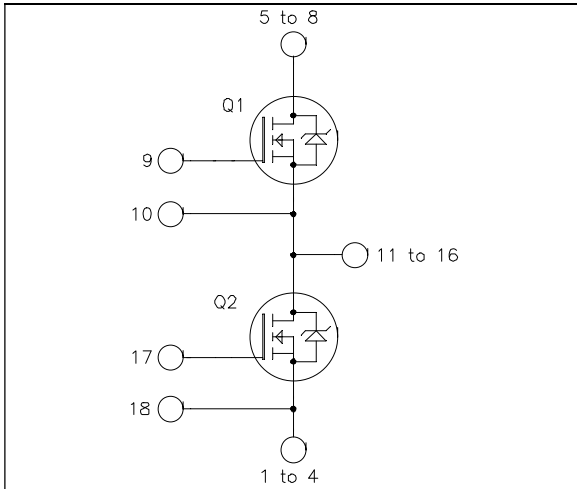


**Phase leg
Super Junction MOSFET
Power Module**

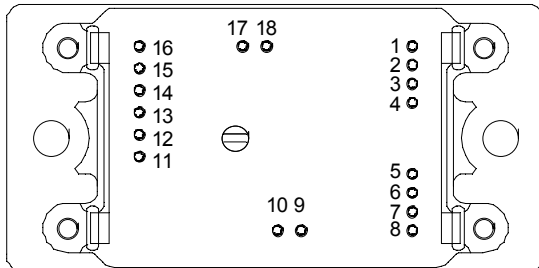
$V_{DSS} = 900V$
 $R_{DSon} = 60m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 59A \text{ @ } T_c = 25^\circ C$


Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- CoolMOS™
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Very low stray inductance
- Kelvin source for easy drive
- High level of integration


Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

Pins 1/2/3/4 ; 5/6/7/8 ; 11/12/13/14/15/16 must be shorted together

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|------------|---|--------------------|-----------|
| V_{DSS} | Drain - Source Breakdown Voltage | 900 | V |
| I_D | Continuous Drain Current | $T_c = 25^\circ C$ | 59 |
| | | $T_c = 80^\circ C$ | 44 |
| I_{DM} | Pulsed Drain current | 150 | |
| V_{GS} | Gate - Source Voltage | ± 20 | V |
| R_{DSon} | Drain - Source ON Resistance | 60 | $m\Omega$ |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 462 |
| I_{AR} | Avalanche current (repetitive and non repetitive) | 8.8 | A |
| E_{AR} | Repetitive Avalanche Energy | 2.9 | mJ |
| E_{AS} | Single Pulse Avalanche Energy | 1940 | |

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

Electrical Characteristics

| <i>Symbol</i> | <i>Characteristic</i> | <i>Test Conditions</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> |
|---------------|---------------------------------|----------------------------------|------------|------------|------------|-------------|
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS} = 0V, V_{DS} = 900V$ | | | 200 | μA |
| $R_{DS(on)}$ | Drain – Source on Resistance | $V_{GS} = 10V, I_D = 52A$ | | 50 | 60 | m Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 6mA$ | 2.5 | 3 | 3.5 | V |
| I_{GSS} | Gate – Source Leakage Current | $V_{GS} = \pm 20 V, V_{DS} = 0V$ | | | 200 | nA |

Dynamic Characteristics

| <i>Symbol</i> | <i>Characteristic</i> | <i>Test Conditions</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> |
|---------------|-------------------------------------|--|---------------------|------------|------------|--------------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V ; V_{DS} = 100V$ $f = 1MHz$ | | 13.6 | | nF |
| C_{oss} | Output Capacitance | | | 0.66 | | |
| Q_g | Total gate Charge | $V_{GS} = 10V$ $V_{Bus} = 400V$ $I_D = 52A$ | | 540 | | nC |
| Q_{gs} | Gate – Source Charge | | | 64 | | |
| Q_{gd} | Gate – Drain Charge | | | 230 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (125°C) $V_{GS} = 10V$ $V_{Bus} = 600V$ $I_D = 52A$ $R_G = 3.8\Omega$ | | 70 | | ns |
| T_r | Rise Time | | | 20 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 400 | | |
| T_f | Fall Time | | | 25 | | |
| E_{off} | Turn-off Switching Energy | Inductive switching $V_{GS}=10V ; I_D=52A$ $V_{Bus}=600V ; R_G=3.8\Omega$ | $T_j = 25^\circ C$ | 1.5 | | mJ |
| | | | $T_j = 125^\circ C$ | 1.7 | | |
| R_{thJC} | Junction to Case Thermal Resistance | | | | 0.27 | $^\circ C/W$ |

