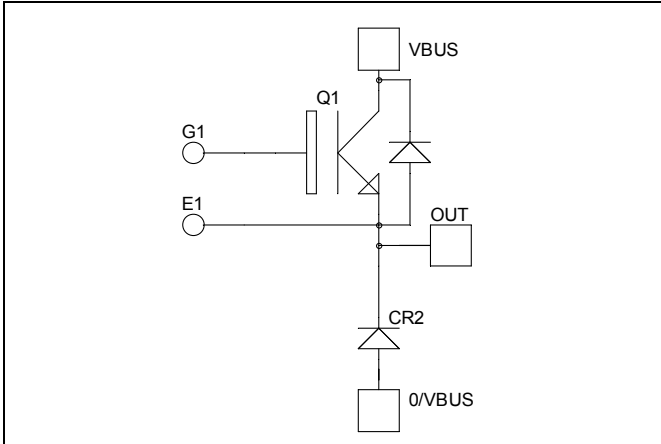


**Buck chopper
Trench + Field Stop IGBT3
Power Module**

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

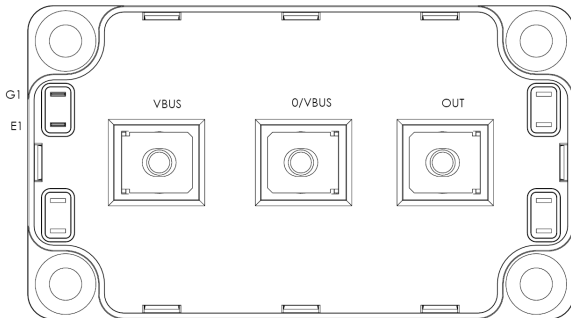


Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- 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		600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	700 *	A
		$T_c = 80^\circ C$	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	W
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	$V_{GE} = 0\text{V}$, $V_{CE} = 600\text{V}$			750	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 600\text{A}$		1.4 1.5	1.8	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 2\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$			800	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		49		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		3.1		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.5		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 2\Omega$		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) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$ $R_G = 2\Omega$		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	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$	$T_j = 25^\circ\text{C}$	3		mJ
			$T_j = 150^\circ\text{C}$	5.5		
E_{off}	Turn off Energy	$R_G = 2\Omega$	$T_j = 25^\circ\text{C}$	17		mJ
			$T_j = 150^\circ\text{C}$	21		

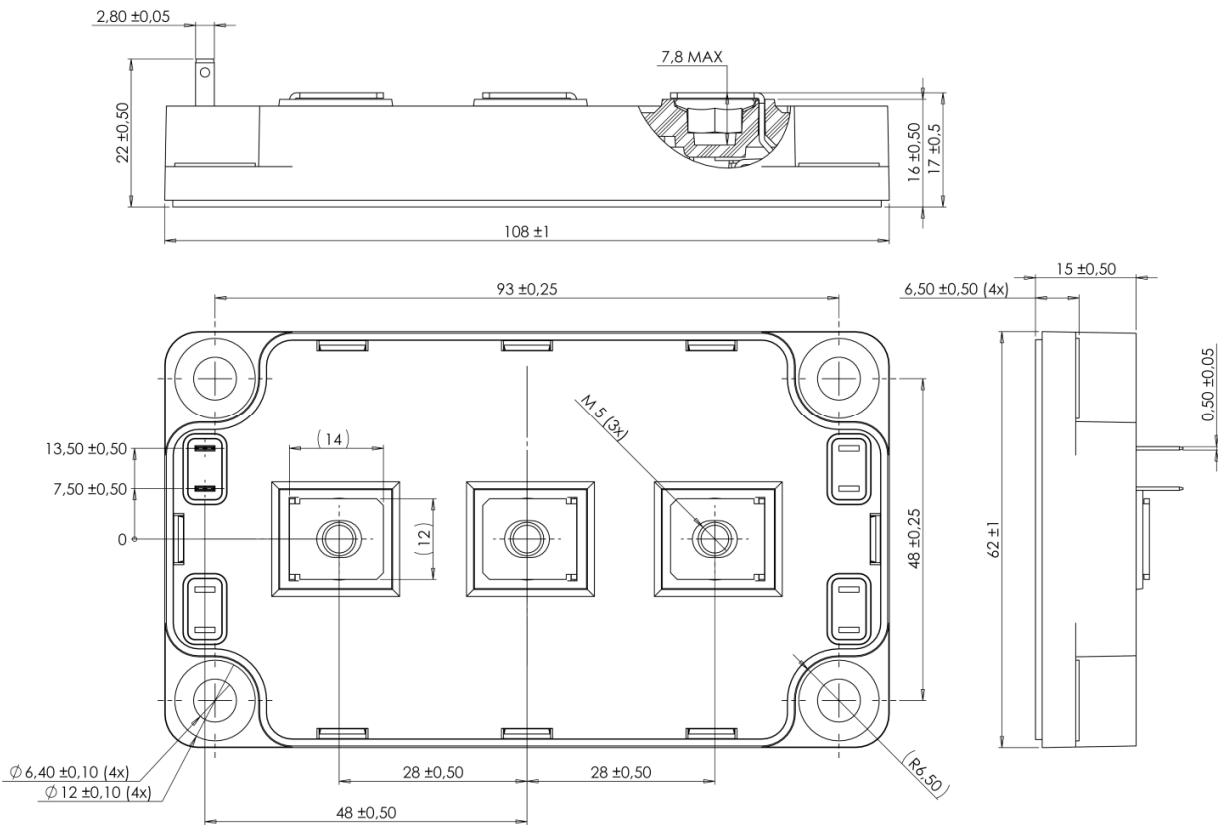
Chopper diode ratings and characteristics

