

Key Features**Solid Carbon Composition****Designed for Pulse Withstand****Low Cost, High Performance****Two Sizes Available****Supplied Ammo Pack in boxes of 2000****Type CBT Series**

The CBT series of resistors is constructed utilising solid carbon composition, which is the traditional medium for absorbing high energy pulses, in cases of high inrush current. These resistors have evolved over many years to have excellent pulse withstand capabilities, whilst remaining very stable. These improved characteristics have been achieved by prudent selection of materials of optimum physical properties and by advances in the manufacturing process.

Characteristics – Electrical

	CBT25				CBT50			
Power @ 70°C	0.25W (~0 @ 125°C)				0.5W (~0 @ 125°C)			
Maximum Voltage	250V				350V			
Tolerance	5%	10%	10%	20%	5%	10%	10%	20%
Selection Series	E24	E24	E12	E6	E24	E24	E12	E6
Resistance values Ω	1 - 91K	100K - 5M6	1 - 5M6		1 - 91K	100K - 22M	1 - 22M	
Limiting Element Voltage	250v				350v			
Maximum Overload Voltage	500v				700v			
Insulation Resistance	1000M minimum							
Operating Temperature	-55 ~ +125							

Climatic Category

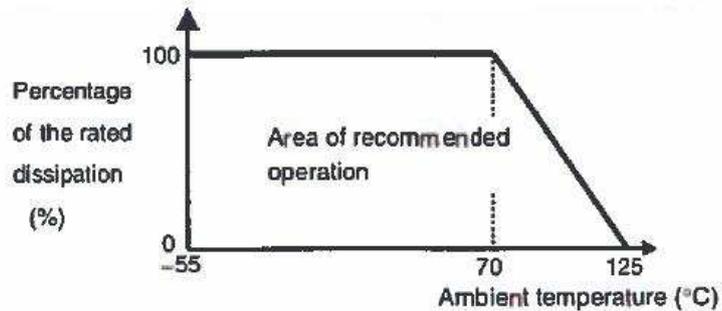
55/125/56	Lower Category Temperature	-55°C
	Upper Category Temperature	+125°C
	Damp Heat Steady State Duration	56 Days

Stability Class

10%	Limits For Change of Resistance	
	For Long Term Tests	±(10%+0.5Ω)
	For Short Term Tests	±(2%+0.1Ω)

Derating

At ambient temperatures in excess of 70°C the resistor shall be derated in accordance with the following curve:



Rated Voltage

D.C. or A.C. rms voltage calculated from the square root of the product of the rated resistance and the rated dissipation.

$$E = \sqrt{P \cdot R}$$

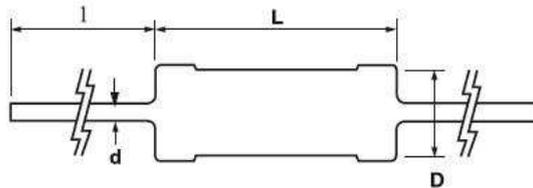
E : Rated voltage (V)

P : Rated dissipation (W)

R : Rated resistance (Ω)

Where the calculated rated voltage is higher than the limiting element voltage, the limiting element voltage must be applied.

Dimensions



	L	$\varnothing D$	l	$\varnothing d$
CBT25	6.3±0.7	2.4±0.1	30±3	0.6±0.05
CBT50	9.5 ^{+0.8} _{-0.7}	3.6±0.2	25±3	0.7 ^{+0.07} _{-0.05}

