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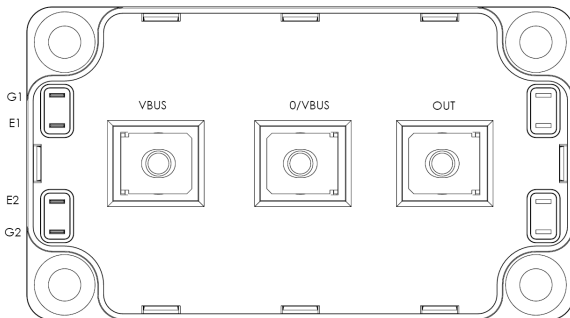
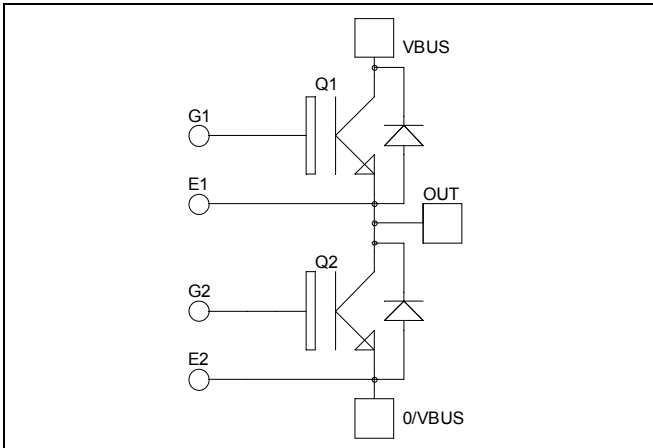
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Phase leg
Fast Trench + Field Stop IGBT3
Power Module

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



Application

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

Features

- Fast Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - 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	$T_c = 25^\circ C$	220	A
		$T_c = 80^\circ C$	150	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	350	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	690	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	300A @ 1150V	

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	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 150\text{A}$		1.7 2.0	2.1	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
$V_{GE(th)}$	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	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		10.7		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		0.56		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.48		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		280		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		40		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		420		
T_f	Fall Time	$I_C = 150\text{A}$ $R_G = 2.2\Omega$		75		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		290		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		45		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$		520		
T_f	Fall Time	$I_C = 150\text{A}$ $R_G = 2.2\Omega$		90		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$	14		mJ
E_{off}	Turn-off Switching Energy	$I_C = 150\text{A}$ $R_G = 2.2\Omega$	$T_j = 125^\circ\text{C}$	16		

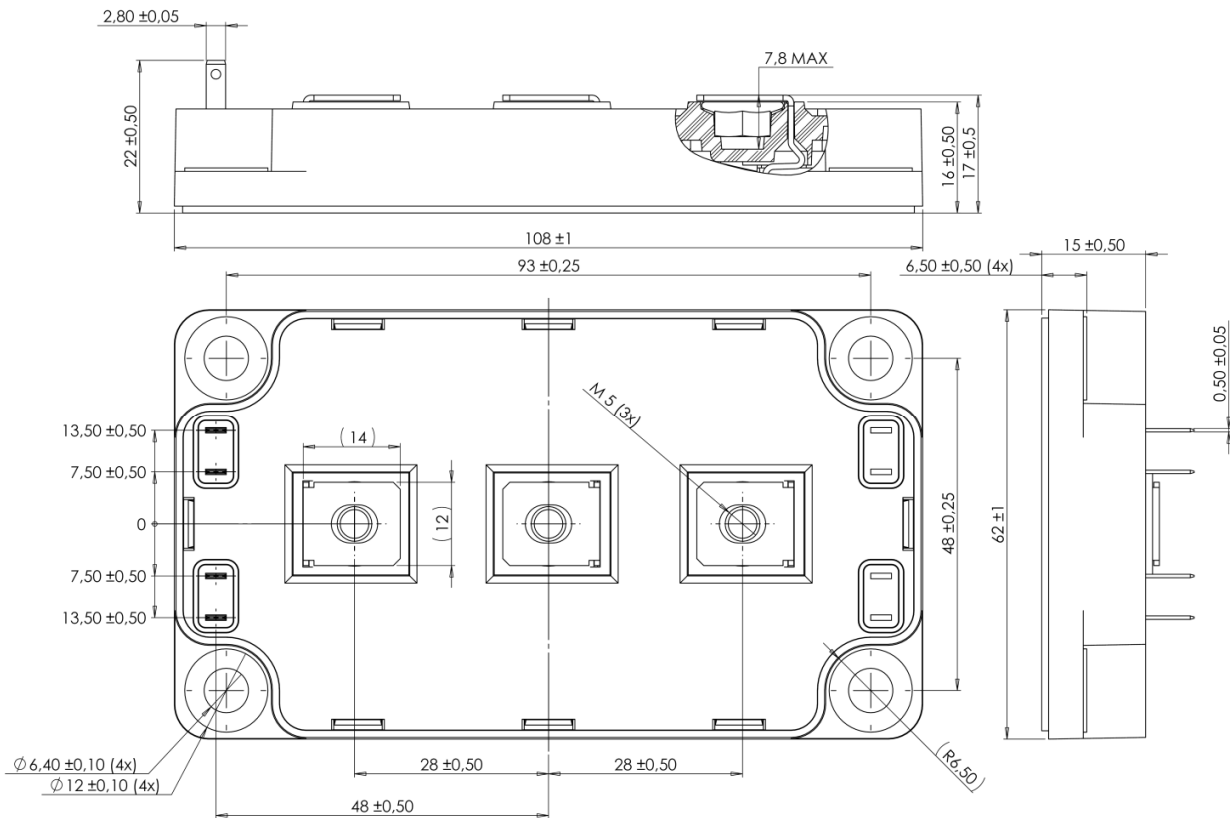
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$			250 600	μA
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
I_F	DC Forward Current			150		A
		$T_c = 80^\circ\text{C}$				
V_F	Diode Forward Voltage	$I_F = 150\text{A}$		1.6 1.6	2.1	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
t_{rr}	Reverse Recovery Time			170 280		ns
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
Q_{rr}	Reverse Recovery Charge	$I_F = 150\text{A}$ $V_R = 600\text{V}$ $di/dt = 2500\text{A}/\mu\text{s}$		14 28		μC
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
E_r	Reverse Recovery Energy			6 11		mJ
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				

