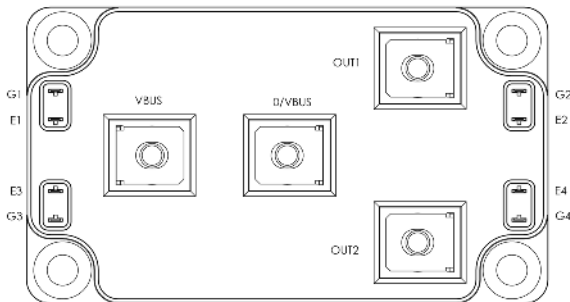
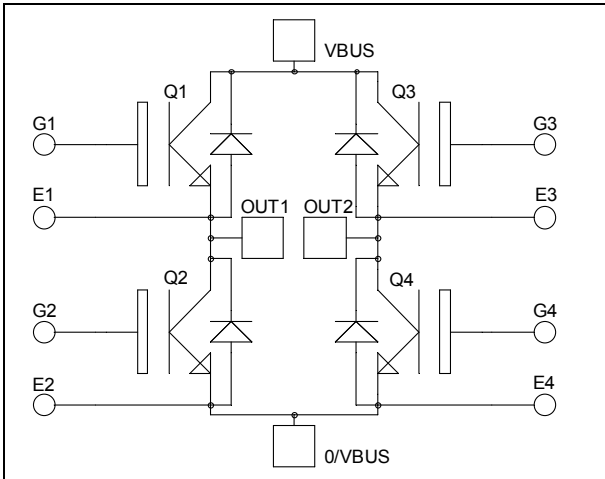


**Full bridge
High speed Trench + Field Stop
IGBT4 Power module**

**$V_{CES} = 1200V$
 $I_C = 150A @ T_c = 80^\circ C$**



Application

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

Features

- **High speed Trench + Field Stop IGBT 4**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- Kelvin emitter for easy drive
- Very low stray inductance
- M5 power connectors

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS compliant

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

Absolute maximum ratings (Per IGBT)

| Symbol | Parameter | Max ratings | Unit |
|-----------|------------------------------|--------------------|------|
| V_{CES} | Collector - Emitter Voltage | 1200 | V |
| I_C | Continuous Collector Current | $T_C = 25^\circ C$ | 250 |
| | | $T_C = 80^\circ C$ | 150 |
| I_{CM} | Pulsed Collector Current | $T_C = 25^\circ C$ | 480 |
| V_{GE} | Gate - Emitter Voltage | ± 20 | V |
| P_D | Power Dissipation | 750 | W |

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

Electrical Characteristics (Per IGBT)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|---------------|--------------------------------------|---------------------------------|------|----------------------------|-----|---------|
| I_{CES} | Zero Gate Voltage Collector Current | $V_{GE} = 0V, V_{CE} = 1200V$ | | | 100 | μA |
| $V_{CE(sat)}$ | Collector Emitter Saturation Voltage | $V_{GE} = 15V$ $I_C = 150A$ | 1.78 | $T_j = 25^\circ C$ 2.05 | 2.4 | V |
| | | $T_j = 150^\circ C$ | | 2.6 | | |
| $V_{GE(th)}$ | Gate Threshold Voltage | $V_{GE} = V_{CE}, I_C = 5.2 mA$ | 5.3 | 5.8 | 6.3 | V |
| I_{GES} | Gate – Emitter Leakage Current | $V_{GE} = 20V, V_{CE} = 0V$ | | | 240 | nA |

