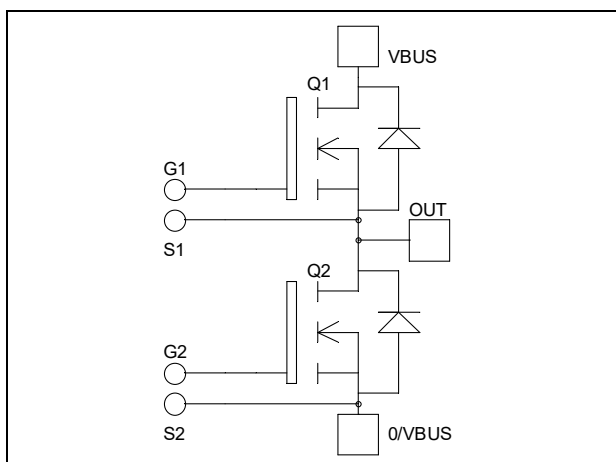
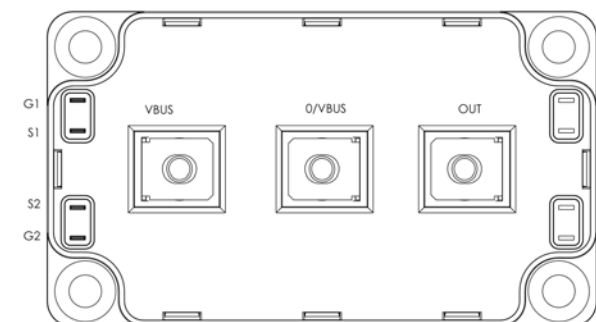


Phase leg MOSFET Power Module

$V_{DSS} = 500V$

$R_{DSon} = 17m\Omega \text{ typ @ } T_j = 25^\circ C$

$I_D = 180A \text{ @ } T_c = 25^\circ C$



Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS 7[®] FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
- 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

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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	180
		$T_c = 80^\circ C$	135
I_{DM}	Pulsed Drain current	720	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	20	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	1250
I_{AR}	Avalanche current (repetitive and non repetitive)	51	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.

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$			400	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 90A$		17	20	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 10mA$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		28		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		5.6		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		0.36		
Q_g	Total gate Charge	$V_{GS} = 10V$		560		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250V$		160		
Q_{gd}	Gate – Drain Charge	$I_D = 180A$		280		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 180A$ $R_G = 0.5\Omega$		21		ns
T_r	Rise Time			38		
$T_{d(off)}$	Turn-off Delay Time			75		
T_f	Fall Time			93		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 180A, R_G = 0.5\Omega$		4140		μJ
E_{off}	Turn-off Switching Energy			3380		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 180A, R_G = 0.5\Omega$		6224		μJ
E_{off}	Turn-off Switching Energy			4052		
R_{thJC}	Junction to Case Thermal Resistance				0.1	$^{\circ}C/W$

