Approval Sheet

for

Carbon Film Resistors
Non-Inductive

NCR series

±5%, ±10%

YAGEO CORPORATION

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Rev.	Description	Issue Date	Drawn	Approved
00	issue new spec.	Jul 16, 2007	Sara Lin	Joyce Chung

Description	Carbon Film Resistors, Non-Inductive Type		
Series	NCR	Rev.	00

1. PRODUCT:

Non-Inductive CARBON FILM RESISTORS

(Normal & Miniature Style)

Gray body color for Normal Size

Pink body color for Miniature Size

Inductance is $<1\mu H$

2. PART NUMBER:

Part number of the Non-Inductive flame-proof type carbon film resistor is identified by the name, power, tolerance, packing, temperature coefficient, special type and resistance value.

Example：

NCR	-50	K	T	-	52-	10K
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Series Name	Power Rating	Resistance Tolerance	Packing Style	Temperature Coefficient of Resistance	Special Type	Resistance Value

(1) Style：NCR SERIES

(2) Power Rating： -25=1/4W、50S=1/2W、-50=1/2W、1WS=1W、100=1W、2WS=2W、200=2W 、3WS=3W

(3) Tolerance： J = ±5% , K = ±10%

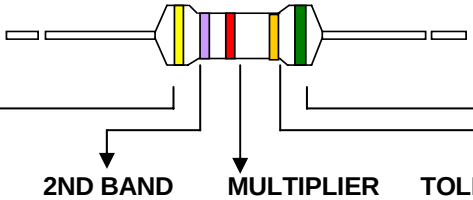
(4) Packaging Type： R＝Paper Taping Reel
T＝Tape on Box Packing
B＝Bulk Packing

(5) Temperature Coefficient : see table 1

(6) Special Type： 26- = 26mm
52- = 52.4mm
73- = 73mm
M = M-Type forming for Bulk
PN = PANAsert (rated watts -25 & 50s & -50 & 1ws size only)
AV = Avlsert (rated watts -25 & 50s & -50 & 1ws size only)
FT = M-Type forming for taping (rated watts -25 & 50s & -50 & 1ws size only)

(7) Resistance Value：E24 Series

3. BAND-CODE:



COLOR	1ST BAND	2ND BAND	MULTIPLIER	TOLERANCE	
BLACK	0	0	1Ω		
BROWN	1	1	10Ω		
RED	2	2	100Ω		
ORANGE	3	3	1KΩ		
YELLOW	4	4	10KΩ		
GREEN	5	5	100KΩ		Non Inductance
BLUE	6	6	1MΩ		
VIOLET	7	7	10MΩ		
GREY	8	8			
WHITE	9	9			
GOLD			0.1Ω	± 5 % (J)	
SILVER			0.01Ω	± 10 % (K)	

4. ELECTRICAL CHARACTERISTICS

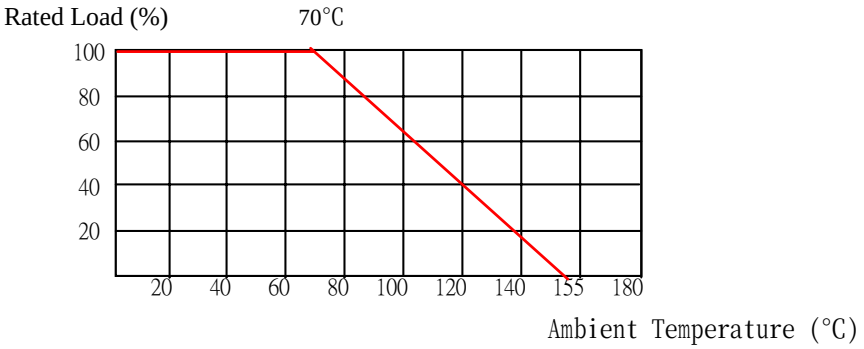
STYLE	NCR-25	NCR50S	NCR-50	NCR1WS	NCR100	NCR2WS	NCR200	NCR3WS
Power Rating at 70 ℃	1/4W	1/2W		1W		2W		3W
Maximum Working Voltage	250V	300V	350V	400V	500V			
Maximum Overload Voltage	500V	600V	700V	800V	1000V			
Dielectric Withstanding Voltage	500V		700V		1000V			
Resistance Range	2.2Ω~5KΩ for E24 series value							
Operating Temp. Range	- 55 ℃ to + 155 ℃							
Temperature Coefficient	see Table. 1							

∗ Below or over this resistance range on request.

