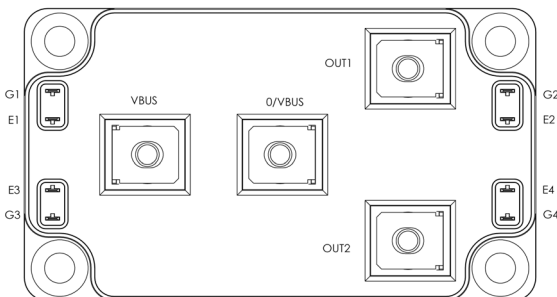
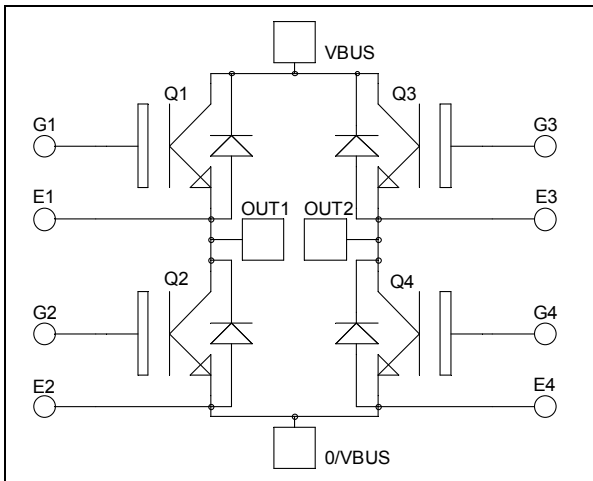


**Full bridge  
High speed Trench + Field Stop IGBT4  
Power module**

**$V_{CES} = 1200V$   
 $I_C = 200A @ T_c = 80^\circ C$**


**Application**

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

**Features**

- High speed Trench + Field Stop IGBT 4 Technology
  - Low voltage drop
  - Low leakage current
  - Low switching losses
  - Soft recovery parallel diodes
  - Low diode VF
  - RBSOA and SCSOA rated
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration

**Benefits**

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- 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	$T_c = 25^\circ C$	350
		$T_c = 80^\circ C$	200
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	700
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	1000
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	400A @ 1100V

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://www.microsemi.com)

**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	$\mu A$
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 200A$		2.05 2.6	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 7 mA$	5.2	5.8	6.4	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			340	nA

**Dynamic Characteristics (Per IGBT)**

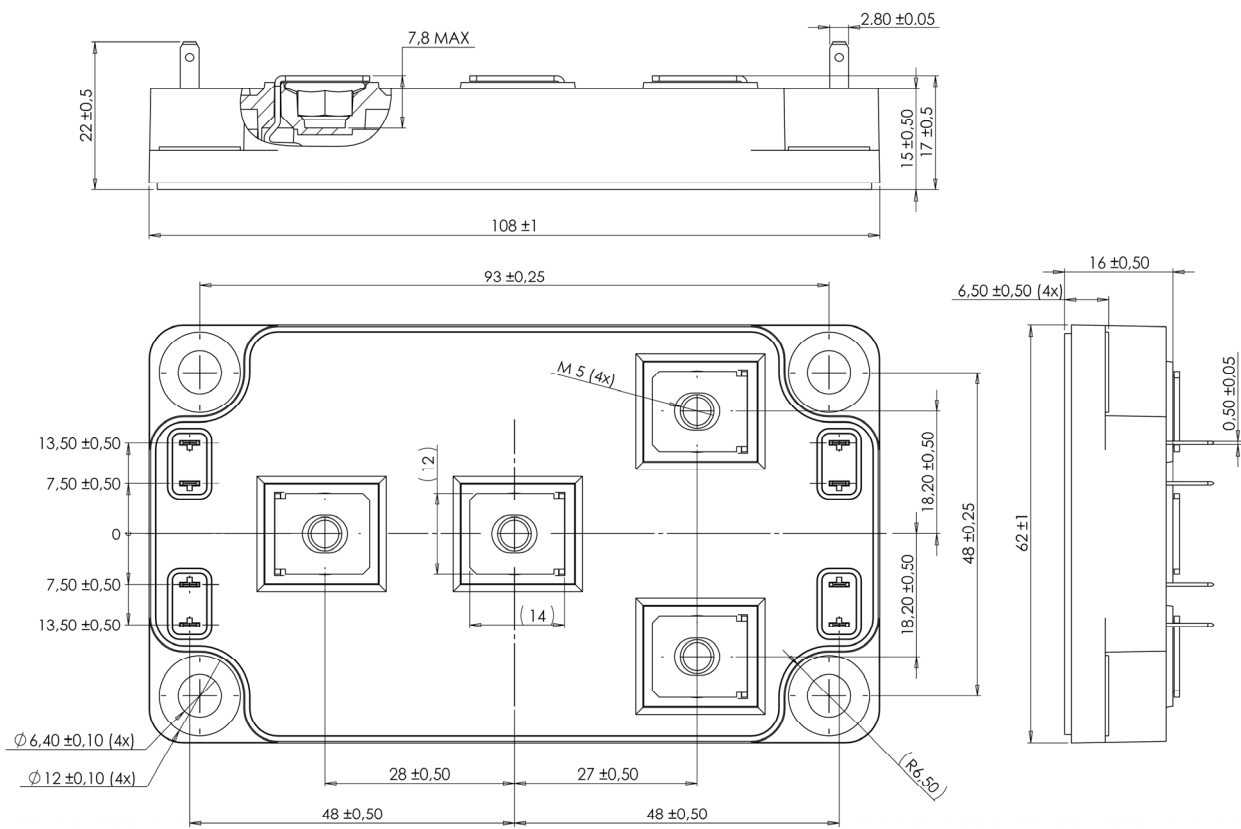
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$		12.3		nF
$C_{oes}$	Output Capacitance	$V_{CE} = 25V$		0.7		
$C_{res}$	Reverse Transfer Capacitance	$f = 1MHz$		0.6		
$Q_G$	Gate charge	$V_{GE} = 15V ; V_{CE} = 960V$ $I_C = 200A$		900		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 200A$ $R_G = 2.5\Omega$		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) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 200A$ $R_G = 2.5\Omega$		30		ns
$T_r$	Rise Time			49		
$T_{d(off)}$	Turn-off Delay Time			366		
$T_f$	Fall Time			48		
$E_{on}$	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 200A$		18		mJ
$E_{off}$	Turn-off Switching Energy	$R_G = 2.5\Omega$		11		mJ
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 600V$ $t_p \leq 10\mu s ; T_j = 150^\circ C$		700		A
$R_{thJC}$	Junction to Case Thermal Resistance				0.15	$^\circ C/W$

