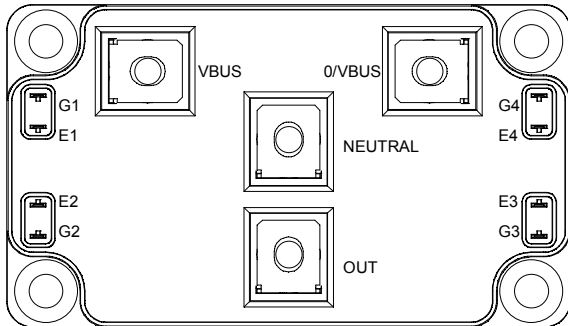
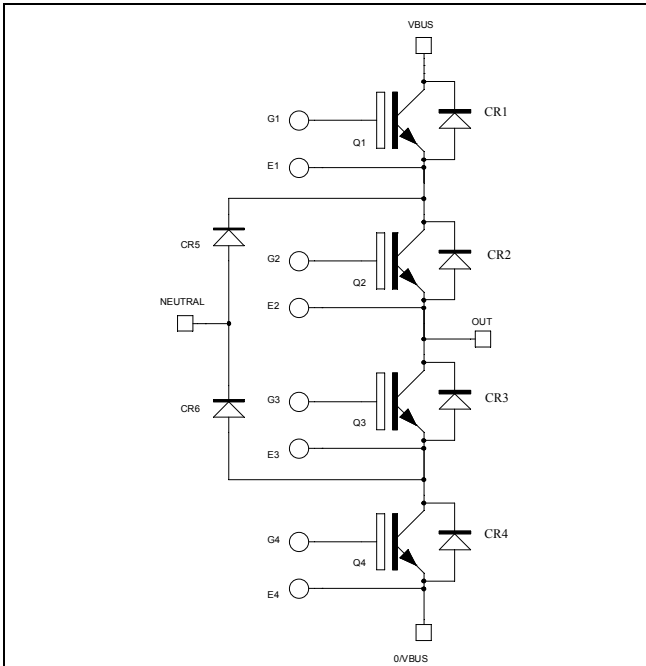


**Three level inverter
Trench + Field Stop IGBT
Power Module**

**$V_{CES} = 1700V$
 $I_C = 100A @ T_c = 80^\circ C$**



Application

- Solar converter
- Uninterruptible Power Supplies

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
 - 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

Q1 to Q4 Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1700	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	150
		$T_c = 80^\circ C$	100
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	200
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	560
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	200A @ 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

Q1 to Q4 Electrical Characteristics (per IGBT)

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	$V_{GE} = 15V$ $I_C = 100A$		2.0	2.4	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			500	nA

Q1 to Q4 Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$		9		nF
C_{oes}	Output Capacitance			0.36		
C_{res}	Reverse Transfer Capacitance			0.3		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 100A$ $V_{CE} = 900V$		1.2		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15V$ $V_{Bus} = 900V$ $I_C = 100A$ $R_G = 4.7 \Omega$		370		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			650		
T_f	Fall Time			180		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = 15V$ $V_{Bus} = 900V$ $I_C = 100A$ $R_G = 4.7 \Omega$		400		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			800		
T_f	Fall Time			300		
E_{on}	Turn-on Switching Energy	$V_{GE} = 15V$ $V_{Bus} = 900V$ $I_C = 100A$ $R_G = 4.7 \Omega$		32		mJ
E_{off}	Turn-off Switching Energy		$T_j = 125^\circ\text{C}$ $T_j = 125^\circ\text{C}$		31	
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 1000V$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		400		A
R_{thJC}	Junction to Case Thermal Resistance				0.22	$^\circ\text{C/W}$

CR1 to CR4 diode ratings and characteristics (per diode)

<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			1700			V
I _{RM}	Maximum Reverse Leakage Current	V _R =1700V	T _j = 25°C			350	μA
			T _j = 125°C			600	
I _F	DC Forward Current		T _c = 80°C		100		A
V _F	Diode Forward Voltage	I _F = 100A	T _j = 25°C		1.8	2.2	V
			T _j = 125°C		1.9		
t _{rr}	Reverse Recovery Time		T _j = 25°C		385		ns
			T _j = 125°C		490		
Q _{rr}	Reverse Recovery Charge	I _F = 100A V _R = 900V di/dt = 1600A/μs	T _j = 25°C		28		μC
			T _j = 125°C		46		
E _{rr}	Reverse Recovery Energy		T _j = 25°C		12		mJ
			T _j = 125°C		24		
R _{thJC}	Junction to Case Thermal Resistance					0.39	°C/W

