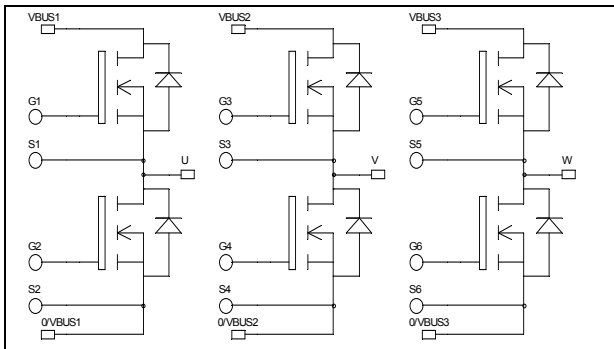


Triple phase leg Super Junction MOSFET Power Module

$$V_{DSS} = 600V$$

$$R_{DSon} = 35m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 72A \text{ @ } T_c = 25^\circ C$$

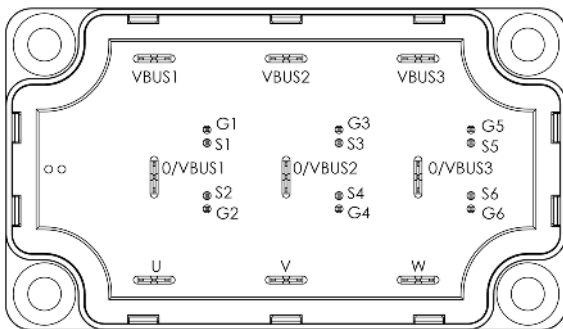


Application

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

Features

- **COOLMOS**
Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration



Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a phase leg of three times the current capability
- Module can be configured as a three phase bridge
- Module can be configured as a boost followed by a full bridge
- RoHS Compliant

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|------------|---|--------------------|-----------|
| V_{DSS} | Drain - Source Breakdown Voltage | 600 | V |
| I_D | Continuous Drain Current | $T_c = 25^\circ C$ | 72 |
| | | $T_c = 80^\circ C$ | 54 |
| I_{DM} | Pulsed Drain current | 200 | A |
| V_{GS} | Gate - Source Voltage | ± 20 | V |
| R_{DSon} | Drain - Source ON Resistance | 35 | $m\Omega$ |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 416 |
| I_{AR} | Avalanche current (repetitive and non repetitive) | 20 | A |
| E_{AR} | Repetitive Avalanche Energy | 1 | mJ |
| E_{AS} | Single Pulse Avalanche Energy | 1800 | |

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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

Electrical Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|---------------------------------|---------------------------------------|-----|-----|-----------|------------------|
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS} = 0V, V_{DS} = 600V$ | | | 40 | μA |
| | | $T_j = 25^\circ\text{C}$ | | | | |
| $R_{DS(on)}$ | Drain – Source on Resistance | $V_{GS} = 10V, I_D = 72A$ | | | 35 | $\text{m}\Omega$ |
| | | $T_j = 125^\circ\text{C}$ | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 5.4\text{mA}$ | 2.1 | 3 | 3.9 | V |
| I_{GSS} | Gate – Source Leakage Current | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 150 | nA |

