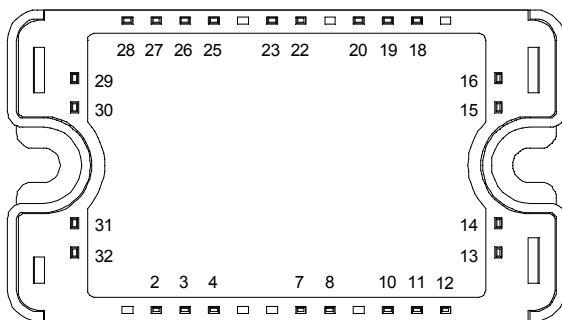
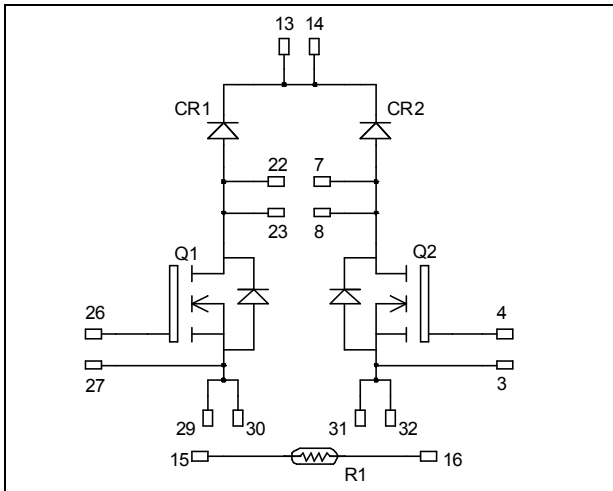


Dual Boost chopper Super Junction MOSFET Power Module

$V_{DSS} = 800V$
 $R_{DSon} = 150m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 28A \text{ @ } T_c = 25^\circ C$



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

Application

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

Features

- **COOLMOS** Power Semiconductors
 - 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
 - Symmetrical design
- Internal thermistor for temperature monitoring
- 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
- Low profile
- Each leg can be easily paralleled to achieve a single boost of twice the current capability
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	800	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	28
		$T_c = 80^\circ C$	21
I_{DM}	Pulsed Drain current	110	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	150	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	277
I_{AR}	Avalanche current (repetitive and non repetitive)	17	A
E_{AR}	Repetitive Avalanche Energy	0.5	mJ
E_{AS}	Single Pulse Avalanche Energy	670	

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} = 800V			50	μA
		T _j = 25°C				
		V _{GS} = 0V, V _{DS} = 800V			375	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 14A			150	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 2mA	2.1	3	3.9	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0V			±150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		4507		pF
C _{oss}	Output Capacitance	V _{DS} = 25V		2092		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		108		
Q _g	Total gate Charge	V _{GS} = 10V		180		nC
Q _{gs}	Gate – Source Charge	V _{Bus} = 400V		22		
Q _{gd}	Gate – Drain Charge	I _D = 28A		90		
T _{d(on)}	Turn-on Delay Time	Inductive switching @125°C		10		ns
T _r	Rise Time	V _{GS} = 15V		13		
T _{d(off)}	Turn-off Delay Time	V _{Bus} = 533V		83		
T _f	Fall Time	I _D = 28A R _G = 2.5Ω		35		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C		486		μJ
E _{off}	Turn-off Switching Energy	V _{GS} = 15V, V _{Bus} = 533V I _D = 28A, R _G = 2.5Ω		278		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C		850		μJ
E _{off}	Turn-off Switching Energy	V _{GS} = 15V, V _{Bus} = 533V I _D = 28A, R _G = 2.5Ω		342		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		1000			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 1000V			250	μA
		T _j = 25°C				
		T _j = 125°C			500	
I _F	DC Forward Current	T _c = 100°C		60		A
V _F	Diode Forward Voltage	I _F = 60A		1.9	2.5	V
		I _F = 120A		2.2		
		I _F = 60A	T _j = 125°C		1.7	
t _{rr}	Reverse Recovery Time	I _F = 60A V _R = 667V di/dt = 200A/μs	T _j = 25°C		280	ns
			T _j = 125°C		350	
Q _{rr}	Reverse Recovery Charge	I _F = 60A V _R = 667V di/dt = 200A/μs	T _j = 25°C		760	nC
			T _j = 125°C		3600	

