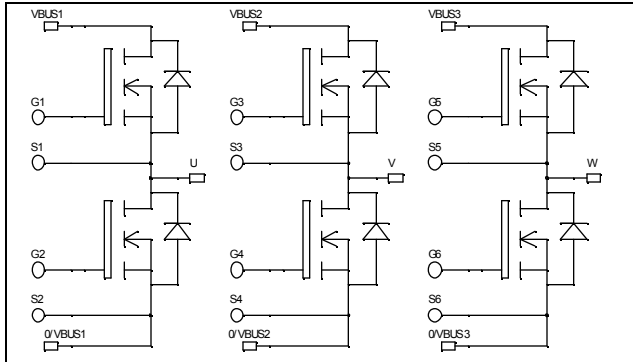


Triple phase leg MOSFET Power Module

$V_{DSS} = 100V$
 $R_{DSon} = 09m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 139A \text{ @ } T_c = 25^\circ C$

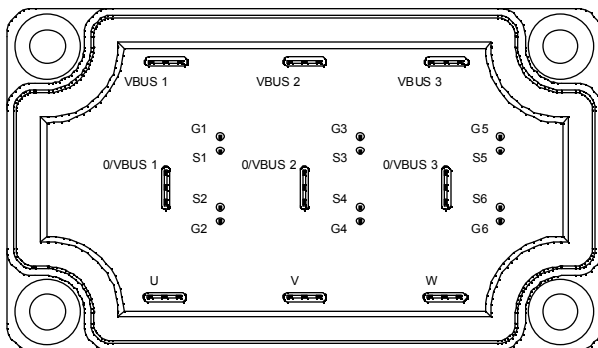


Application

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

Features

- Power MOS V[®] FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration




Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a phase leg of three times the current capability
- Module can be configured as a three phase bridge
- Module can be configured as a boost followed by a full bridge
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	100	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	139
		$T_c = 80^\circ C$	100
I_{DM}	Pulsed Drain current	430	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	10	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390
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	$V_{GS} = 0\text{V}, V_{DS} = 100\text{V}$			100	μA
		$T_j = 25^\circ\text{C}$				
		$V_{GS} = 0\text{V}, V_{DS} = 80\text{V}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 69.5\text{A}$		9	10	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$		9875		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$		3940		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1470		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$		350		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 50\text{V}$		60		
Q_{gd}	Gate – Drain Charge	$I_D = 139\text{A}$		180		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C		35		ns
T_r	Rise Time	$V_{GS} = 15\text{V}$		70		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 66\text{V}$		95		
T_f	Fall Time	$I_D = 139\text{A}$ $R_G = 5\Omega$		125		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C		552		μJ
E_{off}	Turn-off Switching Energy	$V_{GS} = 15\text{V}, V_{Bus} = 66\text{V}$ $I_D = 139\text{A}, R_G = 5\Omega$		604		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C		608		μJ
E_{off}	Turn-off Switching Energy	$V_{GS} = 15\text{V}, V_{Bus} = 66\text{V}$ $I_D = 139\text{A}, R_G = 5\Omega$		641		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			139	A	
		$T_c = 80^\circ\text{C}$			100		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = -139\text{A}$			1.3	V	
dv/dt	Peak Diode Recovery 1				8	V/ns	
t_{rr}	Reverse Recovery Time	$I_S = -139\text{A}$ $V_R = 66\text{V}$	$T_j = 25^\circ\text{C}$			190	ns
			$T_j = 125^\circ\text{C}$			370	
Q_{rr}	Reverse Recovery Charge	$di/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		0.4	μC	
			$T_j = 125^\circ\text{C}$		1.7		

