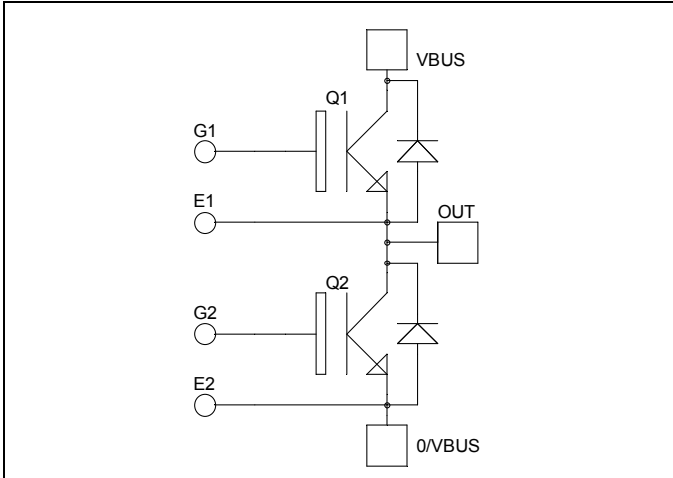


*Phase leg
Trench + Field Stop IGBT®
Power Module*

**$V_{CES} = 600V$
 $I_C = 600A^* @ T_c = 80^\circ C$**

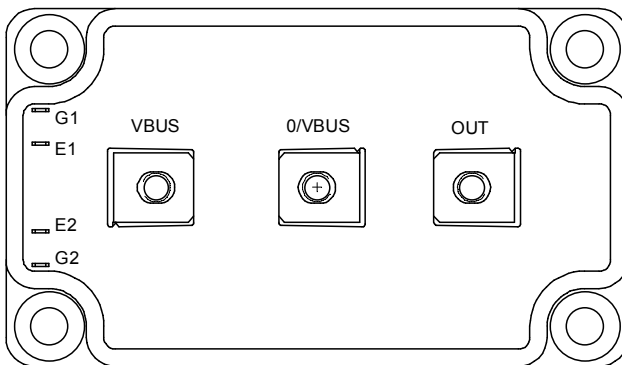


Application

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

Features

- 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 T_C of V_{CEsat}
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	700 *
		$T_C = 80^\circ C$	600 *
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2300
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	1200A @ 550V

* Specification of IGBT device but output current must be limited to 500A to not exceed a delta of temperature greater than 100°C for the connectors.

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	$V_{GE} = 0V, V_{CE} = 600V$			750	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 600A$	$T_j = 25^\circ\text{C}$	1.4	1.8	V
			$T_j = 150^\circ\text{C}$	1.5		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			800	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		49		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		3.1		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		1.5		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 600A$ $R_G = 1\Omega$		130		ns
T_r	Rise Time			55		
$T_{d(off)}$	Turn-off Delay Time			250		
T_f	Fall Time			60		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 600A$ $R_G = 1\Omega$		145		ns
T_r	Rise Time			60		
$T_{d(off)}$	Turn-off Delay Time			320		
T_f	Fall Time			80		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$	$T_j = 25^\circ\text{C}$	3		mJ
			$T_j = 150^\circ\text{C}$	5.5		
E_{off}	Turn off Energy	$I_C = 600A$ $R_G = 1\Omega$	$T_j = 25^\circ\text{C}$	17		mJ
			$T_j = 150^\circ\text{C}$	21		

