



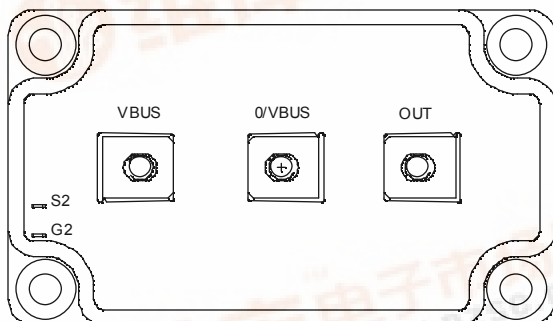
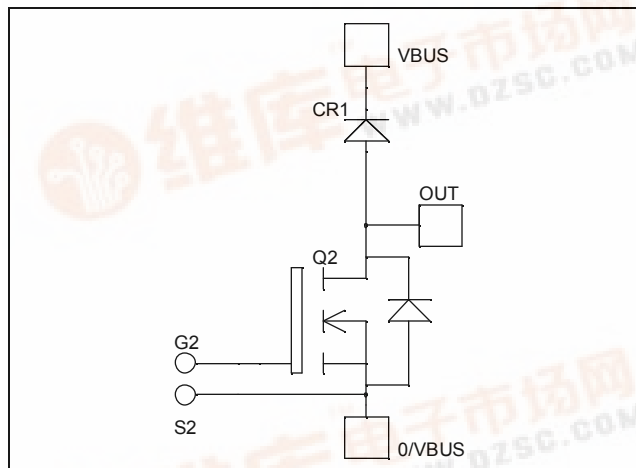
APT0502DAM90G

Boost chopper MOSFET Power Module

$$V_{DSS} = 1000V$$

$$R_{DSon} = 90m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 78A \text{ @ } T_c = 25^\circ C$$



Application

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

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1000	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$ 78	A
		$T_c = 80^\circ C$ 59	
I_{DM}	Pulsed Drain current	312	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	105	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 1250	W
I_{AR}	Avalanche current (repetitive and non repetitive)	25	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	



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_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V$			400	μA
		$V_{GS} = 0V, V_{DS} = 800V$			2000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 39A$		90	105	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10mA$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 250	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		20.7		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		3.5		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.64		
Q_g	Total gate Charge	$V_{GS} = 10V$		744		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 500V$		96		
Q_{gd}	Gate – Drain Charge	$I_D = 78A$		488		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 78A$ $R_G = 1.2\Omega$		18		ns
T_r	Rise Time			12		
$T_{d(off)}$	Turn-off Delay Time			155		
T_f	Fall Time			40		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 78A, R_G = 1.2\Omega$		3.6		mJ
E_{off}	Turn-off Switching Energy			2.5		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 78A, R_G = 1.2\Omega$		5.7		mJ
E_{off}	Turn-off Switching Energy			3.1		

