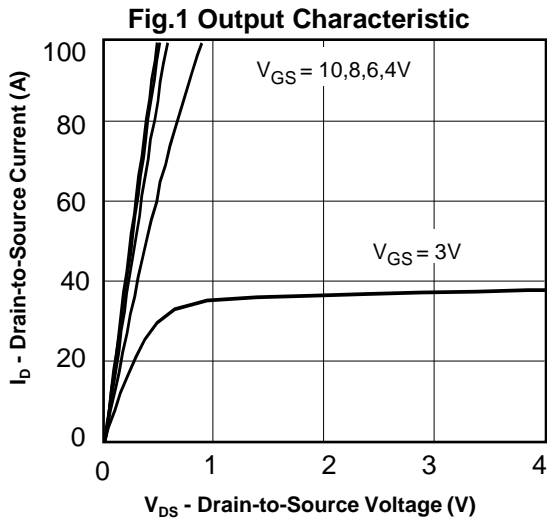
Note: Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3. Guaranteed by design; not subject to production testing



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Typical Characteristics Curves ($T_a=25^\circ\text{C}$, unless otherwise no



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Typical Characteristics Curves (Ta=25°C, unless otherwise no

Fig. 7 Gate Charge Waveform

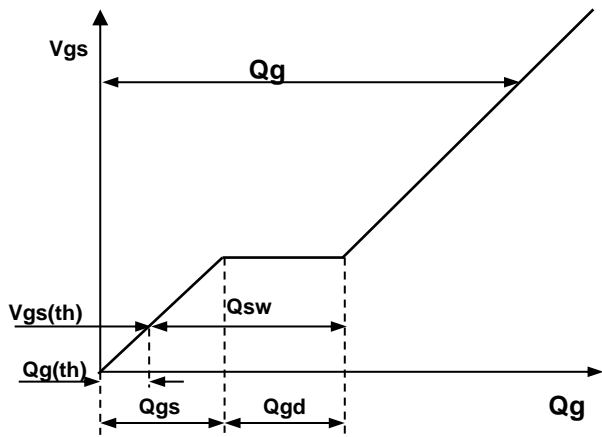


Fig. 8 Gate Charge

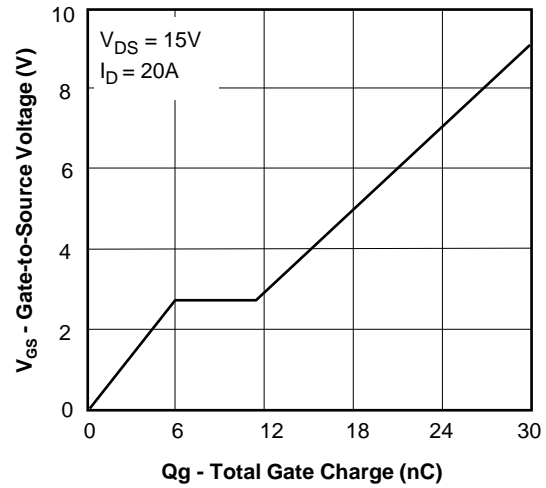


Fig. 9 Maximum Safe Operating Area