Performance Characteristics

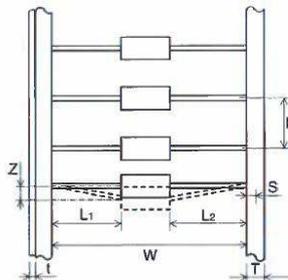
Test Item	Condition of Test (JIS C 5201-1)	Performance Requirement
Visual Examination	Sub-clause 4.4.1 Checked by visual examination	As per 4.4.1 Marking shall be legible as checked visually
Dimension	Sub-clause 4.4.2	As specified
Resistance	Sub-clause 4.5	As specified Resistance value shall correspond to the rated resistance value taking into account the specified tolerance
Voltage Proof	Sub-clause 4.7 Method: V-Block Method Test Voltage: Alternating voltage with a peak value of 1.42 times the insulation voltage. Duration 60s ±5s	No breakdown or flashover
Solderability	Sub-clause 4.17 Without ageing Method 1 (solder bath method) Bath Temperature: 235°C±5°C Immersion time: 5s ±0.5s Immersion depth: A point within about 4mm from the resistor body.	Good tinning as evidenced by free flowing of the solder with wetting of the terminations
Overload (mounted)	Sub-clause 4.13 The applied voltage shall be 2.5 times RCWV or 2 times limiting element voltage, whichever is lower. Duration: 5s Visual Examination Resistance test	No Visible Damage Legible Marking $\Delta R \leq \pm(2\% + 0.1\Omega)$
Terminal strength	Sub-clause 4.16	No visible damage $\Delta R \leq \pm(2\% + 0.1\Omega)$
Tensile	Sub-clause 4.16.2 Force: 10N Duration: 10s ±1s	
Bending	Sub-clause 4.16.3 Method 1 Bending times: 2 times Bending force: 5N	
Torsion	Sub-clause 4.16.4 Method A, Severity 2 (2 successive rotations of 180°)	

Resistance to soldering heat	Sub-clause 4.18 Method 1B Solder Temperature: CBT25: 300°C±10°C CBT50: 350°C±10°C Immersion time: 3.5s±0.5s Immersion depth: A point within 4.0±0.8mm from the resistor body.	No Visible Damage Legible marking $\Delta R \leq \pm(3\%+0.1\Omega)$
Rapid Temperature change	Sub-clause 4.19 Lower category temperature: -55°C Upper category temperature: 125°C Duration of exposure at each temperature: 30 min. Number of cycles: 5	No visible damage $\Delta R \leq \pm(2\%+0.1\Omega)$
Vibration	Sub-Clause 4.22 Endurance by sweeping Frequency range: 10Hz – 500Hz Amplitude: 0.75mm or acceleration 98m/s ² (whichever is less severe) Total Duration: 6h	No visible damage $\Delta R \leq \pm(2\%+0.1\Omega)$
Climatic sequence	Sub-clause 4.23	No Visible Damage Legible marking $\Delta R \leq \pm(10\%+0.5\Omega)$ Insulation Resistance: $R \geq 100 \text{ M}\Omega$
Dry Heat	Sub-clause 4.23.2 Test temperature: 125°C Duration 16h	
Damp Heat, cycle (12 + 12h cycle First Cycle)	Sub-clause 4.23.3 Test Method: 2 Test temperature: 55°C (Severity (2))	
Cold	Sub-clause 4.23.4 Test temperature: -55°C Duration: 2h	
Low air pressure	8kPa	
Damp heat, cycle (12 + 12h cycle) Remaining cycle	Sub-clause 4.23.6 Test method: 2 Test temperature: 55°C (Severity (2)) Number of cycles: 5	
D.C. load	Sub-clause 4.23.7 The applied voltage shall be the rated voltage or the limiting element voltage, whichever is smaller. Duration: 1 min.	
Endurance @ 70°C	Sub-clause 4.25.1 Ambient temperature: 70°C±2°C Duration: 1000h Voltage applied 1.5h on and 0.5h off The applied voltage shall be the rated voltage or the limiting element voltage, whichever is smaller Examination at 48h, 500h and 1000h	

