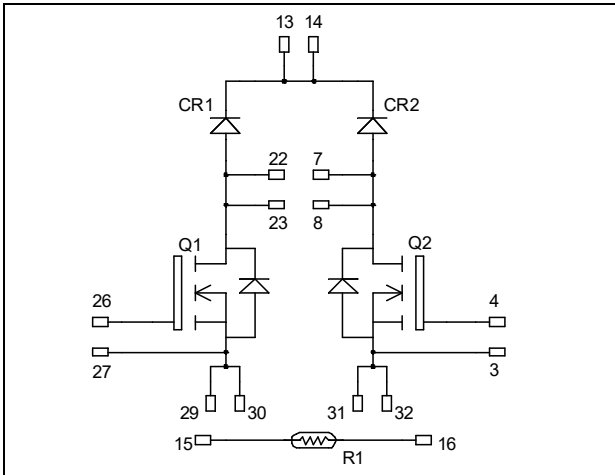


Dual boost chopper
Super Junction MOSFET
Power Module

$V_{DSS} = 600V$
 $R_{DSon} = 35m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 72A \text{ @ } T_c = 25^\circ C$

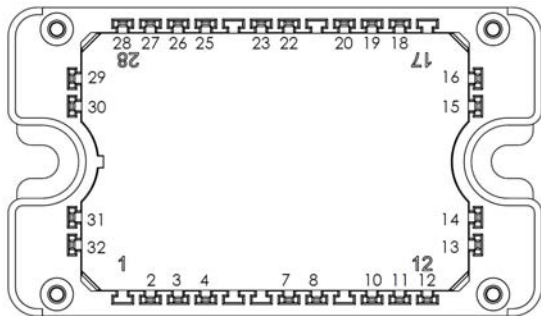


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

- **Super junction MOSFET**
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra 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 boost 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 super junction MOSFET)

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	72
		$T_c = 80^\circ C$	54
I_{DM}	Pulsed Drain current	288	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	35	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	416
I_{AR}	Avalanche current (repetitive and non repetitive)	20	A
E_{AR}	Repetitive Avalanche Energy	1	mJ
E_{AS}	Single Pulse Avalanche Energy	1800	

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

Electrical Characteristics (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 600V			40	μA
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 72A			35	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 5.4mA	2.1	3	3.9	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0V			±150	nA

Dynamic Characteristics (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		14		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		5.13		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.42		
Q _g	Total gate Charge	V _{GS} = 10V		518		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 300V		58		
Q _{gd}	Gate – Drain Charge	I _D = 72A		222		
T _{d(on)}	Turn-on Delay Time	Inductive Switching @ 125°C V _{GS} = 15V V _{Bus} = 400V I _D = 72A R _G = 2.5Ω		21		ns
T _r	Rise Time			30		
T _{d(off)}	Turn-off Delay Time			283		
T _f	Fall Time			84		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 400V I _D = 72A, R _G = 2.5Ω		1340		μJ
E _{off}	Turn-off Switching Energy			1960		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 400V I _D = 72A, R _G = 2.5Ω		2192		μJ
E _{off}	Turn-off Switching Energy			2412		
R _{thJC}	Junction to Case Thermal Resistance				0.3	°C/W

Chopper diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Peak Repetitive Reverse Voltage				600	V
I _{RM}	Reverse Leakage Current	V _R = 600V			350	μA
I _F	DC Forward Current	T _c = 80°C		80		A
V _F	Diode Forward Voltage	I _F = 80A V _{GE} = 0V	T _j = 25°C	1.45		V
			T _j = 125°C	1.35		
t _{rr}	Reverse Recovery Time	I _F = 80A V _R = 300V di/dt = 4500A/μs	T _j = 25°C	95		ns
			T _j = 125°C	115		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C	5.2		μC
			T _j = 125°C	8		
R _{thJC}	Junction to Case Thermal Resistance				0.8	°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

