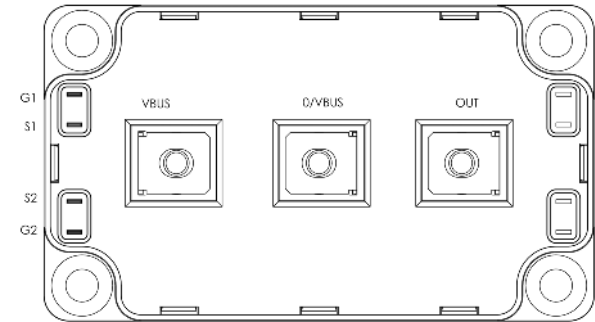
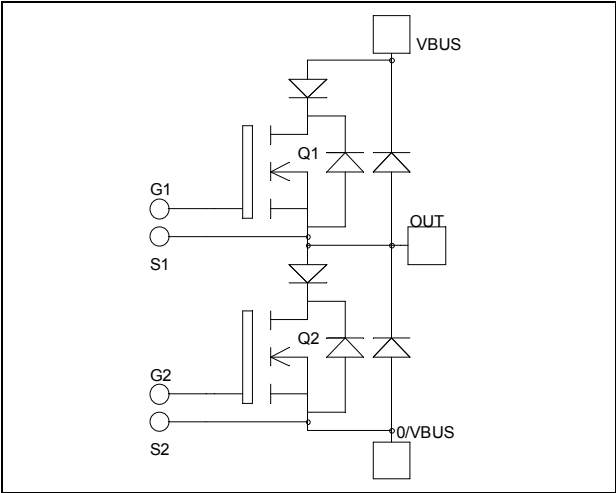


Phase leg

Series & parallel diodes

MOSFET Power Module

$V_{DSS} = 200V$
 $R_{DSon} = 6m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 300A$ @ $T_c = 25^\circ C$



Application

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

Features

- Power MOS 7[®] MOSFETs
 - 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
 - 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	200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	300
		$T_c = 80^\circ C$	225
I_{DM}	Pulsed Drain current	1200	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	7.2	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1250
I_{AR}	Avalanche current (repetitive and non repetitive)	24	A
E_{AR}	Repetitive Avalanche Energy	30	mJ
E_{AS}	Single Pulse Avalanche Energy	1300	

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} = 200V			500	μA
		V _{GS} = 0V, V _{DS} = 160V	T _j = 25°C		2000	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 150A		6	7.2	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 6mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30V, V _{DS} = 0V			±500	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		18.5		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		6.03		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.58		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 100V I _D = 300A		325		nC
Q _{gs}	Gate – Source Charge			144		
Q _{gd}	Gate – Drain Charge			156		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 133V I _D = 300A R _G = 0.8Ω		28		ns
T _r	Rise Time			56		
T _{d(off)}	Turn-off Delay Time			81		
T _f	Fall Time			99		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 133V I _D = 300A, R _G = 0.8Ω		1543		μJ
E _{off}	Turn-off Switching Energy			1517		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 133V I _D = 300A, R _G = 0.8Ω		2027		μJ
E _{off}	Turn-off Switching Energy			1770		

