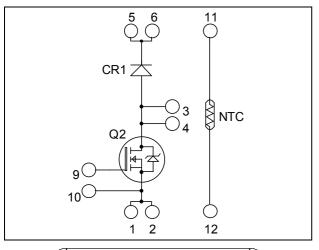
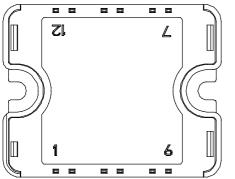


Boost chopper MOSFET + SiC chopper diode Power Module





Pins 1/2; 3/4; 5/6 must be shorted together

APTM120DA30CT1G

$V_{DSS} = 1200V$ $R_{DSon} = 300m\Omega \text{ typ } @ \text{ Tj} = 25^{\circ}\text{C}$

 $I_D = 31A$ @ Tc = 25°C

Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

• Power MOS 8TM MOSFET

- Low R_{DSon}
- Low input and Miller capacitance
- Low gate charge
- Avalanche energy rated
- Very rugged

• SiC Schottky Diode

- Zero reverse recovery
- Zero forward recovery
- Temperature Independent switching behavior
- Positive temperature coefficient on VF
- Very low stray inductance
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter		Max ratings	Unit
V _{DSS}	Drain - Source Breakdown Voltage		1200	V
т	Continuous Durin Comment	$T_c = 25^{\circ}C$	31	
I _D	Continuous Drain Current	$T_c = 80^{\circ}C$	23	А
I _{DM}	Pulsed Drain current		195	
V _{GS}	Gate - Source Voltage		±30	V
R _{DSon}	Drain - Source ON Resistance		360	mΩ
P _D	Maximum Power Dissipation	$T_c = 25^{\circ}C$	657	W
I _{AR}	Avalanche current (repetitive and non repetitive)		25	А

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

www.microsemi.com



All ratings @ $T_j = 25^{\circ}C$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Тур	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =1200V	$T_j = 25^{\circ}C$			100	۸
		$V_{GS} = 0V$	$T_{j} = 125^{\circ}C$			500	μA
R _{DS(on)}	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 25A$			300	360	mΩ
V _{GS(th)}	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5 \text{mA}$		3	4	5	V
I _{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30 \text{ V}$				±100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Тур	Max	Unit
C _{iss}	Input Capacitance	$V_{GS} = 0V$		14560		
C _{oss}	Output Capacitance	$V_{\rm DS} = 25 V$		1340		pF
C _{rss}	Reverse Transfer Capacitance	f = 1 MHz		172		
Qg	Total gate Charge	$V_{GS} = 10V$		560		
Q _{gs}	Gate – Source Charge	$V_{Bus} = 600 V$		90		nC
Q_{gd}	Gate – Drain Charge	$I_D = 25A$		265		
T _{d(on)}	Turn-on Delay Time	Resistive switching @ 25°C		100		
Tr	Rise Time	$V_{GS} = 15V$ $V_{Bus} = 800V$ $I_D = 25A$ $R_G = 2.2\Omega$		60		
T _{d(off)}	Turn-off Delay Time		315			ns
T _f	Fall Time			90		

SiC chopper diode ratings and characteristics

Symbol	<i>Characteristic</i>	Test Conditions	Min	Тур	Max	Unit	
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V	
I _{RM}	Maximum Reverse Leakage Current	$V_{n} = 1200V$	$T_j = 25^{\circ}C$		64	400	μA
IRM	Waximum Reverse Leakage Current		$T_{j} = 175^{\circ}C$		112	2000	μА
I _F	DC Forward Current	$Tc = 100^{\circ}C$			20		А
$V_{\rm F}$	Diada Famuard Valtaga	I = 20.4	$T_i = 25^{\circ}C$		1.6	1.8	V
V F	Diode Forward Voltage	$I_F = 20A$	$T_{j} = 175^{\circ}C$		2.3	3	v
Qc	Total Capacitive Charge	$I_F = 20A, V_R = 600V$ di/dt =1000A/µs			80		nC
C	Total Compositor of	$f = 1 \text{MHz}, V_R = 200 \text{V}$ $f = 1 \text{MHz}, V_R = 400 \text{V}$			192		ъĘ
C	Total Capacitance				138		pF

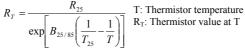
Thermal and package characteristics

Symbol	Characteristic				Min	Тур	Max	Unit
D	Junction to Case Thermal Resistance	Trans	istor			0.19	°C/W	
R _{thJC}			SiC D	Diode			1	C/ W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V	
T _J	Operating junction temperature range		-40		150			
T _{STG}	Storage Temperature Range			-40		125	°C	
T _C	Operating Case Temperature				-40		100	
Torque	Mounting torque	To heatsi	nk	M4	2		3	N.m
Wt	Package Weight				80	g		