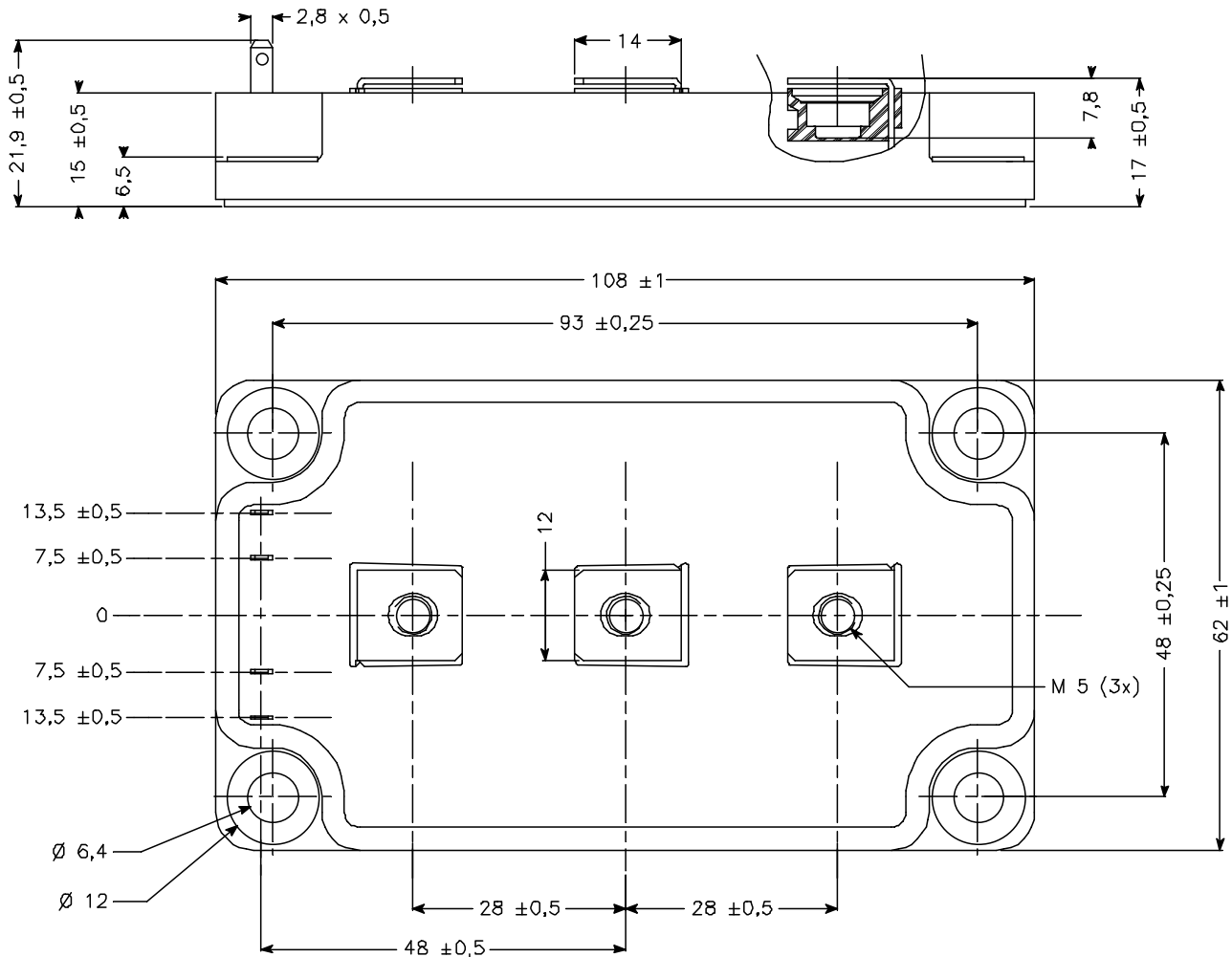
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ\text{C}$		350	μA
			$T_j = 150^\circ\text{C}$		550	
I_F	DC Forward Current		$T_C = 80^\circ\text{C}$	600		A
V_F	Diode Forward Voltage	$I_F = 600A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$	1.5	1.9	V
			$T_j = 150^\circ\text{C}$	1.4		
t_{rr}	Reverse Recovery Time	$I_F = 600A$ $V_R = 300V$ $di/dt = 5000A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	120		ns
			$T_j = 150^\circ\text{C}$	210		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	27		μC
			$T_j = 150^\circ\text{C}$	57		
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	6.9		mJ
			$T_j = 150^\circ\text{C}$	14.1		