Source - Drain diode ratings and characteristics

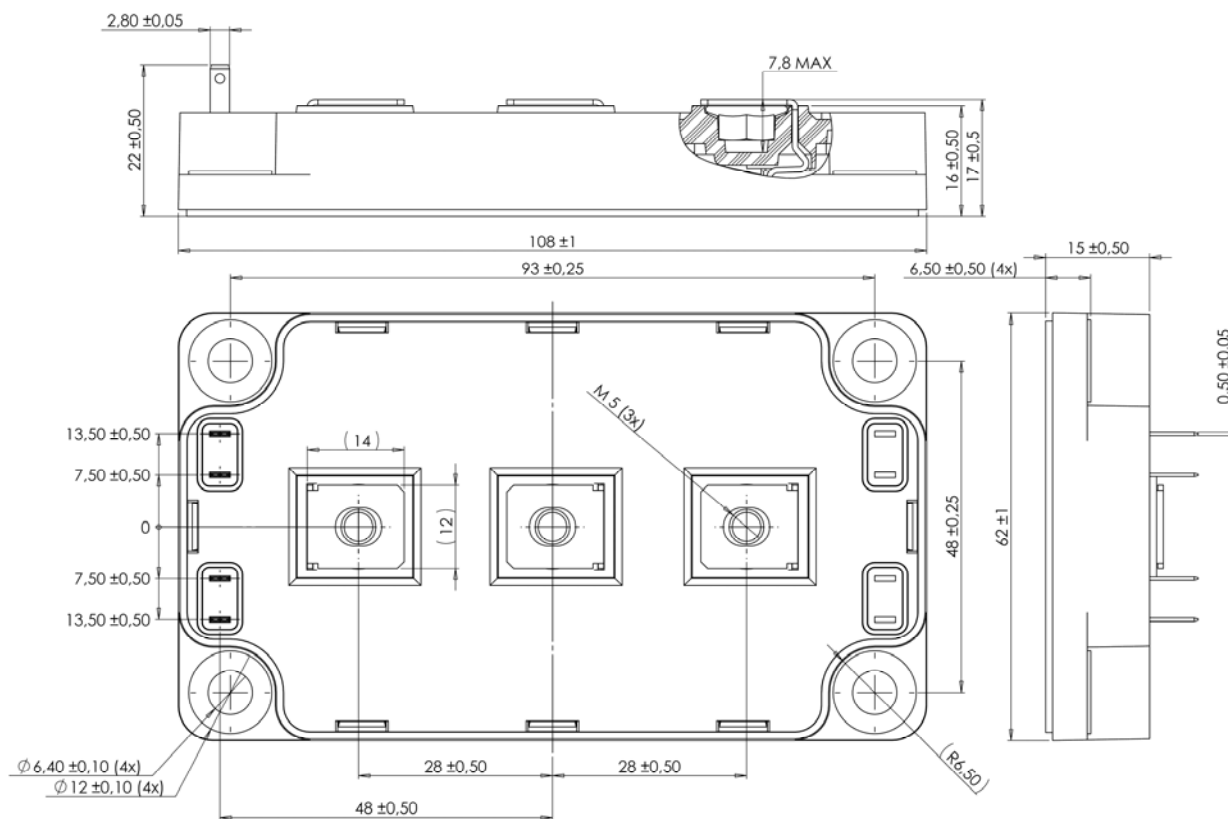
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I _S	Continuous Source current (Body diode)		T _C = 25°C			180	A
			T _C = 80°C			135	
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 180A				1.3	V
dv/dt	Peak Diode Recovery ❶					15	V/ns
t _{rr}	Reverse Recovery Time	I _S = -180A V _R = 333V di _S /dt = 400A/μs	T _j = 25°C			270	ns
			T _j = 125°C			540	
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		10.4		μC
			T _j = 125°C		38.4		

❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq -180A$ $di/dt \leq 700A/\mu s$ $V_R \leq V_{DSS}$ $T_j \leq 150^{\circ}C$