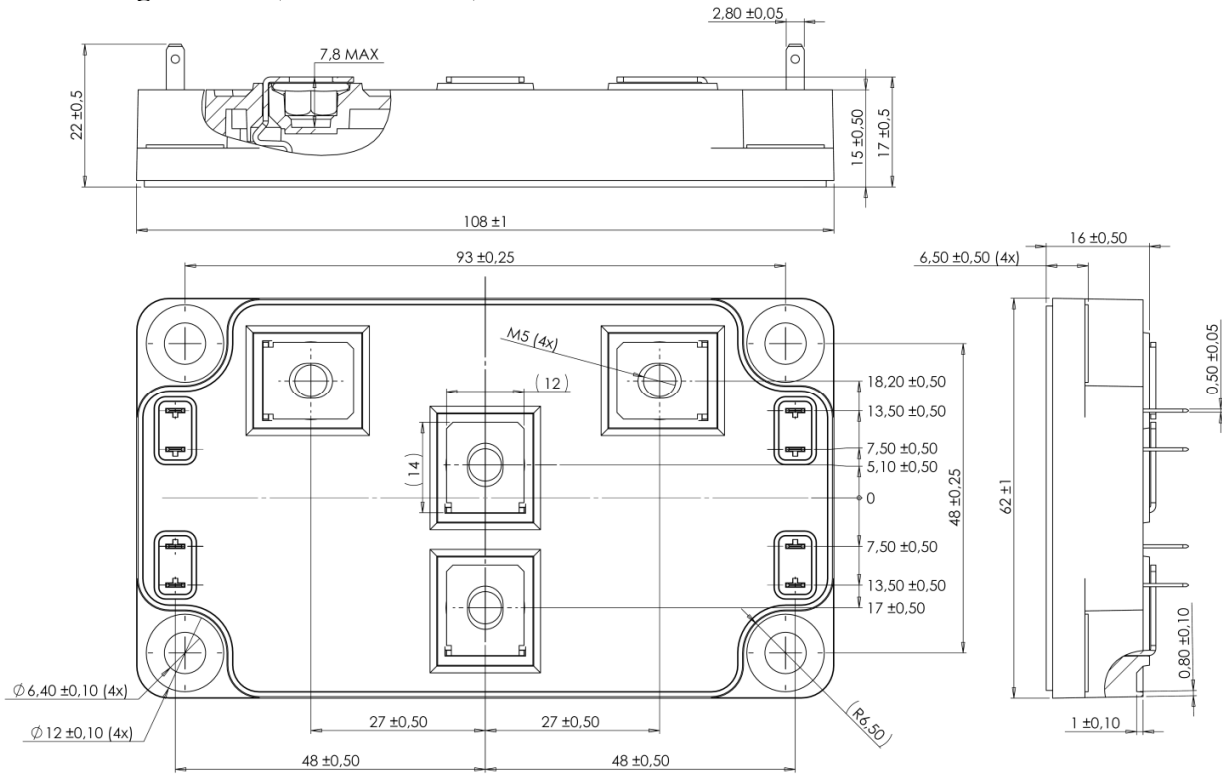
CR5 & CR6 diode ratings and characteristics (per diode)

<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			1700			V
I _{RM}	Maximum Reverse Leakage Current	V _R =1700V	T _j = 25°C			350	μA
			T _j = 125°C			600	
I _F	DC Forward Current		T _c = 80°C		150		A
V _F	Diode Forward Voltage	I _F = 150A	T _j = 25°C		1.8	2.2	V
			T _j = 125°C		1.9		
t _{rr}	Reverse Recovery Time		T _j = 25°C		385		ns
			T _j = 125°C		490		
Q _{rr}	Reverse Recovery Charge	I _F = 150A V _R = 900V di/dt = 1600A/μs	T _j = 25°C		38		μC
			T _j = 125°C		62		
E _{rr}	Reverse Recovery Energy		T _j = 25°C		17.5		mJ
			T _j = 125°C		35		
R _{thJC}	Junction to Case Thermal Resistance					0.26	°C/W

