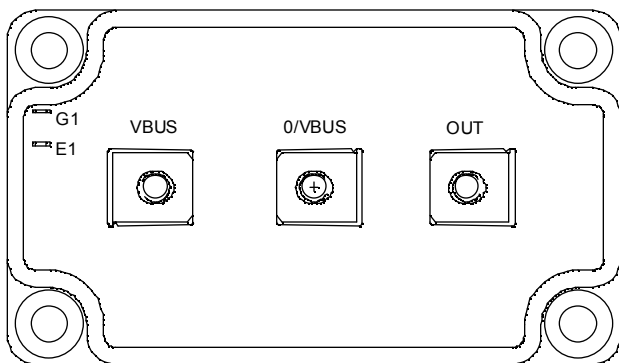
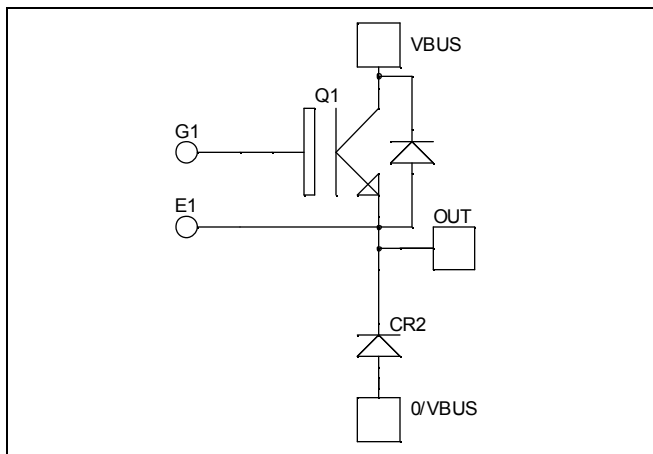


Buck chopper NPT IGBT Power Module

**$V_{CES} = 1200V$
 $I_C = 300A @ T_c = 80^\circ C$**



Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Non Punch Through (NPT) FAST IGBT
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 50 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

- Outstanding performance at high frequency operation
- 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		1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	400	A
		$T_c = 80^\circ C$	300	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	600	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1780	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	600A @ 1200V	



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

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}$ $V_{CE} = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			500 750	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 300\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		3.3 4	3.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12\text{mA}$		4.5		6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$				± 1	μA

Dynamic Characteristics

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$			21		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$			2.9		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			1.52		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)			120		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$			50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$			310		
T_f	Fall Time	$R_G = 3\Omega$			30		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)			130		ns
T_r	Rise Time	$V_{GE} = 15\text{V}$			60		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 600\text{V}$ $I_C = 300\text{A}$			360		
T_f	Fall Time	$R_G = 3\Omega$			40		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15\text{V}$ $V_{Bus} = 600\text{V}$	$T_j = 125^\circ\text{C}$		25		mJ
E_{off}	Turn-off Switching Energy	$I_C = 300\text{A}$ $R_G = 3\Omega$	$T_j = 125^\circ\text{C}$		15		