Thermal and package characteristics

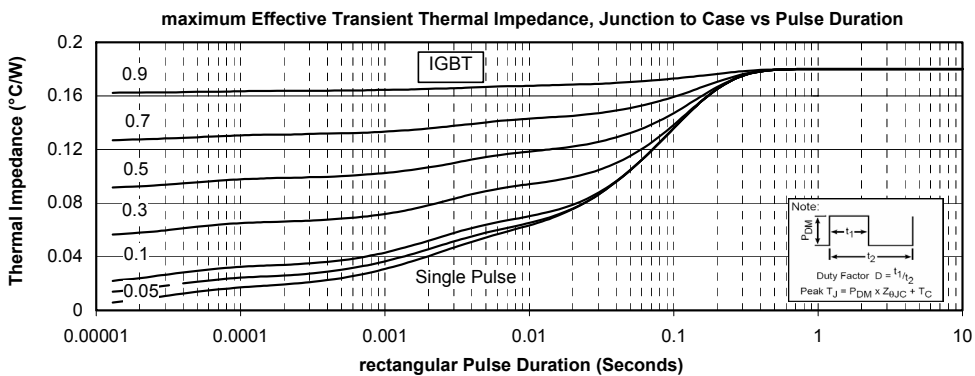
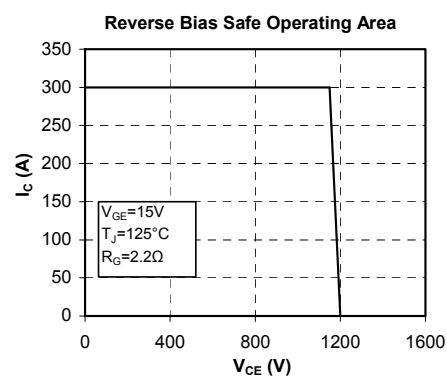
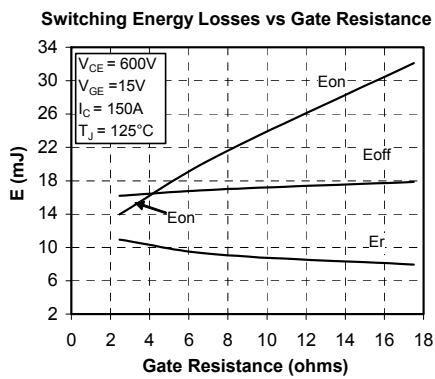
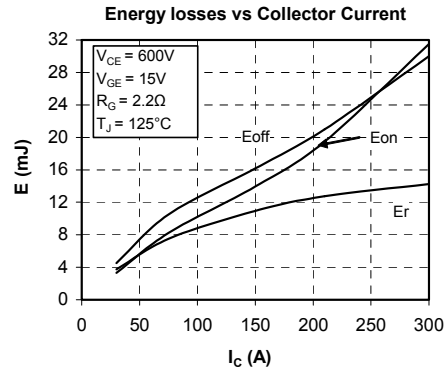
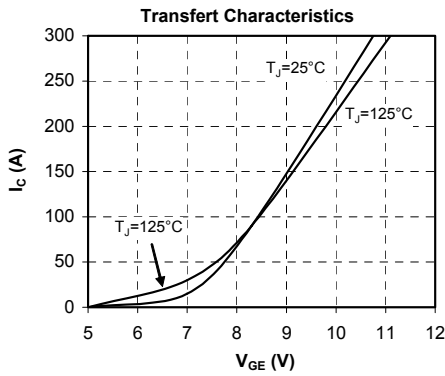
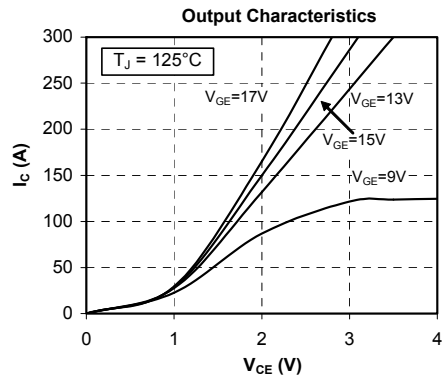
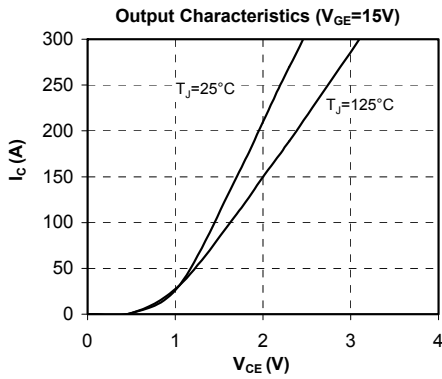
<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.18	°C/W	
		Diode		0.32		
V_{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T_J	Operating junction temperature range	-40		150	°C	
T_{STG}	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			300	g	

