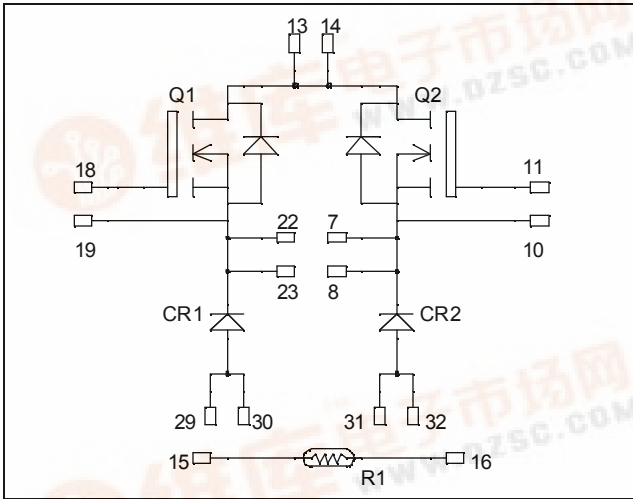




APTC80DSK15T3G

Dual Buck chopper
Super Junction MOSFET
Power Module

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

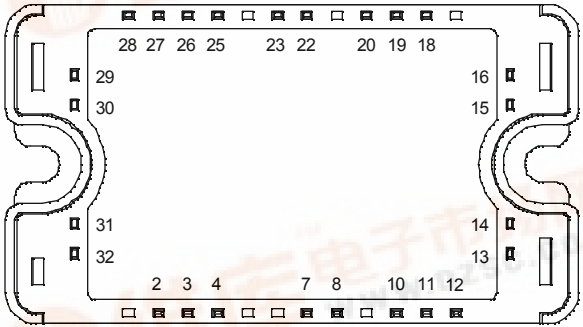


Application

- AC and DC motor control
- Switched Mode Power Supplies

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 buck of twice the current capability
- RoHS Compliant

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

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	A
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	T _j = 25°C			50	μA
		V _{GS} = 0V, V _{DS} = 800V	T _j = 125°C			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 V _{Bus} = 400V I _D = 28A		180		nC
Q _{gs}	Gate – Source Charge			22		
Q _{gd}	Gate – Drain Charge			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	T _j = 25°C		250	μA
			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