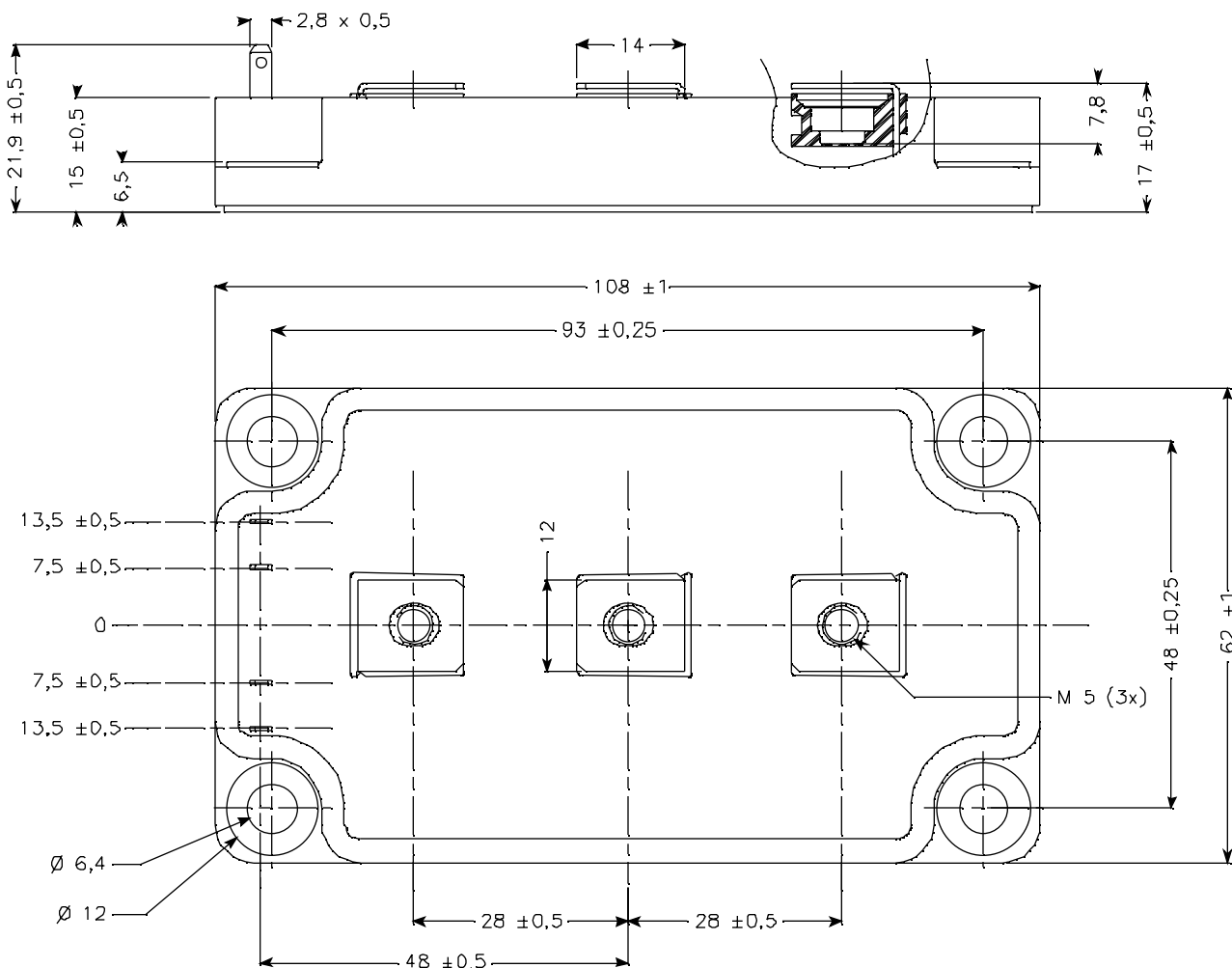
Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1000			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1000V$	$T_j = 25^\circ\text{C}$		250	μA
			$T_j = 125^\circ\text{C}$		500	
I_F	DC Forward Current	$T_c = 70^\circ\text{C}$		100		A
V_F	Diode Forward Voltage	$I_F = 100A$		1.9	2.5	V
		$I_F = 200A$		2.2		
		$I_F = 100A, T_j = 125^\circ\text{C}$		1.7		
t_{rr}	Reverse Recovery Time	$I_F = 100A$ $V_R = 670V$	$T_j = 25^\circ\text{C}$	300		ns
			$T_j = 125^\circ\text{C}$	360		
Q_{rr}	Reverse Recovery Charge	$di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$	800		nC
			$T_j = 125^\circ\text{C}$	4050		

