

## 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT


DIMENSIONS in millimeters							
	TYPE	Ø D max.	L max.	A ± 1	Ø d	CC <sub>e</sub>	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 <sub>70 °C</sub> 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 <sup>(1)</sup>	± 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 <sup>(2)</sup>	± 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 <sup>(2)</sup>	± 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	-
	± 100 ppm/°C <sup>(2)</sup>	± 1 %	-	-	1 Ω	-	-	-	10 Ω	-	-	-	2.67 Ω	-
					1.5 MΩ	-	-	-	3.32 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

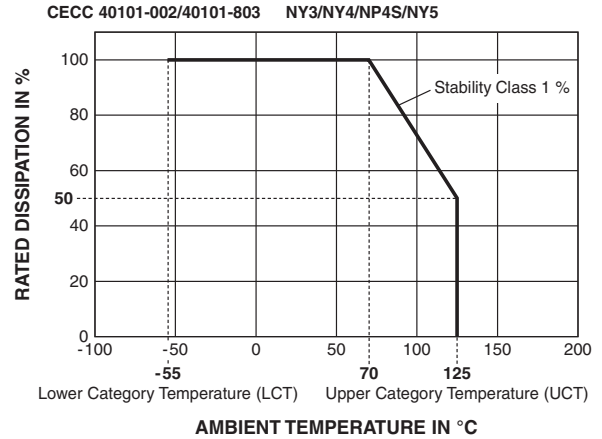
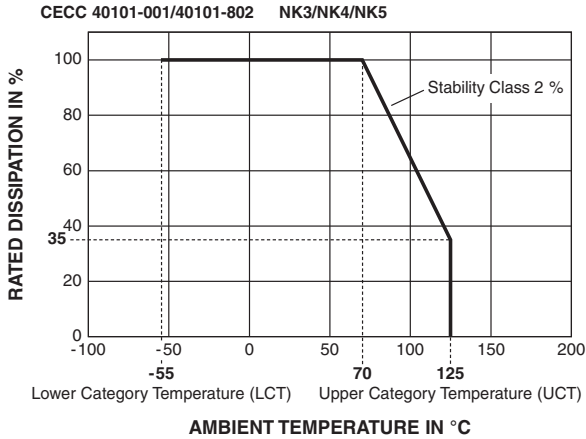
ENVIRONMENTAL SPECIFICATIONS												
MODEL	NT3S	NP3S	NY3	NK3	NT4S	NP4S	NY4	NK4	NT5S	NP5S	NY5	NK5
Temperature Range	- 25 °C to + 85 °C	- 55 °C to + 155 °C			- 25 °C to + 85 °C	- 55 °C to + 155 °C			- 25 °C to + 85 °C	- 55 °C to + 155 °C		
Climatic Category (LCT/UCT/days)	-	55/125/56			-	55/125/56			-	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 $P_T$ or 2 $U_{max}$ , 1 s for 0.063 W/5 s for $\geq 0.125$ W	$\pm (0.25 \% + 0.05 \Omega)$	$\pm (0.5 \% + 0.05 \Omega)$	$\leq \pm 0.05 \%$
Load Life		IEC 60115-1 90'/30' cycles, 1000 h at $P_T/70$ °C	$\pm (1 \% + 0.05 \Omega)$	$\pm (2 \% + 0.1 \Omega)$	$\leq \pm 0.25 \%$
Load Life at Maximum Category Temperature		IEC 60115-1 90'/30' cycles, 1000 h at derated $P_T/125$ °C	$\pm (1 \% + 0.05 \Omega)$	$\pm (2 \% + 0.1 \Omega)$	$\leq \pm 0.25 \%$
		IEC 60115-1 1000 h at 155 °C	-	-	
Sheft Life		1 year at ambient temperature	-	-	$\leq \pm 0.1 \%$
Seq. A1	Robustness of Terminations	IEC 60115-1, IEC 60068-2-21 Test Ua1: Traction 10 N/10 s Test Ub: Bending + 90° → - 90° → 0° with 5 N Test Uc: Twisting 2 times at 180°	$\pm (0.25 \% + 0.05 \Omega)$	$\pm (0.5 \% + 0.05 \Omega)$	$\leq \pm 0.1 \%$
Seq. A2	Resistance to Soldering Heat	IEC 60115-1 IEC 60068-2-20 Test Tb Method 1: Solder bath 260 °C/10 s	$\pm (0.25 \% + 0.05 \Omega)$	$\pm (0.5 \% + 0.05 \Omega)$	$\leq \pm 0.05 \%$
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	$\pm (0.25 \% + 0.05 \Omega)$	$\pm (0.5 \% + 0.05 \Omega)$	$\leq \pm 0.05 \%$
Seq. B2	Vibration	IEC 60115-1, IEC 60068-2-6 Test Fc 10 Hz/500 Hz	$\pm (0.25 \% + 0.05 \Omega)$	$\pm (0.5 \% + 0.05 \Omega)$	$\leq \pm 0.1 \%$
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)	$\pm (1 \% + 0.05 \Omega)$	$\pm (2 \% + 0.1 \Omega)$	$\leq \pm 0.25 \%$
Damp Heat, Steady State		IEC 60115-1, IEC 60068-2-78 40 °C/93 % RH/56 days	$\pm (1 \% + 0.05 \Omega)$	$\pm (2 \% + 0.1 \Omega)$	$\leq \pm 0.5 \%$