Dynamic Characteristics (Per IGBT)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|-------------------------------------|--|---------------------|------|------|--------------|
| C_{ies} | Input Capacitance | $V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$ | | 8.8 | | nF |
| C_{oes} | Output Capacitance | | | 0.5 | | |
| C_{res} | Reverse Transfer Capacitance | | | 0.45 | | |
| Q_G | Gate charge | $V_{GE} = 15V, I_C = 150A$ $V_{CE} = 960V$ | | 645 | | nC |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 150A$ $R_G = 3.5\Omega$ | | 30 | | ns |
| T_r | Rise Time | | | 57 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 290 | | |
| T_f | Fall Time | | | 16 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 150A$ $R_G = 3.5\Omega$ | | 30 | | ns |
| T_r | Rise Time | | | 49 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 366 | | |
| T_f | Fall Time | | | 48 | | |
| E_{on} | Turn on Energy | $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 150A$ | $T_j = 150^\circ C$ | 13 | | mJ |
| E_{off} | Turn off Energy | $R_G = 3.5\Omega$ | | 8 | | |
| R_G | Integrated gate resistor | | | 5 | | Ω |
| I_{sc} | Short Circuit data | $V_{GE} \leq 15V; V_{Bus} = 600V$ $t_p \leq 10\mu s; T_j = 150^\circ C$ | | 525 | | A |
| R_{thJC} | Junction to Case Thermal Resistance | | | | 0.20 | $^\circ C/W$ |

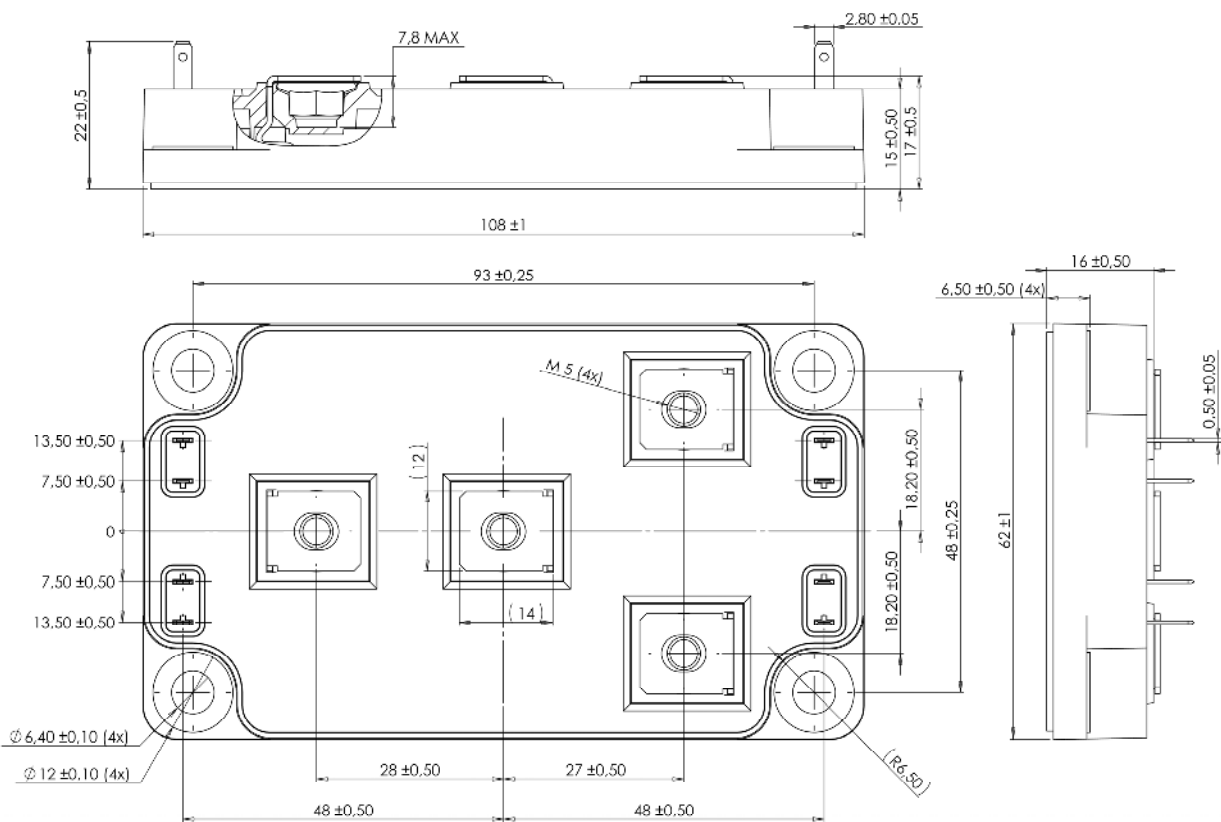
Diode ratings and characteristics (per diode)

