Rev: 4/99

RL Series
Low Value, Thick Film SMT Chip

Surface Mount Resistor Chip

An ISO 9002
Registered Company

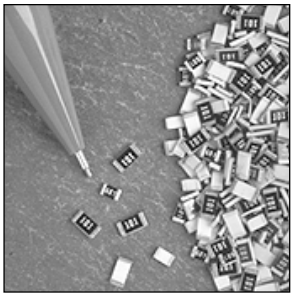
PACCOM® ELECTRONICS
Resistors | Capacitors | Inductors

RL Series

Low Value Thick-Film Resistor ▼ Glass Passivated ▼ Chip

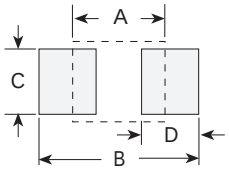
Features:

NEW Series

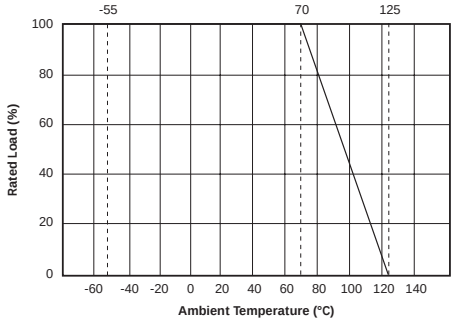


- Low resistance values for current sensing in desktop, laptop, palmtop, and embedded computer systems
- Low inductance
- Internationally standardized case sizes – 0805 to 2512
- Ruthenium Oxide thick-film resistive element
- 3-layer termination yields excellent solderability
- A protective coating on the resistive element ensures high reliability
- Operating temperature range of -55°C to +125°C
- Bulk cassette available for high-volume requirements
- Compatible with high-speed automated placement equipment
- Nickel barrier terminations are wave, IR reflow and vapor phase solderable

■ Solder Land



■ Derating Curve



Recommended Solder Land dimensions in mm (max)

EIA Size	(A)	(B)	(C)	(D)
0805	1.2	3.0	1.2	0.9
1206	2.2	4.2	1.6	1.0
1210	2.2	4.2	2.4	1.0
2010	3.3	6.1	2.4	1.4
2512	4.4	8.0	3.0	1.8

■ Part Numbering System

RL	18	T		J_	.01 OHM
Series Code	Wattage	Package	Reel Size	Tolerance	Resistance
	1/8W to 1W 18 = 1/8W (0805) 25 = 1/4W (1206) 33 = 1/3W (1210) 75 = 3/4W (2010) 100 = 1W (2512)	B = Bulk Bag C = Bulk Cassette P = Plastic Tape/Reel T = Paper Tape/Reel	Null = 7" Reel 13 = 13" Reel	F = ±1% G = ±2% J = ±5%	0.01 to 1Ohm (Expressed in Ω as actual value)

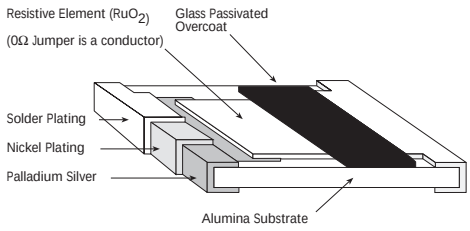
Rev 4-2-99

RL Series

Performance Specifications

Electrical Characteristics	Specification	
Nominal Resistance Range	0.01Ω ~ 1Ω	
Rated Working Voltage (WV)	V=√ (P*R)	
Wattage Range	1/8W ~ 1W	
Resistance Tolerance Range	1%, 2%, 5% (F, G, J)	
Operating Temperature Range	-55°C ~ +125°C	
Environmental Characteristics	**Test Method**	**Specification**
Temperature Coefficient (TCR)	MIL-STD-202F, Method 304 -55°C ~ +125°C	±600ppm/°C
Thermal Shock	MIL-STD-202F, Method 107, 5 cycles, 55°C ~ +125°C	±1%
Low Temperature Exposure	MIL-R-55342D, -55°C, 1 hr, 45 min rated WV	±1%
High Temperature Exposure	MIL-R-55342D, 125°C, 100 hrs	±2%
Short Time Overload	MIL-R-55342D, 2.5 times rated WV, 5 sec.	±1%
Resistance to Soldering Heat	MIL-R-55342D, 260°C, 10 sec	±1%
Moisture Resistance	MIL-STD-202F, Method 106, 10 cycles, total 240 hours	±2%
Load Life	MIL-STD-202F, Method 108A, 70°C, 1000 hours	±2%
Solderability	MIL-STD-202F, Method 208, 230°C, 5 sec	95% coverage min

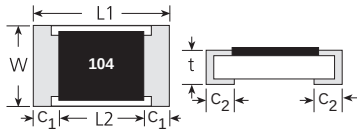
■ Thick-Film Chip Construction



Alphanumeric Marking System

5% and 2% tolerances (E-24 values) use a 3-digit code: the first two digits are significant figures and the third digit is the multiplier. The letter R is a decimal point.

