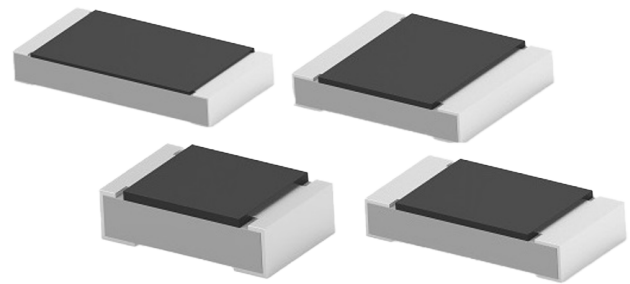


# SMD LOW OHMIC – CURRENT SENSE RESISTORS

## TYPE RLC73 SERIES

### INTRODUCTION

TE Connectivity (TE) introduces a new range of current sense resistors to be offered as a low-cost alternative to legacy solutions characterised by noble metal construction (Ag /Pd / RU) and terminations. RLC73 series has the additional benefit of being fully RoHS compliant, and features power ratings up to 2W and TCRs down to 50ppm/°C in the high-power version. Furthermore, these resistors satisfy the demand for low ohmic shunt resistors to act as current sensors towards ICs for battery charge management and low voltage power supplies produced by global semiconductor manufacturers.



### FEATURES

- Resistance values from 10mΩ
- Low TCR version available for many values
- High purity alumina substrate for high power dissipation
- RoHS Compliance
- MSL Level 1

### APPLICATIONS

- Power management applications
- Switching power supply
- Over current protection in audio applications
- Voltage regulation module (VRM)
- DC-DC converter
- Battery pack
- Charger
- Adaptor
- Disk driver

## CHARACTERISTICS - ELECTRICAL - STANDARD

Type	Size	Power Rating (W)	Operating Temperature Range	Maximum Operating Current (A)	Resistance Range (mΩ)			TCR (PPM/°C)
					±1% E24 & E96*	±2% E24	±5% E24	
RLC73	0805	0.125	-55 - 155°C	2.5	20 - 50	20 - 50	±600	
					51 - 100	51 - 100	±400	
					102 - 196	110 - 180	±300	
					200 - 1000	200 - 1000	±200	

# SMD Low Ohmic – Current Sense Resistors

Type RLC73 Series

## CHARACTERISTICS - ELECTRICAL - STANDARD

Type	Size	Power Rating (W)	Operating Temperature Range	Maximum Operating Current (A)	Resistance Range (mΩ)			TCR (PPM/C°)
					±1% E24 & E96*	±2% E24	±5% E24	
RLC73	1206	0.25	-55 - 155°C	5.0	10 - 20	10 - 20	±600	
					22 - 50	22 - 50	±400	
					51 - 91	51 - 91	±300	
					100 - 1000	100 - 1000	±200	
RLC73	1210	0.5		7.07	10 - 20	10 - 20	±600	
					22 - 50	22 - 50	±400	
					51 - 91	51 - 91	±300	
					100 - 1000	100 - 1000	±200	
RLC73	2010	0.75		8.66	10 - 20	10 - 20	±600	
					22 - 50	22 - 50	±400	
					51 - 91	51 - 91	±300	
					100 - 1000	100 - 1000	±200	
RLC73	2512	1		10.0	10 - 20	10 - 20	±600	
					22 - 50	22 - 50	±400	
					51 - 91	51 - 91	±300	
					100 - 1000	100 - 1000	±200	

\*The nominal resistance value range for less than 100mΩ is in E24 series

## CHARACTERISTICS - ELECTRICAL - HIGH POWER

Type	Size	Power Rating (W)	Operating Temperature Range	Maximum Operating Current (A)	Resistance Range (mΩ)			TCR (PPM/C°)
					±1% E24 & E96*	±2% E24	±5% E24	
RLC73P	0805	0.25	-55 - 155°C	2.21	20 - 50	20 - 50	±600	
					51 - 91	51 - 91	±400	
				1.58	100 - 196	100 - 180	±100	
					200 - 499	200 - 470	±75	
				500 - 1000	500 - 1000	±50		

