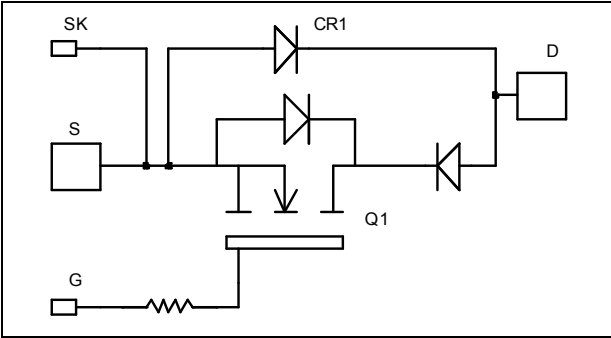


*Single switch
Series & parallel diodes
MOSFET Power Module*

$V_{DSS} = 200V$
 $R_{DSon} = 4m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 417A \text{ @ } T_c = 25^\circ C$

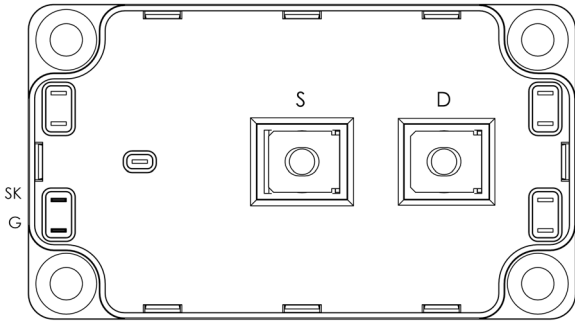


Application

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

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
- 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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	417
		$T_c = 80^\circ C$	310
I_{DM}	Pulsed Drain current	1670	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	5	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1560
I_{AR}	Avalanche current (repetitive and non repetitive)	100	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} = 200V			500	μA
		T _j = 25°C				
		V _{GS} = 0V, V _{DS} = 160V			2000	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 208.5A		4	5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 10mA	3		5	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, V _{DS} = 0V			±200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1MHz		28.8		nF
C _{oss}	Output Capacitance			9.32		
C _{rss}	Reverse Transfer Capacitance			0.58		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 100V I _D = 417A		560		nC
Q _{gs}	Gate – Source Charge			212		
Q _{gd}	Gate – Drain Charge			268		
T _{d(on)}	Turn-on Delay Time	Inductive switching @ 125°C V _{GS} = 15V V _{Bus} = 133V I _D = 417A R _G = 1.2Ω		32		ns
T _r	Rise Time			64		
T _{d(off)}	Turn-off Delay Time			88		
T _f	Fall Time			116		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 133V I _D = 417A, R _G = 1.2Ω		3396		μJ
E _{off}	Turn-off Switching Energy			3716		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 133V I _D = 417A, R _G = 1.2Ω		3744		μJ
E _{off}	Turn-off Switching Energy			3944		