Thermal and package characteristics

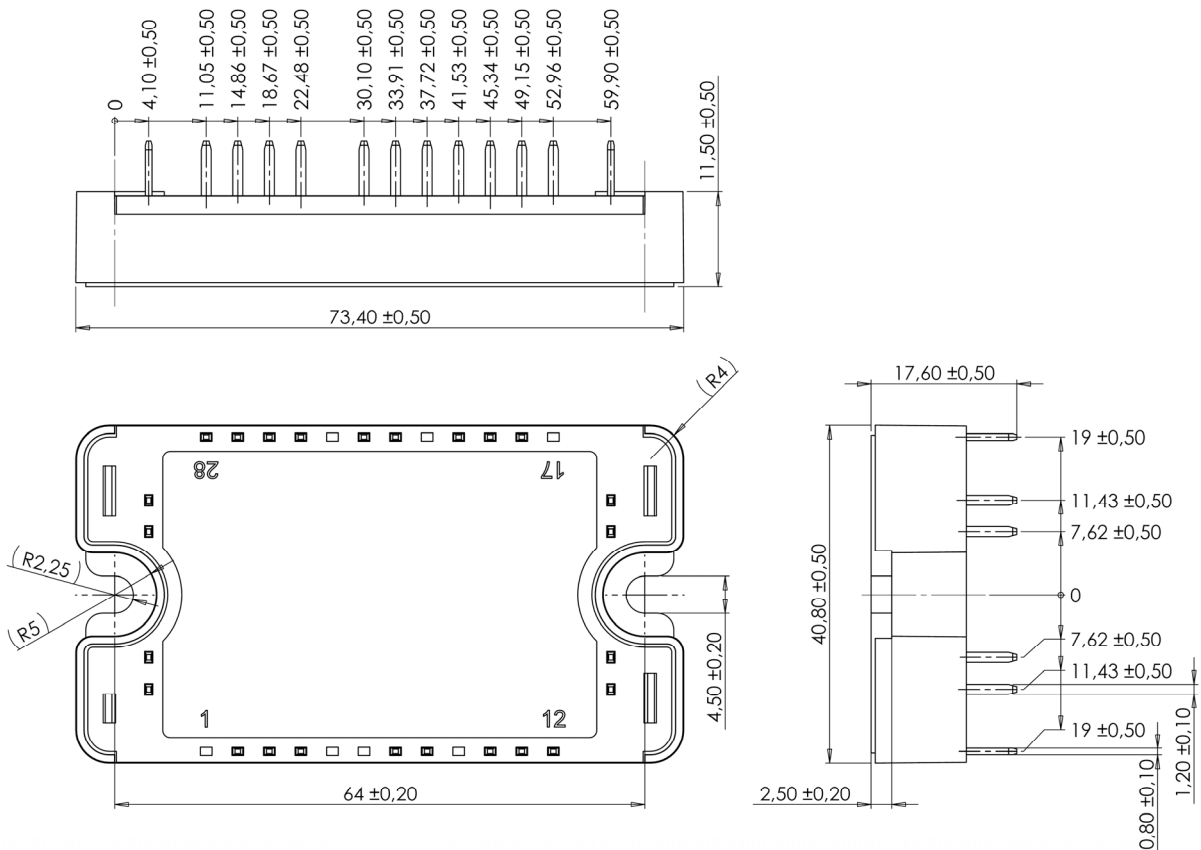
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.45	°C/W	
		Diode		0.9		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	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
B _{25/85}	T ₂₅ = 298.15 K		3952		K