# SMD Low Ohmic - Current Sense Resistors

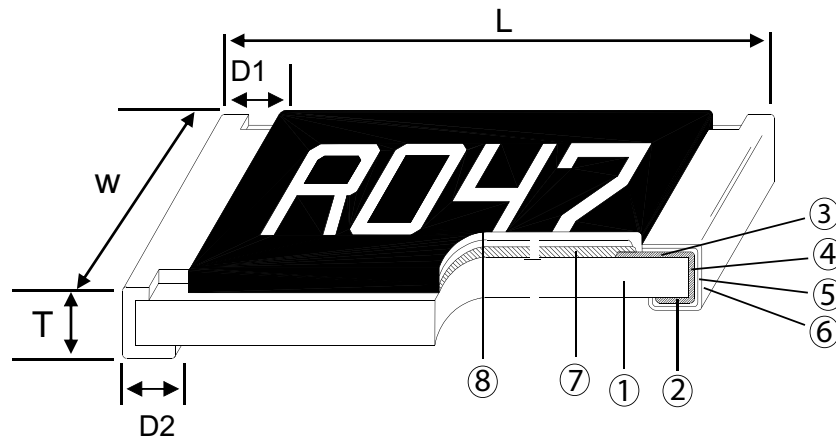
Type RLC73 Series

## CHARACTERISTICS - ELECTRICAL - HIGH POWER

Type	Size	Power Rating (W)	Operating Temperature Range	Maximum Operating Current (A)	Resistance Range (mΩ)			TCR (PPM/C°)		
					±1% E24 & E96*	±2% E24	±5% E24			
RLC73P	1206	0.5	-55 - 155°C	7.07	10 - 20	10 - 20	±600			
					22 - 50	22 - 50	±400			
					51 - 68	51 - 68	±300			
RLC73P	1206	1		3.65	75 - 100	75 - 100	±100			
					102 - 147	110 - 140	±75			
					150 - 1000	150 - 1000	±50			
RLC73P	1210	0.75		8.66	10 - 20	10 - 20	±600			
					22 - 47	22 - 47	±400			
					RLC73P	2010	1	3.87	50 - 147	50 - 140
150 - 1000	150 - 1000	±50								
RLC73P	2010	1	10.0	10 - 20					10 - 20	±600
				22 - 47	22 - 47	±400				
				RLC73P	2512	2	4.47	50 - 147	50 - 140	±75
150 - 1000	150 - 1000	±50								
RLC73P	2512	2	14.1					10 - 18	10 - 18	±600
				RLC73P	2512	2	10.0	20 - 47	20 - 47	±100
								RLC73P	2512	2
				150 - 1000	150 - 1000	±50				

\*The nominal resistance value range for less than 100mΩ is in E24 series

## CONSTRUCTION AND DIMENSIONS



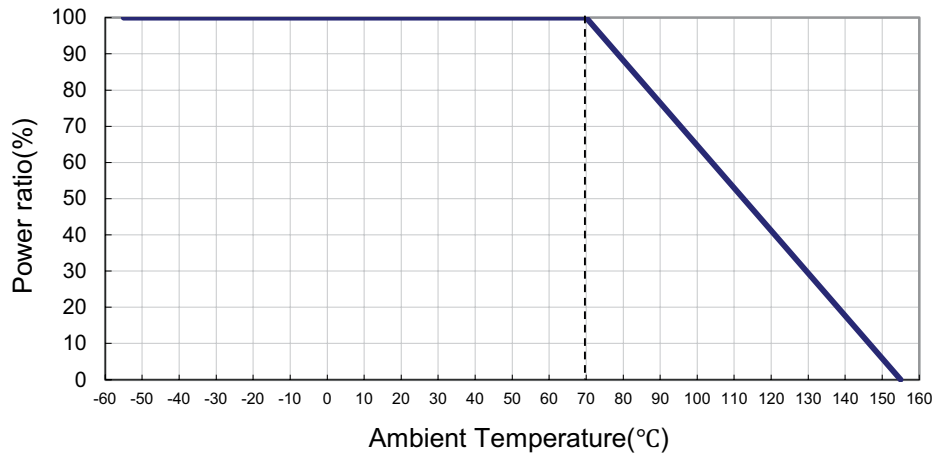
- ① Alumina Substrate
- ② Bottom Electrode
- ③ Top Electrode
- ④ Edge Electrode
- ⑤ Barrier Layer
- ⑥ External Electrode
- ⑦ Resistor Layer
- ⑧ Overcoat

