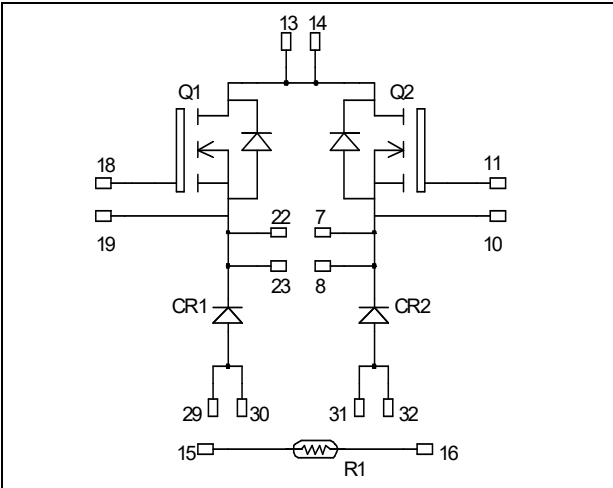


Dual Buck chopper MOSFET Power Module

$V_{DSS} = 100V$
 $R_{DSon} = 19m\Omega \text{ typ @ } T_j = 25^\circ C$
 $I_D = 70A \text{ @ } T_c = 25^\circ C$



Application

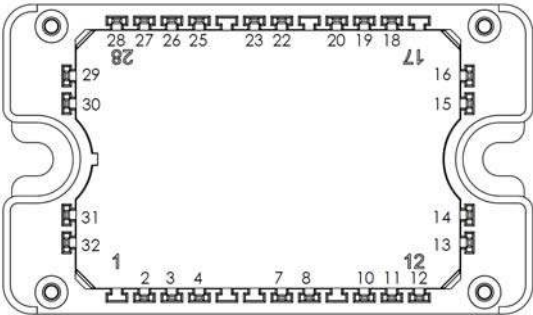
- AC and DC motor control
- Switched Mode Power Supplies

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 @ $T_j = 25^\circ C$ 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	$T_c = 25^\circ C$	70
		$T_c = 80^\circ C$	50
I_{DM}	Pulsed Drain current	300	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	21	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	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	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 1mA	2		4	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±30 V, 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 = 5Ω		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 = 5Ω		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 = 5Ω		304		μJ
E _{off}	Turn-off Switching Energy			320		
R _{thJC}	Junction to Case Thermal Resistance				0.6	°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°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°C		0.9		
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 133V	T _j = 25°C		31	ns
			T _j = 125°C		60	
Q _{rr}	Reverse Recovery Charge	di/dt = 200A/μs	T _j = 25°C		60	nC
			T _j = 125°C		250	
R _{thJC}	Junction to Case Thermal Resistance				0.9	°C/W