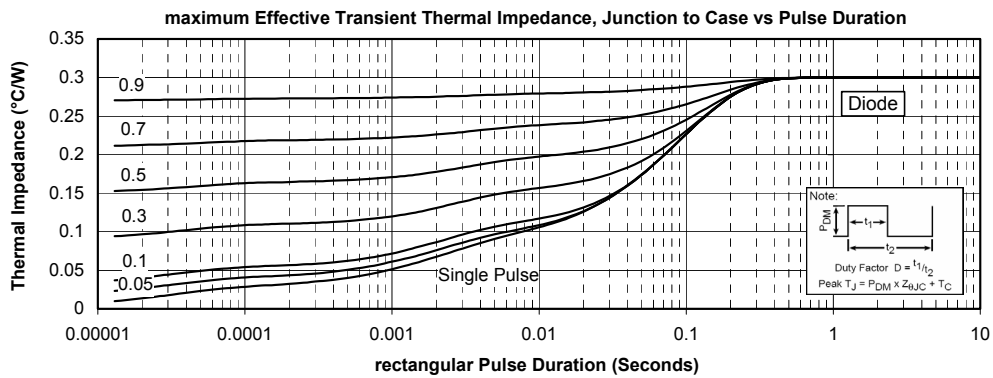
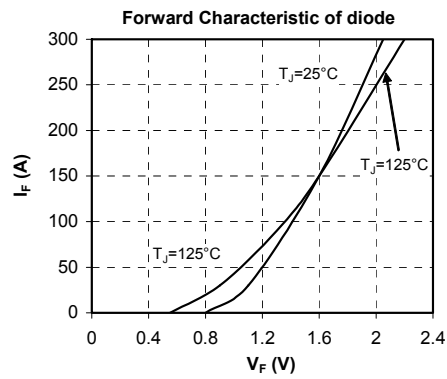
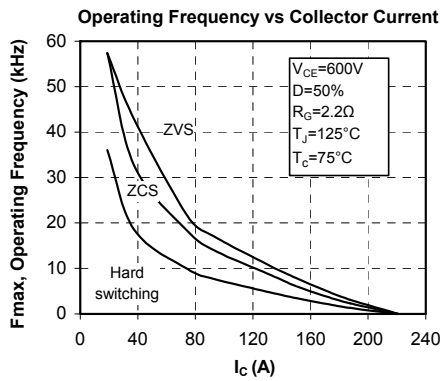
SP6 Package outline (dimensions in mm)



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

Typical Performance Curve





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