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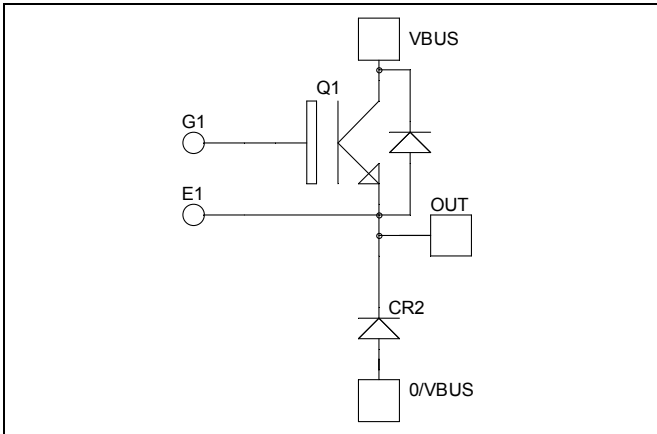
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**Buck chopper
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 1700V$
 $I_C = 150A @ T_c = 80^\circ C$**

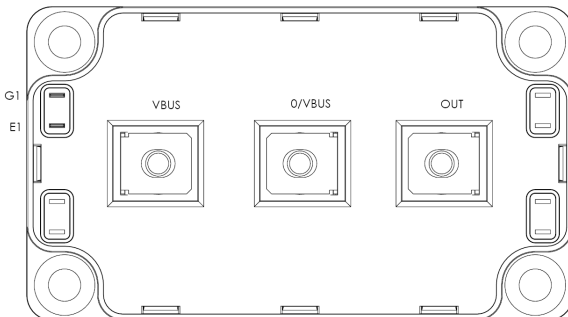


Application

- 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	1700	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	250
		$T_c = 80^\circ C$	150
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	300
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	890
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	300A @ 1600V

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	$V_{GE} = 0V, V_{CE} = 1700V$			350	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 150A$		2.0	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 3mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		13.5		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		0.55		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		0.44		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		370		ns
T_r	Rise Time	$V_{GE} = 15V$ $V_{Bus} = 900V$		40		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 150A$		650		
T_f	Fall Time	$R_G = 4.7\Omega$		180		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C)		400		ns
T_r	Rise Time	$V_{GE} = 15V$ $V_{Bus} = 900V$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 150A$		800		
T_f	Fall Time	$R_G = 4.7\Omega$		300		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15V$ $V_{Bus} = 900V$		48		mJ
E_{off}	Turn-off Switching Energy	$I_C = 150A$ $R_G = 4.7\Omega$		47		

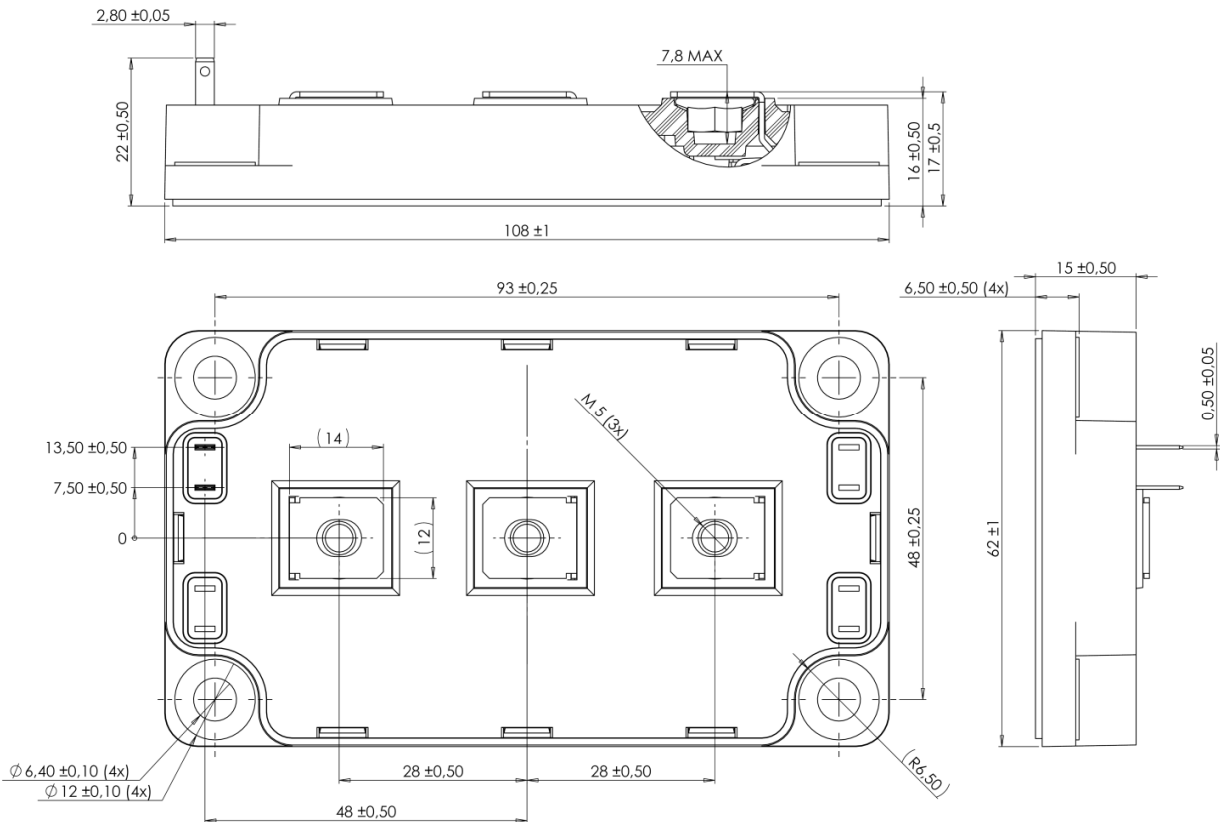
Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1700			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1700V$			350	μA
					600	
I_F	DC Forward Current			150		A
V_F	Diode Forward Voltage	$I_F = 150A$		1.8	2.2	V
				1.9		
t_{rr}	Reverse Recovery Time			385		ns
				490		
Q_{rr}	Reverse Recovery Charge	$I_F = 150A$ $V_R = 900V$ $di/dt = 1600A/\mu\text{s}$		38		μC
				62		
E_r	Reverse Recovery Energy			17.5		mJ
				35		

