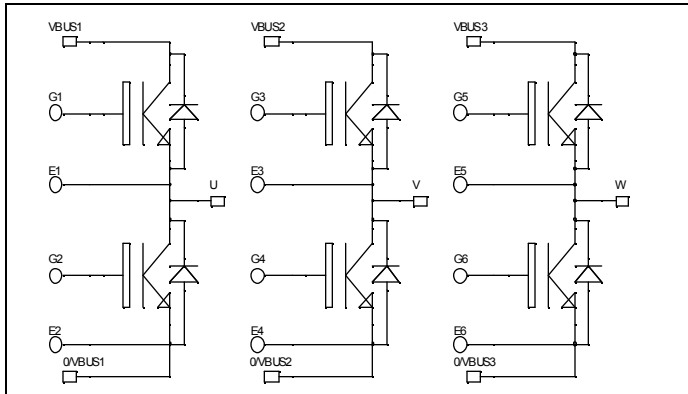


**Triple phase leg  
Fast Trench + Field Stop IGBT®  
Power Module**

**$V_{CES} = 1200V$   
 $I_C = 75A @ T_c = 80^\circ C$**

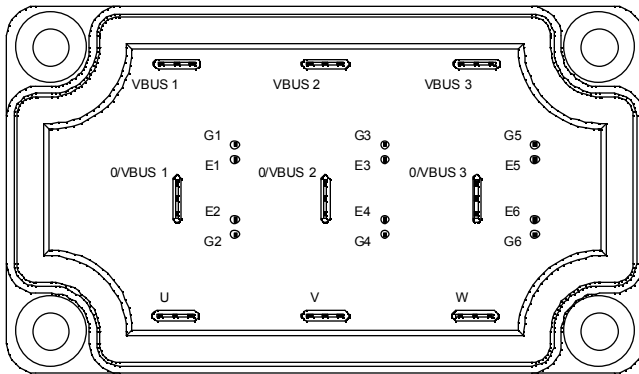


### Application

- 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
  - Lead frames for power connections
- High level of integration



### Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- 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
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	100
		$T_C = 80^\circ C$	75
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	175
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	350
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	150A@1150V

**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)

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	$V_{GE} = 0\text{V}$ , $V_{CE} = 1200\text{V}$			250	$\mu\text{A}$
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 75\text{A}$	$T_j = 25^\circ\text{C}$ 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		6.5	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$ , $V_{CE} = 0\text{V}$			400	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$		5340		pF
$C_{oes}$	Output Capacitance	$V_{CE} = 25\text{V}$		280		
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		240		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ )		260		ns
$T_r$	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$		30		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 75\text{A}$		420		
$T_f$	Fall Time	$R_G = 4.7\Omega$		70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ )		285		ns
$T_r$	Rise Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 75\text{A}$		520		
$T_f$	Fall Time	$R_G = 4.7\Omega$		90		
$E_{on}$	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$	7		mJ
$E_{off}$	Turn-off Switching Energy	$I_C = 75\text{A}$ $R_G = 4.7\Omega$	$T_j = 125^\circ\text{C}$	8.1		

