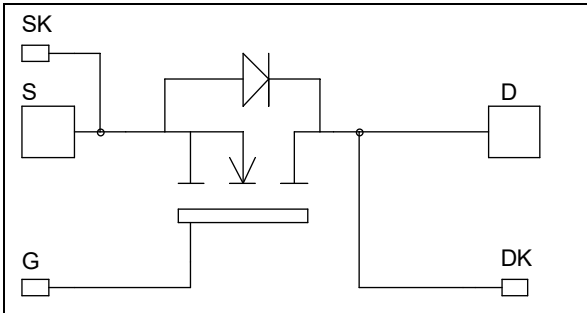


Single Switch MOSFET Power Module

$V_{DSS} = 500V$
 $R_{DSon} = 9\ m\Omega\ typ\ @\ T_j = 25^\circ C$
 $I_D = 497A\ @\ T_c = 25^\circ C$

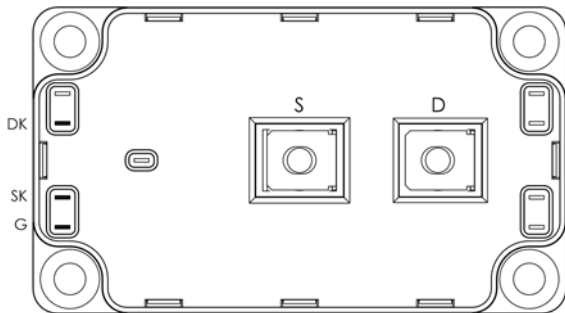


Application

- 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
- AlN substrate for improved thermal performance



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	$T_c = 25^\circ C$	497
		$T_c = 80^\circ C$	371
I_{DM}	Pulsed Drain current	1988	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	10	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	5000
I_{AR}	Avalanche current (repetitive and non repetitive)	71	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			600	μA
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 248.5A		9	10	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 30mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0V			±450	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		63.3		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		12.4		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.63		
Q _g	Total gate Charge	V _{GS} = 10V		1200		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 250V		300		
Q _{gd}	Gate – Drain Charge	I _D = 497A		630		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 333V I _D = 497A R _G = 0.5Ω		21		ns
T _r	Rise Time			42		
T _{d(off)}	Turn-off Delay Time			96		
T _f	Fall Time			100		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 333V I _D = 497A, R _G = 0.5Ω		6		mJ
E _{off}	Turn-off Switching Energy			6.2		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 333V I _D = 497A, R _G = 0.5Ω		9.48		mJ
E _{off}	Turn-off Switching Energy			6.96		
R _{thJC}	Junction to Case Thermal Resistance				0.025	°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			497	A
		T _c = 80°C			371	
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 497A			1.3	V
dv/dt	Peak Diode Recovery ❶				18	V/ns
t _{rr}	Reverse Recovery Time	I _S = - 497A V _R = 333V	T _j = 25°C		300	ns
			T _j = 125°C		600	
Q _{rr}	Reverse Recovery Charge	di/dt = 600A/μs	T _j = 25°C	15.6		μC
			T _j = 125°C	60		