Thermal and package characteristics

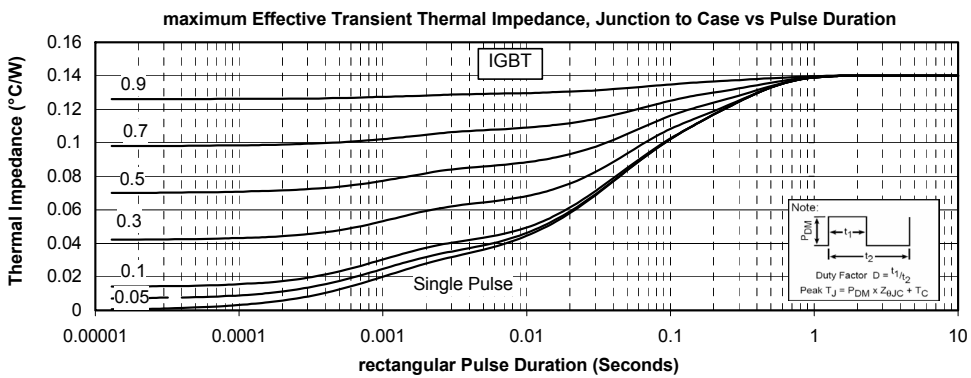
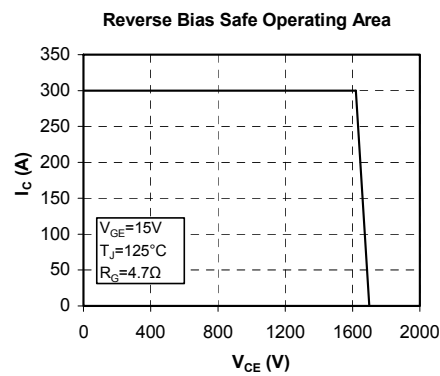
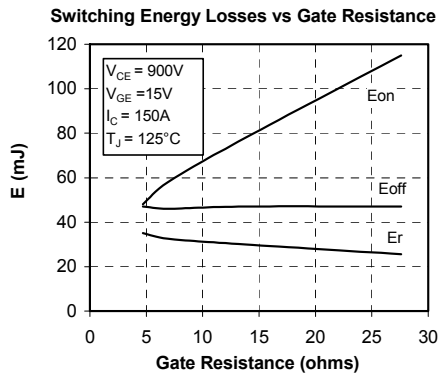
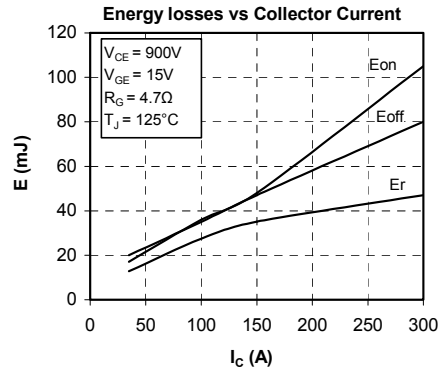
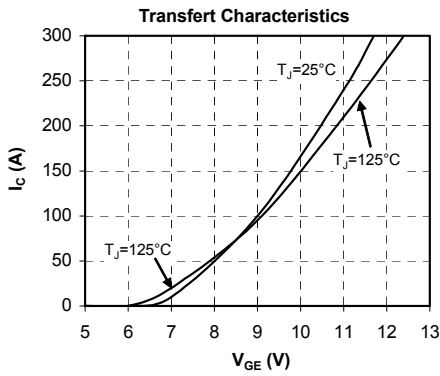
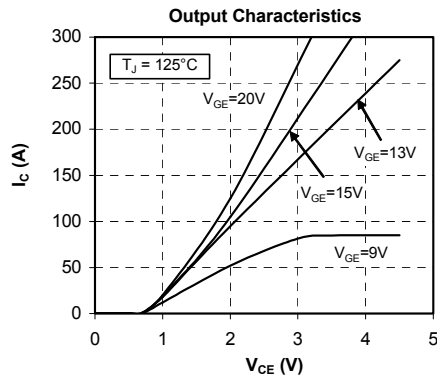
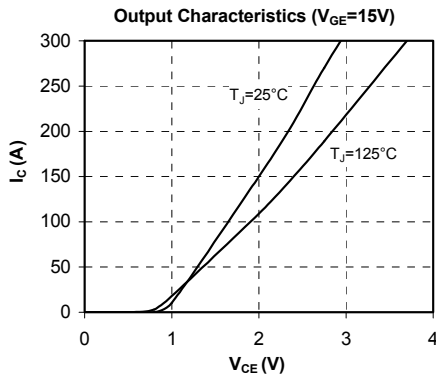
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.14	°C/W	
		Diode		0.26		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
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	