Thermal and package characteristics

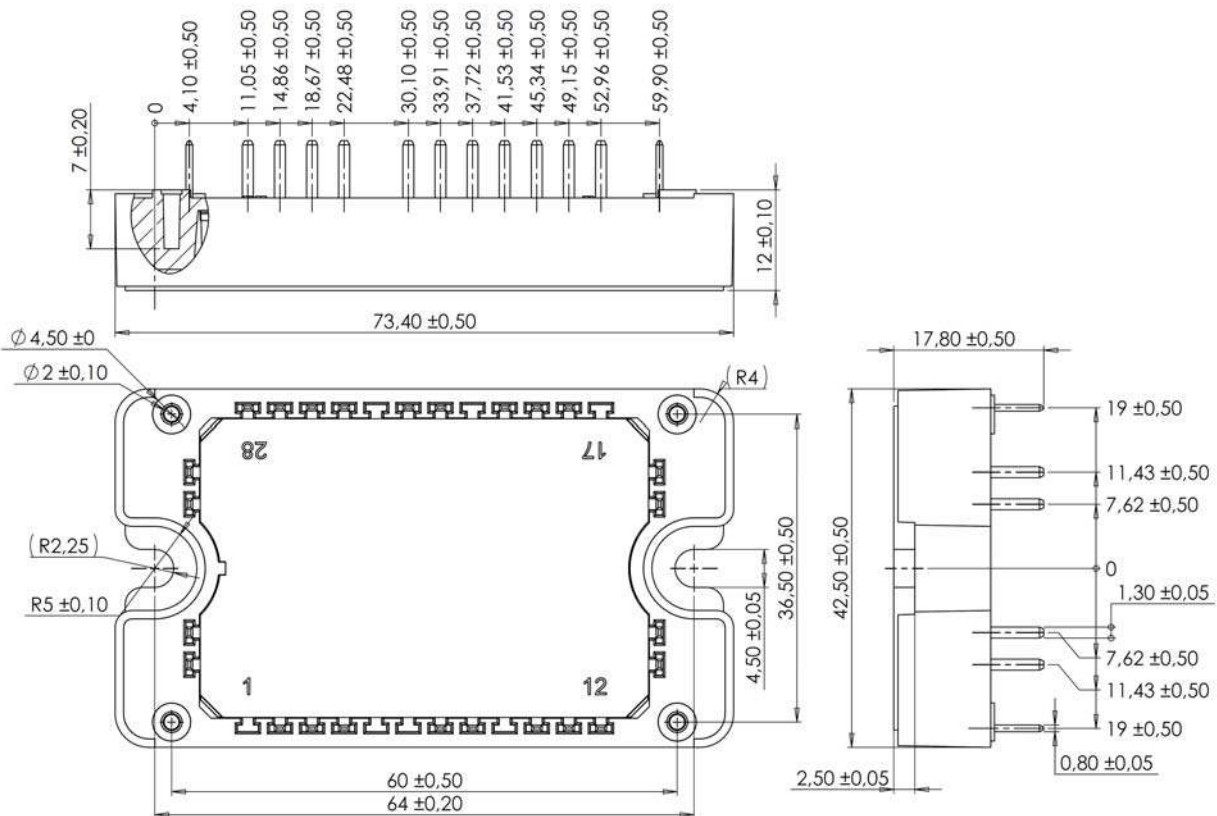
Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	150	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} - 25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	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		%