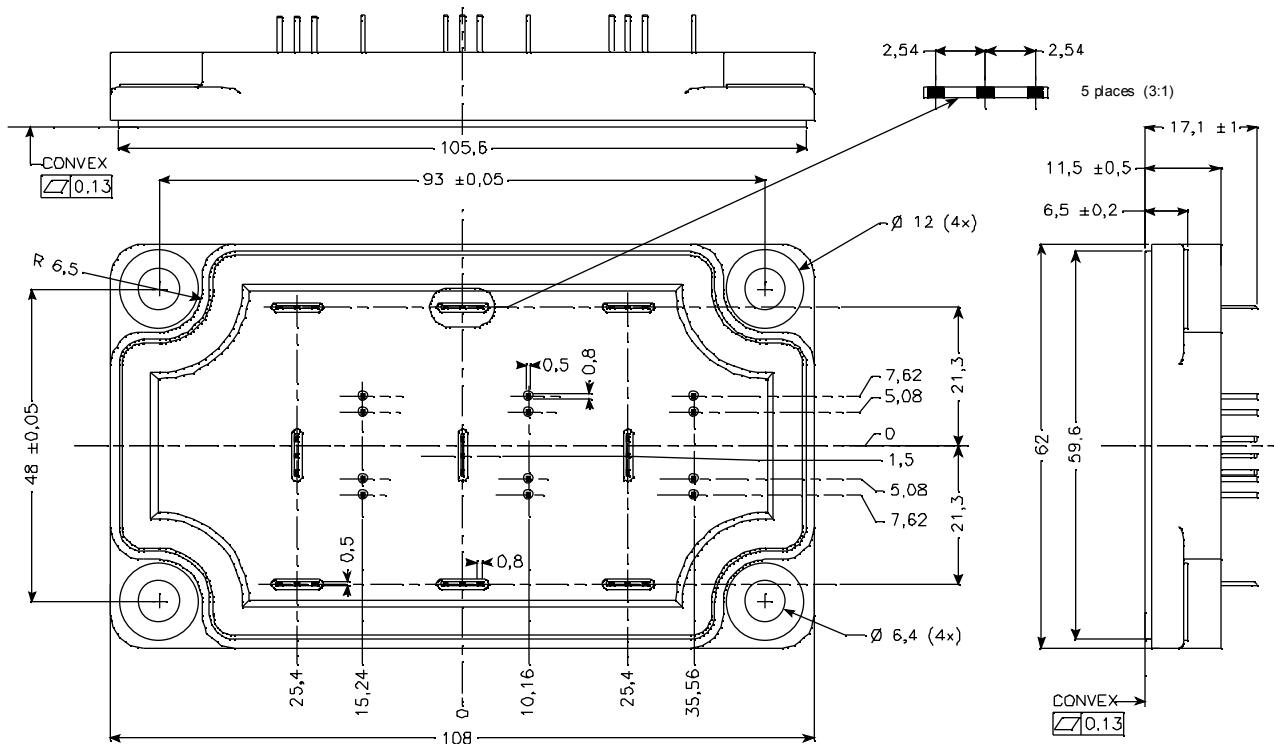
1 dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -139\text{A} \quad di/dt \leq 700\text{A}/\mu\text{s} \quad V_R \leq V_{DSS} \quad T_j \leq 150^\circ\text{C}$$