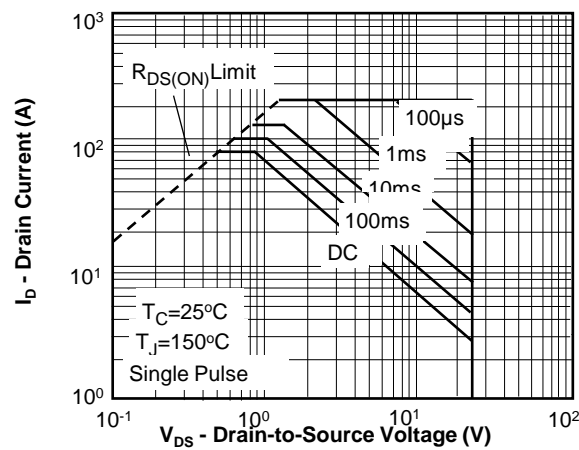
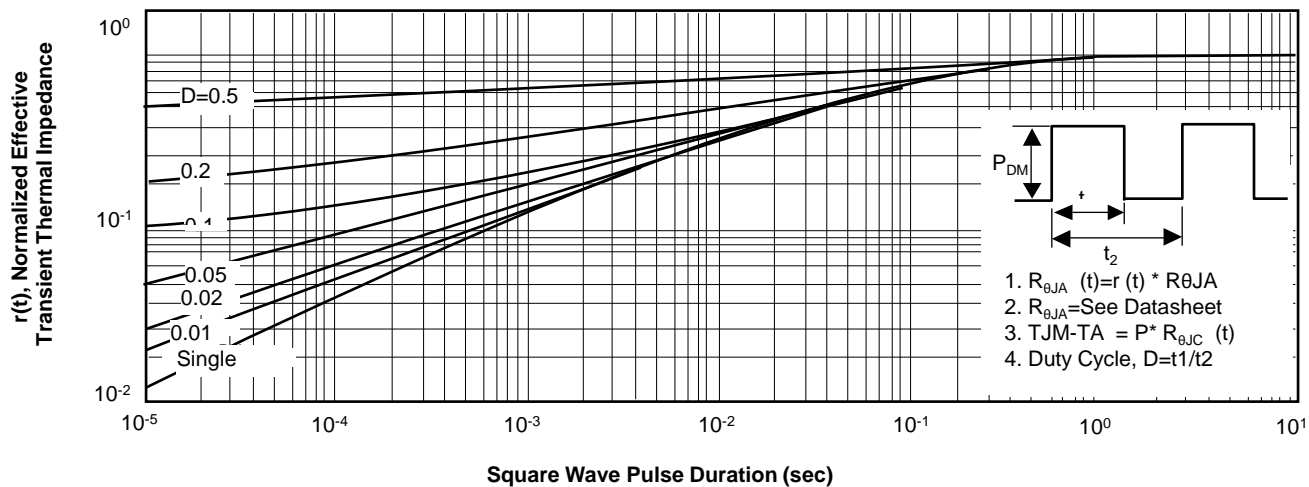


Fig. 10 Normalized Thermal Transient Impedance Curve





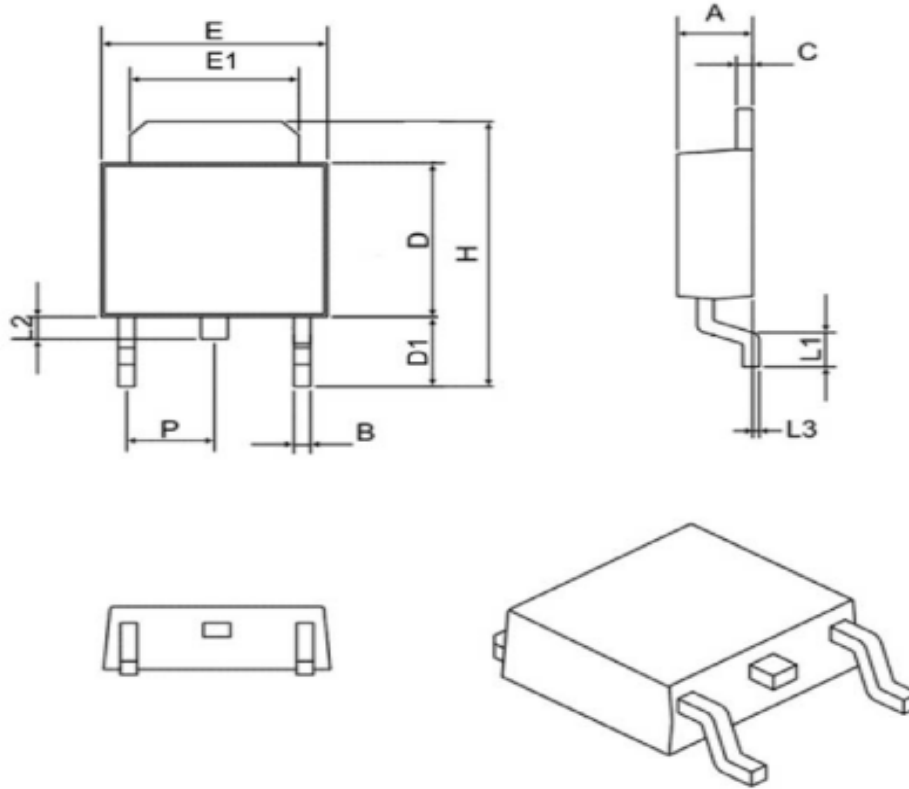
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2. Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



TO-252 Package Outline



| SYMBOL | MIN | MAX |
|--------|----------|-------|
| A | 2.10 | 2.50 |
| B | 0.40 | 0.90 |
| C | 0.40 | 0.90 |
| D | 5.30 | 6.30 |
| D1 | 2.20 | 2.90 |
| E | 6.30 | 6.75 |
| E1 | 4.80 | 5.50 |
| L1 | 0.90 | 1.80 |
| L2 | 0.50 | 1.10 |
| L3 | 0.00 | 0.20 |
| H | 8.90 | 10.40 |
| P | 2.30 BSC | |