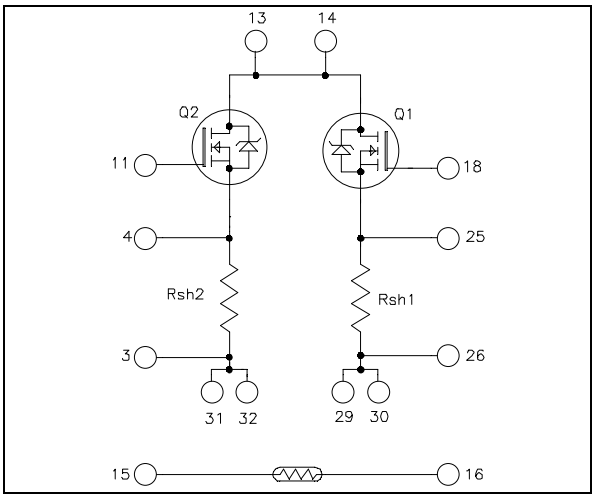
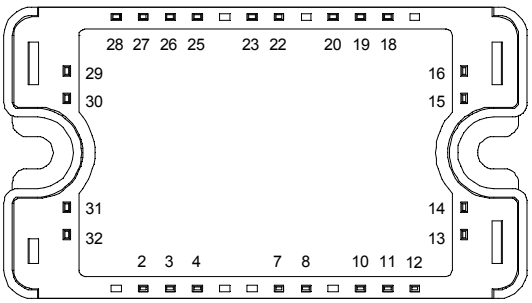
APTML602U12R020T3AG

Linear MOSFET Power Module

V_{DSS} = 600V
R_{DSon} = 125mΩ typ @ Tj = 25°C
I_D = 45A* @ Tc = 25°C





Pins 13/14 ; 29/30 ; 31/32 must be shorted together

Application

- Electronic load dedicated to power supplies and battery discharge testing

Features

- Linear MOSFET
- Very low stray inductance
- Internal thermistor for temperature monitoring
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Direct mounting to heatsink (isolated package)
- easy series and parallels combinations for power and voltage improvements
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

Absolute maximum ratings (per leg)

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{DSS}	Drain - Source Breakdown Voltage		600	V
I_D	Continuous Drain Current	T_c = 25°C	45*	A
		T_c = 80°C	33*	
I_{DM}	Pulsed Drain current		172	
V_{GS}	Gate - Source Voltage		±30	V
R_{DSon}	Drain - Source ON Resistance		150	mΩ
P_D	Maximum Power Dissipation ❶	T_c = 25°C	568	W
I_{AR}	Avalanche current (repetitive and non repetitive)		45	A
E_{AR}	Repetitive Avalanche Energy		50	mJ
E_{AS}	Single Pulse Avalanche Energy		3000	

* Output current must be limited to 31A @ T_C=25°C and 22A @ T_C=80°C to not exceed the shunt specification.
❶ In saturation mode

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°C unless otherwise specified

Electrical Characteristics (per leg)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600V ; V_{GS} = 0V	T_j = 25°C			25	µA
		V_{DS} = 480V ; V_{GS} = 0V	T_j = 125°C			250	
$R_{DS(on)}$	Drain – Source on Resistance	V_{GS} = 10V, I_D = 22.5A			125	150	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 2.5mA		2		4	V
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±30 V				±100	nA

Dynamic Characteristics (per leg)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1MHz		7600		pF
C_{oss}	Output Capacitance			1280		
C_{rss}	Reverse Transfer Capacitance			620		

Shunt Electrical Characteristics (per leg)

Symbol	Characteristic		Min	Typ	Max	Unit
R_{sh}	Resistance value			20		mΩ
T_{sh}	Tolerance			2		%
P_{sh}	Load capacity	T_C=25°C			20	W
		T_C=80°C			10	
I_{sh}	Current capacity	T_C=25°C			31	A
		T_C=80°C			22	