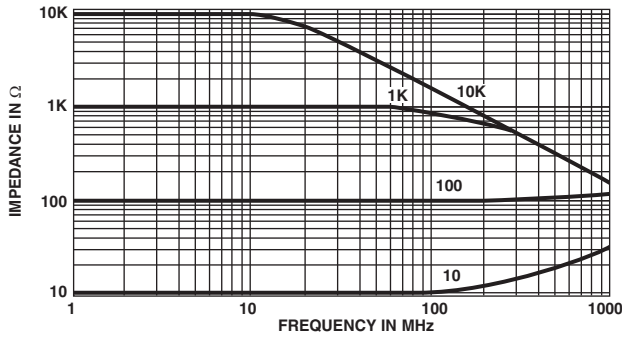


**POWER RATING CHARTS**

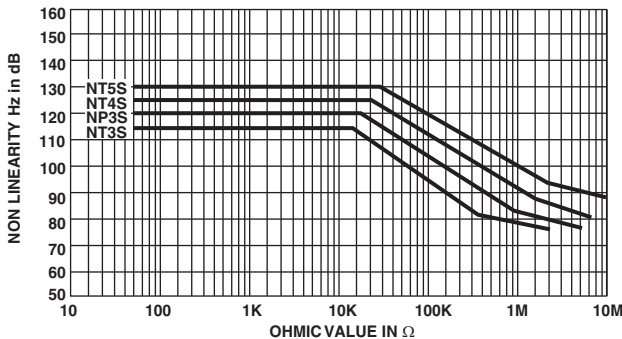


**HIGH FREQUENCY**

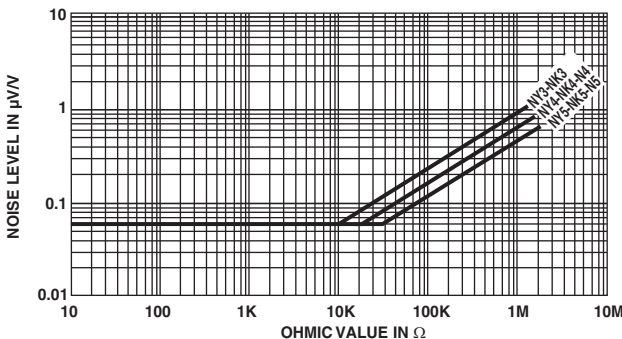
Typical behavior for NK4



**THIRD HARMONIC**

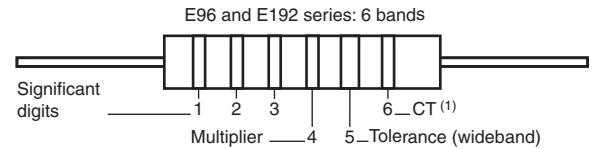


**NOISE**



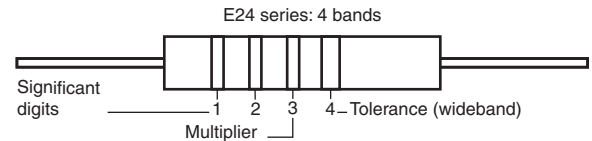
**MARKING**

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



**Note**

(1) Only for TCR ≤ 25 ppm/°C

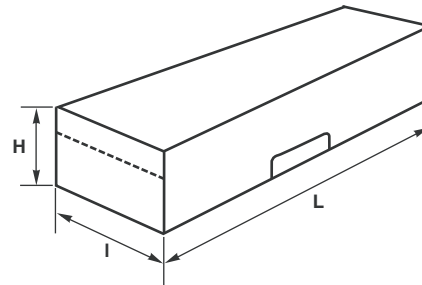
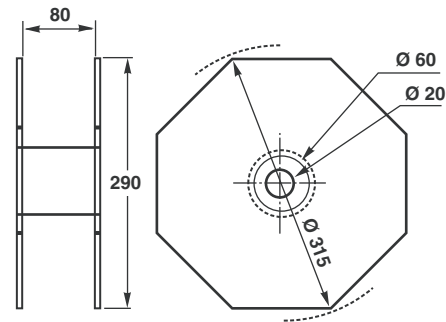
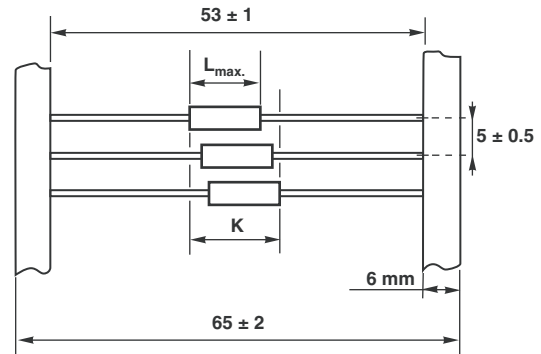


COLOR	DIGIT.	MULTIP.	TOL %	CT ppm/°C
Black	0	1		
Brown	1	10	1	
Red	2	10 <sup>2</sup>	2	
Orange	3	10 <sup>3</sup>		± 15
Yellow	4	10 <sup>4</sup>		± 25
Green	5	10 <sup>5</sup>	0.5	
Blue	6	10 <sup>6</sup>	0.25	± 10
Purple	7	10 <sup>7</sup>	0.1	± 5
Grey	8	10 <sup>8</sup>		
White	9	10 <sup>9</sup>		
Silver		10 <sup>-2</sup>		
Gold		10 <sup>-1</sup>	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 x l x H (mm)
NT3S/NP3S	500	260 x 80 x 26
NY3	500	
NK3/SL3	1000	
NT4S/NP4S	500	
NY4	500	260 x 80 x 37
NK4/SL4	1000	260 x 85 x 28
NT5S/NP5S	500	
NK5	500	

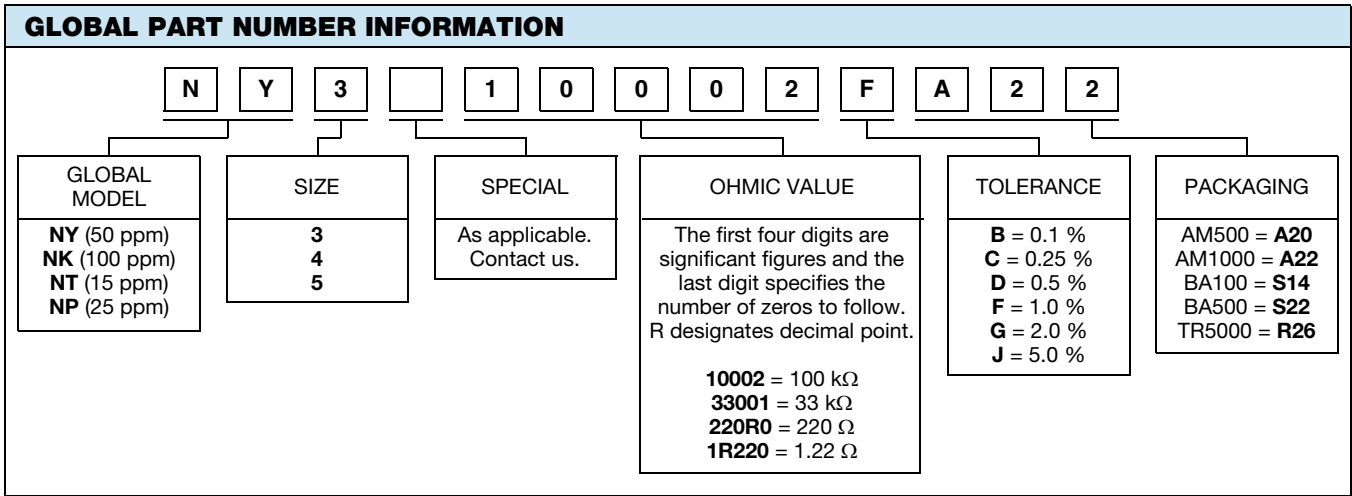
TAPED IN BAG		
SERIES AND MODEL	QUANTITY PER BAG	BOX DIMENSIONS (mm)
NP3S/NT3S	100	85 x 140
NP4S/NT4S		
NP5S/NT5S		
NY3 CC/NK3 CC	500	

**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





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