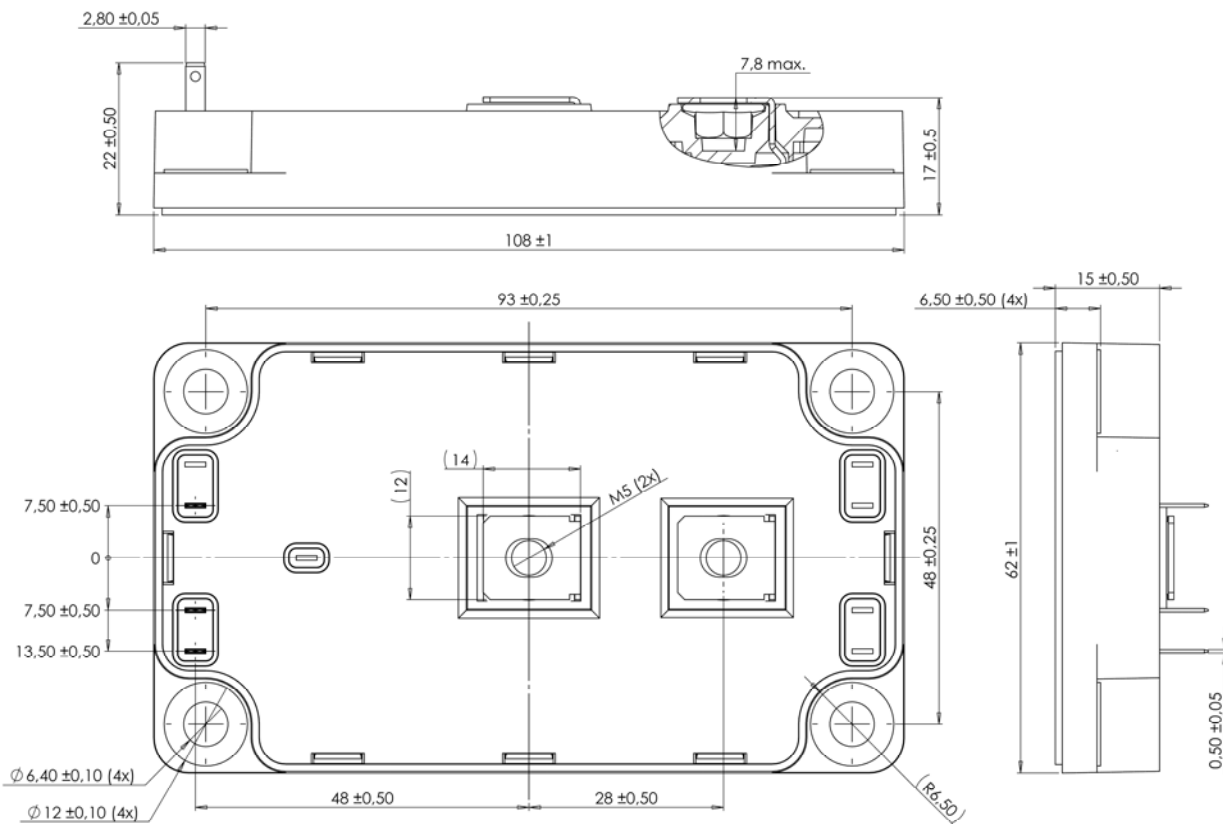
❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -497A \quad di/dt \leq 700A/\mu s \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ C$$

