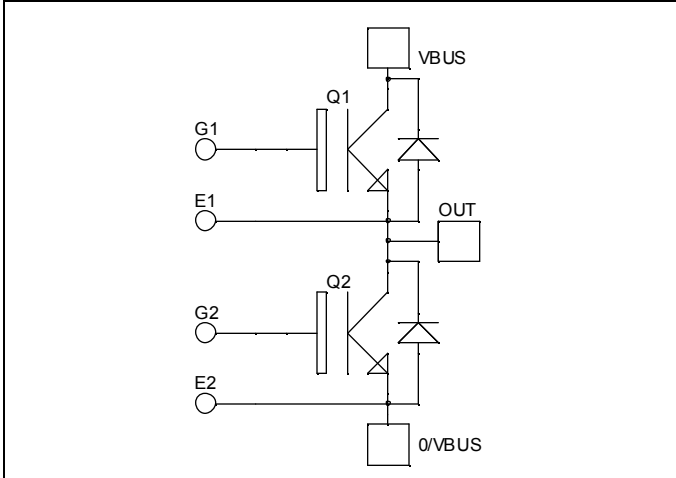


**Phase leg**  
**Fast Trench + Field Stop IGBT®**  
**Power Module**

www.datasheet4u.com

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

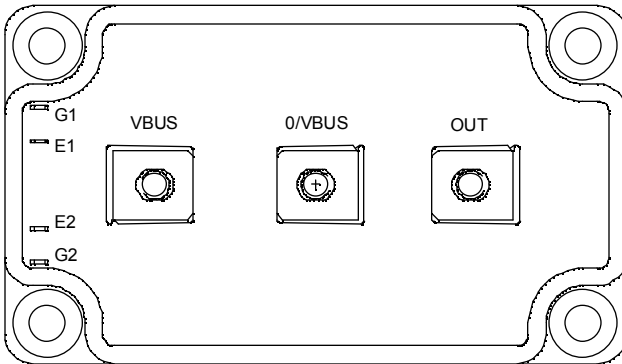


### Application

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

### Features

- Fast Trench + Field Stop IGBT® Technology
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 20 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - RBSOA and SCSOA rated
- Kelvin emitter 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

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_c = 25^{\circ}C$	280
		$T_c = 80^{\circ}C$	200
$I_{CM}$	Pulsed Collector Current	$T_c = 25^{\circ}C$	400
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^{\circ}C$	890
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

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

## Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}, V_{CE} = 1200\text{V}$			350	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 200\text{A}$	$T_j = 25^\circ\text{C}$ 1.4	$T_j = 25^\circ\text{C}$ 1.7	$T_j = 25^\circ\text{C}$ 2.1	V
			$T_j = 125^\circ\text{C}$	2.0		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 3\text{mA}$	5.0	5.8	6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			500	nA

## Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		14		nF
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		0.8		
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.6		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 200\text{A}$ $R_G = 2.7\Omega$		260		ns
$T_r$	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			420		
$T_f$	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 200\text{A}$ $R_G = 2.7\Omega$		290		ns
$T_r$	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			520		
$T_f$	Fall Time			90		
$E_{on}$	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$	20		mJ
$E_{off}$	Turn off Energy	$I_C = 200\text{A}$ $R_G = 2.7\Omega$	$T_j = 125^\circ\text{C}$	20		

## Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$			$T_j = 25^\circ\text{C}$ 350 $T_j = 125^\circ\text{C}$ 600	$\mu\text{A}$
$I_F$	DC Forward Current			200		A
$V_F$	Diode Forward Voltage	$I_F = 200\text{A}$ $V_{GE} = 0\text{V}$		$T_j = 25^\circ\text{C}$ 1.6 $T_j = 125^\circ\text{C}$ 1.6	2.1	V
$t_{rr}$	Reverse Recovery Time	$I_F = 200\text{A}$ $V_R = 600\text{V}$ $di/dt = 2500\text{A}/\mu\text{s}$		$T_j = 25^\circ\text{C}$ 170 $T_j = 125^\circ\text{C}$ 280		ns
$Q_{rr}$	Reverse Recovery Charge			$T_j = 25^\circ\text{C}$ 18 $T_j = 125^\circ\text{C}$ 36		$\mu\text{C}$
$E_r$	Reverse Recovery Energy			$T_j = 25^\circ\text{C}$ 10 $T_j = 125^\circ\text{C}$ 18		mJ