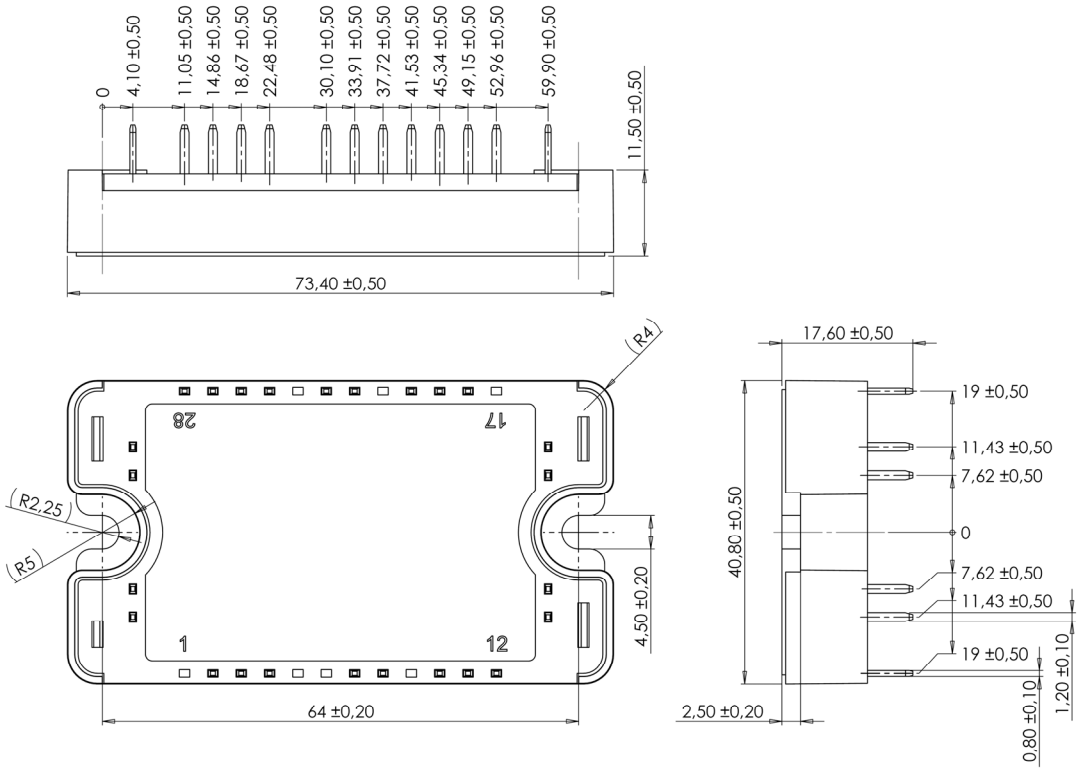
Temperature sensor PTC

Symbol	Characteristic		Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		1980		2020	Ω
R_{100}/R_{25}	Resistance ratio	Tamb=100°C & 25°C	1.676	1.696	1.716	
R_{-55}/R_{25}	Resistance ratio	Tamb=-55°C & 25°C	0.48	0.49	0.50	
B	Temperature coefficient			7900		ppm/K

Thermal and package characteristics

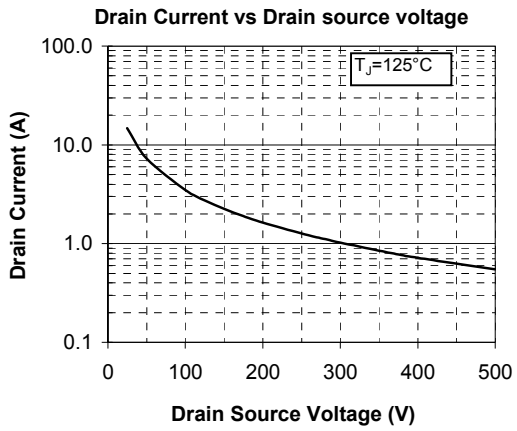
Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	MOSFET (per leg)				0.22	°C/W
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					110	g

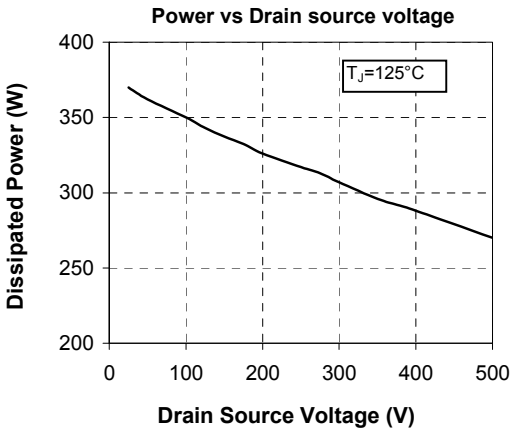
SP3 Package outline (dimensions in mm)



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

Typical Performance Curve (linear mode) (per leg)





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