

High Power Current Sensing Resistor

RoHS
Compliant



1. Scope:

1.1 This specification is covered following series ():

- CUM1206 series
- CUM2010 series
- CUM2512 series
- CUM2725 series
- CUM2728 series
- CUM2817 series
- CUM4527 series

2. Product Features ():

2.1 Applications include current sensing, voltage division and pulse applications ()

2.2 Suitable for high precision current sensing circuit protection application ()

2.3 The resistive material stable and ultra low TCR. Low and Stable TCR $\leq \pm 50 \text{ ppm}/^\circ\text{C}$ ()

$\leq \pm 50 \text{ ppm}/^\circ\text{C}$).

2.4 Specially selected and stabilized materials allow for high temperature derating to $+170^\circ\text{C}$ ($+170^\circ\text{C}$)

2.5 Pure tin plating provides compatibility with lead (Pb) free and lead containing soldering processes ()

2.6 Excellent stability ($|\Delta R/R| \leq \pm 1.0\%$ for 1000 h at 70°C) different environmental conditions ()

($\leq \pm 1.0\%$ 70

$^\circ\text{C}/1,000$)).

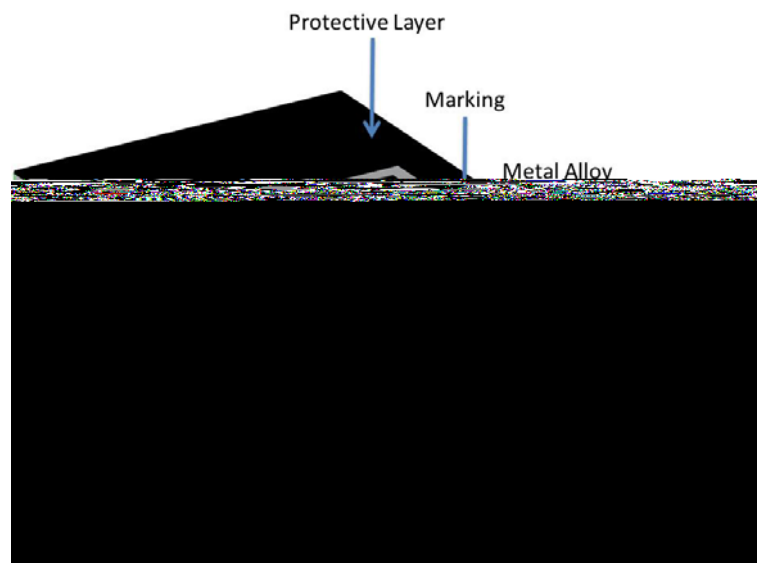
2.7 Compliant to RoHS directive 2011/65/EU and Halogen free (RoHS 2011/65/EU)

2.8 Flame retardant type material is used to meet UL94 V-0 requirements (UL94 V-0)

3. Product Construction ():

3.1 The resistors are constructed in a high grade material, Internal metal electrodes are added at each end and connected by a resistive paste that is applied to the top surface of the metal alloy ()

3.2 The resistive layer is covered with a protective coat, and two external end terminations are added. Wrap-around terminations have an electroplated nickel barrier and pure Tin (lead free) or matte-tin finish, ensuring excellent 'leach' resistance properties and solderability ()



High Power Current Sensing Resistor

6. Rating Current()::

6.1 The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used

$$I = \sqrt{P/R}$$

(DC () AC () (RMS))
() ())

Remark:

- I: Rating Current.
- P: Rating Power.
- R: Resistance.

$$I = \sqrt{P/R}$$

7. Ordering Information()::

Model	Size ()	Power Rating Watts ()	Packing*	Tolerance**	Resistance***
CUM	1206 2010 2512 2725 2728 2817 4527	<ul style="list-style-type: none"> B: 0.5W, C: 0.75W, 1: 1.0W, D: 1.5W, 2: 2.0W, 3: 3.0W, 4: 4.0W, 5: 5.0W 	<ul style="list-style-type: none"> A: 500pcs 1: 1,000pcs 2: 2,000pcs 4: 4,000pcs 5: 5,000pcs 	<ul style="list-style-type: none"> D=±0.5%; F=±1.0%; G=±2.0%; J=±5.0% 	e.g.: R003: 3mΩ R100: 100mΩ

Remark :

a. “*” The packing quantity per reel are listed below (“*”:)