Thermal and package characteristics

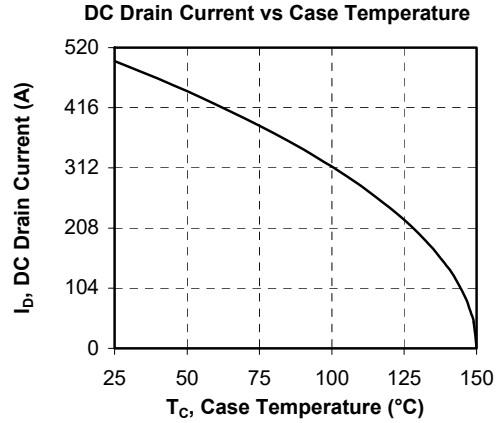
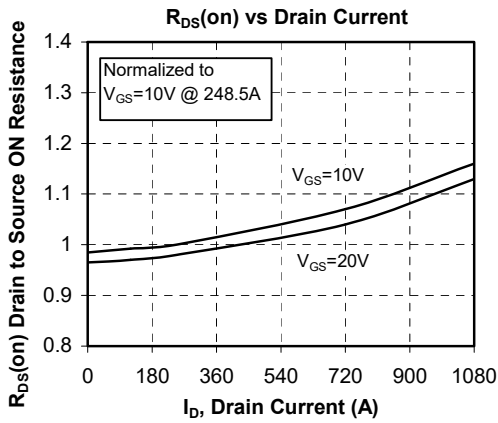
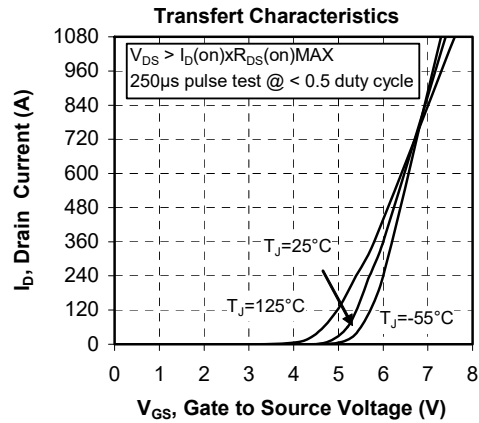
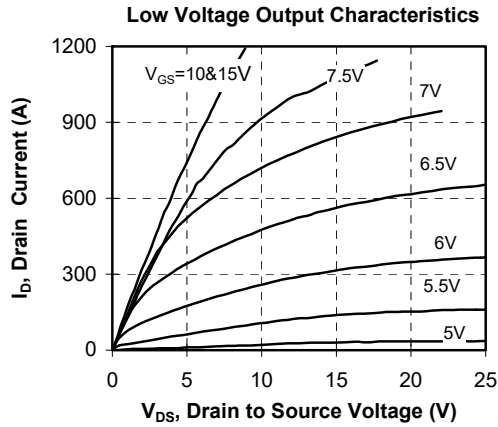
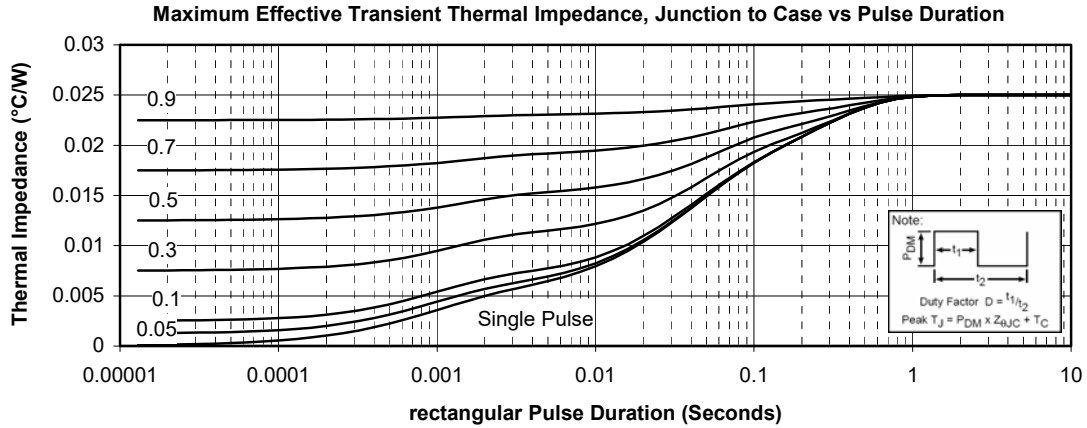
Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	150	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	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