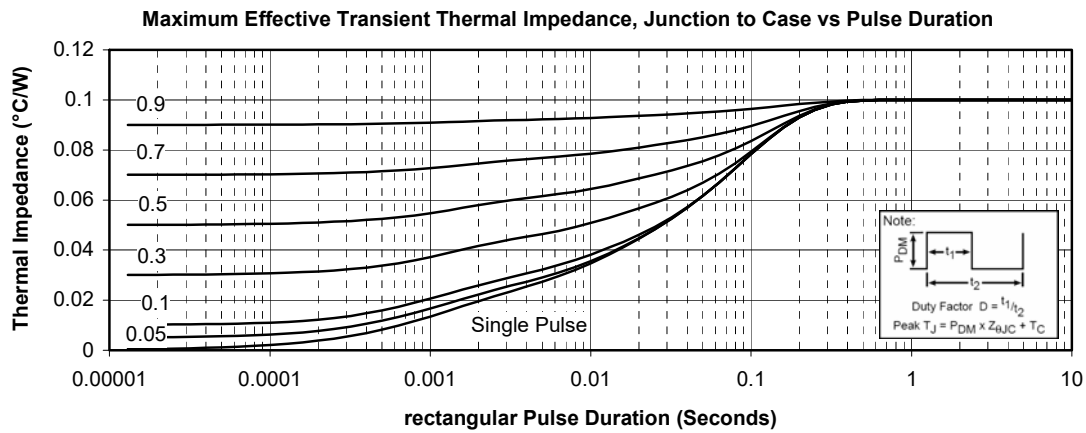
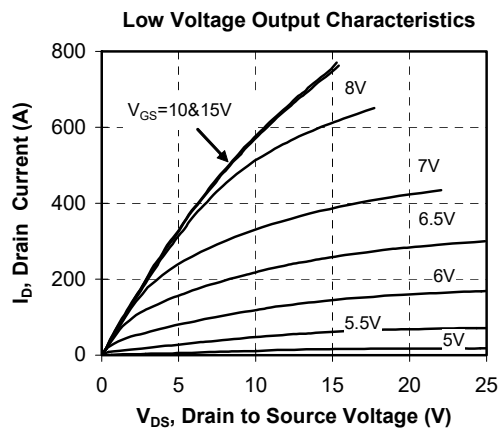
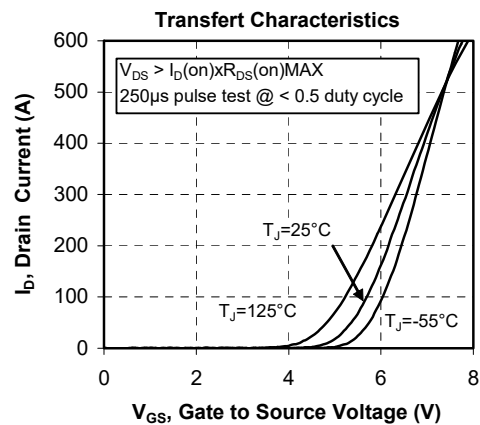
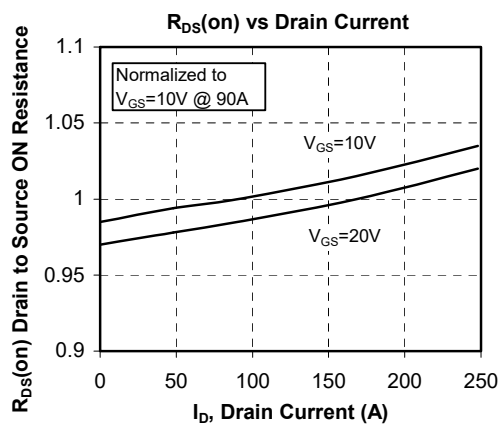
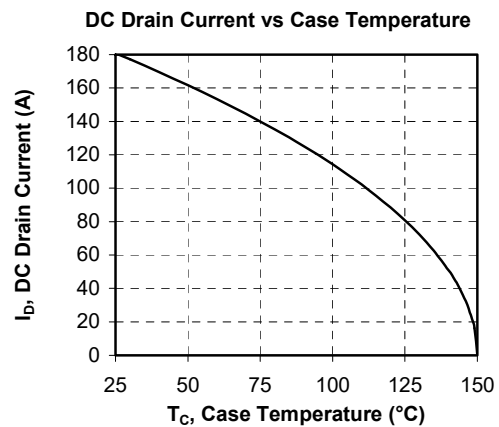
Thermal and package characteristics

