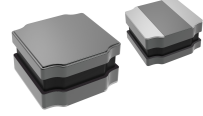


NRS40**Series

Metal Alloy Wire Wound SMD Power Inductors

FEATURES

- Fe base metal material core provides large saturation current
- Metallization on ferrite core results in excellent shock resistance and damage-free durability
- Closed magnetic circuit design reduces leakage flux and Electro Magnetic Interference (EMI)
- Low DCR decreases power loss, small and slim take up less PCB real estate
- Automatic production ensures high quality and consistency
- Operate temperature range $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$ (Including self temp. rise)
- RoHS compliant



APPLICATIONS

- Smart phone, set top box, VR, AR
- Notebooks, desktop computers, servers
- Portable gaming devices, personal navigation systems, personal multimedia devices

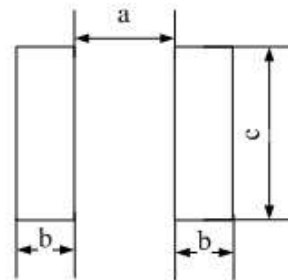
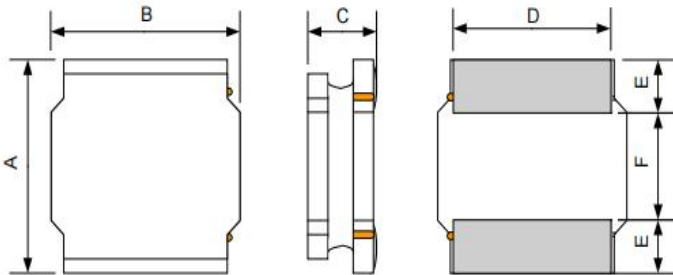
Explanation of Part Number

NRS 4020 T 1R0 M T
 1 2 3 4 5 6

- ◆ 1:Product Series: Metal Alloy Wire Wound SMD Power Inductors
- ◆ 2:Dimensions:
- ◆ 3: Feature Type:T Type
- ◆ 4: Initial inductance value: 1R0 = 1.0uH
- ◆ 5: Tolerance of Inductance:M: $\pm 20\%$, N: $\pm 30\%$
- ◆ 6:Packing:Tape Carrier Package

SHAPE AND DIMENSIONS [mm]

Recommended Land Pattern



Unit: mm

Series	A	B	C	D	E	F	a Typ.	b Typ.	c Typ.
NRS4012T	4.0 \pm 0.2	4.0 \pm 0.2	1.2 Max.	3.1 \pm 0.2	0.95 \pm 0.2	2.1 \pm 0.2	1.9	1.1	3.7
NRS4020T	4.0 \pm 0.2	4.0 \pm 0.2	2.0 Max.	3.4 \pm 0.2	0.95 \pm 0.2	2.1 \pm 0.2	1.9	1.1	3.7

Electrical Characteristics List

NRS4012T Series

Part Number	Inductance	DC Resistance		Isat(A)		Irms(A)	
	1MHz/0.1V	Max.	Typ.	Max.	Typ.	Max.	Typ.
Units	(μ H)	Ω	Ω	A	A	A	A
NRS4012TR68NT	0.68 \pm 30%	0.046	0.037	5.00	5.60	4.00	4.70
NRS4012T1R0NT	1.0 \pm 30%	0.066	0.053	4.50	5.30	3.60	4.20
NRS4012T1R5NT	1.5 \pm 30%	0.070	0.056	3.90	4.50	3.20	3.90
NRS4012T2R2MT	2.2 \pm 20%	0.102	0.082	2.50	2.80	2.30	2.80
NRS4012T3R3MT	3.3 \pm 20%	0.145	0.096	2.30	2.60	2.20	2.50
NRS4012T4R7MT	4.7 \pm 20%	0.187	0.150	2.30	2.60	1.90	2.20
NRS4012T6R8MT	6.8 \pm 20%	0.255	0.188	1.60	2.20	1.60	1.90
NRS4012T100MT	10.0 \pm 20%	0.408	0.325	1.40	1.80	1.10	1.50
NRS4012T150MT	15.0 \pm 20%	0.632	0.506	1.20	1.60	0.90	1.25
NRS4012T220MT	22.0 \pm 20%	0.763	0.611	1.10	1.35	0.75	0.95