Chopper diode ratings and characteristics

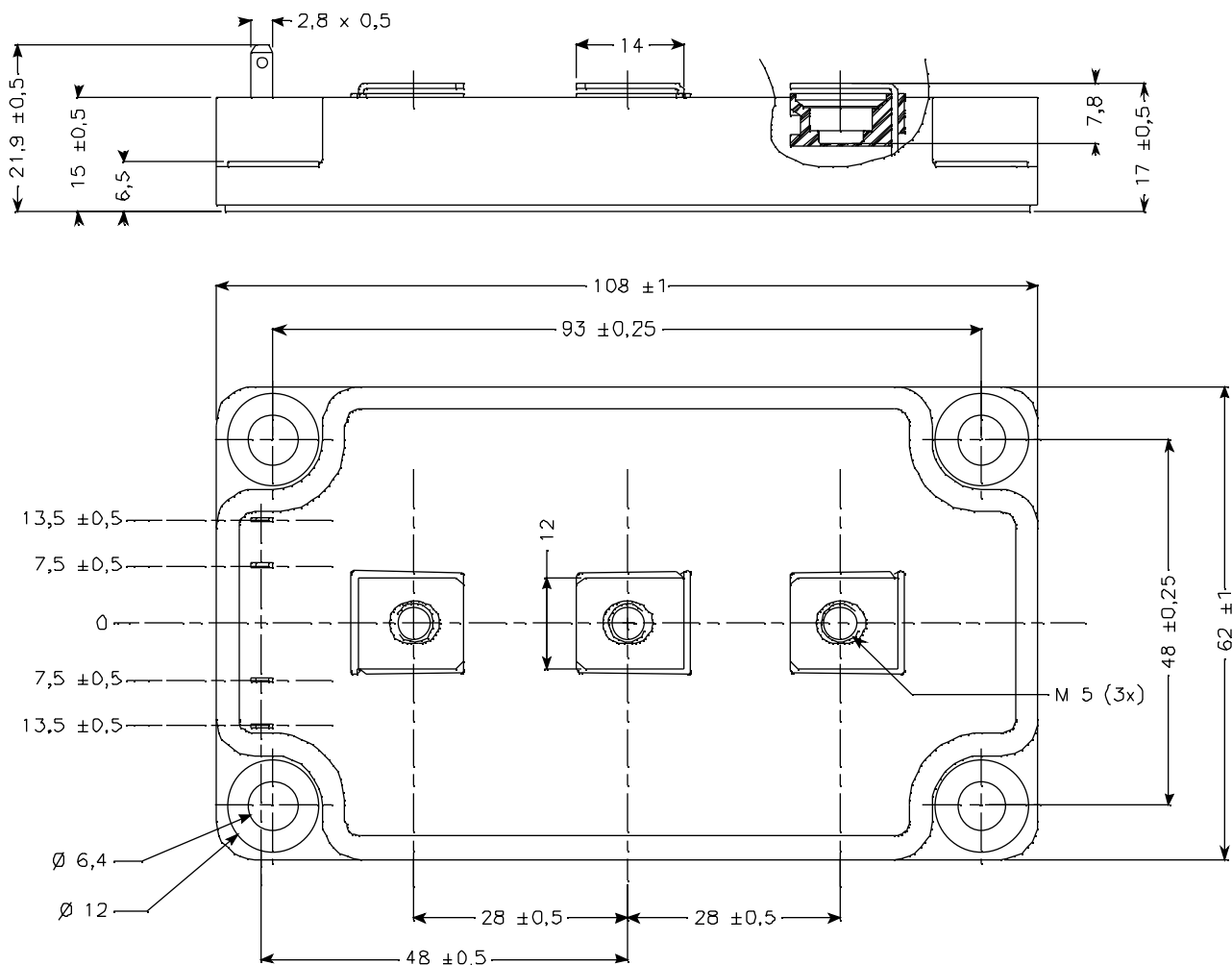
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			750 1000	μA
I_F	DC Forward Current		$T_c = 70^\circ\text{C}$		400		A
V_F	Diode Forward Voltage	$I_F = 400\text{A}$			2.0	2.5	V
		$I_F = 800\text{A}$			2.5		
		$I_F = 400\text{A}$	$T_j = 125^\circ\text{C}$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 400\text{A}$ $V_R = 800\text{V}$ $di/dt = 800\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		420		ns
			$T_j = 125^\circ\text{C}$		580		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		5 21.4		μC

Thermal and package characteristics

Symbol Characteristic

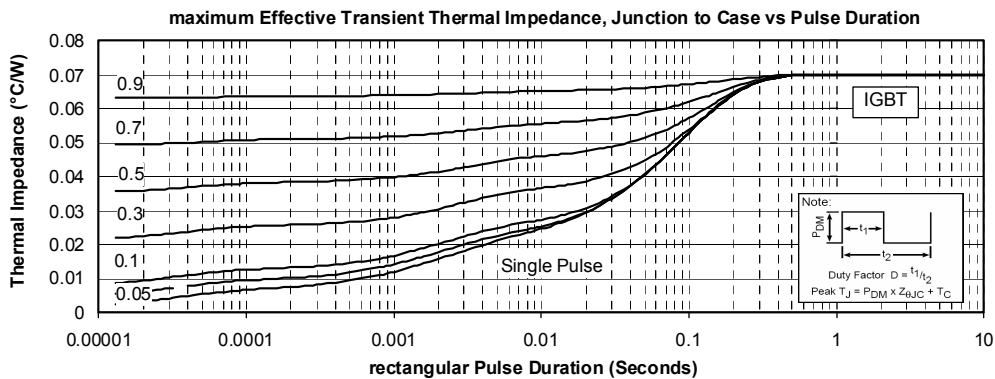
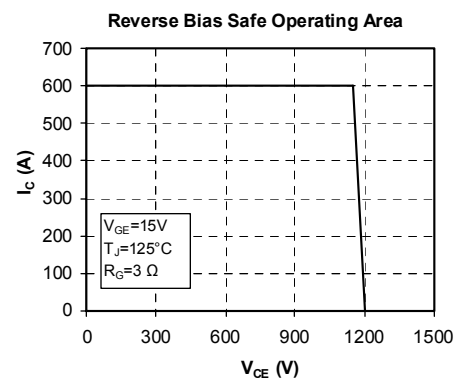
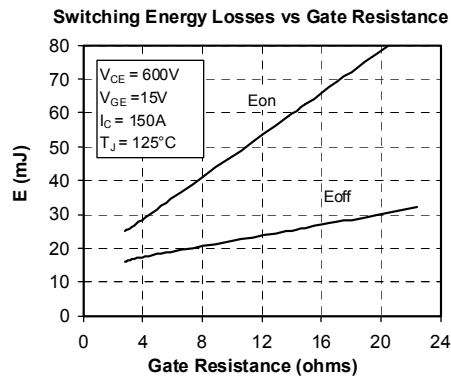
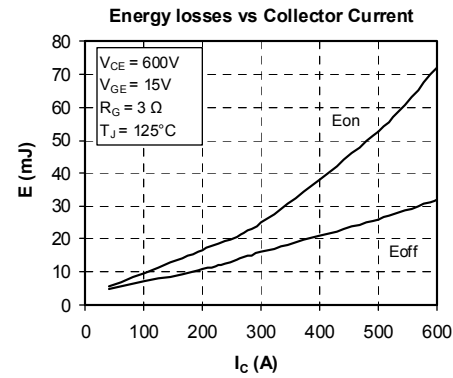
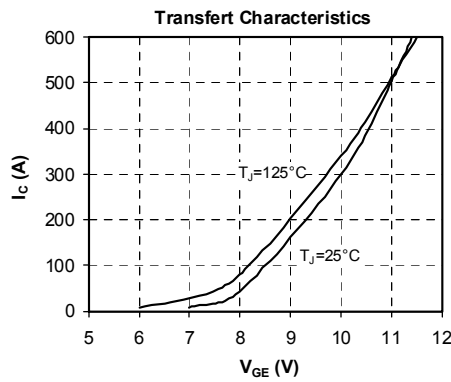
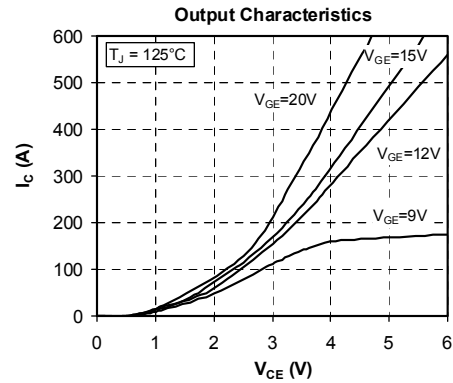
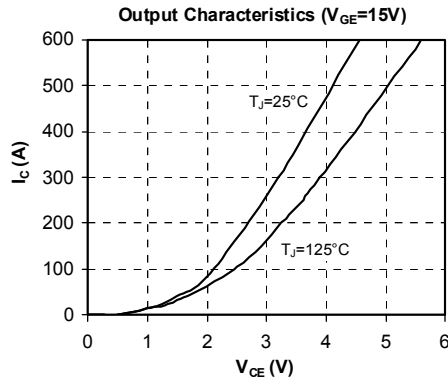
			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.07	°C/W
		Diode			0.16	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz		2500			V
T_J	Operating junction temperature range		-40		150	°C
T_{STG}	Storage Temperature 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				280	g

