Precision Metal Film Resistors

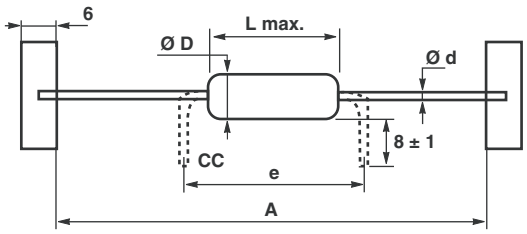
FEATURES

- 0.063 W to 0.5 W at 70 °C
- According to CECC 40101
- Wide ohmic range from 1 Ω to 4.7 MΩ
- Good initial precision up to ± 0.1 %
- Operating temperatures:
  - 55 °C to + 155 °C for TCR ≥ 25 ppm/°C
  - 25 °C to + 85 °C for TCR ≤ 15 ppm/°C
- Epoxy coating
- Termination: Pure matt tin
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

DIMENSIONS in millimeters



TYPE	Ø D max.	L max.	A ± 1	Ø d	CC e	WEIGHT in g
N.. 3..	1.8	3.9	53	0.5	5.08	0.15
N.. 4..	2.5	6.2	53	0.6	NA	0.3
N.. 5..	3.3	8.7	53	0.6	NA	0.5

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE Ω	RATED POWER $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C
NT3S	10 to 200K	0.125	200	0.1, 0.25, 0.5, 1	15
NP3S	10 to 511K	0.250	200	0.1, 0.25, 0.5, 1	25
NY3	1 to 1.5M	0.250	200	0.5, 1	50
NK3	1 to 1.5M	0.250	200	2, 5	100
NT4S	10 to 499K	0.250	350	0.1, 0.25, 0.5, 1	15
NP4S	10 to 1M	0.500	350	0.1, 0.25, 0.5, 1	25
NY4	10 to 3.32M	0.500	350	0.1, 0.25, 0.5, 1	50
NK4	10 to 3.3M	0.500	350	2, 5	100
NT5S	10 to 499K	0.500	350	0.1, 0.25, 0.5, 1	15
NP5S	10 to 1M	0.500	350	0.1, 0.25, 0.5, 1	25
NY5	2.67 to 4.7M	0.500	350	0.1, 0.25, 0.5, 1	50
NK5	2.7 to 4.M	0.500	350	2, 5	100

TECHNICAL SPECIFICATIONS

MODEL			NT3S	NP3S	NY3	NK3	NT4S	NP4S	NY4	NK4	NT5S	NP5S	NY5	NK5
Power Rating, P_r at + 70 °C			0.125 W	0.25 W			0.25 W	0.5 W			0.5 W			
Stability Class			1 %			2 %	1 %			2 %	1 %			2 %
Preferred Standard Ohmic Values Series			E192 for 0.1 %/0.25 %/0.5 % E96 for 1 %			E24	E192 for 0.1 %/0.25 %/0.5 % E96 for 1 %			E24	E192 for 0.1 %/0.25 %/0.5 % E96 for 1 %			E24
Ohmic Value Range in Relation to: Temperature Coefficient, TCR/ Tolerance	± 15 ppm/°C (1)	± 0.1 %	100 Ω	-	-	-	49.9 Ω	-	-	-	100 Ω	-	-	-
		± 0.25 %	200 kΩ				499 kΩ				499 kΩ			
		± 0.5 %	10 Ω	-	-	-	10 Ω	-	-	-	10 Ω	-	-	-
		± 1 %	200 kΩ				499 kΩ				499 kΩ			
	± 25 ppm/°C (2)	± 0.1 %	-	100 Ω	-	-	-	10 Ω	-	-	-	100 Ω	-	-
		± 0.25 %		511 kΩ				1 MΩ				1 MΩ		
		± 0.5 %	-	10 Ω	-	-	-	10 Ω	-	-	-	10 Ω	-	-
		± 1 %		511 kΩ				1 MΩ				1 MΩ		
	± 50 ppm/°C (2)	± 0.1 %	-	-	-	-	-	-	10 Ω	-	-	-	10 Ω	-
		± 0.25 %							1 MΩ				1 MΩ	
		± 0.5 %	-	-	10 Ω	-	-	-	10 Ω	-	-	-	10 Ω	-
					1.5 MΩ				3.32 MΩ				4.7 MΩ	
		± 1 %	-	-	1 Ω	-	-	-	10 Ω	-	-	-	2.67 Ω	-
					1.5 MΩ				3.32 MΩ				4.7 MΩ	
	± 100 ppm/°C (2)	± 2 %	-	-	-	1 Ω	-	-	-	10 Ω	-	-	-	2.7 Ω
		± 5 %				1.5 MΩ				3.3 MΩ				4.7 MΩ
Limiting Element Voltage $U_{max.\ RMS}$			200 V				350 V				350 V			
Critical Resistance			-	-	160 kΩ		490 kΩ	245 kΩ			245 kΩ			
Thermal Resistance			170 °C/W				145 °C/W				110 °C/W			