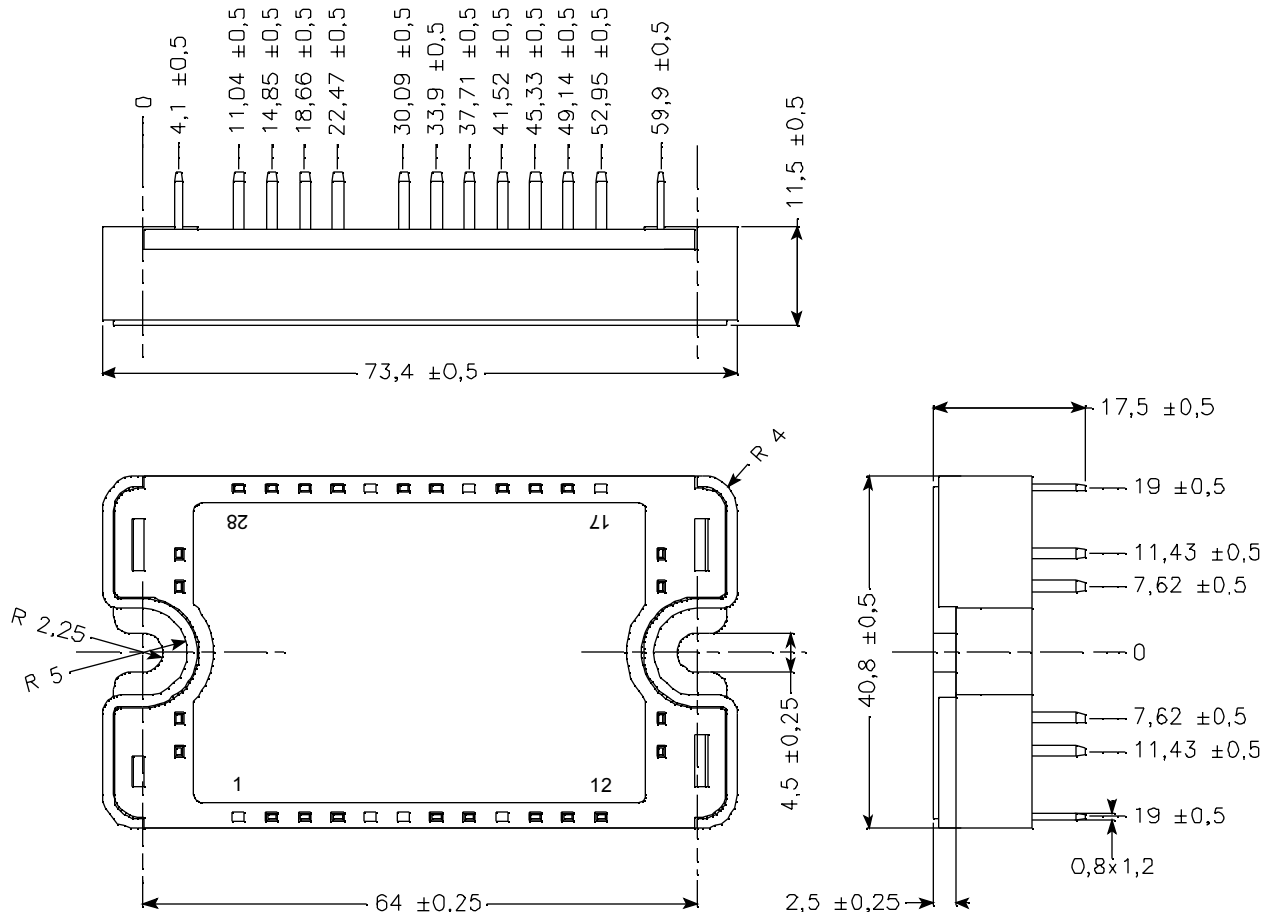
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.45	°C/W	
		Diode		0.9		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2.5	4.7	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