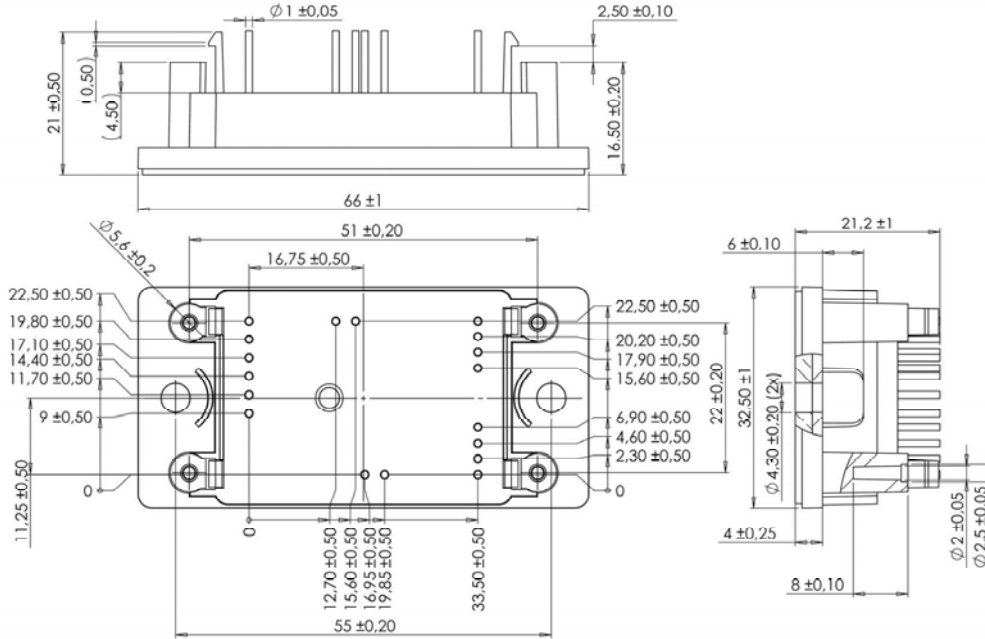
Source - Drain diode ratings and characteristics

| <i>Symbol</i> | <i>Characteristic</i> | <i>Test Conditions</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> | |
|---------------|---|---|--------------------|------------|------------|-------------|---|
| I_S | Continuous Source current (Body diode) | | $T_c = 25^\circ C$ | | | 59 | A |
| | | | $T_c = 80^\circ C$ | | | 44 | |
| V_{SD} | Diode Forward Voltage | $V_{GS} = 0V, I_S = - 52A$ | | 0.8 | 1.2 | V | |
| t_{rr} | Reverse Recovery Time | $I_S = - 52A$ $V_R = 400V$ $di_S/dt = 200A/\mu s$ | $T_j = 25^\circ C$ | | 920 | ns | |
| Q_{rr} | Reverse Recovery Charge | | $T_j = 25^\circ C$ | | 60 | μC | |

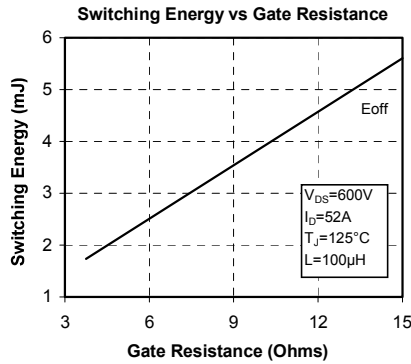
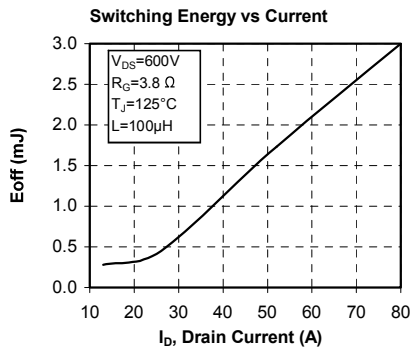
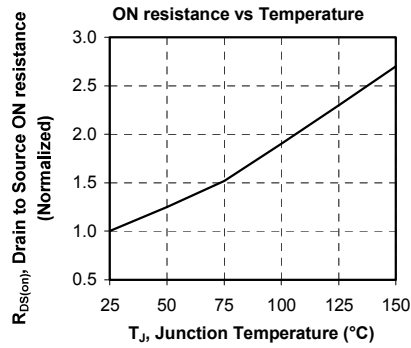
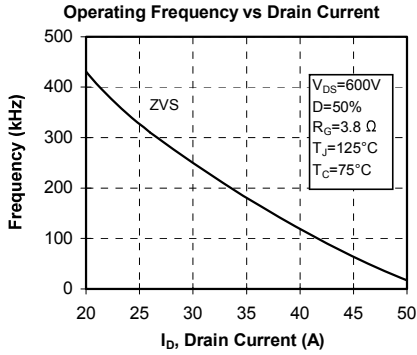
Thermal and package characteristics