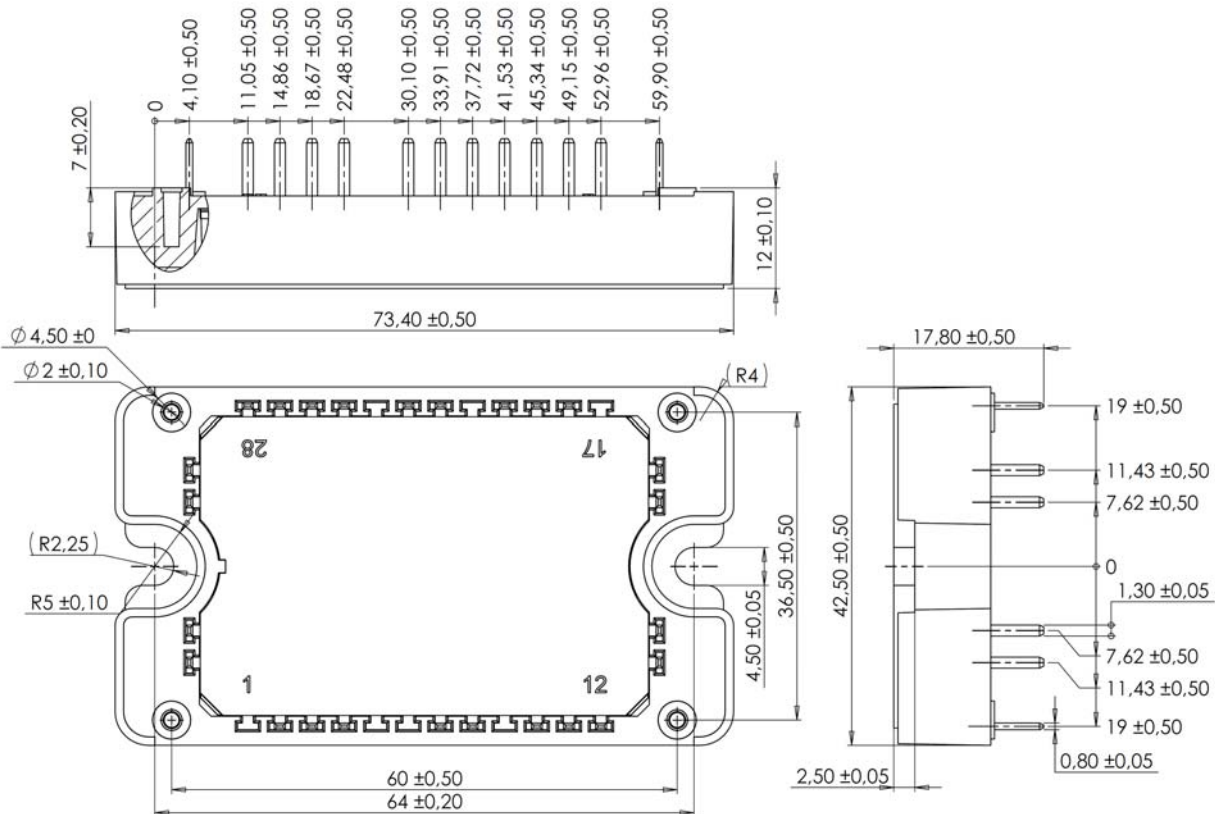
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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		%