# SMD Low Ohmic – Current Sense Resistors

Type RLC73 Series

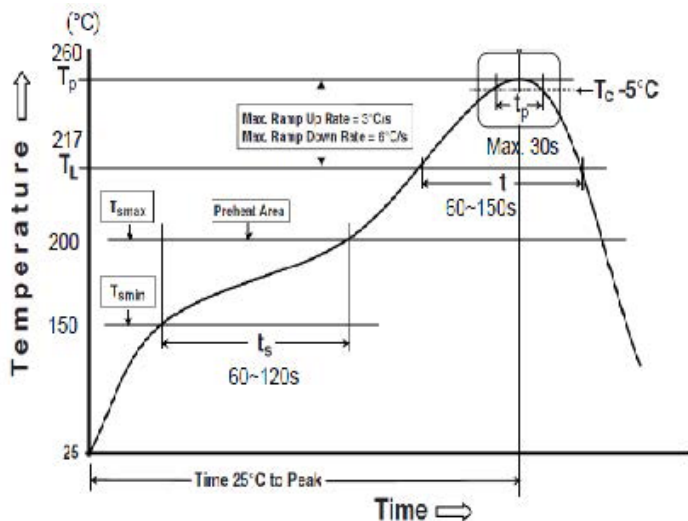
Type	Size	L (mm) ±0.10	W (mm)	T (mm)	D1 (mm)	D2 (mm)	Weight (g)
RLC73 / RLC73P	0805	2.00	1.25 ±0.10	0.55 ±0.10	0.30 ±0.20	0.40 ±0.25	4.6
RLC73 / RLC73P	1206	3.10	1.55 ±0.10	0.55 ±0.10	0.50 ±0.30	0.40 ±0.25	8.7
RLC73 / RLC73P	1210	3.10	2.60 ±0.15	0.55 ±0.10	0.50 ±0.30	0.50 ±0.25	16.0
RLC73 / RLC73P	2010	5.00	2.50 ±0.15	0.60 ±0.15	0.60 ±0.30	0.50 ±0.25	23.7
RLC73	2512	6.35	3.10 ±0.15	0.60 ±0.10		0.55 ±0.25	40.0
RLC73P	2512			10-18 mΩ		0.74 ±0.10	2.10 ±0.10
		20 - 43 mΩ	6.45	3.25 ±0.15		0.85 ±0.10	0.60 ±0.30
		47 mΩ	6.35	3.10 ±0.15	0.74 ±0.10	210 ±0.10	53.6
51 - 1000 mΩ							

## DERATING CURVE



## SOLDERING PROFILE

Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T <sub>sm</sub> )	150 °C
Max Temperature (T <sub>sm</sub> )	200 °C
Preheating time (t <sub>s</sub> ) from (T <sub>sm</sub> to T <sub>sm</sub> )	60-120 seconds
Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3°C/second max.
Liquidous temperature (T <sub>L</sub> )	217 °C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds
Min. Peak temperature (T <sub>p</sub> min)	235°C
Max. Peak temperature (T <sub>p</sub> max)	260°C
Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> )	30 seconds max.
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6°C/second max.
Time 25 °C to peak temperature	8 minutes max.

# SMD Low Ohmic – Current Sense Resistors

Type RLC73 Series

## ENVIRONMENTAL CHARACTERISTICS

Item	Requirement	Test Method
Temperature Coefficient of resistance (T.C.R.)	As Spec.	<b>JIS-C-5201-1 4.8</b> <b>IEC-60115-1 4.8</b> At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature Low TCR: At 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(0.5%+0.05Ω)	<b>JIS C 5201-1 4.13</b> <b>IEC 60115-1 4.13</b> RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
	±(1.0%+0.05Ω) For ≤50mR & all High power	
Insulation Resistance	≥10G	<b>JIS-C-5201-1 4.6</b> <b>IEC-60115-1 4.6</b> Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.05Ω)	<b>JIS-C-5201-1 4.25</b> <b>IEC-60115-1 4.25.1</b> 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
	±(2.0%+0.05Ω) For ≤50mΩ & all High power	
Damp Heat with Load	±(0.5%+0.05Ω)	<b>JIS-C-5201-1 4.24</b> <b>IEC-60115-1 4.24</b> 40±2°C, 90-95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
	±(1.0%+0.05Ω) For ≤50mΩ & all High power	
Dry Heat	±(1.0%+0.05Ω)	<b>JIS-C-5201-1 4.23</b> <b>IEC-60115-1 4.23.2</b> at +155°C for 1000 hrs
	±(2.0%+0.05Ω) For ≤50mΩ & all High power	
Bending Strength	±(1.0%+0.05Ω)	<b>JIS-C-5201-1 4.33</b> <b>IEC-60115-1 4.33</b> Bending once for 60 seconds with 3mm 2010, 2512 sizes: 2mm
Solderability	95% min. coverage	<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	<b>JIS-C-5201-1 4.18</b> <b>IEC-60115-1 4.18</b> 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	<b>JIS-C-5201-1 4.7</b> <b>IEC-60115-1 4.7</b> 1.42 times Max. Operating Voltage for 1 minute CSN05:300V CSN06/13/10:400V; CSN12:500V
Leaching	Individual leaching area ≤5% Total leaching area ≤10%	<b>JIS-C-5201-1 4.18</b> <b>IEC-60068-2-58 8.2.1</b> 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	<b>JIS-C-5201-1 4.19</b> <b>IEC-60115-1 4.19</b> -55°C to +155°C, 5 cycles

