RAW Series Surge Resistors

Product Overview

- Cost effective high-voltage surge resistors to 200 joules
- Available on the exclusive SWIFT™ program
- Molded surface mount version available

Excellent Low Cost Replacement for Composition Resistors

Series RAW pulse resistors withstand higher energy pulses than conventional film & wirewound types, without the performance disadvantages of carbon composition resistors. The heavy duty construction features a high thermal conductivity core and coating, enabling improved stability and environmental performance. Series RAW satisfy a wide variety of pulse applications including lightning, snubber, in-rush current, capacitor charge, etc. RoHS (Sn) or Mil-spec (Sn-Pb) termination finish available.



Wire Materials & Precision Low-Resistance Version

Constantan alloy (6J40); nickel-chromium alloy (6J20); Karma precision alloy (6J22).

Precision low-resistance version: 6J20 (Karma / nickel-chromium-aluminium-iron alloy wire), with low TCR (20-50ppm/°C), long-term resistance stability and low thermal EMF; the standard wire for INLANX precision axial wirewound resistors.

Outer Protective Coating (FBW/JBW Suffix)

High-temperature silicone resin (silicone rubber coating), UL94 V-0 flame retardancy; moisture and solvent resistance, with long-term temperature resistance up to 350°C.

Sectioned non-inductive winding (two strands wound in opposite directions) reduces parasitic inductance. This is the main distinction between this INLANX design and conventional wirewound resistors in the United States.

Manufacturing Process

- Clean and pretreat the alumina ceramic tube core.
- Apply precision alloy wire in a non-inductive double winding; control the turn count precisely for the required resistance.
- Fusion-weld both wire ends to the metal end caps.
- Measure initial resistance and sort.
- Dip-coat in high-temperature silicone resin and cure, fully encapsulating the ceramic core and winding.
- Laser- or ink-mark the model, resistance and tolerance using US-style lettering.
- Pre-bake for thermal ageing and stress relief; perform final resistance, TCR and voltage-withstand inspections.

Options

- Opt. ER: Group A Screening per MIL-R-39008 RCR
- Opt. F: Flameproof coating
- Opt. B: Increased power (see Specifications table)
- Opt. X: Non-inductive (see Performance Characteristics)
- Custom marking, cut & form, burn-in, etc.

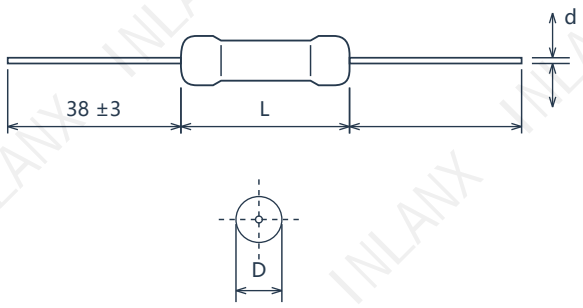
Specification Notes

1 Max voltage = √(P×R), not to exceed value listed.
2 Pulse voltage & energy capability depend on resistance value, waveform, repetition rate & environmental conditions (refer to R-42 for derating factors).
3 .040″ (1mm) lead dia. is available on RAW-1; .032″ [.8mm] lead dia. is available on RAW2.
4 Lead length is for bulk packaging; taped parts may be shorter (consult taping dimensions).
5 Expanded range available.
6 Allow .024″ [.6mm] additional for Opt. X or values <1Ω.
7 Specify Opt. 56 for 1.5″ [38.1] min. lead length; Opt. 70 for 2″ [50.8] lead length.
8 Multiply by 0.7 on Opt. X parts.

Electrical Specifications & Dimensions

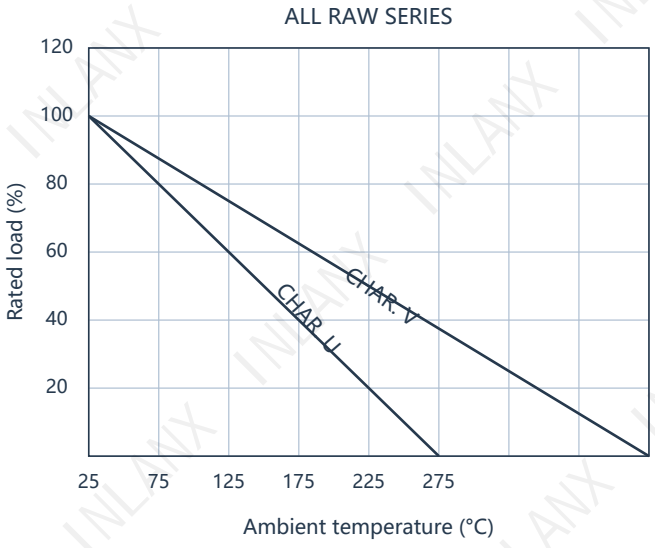
TYPE	POWER RATING(W)	Wattage (W)		Max. working voltage (V)		Resistance range (Ω)	Dimensions (mm)		
		U	V	U	V	0.5% 1% 3% 5%	L ±0.81	D ±0.81	d ±0.05
RAW1/4		0.40		20		0.1~100R	6.35	1.98	0.51
RAW1/2	RAW70	0.75		29		0.1~500R	7.92	1.98	0.51
RAW-1A		1.00		53		0.1~10.1K	10.31	2.36	0.64
RAW-1	RAW69	1.10		62		0.1~15K	13.49	2.36	0.64
RAW12 1/2		2.50	3.25	138	157	0.01~35K	12.70	5.33	0.81
RAW2	RAW79	3.00	3.75	135	148	0.01~5K	13.49	4.06	0.81
RAW3A		3.00	3.75	135	148	0.01~10K	14.27	5.33	0.81
RAW3		3.25	4.75	185	220	0.01~20K	20.62	5.33	1.02
RAW4	RAW67	4.00	5.50	210	250	0.01~20K	15.88	7.62	1.02
RAW5	RAW74	5.00	6.50	330	376	0.01~30K	22.22	7.62	1.02
RAW7	RAW68	7.00	9.00	504	576	0.01~40K	30.94	9.52	1.02
RAW-10	RAW78	10.00	13.00	799	911	0.01~51K	45.21	9.52	1.02