NRS4020T Series

Part Number	Inductance	DC Resistance		Saturation Current		Heat Rating Current	
	1MHz/1V	Max.	Typ.	Max.	Typ.	Max.	Typ.
Units	μ H	Ω	Ω	A	A	A	A
Symbol	L	DCR		Isat		Irms	
NRS4020TR24MT	0.24 \pm 20%	0.017	0.013	14.0	17.0	6.00	7.00
NRS4020TR33MT	0.33 \pm 20%	0.020	0.015	13.0	16.0	5.90	6.80
NRS4020TR47MT	0.47 \pm 20%	0.022	0.016	11.0	12.0	5.90	6.80
NRS4020TR68MT	0.68 \pm 20%	0.0245	0.0192	9.00	11.5	5.80	6.70
NRS4020T1R0MT	1.0 \pm 20%	0.028	0.023	8.70	11.0	5.80	6.70
NRS4020T1R5MT	1.5 \pm 20%	0.038	0.032	7.70	9.60	5.20	6.00
NRS4020T2R2MT	2.2 \pm 20%	0.056	0.046	6.00	7.50	4.00	4.80
NRS4020T3R3MT	3.3 \pm 20%	0.088	0.073	4.70	5.90	3.40	4.00
NRS4020T4R7MT	4.7 \pm 20%	0.115	0.095	4.00	4.90	2.85	3.30
NRS4020T6R8MT	6.8 \pm 20%	0.160	0.130	3.00	4.20	2.40	2.80
NRS4020T8R2MT	8.2 \pm 20%	0.220	0.175	2.90	3.80	2.10	2.40
NRS4020T100MT	10 \pm 20%	0.220	0.190	2.80	3.50	2.00	2.35
NRS4020T150MT	15 \pm 20%	0.400	0.305	2.10	2.80	1.00	1.20

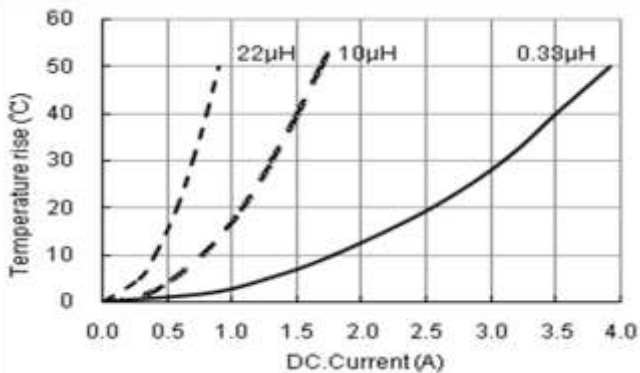
Part Number	Inductance	DC Resistance		Saturation Current		Heat Rating Current	
	1MHz/1V	Max.	Typ.	Max.	Typ.	Max.	Typ.
Units	uH	Ω	Ω	A	A	A	A
Symbol	L	DCR		Isat		Irms	
NRS4020T220MT	22±20%	0.545	0.415	1.30	1.50	0.95	1.10
NRS4020T330MT	33±20%	0.850	0.650	1.20	1.40	0.70	0.86
NRS4020T470MT	47±20%	1.20	0.950	1.10	1.30	0.56	0.66

- ※1: All test data is referenced to 20°C ambient;
- ※2: Rated current: Isat or Irms, whichever is smaller;
- ※3: For NRS40 size inductors, absolute maximum voltage: DC 40V;
- ※Isat: DC current at which the inductance drops approximate 30% from its value without current;
- ※Irms: DC current that causes the temperature rise ($\Delta T = 40^\circ\text{C}$) from 20°C ambient.