**Reverse diode ratings and characteristics**

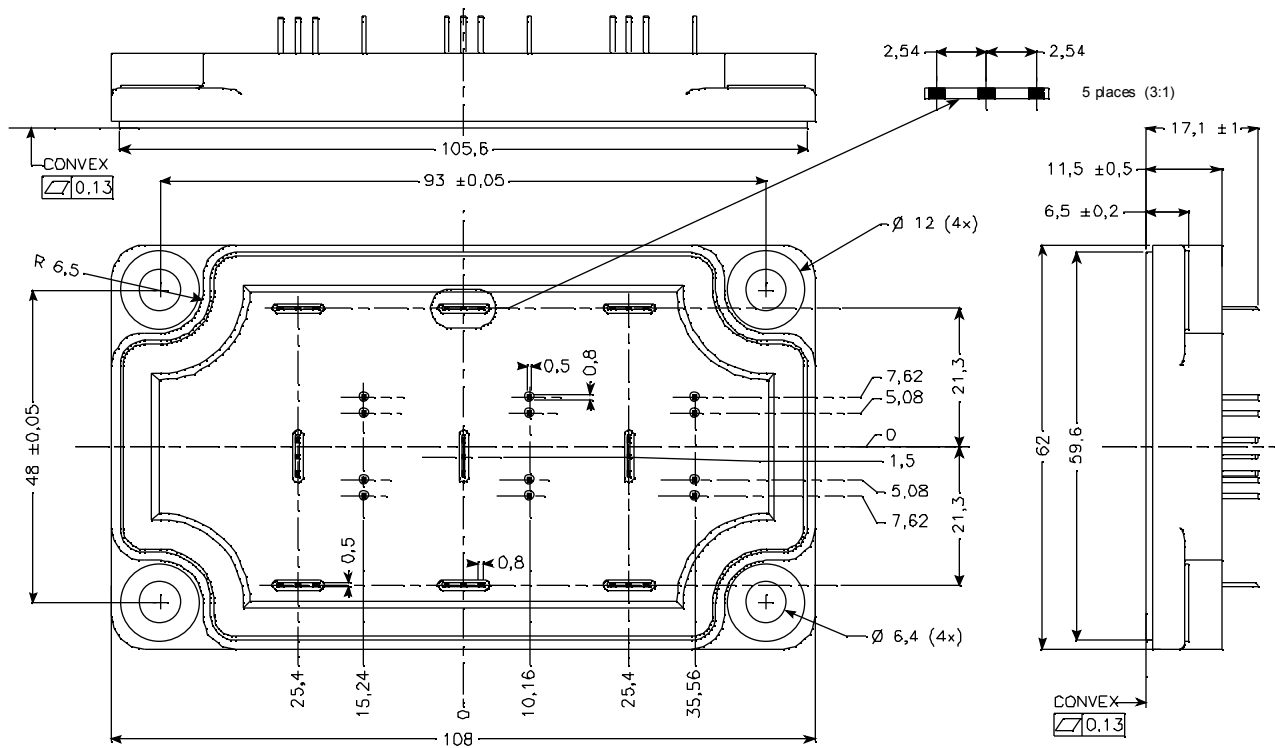
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$			$T_j = 25^\circ\text{C}$ 250 $T_j = 125^\circ\text{C}$ 500	$\mu\text{A}$
$I_F$	DC Forward Current			$T_c = 80^\circ\text{C}$ 75		A
$V_F$	Diode Forward Voltage	$I_F = 75\text{A}$ $V_{GE} = 0\text{V}$		$T_j = 25^\circ\text{C}$ 1.6 $T_j = 125^\circ\text{C}$ 1.6	$T_j = 25^\circ\text{C}$ 2.1	V
$t_{rr}$	Reverse Recovery Time	$I_F = 75\text{A}$ $V_R = 600\text{V}$ $di/dt = 2000\text{A}/\mu\text{s}$		$T_j = 25^\circ\text{C}$ 170 $T_j = 125^\circ\text{C}$ 280		ns
$Q_{rr}$	Reverse Recovery Charge			$T_j = 25^\circ\text{C}$ 7 $T_j = 125^\circ\text{C}$ 14		$\mu\text{C}$
$E_r$	Reverse Recovery Energy			$T_j = 25^\circ\text{C}$ 3 $T_j = 125^\circ\text{C}$ 5.5		mJ

## Thermal and package characteristics

Symbol Characteristic

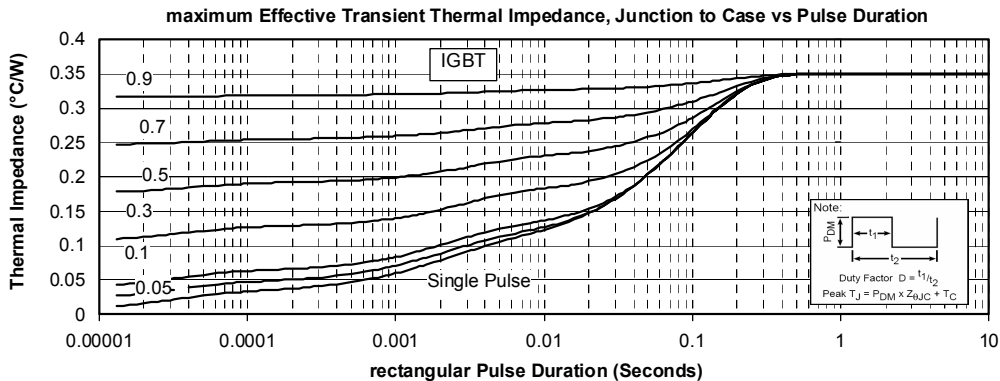
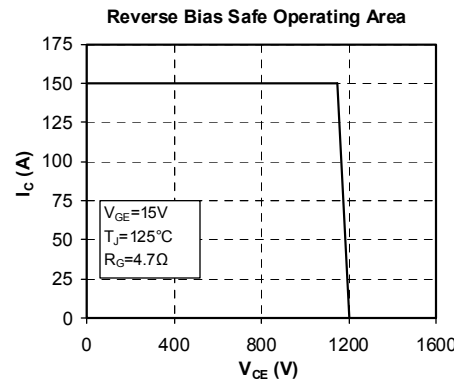
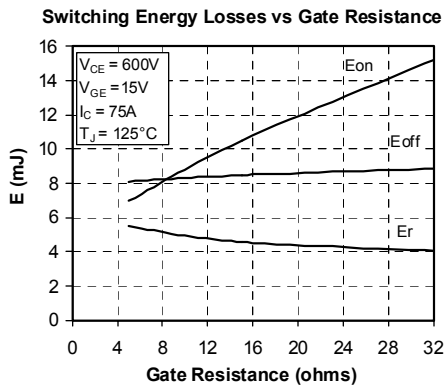
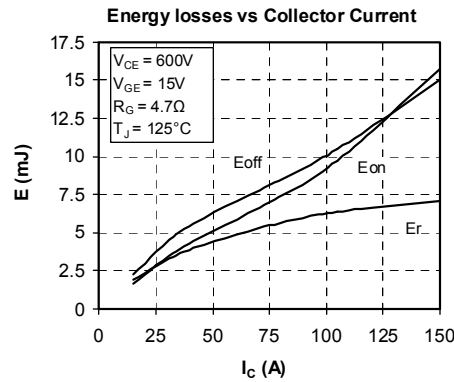
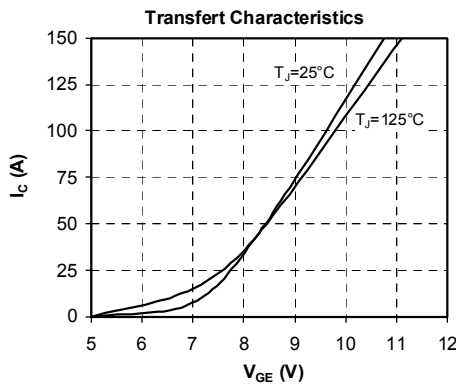
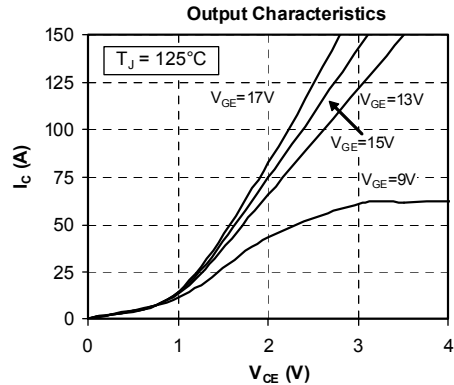
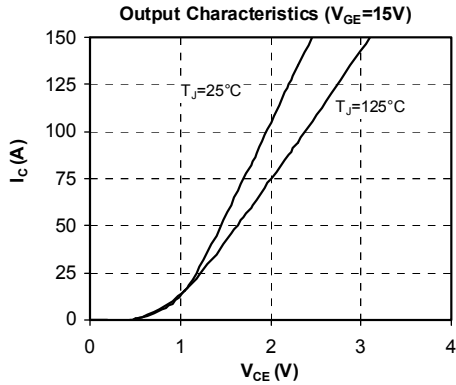
			Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	IGBT			0.35	°C/W
		Diode			0.58	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz		2500			V
T <sub>J</sub>	Operating junction temperature range		-40		150	°C
T <sub>STG</sub>	Storage Temperature Range		-40		125	
T <sub>C</sub>	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
Wt	Package Weight				250	g