Thermal and package characteristics

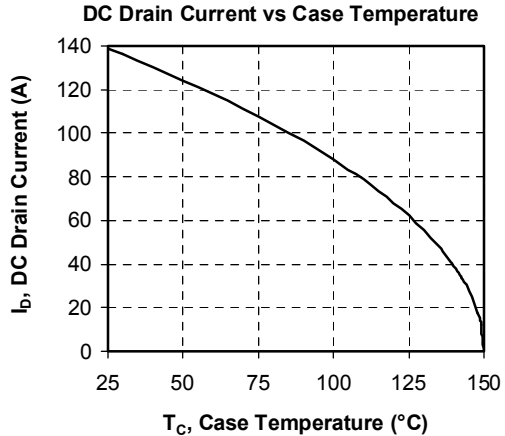
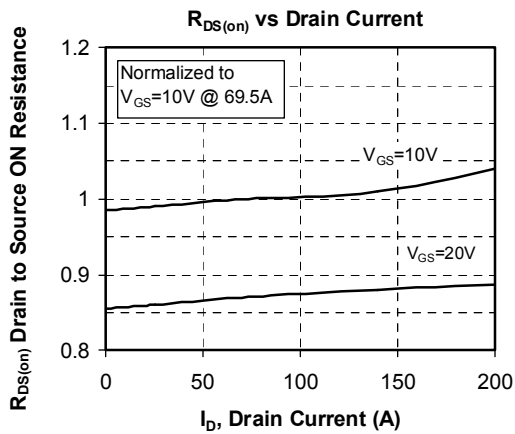
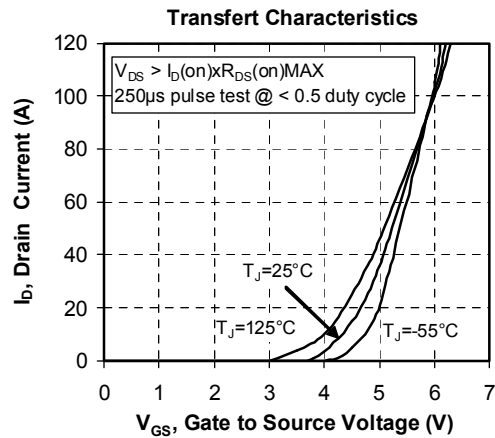
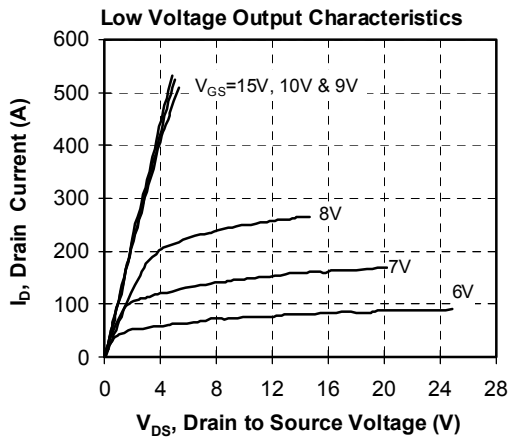
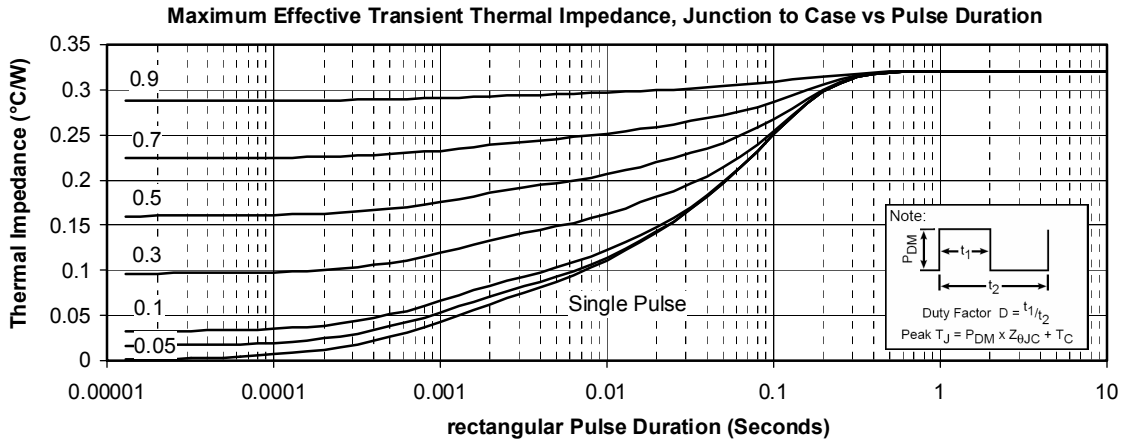
Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case Thermal Resistance			0.32	°C/W	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T_J	Operating junction temperature range	-40		150	°C	
T_{STG}	Storage Temperature Range	-40		125		
T_C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M6	3	5	N.m
Wt	Package Weight				250	g