Series diode ratings and characteristics

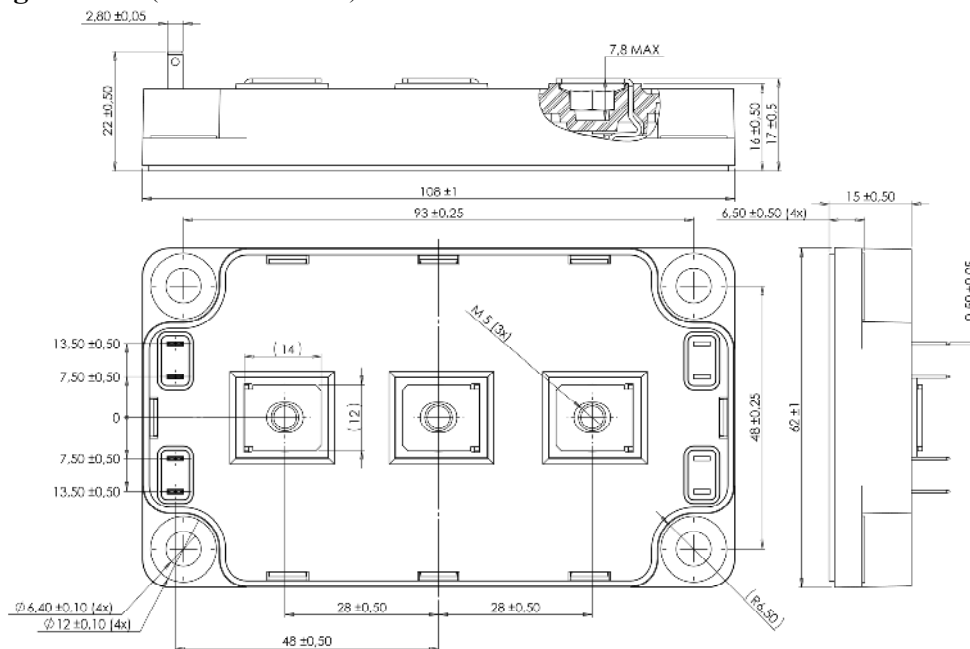
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		200			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 200V	T _j = 25°C		350	μA
			T _j = 125°C		600	
I _F	DC Forward Current	T _c = 85°C		120		A
V _F	Diode Forward Voltage	I _F = 120A		1.1	1.15	V
		I _F = 240A		1.4		
		I _F = 120A	T _j = 125°C		0.9	
t _{rr}	Reverse Recovery Time	I _F = 120A V _R = 133V di/dt = 400A/μs	T _j = 25°C		31	ns
			T _j = 125°C		60	
Q _{rr}	Reverse Recovery Charge	I _F = 120A V _R = 133V di/dt = 400A/μs	T _j = 25°C		120	nC
			T _j = 125°C		500	