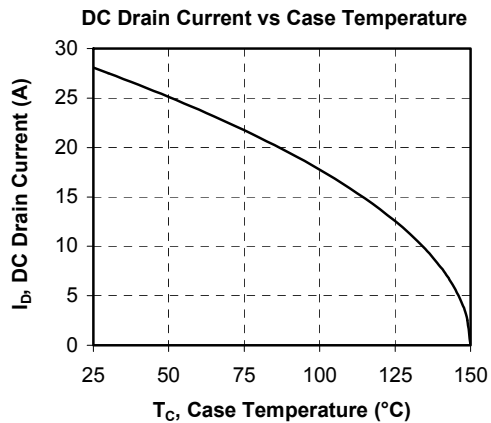
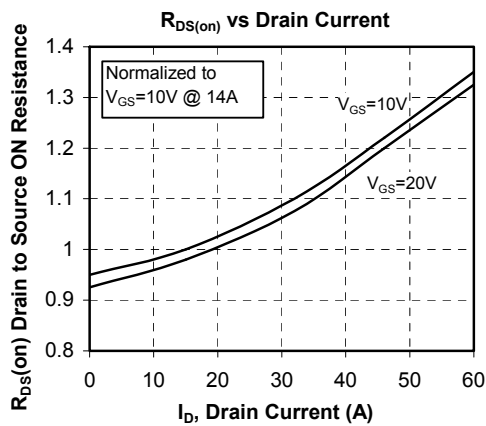
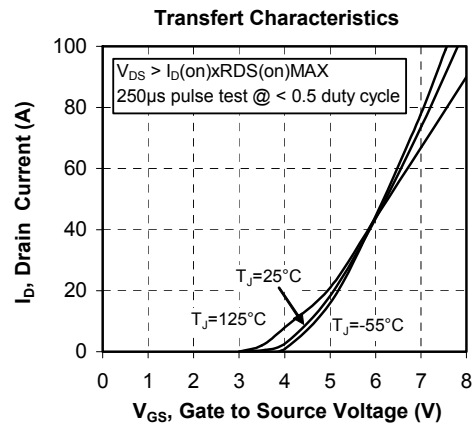
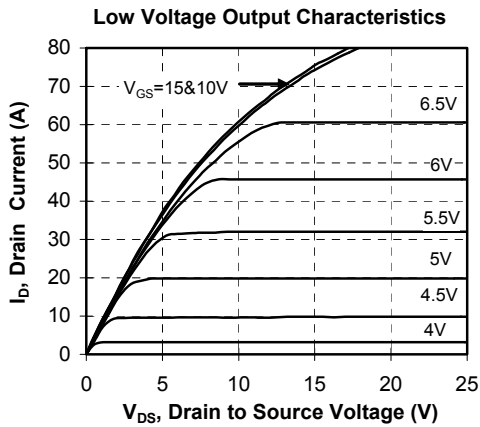
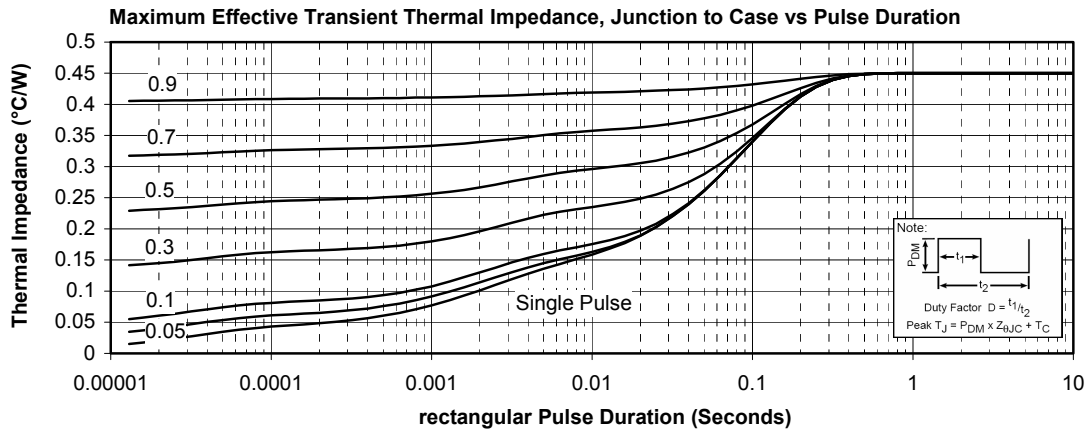
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

