FrelTec GmbH

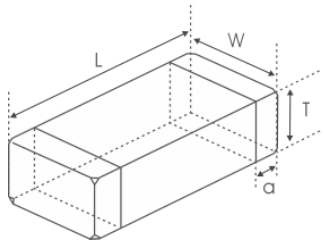
Mathildenstr. 10A
82319 Starnberg
Germany

Multilayer
Ceramic Chip Inductors
SMD

Part Number

090		02*		101*		J*		T04
Type		Size		Value		Tolerance		Packing
090 : SMD Multilayer Ceramic Chip Inductor		01 : 0201		The value is given in nH and “N” indicates the decimal point.		S : ±0,3nH		T04: Tape and reel For4k pc available for 0603 (7”reel)
		02 : 0402				J : ±5%		T10: Tape and reel for 10k pc available for 0402 (7”reel)
		03 : 0603				K : ±10%		T15: Tape and reel for 15k pc available for 0201 (7”reel)
				Example:				
				3N3 : 3,3 nH				
				22N : 22 nH				
				151 : 150 nH				
								* not all combination is possible

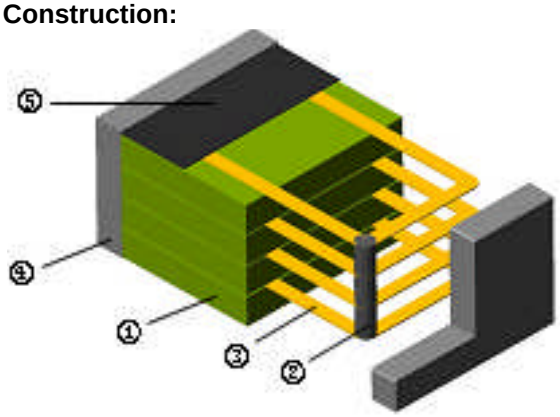
Dimensions for reflow soldering:



Unit: mm

Type	L	W	T	A (min./max.)
0201	0,6±0,03	0,3±0,03	0,33 max	0,1 / 0,3
0402	1,0±0,10	0,5±0,10	0,5±0,10	0,1 / 0,3
0603	1,6±0,15	0,8±0,15	0,8±0,15	0,2 / 0,6

Construction:



1. Ceramic Material
2. Through Hole
3. Inner Electrode (Ag)
4. Endtermination (Ag/Ni/Sn)
5. Direction Mark

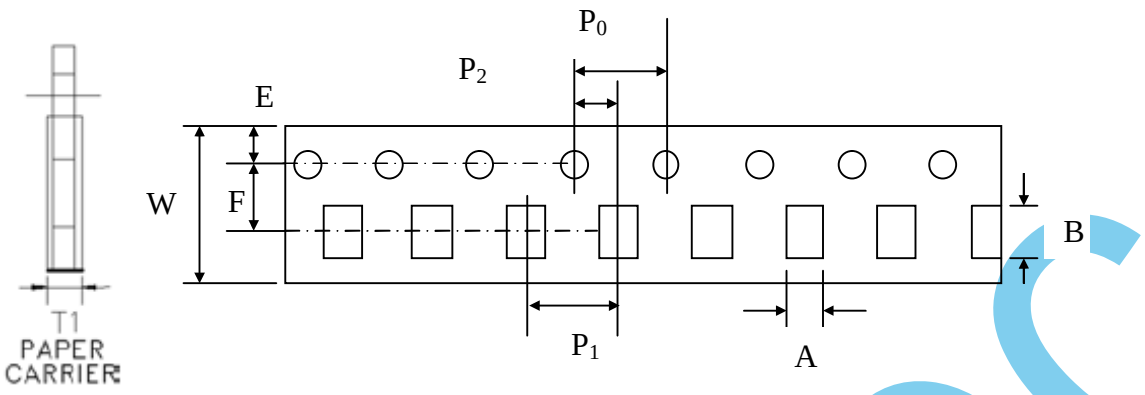
Electrical Characteristics

Size	Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	Q(Typical) Freq.(MHz)			SRF min. (GHz)	RDC (Ω) max.	IDC (mA) max.
					100	500	800			
0201	0,3	±0,3nH	4	100	5	13	18	10,0	0,07	250
	0,4								0,07	
	0,5								0,08	
	0,6								0,08	
	0,7								0,09	
	0,8								0,10	
	0,9								0,10	
	1,0					15	19		0,14	
	1,1								0,14	
	1,2				6		20		0,14	
	1,3								0,14	
	1,5								0,18	230
	1,6								0,18	
	1,8								0,19	200
	2,0							8,8	0,20	
	2,2								0,22	
	2,4							8,3	0,24	
	2,7		5			16		7,7	0,25	
	3,0							7,2	0,28	180
	3,3							6,7	0,30	
	3,6							6,4	0,30	170
	3,9				7			6,0	0,30	
	4,3							5,7	0,40	150
	4,7							5,3	0,40	
	5,1							5,0	0,40	
	5,6							4,2	0,40	
	6,2	±5%						3,8	0,44	
	6,8							3,5	0,50	
	7,5					15		3,3	0,53	
	8,2							3,2	0,55	
	9,1							3,0	0,62	
	10						19	2,8	0,65	
	12					14	18	2,4	0,70	100
	15							2,2	0,80	
	18							2,1	0,90	
	22							1,8	1,20	
	27		4		6	13	16	1,8	1,80	50
	33					12	14	1,7	2,10	
	39							1,5	2,40	
	47					11	13	1,3	2,80	
	56						12	1,1	3,00	

Size	Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	Q(Typical) Freq.(MHz)			SRF min. (GHz)	RDC (Ω) max.	IDC (mA) max.
					100	500	800			
0402	1,0	±0,3nH	8	100	11	33	37	10,0	0,12	300
	1,2				11	29	26	10,0	0,12	
	1,5				12	29	40	6,00	0,13	
	1,8				11	26	34	6,00	0,14	
	2,2				11	26	36	6,00	0,16	
	2,7				12	29	38	6,00	0,17	
	3,3	±0,3nH, ±10%			11	28	37	6,00	0,19	
	3,9				11	26	32	4,00	0,22	
	4,7				12	28	37	4,00	0,24	
	5,6				11	26	35	4,00	0,27	
	6,8	±5%, ±10%			11	26	34	3,90	0,32	
	8,2				12	26	34	3,50	0,37	
	10				11	25	31	3,20	0,42	
	12				11	25	31	2,60	0,50	
	15				11	24	30	2,30	0,55	
	18				11	24	30	2,00	0,65	
	22				12	24	30	1,60	0,80	
	27				11	24	28	1,40	0,90	
	33				12	23	26	1,20	1,00	200
	39				11	21	24	1,10	1,20	150
	47				11	21	23	0,90	1,30	
	56				12	21	21	0,75	2,0	
	68				11	19	19	0,75	2,2	100
	82				10	19	16	0,60	2,5	
	100				10	18	-	0,60	2,5	
	120				-	-	-	0,60	2,7	