Series diode ratings and characteristics

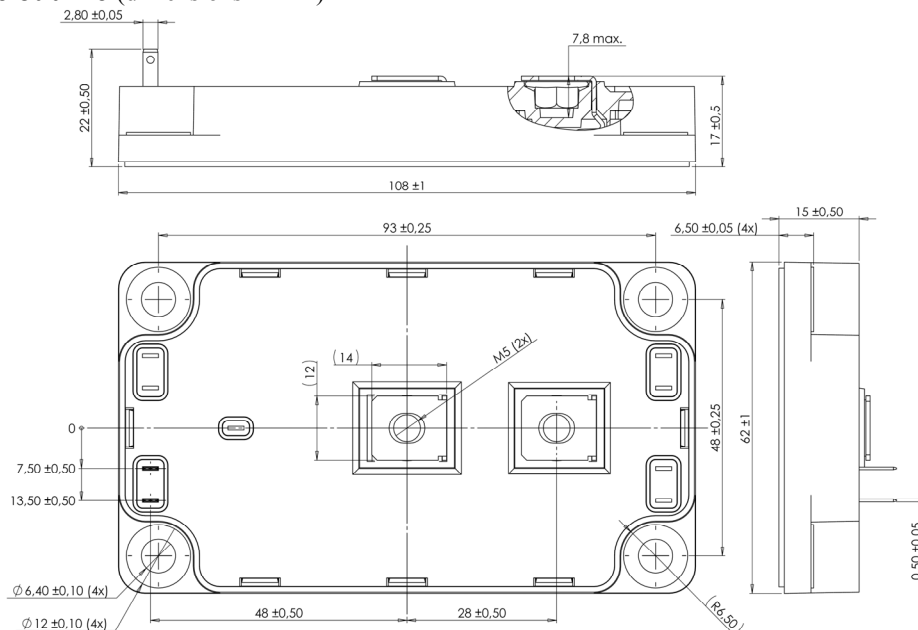
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		200			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 200V			1000	μA
			T _j = 25°C			
					1250	
I _F	DC Forward Current	T _c = 85°C		360		A
V _F	Diode Forward Voltage	I _F = 360A		1.1	1.15	V
		I _F = 720A		1.4		
		I _F = 360A	T _j = 125°C		0.9	