Notes

(1) TCR requirement for temperature between - 25 °C and + 85 °C

(2) TCR requirement for temperature between - 55 °C and + 125 °C

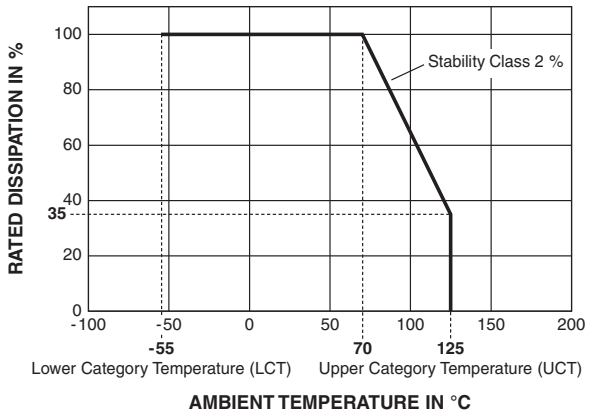
ENVIRONMENTAL SPECIFICATIONS

MODEL	NT3S	NP3S	NY3	NK3	NT4S	NP4S	NY4	NK4	NT5S	NP5S	NY5	NK5
Temperature Range	- 25 °C to + 85 °C	- 55 °C to + 155 °C			- 25 °C to + 85 °C	- 55 °C to + 155 °C			- 25 °C to + 85 °C	- 55 °C to + 155 °C		
Climatic Category (LCT/UCT/days)	-	55/125/56			-	55/125/56			-	55/125/56		

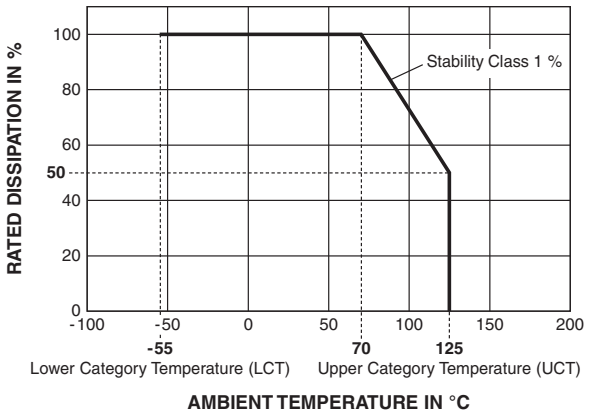
PERFORMANCE					
TEST		CONDITIONS	REQUIREMENTS		TYPICAL DRIFT
			STABILITY CLASS 1 CECC 40101-002/803	STABILITY CLASS 2 CECC 40101-001/802	
Short Time Overload		IEC 60115-1 6.25 P_r or 2 $U_{max.}$, 1 s for 0.063 W/5 s for ≥ 0.125 W	± (0.25 % + 0.05 Ω)	± (0.5 % + 0.05 Ω)	≤ ± 0.05 %
Load Life		IEC 60115-1 90'/30' cycles, 1000 h at P_r/70 °C	± (1 % + 0.05 Ω)	± (2 % + 0.1 Ω)	≤ ± 0.25 %
Load Life at Maximum Category Temperature		IEC 60115-1 90'/30' cycles, 1000 h at derated P_r/125 °C	± (1 % + 0.05 Ω)	± (2 % + 0.1 Ω)	≤ ± 0.25 %
		IEC 60115-1 1000 h at 155 °C	-	-	
Sheft Life		1 year at ambient temperature	-	-	≤ ± 0.1 %
Seq. A1	Robustness of Terminations	IEC 60115-1, IEC 60068-2-21 Test Ua1: Traction 10 N/10 s Test U_b: Bending + 90° → - 90° → 0° with 5 N Test U_c: Twisting 2 times at 180°	± (0.25 % + 0.05 Ω)	± (0.5 % + 0.05 Ω)	≤ ± 0.1 %
Seq. A2	Resistance to Soldering Heat	IEC 60115-1 IEC 60068-2-20 Test Tb Method 1: Solder bath 260 °C/10 s	± (0.25 % + 0.05 Ω)	± (0.5 % + 0.05 Ω)	≤ ± 0.05 %
Seq. B1	Rapid Change of Temperature	IEC 60115-1, IEC 60068-2-14 Test Na 5 cycles (30' at LCT/30' at UCT), - 55 °C/125 °C	± (0.25 % + 0.05 Ω)	± (0.5 % + 0.05 Ω)	≤ ± 0.05 %
Seq. B2	Vibration	IEC 60115-1, IEC 60068-2-6 Test Fc 10 Hz/500 Hz	± (0.25 % + 0.05 Ω)	± (0.5 % + 0.05 Ω)	≤ ± 0.1 %
Seq. A + B	Climatic Sequence	IEC 60115-1 1. Dry heat at 125 °C/16 h (IEC 60068-2-2) 2. Damp heat 55 °C/24 h (IEC 60068-2-30 Test Db) 3. Cold at - 55 °C/2 h (IEC 60068-2-1 Test Aa) 4. Low pressure 25 °C/1 h (IEC 60068-2-13) 5. Damp heat 55 °C/120 h (IEC 60068-2-30 Test Db)	± (1 % + 0.05 Ω)	± (2 % + 0.1 Ω)	≤ ± 0.25 %
Damp Heat, Steady State		IEC 60115-1, IEC 60068-2-78 40 °C/93 % RH/56 days	± (1 % + 0.05 Ω)	± (2 % + 0.1 Ω)	≤ ± 0.5 %