Parallel diode ratings and characteristics

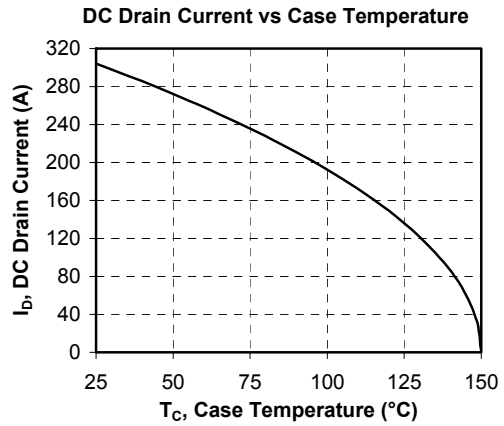
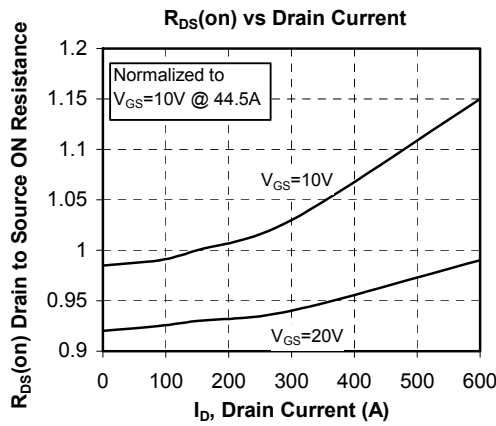
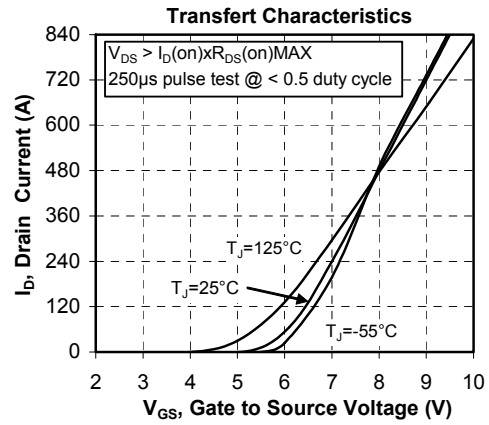
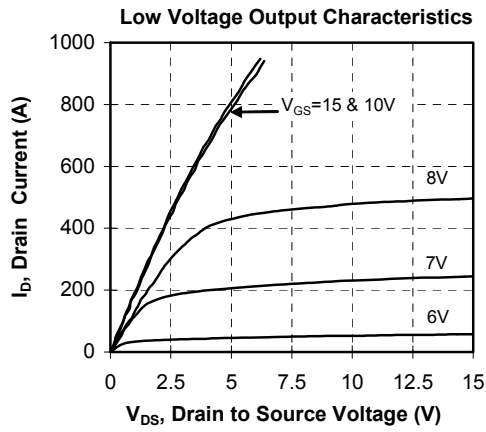
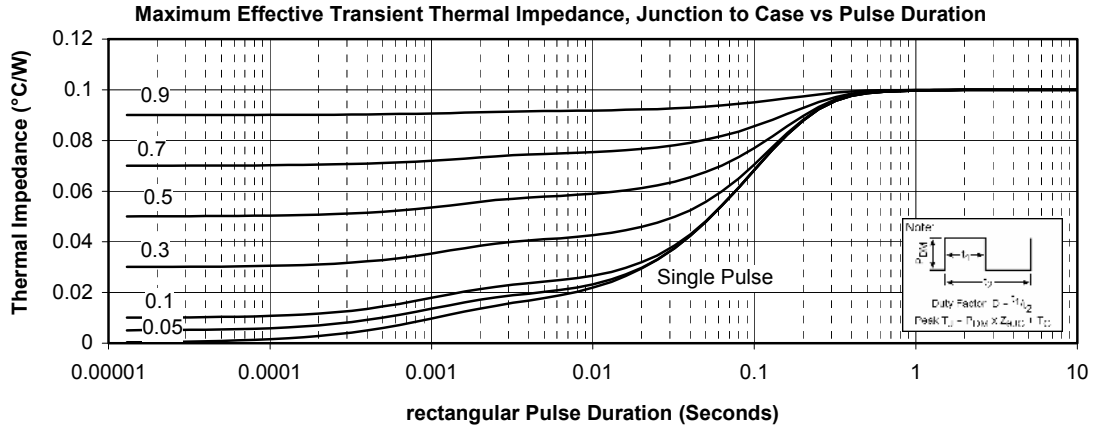
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			200			V
I _{RM}	Maximum Reverse Leakage Current	V _R =200V	T _j = 25°C			350	μA
			T _j = 125°C			600	
I _F	DC Forward Current	T _c = 85°C			120		A
V _F	Diode Forward Voltage	I _F = 120A			1.1	1.15	V
		I _F = 240A			1.4		
		I _F = 120A	T _j = 125°C		0.9		
t _{rr}	Reverse Recovery Time	I _F = 120A V _R = 133V di/dt = 400A/μs	T _j = 25°C		31		ns
			T _j = 125°C		60		
Q _{rr}	Reverse Recovery Charge	I _F = 120A V _R = 133V di/dt = 400A/μs	T _j = 25°C		120		nC
			T _j = 125°C		500		