**Diode ratings and characteristics (Per diode)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$V_{RRM}$	Repetitive Reverse Voltage		1200			V	
$I_{RM}$	Reverse Leakage Current	$V_R = 1200V$			150	$\mu A$	
$I_F$	DC Forward Current	$T_C = 60^\circ C$		200		A	
$V_F$	Diode Forward Voltage	$I_F = 200A$ $V_{GE} = 0V$		1.9 1.85	2.2	V	
$t_{rr}$	Reverse Recovery Time	$I_F = 200A$ $V_R = 600V$ $di/dt = 4000A/\mu s$		155 300		ns	
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ C$ $T_j = 150^\circ C$		18.6 39		$\mu C$
$E_r$	Reverse Recovery Energy		$T_j = 25^\circ C$ $T_j = 150^\circ C$		8 16	mJ	
$R_{thJC}$	Junction to Case Thermal Resistance					0.25	$^\circ C/W$

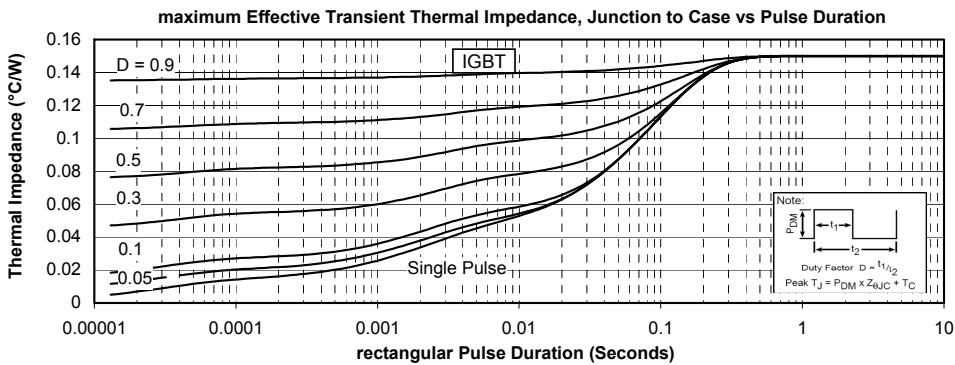
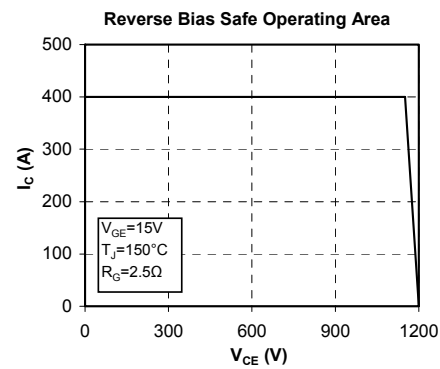