Variation of Resistance with Temperature	Sub-clause 4.8 -55°C / +20°C +20°C / +125°C	At -55°C	
		Resistance Range	Temp. Coefficient
		R≤1KΩ	+6.5-0(%)
		R≤10KΩ	+10-0(%)
		R≤100KΩ	+13-0(%)
		R≤1MΩ	+15-0(%)
		R>1MΩ	+20-0%
		At +125°C	
		Resistance Range	Temp. Coefficient
		R≤1KΩ	+1-5(%)
		R≤10KΩ	0-6(%)
R≤100KΩ	0-7.5(%)		
R≤1MΩ	0-10(%)		
R>1MΩ	0-15(%)		
Damp Heat, Steady State	Sub-clause 4.24 Ambient Temperature: 40°C±2°C Relative Humidity: 93 ⁺² / ₋₃ % a) 1 st group: without voltage applied b) 2 nd group: DC voltage applied continuously in accordance with sub-clause 4.24.2.1b c) 3 rd group: DC voltage – 20v±2v shall be applied continuously.	No Visible Damage Legible marking ΔR≤±(10%+0.5Ω) Insulation resistance ≥100MΩ	
Endurance at upper category temperature	Sub-clause 4.25.3 Ambient temperature: 125°C±2°C Duration: 1000h Examination at 48h, 500h and 1000h Visual examination Resistance At 1000h only: Insulation Resistance	No Visible Damage ΔR≤±(10%+0.5Ω) Insulation Resistance ≥1GΩ	

Packaging

Taping in accordance with JIS C 0806-1:1999



	W	P	L ₁ - L ₂	Z	S	T	t
CBT25	52.4	+1.6	1.0 max	1.0 max	3.2 min	6.0±0.5	0.5 max
CBT50	-1.4	5.08±0.38					

Packaging

Notes:

The direction of the color codes should be unified.

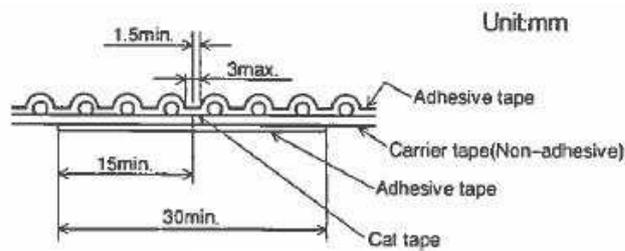
No component shall be missed.

Wire leads shall be free from kinks and bends.

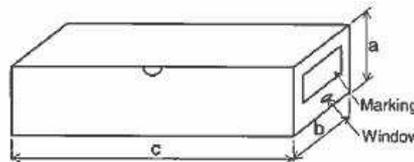
Pitch tolerance is 2mm for 20 pitches (100±2mm).

The edge waving on tape shall not be more than ±1.0mm through a length of 300mm.

The reinforcement of the tape cutting should be reinforced by a new tape (30mm min) in 3mm limits and ensuring 1 pitch dimension as shown below.



Tape in Box (Ammo Pack)



	Code	Qty per Box	a	b	C
CBT25	No Code	2000	60±5	75±5	275±5
CBT50		2000	65±5	75±5	455±5

How To Order

CBT	25	J	10K
Common Part	Size	Tolerance	Resistance Value
CBT – Carbon Composition Resistor	25 – 0.25W 50 – 0.5W	J – 5% K – 10% M – 20%	1Ω - 1R0 100Ω - 100R 1000Ω (1KΩ) - 1K0 100000Ω (100KΩ) - 100K 1000000Ω (1MΩ) - 1M0

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[CFR0W4J0242A10](#) [CFR0W4J0391A50](#) [CFR0W4J0303A50](#) [CFR0W4J0433A50](#) [CFR03SJ0753AA0](#) [CFR03SJ0470AA0](#) [CF1/6W-20K±5%](#)
[T52](#) [CF1/4W-43±5% T52](#) [CFR01SJ0433A10](#) [RD50T5151J](#) [RD 1/8W 33K J T/B A1](#) [RD 2WS 3K6 J T/B A1](#)