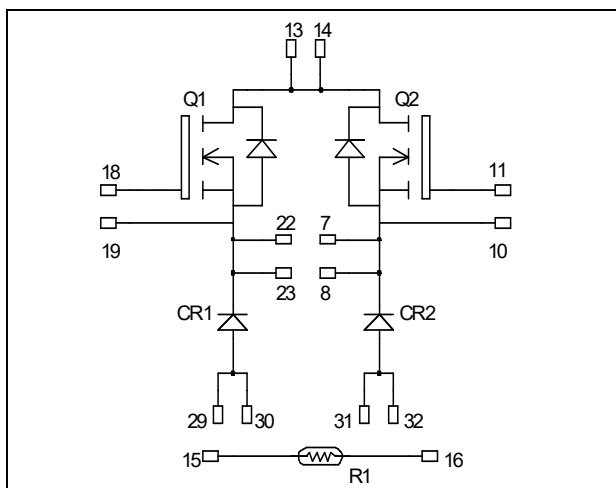


Dual Buck chopper MOSFET Power Module

V_{DSS} = 100V

R_{DSon} = 19mΩ typ @ T_j = 25°C

I_D = 70A @ T_c = 25°C



Application

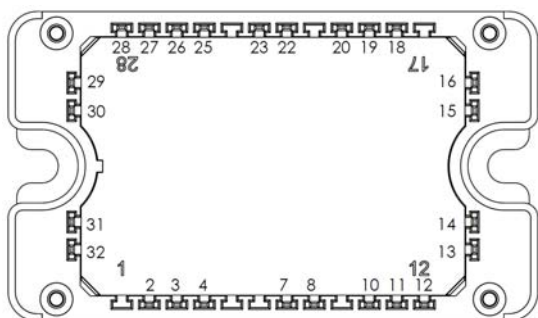
- AC and DC motor control
- Switched Mode Power Supplies

Features

- **Power MOS V[®] 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
- Internal thermistor for temperature monitoring

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
- Low profile
- Each leg can be easily paralleled to achieve a single buck of twice the current capability
- RoHS Compliant



All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

All ratings @ T_j = 25°C unless otherwise specified

Absolute maximum ratings (per MOSFET)

Symbol	Parameter	Max ratings	Unit
V _{DSS}	Drain - Source Voltage	100	V
I _D	Continuous Drain Current	T _c = 25°C	A
		T _c = 80°C	
I _{DM}	Pulsed Drain current	300	
V _{GS}	Gate - Source Voltage	±30	V
R _{DSon}	Drain - Source ON Resistance	21	mΩ
P _D	Power Dissipation	T _c = 25°C	208
I _{AR}	Avalanche current (repetitive and non repetitive)	75	A
E _{AR}	Repetitive Avalanche Energy	30	mJ
E _{AS}	Single Pulse Avalanche Energy	1500	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

Electrical Characteristics (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 100V$			250	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 35A$		19	21	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1mA$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		5100		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1900		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		800		
Q_g	Total gate Charge	$V_{GS} = 10V$		200		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 100V$		40		
Q_{gd}	Gate – Drain Charge	$I_D = 70A$		92		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 70A$ $R_G = 5\Omega$		35		ns
T_r	Rise Time			70		
$T_{d(off)}$	Turn-off Delay Time			95		
T_f	Fall Time			125		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 70A, R_G = 5\Omega$		276		μJ
E_{off}	Turn-off Switching Energy			302		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 70A, R_G = 5\Omega$		304		μJ
E_{off}	Turn-off Switching Energy			320		
R_{thJC}	Junction to Case Thermal Resistance				0.6	$^{\circ}C/W$

Chopper diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage				200	V
I_{RM}	Reverse Leakage Current	$V_R = 200V$			250	μA
I_F	DC Forward Current	$T_c = 80^{\circ}C$		60		A
V_F	Diode Forward Voltage	$I_F = 60A$		1.1		V
		$I_F = 120A$		1.4		
		$I_F = 60A, T_j = 125^{\circ}C$		0.9		
t_{rr}	Reverse Recovery Time	$I_F = 60A$ $V_R = 133V$ $di/dt = 200A/\mu s$	$T_j = 25^{\circ}C$	31		ns
			$T_j = 125^{\circ}C$	60		
Q_{rr}	Reverse Recovery Charge	$T_j = 25^{\circ}C$ $T_j = 125^{\circ}C$	$T_j = 25^{\circ}C$	60		nC
			$T_j = 125^{\circ}C$	250		
R_{thJC}	Junction to Case Thermal Resistance				0.9	$^{\circ}C/W$