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

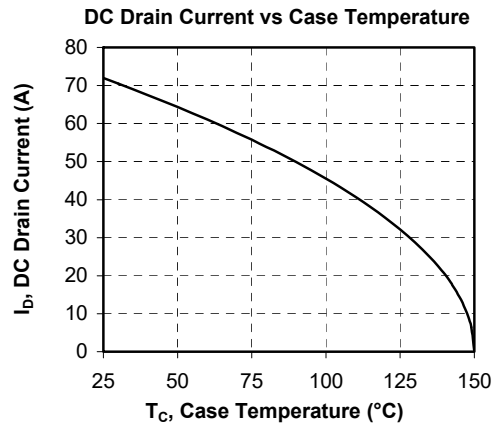
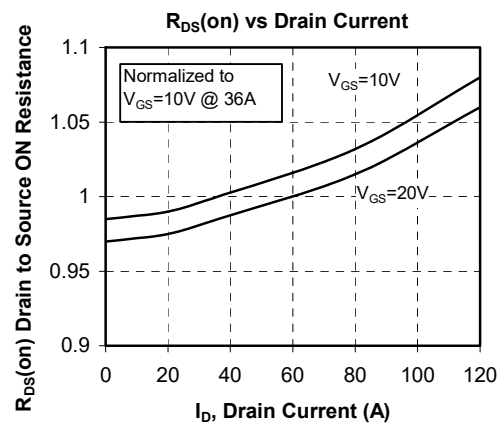
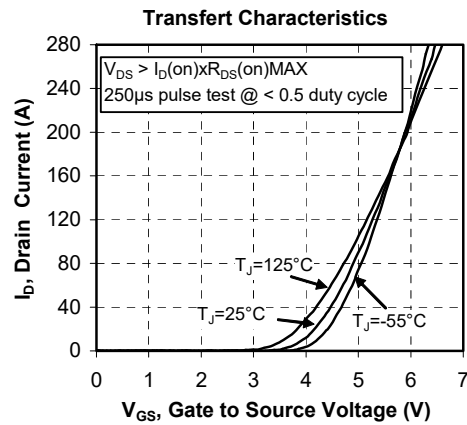
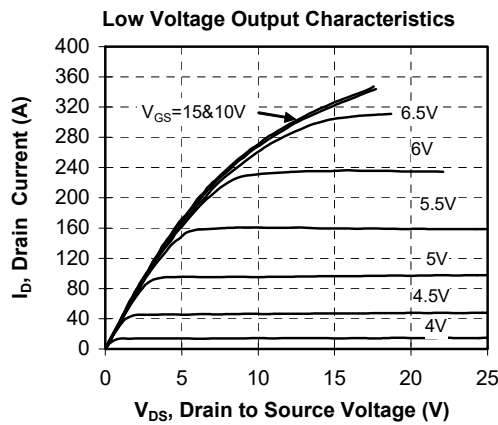
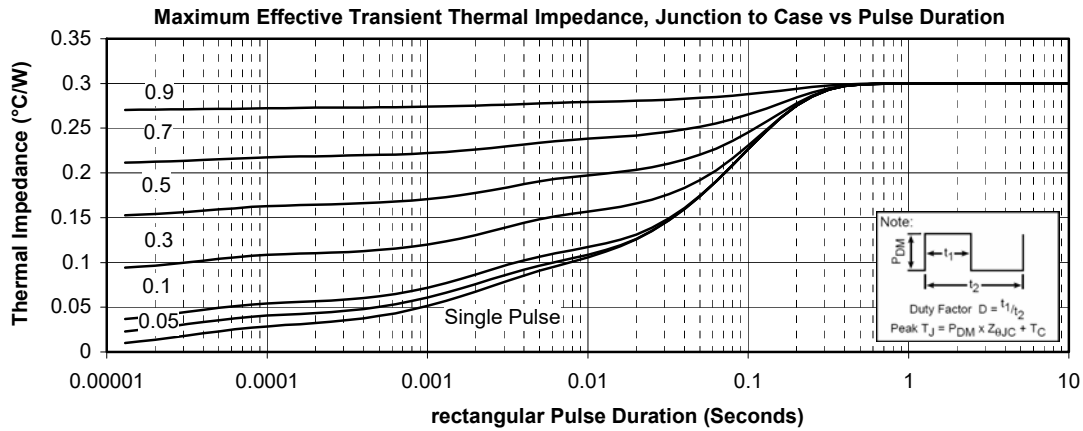
T: Thermistor temperature
 R_T: Thermistor value at T