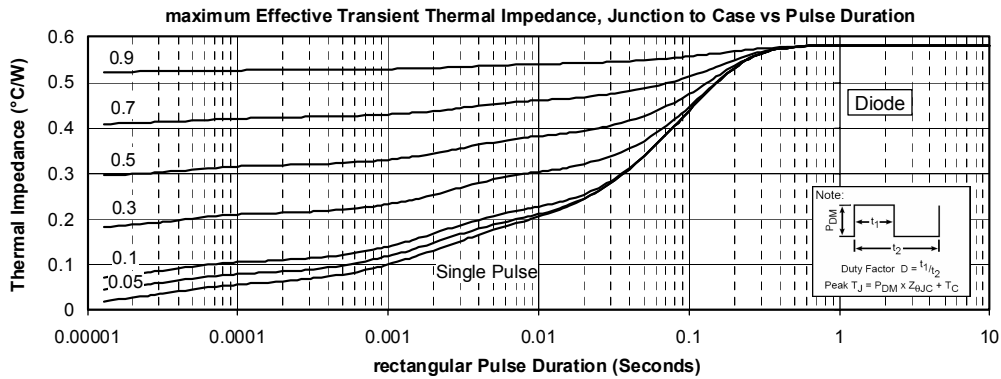
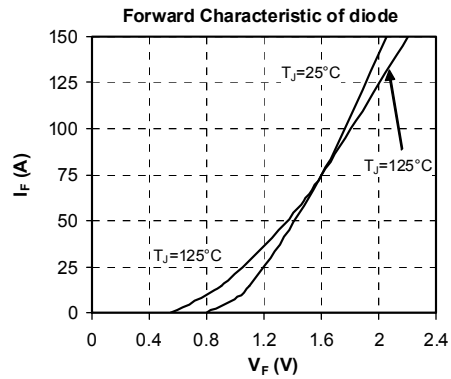
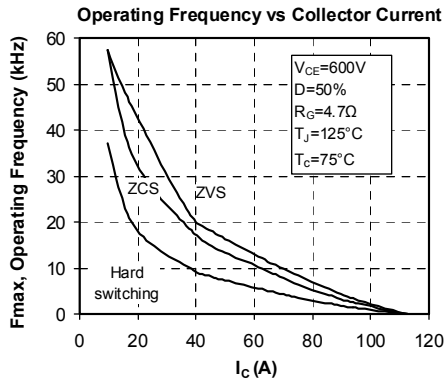
## SP6-P Package outline (dimensions in mm)



See application note 1902 - Mounting Instructions for SP6-P (12mm) Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve





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