Outline & Dimensions



Unit: mm

Rated Load Derating

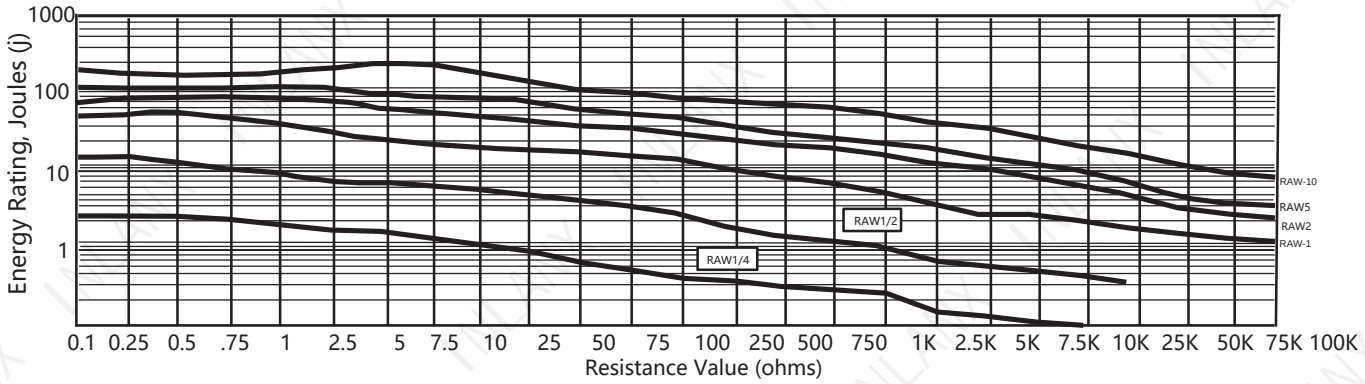


Performance Characteristics • Typical

Parameter	Performance
Derating, wattage & voltage	RAW1/4, RAW1/2, RAW-1, RAW2: 1.25%/°C >70°C; RAW5, RAW7, RAW-10 & Opt. B: 0.8%/°C >25°C
Max. inductance*: Opt. X≤50Ω	0.2uH RAW1/4X, RAW1/2X; 0.3uH RAW-1X, RAW2X; 0.7uH RAW5X, RAW7X, RAW-10X
Max. inductance*: Opt. X>50Ω	0.37uH RAW1/4X, RAW1/2X; 0.6uH RAW-1X, RAW2X; 1.4uH RAW5X, RAW7X, RAW-10X
Short-time overload	±0.5%
Temperature cycling	±0.5%
TCR (20 & 50ppm available)	±100ppm/°C (<0.2Ω=200ppm)
Moisture resistance	±1%
Shock and vibration	±0.2%
Effect of soldering	±0.2%
Voltage coefficient	±0.005%/V
Load life	±0.5% Std, ±1% Opt. B
Operating temperature range	-55 to +150°C, +275°C available
Dielectric strength (1KV available)	500V (RAW1/4 =300V)

* Specify Opt. 75 for inductance 50% of Opt. X, or Opt. 76 for 33% of Opt. X.

Surge Capability



Application Note

Use the surge chart to select a model meeting the desired surge level. Pulses must not exceed peak voltage and joule ratings (derate 30% for Opt. X); average power during repetitive pulses must not exceed rated wattage. A safety factor of 30% typical is recommended for infrequent pulses, 50% typical for repetitive pulses (refer to Note R42 for derating factors attributable to pulse width, repetition rate, temperature, altitude and humidity). Verify under worst-case conditions. Depending on specifics, RAW series can often satisfy surge requirements of UL-217, -268, -294, -497, -508, -913, -943, -991, -1459, -1971, ANSI/IEEE C62.41, CCITT (Rec. K17), Bellcore TR-NWT-001089 & TR-TSY-000057, CSA C22.2-225, IEC 664, IEC 801.5, IEEE587, Can.Doc. CS-03, FCC Part 68., etc. Consult factory for assistance.

Part Number Designation

P/N DESIGNATION: RAW1/2 □ - 102 - K T □ W

INLANX Type
Options: X, S, F, ER, B (leave blank if std)
Resis. Code 1% tol: 3 signif. figures & multiplier,
e.g. R100=0.1Ω, 1R00=1Ω, 10R0=10Ω, 1000=100Ω, 1001=1K.
2%-10%: 2 signif.fig. & multiplier (R10=0.1Ω, 1R0=1Ω, 100=10Ω, 102=1K)
Tolerance: J=5% (standard), F=1%, G=2%, K=10%
Packaging: B = bulk, T = Tape & Reel
Optional TC: 20 =20ppm, 50= 50ppm (leave blank if standard)
Termination: W= RoHS (std), Q= Tin/Lead (leave blank if either is acceptable)