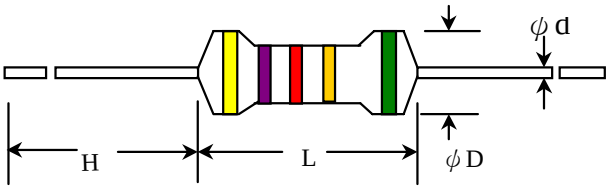
TABLE 1 TEMPERATURE COEFFICIENT

Value Range	Max. Value of Temp. Coefficient ppm/℃
Under 5KΩ	- 500
5K ~ 10KΩ	-800

5. DERATING CURVE



6. DIMENSIONS



STYLE		DIMENSION			
Normal	Miniature	L	ϕ D	H	ϕ d
NCR-25	NCR50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05
NCR-50	NCR1WS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05
NCR100	NCR2WS	11.5±1.0	4.5±0.5	35±2.0	0.8±0.05
NCR200	NCR3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05

7. ENVIRONMENTAL CHARACTERISTICS

(1) Short Time Over Load Test

At 2.5 times of the rated voltage applied for 5 seconds, the resistor should be free from defects after the resistor is released from load for about 30 minutes

Short Time Overload Voltage = $2.5 * \sqrt{\text{Power Rating} \times \text{Resistance Value}}$

The change of the resistance value should be within ± 0.75 % + 0.05Ω (Normal Style)
The change of the resistance value should be within ± 2.0 % + 0.05Ω (Miniature Style)

(2) Dielectric Withstanding Voltage

The resistor is placed on the metal V Block. Apply a Table I dielectric withstanding between the terminals connected together with the block for about 60 seconds.
The resistor shall be able to withstand without breakdown or flashover.

(3) Temperature Coefficient Test

Test of resistors above room temperature 100°C ± 2°C (Testing Temperature 115°C to 130°C) at the constant temperature silicon plate for over 5 minutes. Then measure the resistance value.
The Temperature Coefficient is calculated by the following equation and its value should be within the range of requested.

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

R = Resistance value under the testing temperature
R0 = Resistance value at the room temperature
t = The testing temperature
t_o = Room temperature

(4) Insulation Resistance

Apply test terminal on lead and resistor body.
The test resistance should be high than 1,000M ohm.

(5) Solderability

Immerse the specimen into the solder pot at 260 ± 5 °C for 5 ± 0.5 seconds.
At least 95% solder coverage on the termination.

(6) Resistance to Solvent

The specimen into the appropriate solvent of IPA condition of ultrasonic machine for 1 minutes.
The specimen is no deterioration of coatings and color code.

(7) Terminal Strength

Direct Load – Resistors shall be held by one terminal and the load shall be gradually applied in the direction of the longitudinal axis of the resistor unit the applied load reacheds 5 pounds。
The load shall be held for 10 seconds. The load of weight shall be ≧ 2.5 kg (24.5N).

(8) Pulse Overload

Apply 4 times of rated voltage to the specimen at the 1 second on and 25 seconds off cycle, subjected to voltage application cycles specified in 10,000 time。
The change of the resistance value shall be within ± 1.0% + 0.05 Ω

(9) Load Life in Humidity

Place the specimen in a test chamber at 40 ± 2 °C and 90 ~ 95 % relative humidity. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1,000 hours
The change of the resistance value shall be within ± 3 % + 0.05 Ω

(10) Load Life Test

Placed in the constant temperature chamber of 70 ± 3 °C the resistor shall be connected to the lead wire at the point of 25mm. Length with each terminal, the resistors shall be arranged not much effected mutually by the temperature of the resistors and the excessive ventilation shall not be performed, for 90 minutes on and 30 minutes off under this condition the rated D.C. voltage is applied continuously for 1000+48/-0 hours then left at no-load for 1hour, measured at this time the resistance value。
The change of the resistance value shall be within ± 3 % + 0.05 Ω.
There shall be no remarkable change in the appearance and the color code shall be legible after the test.