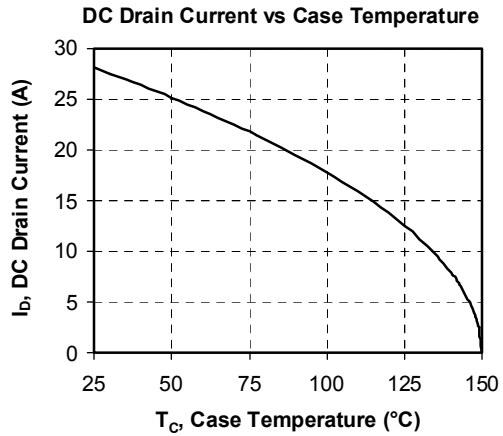
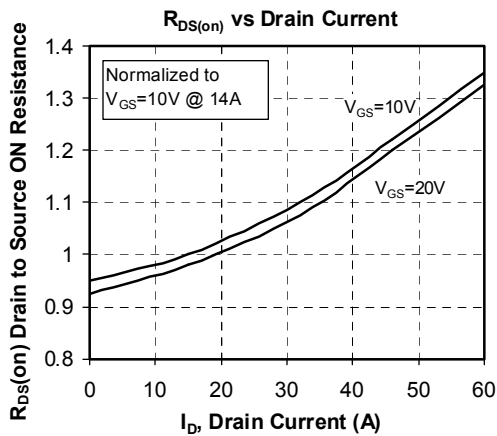
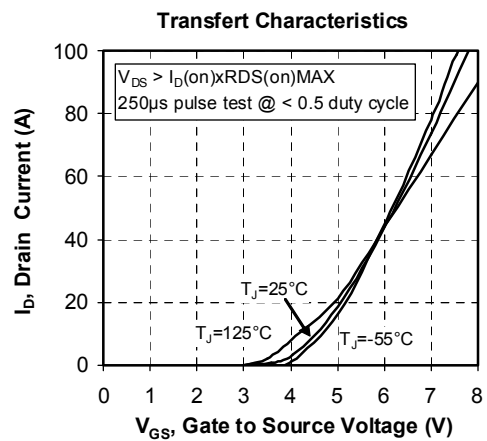
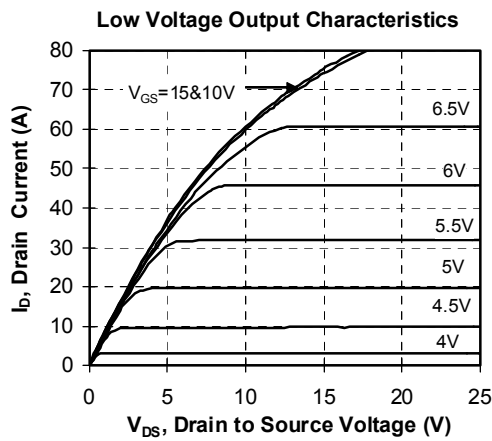
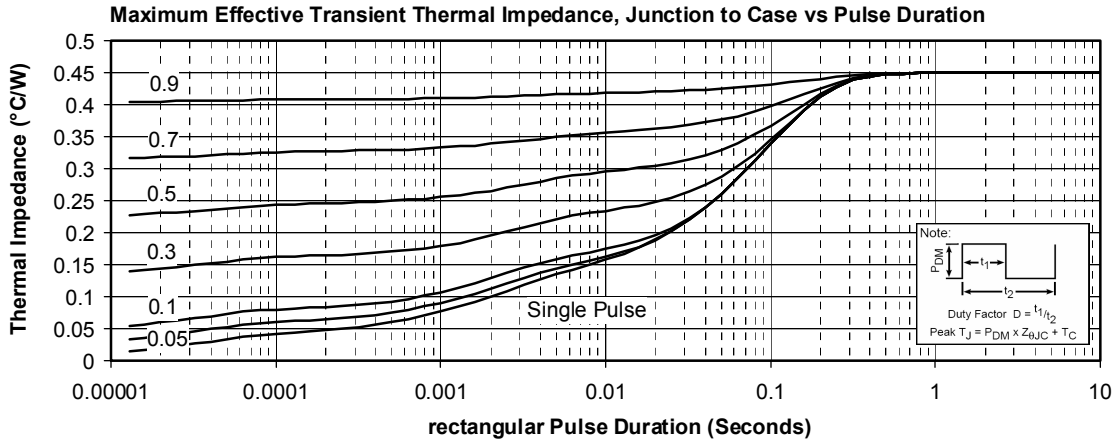
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T} - \frac{1}{T_{25}}\right)\right]}$$