t _{rr}	Reverse Recovery Time	I _F = 360A V _R = 133V di/dt = 1000A/μs	T _j = 25°C		31	ns
			T _j = 125°C		60	
Q _{rr}	Reverse Recovery Charge	I _F = 360A V _R = 133V di/dt = 1000A/μs	T _j = 25°C		360	nC
			T _j = 125°C		1500	

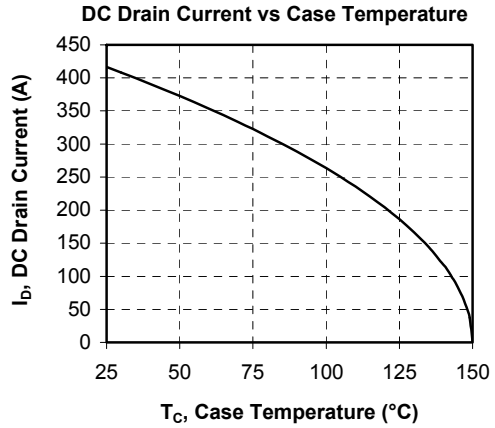
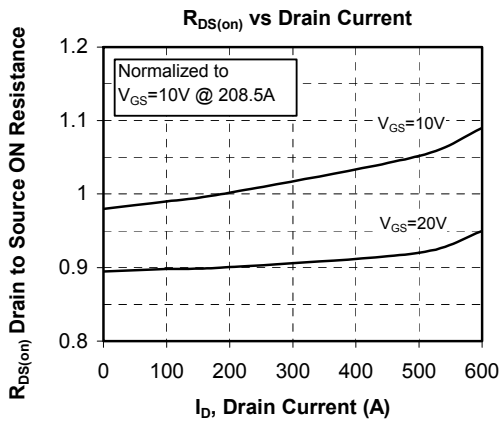
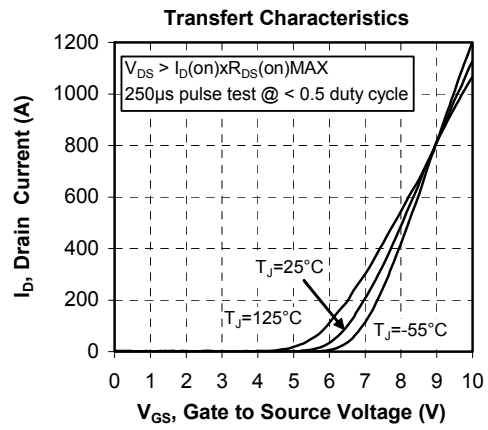
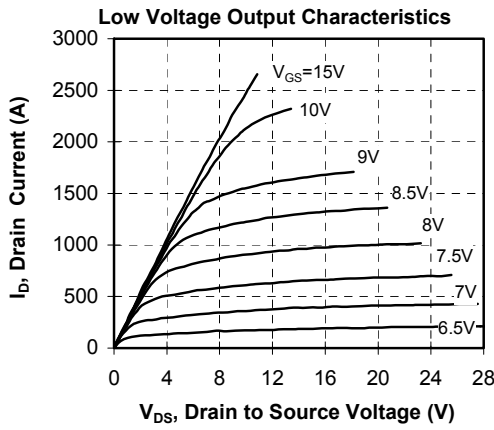
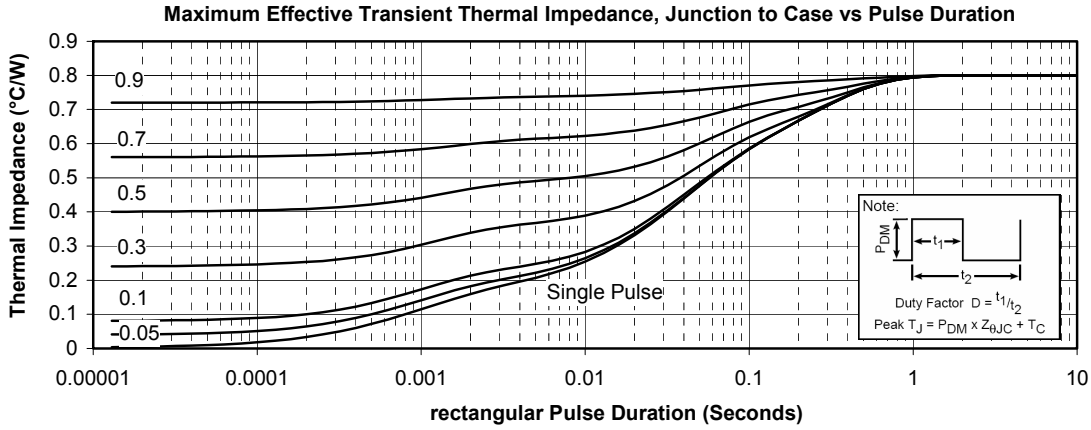
Parallel diode ratings and characteristics