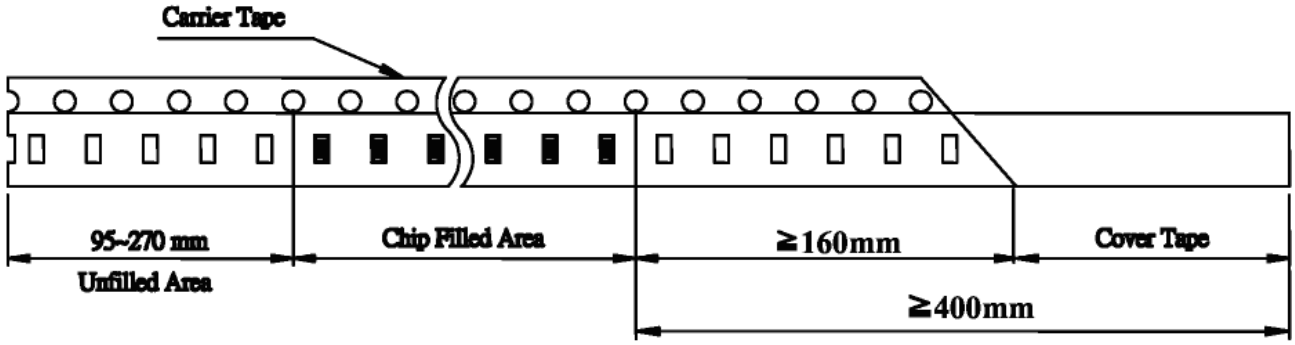
Size	Inductance (nH)	Tolerance	Quality Factor /min.	L/Q Freq. (MHz)	Q (Typical) Freq.(MHz)			SRF (GHz) Min.	RDC (Ω) Max.	IDC (mA) Max.
					100	500	800			
0603	1,0	±0,3nH	8	100	15	36	49	6,0	0,10	500
	1,2				15	36	49	6,0	0,10	
	1,5				14	34	47	6,0	0,10	
	1,8				17	40	55	6,0	0,10	
	2,2				15	38	49	6,0	0,10	
	2,7				14	37	48	6,0	0,10	
	3,3	±0,3nH, ±10%	10		16	40	51	6,0	0,13	
	3,9				14	36	48	6,0	0,15	
	4,7				14	37	48	4,0	0,20	
	5,6				14	36	46	4,0	0,23	
	6,8	±5%, ±10%			15	37	48	3,75	0,25	
	8,2				16	39	50	3,30	0,28	
	10		12		16	37	47	3,00	0,30	300
	12				15	36	45	2,6	0,35	
	15				16	38	48	2,3	0,40	
	18				17	38	47	2,0	0,45	
	22				18	40	49	1,6	0,50	
	27				18	40	47	1,4	0,55	
	33				17	40	46	1,2	0,60	
	39				19	40	46	1,1	0,65	
	47				17	36	39	0,9	0,70	
	56				18	36	37	0,9	0,75	
	68				18	35	36	0,7	0,85	
	82				18	33	29	0,6	1,00	
	100				18	28	16	0,6	1,20	
	120		8	50	-	-	-	0,5	2,30	250
	150				-	-	-	0,5	2,40	
	180				-	-	-	0,4	2,70	
	220				-	-	-	0,4	3,00	