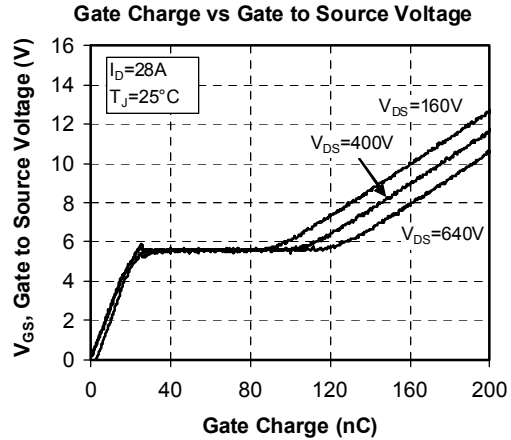
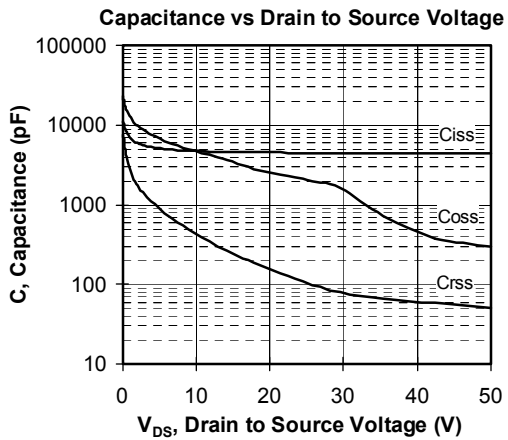
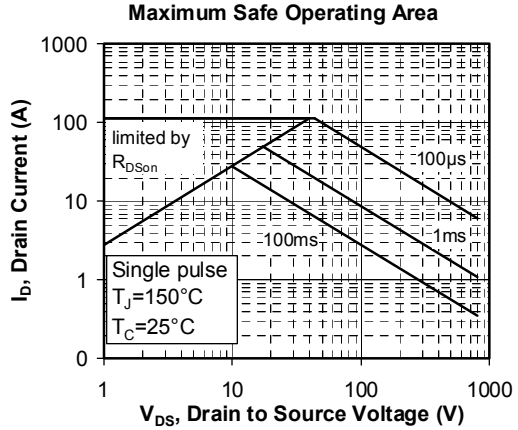
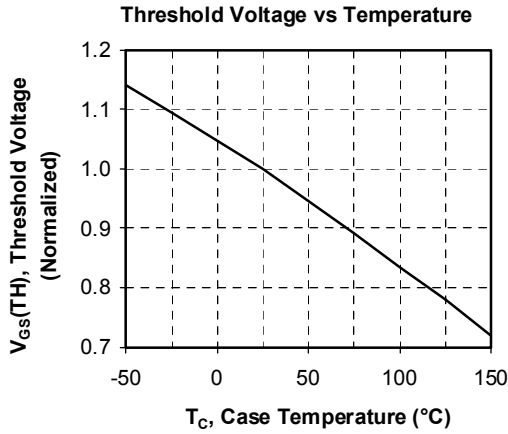
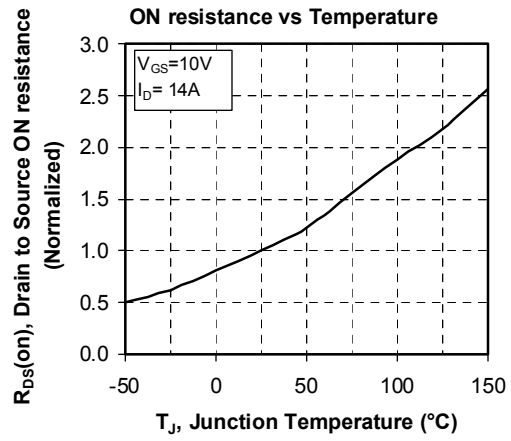
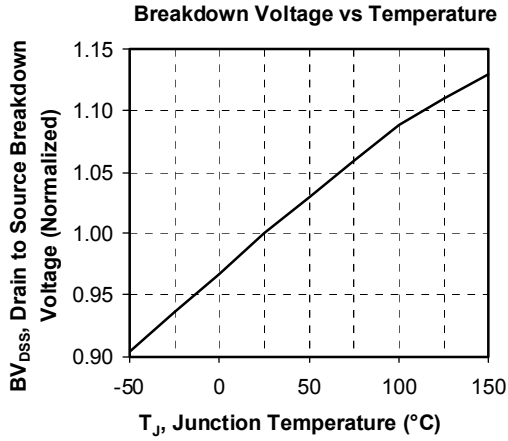
T: Thermistor temperature
 R_T: Thermistor value at T