Thermal and package characteristics

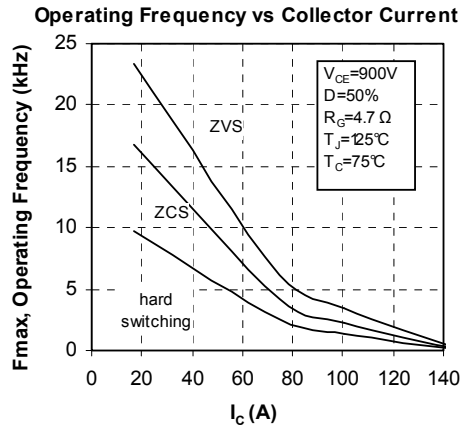
<i>Symbol</i>	<i>Characteristic</i>			<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
		For terminals	M5	2		3.5	
Wt	Package Weight					300	g

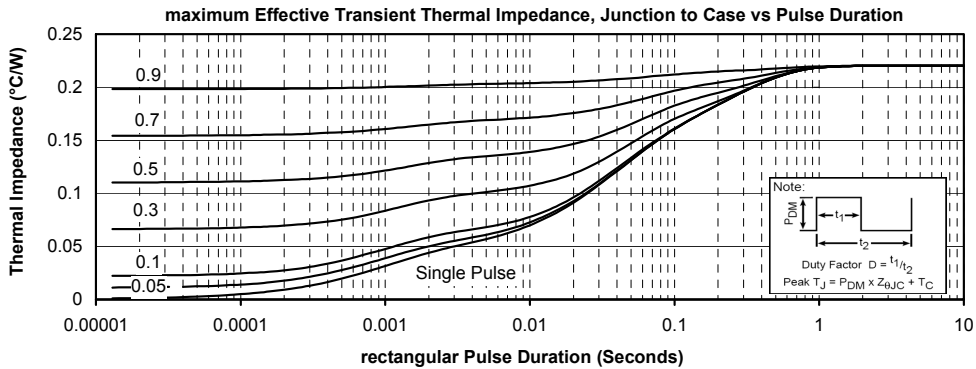
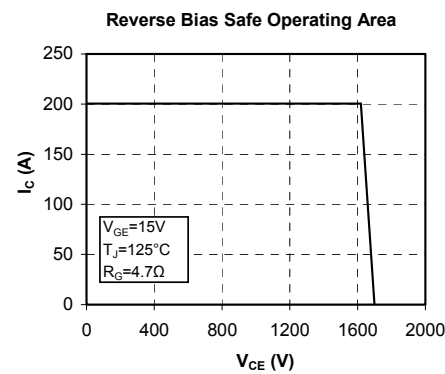
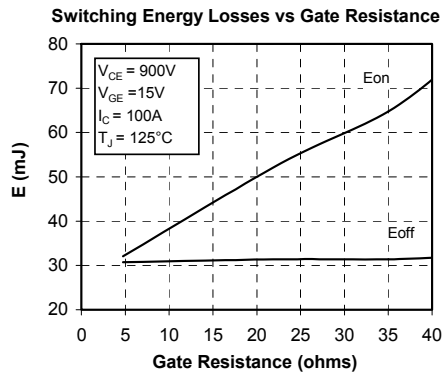
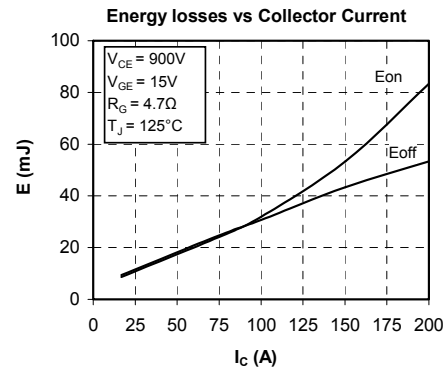
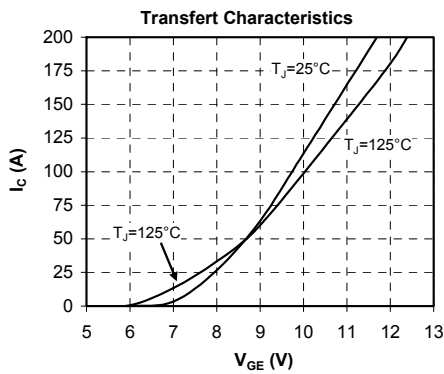
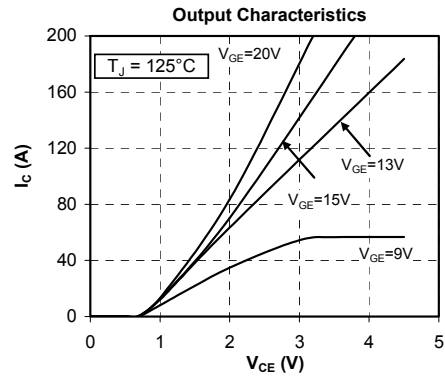
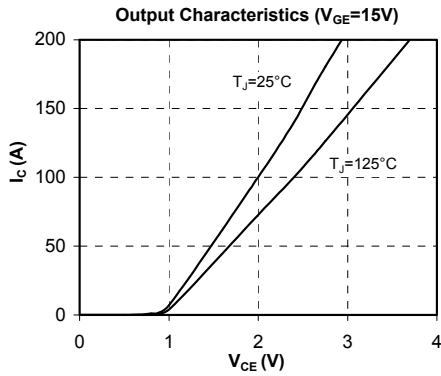
SP6 Package outline (dimensions in mm)