Thermal and package characteristics

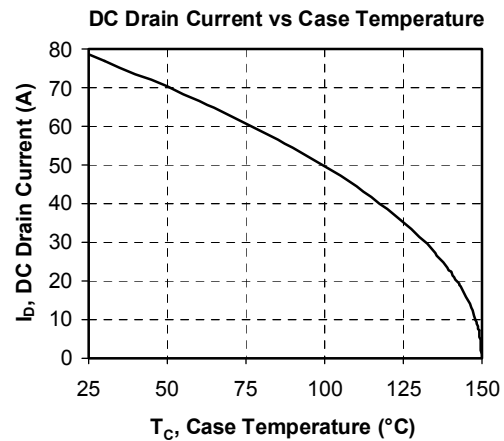
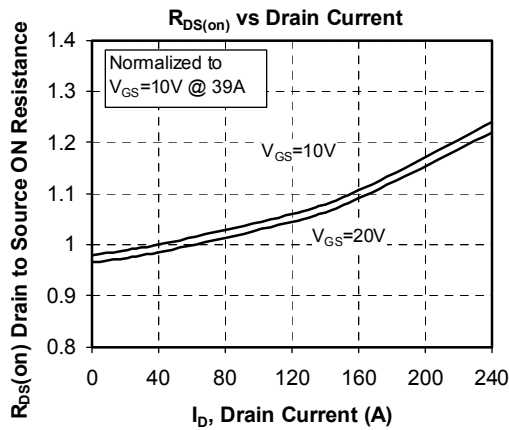
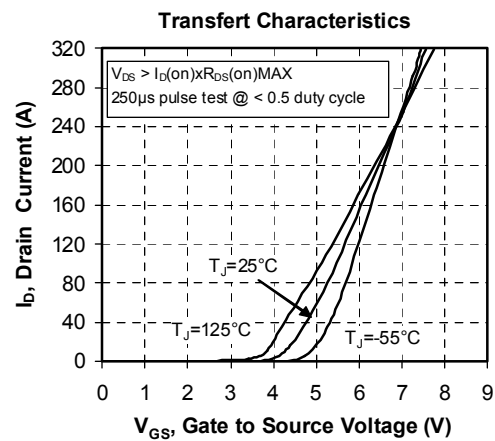
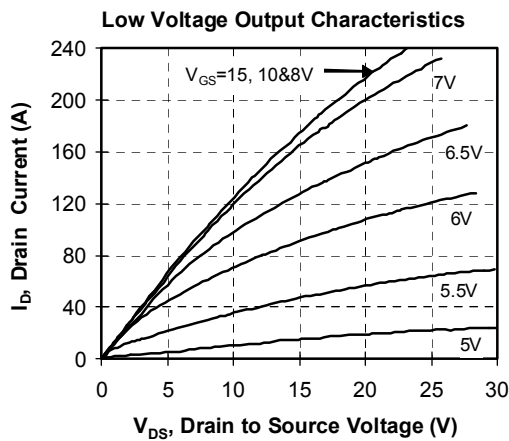
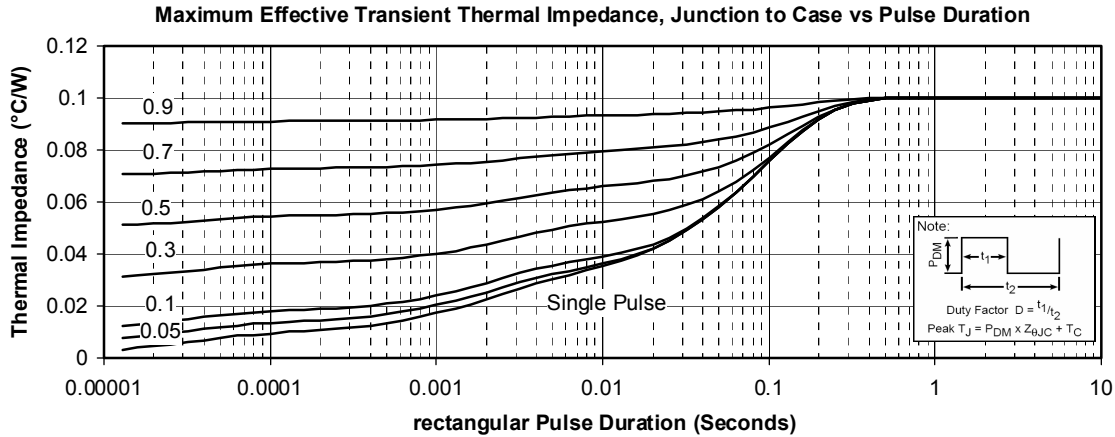
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor			0.1	°C/W
		Diode			0.55	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I isol<1mA, 50/60Hz		2500			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature 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

