

APPROVAL SHEET

Product Name : High Power Low ohm Shunt Resistor

Part No. : REL

Description : Size 4312, 4320

High Power Low ohm Shunt Resistor — REL Series

■ Applications

- Automation Control System
- Industrial / Power supply
- Battery management system



■ Features

- High power type of shunt resistor with high heat dissipation and reliability
- AEC-Q200 compliant
- RoHS compliant

■ Part Number Explanation

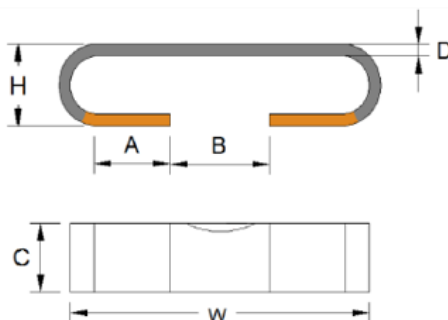
REL	4312	30	F	R005	T	S
Product	Size (Inch)	Rated Power	Tolerance	Resistance	Packaging	Functional
High Power Low ohm Shunt Resistor	4312 4320	30 : 3W 50 : 5W	D : ±0.5% F : ±1.0% J : ±5.0%	R001=1mR R020=20mR R030=30mR	T=Tape & Reel	S= Standard M= Meet AEC-Q200

■ Standard Electrical Specifications

Type	Rating Power at 70°C	Max. Rating Current	T.C.R (ppm/°C)	Resistance Range
				0.5% (D) 1.0% (F) 5.0% (J)
REL4312	3W	54.77A	25ppm~50ppm	$1\text{m}\Omega \leq R \leq 50\text{m}\Omega$
REL4320	5W	70.71A	25ppm~50ppm	$1\text{m}\Omega \leq R \leq 25\text{m}\Omega$

- Functional code: S
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.
- Operating Temperature Range:-55°C~+170°C

■ Dimension



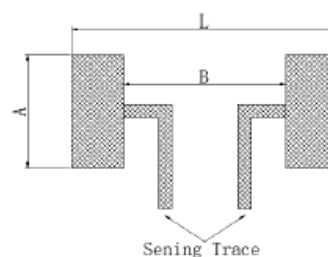
Unit: mm

Type	Resistance	C	B	A	H	W	D
REL4312	5mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.38±0.03
	10mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.68±0.03
	15mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.45±0.03
	20mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.32±0.03
	25mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.27±0.03
	40mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.15±0.03
	50mR	3.1±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.15±0.03
REL4320	1mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.85±0.03
	2mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.43±0.03
	5mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.65±0.03
	8mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.38±0.03
	10mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.32±0.03
	15mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.30±0.03
	20mR	6.2±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.15±0.03
	25mR	5.0±0.5	4.2±0.3	3.0±0.5	3.2±0.3	11±0.5	0.15±0.03

■ Recommend Land Pattern Design

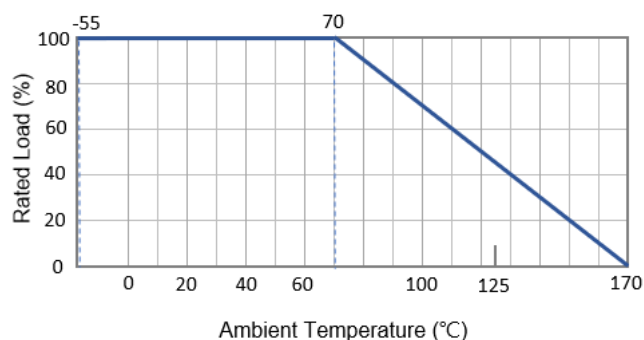
Type	L	A	B
REL4312	11	3.5	3.7
REL4320	11	7.0	3.7

