

## Dual common source MOSFET Power Module

**$V_{DSS} = 500V$**

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

**$I_D = 149A$  @  $T_c = 25^\circ C$**

### Application

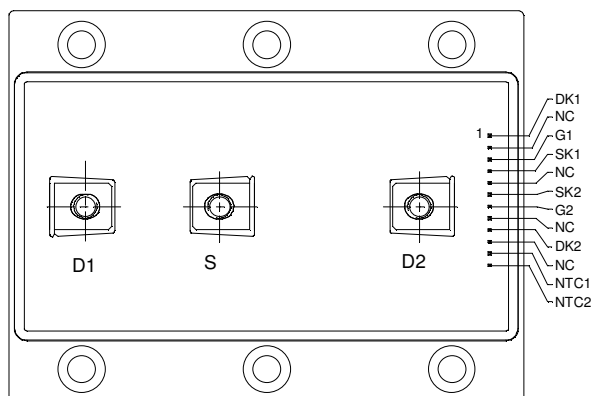
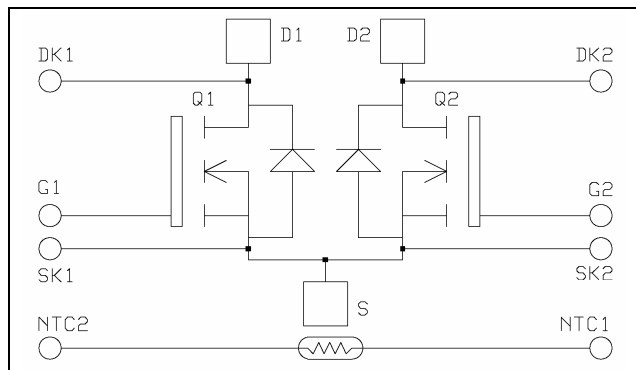
- AC Switches
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

### Features

- Power MOS V<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Kelvin Drain for VDS monitoring
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- Internal thermistor for temperature monitoring
- 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 for signal and M5 for power for easy PCB mounting



### Absolute maximum ratings

| Symbol     | Parameter                                         | Max ratings                | Unit       |
|------------|---------------------------------------------------|----------------------------|------------|
| $V_{DSS}$  | Drain - Source Breakdown Voltage                  | 500                        | V          |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$<br>149  | A          |
|            |                                                   | $T_c = 80^\circ C$<br>111  |            |
| $I_{DM}$   | Pulsed Drain current                              | 300                        |            |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$                   | V          |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 25                         | m $\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$<br>1250 | W          |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 149                        | A          |
| $E_{AR}$   | Repetitive Avalanche Energy                       | 30                         | mJ         |
| $E_{AS}$   | Single Pulse Avalanche Energy                     | 1300                       |            |



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

## Electrical Characteristics

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

| Symbol       | Characteristic                   | Test Conditions                                       | Min | Typ | Max       | Unit      |
|--------------|----------------------------------|-------------------------------------------------------|-----|-----|-----------|-----------|
| $BV_{DSS}$   | Drain - Source Breakdown Voltage | $V_{GS} = 0V, I_D = 500\mu A$                         | 500 |     |           | V         |
| $I_{DSS}$    | Zero Gate Voltage Drain Current  | $V_{GS} = 0V, V_{DS} = 500V, T_j = 25^\circ\text{C}$  |     |     | 300       | $\mu A$   |
|              |                                  | $V_{GS} = 0V, V_{DS} = 400V, T_j = 125^\circ\text{C}$ |     |     | 2000      |           |
| $R_{DS(on)}$ | Drain - Source on Resistance     | $V_{GS} = 10V, I_D = 74.5A$                           |     |     | 25        | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage           | $V_{GS} = V_{DS}, I_D = 8mA$                          | 2   |     | 4         | V         |
| $I_{GSS}$    | Gate - Source Leakage Current    | $V_{GS} = \pm 30V, V_{DS} = 0V$                       |     |     | $\pm 250$ | nA        |

## Dynamic Characteristics

| Symbol       | Characteristic               | Test Conditions                                                                                        | Min | Typ  | Max | Unit |
|--------------|------------------------------|--------------------------------------------------------------------------------------------------------|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$                                                                                          |     | 29.6 |     | nF   |
| $C_{oss}$    | Output Capacitance           | $V_{DS} = 25V$                                                                                         |     | 4    |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance | $f = 1MHz$                                                                                             |     | 1.6  |     |      |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10V$                                                                                         |     | 1200 |     | nC   |
| $Q_{gs}$     | Gate - Source Charge         | $V_{Bus} = 250V$                                                                                       |     | 200  |     |      |
| $Q_{gd}$     | Gate - Drain Charge          | $I_D = 149A$                                                                                           |     | 560  |     |      |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Resistive Switching</b><br>$V_{GS} = 15V$<br>$V_{Bus} = 250V$<br>$I_D = 149A$<br>$R_G = 0.22\Omega$ |     | 12   |     | ns   |
| $T_r$        | Rise Time                    |                                                                                                        |     | 10   |     |      |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                        |     | 50   |     |      |
| $T_f$        | Fall Time                    |                                                                                                        |     | 8    |     |      |