Thermal and package characteristics

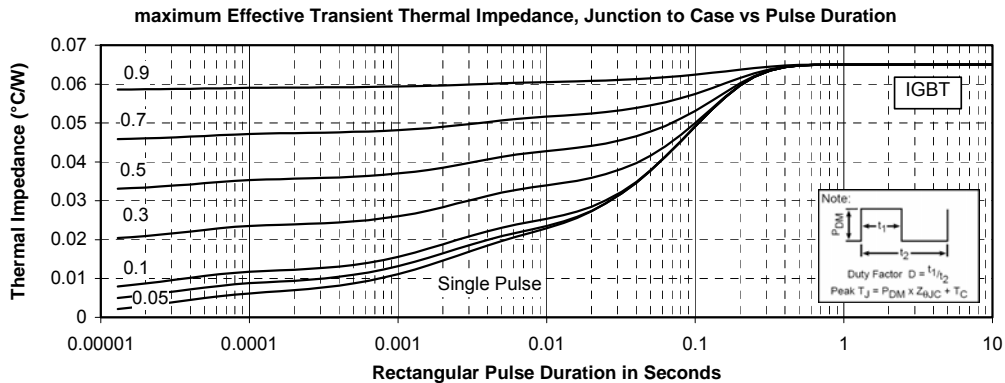
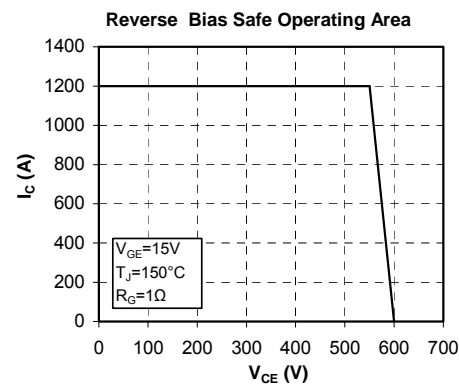
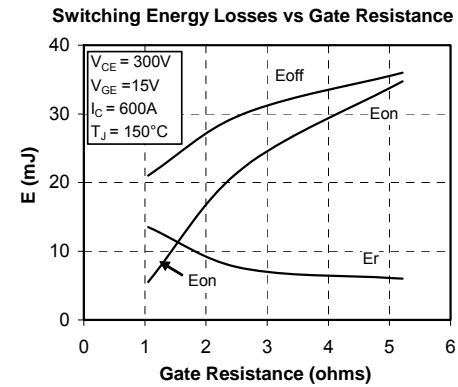
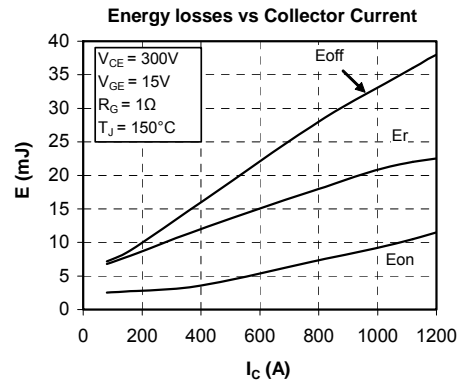
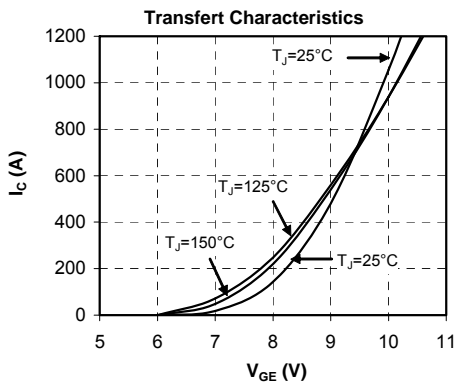
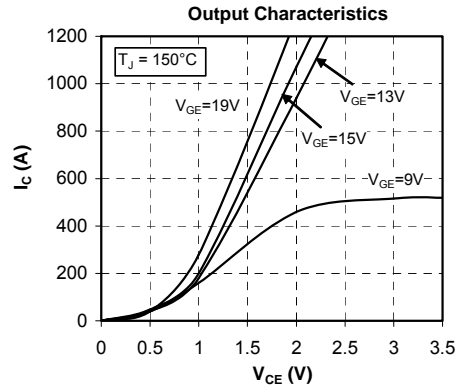
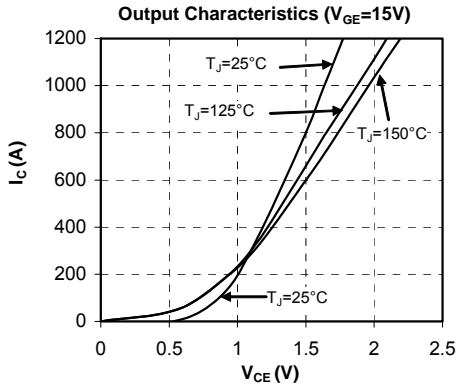
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.065	°C/W	
		Diode		0.11		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		175	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	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	