Thermal and package characteristics

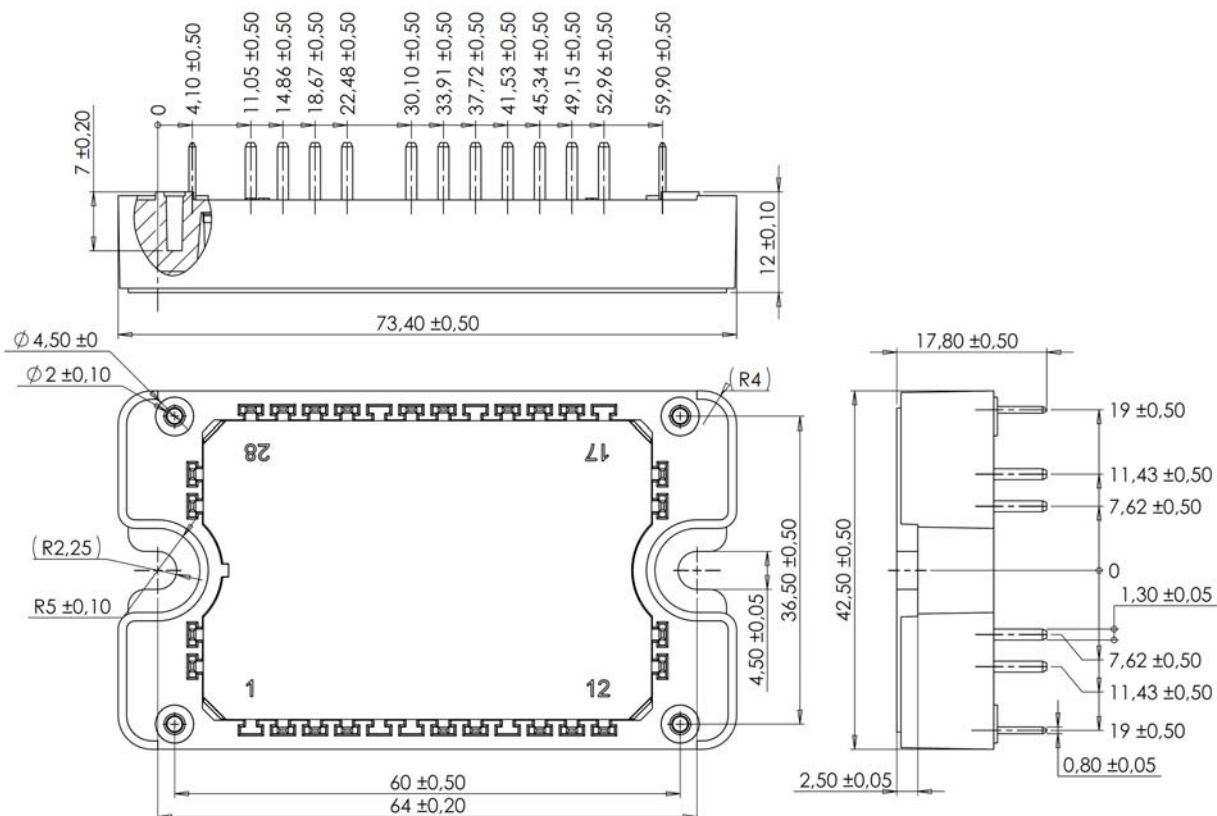
Symbol	Characteristic	Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V
T _J	Operating junction temperature range	-40	150	°C
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} - 25	
T _{STG}	Storage Temperature Range	-40	125	
T _C	Operating Case Temperature	-40	125	
Torque	Mounting torque	To heatsink	M4	N.m
Wt	Package Weight		110	g

Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C =100°C		4		%

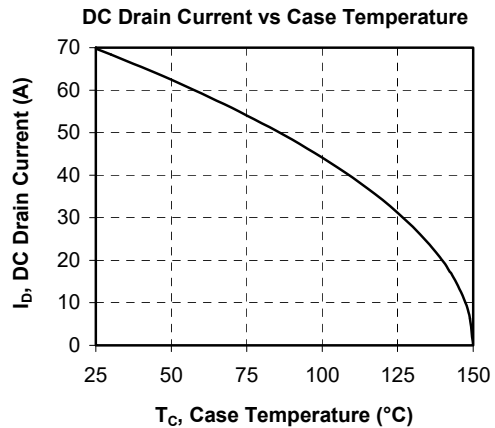
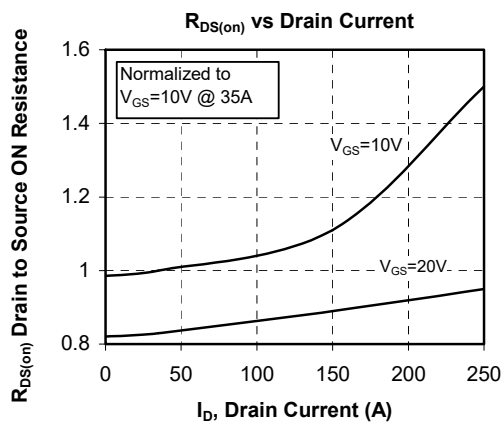
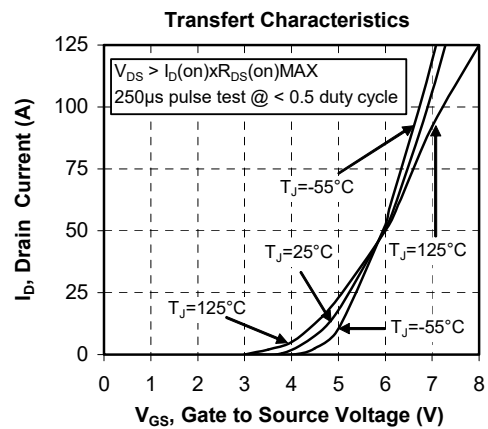
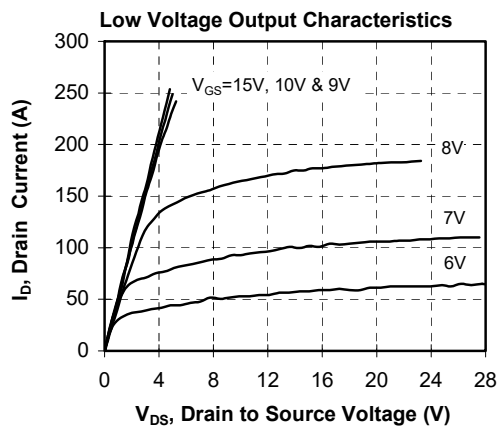
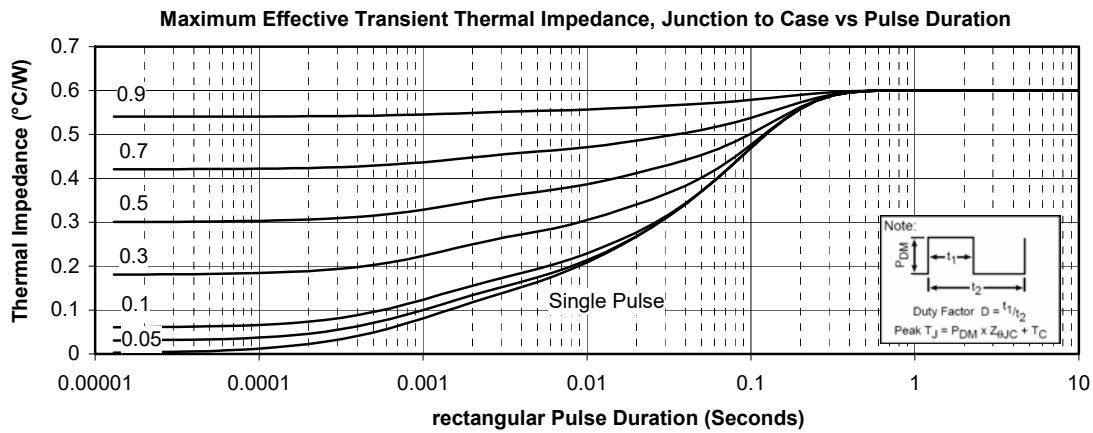
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