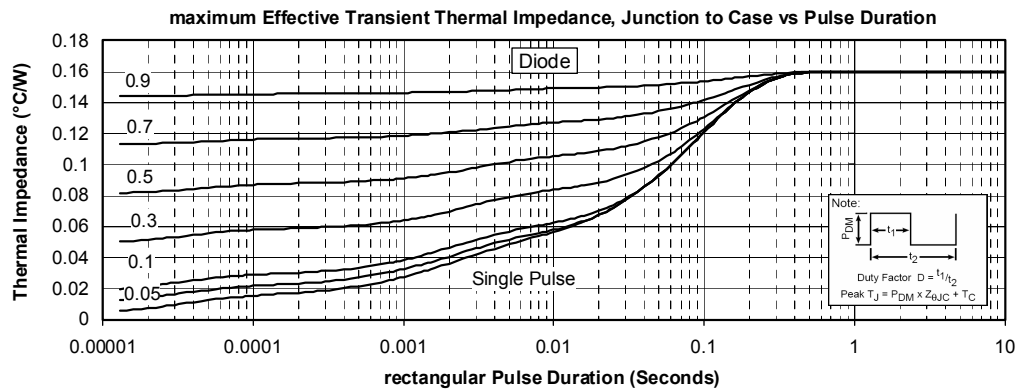
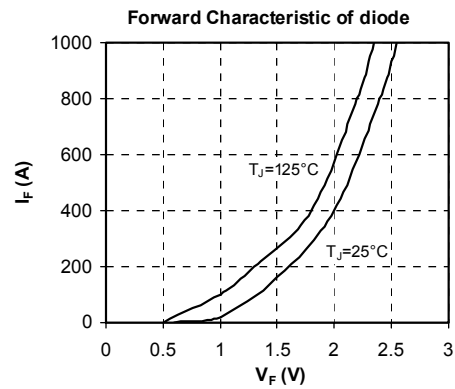
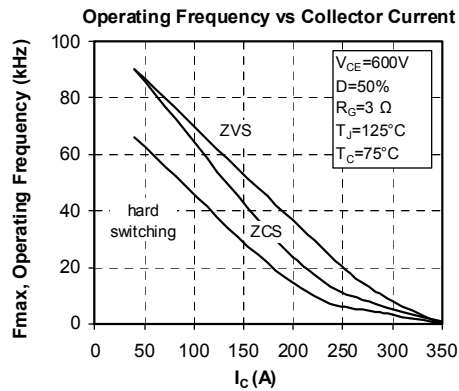
SP6 Package outline (dimensions in mm)



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.