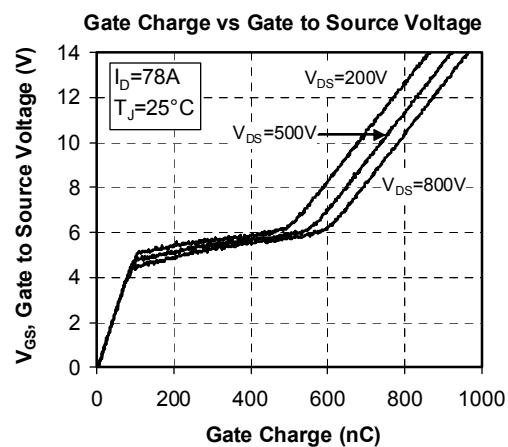
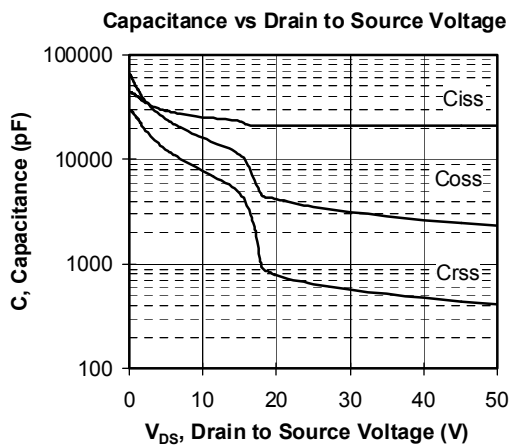
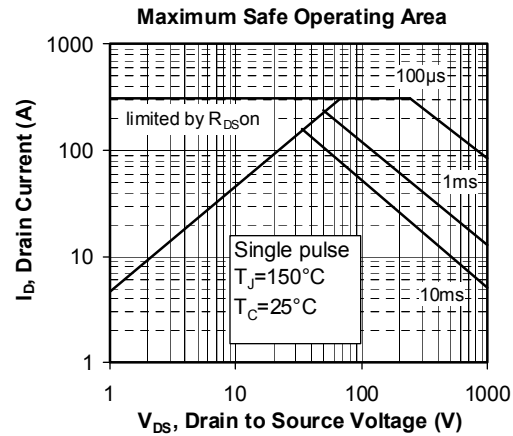
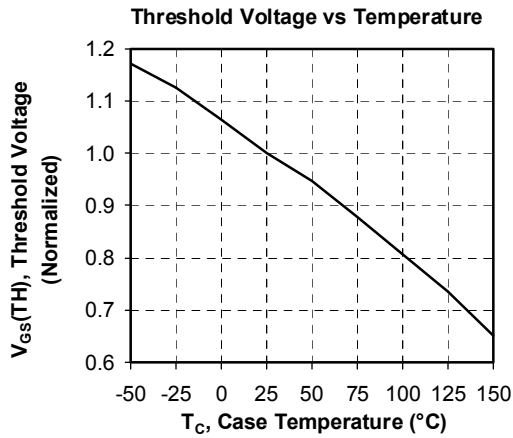
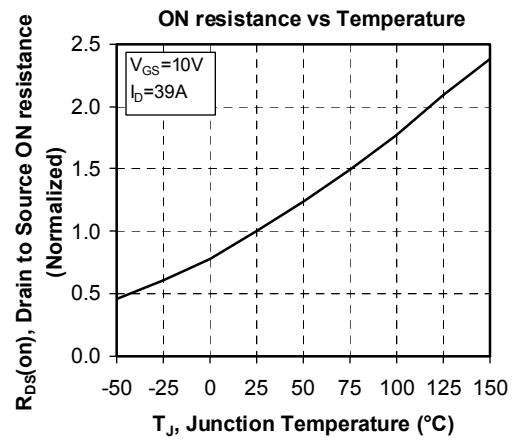
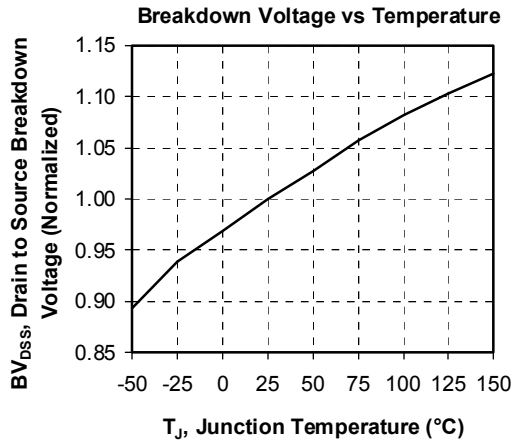
SP6 Package outline (dimensions in mm)

