

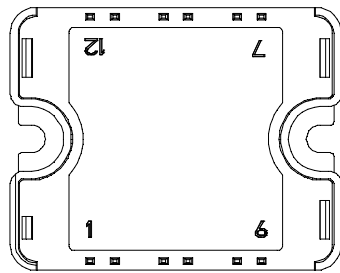
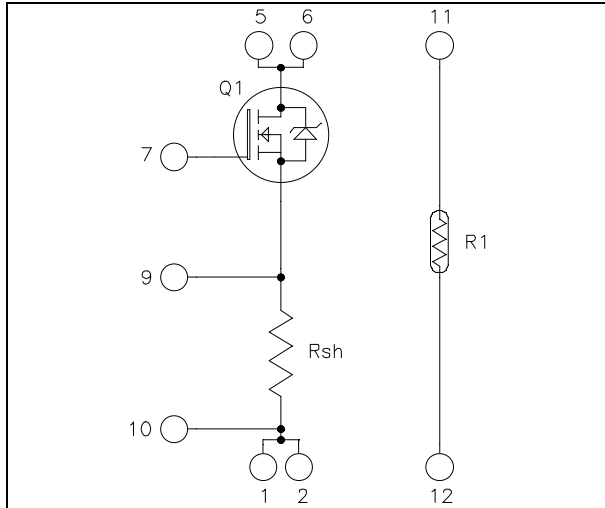
# APTML50UM90R020T1AG

## Linear MOSFET Power Module

$$V_{DSS} = 500V$$

$$R_{DSon} = 90m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 52A^* @ T_c = 25^\circ C$$



Pins 1/2 ; 5/6 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

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### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	500	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	52*
		$T_c = 80^\circ C$	39*
$I_{DM}$	Pulsed Drain current	200	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	95	m $\Omega$
$P_D$	Maximum Power Dissipation ①	$T_c = 25^\circ C$	568
$I_{AR}$	Avalanche current (repetitive and non repetitive)	52	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3000	

\* Output current must be limited to 31A @  $T_c=25^\circ C$  and 22A @  $T_c=80^\circ C$  to not exceed the shunt specification.

① 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 @  $T_j = 25^\circ\text{C}$  unless otherwise specified

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 500\text{V}; V_{GS} = 0\text{V}$			25	$\mu\text{A}$
		$T_j = 25^\circ\text{C}$				
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 26\text{A}$		90	95	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$				
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	2		4	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}$			$\pm 100$	nA

**Dynamic Characteristics**

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

**Shunt Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$R_{sh}$	Resistance value			20		$\text{m}\Omega$
$T_{sh}$	Tolerance			2		%
$P_{sh}$	Load capacity	$T_C = 25^\circ\text{C}$			20	W
		$T_C = 80^\circ\text{C}$			10	
$I_{sh}$	Current capacity	$T_C = 25^\circ\text{C}$			31	A
		$T_C = 80^\circ\text{C}$			22	