Dynamic Characteristics

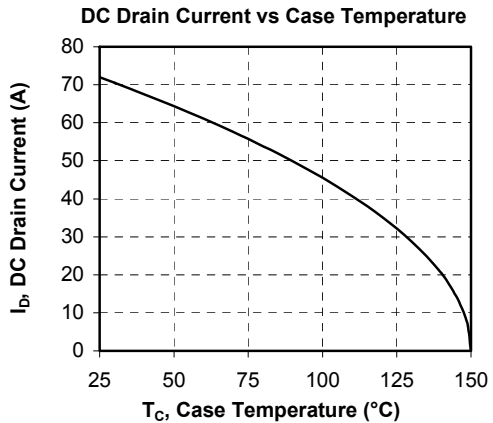
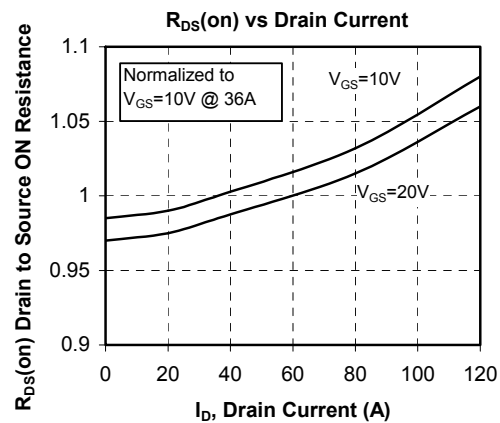
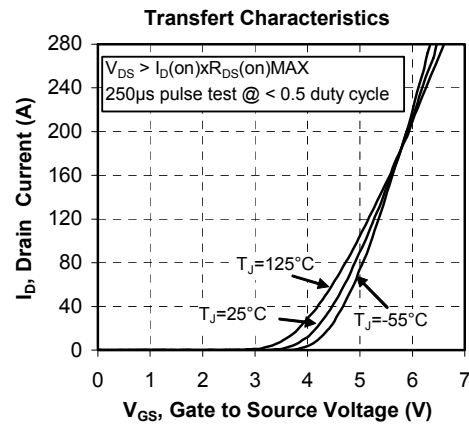
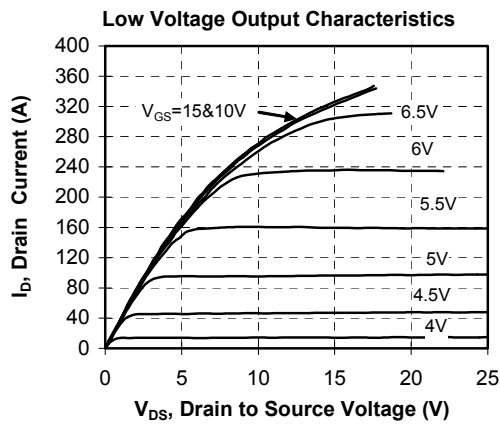
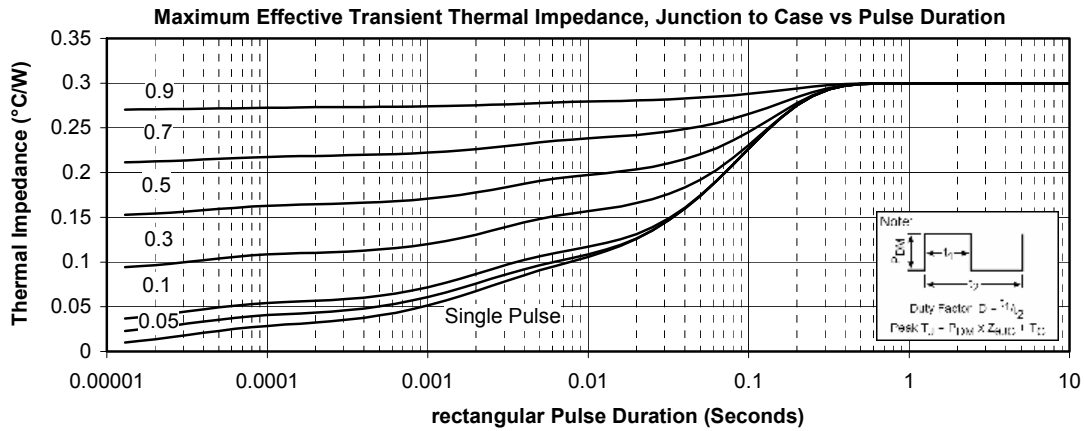
| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|--|-----|------|-----|---------------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{MHz}$ | | 14 | | nF |
| C_{oss} | Output Capacitance | | | 5.13 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 0.42 | | |
| Q_g | Total gate Charge | $V_{GS} = 10V$ $V_{Bus} = 300V$ $I_D = 72A$ | | 518 | | nC |
| Q_{gs} | Gate – Source Charge | | | 58 | | |
| Q_{gd} | Gate – Drain Charge | | | 222 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 400V$ $I_D = 72A$ $R_G = 2.5\Omega$ | | 21 | | ns |
| T_r | Rise Time | | | 30 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 283 | | |
| T_f | Fall Time | | | 84 | | |
| E_{on} | Turn-on Switching Energy | Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 72A, R_G = 2.5\Omega$ | | 1340 | | μJ |
| E_{off} | Turn-off Switching Energy | | | 1960 | | |
| E_{on} | Turn-on Switching Energy | Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 400V$ $I_D = 72A, R_G = 2.5\Omega$ | | 2192 | | μJ |
| E_{off} | Turn-off Switching Energy | | | 2412 | | |

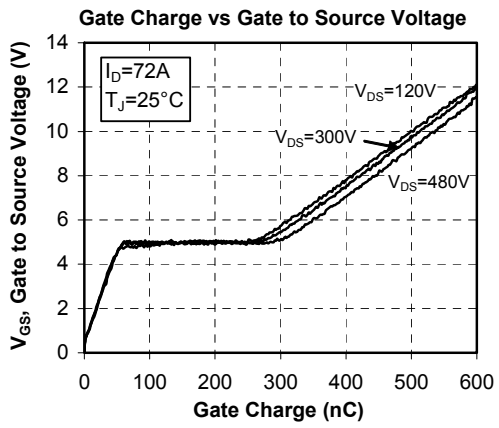
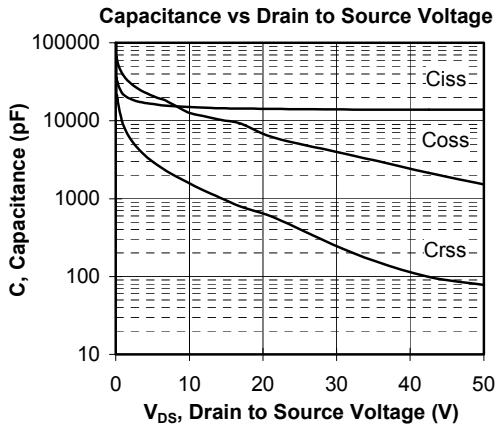
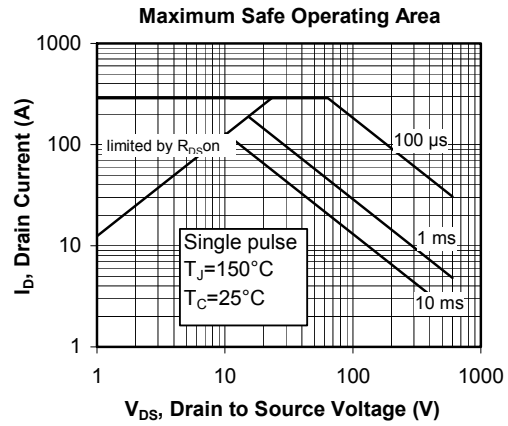
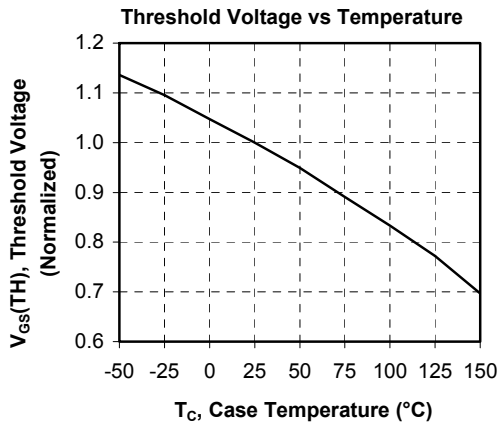
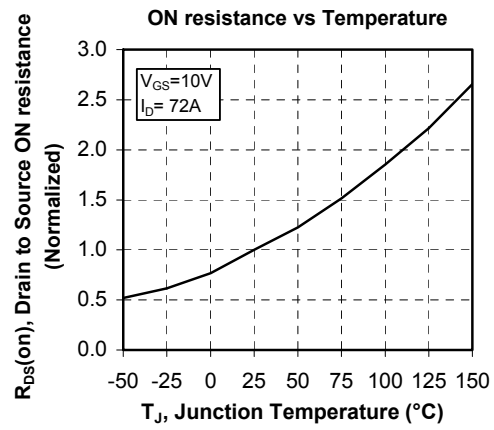
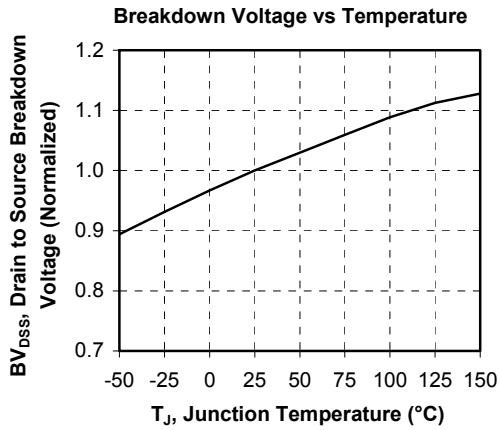
Source - Drain diode ratings and characteristics