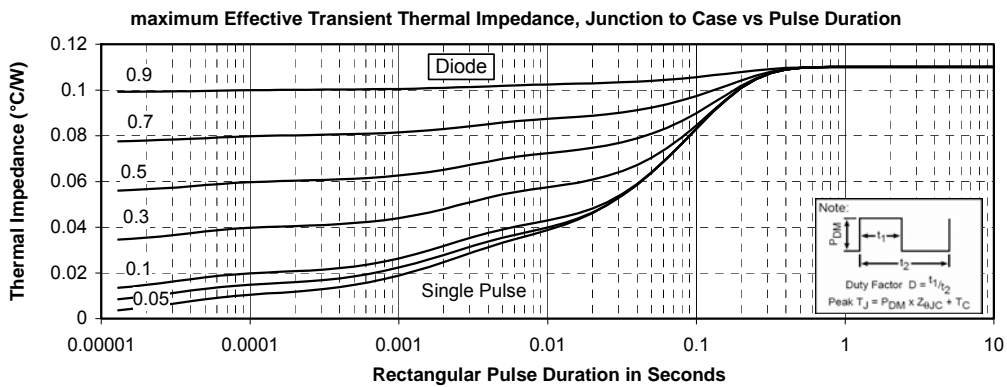
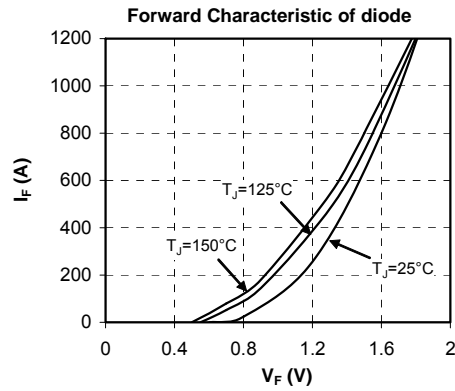
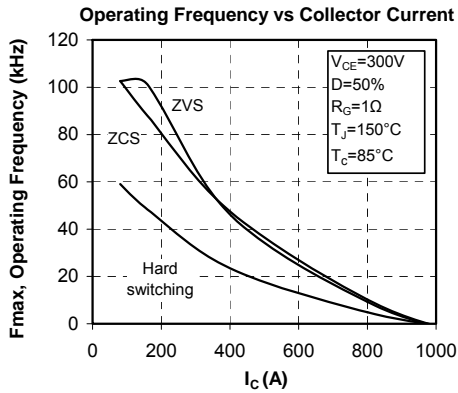
SP6 Package outline (dimensions in mm)



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

Typical Performance Curve





Microsemi reserves the right to change, without notice, the specifications and information contained herein

Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.