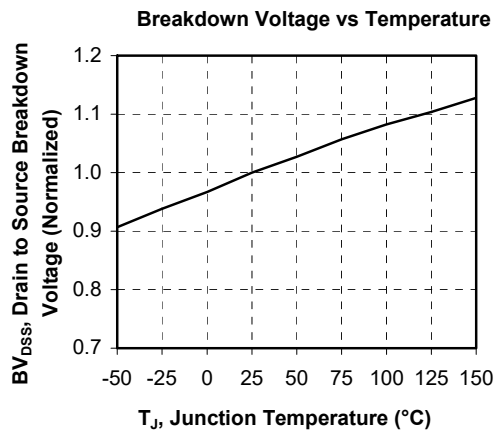
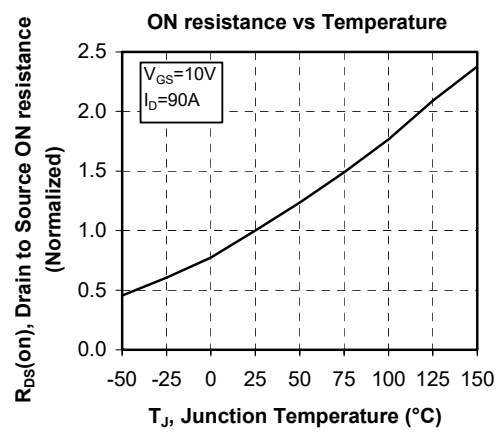
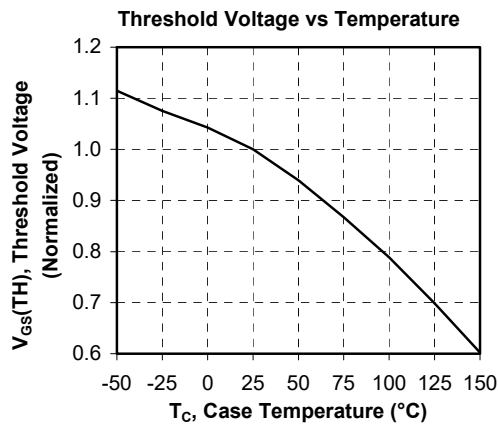
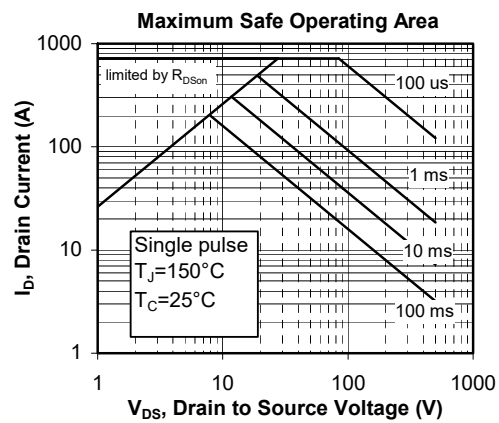
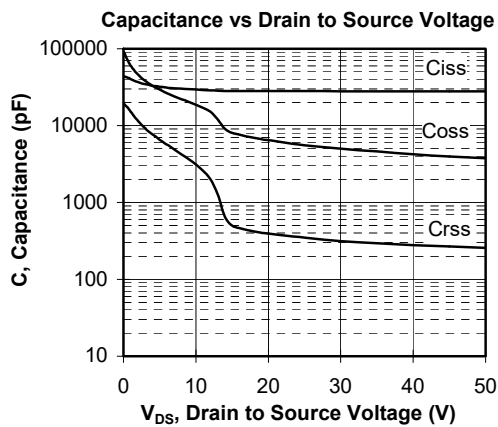
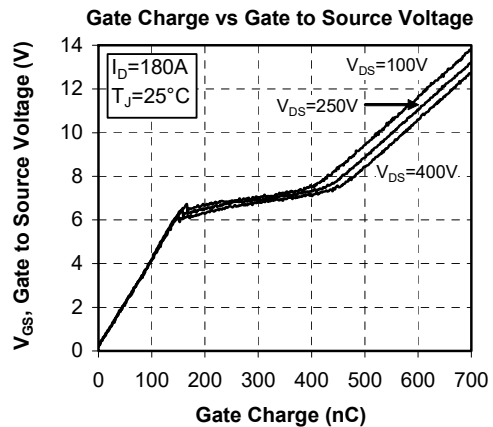
Symbol	Characteristic			Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000		V
T _J	Operating junction temperature range			-40	150	°C
T _{JOP}	Recommended junction temperature under switching conditions			-40	T _{Jmax} -25	
T _{STG}	Storage Temperature Range			-40	125	
T _C	Operating Case Temperature			-40	125	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				300	g