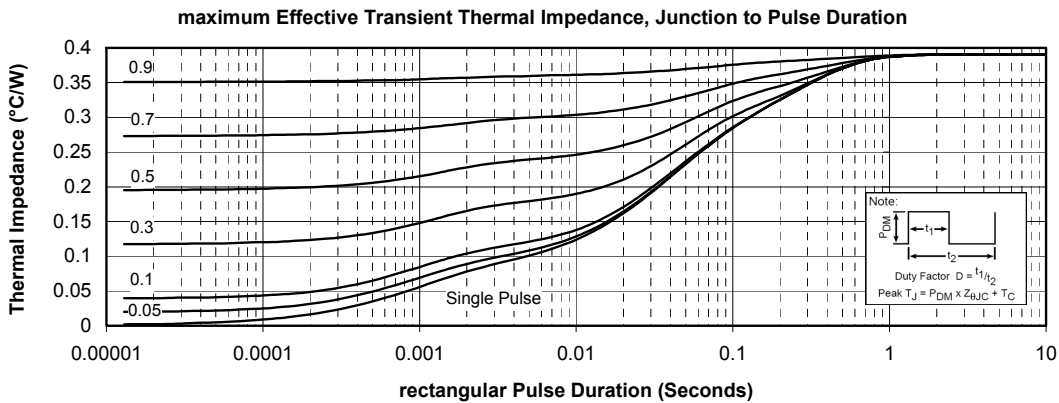
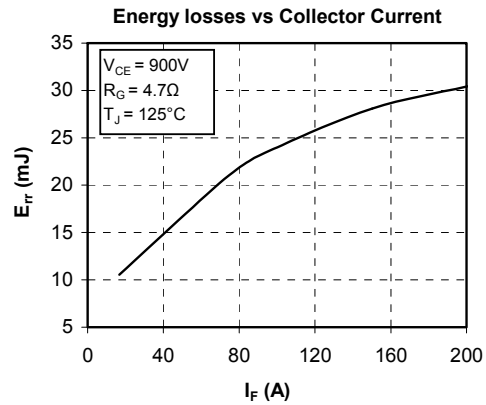
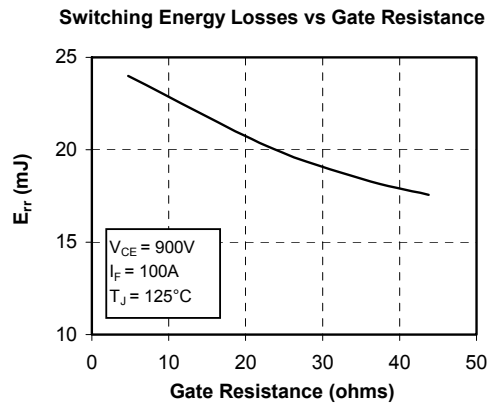
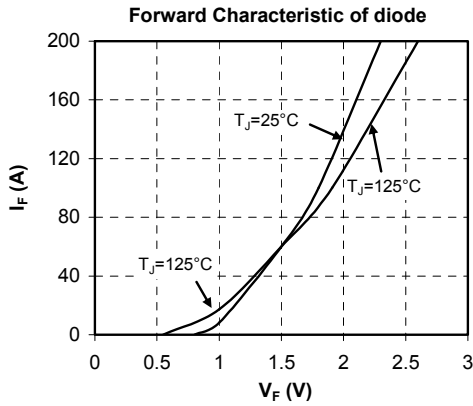