POWER RATING CHARTS

CECC 40101-001/40101-802 NK3/NK4/NK5

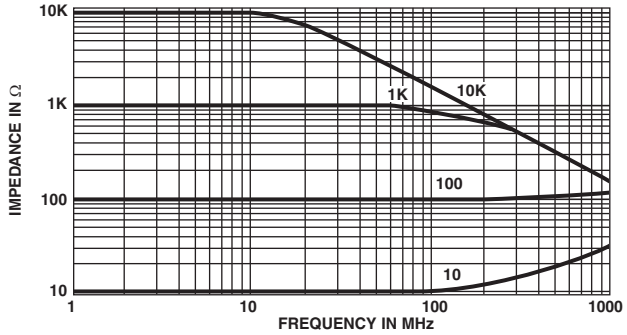


CECC 40101-002/40101-803 NY3/NY4/NP4S/NY5

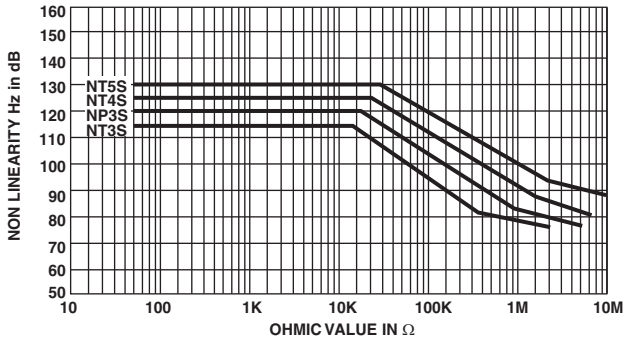


HIGH FREQUENCY

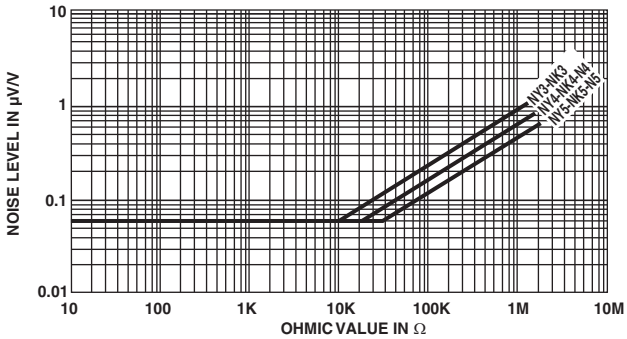
Typical behavior for NK4



THIRD HARMONIC

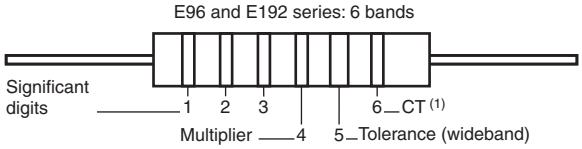


NOISE



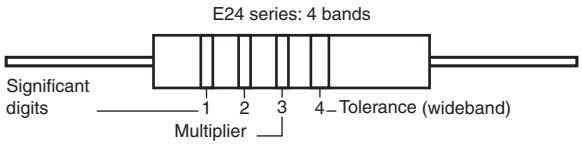
MARKING

Resistor color code chart 6, 5, or 4 bands.