1% tolerance (E-96 values) uses a 4-digit code: the first three digits are significant figures and the fourth digit is the multiplier. The letter R is a decimal point.



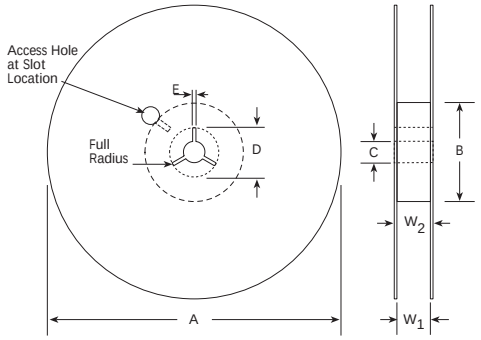
Electrical and Size Specifications

dimensions in mm

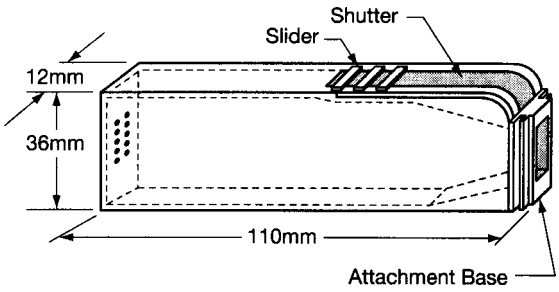
Series	EIA Size	Wattage @70°C	Length (L1)	Width (W)	Thickness (t)	Top Termination width (c_1)	Bottom Termination width (c_2)	Resistance Range Ω
RL18	0805	1/8W	2.0±0.10	1.25±0.10	0.50±0.05	0.40±0.20	0.40±0.20	0.01~1.0 Ohm
RL25	1206	1/4W	3.1±0.10	1.60±0.10	0.55±0.05	0.50±0.25	0.50±0.25	
RL30	1210	1/3W	3.1±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20	
RL75	2010	3/4W	5.0±0.10	2.50±0.10	0.55±0.05	0.60±0.25	0.40±0.20	
RL100	2512	1W	6.35±0.10	3.20±0.10	0.55±0.05	0.60±0.25	0.40±0.20	
Temperature Coefficient				±600ppm/°C				

Resistors

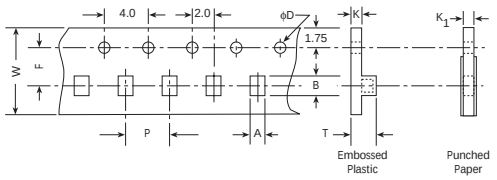
■ Surface Mount Reel



■ Bulk Cassette (meets dimensional requirements of IEC-286-6 and EIAJ 7201)



■ Tape Dimensions



Package Quantities

Size	0402	0603	0805	1206	1210	2010*	2512*
7"	10,000	5,000	5,000	5,000	5,000	4,000	4,000
10"	20,000	10,000	10,000	10,000	10,000	-	-
13"	40,000	20,000	20,000	20,000	20,000	-	-
Bulk Cassette	50,000	25,000	10,000	-	-	-	-

* Embossed Plastic Tape- All others are Coated Punched Paper Tape

Chip Resistor Reel Dimensions

dimensions in mm

Carrier Tape Width	Reel Diameter (A) max		Hub Diameter (B)		Arbor Hole Diameter (C)		Drive Spoke Diameter (D)		Drive Spoke Radius (E)		Inside Reel Width (W_1)		Outside Reel Width (W_2)	
8	330	max	50	min	13	+0.50 -0.20	20.2	min	1.5	min	8.4	+1.5 / -0	14.4	max
12											12.4	+2.0 / -0	18.4	max

Chip Resistor Tape Dimensions

Dimensions in mm

Type	EIA Case Size	Pocket Width (A)	Pocket Length (B)	Pocket Depth (T)	Carrier Tape Width (W)	Sprocket Hole Center to Pocket Center (F)	Embossed Plastic Tape K	Punched Paper Tape K_1	Pocket Spacing (P)	Sprocket Hole Diameter (φD)
SRM06	0402	.65±0.1	1.15±0.1	2.5 max	8.0±0.2	3.5±0.05	-	0.45±0.1	2.0±0.1	1.5+0.1/-0
RM06	0603	1.1±0.1	1.9±0.1	2.5 max	8.0±0.2	3.5±0.05	-	0.60±0.1	4.0±0.1	1.5+0.1/-0
RT06	0603	1.1±0.1	1.9±0.1	2.5 max	8.0±0.2	3.5±0.05	-	0.75±0.1	4.0±0.1	1.5+0.1/-0
RM10	0805	1.65±0.1	2.4±0.1	2.5 max	8.0±0.2	3.5±0.05	0.25±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
RT10	0805	1.65±0.1	2.4±0.1	2.5 max	8.0±0.2	3.5±0.05	0.25±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
SRM18	0805	1.65±0.1	2.4±0.1	2.5 max	8.0±0.2	3.5±0.05	0.25±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
RM18	1206	1.9±0.1	3.5±0.1	2.5 max	8.0±0.2	3.5±0.05	0.25±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
SRM25	1206	1.9±0.1	3.5±0.1	2.5 max	8.0±0.2	3.5±0.05	0.25±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
RM25	1210	2.8±0.1	3.5±0.1	2.5 max	8.0±0.1	3.5±0.05	0.20±0.05	0.75±0.1	4.0±0.1	1.5+0.1/-0
RM50	2010	2.8±0.2	5.6±0.2	6.5 max	12.0±0.1	5.5±0.05	0.20±0.05	-	4.0±0.1	1.5+0.1/-0
RM100	2512	3.6±0.2	6.7±0.2	6.5 max	12.0±0.1	5.5±0.05	0.20±0.05	-	8.0±0.1	1.5+0.1/-0