Unit: mm



■ Derating curve

Operating Temperature Range: -55 to +170°C



■ Recommended Customer Soldering Parameters

■ Recommended IR Reflow Soldering Conditions

Preliminary heating: 150°C~190°C, 60~120s max

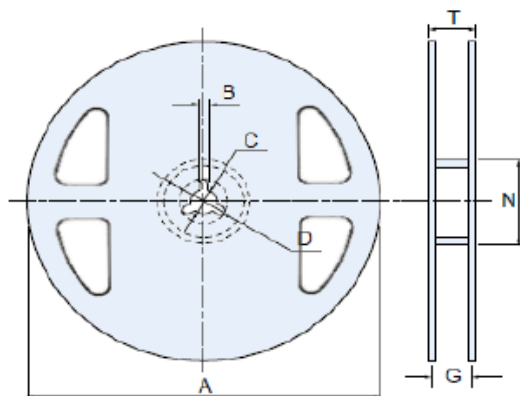
Soldering: 220°C, 90~150s max

Peak temperature: 255°C~260°C, 20s max

■ Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS-C-5201	TCR +125 °C, 25 °C is the reference temperature	Within the spec.
Short Time Overload	JIS-C-5201	2.5 × Rated power for 5 seconds	$\Delta R \leq 0.5\%$ F : $\Delta R \leq \pm(1\% + 0.5m\Omega)$
Solderability	AEC-Q200 18 J-STD-002	After immersing flux, dip in the 245±2°C molten solder bath for 3±0.5 sec.	Over 95% of termination must be covered with Solder.
Resistance to Soldering Heat	AEC-Q200 15	260±5°C for 10±1sec. Measure after 60 min.	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage
Operational Life	AEC-Q200 7	Test 1000hr @ TA=125°C at specified rated power. Measurement at 24±2 hours after test conclusion. Measuring at 250H, 500H, 1000H respectively	$\Delta R \leq 0.5\%$
Bending Strength	AEC Q200-005	Resistance variance after bended D: 4312 / 4320 = 2mm, 60sec at least	$\Delta R \leq 0.5\%$ No mechanical damage.
Temperature Cycling	AEC-Q200 4 JESD22 JA-104	100 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion.	$\Delta R \leq 0.5\%$
High Temperature Exposure (Storage)	AEC-Q200 7.3	1000 hrs. @ T=155°C. Unpowered. Measurement at 24 ±2 hours after test conclusion. Measuring at 250H, 500H, 1000H respectively	$\Delta R \leq 0.5\%$
Biased Humidity	AEC-Q200 7.7	1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 ±2 hours after test conclusion. Measuring at 250H, 500H, 1000H respectively	$\Delta R \leq 0.5\%$
Mechanical Shock	AEC-Q200 7.13	Test Peak value:100g's,Wave: Hail-sine, Duration:0.5ms	$\Delta R \leq 0.5\%$
Vibration	AEC-Q200 7.14	Frequency varied 10Hz to 2000Hz in 20min, 3 directions, 12 times.	$\Delta R \leq 0.5\%$

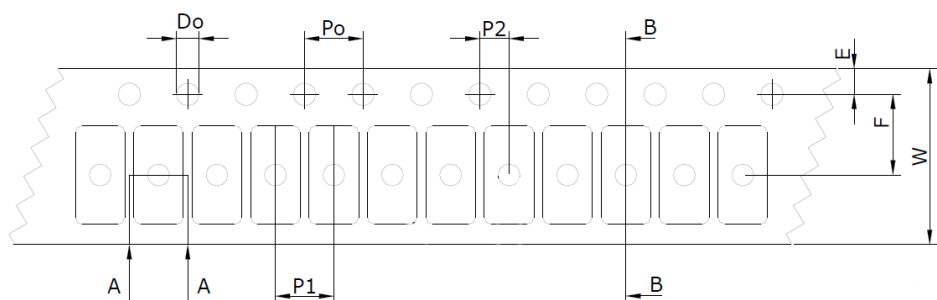
■ Packaging Information



Unit : mm

Size	Packaging Q'ty	A	N	C	B	G
4312	2kpcs/Reel	350.0±1.0	100±2.0	13.2±1.0	2.3±1.0	16.0±0.5
4320	1kpcs/Reel	350.0±1.0	100±2.0	13.2±1.0	2.3±1.0	16.0±0.5

■ Tapping Specification Tapping Specification



Unit : mm

Size	A	B	W	F	E	P1	P2	P0	D
4312	3.2±0.10	11.4±0.10	24±0.30	11.5±0.10	1.75±0.10	12±0.10	2±0.10	4.00±0.10	1.50+0.10/-0
4320	6.3±0.10	11.4±0.10	24±0.30	11.5±0.10	1.75±0.10	12±0.10	2±0.10	4.00±0.10	1.50+0.10/-0