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

Thermal and package characteristics

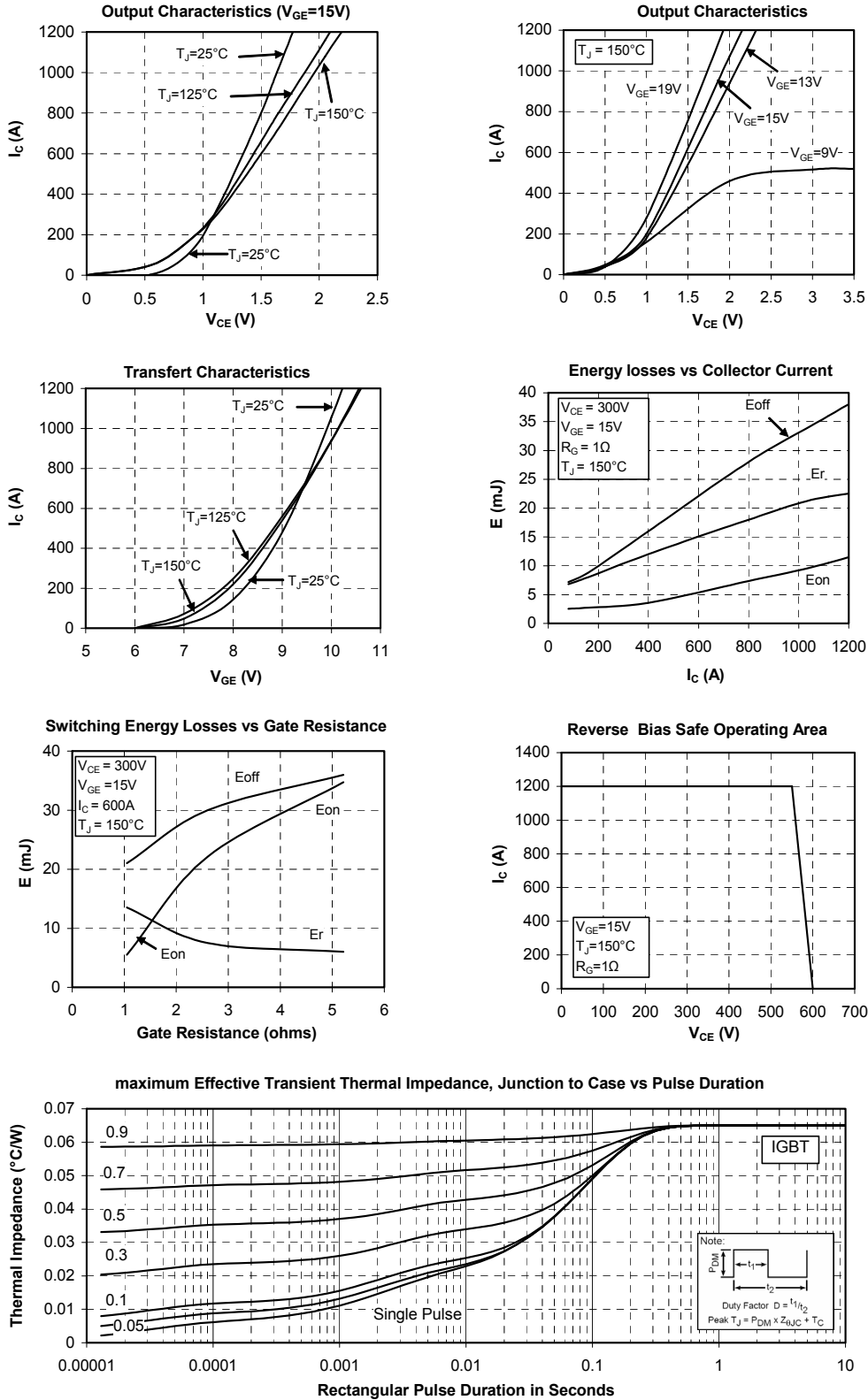
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.065	°C/W
		Diode			0.11	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		175	°C
T _{STG}	Storage Temperature Range		-40		125	
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				300	g