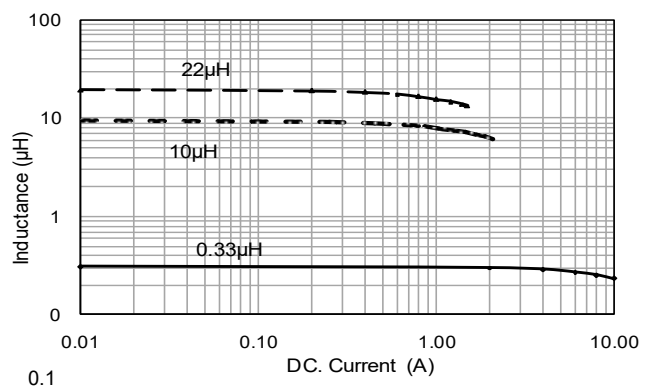
TYPICAL ELECTRICAL CHARACTERISTICS

NRS4012T Series

Temperature vs. DC Current Characteristics

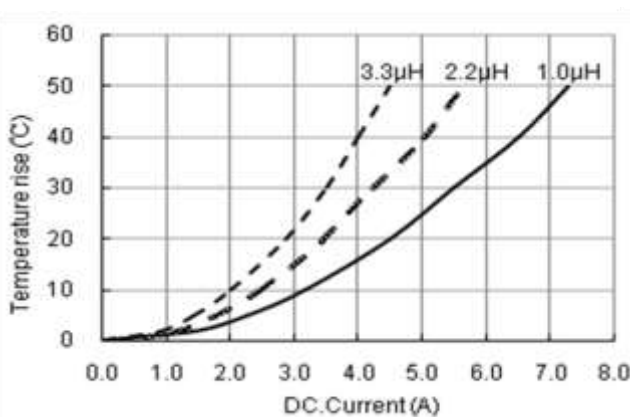


Inductance vs. DC Current Characteristics

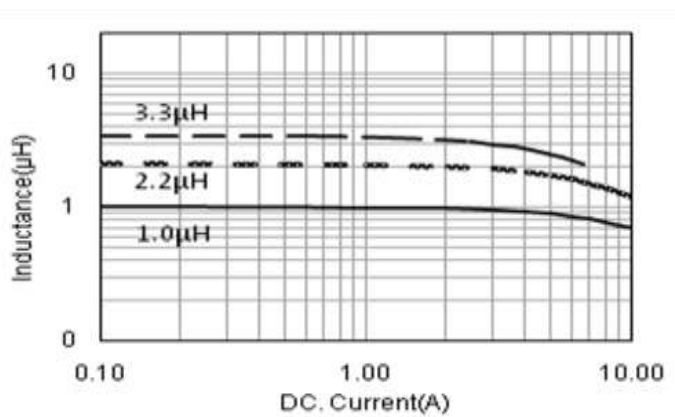


NRS4020T Series

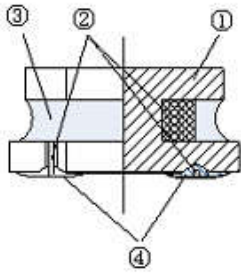
Temperature vs. DC Current Characteristics



Inductance vs. DC Current Characteristics



Structure



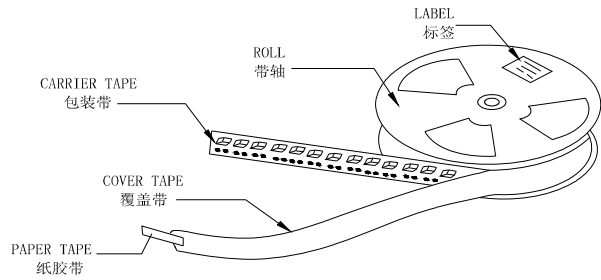
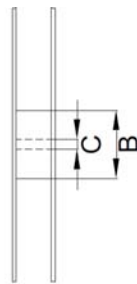
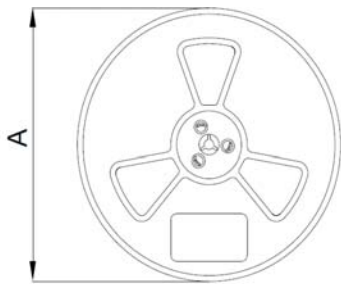
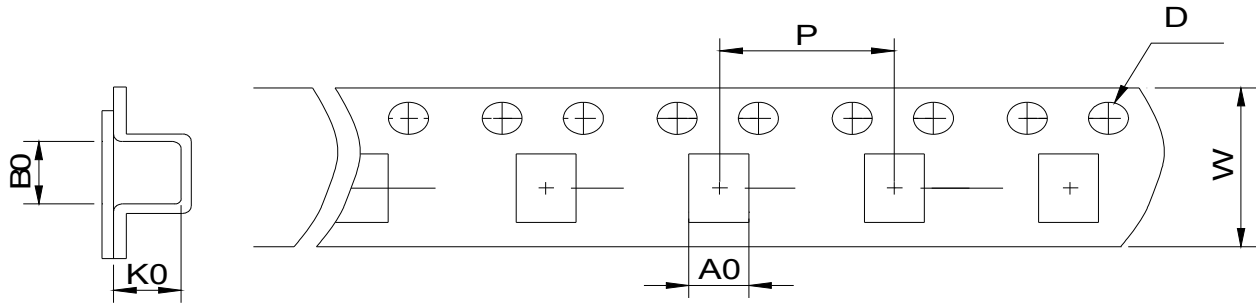
NO.	Components	Material
①	Core	Soft magnetic Metal
②	Wire	Polyurethane system enameled copper wire
③	Magnetic Glue	Epoxy resin and magnetic powder
④	Electrodes	AgNiSn or FeNiCu + Sn Alloy

