

Key Features

Solid Carbon Composition

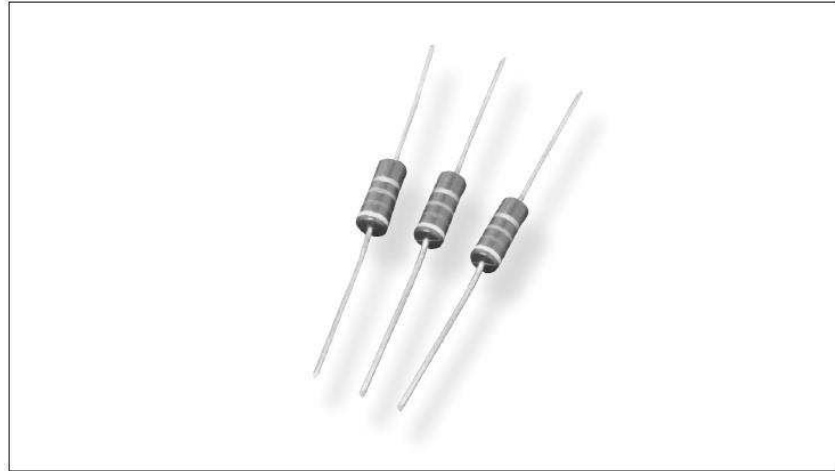
Designed for Pulse Withstand

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

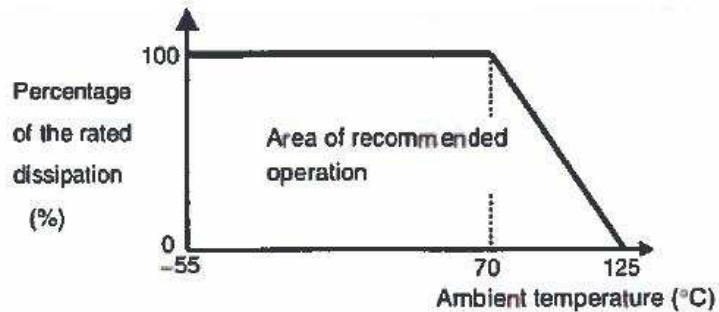
| | | |
|-----------|---------------------------------|---------|
| 55/125/56 | Lower Category Temperature | -55°C |
| | Upper Category Temperature | +125°C |
| | Damp Heat Steady State Duration | 56 Days |

Stability Class

| | | |
|-----|---------------------------------|-----------------------|
| 10% | Limits For Change of Resistance | |
| | For Long Term Tests | $\pm(10\%+0.5\Omega)$ |
| | For Short Term Tests | $\pm(2\%+0.1\Omega)$ |

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.

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

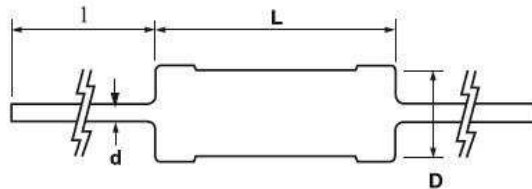
E : Rated voltage (V)

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

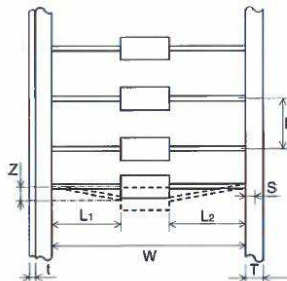
| Test Item | Condition of Test (JIS C 5201-1) | Performance Requirement |
|--------------------|---|---|
| Visual Examination | Sub-clause 4.4.1 Checked by visual examination | As per 4.4.1 Marking shall be legible as checked visually |
| Dimension | Sub-clause 4.4.2 | As specified |
| Resistance | 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 \pm 5s | No breakdown or flashover |
| Solderability | Sub-clause 4.17 Without ageing Method 1 (solder bath method) Bath Temperature: 235°C \pm 5°C Immersion time: 5s \pm 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 \pm 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.

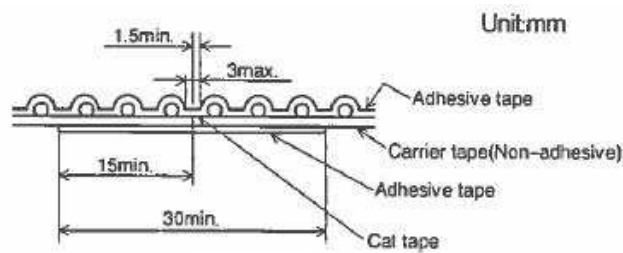
No component shall be missed.

Wire leads shall be free from kinks and bends.

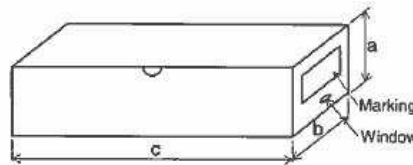
Pitch tolerance is 2mm for 20 pitches (100±2mm).

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 |