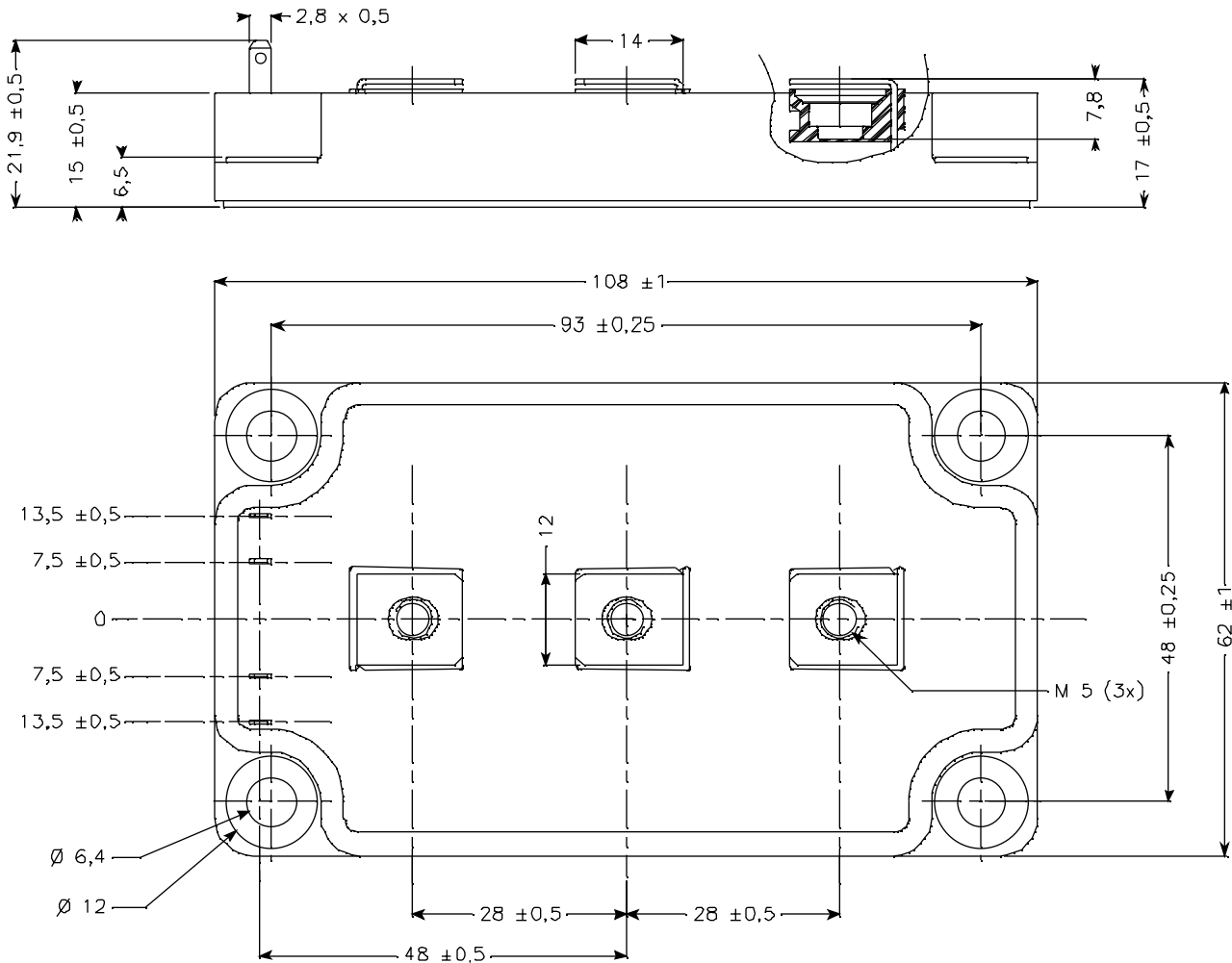
## Thermal and package characteristics

**Symbol Characteristic**

**Min Typ Max Unit**

Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case Thermal Resistance	IGBT		0.14	°C/W	
		Diode		0.25		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <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	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight			280	g	