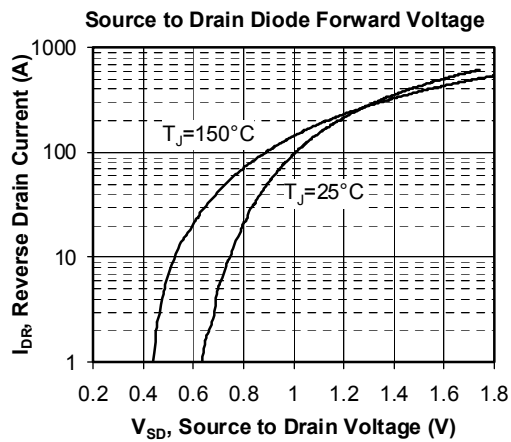
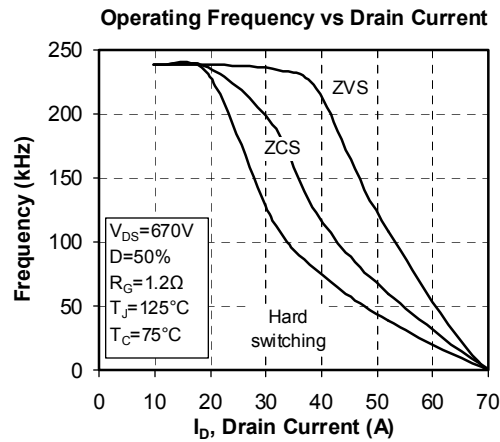
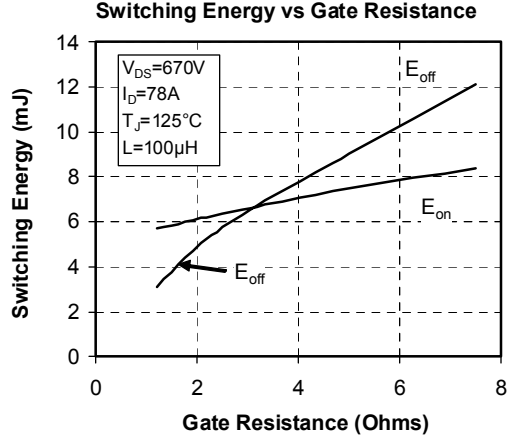
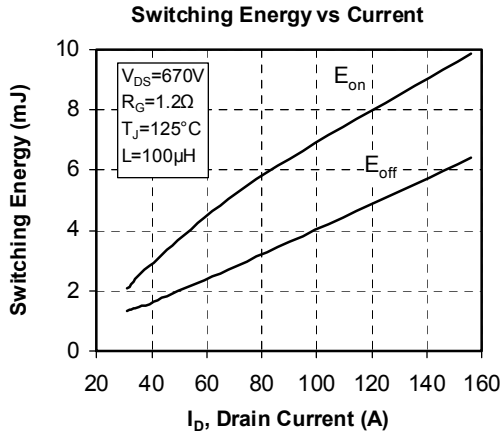
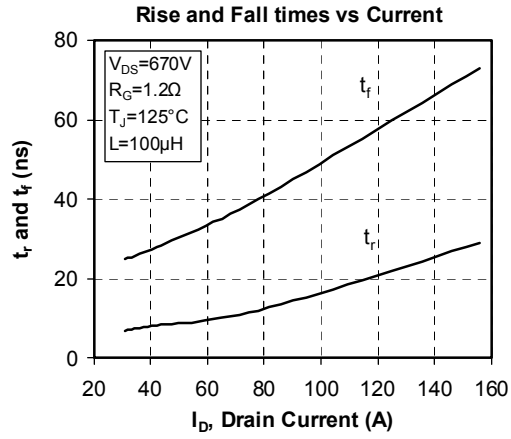
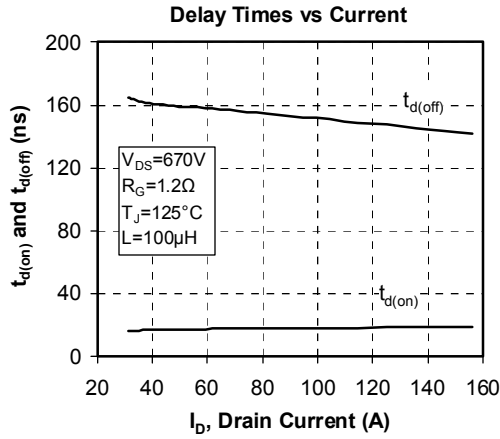


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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