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|------------|-------------------------------------|--|---------------------|------|------|--------------|
| V_{RRM} | Peak Repetitive Reverse Voltage | | | | 1200 | V |
| I_{RM} | Reverse Leakage Current | $V_R = 1200V$ | | | 200 | μA |
| I_F | DC Forward Current | $T_c = 60^\circ C$ | | 120 | | A |
| V_F | Diode Forward Voltage | $I_F = 120A$ | | 2.5 | 3.5 | V |
| | | $I_F = 240A$ | | 3 | | |
| | | $I_F = 120A$ | $T_j = 125^\circ C$ | 1.8 | | |
| t_{rr} | Reverse Recovery Time | $I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu s$ | $T_j = 25^\circ C$ | 265 | | ns |
| | | | $T_j = 125^\circ C$ | 350 | | |
| Q_{rr} | Reverse Recovery Charge | $I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu s$ | $T_j = 25^\circ C$ | 1120 | | nC |
| | | | $T_j = 125^\circ C$ | 5780 | | |
| R_{thJC} | Junction to Case Thermal Resistance | | | | 0.33 | $^\circ C/W$ |

Thermal and package characteristics

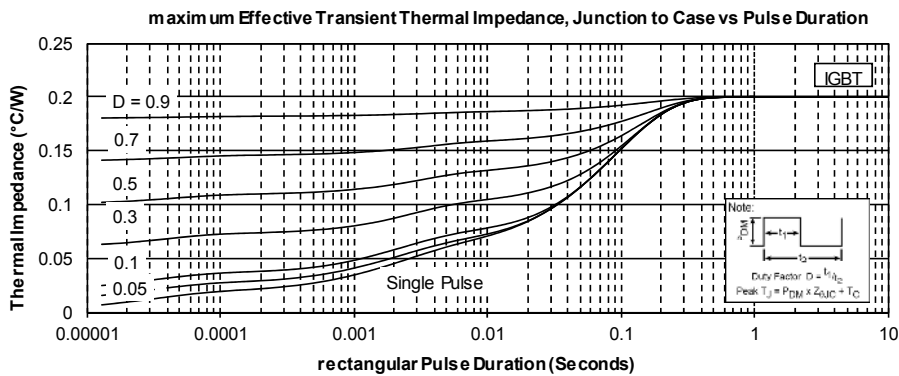
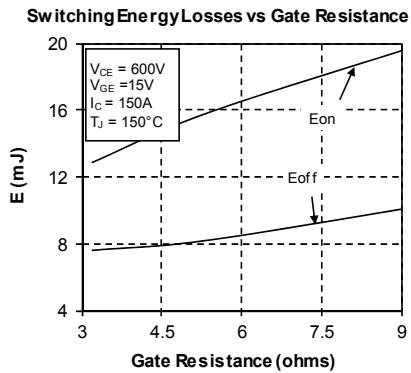
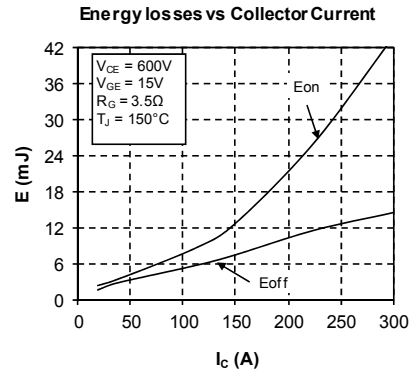
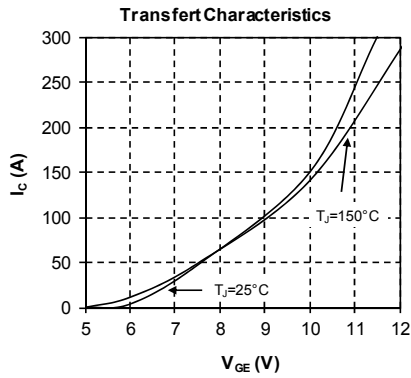
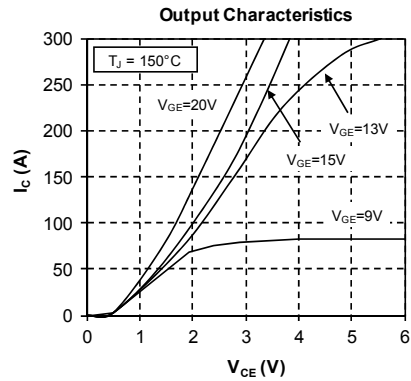
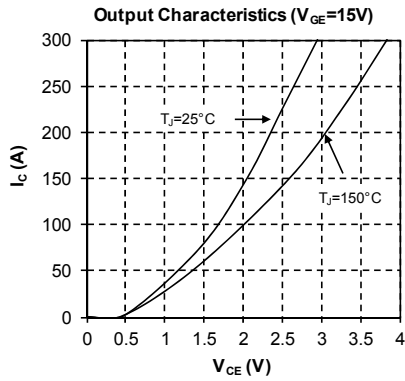
| Symbol | Characteristic | Min | Max | Unit | | |
|-------------------|--|---------------|-----------------------|------|-----|-----|
| V _{ISOL} | RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz | 4000 | | V | | |
| T _J | Operating junction temperature range | -40 | 175 | °C | | |
| T _{JOP} | Recommended junction temperature under switching conditions | -40 | T _{Jmax} -25 | | | |
| T _{STG} | Storage Temperature Range | -40 | 125 | | | |
| T _C | Operating Case Temperature | -40 | 125 | | | |
| Torque | Mounting torque | To heatsink | M6 | 3 | 5 | N.m |
| | | For terminals | M5 | 2 | 3.5 | |
| Wt | Package Weight | | | 300 | g | |