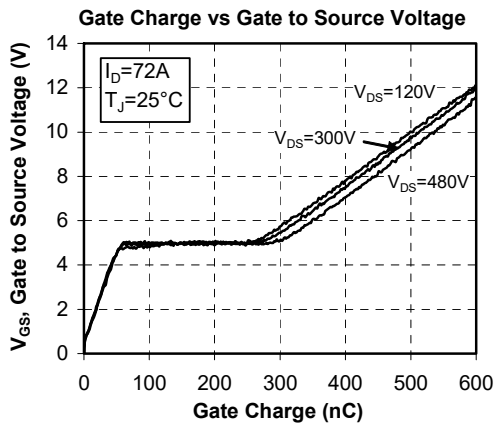
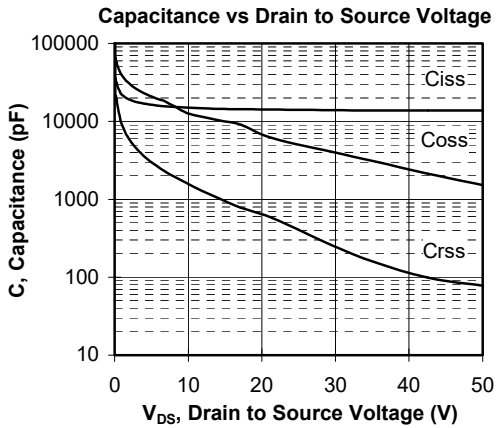
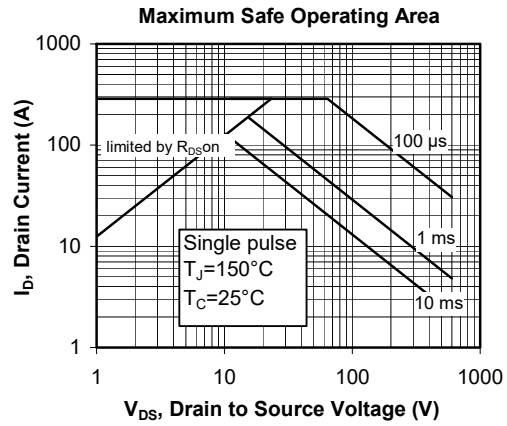
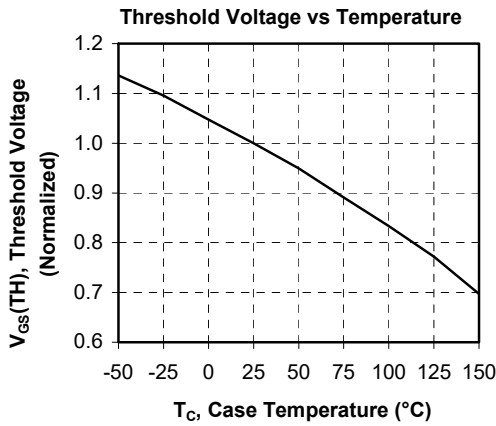
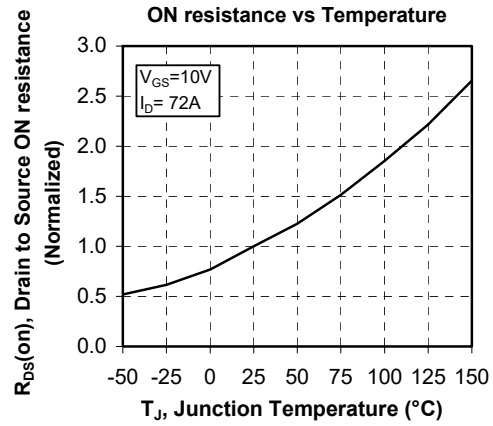
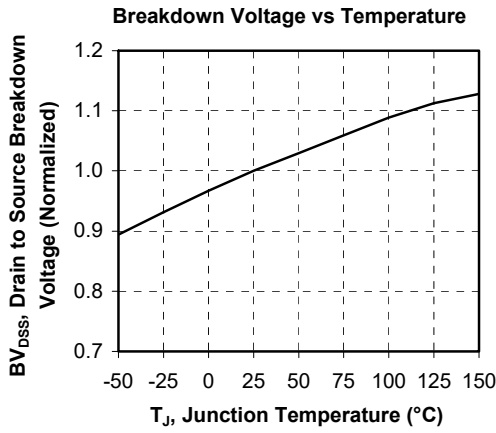
Package outline (dimensions in mm)