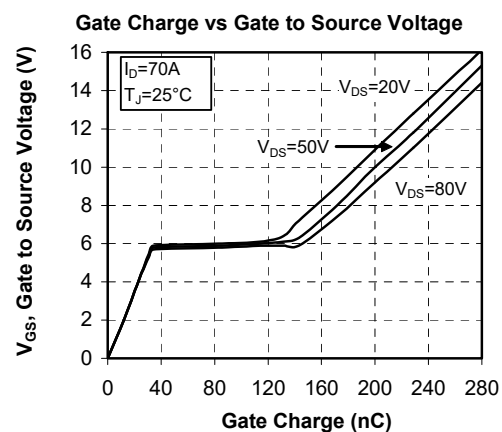
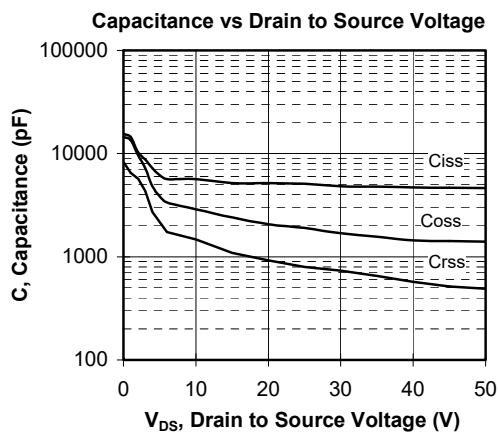
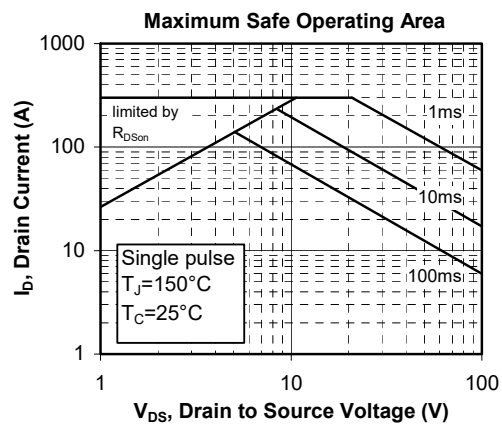
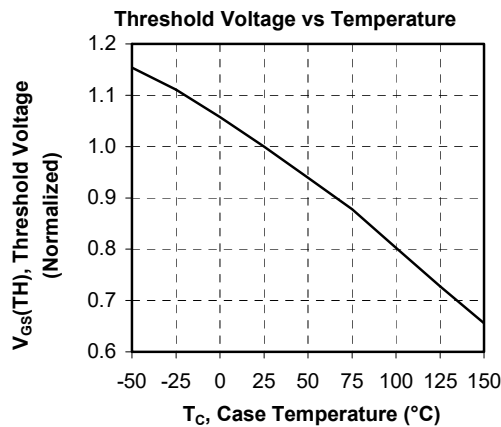
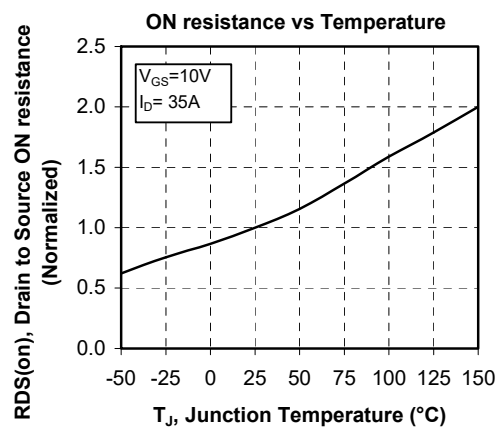
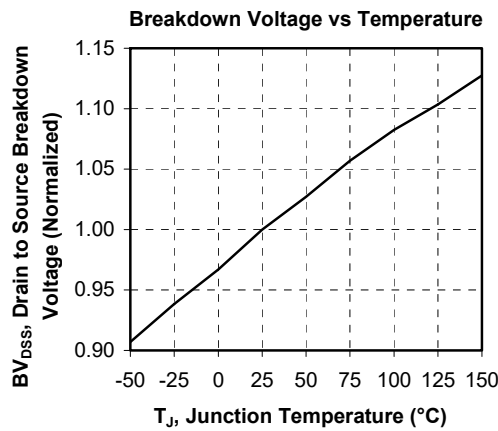
T: Thermistor temperature
 R_T: Thermistor value at T