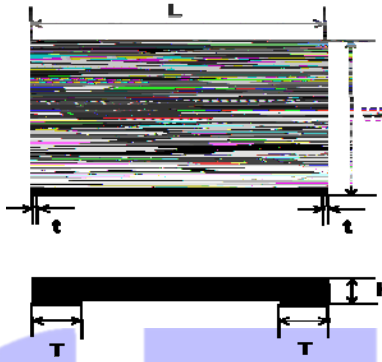
Model ()	Tape Width ()	Diameter ()	Piece/reel (())
CUM1206	12 mm/embossed plastic	178 mm/7"	5,000 pieces (5,000)
CUM2010			4,000 pieces (4,000)
CUM2512			4,000 pieces (4,000)
CUM2725			2,000 pieces (2,000)
CUM2728			2,000 pieces (2,000)
CUM2817			1,000 pieces (1,000)
CUM4527	24 mm/embossed plastic		1,000 pieces (1,000)

b. “**” Special tolerance and range of resistance are under requested (“**”).

c. “***” Normal product order information has 3 digits, if includes one decimal point then the order information should be 4 digits (e.g. 0.5mΩ is R0005), if includes 2 decimal points, then it should be 5 digits (e.g. 0.25mΩ is R00025) (“***” , (0.5mΩ R0005), (0.25mΩ R00025)).

High Power Current Sensing Resistor

8. Physical Dimensions():



Type	Maximum Power Rating (Watts) ()	Resistance Range (mΩ) ()	Dimensions - in inches (millimeters) - ()				
			L	W	H	T	t
CUM1206	0.5	51.0 ~ 100.0	0.120±0.010 (3.200±0.254)	0.065±0.010 (1.650±0.254)	0.012±0.010 (0.300±0.254)	0.020±0.010 (0.508±0.254)	0~0.008 (0~0.200)
	0.75	21.0 ~50.0			0.015±0.010 (0.390±0.254)		
	1.0	1.0~2.0			0.026±0.010 (0.670±0.254)		
		3.0~100.0			0.019±0.010 (0.490±0.254)		
CUM2010	0.75	71.0~100.0	0.200±0.010 (5.100±0.254)	0.095±0.010 (2.400±0.254)	0.012±0.010 (0.310±0.254)	0.033±0.010 (0.840±0.254)	0~0.008 (0~0.200)
	1	31.0~70.0			0.018±0.010 (0.460±0.254)		
	1.5	1.0~2.0			0.026±0.010 (0.670±0.254)		
		2.5~30.0			0.018±0.010 (0.460±0.254)		
		31.0~100.0			0.023±0.010 (0.590±0.254)		
CUM2512	1	0.5~1.0	0.250±0.010 (6.350±0.254)	0.120±0.010 (3.050±0.254)	0.026±0.010 (0.670±0.254)	0.087±0.010 (2.200±0.254)	0~0.008 (0~0.200)
		1.5			0.022±0.010 (0.560±0.254)	0.078±0.010 (2.000±0.254)	0.008~0.039 (0.200~1.000)
		2.0~100.0			0.043±0.010 (1.100±0.254)		
		101.0~680.0			0.019±0.010 (0.490±0.254)	0.033±0.010 (0.850±0.254)	
	2	0.5~1.0			0.026±0.010 (0.670±0.254)	0.087±0.010 (2.200±0.254)	0~0.008 (0~0.200)
		1.5			0.022±0.010 (0.560±0.254)	0.078±0.010 (2.000±0.254)	0.008~0.039 (0.200~1.000)
		2.0~100.0			0.043±0.010 (1.100±0.254)		
		101.0~450.0			0.024±0.010 (0.610±0.254)	0.033±0.010 (0.850±0.254)	