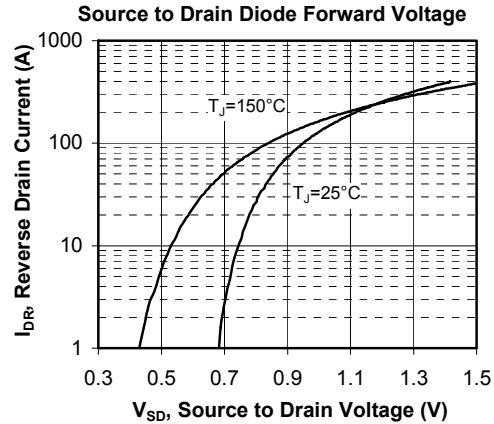
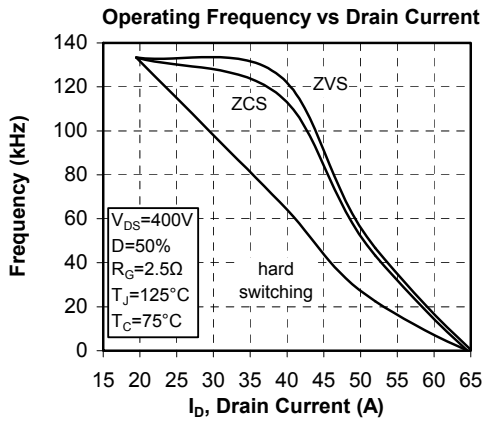
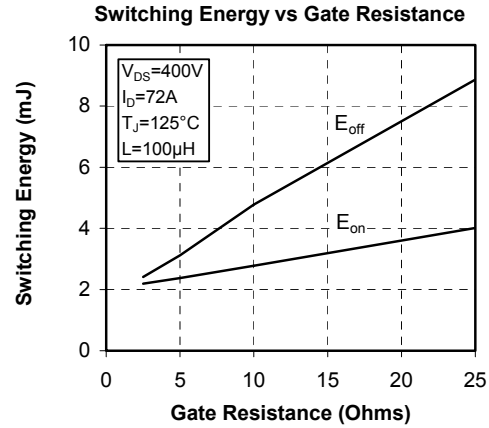
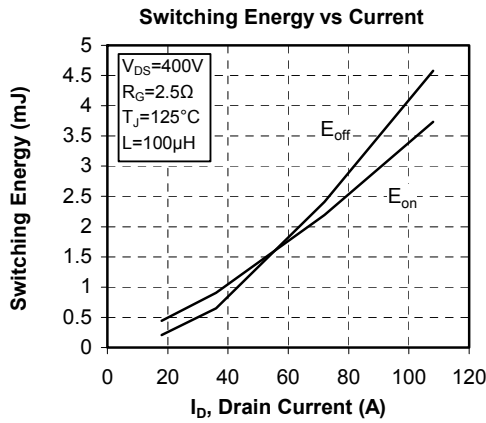
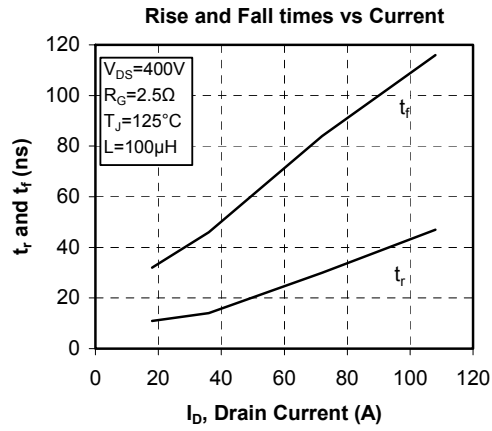
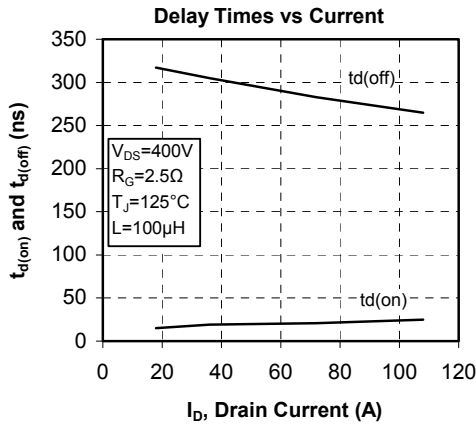
| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|----------|--|------------------------------|--------------------------|-----|-----|---------------|
| I_S | Continuous Source current (Body diode) | | $T_c = 25^\circ\text{C}$ | 72 | | A |
| | | | $T_c = 80^\circ\text{C}$ | | 54 | |
| V_{SD} | Diode Forward Voltage | $V_{GS} = 0V, I_S = -72A$ | | | 1.2 | V |
| dv/dt | Peak Diode Recovery ① | | | | 6 | V/ns |
| t_{rr} | Reverse Recovery Time | $I_S = -72A$ $V_R = 350V$ | | 580 | | ns |
| Q_{rr} | Reverse Recovery Charge | $di/dt = 200A/\mu\text{s}$ | | 46 | | μC |

① dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -72A \quad di/dt \leq 200A/\mu\text{s} \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

Typical Performance Curve






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