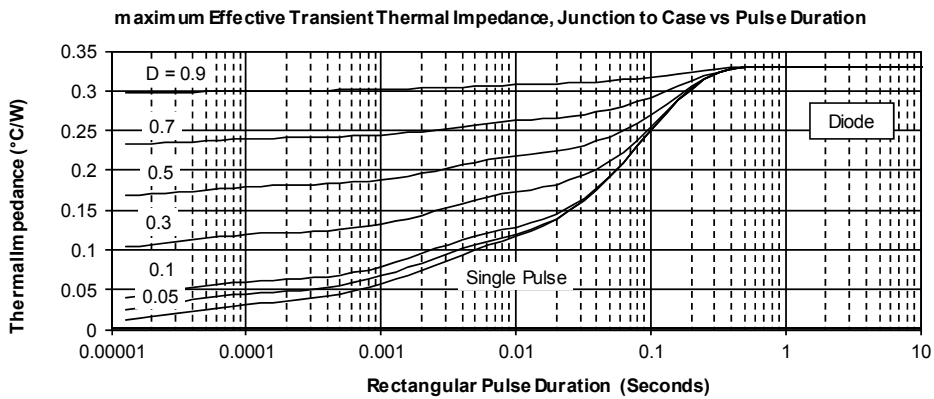
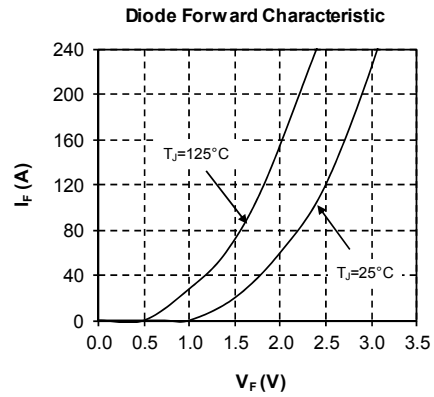
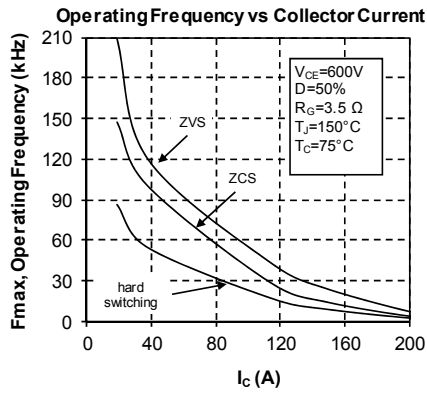
Package outline (dimensions in mm)



See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve





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