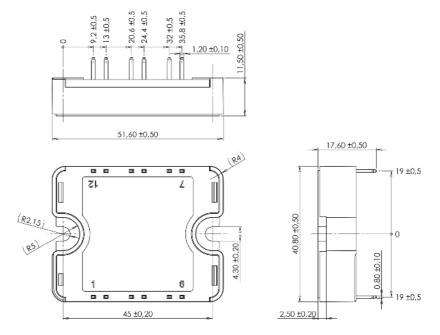


Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic		Min	Тур	Max	Unit
R ₂₅	Resistance @ 25°C			50		kΩ
$\Delta R_{25}/R_{25}$				5		%
B _{25/85}	$T_{25} = 298.15 \text{ K}$			3952		K
$\Delta B/B$		T _C =100°C		4		%
	n					

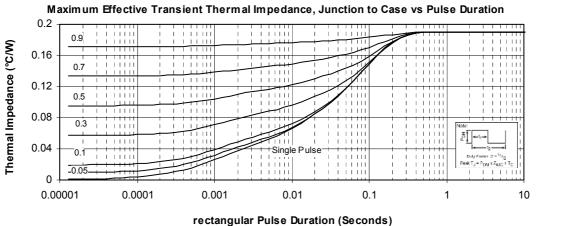


SP1 Package outline (dimensions in mm)



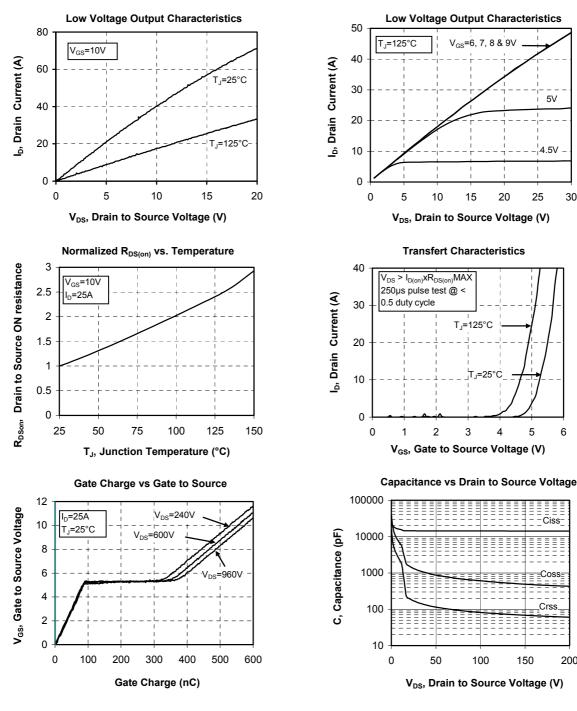
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Mosfet Performance Curve



3-6





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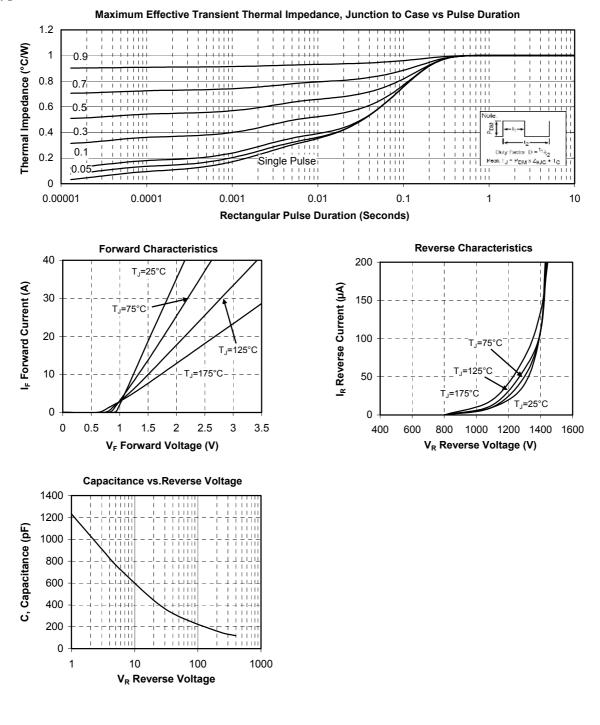
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6

200



Typical SiC Diode Performance Curve



APTM120DA30CT1G-Rev1 October, 2012

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