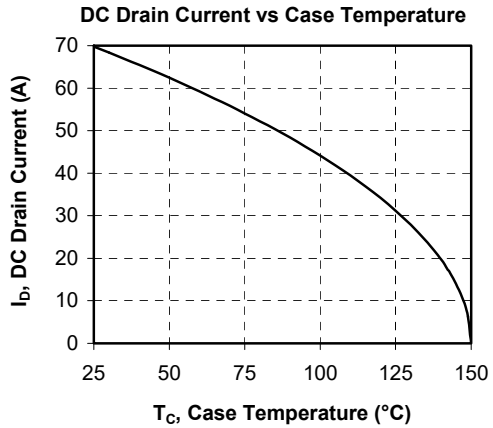
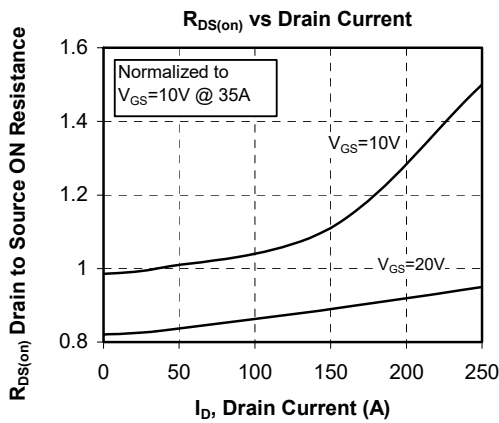
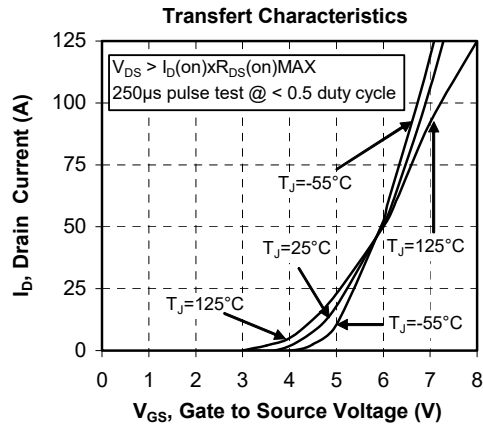
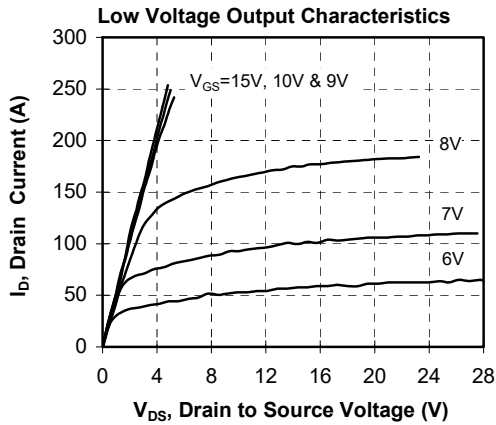
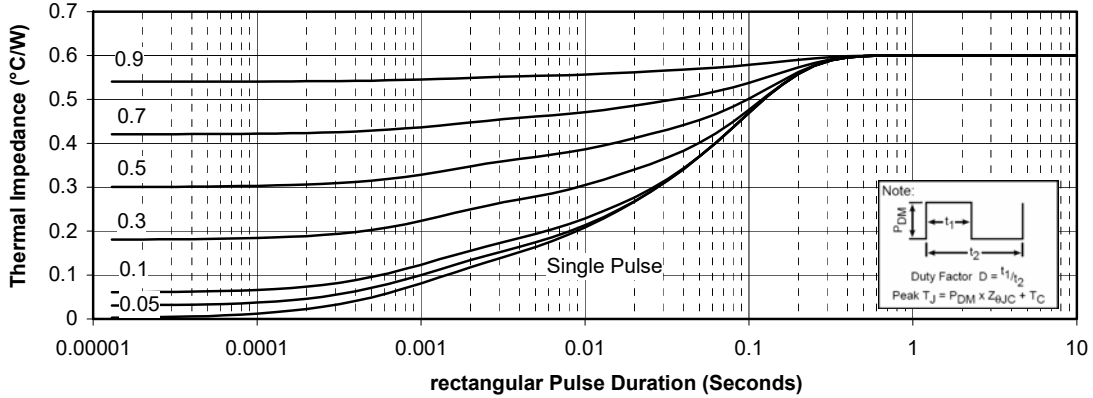
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