Tape Leader	There shall be a leader of 230mm minimum, which may consist of carrier and / or cover tape followed by a minimum of 160mm of empty carrier tape sealed with cover tape
Tape Trailer	There shall be a trailer of 160mm minimum of empty carrier tape sealed with cover tape. The entire carrier tape must release from the reel hub when the last portion of the tape unwinds from the reel without damage to the carrier tape and the remaining components in the cavities.

Chip Resistor Cross Reference

Chip Resistor Cross Reference

P/N Seq.	Manufacturer		Paccom	AVX	Dale	Kamaya	KOA	NIC	Panasonic	Philips	RCD	Rohm	SEI
1	**Series**		RM/SRM	CR	CRCW	RMC	RM73	NRC	ERJ	9C	MC	MCR	RMC
2	**Size**	**Wattage**											
	0402	1/16W	SRM06	05	0402	1/16S	1E	04	2GE	0402	0402	01	1/16S
	0603	1/16W	RM06	10	0603	1/16	1J	06	3GS	0603	0603	03	1/16
	0805	1/10W	RM10	21	0805	1/10	2A	10	6GE	0805	0805	10	1/10
	0805	1/8W	SRM18	—	0805	—	2A	12R	—	—	—	—	—
	1206	1/8W	RM18	32	1206	1/8	2B	12	6GM	1206	1A	18	1/8
	1206	1/4W	SRM25	—	1206	—	2B	25R	8GC	1206	1206	—	—
	1210	1/4W	RM25		1210	1/4	2E	25	14	1210	1210	25	1/4
	2010	1/2W	RM50		2010	1/2	2H	50	12(1812)	2010	2010	50	1/2
	2512	1W	RM100	63	2512	1	3A	100	1W	2512	2512	100	1
3	**Tolerances**												
				K = 10%		J = 5%		G = 2%		F = 1%			
4	**Nominal Resistance Value**												
	3 digit mark		10K = 103 / 100Ω = 101				4 digit mark			10K = 1021 / 100Ω = 1000			
5	**Package**												
	Paper Tape		R	T	RT1	TP	TD	—	V	—	T	EZH	—
	Plastic Tape		P	H	RT2	TE	TE	PL	U	—	—	JZH	—
	10,000 Piece Reel		10	D	RT3	—	—	10	—	—	—	FZH	—
	20,000 Piece Reel		13	S	—	—	—	—	—	—	—	QZH	—
	Cassette		C	—	—	—	—	—	—	—	M	PZHI	—
6	**Marking** (Except 0402)												
	Top		Y	—	—	—	—	—	Y	—	—	—	—
	Bottom		—	—	—	—	—	—	—	—	—	—	—

E-96 Marking Code for 1% 0603 Chip Resistors

Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value
01	100	13	133	25	178	37	237	49	316	61	422	73	562	85	750
02	102	14	137	26	182	38	243	50	324	62	432	74	576	86	768
03	105	15	140	27	187	39	249	51	332	63	442	75	590	87	787
04	107	16	143	28	191	40	255	52	340	64	453	76	604	88	806
05	110	17	147	29	196	41	261	53	348	65	464	77	619	89	825
06	113	18	150	30	200	42	267	54	357	66	475	78	634	90	845
07	115	19	154	31	205	43	274	55	365	67	487	79	649	91	866
08	118	20	158	32	210	44	280	56	374	68	499	80	665	92	887
09	121	21	162	33	215	45	287	57	383	69	511	81	681	93	909
10	124	22	165	34	221	46	294	58	392	70	523	82	698	94	931
11	127	23	169	35	226	47	301	59	402	71	536	83	715	95	983
12	130	24	174	36	232	48	309	60	412	72	549	84	732	96	976

This table shows the first two digits for the three digit EIA-96 Part Marking Scheme. Locate the desired base value in the columns marked R Value, then select the code to the left and apply the following Alpha multiplier codes. S =10^{-2}, R = 10^{-1}, A = 10^{0}, B = 10^{1}, C = 102, D = 10^{3}, E = 10^{4}, F = 10^{5}. Example 1K ohm = 01B