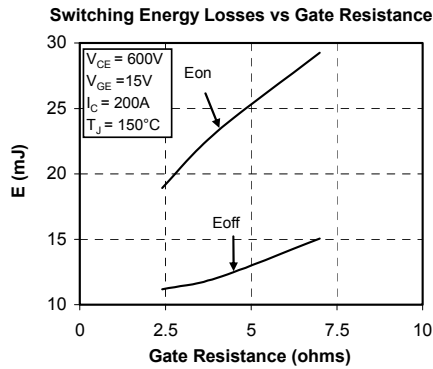
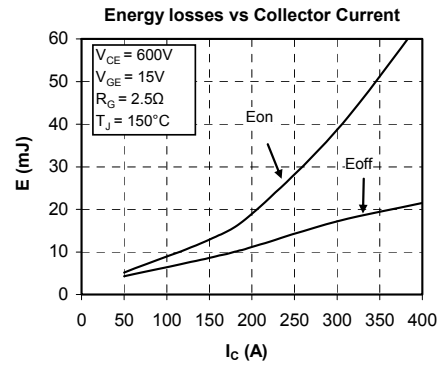
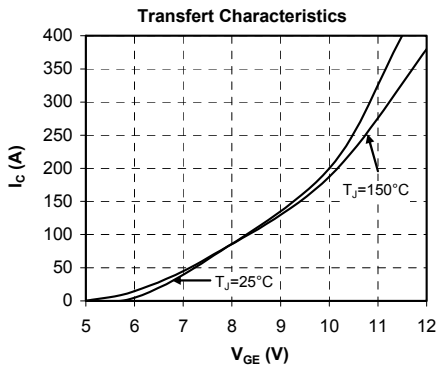
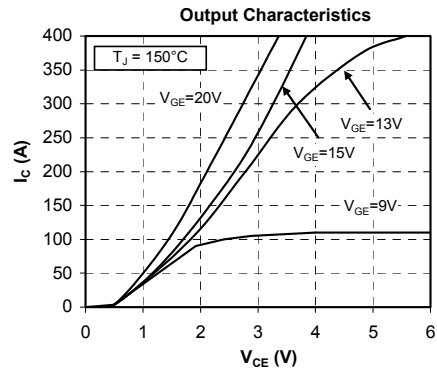
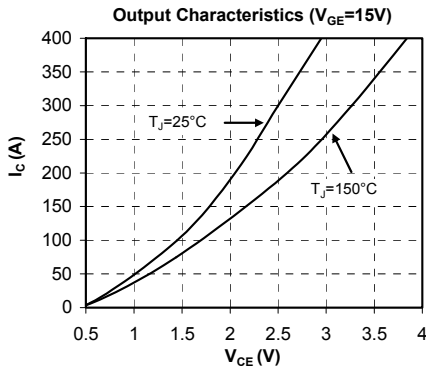
**Thermal and package characteristics**

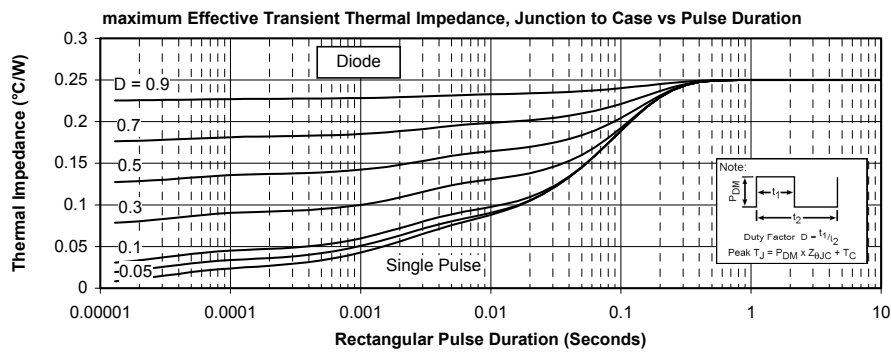
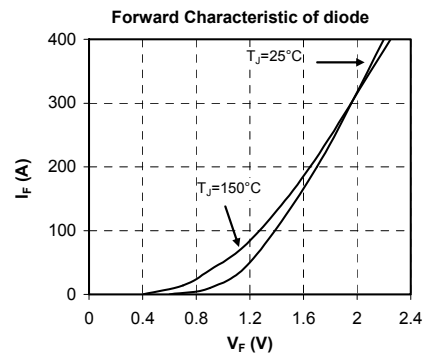
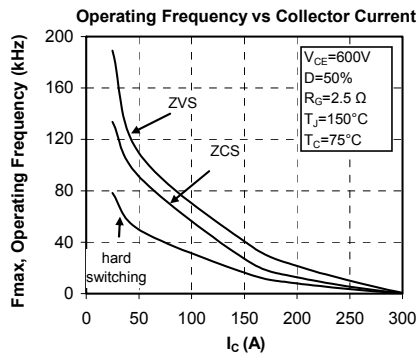
Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	175	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> -25			
T <sub>STG</sub>	Storage Temperature Range	-40	125			
T <sub>C</sub>	Operating Case Temperature	-40	100			
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](http://www.microsemi.com)

## Typical Performance Curve





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