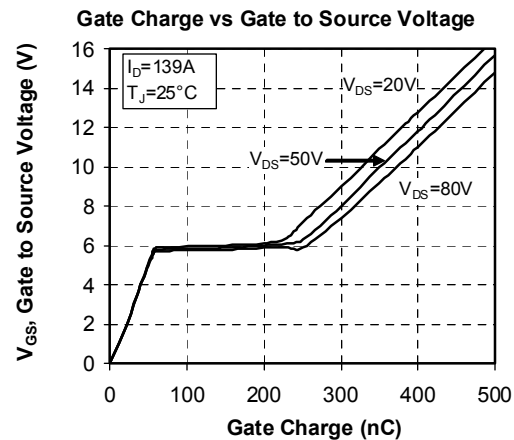
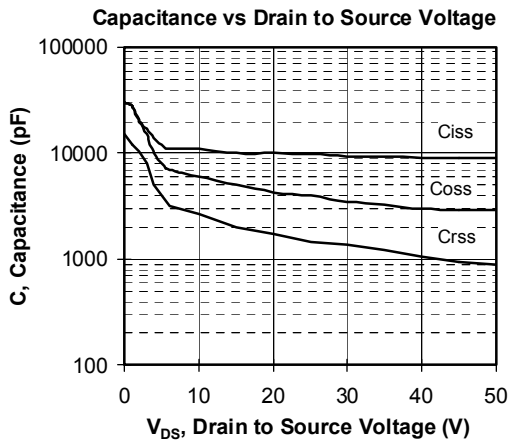
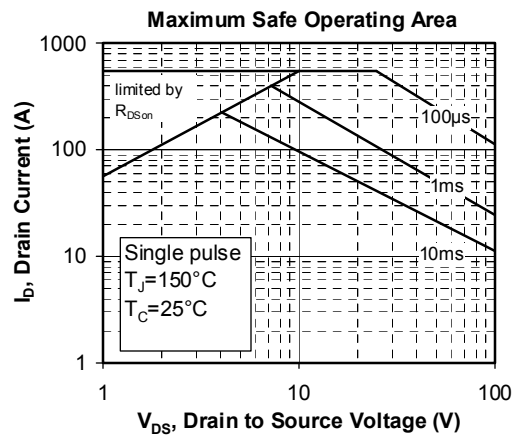
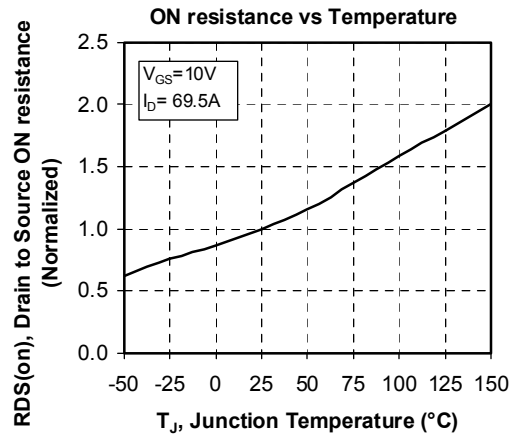
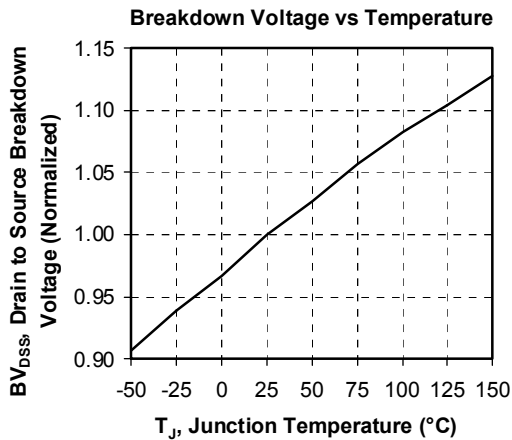
SP6-P Package outline (dimensions in mm)