Reliability Test

TEST ITEM	SPECIFICATION	TEST CONDITION
Withstanding voltage test	After test, inductors shall have no evidence of electrical and mechanical damage.	AC voltage of 100v and AC current of 1mA applied between inductor's terminal and core for 3 secs.
Resistance to soldering heat	1. Inductor shall have no eviden of electrical and mechanical damage. 2. Inductance shall not chan more than $\pm 5\%$. 3. Q shall not change more than 20%.	a. Temp: 260 ± 5 b. Time: 10 ± 1.0 se
Solderability test	The terminal shall be at least 95% covered with solder.	After fluxing, the terminal shall be dipped in a melted solder bath at $245 \pm 5^\circ\text{C}$ for 4 ± 1.0 secs.
High temperature & high humidity test	The anti-erosion quality of the surface and the specimen's inductance shall not change from the initial value within $\pm 10\%$	a. Test conditi 1)Temp.: 85°C , R.H.:85% 2)Time: 144 ± 2 hours b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test
Salt spray test		a. Test conditi 1)Temp.: $35 \pm 2^\circ\text{C}$ 2)Time: 48 ± 2 hours 3)Salt solution PH:6.5~7.2 b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test
Vibration test	1. Inductance shall be within 10% of the initial value. 2. Appearance:no dama	a. Frequency: 10 to 55 b. Amplitude: 1.5 c. Direction and tim X, Y and Z directions for 2 hours each.

TEST ITEM	SPECIFICATION	TEST CONDITION
Free fall test	No mechanical damage shall be noticed.	Drop 5 times on a concrete floor from 1m the height
Temperature Cycling test	1. Inductance shall be within 10% of the initial value 2. Appearance: No damage	a. Test conditions 1) Temp.: -55°C , time: 30 ± 3 min 2) Temp.: $+125^{\circ}\text{C}$, time: 30 ± 3 min 3) Cycles times: 12 cycles b. Measurement method The experimental component should be put at normal condition for 2 hours then to measure again after test
High Temperature resistance test		a. Test conditions 1) Applied rated current 2) Temp.: $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 3) Test time: $1000 + 24/-0$ H b. Measurement method The experimental component should be put at normal condition for 24 hours then to measure again after test.
Low temperature resistance test		a. Test conditions 1) Temp.: $-55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2) Test time: $1000 + 24/-0$ H b. Measurement method The experimental component should be put at normal condition for 24 hours then to measure again after test.

We have suggested the storage period of lead-free product should not over 6 months.

PACKAGING SPECIFICATION :


Type	Tape Dimension (mm)						Reel Dimension (mm)			Quantity (Pcs/Reel)
	W	A0	B0	K0	D	P	A	B	C	
NRS4012T	12	4.3	4.3	1.8	1.5	8	330	100	13	4500
NRS4020T	12	4.3	4.3	2.4	1.5	8	330	100	13	3000

Re-flowing Profile:
