

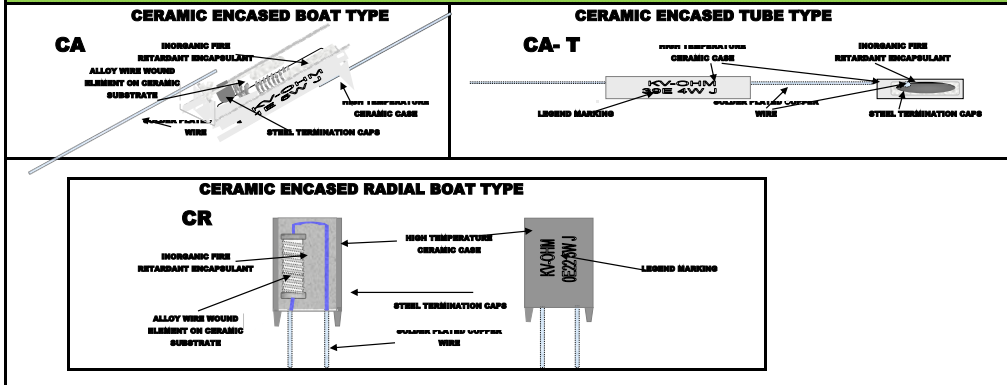
**CERAMIC ENCASED WIRE WOUND RESISTORS**

Series : **CA, CA-T / CR**

**Features:**

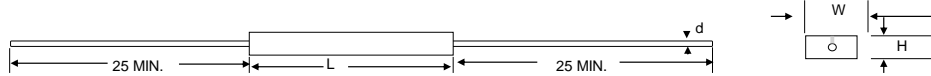
- Fully welded construction.
- Flameproof inorganic construction.
- Enhanced heat dissipation.
- Operating temperature **-55°C to -275°C.**
- MO film element utilized for higher resistance values.
- Any special design on request.
- Lead (Pb)-free solder contacts.
- **RoHS** Compliant directive 2002/95/EC

**Construction :**



**Dimensions :**

**1.0 CERAMIC ENCASED BOAT TYPE (CA)**



**Physical Data:**

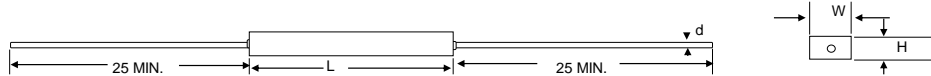
**CERAMIC ENCASED BOAT TYPE (CA) :**

TYPE	WATT. @ 70°C	TOL.	DIMENSIONS (mm)				RESISTANCE RANGE		MAX. WORKING VOLTAGE
			L	W	H	d ± 0.05	WIRE WOUND	MO	
CA3	3W	±5%	15 ± 2	7.0 ± 1.0	7.0 ± 1.0	0.75	0.1Ω ~ 50Ω	51Ω ~ 33KΩ	350 V
CA5	5W	±5%	22 ± 1.5	10 ± 1.0	8.5 ± 1.0	0.75	0.1Ω ~ 100Ω	101Ω ~ 50KΩ	350 V
CA10	10W	±5%	48 ± 1.5	10 ± 1.0	9.0 ± 1.0	0.75	0.1Ω ~ 500Ω	501Ω ~ 50KΩ	750 V
CA15	15W	±5%	48 ± 1.5	12.5 ± 1.0	12.0 ± 1.0	0.75	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ	1000 V
CA20	20W	±5%	60 ± 1.5	13 ± 1.0	13 ± 1.0	0.75	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ	1000 V

- Note :** 1.0 Working voltage is  $\sqrt{P \times R}$  where P is power & R is resistance in Ohms  
 2.0 Resistance range & tolerance other than specified is available on request.