Package outline (dimensions in mm)


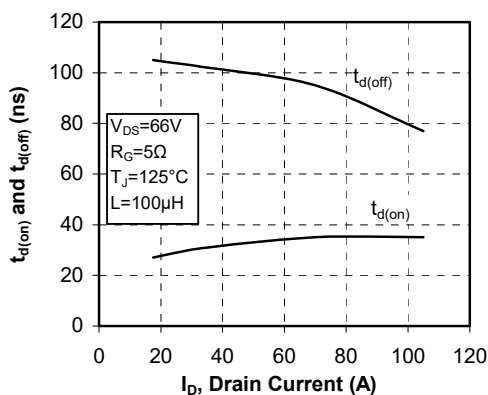
See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

Typical Performance Curve

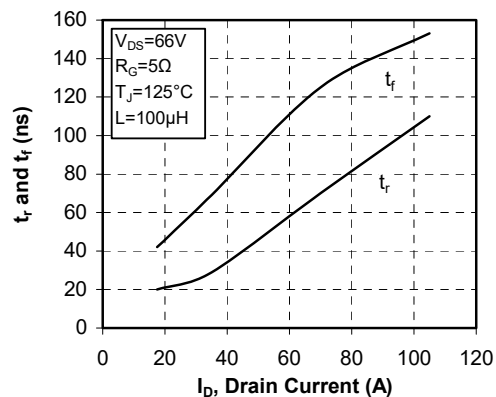




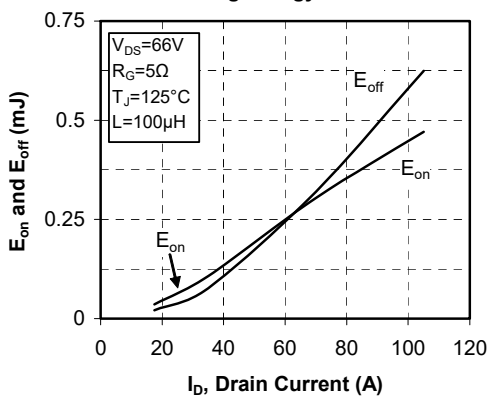
Delay Times vs Current



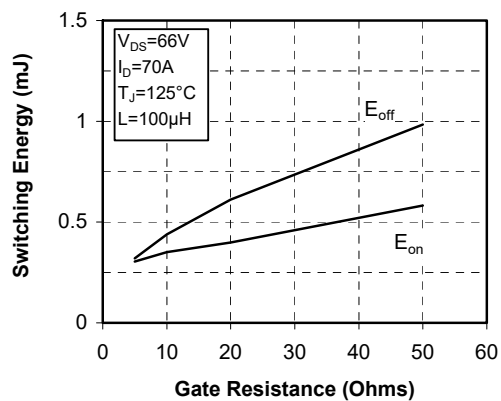
Rise and Fall times vs Current



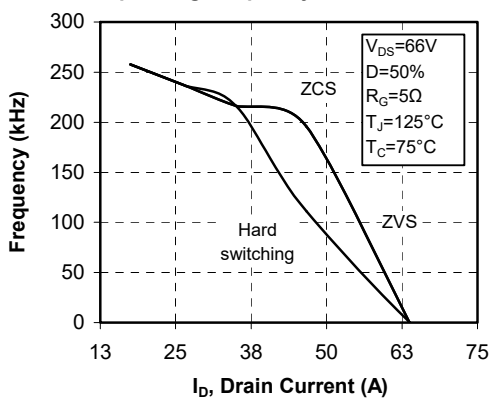
Switching Energy vs Current



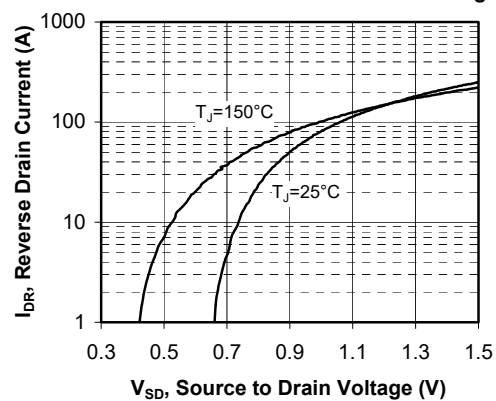
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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