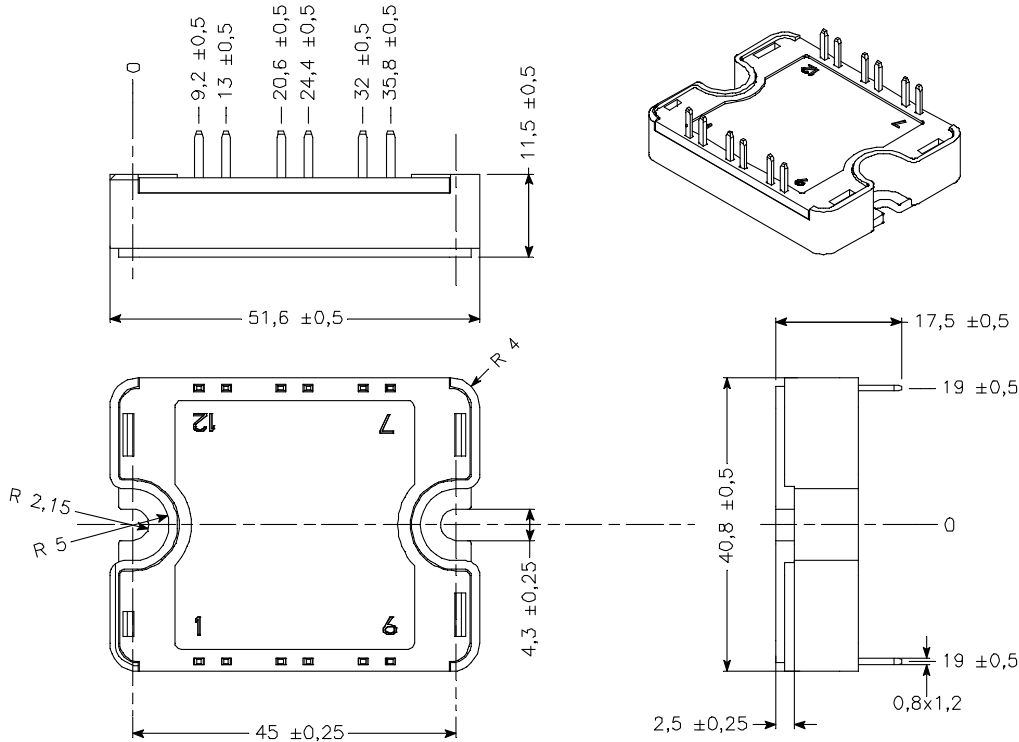
**Temperature sensor PTC**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$R_{25}$	Resistance @ $25^\circ\text{C}$		1980		2020	$\Omega$
$R_{100}/R_{25}$	Resistance ratio	$T_{amb} = 100^\circ\text{C} \& 25^\circ\text{C}$	1.676	1.696	1.716	
$R_{-55}/R_{25}$	Resistance ratio	$T_{amb} = -55^\circ\text{C} \& 25^\circ\text{C}$	0.48	0.49	0.50	
$B$	Temperature coefficient			7900		ppm/K

**Thermal and package characteristics**

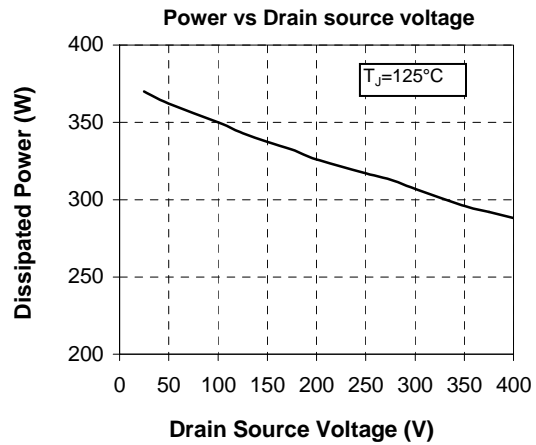
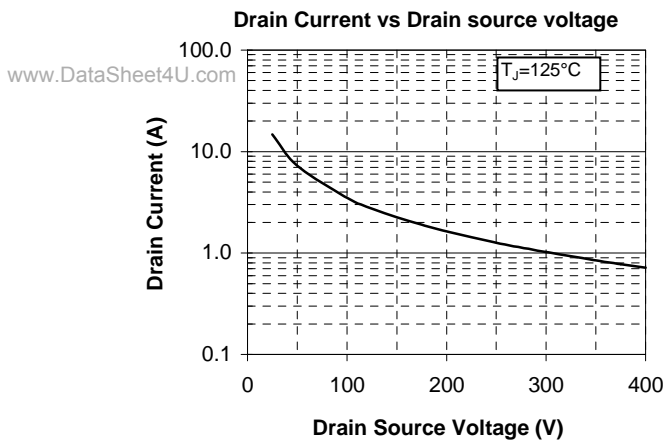
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case Thermal Resistance	MOSFET			0.22	$^\circ\text{C}/\text{W}$
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1\text{min}$ , $I_{isol} < 1\text{mA}$ , 50/60Hz		4000			V
$T_j$	Operating junction temperature range		-40		150	$^\circ\text{C}$
$T_{STG}$	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				80	g

## SP1 Package outline (dimensions in mm)



See application note 1904 - Mounting Instructions for SP1 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve (linear mode)



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