RCWV(Rated Continuous Working Voltage)=√(P\*R) or Max. Operating Voltage whichever is lower.

**Storage Temperature: 15-28°C; Humidity < 80%RH**

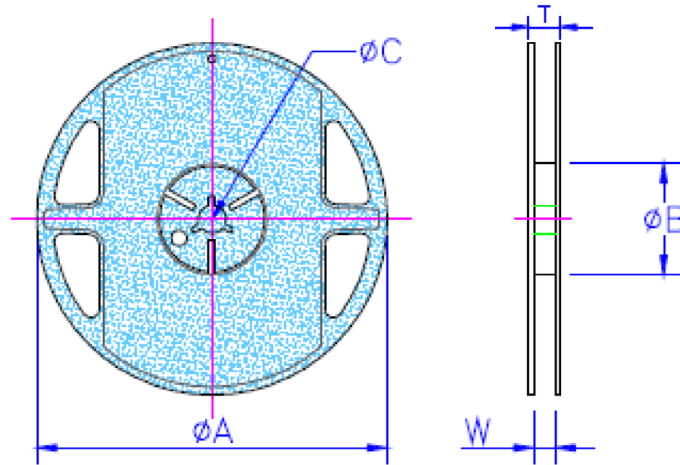
**Shelf Life: 2 years from production date**

# SMD Low Ohmic - Current Sense Resistors

Type RLC73 Series

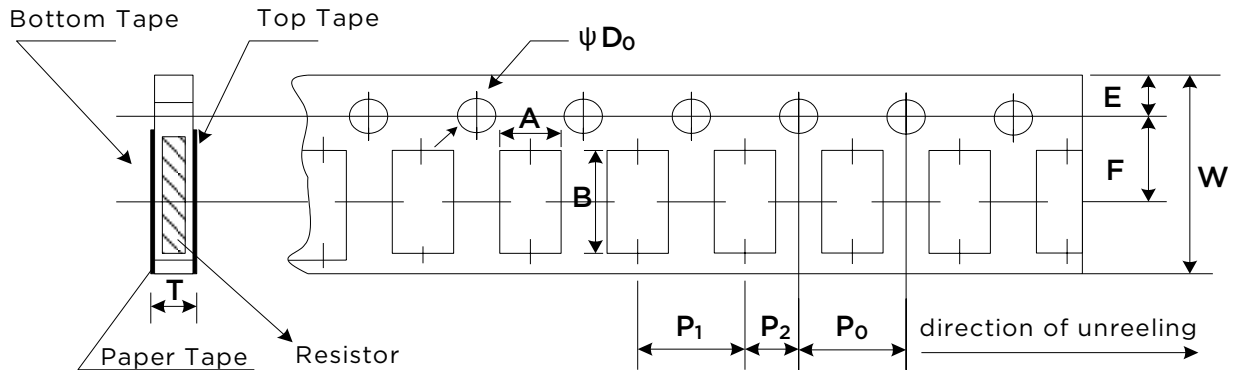
## PACKAGING

Reel Dimensions (mm)



Size	Type	Qty	Tape Width	Reel Diameter	$\phi A$ (mm)	$\phi B$ (mm)	$\phi C$ (mm)	W (mm)	T (mm)
0805	Paper	5K / 1K	8mm	7 inch	178.5 $\pm$ 1.5	60 +0/-1	13.0 $\pm$ 0.2	9.0 $\pm$ 0.5	12.5 $\pm$ 0.5
1206									
1210									
2010	Embossed	4K / 1K	12mm	7 inch	178.5 $\pm$ 1.5	60 +0/-1	13.0 $\pm$ 0.5	13.0 $\pm$ 0.5	15.5 $\pm$ 0.5
2512									
2512 2W	Embossed	2K/ 1K	12mm	7 inch	178.5 $\pm$ 1.5	60 +0/-1	13.0 $\pm$ 0.5	13.0 $\pm$ 0.5	15.5 $\pm$ 0.5