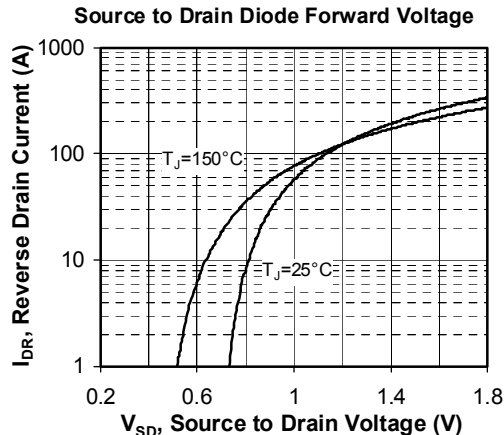
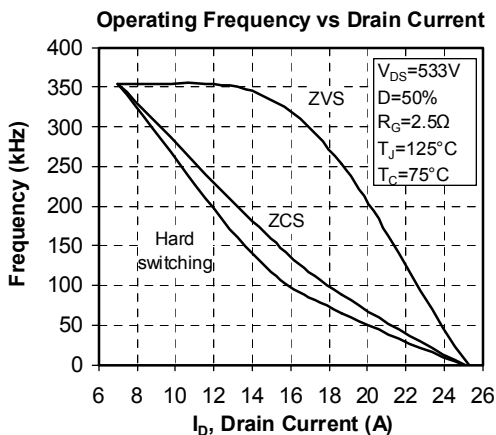
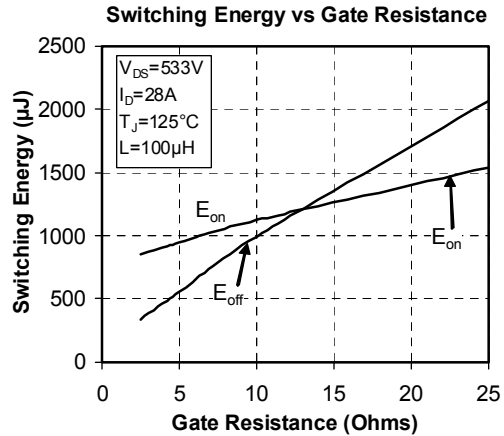
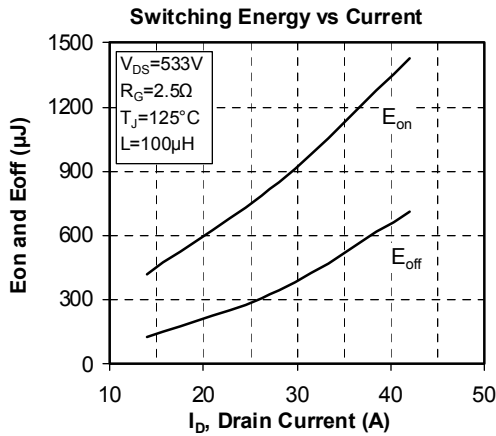
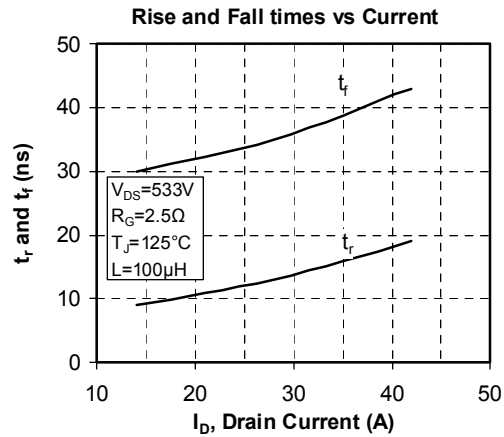
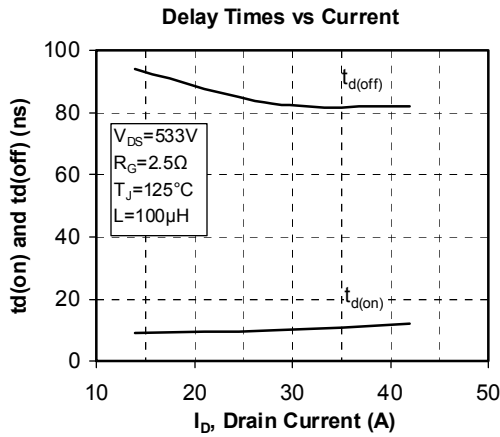
SP3 Package outline (dimensions in mm)


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

Typical Performance Curve







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