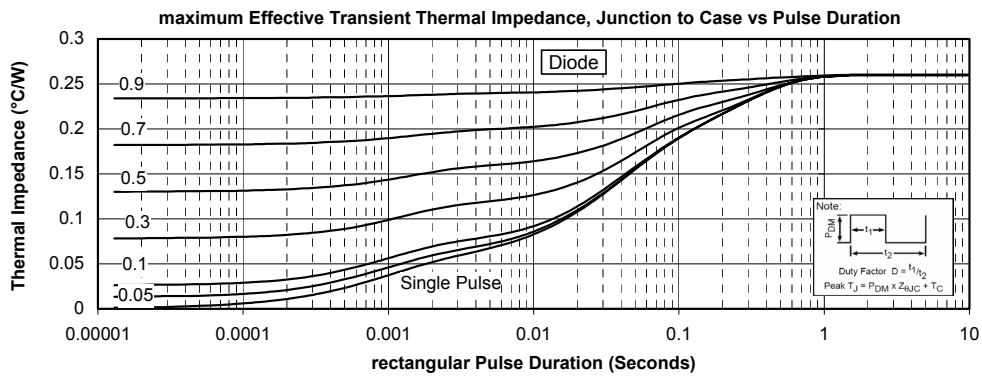
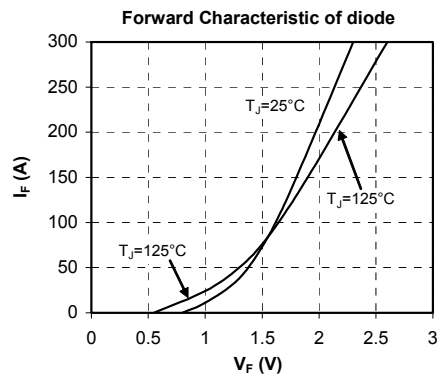
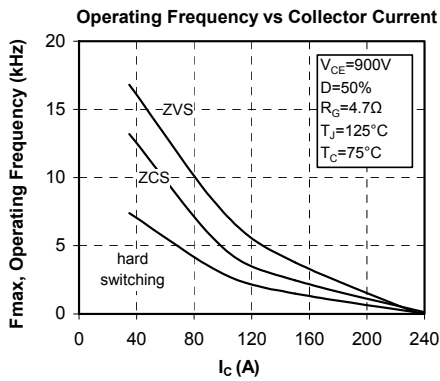
SP6 Package outline (dimensions in mm)



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

Typical Performance Curve





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