(11) Temperature Cycling Test

The temperature cycle shown in the following table shall be repeated 5 times consecutively. The measurement of the resistance value is done before the first cycle and after ending the fifth cycle, leaving in the room temperature for about 1 hour ◦

Temperature Cycling Conditions:

Step	Temperature(°C)	Time (minute)
1	-55 ± 3	30
2	25 ± 3	2 ~3
3	155 ± 3	30
4	25 ± 3	2 ~3

The change of the resistance value shall be within ± 1.0 % + 0.05 Ω
After the test the resistor shall be free from the electrical or mechanical damage.

(12) Resistance to Soldering Heat

The terminal lead shall be dipped into the solder pot at 350 ± 10 °C for 3 ± 0.5 seconds up to 2 ~ 2.5 mm.
The change of the resistance value shall be within ± 1.0 % + 0.05 Ω

(13) Overload Flame Retardant

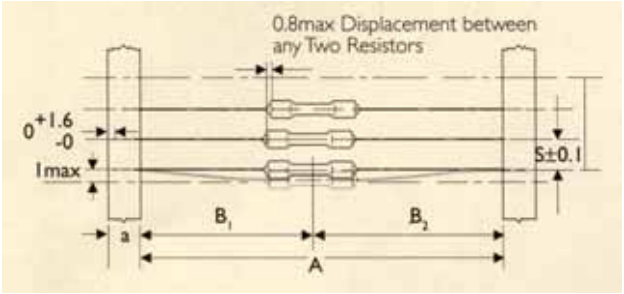
At 4 times of the rated voltage applied for 1 minute

Overload Test Voltage = $4 * \sqrt{\text{Power Rating} \times \text{Resistance Value}}$

The resistor shall be able to no evidence of flaming arcing.

8. PACKING METHODS

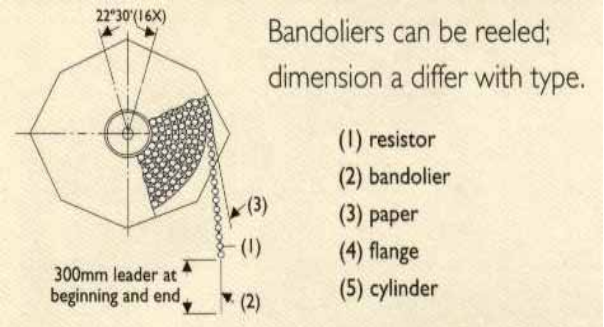
Bandolier for Axial leads

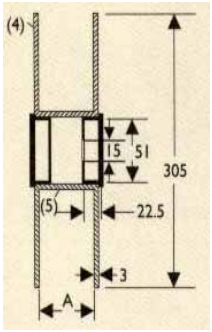


STYLE DIMENIONS Unit: ： mm

Normal	Miniature	a	A	B1-B2	S (spacing)	T (max. deviation of spacing)
NCR-25	NCR50S	6 ± 0.5	52.4 ± 1.0	1.2	5	1 mm per 10 spacing
			26.0 ± 1.0	1.0		
NCR-50	NCR1WS	6 ± 0.5	52.4 ± 1.0	1.2	5	0.5 mm per 5 spacing
NCR100	NCR2WS	6 ± 0.5	73.0 ± 1.5	1.5	5	
			52.4 ± 1.0	1.2		
NCR200	NCR3WS	6 ± 0.5	73.0 ± 1.5	1.5	10	
			52.4 ± 1.0	1.2		

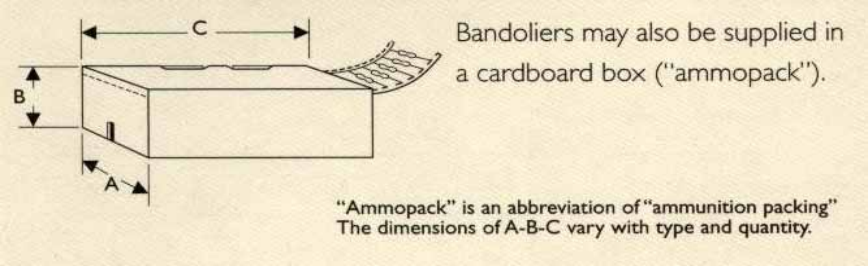
9. TAPE ON REEL PACKING





STYLE		TAPE ON REEL	
Normal	Miniature	ACROSS FLANGE (A)	Qty per reel
NCR-25	NCR50S	72	5,000
NCR-50	NCR1WS	72	2,500
NCR100	NCR2WS	95	2,000
NCR200	NCR3WS	95	1,000