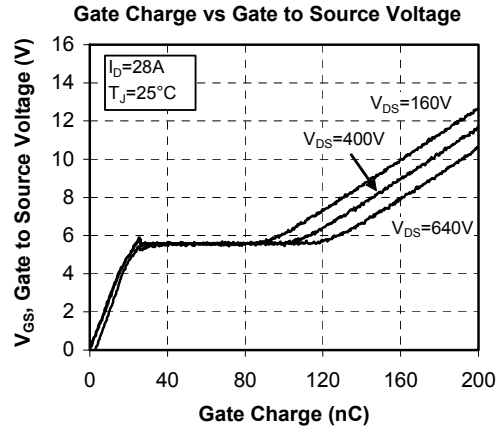
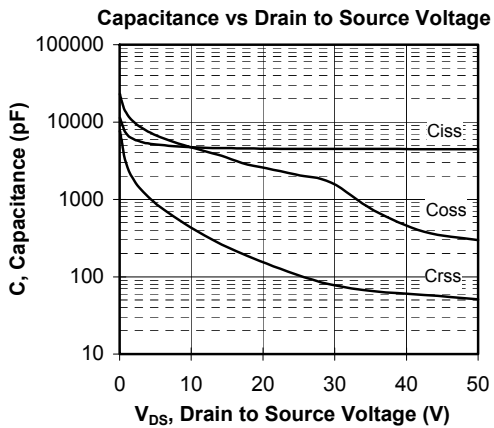
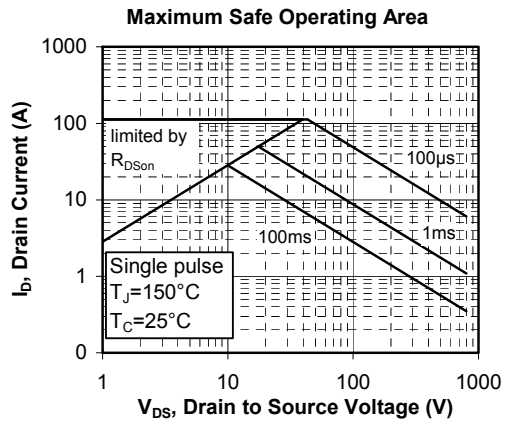
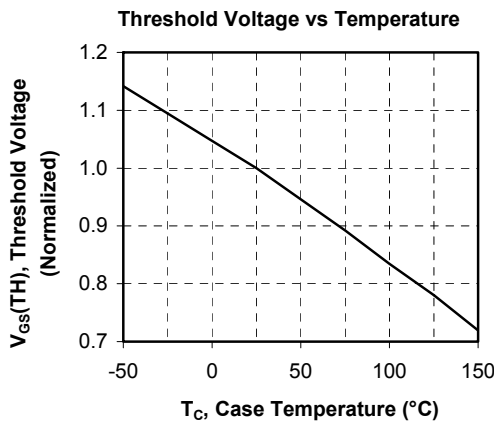
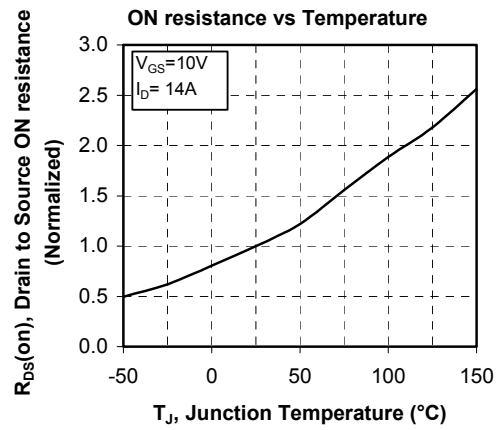
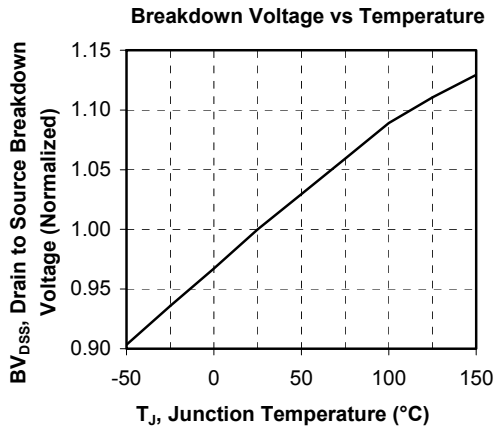
T: Thermistor temperature
 R_T: Thermistor value at T