## PAPER TAPE SPECIFICATIONS

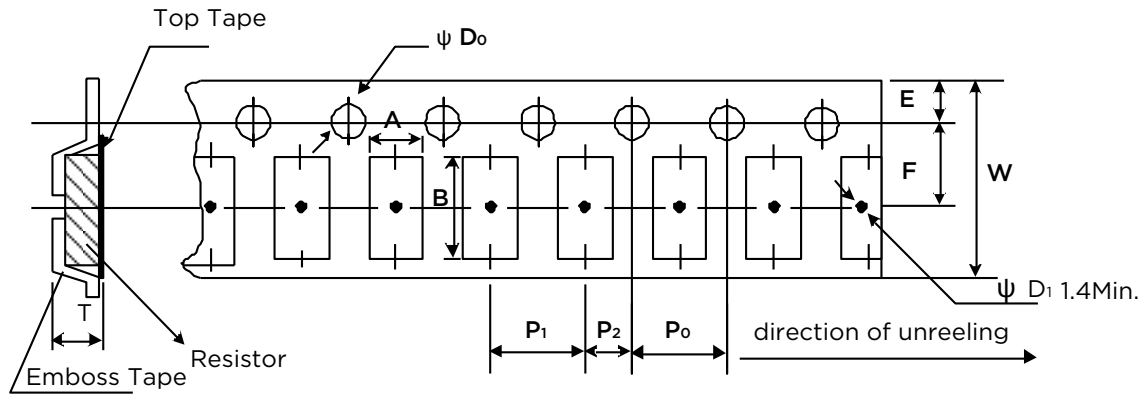


Size	A (mm) $\pm 0.10$	B (mm) $\pm 0.20$	W (mm) $\pm 0.20$	E (mm) $\pm 0.10$	F (mm) $\pm 0.05$	$P_0$ (mm) $\pm 0.10$	$P_1$ (mm) $\pm 0.05$	$P_2$ (mm) $\pm 0.05$	$\phi D_0$ (mm) $+0.1 -0$	T (mm) $\pm 0.1$
0805	1.60	2.40	8.0	1.75	3.50	4.00	4.00	2.00	1.50	0.85
1206	1.90	3.50	8.0	1.75	3.50	4.00	4.00	2.00	1.50	0.85
1210	2.90	3.50	8.0	1.75	3.50	4.00	4.00	2.00	1.50	0.85

# SMD Low Ohmic - Current Sense Resistors

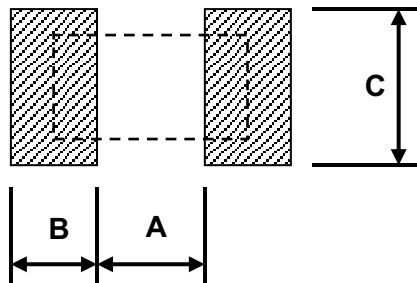
Type RLC73 Series

## EMBOSED PLASTIC TAPE SPECIFICATIONS



Size	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	∅D <sub>0</sub> (mm)	T (mm)
2010	2.80 ±0.10	5.40 ±0.20	12.0 ±0.30	1.75 ±0.10	5.5 ±0.05	4.00 ±0.05	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10	1.00 ±0.20
2512	3.50 ±0.10	6.70 ±0.10	12.0 ±0.30	1.75 ±0.10	5.5 ±0.05	4.00 ±0.05	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10	1.00 ±0.20
2512 2W 20 -49mΩ	3.50 ±0.10	6.70 ±0.10	12.0 ±0.30	1.75 ±0.10	5.5 ±0.05	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10	1.45 ±0.20
2512 2W 10 - 18mΩ >49mΩ	3.38 ±0.10	6.68 ±0.10	12.0 ±0.30	1.75 ±0.10	5.5 ±0.10	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	1.55 ±0.05	1.45 ±0.20