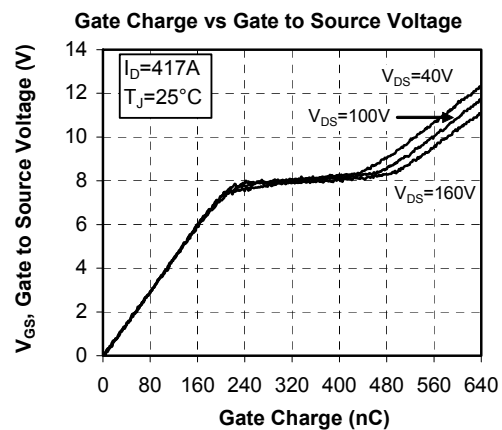
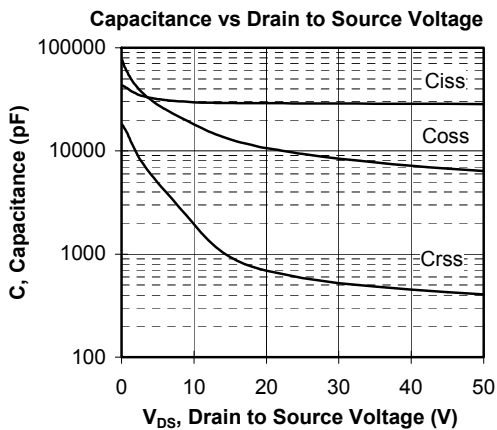
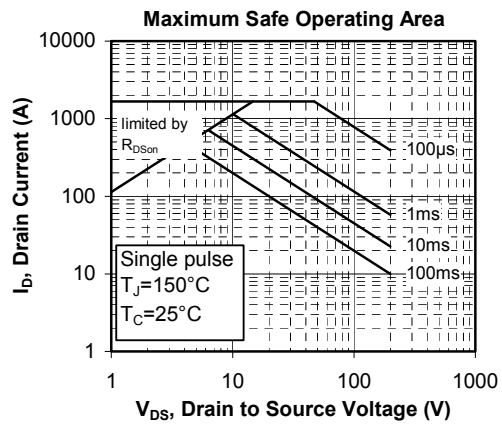
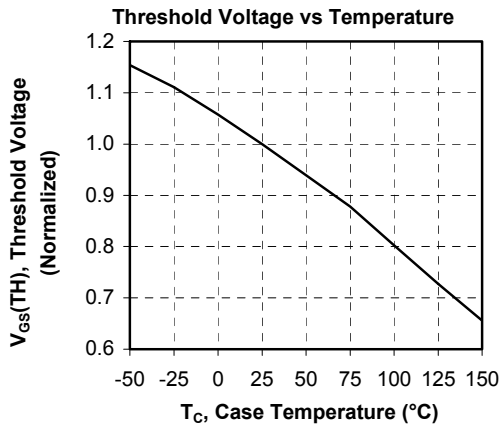
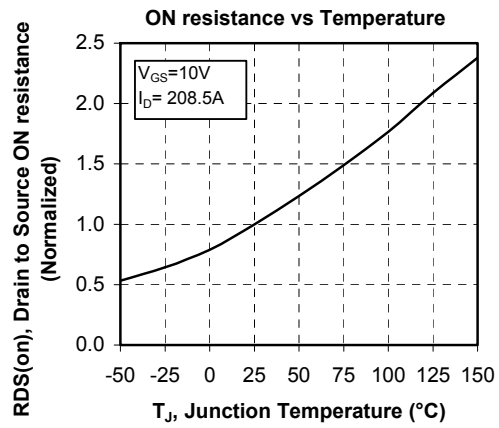
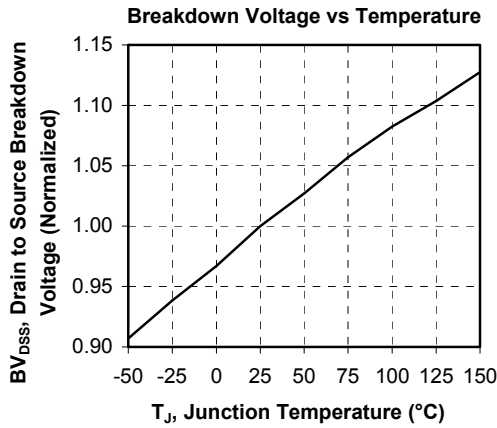
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			200			V
I _{RM}	Maximum Reverse Leakage Current	V _R =200V	T _j = 25°C			1000	μA
			T _j = 125°C			1250	
I _F	DC Forward Current	T _c = 85°C			360		A
V _F	Diode Forward Voltage	I _F = 360A			1.1	1.15	V
		I _F = 720A			1.4		
		I _F = 360A	T _j = 125°C		0.9		
t _{rr}	Reverse Recovery Time	I _F = 360A V _R = 133V di/dt = 1000A/μs	T _j = 25°C		31		ns
			T _j = 125°C		60		
Q _{rr}	Reverse Recovery Charge	I _F = 360A V _R = 133V di/dt = 1000A/μs	T _j = 25°C		360		nC
			T _j = 125°C		1500		