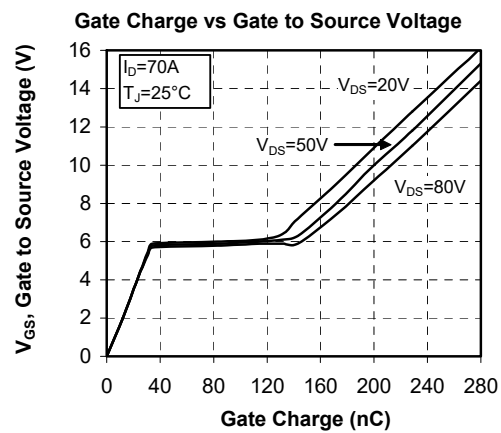
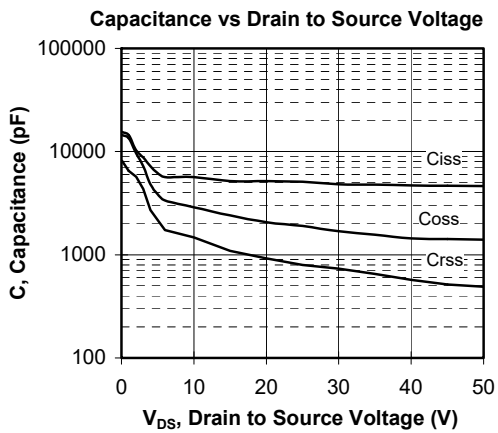
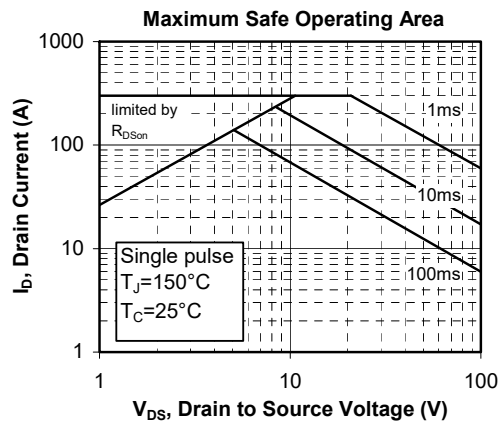
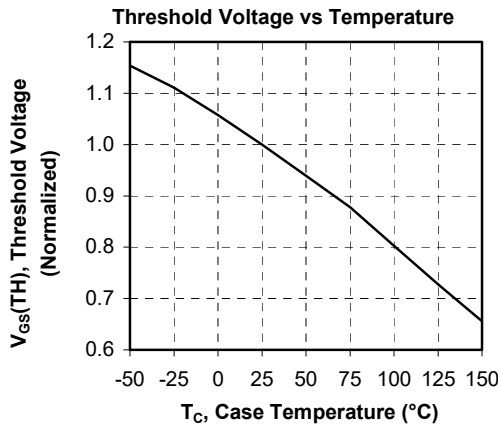
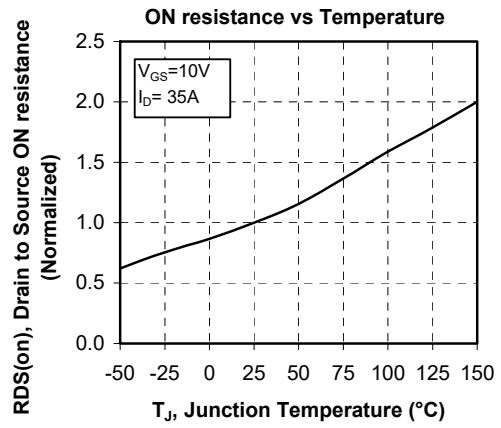
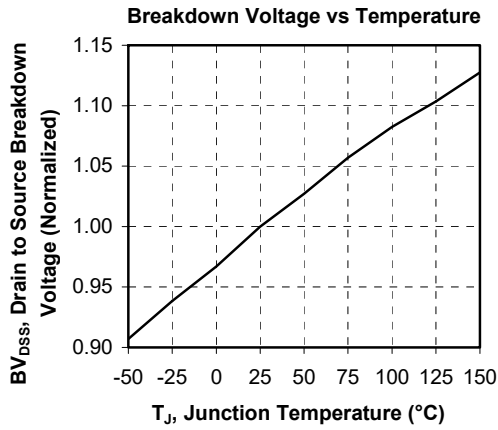
T: Thermistor temperature
 R_T: Thermistor value at T