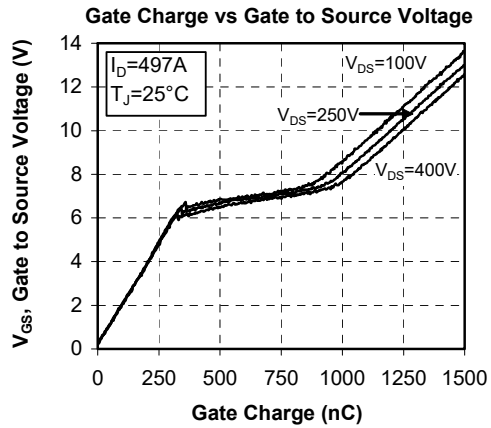
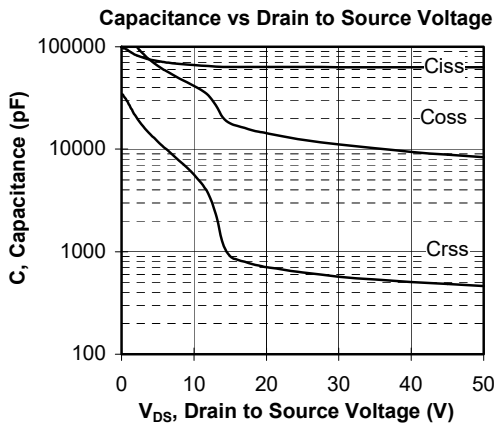
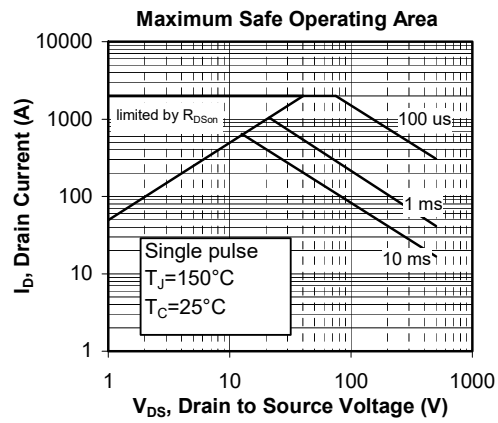
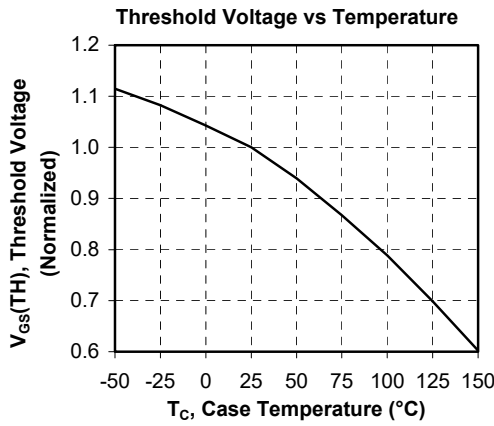
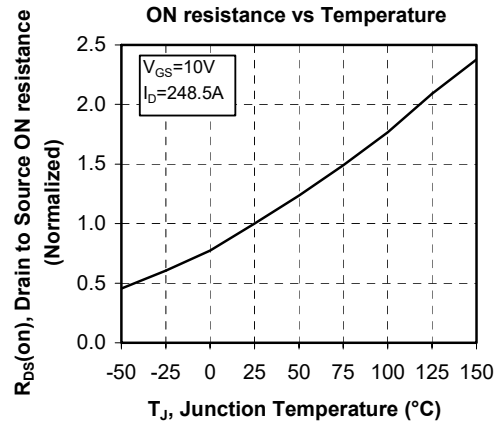
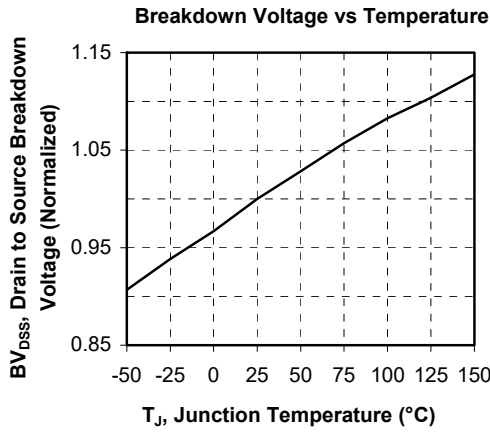
Package outline (dimensions in mm)