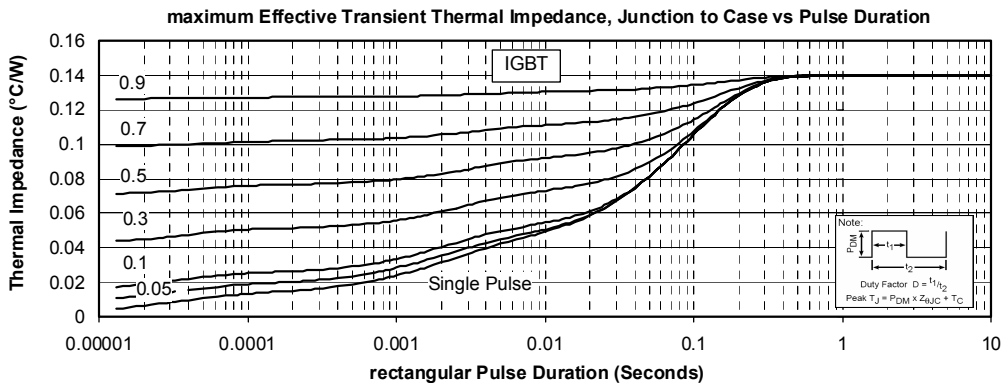
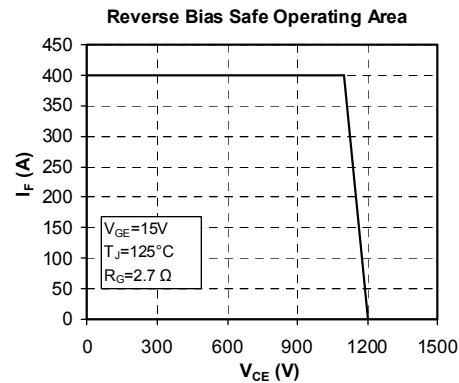
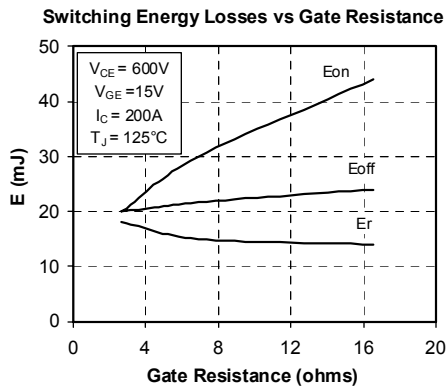
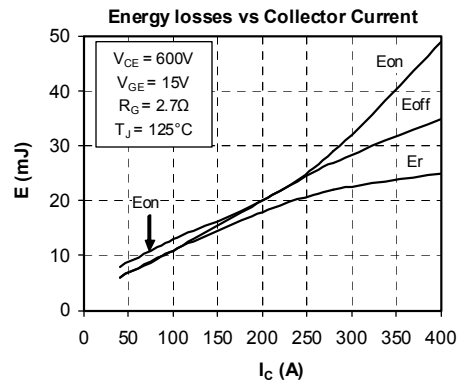
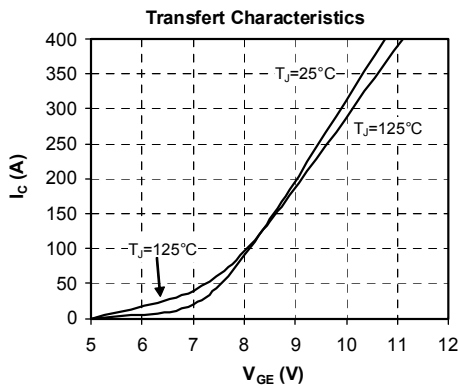
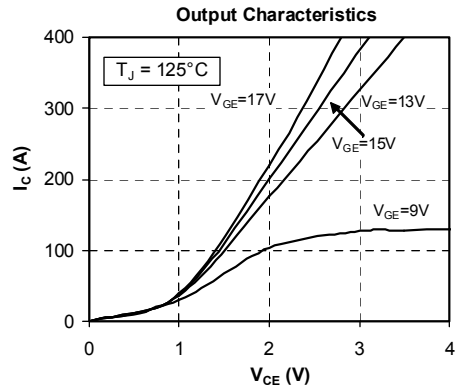
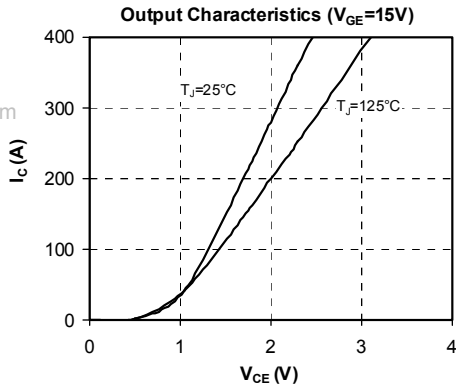
## SP6 Package outline (dimensions in mm)