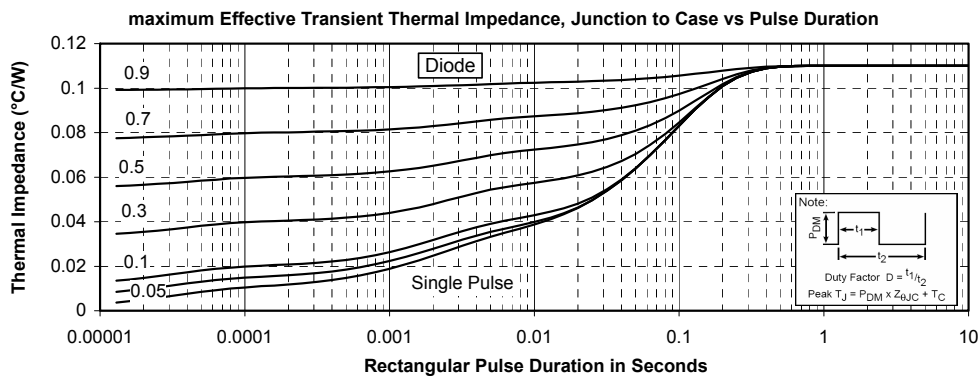
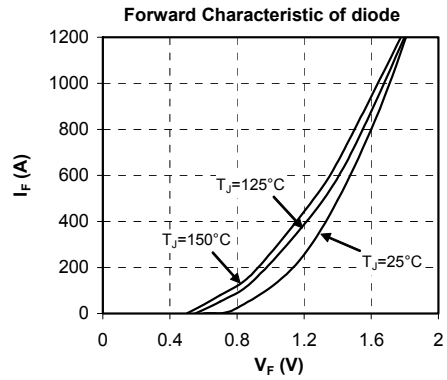
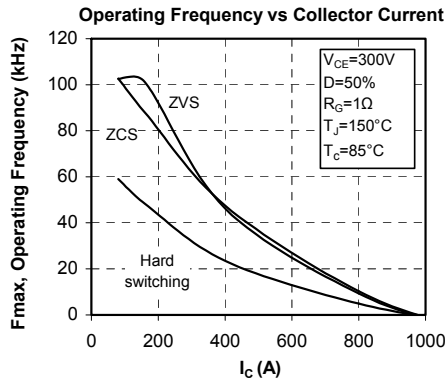
SP6 Package outline (dimensions in mm)



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

Typical Performance Curve





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