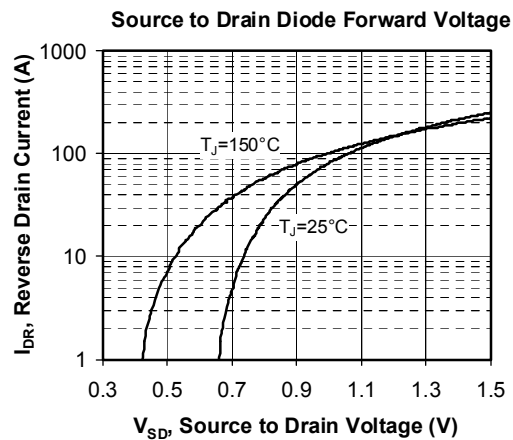
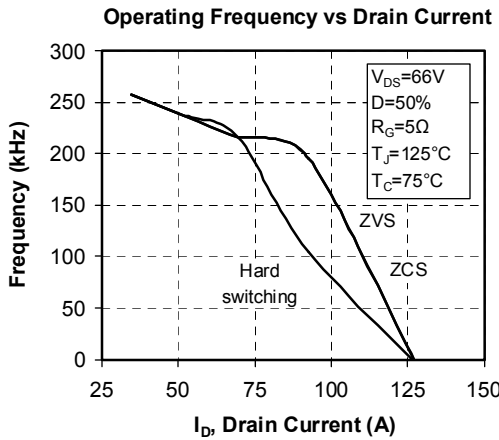
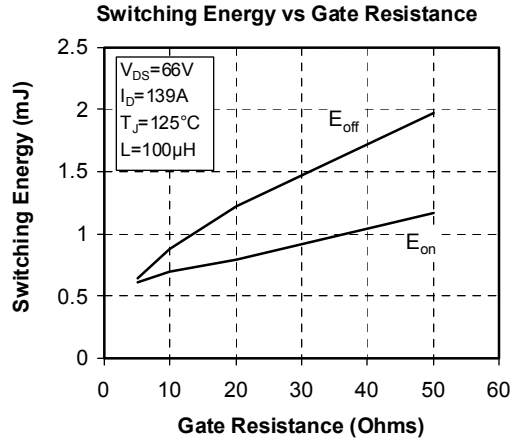
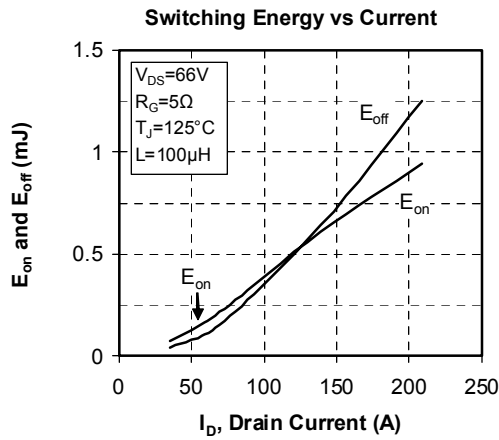
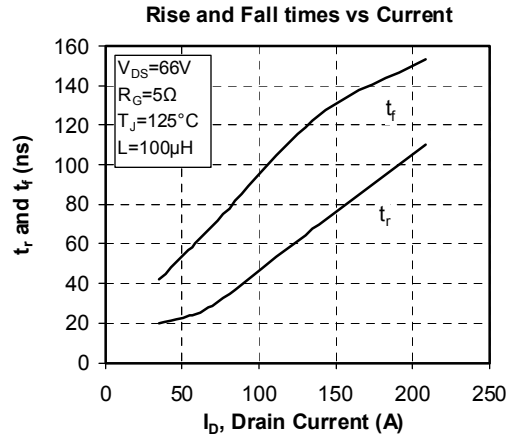
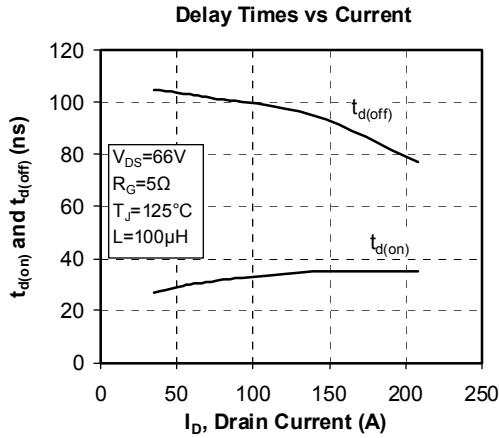


See application note 1902 - Mounting Instructions for SP6-P (12mm) Power Modules on www.microsemi.com

Typical Performance Curve







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