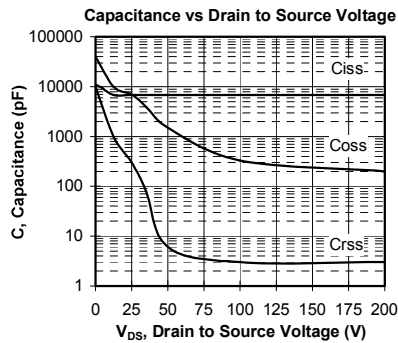
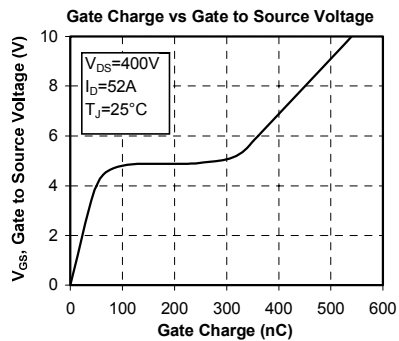
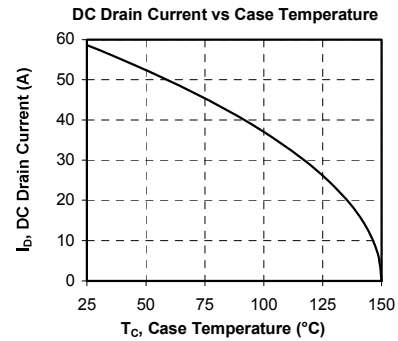
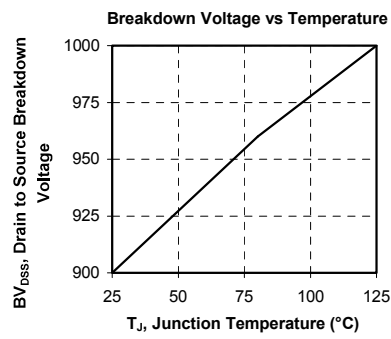
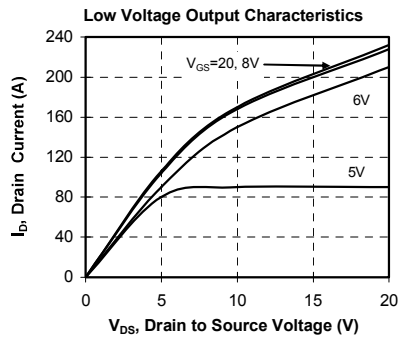
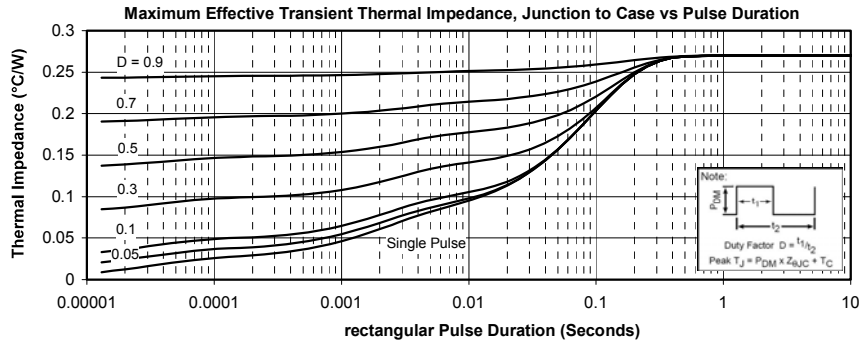
| <i>Symbol</i> | <i>Characteristic</i> | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> | |
|---------------|--|-------------|------------|------------|-------------|-----|
| V_{ISOL} | RMS Isolation Voltage, any terminal to case $t = 1$ min, 50/60Hz | 4000 | | | V | |
| T_J | Operating junction temperature range | -40 | | 150 | $^\circ C$ | |
| T_{STG} | Storage Temperature Range | -40 | | 125 | | |
| T_C | Operating Case Temperature | -40 | | 100 | | |
| Torque | Mounting torque | To heatsink | M4 | 2 | 3 | N.m |
| Wt | Package Weight | | | | 75 | g |

SP2 Package outline (dimensions in mm)



Typical CoolMOS Performance Curve





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