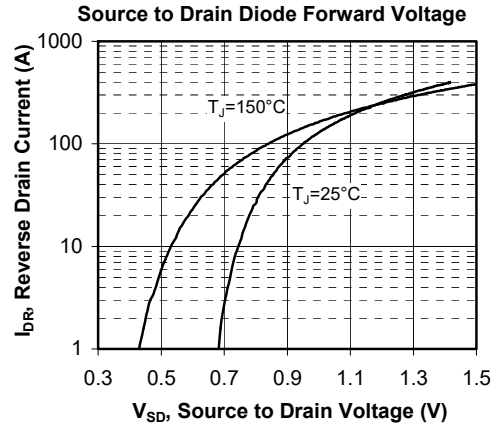
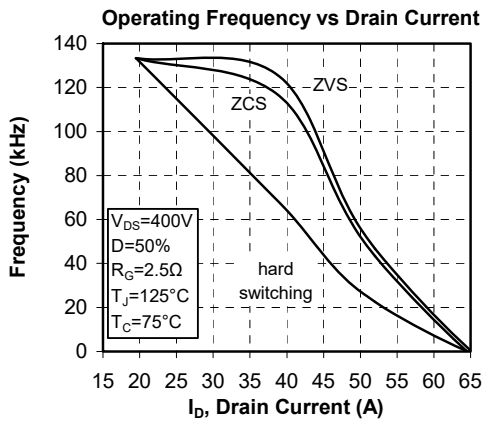
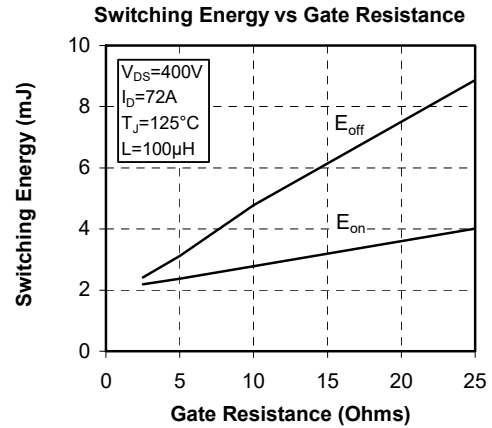
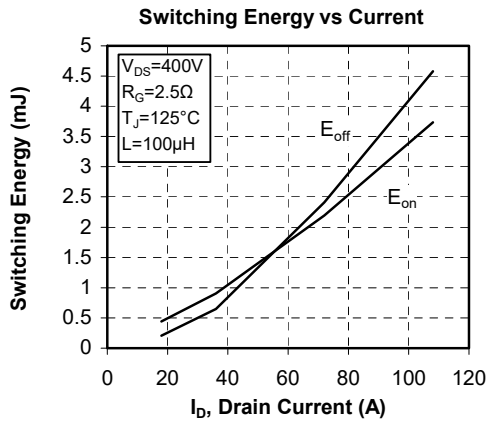
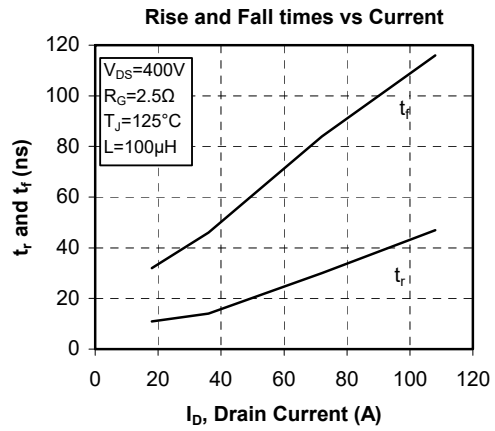
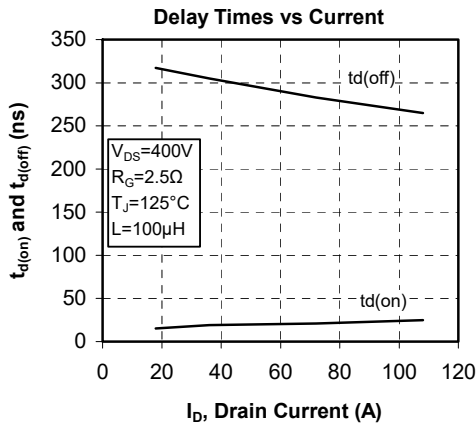


See application note 1906 - Mounting Instructions for SP3F Power Modules on www.microsemi.com

Typical Super junction MOSFET Performance Curve







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