**Dimensions :**

**2.0 CERAMIC ENCASED TUBE TYPE (CA-T)**



**Physical Data:**

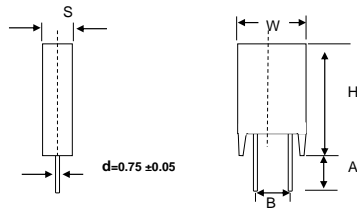
**CERAMIC ENCASED BOAT TYPE (CA) :**

TYPE	WATT. @ 70°C	TOL.	DIMENSIONS (mm)				RESISTANCE RANGES	LEAD LENGTH
			L	W	H	d ± 0.10		
CA-T2	2W	±5%	15 ± 2	7.0 ± 1.0	7.0 ± 1.0	0.80	0.01Ω ~ 2KΩ	25 min.
CA-T3	3W	±5%	15 ± 2	7.0 ± 1.0	7.0 ± 1.0	0.80	0.01Ω ~ 2KΩ	25 min.
CA-T4	4W	±5%	20 ± 2	7.0 ± 1.0	7.0 ± 1.0	0.80	0.01Ω ~ 4.7KΩ	25 min.
CA-T5	5W	±5%	25 ± 2	6.5 ± 1.0	6.5 ± 1.0	0.80	0.01Ω ~ 6.8KΩ	25 min.
CA-T10	10W	±5%	40 ± 2	9.0 ± 1.0	9.0 ± 1.0	0.80	0.01Ω ~ 10KΩ	25 min.
CA-T15	15W	±5%	50 ± 2	9.0 ± 1.0	9.0 ± 1.0	0.80	0.01Ω ~ 10KΩ	25 min.
CA-T20-Mini	20W	±5%	50 ± 2	9.0 ± 1.0	9.0 ± 1.0	0.80	0.01Ω ~ 10KΩ	25 min.
CA-T20	20W	±5%	50 ± 2	12 ± 1.0	12 ± 1.0	0.80	0.01Ω ~ 10KΩ	25 min.

- Note :** 1.0 Working voltage is  $\sqrt{P \times R}$  where P is power & R is resistance in Ohms  
 2.0 Resistance range & tolerance other than specified is available on request.

**Dimensions :**

**3.0 CERAMIC ENCASED RADIAL BOAT TYPE (CR)**



**Physical Data:**

**CERAMIC ENCASED BOAT TYPE (CA) :**

TYPE	WATT. @ 70°C	TOL. PPM/°C	DIMENSIONS (mm)					RESISTANCE RANGES	
			H	W	S	A	B	WIRE WOUND	MO
CR2	2W	±5%	20 ±1.5	11 ±1.0	7.5 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 50Ω	51Ω ~ 20KΩ
CR3	3W	±5%	25 ±1.5	12 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 50Ω	51Ω ~ 33KΩ
CR5	5W	±5%	25 ±1.5	13 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 100Ω	101Ω ~ 50KΩ
CR10	10W	±5%	51 ±1.5	13 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 500Ω	501Ω ~ 50KΩ
CR10S	10W	±5%	35 ±1.5	16 ±1.0	12 ±1.0	4.0 ±1.0	5.0 ±1.5	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ

**Note :** 1.0 Working voltage is  $\sqrt{P \times R}$  where P is power & R is resistance in Ohms

2.0 Resistance range & tolerance other than specified is available on request.

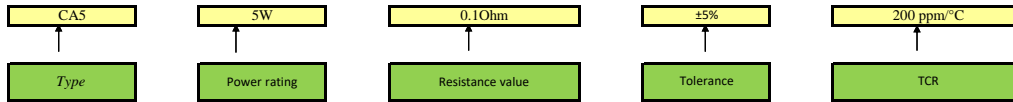
**Marking:**

The CA, CA-T & CR series / type, the nominal resistance & tolerance are marked on the resistor body using LEGEND marking

e.g. KV-OHM  
100E 5W F

**Part Numbering Information:**

Part Number : Type number, power rating, resistance value, tolerance, tcr.



Examples: PART NO. : CA5, 5W, 0.10Ohm, ±5%, 200ppm/°C

**Performance Data (Procedure & Requirements):**

TEST	PROCEDURE	REQUIREMENTS
Terminal strength	5 lbs. minimum	No visual damage $\Delta R/R$ max.: $\pm(0.50\% + 0.05 \Omega)$
Solderability Test	16 hrs steam or 16 hrs. at 155°C 2 sec. $\pm 0.5$ sec. in solder at 260° $\pm 5^\circ$ C Using flux	>95% coverage covered (good tinning) & no damage
Resistance To Soldering Heat	at 350°C for 3 sec., 2.5mm from the body	$\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Temperature Cycling	30 minutes at -55°C & 30 minutes at 150°C Total 5 number of cycles.	No visual damage $\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Dry Heat Test	16 hrs at 150°C	$\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Cold Test	2 hrs at -55°C	$\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Short Time Overload	5 X Power nominal for 5 sec. @ 25°C	$\Delta R/R$ max.: $\pm(1.0 + 0.05 \Omega)$
Endurance @ 70°C	1000 hrs. load with Pn (power nominal) 1.5 hr. ON & 0.5 hr. OFF	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Endurance @ Upper Category Temperature	1000 hrs. at 150°C with no load	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Temperature Rise Test	Horizontally mounted, loaded with Pn	Hot spot temperature less than maximum body temperature
Damp Heat Steady State	56 days, 40°C; 90 to 95% Rh; dissipation $\leq 0.01 Pn$	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Temperature Coefficient	At 25/-55/25 °C & 25/150/25 °C	Within specified limits
Insulation Resistance	V- Block method for 1 minute duration At 500 V dc	> 10 <sup>4</sup> MΩ
Voltage Proof Test	V- Block method for 1 minute duration At 500 V	No flash over or break down should be observed

**Derating Curve:**