## RECOMMEND LAND PATTERN



Size	A (mm)	B (mm)	C (mm) ±0.2
0805	1.00	1.00	1.35
1206	2.00	1.15	1.70
1210	2.00	1.15	2.50
2010	3.60	1.40	2.50
2512	4.90	1.60	3.20
2512 2W 20 - 43mΩ	4.90	1.60	3.20
2512 2W 10 - 18mΩ ≥47mΩ	1.00	3.55	3.20

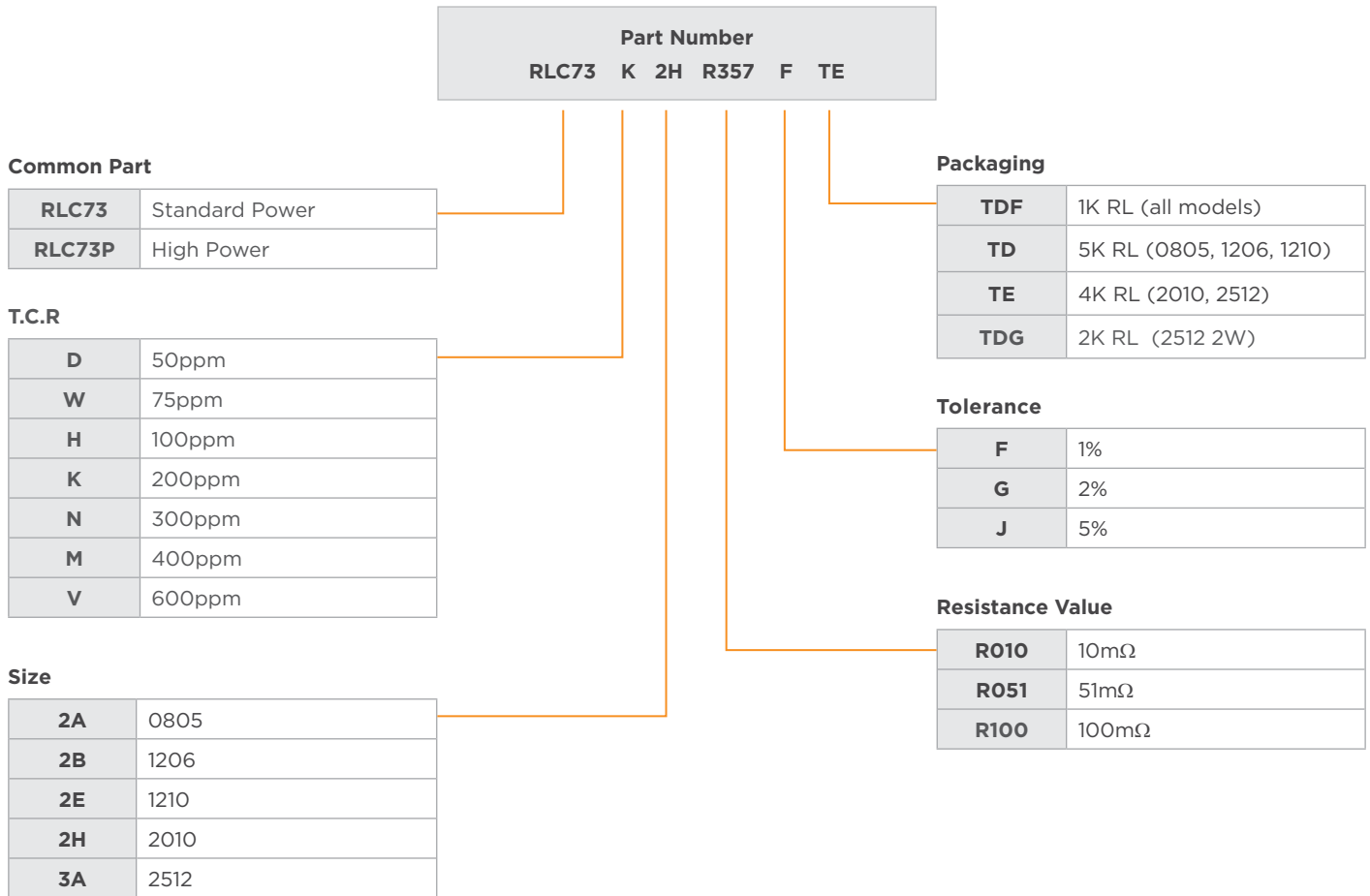
## MARKING

4 digit marking for all models

### Example

<b>Resistance</b>	10mΩ	51mΩ	100mΩ	549mΩ
<b>Marking</b>	R010	R051	R100	R549

## ORDERING INFORMATION



## te.com

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