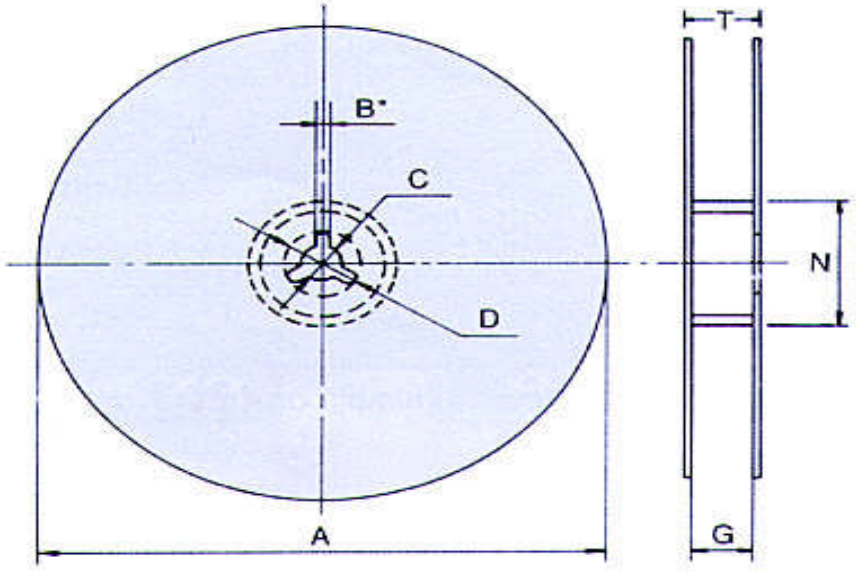
Taping Dimensions



Packing	Size	A	B	W	F	E	P_1	P_2	P_0	T_1
Paper Tape (T)	0201	0,38±0,1	0,68±0,1	8,00±0,2	3,50±0,05	1,75±0,1	2,0±0,1	2,0±0,05	4,0±0,1	0,42±0,05
	0402	0,65±0,1	1,12±0,1	8,00±0,2	3,50±0,05	1,75±0,1	2,0±0,1	2,0±0,05	4,0±0,1	0,60±0,05
	0603	1,10±0,1	1,80±0,1	8,00±0,2	3,50±0,05	1,75±0,1	4,0±0,1	2,0±0,05	4,0±0,1	0,95±0,05

Lead Dimensions:

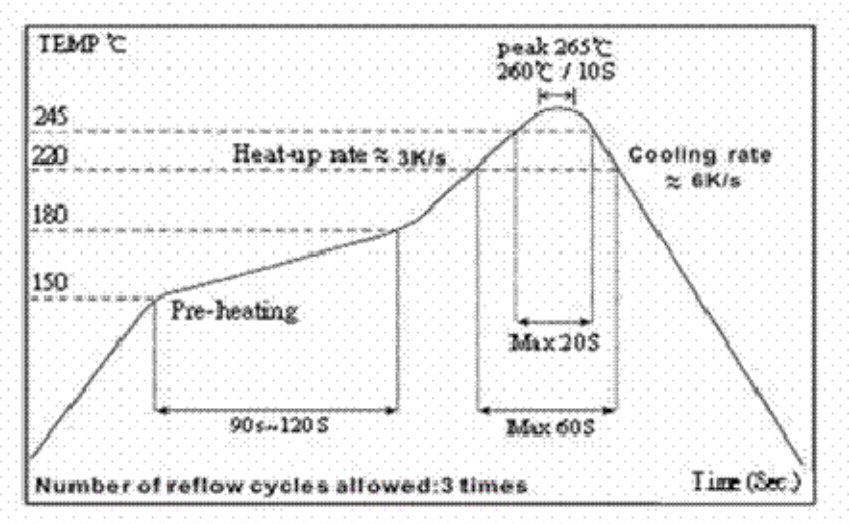




Symbol	Reel Type / Tape	A	N	C	G	T
Dimension	7" reel for 8 mm Tape	178±1	60,0±1	13,0±0,2	9,0±0,5	12,0±0,15

in mm

Lead Free Reflow Soldering Profile



Stock period

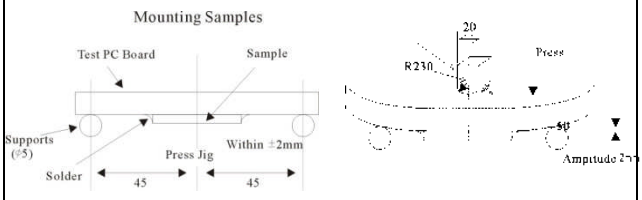
The performance of these products, including the solderability, is guaranteed for 12 month, provided that they remain packed as they were when delivered and stored at a temperature of 25°C ± 3°C and a relative humidity less than 80%RH