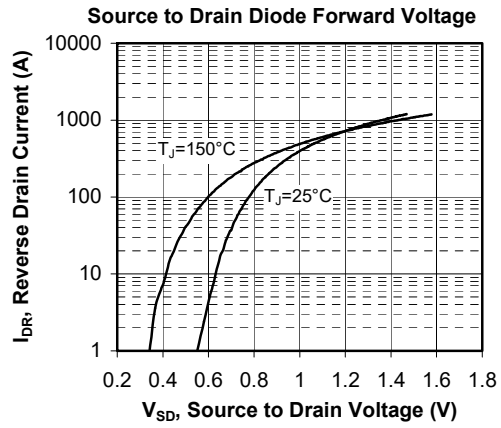
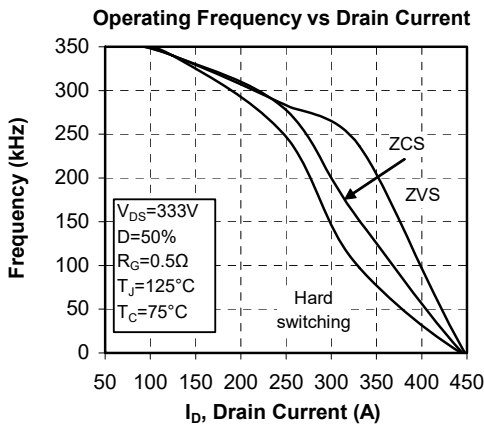
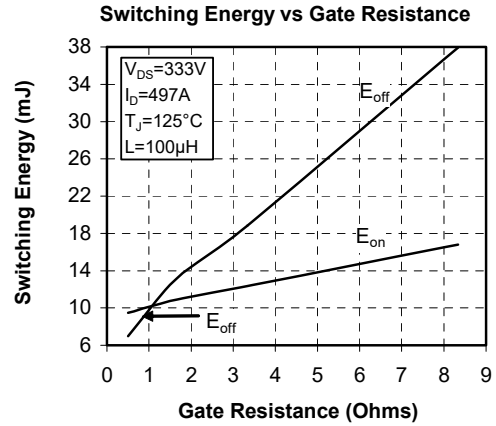
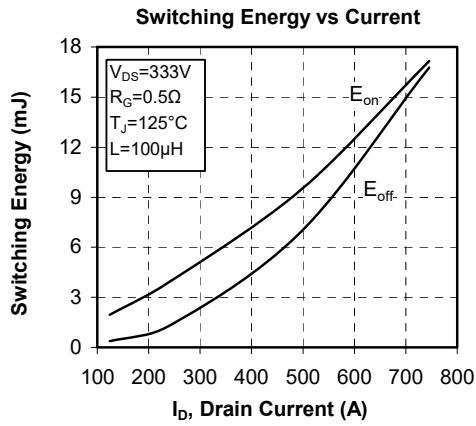
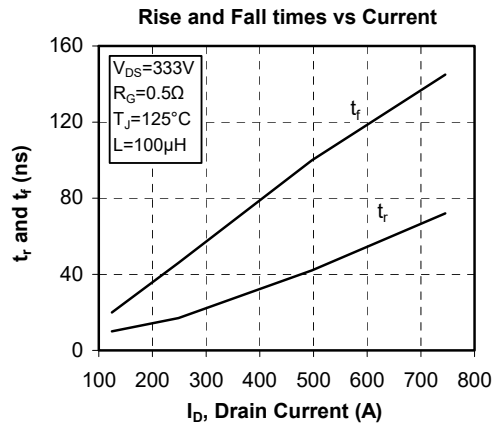
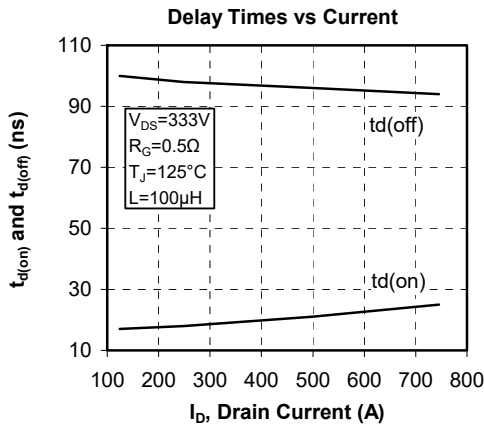


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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