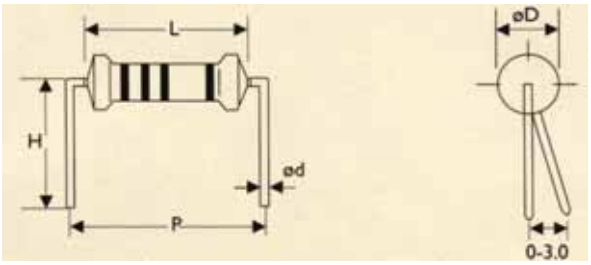
10. TAPE ON BOX PACKING



STYLE		Standard Lead Length			Short Lead Length			Qty per box
Normal	Miniature	W (A)	H (B)	L (C)	W (A)	H (B)	L (C)	
NCR-25	NCR50S	81	104	260	48	102	255	5,000
NCR-50	NCR1WS	73	45	258	—	—	—	1,000
NCR100	NCR2WS	103	78	260	81	91	260	1,000
NCR200	NCR3WS	103	94	260	81	91	260	1,000

11. SPECIAL TYPE (FORMING DIMENSIONS)

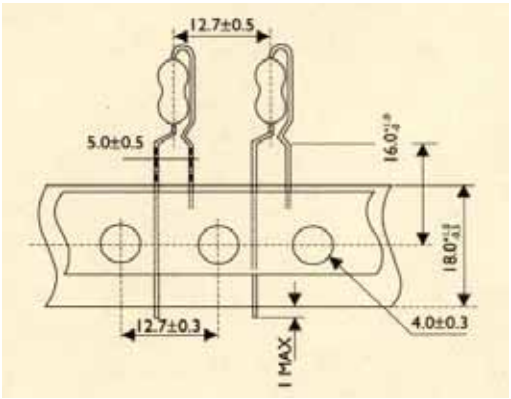
M TYPE



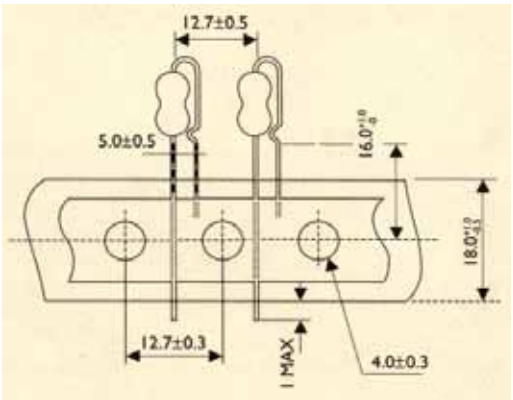
STYLE DIMENSIONS UNIT : mm

Normal	Miniature	L	ϕ D	ϕ d	P	H
NCR-25	NCR50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
NCR-50	NCR1WS	9.0 ± 0.5	3.3 ± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1
NCR100	NCR2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1
NCR200		15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1

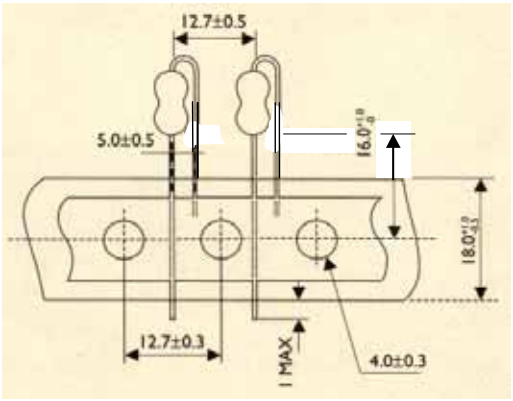
PN Type Forming for Taping (rated watts -25 & 50s & -50 & 1ws size only)



AV Type Forming for Taping (rated watts -25 & 50s & -50 & 1ws size only)



FT Type Forming for Taping (rated watts -25 & 50s & -50 & 1ws size only)



12. Plant Address

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