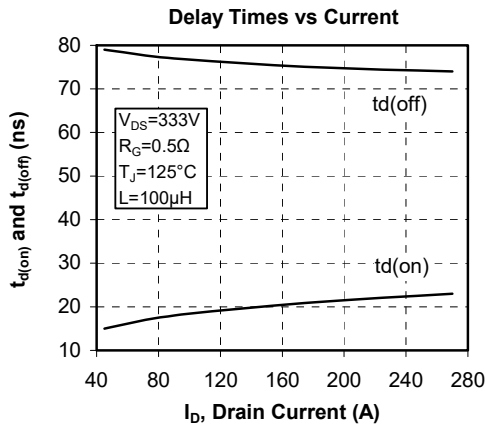
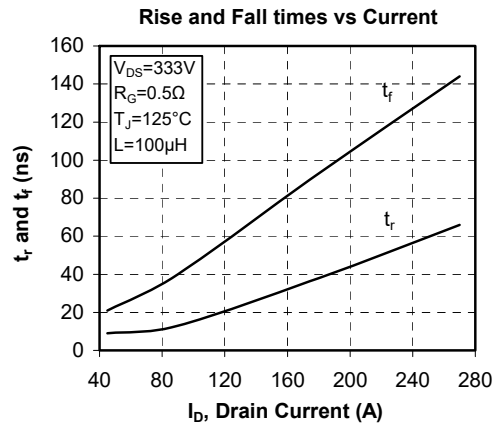
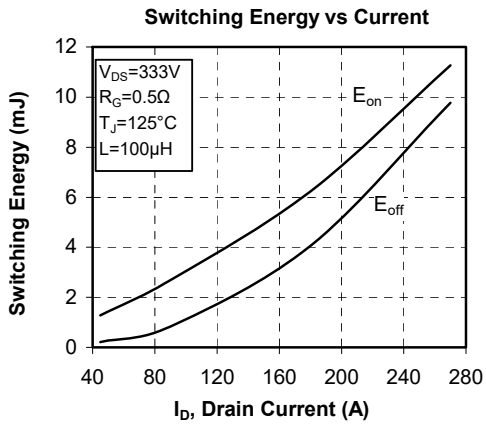
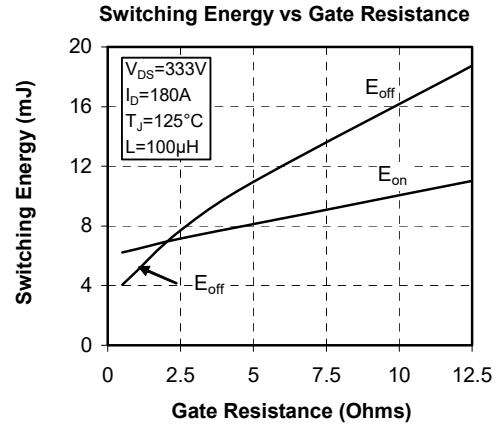
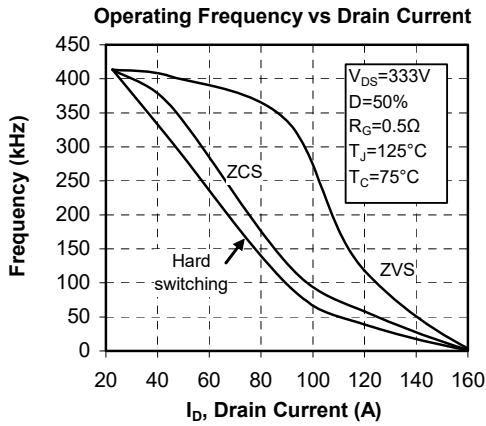
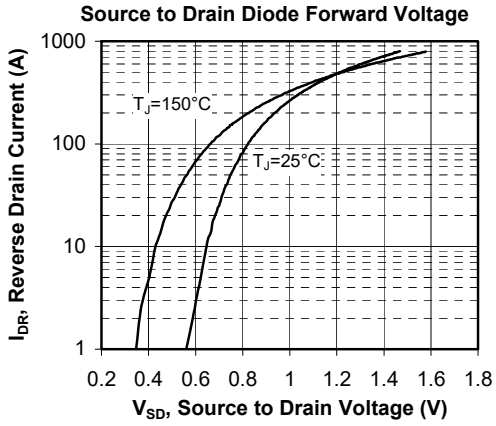
Package outline (dimensions in mm)


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

Typical Performance Curve







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