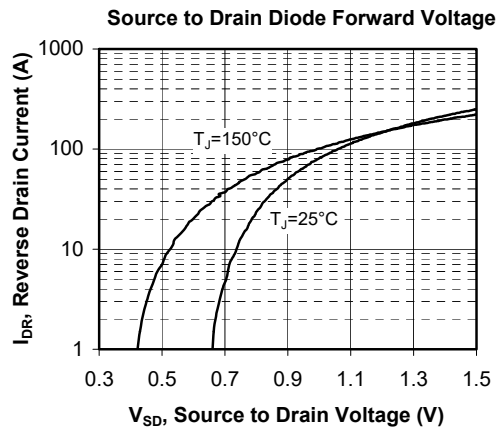
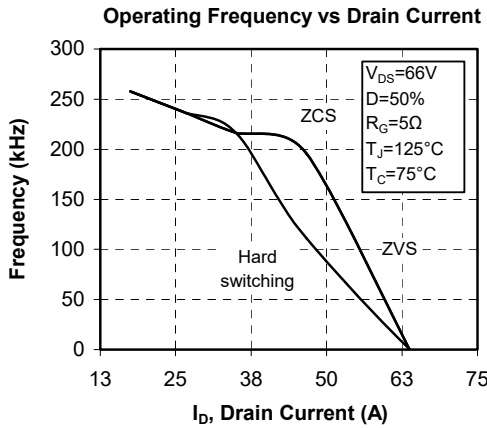
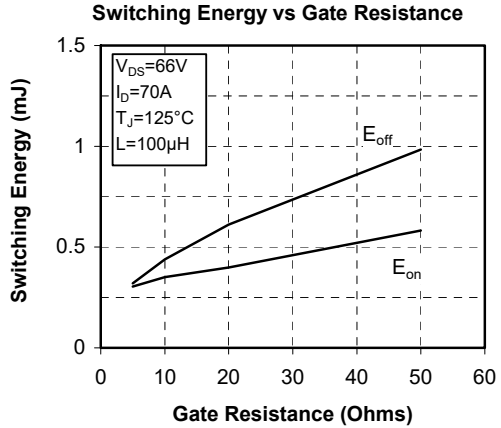
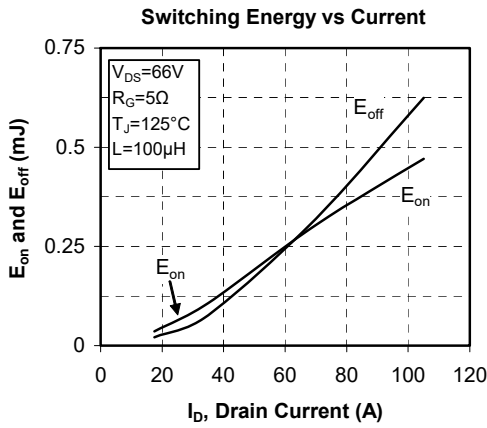
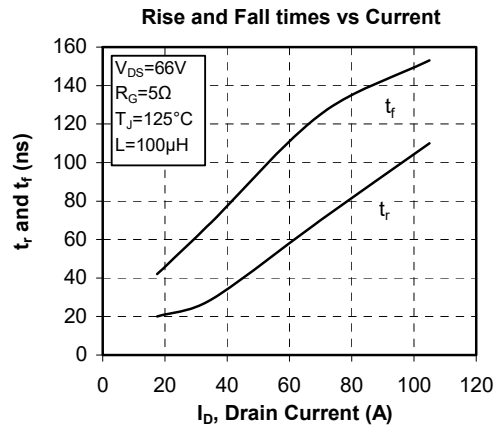
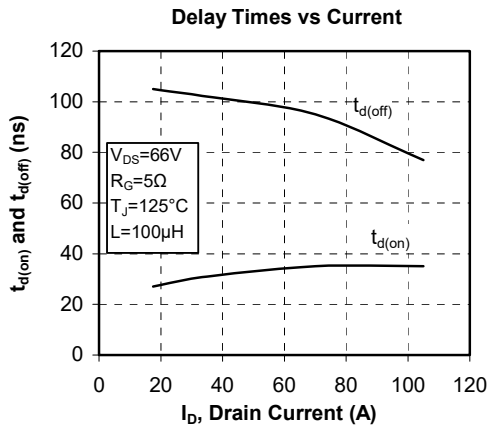
Package outline (dimensions in mm)

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

Typical Performance Curve

Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration







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