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

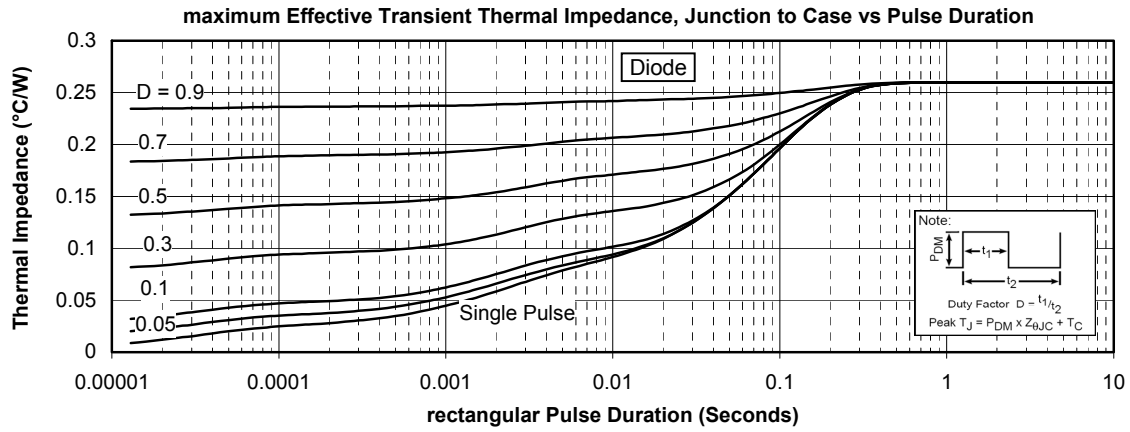
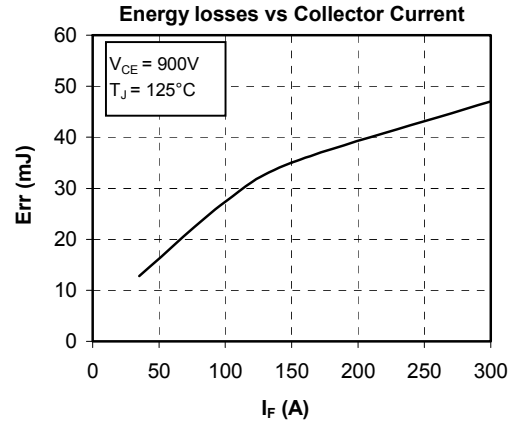
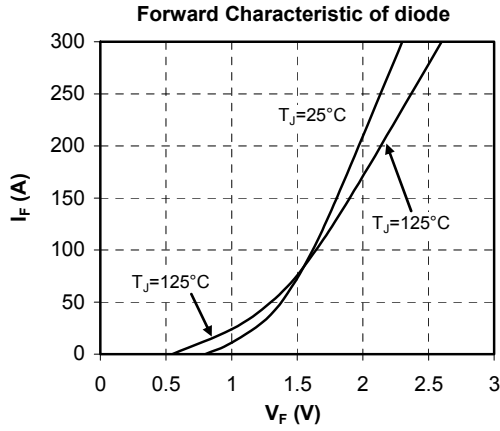
Q1 to Q4 Typical performance curve (per IGBT)





CR1 to CR4 Typical performance curve (per diode)


CR5 & CR6 Typical performance curve (per diode)



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