Note

(1) Only for TCR ≤ 25 ppm/°C



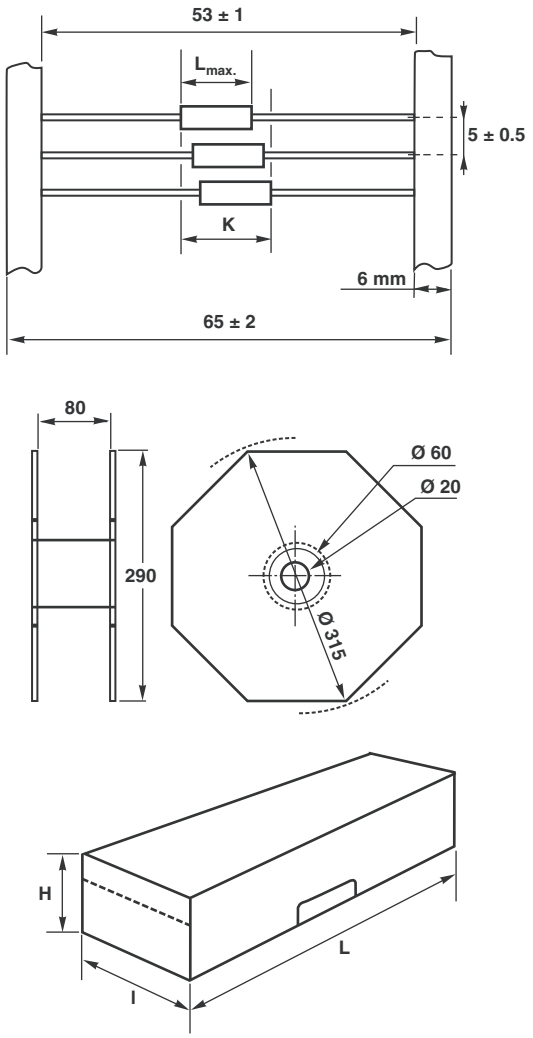
COLOR	DIGIT.	MULTIP.	TOL %	CT ppm/°C
Black	0	1		
Brown	1	10	1	
Red	2	10^2	2	
Orange	3	10^3		± 15
Yellow	4	10^4		± 25
Green	5	10^5	0.5	
Blue	6	10^6	0.25	± 10
Purple	7	10^7	0.1	± 5
Grey	8	10^8		
White	9	10^9		
Silver		10^{-2}		
Gold		10^{-1}	5	

TAPE IN REEL	
SERIES AND MODEL	**QUANTITY PER REEL**
NT4S/NP4S	5000
NK4/NY4	5000
SL3	5000
SL4	5000

TAPED IN AMMOPACK		
SERIES AND MODEL	**QUANTITY PER BOX**	**BOX DIMENSIONS L × I × H (mm)**
NT3S/NP3S	500	260 x 80 x 26
NY3	500	
NK3/SL3	1000	
NT4S/NP4S	500	
NY4	500	
NK4/SL4	1000	260 x 80 x 37
NT5S/NP5S	500	260 x 85 x 28
NK5	500	

TAPED IN BAG		
SERIES AND MODEL	**QUANTITY PER BAG**	**BOX DIMENSIONS (mm)**
NP3S/NT3S	100	85 x 140
NP4S/NT4S		
NP5S/NT5S		
NY3 CC/NK3 CC	500	

PACKAGING



The resistors are required to be inside a window which is the K dimension.

K being equal to the maximum body length of the resistor + 1.4 mm and being centered as per IEC 60286-1 and EIA-296 specification to the tape edges.

ORDERING INFORMATION					
T3	**XXX**	**100 kΩ**	**1 %**	**AM1000**	**e3**
MODEL	CUSTOM DESIGN	OHMIC VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE

GLOBAL PART NUMBER INFORMATION

N	Y	3		1	0	0	0	2	F	A	2	2

GLOBAL MODEL	SIZE	SPECIAL	OHMIC VALUE	TOLERANCE	PACKAGING
NY (50 ppm) **NK** (100 ppm) **NT** (15 ppm) **NP** (25 ppm)	**3** **4** **5**	As applicable. Contact us.	The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. **10002** = 100 kΩ **33001** = 33 kΩ **220R0** = 220 Ω **1R220** = 1.22 Ω	**B** = 0.1 % **C** = 0.25 % **D** = 0.5 % **F** = 1.0 % **G** = 2.0 % **J** = 5.0 %	AM500 = **A20** AM1000 = **A22** BA100 = **S14** BA500 = **S22** TR5000 = **R26**

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