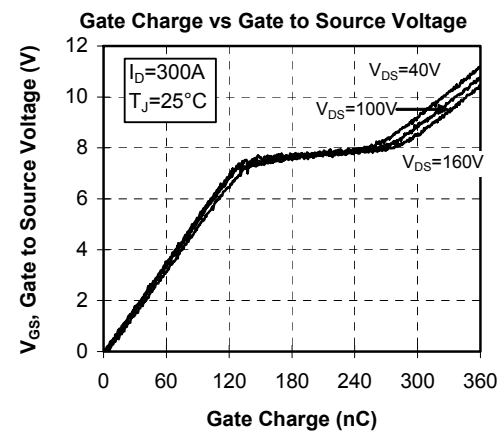
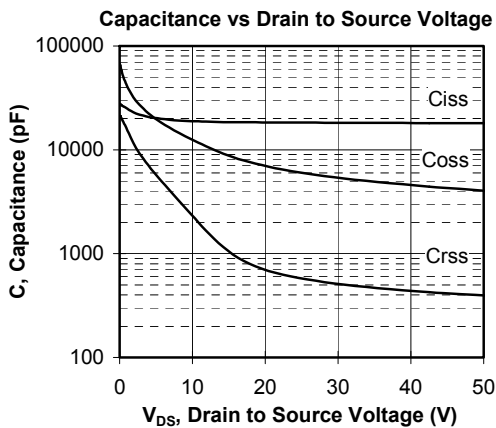
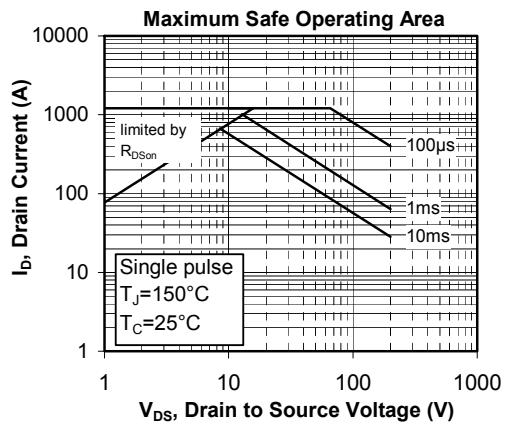
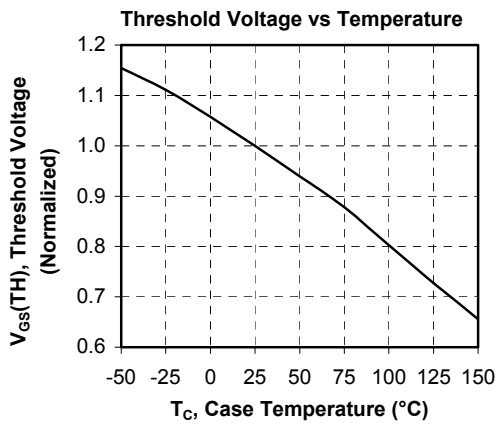
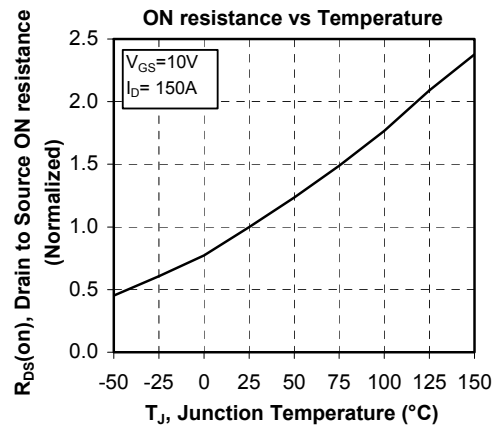
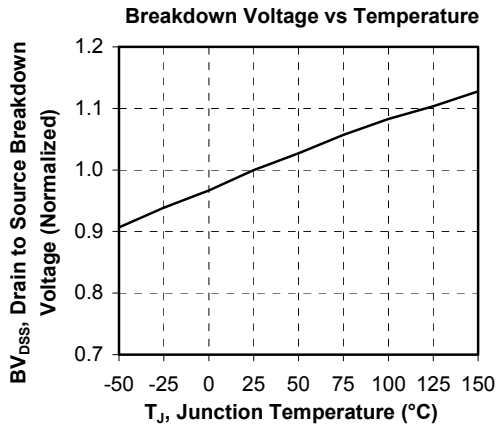
Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor				0.10	°C/W
		Series diode				0.46	
		Diode parallel				0.46	
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