SP3 Package outline (dimensions in mm)


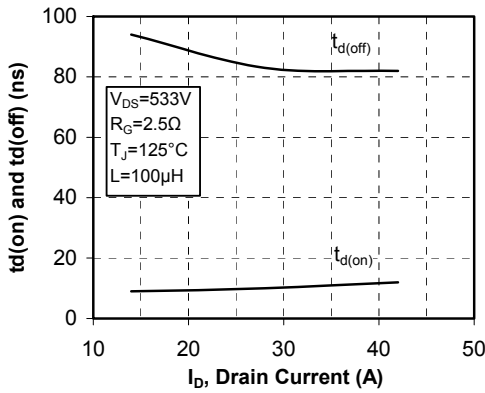
See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve

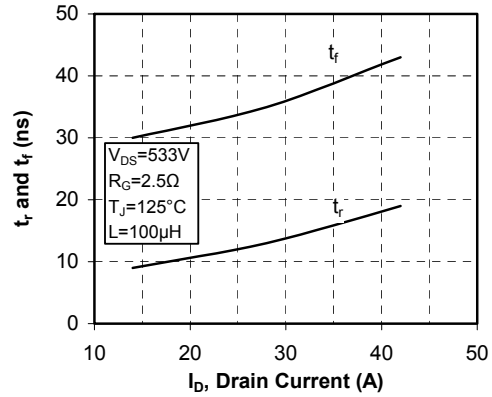




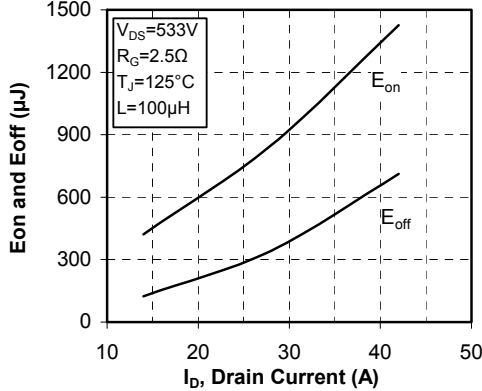
Delay Times vs Current



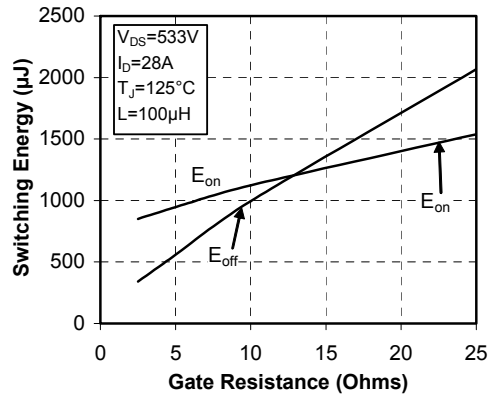
Rise and Fall times vs Current



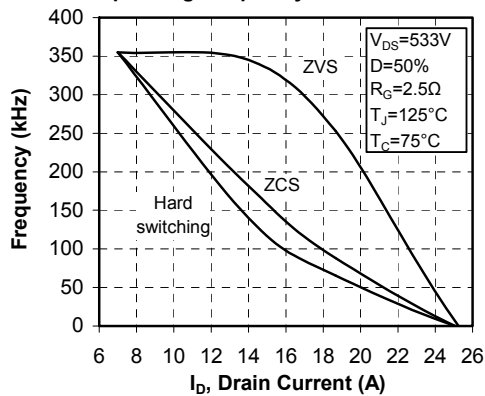
Switching Energy vs Current



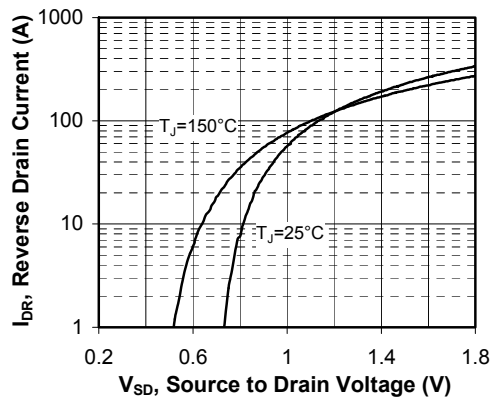
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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