High Power Current Sensing Resistor

Type	Maximum Power Rating (Watts) ()	Resistance Range (mΩ) ()	Dimensions - in inches (millimeters) - ()				
			L	W	H	T	t
CUM2512	3	0.5~1.0	0.250±0.010 (6.350±0.254)	0.120±0.010 (3.050±0.254)	0.026±0.010 (0.670±0.254)	0.087±0.010 (2.200±0.254)	0~0.008 (0~0.200)
		1.5				0.078±0.010 (2.000±0.254)	0.008~0.039 (0.200~1.000)
		2.0~50.0				0.043±0.010 (1.100±0.254)	
		50.0~100.0			0.029±0.010 (0.740±0.254)		
CUM2725	4	0.25	0.268±0.010 (6.800±0.254)	0.250±0.010 (6.350±0.254)	0.032±0.010 (0.820±0.254)	0.091±0.010 (2.300±0.254)	0.008~0.039 (0.200~1.000)
		0.5			0.027±0.010 (0.690±0.254)		
		1			0.027±0.010 (0.690±0.254)	0.071±0.010 (1.800±0.254)	
		1.5~3.0			0.024±0.010 (0.610±0.254)		
CUM2728	4	4.0~50.0	0.260±0.010 (6.600±0.254)	0.264±0.010 (6.700±0.254)	0.028±0.010 (0.720±0.254)	0.047±0.010 (1.200±0.254)	0.008~0.039 (0.200~1.000)
		51.0~450.0			0.033±0.010 (0.840±0.254)		
		451.0~600.0			0.030±0.010 (0.770±0.254)		
CUM2817	3	1.0	0.280±0.010 (7.100±0.254)	0.165±0.010 (4.200±0.254)	0.027±0.010 (0.690±0.254)	0.071±0.010 (1.800±0.254)	0.008~0.039 (0.200~1.000)
		2.0~30.0			0.024±0.010 (0.610±0.254)	0.059±0.010 (1.500±0.254)	
		31.0~100.0			0.028±0.010 (0.720±0.254)		
		101.0~130.0			0.030±0.010 (0.770±0.254)		
		131.0~200.0			0.027±0.010 (0.690±0.254)		
CUM4527	3	501.0~680.0	0.445±0.020 (11.300±0.500)	0.260±0.020 (6.600±0.500)	0.030±0.010 (0.770±0.254)	0.079±0.010 (2.000±0.254)	0.008~0.039 (0.200~1.000)
		681.0m~1.0 R			0.027±0.010 (0.690±0.254)		
	5	1.0			0.031±0.010 (0.790±0.254)	0.118±0.010 (3.000±0.254)	
		1.5			0.033±0.010 (0.840±0.254)		
		2.0~500.0			0.033±0.010 (0.840±0.254)		

High Power Current Sensing Resistor



High Power Current Sensing Resistor

11. Product Reliability Performance():

Test Items	Conditions of Test	Test Limits
Temperature Coefficient Ratio (T.C.R.)	$\text{T.C.R. (ppm/}^\circ\text{C)} = \frac{(R2-R1)}{R1 (T2-T1)} \times 10^6$ <ul style="list-style-type: none"> R1: resistance at room temperature (T1) R2: resistance at 150°C (T2) 	$\leq \pm 50 \text{ ppm/}^\circ\text{C}$
Temperature Cycling	-55°C to +150°C, 1,000cycles, 15min at each extreme	$\Delta R/R1 \leq \pm 0.5\%$
Short Time Overload	<p>The number of rated power are as follows:</p> <ul style="list-style-type: none"> CUM1206-0.5W: 4 times of rated power CUM1206-0.75W: 4 times of rated power CUM1206-1.0W: 4 times of rated power CUM2010-0.75W: 5 times of rated power CUM2010-1.0W: 5 times of rated power CUM2010-1.5W: 4 times of rated power CUM2512-1.0W: 5 times of rated power CUM2512-2.0W: 5 times of rated power CUM2512-3.0W: 3 times of rated power CUM2725-4.0W: 4 times of rated power CUM2728-4.0W: 3 times of rated power CUM2817-3.0W: 4 times of rated power CUM4527-3.0W: 3 times of rated power CUM4527-5.0W: 3 times of rated power <p>Rating power duration: 5secs</p>	<ul style="list-style-type: none"> CUM4527: $\Delta R/R1 \leq \pm 2.0\%$ The others: $\Delta R/R1 \leq \pm 0.5\%$
Resistance to Solder Heat	260±5°C Solder, 10±1secs dwell	$\Delta R/R1 \leq \pm 0.5\%$
High Temperature Exposure	1,000hrs at + 170 °C	<ul style="list-style-type: none"> CUM4527: $\Delta R/R1 \leq \pm 2.0\%$ The others: $\Delta R/R1 \leq \pm 1.0\%$
Load at Rated Power	1,000hrs@70 °C, 1.5hrs "ON", 0.5hrs "OFF"	<ul style="list-style-type: none"> CUM4527: $\Delta R/R1 \leq \pm 2.0\%$ The others: $\Delta R/R1 \leq \pm 1.0\%$
Bias Humidity	1,000hrs@+85°C/85%RH, Bias 1.5hrs "ON", 0.5hrs "OFF"	$\Delta R/R1 \leq \pm 0.5\%$
Solderability	245±5°C for 2±0.5secs	>95% coverage

Remark: R = (resistance after stress - resistance before stress); R1 means resistance before stress.

High Power Current Sensing Resistor