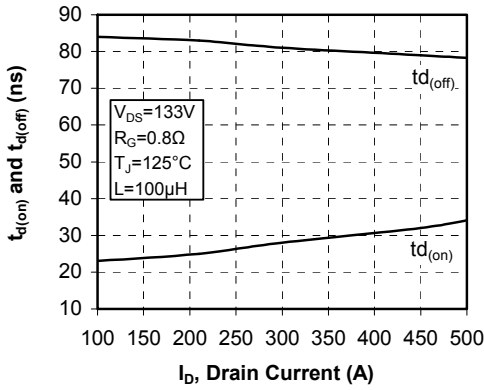
SP6 Package outline (dimensions in mm)


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

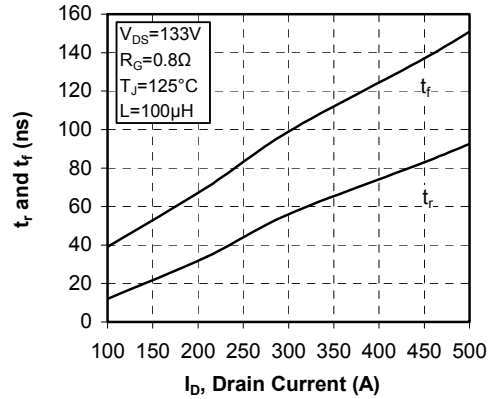
Typical Performance Curve




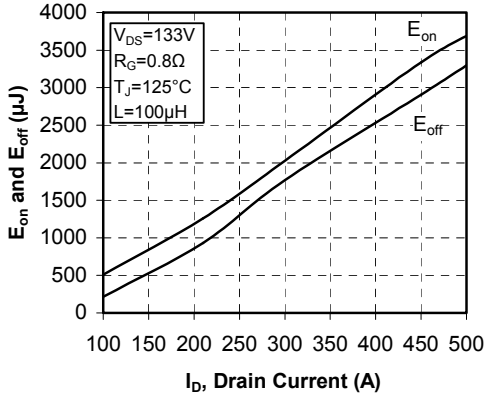
Delay Times vs Current



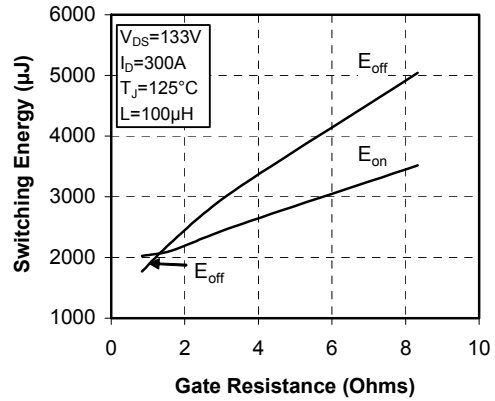
Rise and Fall times vs Current



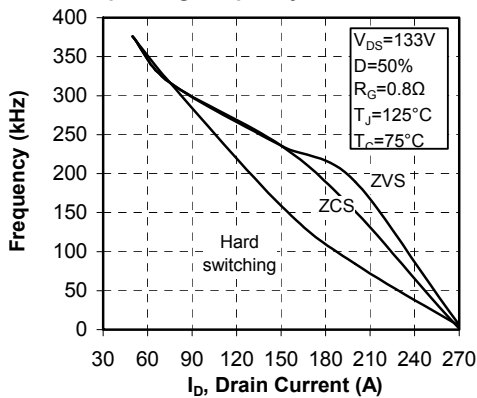
Switching Energy vs Current



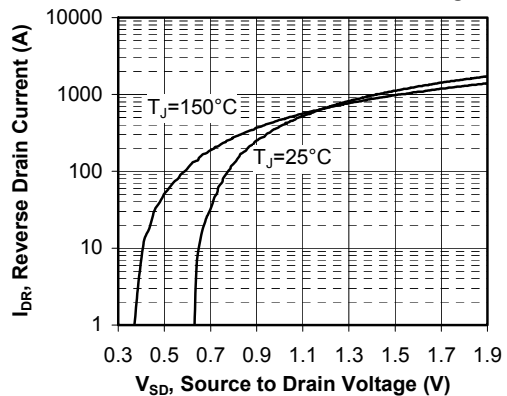
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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