Environmental Characteristics

Electrical Performance Test

Item	Requirement	Test Condition
Inductance	In Within specified tolerance	a.Temperature: 25±1°C b. Relative Humidity: 45 to 85%RH c. Atmospheric Pressure: 86 to 106kpa d. Measuring equipment and fixture: 0201: HP4291B+Agilent16196C 0402: HP4291B+Agilent16193A 0603: HP4291B+Agilent16192A
Q Value	In accordance with electrical specification	a. Temperature: 25±1°C b. Relative Humidity: 45 to 85%RH c. Atmospheric Pressure: 86 to 106kpa
DC Resistance	In accordance with electrical specification	a. Temperature: 25±1°C b. Relative Humidity: 45 to 85%RH c. Atmospheric Pressure: 86 to 106kpa d. Measuring equipment: HP 4338
Temperature Characteristics	Within specified tolerance	a. Temperature range: -30 to+ 85°C b. Reference temperature: 25°C

Mechanical Characteristies Test

Item	Requirement	Test Condition
Bending Strength	No mechanical damage shall be observed	Solder the chip to test jig then apply a force in the direction shown in below. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock. 
Solderability	More than 75% of the terminal electrode part shall be covered with fresh solder	Immerse a test sample into a methanol solution containing rosin, preheat it at 150 to 180°C for 3 to 5 sec. and immerse into molten solder of 245±5°C for 5±0.5 sec..
Resistance to Soldering Heat	No visible damage	Immerse a test sample into a methanol solution containing resin, preheat it at 150 to 180°C for 2 to 3 minutes and immerse into molten solder of 260±5°C for 10±0.5 sec. so that both terminal electrodes are completely submerged.
Appearance	In accordance with specification	Inductors shall be visually inspected for visible evidence of defect
Dimension	In accordance with dimension specification	Dimension shall be measured with caliper or micrometer

Climatic Test

Item	Requirements	Test Condition
Thermal Shock	No visible damage Inductance variation within 10% Q variation within 20%	Solder a test sample to printed circuit board, and conduct 100 cycles of test under the conditions shown as below. Cycle: 100°C/1h — Within 2min — -40°C/1h
High Humidity State Life Test	No visible damage. Inductance variation within 10%. Q variation within 20%.	Keep a test sample in an atmosphere with a temperature of 70±2°C, 90~95%RH for 500±12 hours. After the test, keep the test sample at a normal temperature for 1 to 2 hours, and then carry out measurement.
High Humidity Load Life Test	No visible damage. Inductance variation within 10%. Q variation within 20%.	Solder a test sample to printed circuit board then keep the test sample in an atmosphere with a temperature of 70±2°C, 90~95%RH for 500±12 hours while supplying the rated current. After the test, keep the test sample at a normal temperature for 1 to 2 hours, and then carry out measurement.
High Temperature State Life Test	No visible damage. Inductance variation within 10%. Q variation within 20%.	Keep a test sample in an atmosphere with a temperature of 100±2°C for 500±12 hours. After the test, keep the test sample at a normal temperature for 1 to 2 hours, and then carry out measurement.
High Temperature Load	No visible damage. Inductance variation within 10%. Q variation within 20%.	Solder a test sample to printed circuit board then keep the test sample in an atmosphere with a temperature of 100±2°C for 500±12 hours while supplying the rated current. After the test, keep the test sample at a normal temperature for 1 to 2 hours, and then carry out measurement.

For this part: It does not use the materials that include the substances specified in RoHS, the detail refer to the part of prohibition or exclusion items in RoHS (2002/95/EC).

Cadmium and cadmium compounds (permissive content＜100 ppm)

Lead and lead compounds (permissive content＜1000 ppm)

Exceptions specified:

Lead contained in the glass of cathode ray tubes, electronic components and fluorescent tubes.

The glass material used in the electronic components, which includes resistor elements, conductive pastes (silver or copper ones), adhesives, glass frit and sealing materials.

Mercury and its mercury compounds (permissive content＜1000 ppm)

Hexavalent chromium compounds (permissive content＜1000 ppm)

Polybrominated biphenyls (PBB) (permissive content＜1000 ppm)

Polybrominated diphenylethers (PBDE) (permissive content＜1000 ppm)

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