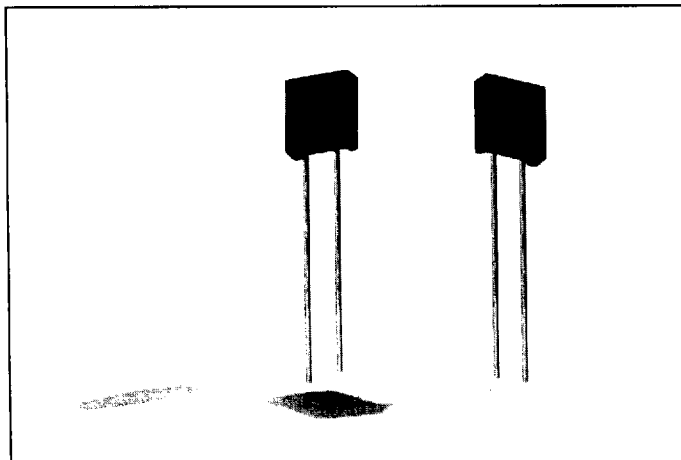


MILITARY ESTABLISHED RELIABILITY

RNC90Y to MIL-R-55182/9 and M122/1 to MIL-R-122



Vishay Military Established Reliability resistors are available in resistance values from 4.99 Ω through 121K Ω and for tolerances from $\pm 0.005\%$ to $\pm 1.0\%$. The same resistors are also available as a non-qualified product for customers desiring higher or lower resistance values and the same or better performance capabilities. (See Table 2.) Both the qualified and the non-qualified version are manufactured on the same production line facilities and are subjected to the same process, lot control, conditioning, and basic QPL testing requirements.

FEATURES

- QPL product with established reliability.
- Best Load Life Stability: $\pm 0.05\% \Delta R$ for 2,000 hrs. @ $+125^\circ\text{C}$
- Best TCR: $\pm 2.5 \text{ ppm}/^\circ\text{C}$ (-55°C to $+125^\circ\text{C}$)
- Best Shelf Life: 0.0025% (25 ppm) for 3 years
- Best Thermal EMF: $0.05 \mu\text{V}/^\circ\text{C}$
- Qualified Resistance Range: 4.99 Ω to 121K Ω
- Resistance Tolerance: to $\pm 0.005\%$
- Specially conditioned non-QPL resistors available. See Improved Performance Tested (IPT) data (Page 29).

TABLE 1 - SPECIFICATIONS COMPARISON

	MIL-R-55182/9 Char. Y Limits RNC90Y	MIL-R-122 Char. A Limits M122/1
Temperature Coefficient of Resistance —	$\pm 5 \text{ ppm}/^\circ\text{C}$ (-55°C to $+125^\circ\text{C}$) $\pm 10 \text{ ppm}/^\circ\text{C}$ ($+125^\circ\text{C}$ to $+175^\circ\text{C}$)	$\pm 2.5 \text{ ppm}/^\circ\text{C}$ (-55°C to $+125^\circ\text{C}$) $\pm 3.5 \text{ ppm}/^\circ\text{C}$ ($+125^\circ\text{C}$ to $+150^\circ\text{C}$) $\pm 4.5 \text{ ppm}/^\circ\text{C}$ ($+150^\circ\text{C}$ to $+175^\circ\text{C}$)
QPL Range	4.99 to 49.9K R level 50K to 121K P level	25.5 Ω to 50K P level
Load-Life Stability ¹ at 2,000 Hours 0.3 W @ $+125^\circ\text{C}$ 0.6 W @ $+85^\circ\text{C}$ 0.75 W @ $+25^\circ\text{C}$ at 10,000 Hrs @ $+125^\circ\text{C}$	$\pm 0.05\%$ Maximum ΔR — — $\pm 0.5\%$ Maximum ΔR	$\pm 0.05\%$ Maximum ΔR $\pm 0.05\%$ Maximum ΔR $\pm 0.05\%$ Maximum ΔR $\pm 0.2\%$ Maximum ΔR
Current Noise	(not specified)	-32 dB Minimum
High-Frequency Operation Rise-Decay Time Inductance ² (L) Capacitance (C) Reactance	Not Specified Not Specified Not Specified Not Specified	Not Specified Not Specified Not Specified $\leq 10\%$
Voltage Coefficient	0.0005%/V	0.0001%/V
Working Voltage ³	300 Volts Maximum	300 Volts Maximum
Thermal EMF ⁴	Not Specified	$1 \mu\text{V}/^\circ\text{C}$
Shelf Life	Not Specified	0.005%

Notes:

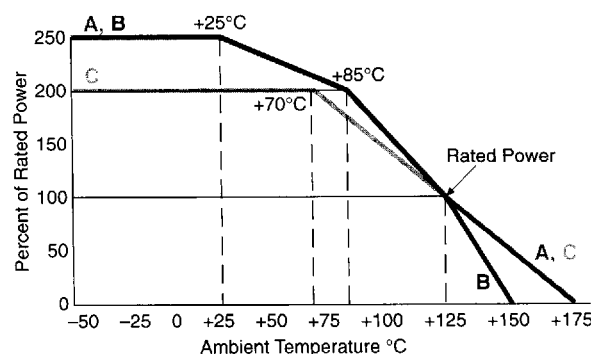
1. Load life ΔR Max can be reduced by 80% through a burn-in procedure.
2. Inductance (L) due mainly to the leads.
3. Not to exceed power rating of resistor.
4. $\mu\text{V}/^\circ\text{C}$ relates to EMF due to lead temperature differences and $\mu\text{V}/\text{watt}$ due to power applied to the resistor.

FIGURE 1 - POWER DERATING CURVE

VISHAY is qualified to the following MIL-R-122 slash sheets:
/01 0.3 W @ $+125^\circ\text{C}$. See Derating Curve A.
/03 0.3 W @ $+125^\circ\text{C}$. See Derating Curve B.
/10 0.15 W @ $+125^\circ\text{C}$. See Derating Curve B.

VISHAY is also qualified to MIL-R-55182/9. See Curve C.

VISHAY IPT (Improved Performance Testing) meets Curve A.

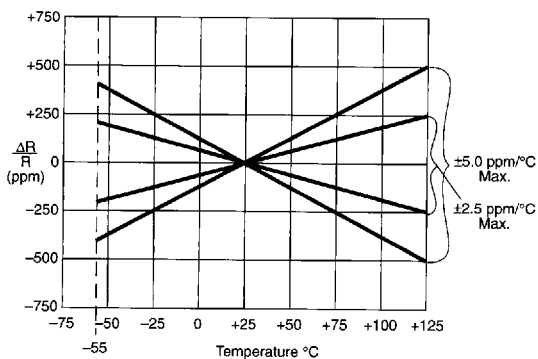
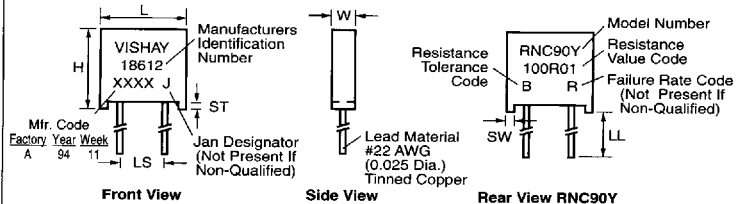
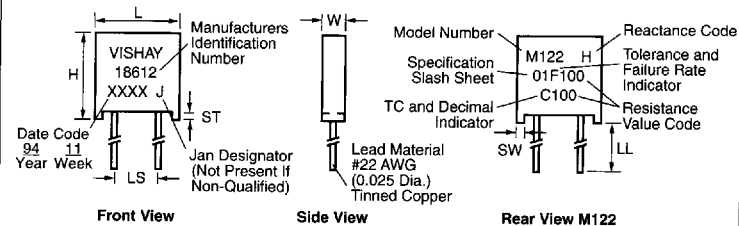


MILITARY ESTABLISHED RELIABILITY

RNC90Y to MIL-R-55182/9 and M122/1 to MIL-R-122

FIGURE 2 - STANDARD MILITARY PRESENTATION OF RESISTANCE TEMPERATURE CHARACTERISTIC

±2.5 ppm/°C: MIL-R-122, Characteristic A
 ±5.0 ppm/°C: MIL-R-55182/9, Characteristic Y


FIGURE 3 - IMPRINTING AND DIMENSIONS
RNC90Y Military Approved Resistors

M122/1 Military Approved Resistors

TABLE 2 - MODEL SELECTION

Model Number	Resistance Range (Ω)	Standard Resistance Tolerance		Failure Rate	Ambient Power Rating		Average Weight In Grams	Dimensions	
		Tightest %	Loosest %		@ +70°C	@ +125°C		Inches	mm
RNC90Y	30.1 to 121K 16.2 to 30.0 4.99 to 16.0	±0.005 ±0.05 ±0.1	±1.0 ±1.0 ±1.0	See Table 5	See Figure 2	See Figure 2	0.6		
S555	30.1 to 121K 25 to <30.1 5 to <25 2 to <5 1 to <2	±0.005 ±0.01 ±0.05 ±0.1 ±0.5	±1.0 ±1.0 ±1.0 ±1.0 ±1.0	—	0.6 W	0.3 W	0.6	W: 0.105 ±0.010 L: 0.300 ±0.010 H: 0.326 ±0.010 ST: 0.015 ±0.005 SW: 0.040 ±0.005 LL: 1.000 ±0.125 LS: 0.150 ±0.005	2.67 ±0.25 7.62 ±0.25 8.28 ±0.25 0.381 ±0.13 1.02 ±0.13 25.4 ±3.18 3.81 ±0.13
	>121K to 150K	±0.005	±1.0	—	0.4 W	0.2 W	0.6		
M122/1, /3, /10	100 to 50K 25.5 to 99.9	±0.005 ±0.05	±1.0 ±1.0	See Table 3 Part 2	@ +85°C 0.6 W	@ +125°C /1 0.3 W	0.6		
S22-1	25.5 to 100K 5 to <25.5 2 to <5 1 to <2	±0.005 ±0.05 ±0.1 ±0.5	±1.0 ±1.0 ±1.0 ±1.0	—	0.6 W	/3 0.3 W			
					0.3 W	/10 0.15 W			



MILITARY ESTABLISHED RELIABILITY

RNC90Y to MIL-R-55182/9 and M122/1 to MIL-R-122

TABLE 3 - PART NUMBERING SYSTEM FOR M122/1Description: Resistor, 10500 ohms, $\pm 0.005\%$, failure rate "P". Application frequency: to 1MHz. Power Rating: 0.3 Watts @ +125°C**M122****H****01****B****10D5000**Military
SpecificationReactance
CodeSpecification
SheetResistance Tolerance
and Failure RateResistance Value, Decimal/Multiplier
Locator, Temperature Characteristic

MIL-R-122

Vishay is qualified
to Reactance Code
C, D, E, H, J and K.
(See Part 1 below.)Vishay is qualified to the
following slash sheets:Use the code letter
from the table below
for the desired
combination of
Failure Rate and
Tolerance.This 7 digit alphanumeric code
incorporates a letter which indicates
both RTC and Resistance Value.
To determine the correct letter to use:Note:
MIL-R-122/01 is
an acceptable
substitution for
MIL-R-55182/9.Note:
Characteristic "H"
is the performance
equivalent to the
RNC90Y of
MIL-R-55182/9./01 Available TCR character-
istics are A, B and C.
(Power curve A applies.)
/03 Available TCR character-
istics are E and F.
(Power curve B applies.)
/10 Available TCR character-
istics are A, B and C.
(Power curve B applies.)First, from Part 3 below, find the
RTC Code for the desired Resistance
Temperature Characteristic.Then, with the RTC code, consult
Part 4 to find the correct letter to use
to complete the Military Part Number.Note: All 3 slash sheets are
the same form factor.**Part 1 - Reactance Code**

Vishay is qualified to Reactance Code C, D, E, H, J and K.

Frequency

$\leq 10K$ Hz		≤ 1 MHz		≤ 100 MHz	
Code	Limits	Code	Limits	Code	Limits
A	≤ 1	F	≤ 1	L	≤ 1
B	≤ 3	G	≤ 3	M	≤ 3
C	≤ 10	H	≤ 10	N	≤ 10
D	≤ 30	J	≤ 30	P	≤ 30
E	uncontrolled	K	uncontrolled	S	uncontrolled

Maximum percentage change in the initial impedance at zero
hertz (nominal resistance) due to all reactive components, for all
frequencies, up to and including the frequency specified.**Part 2 - Resistance Tolerance & Failure Rate****Tolerance****Failure Rate****M**

1%/1000 hrs.

P

0.1%/1000 hrs.

R

0.01%/1000 hrs.

 $\pm 0.005\%$

A

B

 $\pm 0.01\%$

E

F

 $\pm 0.05\%$

I

J

 $\pm 0.1\%$

M

N

 $\pm 0.5\%$

Q

R

 $\pm 1.0\%$

U

V

Not

Available

Example: 'F' = "P" Failure Rate, 0.01% Tolerance.

Note: Resistance values for 0.5% and 1.0% tolerances must be
in accordance with standard decade tables. Resistance values
for 0.1% and tighter may be as required.**Part 3 - TCR Characteristics** (referenced to +25°C)

Temperature -55°C to +125°C		TCR in ppm/°C						
		175	150	125	65	-15	-55	
RTC Code	A	± 2.5	MAX	4.5	3.5	2.5	2.5	2.5
			MIN	-4.5	-3.5	-2.5	-2.5	-2.5
	B	± 5	MAX	7	6	5	5	5
			MIN	-7	-6	-5	-5	-5
	C	± 10	MAX	15	12	10	10	10
			MIN	-15	-12	-10	-10	-10
	E	± 5	MAX	7	6	5	2.5	2.5
			MIN	-7	-6	-5	-2.5	-2.5
	F	± 10	MAX	15	12	10	5	5
			MIN	-15	-12	-10	-5	-5

**Part 4 - Resistance Value, Decimal/Multiplier
Locator, Temperature Characteristic****RTC Code****Resistance**

Less Than 1K Ohm *

1K Ohm or Greater †

A

C

D

B

E

F

C

G

H

E

L

M

* For values under 1K ohm
this letter is used as a deci-
mal point and a multiplier
of X1. Example: 45.5 Ω =
45C5000† For values of 1K ohm and
greater this letter is used as
a decimal point and a multi-
plier of X1000. Example:
10500 Ω = 10D5000THROUGH HOLE
MILITARY



MILITARY ESTABLISHED RELIABILITY

RNC90Y to MIL-R-55182/9 and M122/1 to MIL-R-122

TABLE 4 - HOW TO ORDER RNC90Y SERIES PARTS

Please specify Vishay RNC90Y Series Resistors as follows: (See Figure 1 and Table 2 for further details.)

Example:

<u>RNC90Y</u>	<u>100R01</u>	<u>B</u> ¹	<u>R</u> ²
Model No.	Resistance Value	Tolerance Code	Life Failure Rate Code

Resistance Value, in ohms, is expressed by a series of 6 characters, 5 of which represent significant digits while the 6th is a dual purpose letter that designates both the multiplier and the location of the decimal point.

For Military approved resistors with improved performance testing a unique 3XXXXX part number will be assigned.

Resistance Range	Letter Designator	Multiplier Factor	Example
1 Ω to <1K Ω	R	x 1	100R01 = 100.01 Ω
1K Ω to 121K Ω	K	x 10 ³	15K231 = 15.231 Ω

STANDARD RESISTANCE TOLERANCE AND SYMBOLS FOR RNC90Y AND S555

Tolerance	Symbol
$\pm 0.005\%$	V
$\pm 0.01\%$	T
$\pm 0.05\%$	A
$\pm 0.1\%$	B
$\pm 0.5\%$ *	D
$\pm 1.0\%$ *	F

* $\pm 0.5\%$ and $\pm 1.0\%$ resistors available only in standard values per MIL-R-55182

LIFE FAILURE RATE

Resistance Value Range	Failure Rate†
4.99 ohms to 16.0 ohms	M, P, R
16.2 ohms to 30.0 ohms	M, P, R
30.1 ohms to 49.9K ohms	M, P, R
50K ohms to 121K ohms	M, P *

* "R" level anticipated soon. Call factory to confirm.

† Failure rate code:	LFR	Symbol
	1.0%	M
	0.1%	P
	0.01%	R

TABLE 5 - HOW TO ORDER M122 SERIES PARTS

Please specify Vishay M122 series resistors as follows: (For specific information, refer to Table 3.)

Example:

<u>M122</u>	<u>H</u>	<u>01</u>	<u>A</u>	<u>100C000</u>
Model No.	Reactance Code	Slash Sheet	Resistance Tolerance and Failure Rate	Resistance Value, Decimal/Multiplier Locator, Temperature Characteristic

CAGE #18612

"Commercial and Government Entity"
Formerly "FSCM".