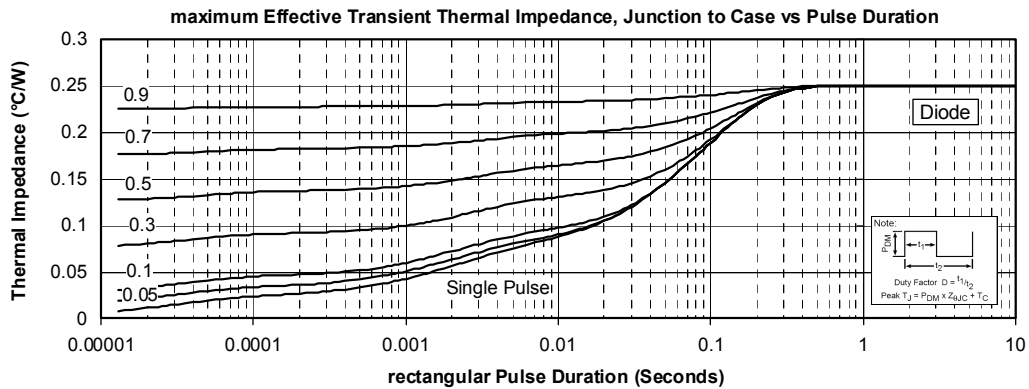
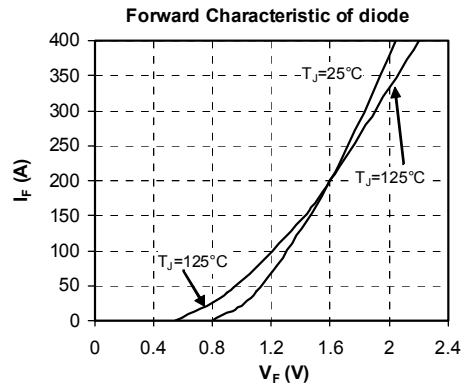
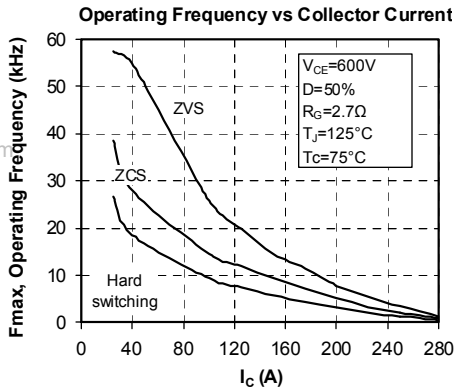
See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve

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