## Source - Drain diode ratings and characteristics

| Symbol   | Characteristic                         | Test Conditions                                   | Min | Typ | Max | Unit    |
|----------|----------------------------------------|---------------------------------------------------|-----|-----|-----|---------|
| $I_S$    | Continuous Source current (Body diode) | $T_c = 25^\circ\text{C}$                          |     |     | 149 | A       |
|          |                                        | $T_c = 80^\circ\text{C}$                          |     |     | 111 |         |
| $V_{SD}$ | Diode Forward Voltage                  | $V_{GS} = 0V, I_S = -149A$                        |     |     | 1.3 | V       |
| $t_{rr}$ | Reverse Recovery Time                  | $I_S = -149A, V_R = 250V$<br>$di/dt = 800A/\mu s$ |     | 510 |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge                | $I_S = -149A, V_R = 250V$<br>$di/dt = 800A/\mu s$ |     | 80  |     | $\mu C$ |

## Thermal and package characteristics

| Symbol            | Characteristic                                                               |               |    | Min  | Typ | Max | Unit |
|-------------------|------------------------------------------------------------------------------|---------------|----|------|-----|-----|------|
| R <sub>thJC</sub> | Junction to Case                                                             |               |    |      |     | 0.1 | °C/W |
| V <sub>ISOL</sub> | RMS Isolation Voltage, any terminal to case<br>t =1 min, I isol<1mA, 50/60Hz |               |    | 2500 |     |     | V    |
| T <sub>J</sub>    | Operating junction temperature range                                         |               |    | -40  |     | 150 | °C   |
| T <sub>STG</sub>  | Storage Temperature Range                                                    |               |    | -40  |     | 125 |      |
| T <sub>C</sub>    | Operating Case Temperature                                                   |               |    | -40  |     | 100 |      |
| Torque            | Mounting torque                                                              | To heatsink   | M5 | 2    |     | 3.5 | N.m  |
|                   |                                                                              | For terminals | M5 | 2    |     | 3.5 |      |
| Wt                | Package Weight                                                               |               |    |      |     | 550 | g    |

## Temperature sensor NTC

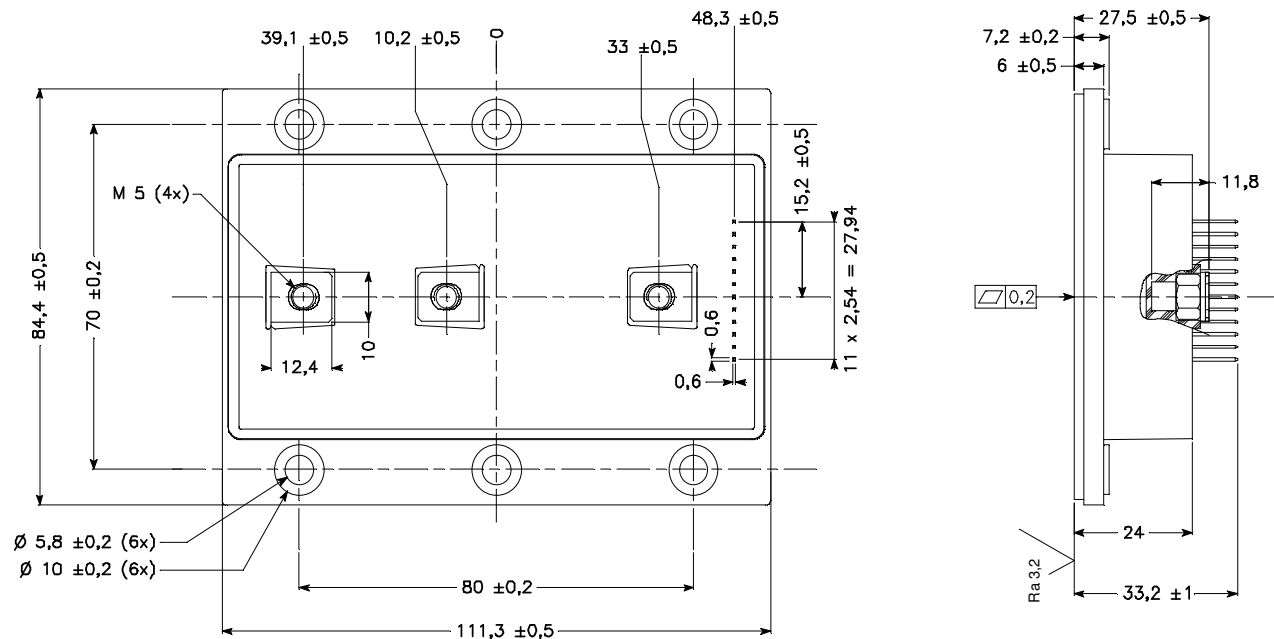
**Symbol Characteristic**

|                    |                            | Min | Typ  | Max | Unit |
|--------------------|----------------------------|-----|------|-----|------|
| R <sub>25</sub>    | Resistance @ 25°C          |     | 68   |     | kΩ   |
| B <sub>25/85</sub> | T <sub>25</sub> = 298.16 K |     | 4080 |     | K    |

$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

## Package outline



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