Thermal and package characteristics

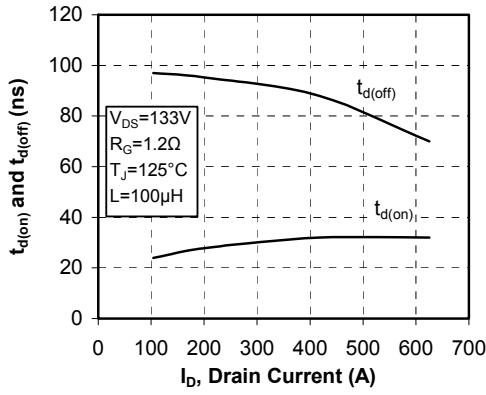
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	Transistor				0.08	°C/W
		Series Diode				0.12	
		Parallel Diode				0.12	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
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

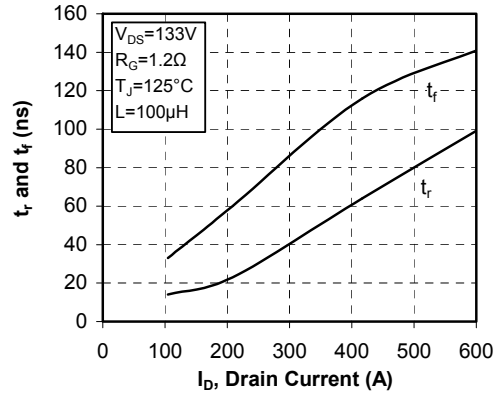
Typical Performance Curve




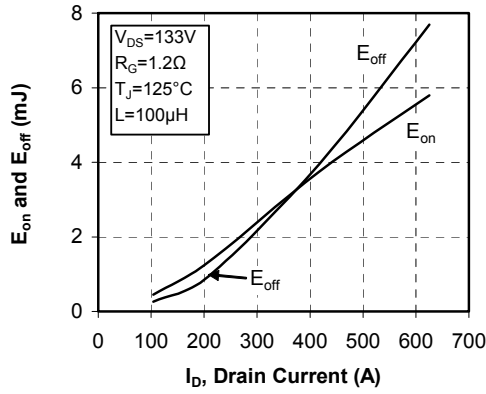
Delay Times vs Current



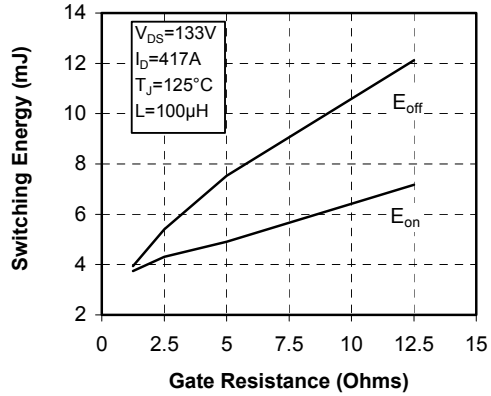
Rise and Fall times vs Current



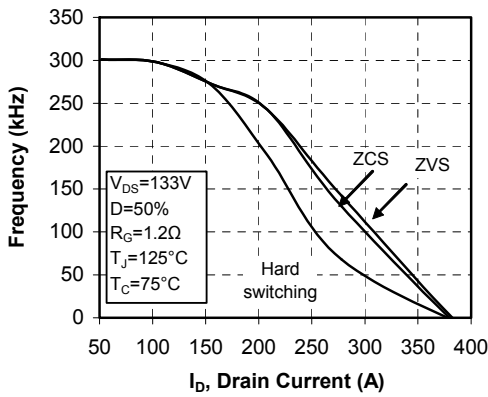
Switching Energy vs Current



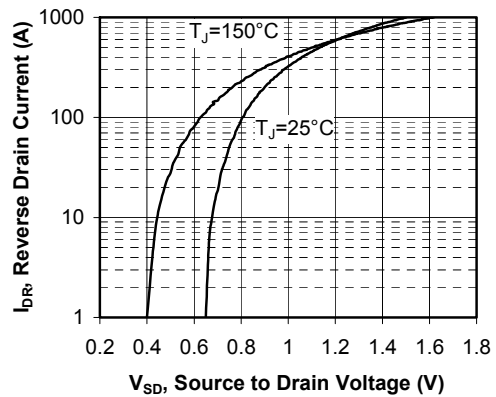
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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