

FrelTec GmbH

Mathildenstr. 10A
82319 Starnberg
Germany

Multilayer Ferrite Chip Inductor SMD

SMD

SPECIFICATION

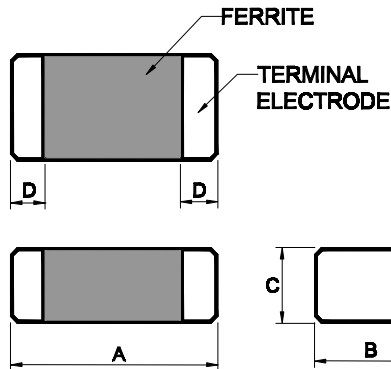
Part Number

097	05*	151*	Q*	E02
Type	Size	Value	Tolerance	Packing
097 : SMD Multilayer Ferrite Chip Inductor	03: 0603	The value is given in μH and "N" indicates the decimal point. When higher than 100 μH then the last digit is the multiplier	J : $\pm 5\%$	T04: tape and reel, for 4kpcs, paper tape 0603 and 0805 size**
	05: 0805	which denotes the number of zero following	K : $\pm 10\%$	E04: tape and reel, for 4kpcs, embossed plastic tape, 0805 ($\leq 2,2\mu\text{H}$) and 0603 size**
	06: 1206	Example:	M : $\pm 20\%$	E03: tape and reel, for 3kpcs, embossed plastic tape, 0805*** ($\geq 2,7\mu\text{H}$) and 1206 size
		10N : 10 nH		E02: tape and reel, for 2kpcs, embossed plastic tape, 0805 ($\geq 2,7\mu\text{H}$) size***
		3U3 : 3300 nH		
		U68 : 680 nH		* not all combination is possible
		151 : 150 μH		** to be chosen paper tape or embossed plastic for 0805 $\leq 2,2\mu\text{H}$ and 0603
				*** to be chosen 2kpcs or 3kpcs for 0805 $\geq 2,7\mu\text{H}$ and 0603

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SMD

Dimensions:

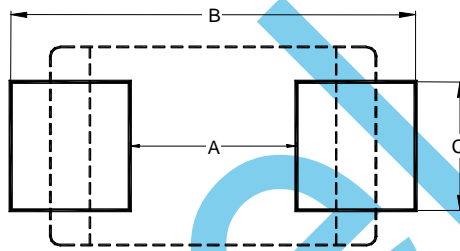


Unit: mm

Type	A	B	C	D
0603	1,60±0,20	0,80±0,20	0,80±0,20	0,30±0,20
0805 ≤2,2μH	2,00±0,20	1,25±0,20	0,90±0,20	0,50±0,30
0805 ≥2,7μH	2,00±0,20	1,25±0,20	1,25±0,20	0,50±0,30
1206	3,20±0,20	1,60±0,20	1,10±0,20	0,50±0,30

unit: mm

Recommended PCB pattern for reflow soldering:



Unit: mm

Type	A	B	C
0603	0,8	2,4~3,4	0,6
0805 ≤2,2μH	1,2	3,0~4,0	1,0
0805 ≥2,7μH	1,2	3,0~4,0	1,0
1206	2,0	4,2~5,2	1,2

unit: mm

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Standard Electrical Specifications

0603 Multilayer Ferrite Chip Inductors Type

Code	Inductance (nH)	Tolerance	L/Q Freq. (MHz)	Q min.	SRF (MHz) min.	DCR (Ω) max.	IDC (mA) max.				
10N	10	±20%	50MHz, 200mV	10	300	0,20	50				
33N	33				270	0,20					
47N	47				260	0,30					
56N	56				255	0,30					
68N	68				250	0,30					
82N	82				245	0,30					
U10	100	±10, ±20%	25MHz, 200mV	15	240	0,50	35				
U12	120				205	0,50					
U15	150				180	0,60					
U18	180				165	0,60					
U22	220				150	0,80					
U27	270				136	0,80					
U33	330				125	0,85					
U39	390				110	1,00					
U47	470				105	1,35					
U56	560				95	1,55					
U68	680				85	1,70					
U82	820				75	2,10					
1U0	1000				±10, ±20%	10MHz, 200mV		35	65	0,60	25
1U2	1200								60	0,80	
1U5	1500	55	0,80								
1U8	1800	50	0,95								
2U2	2200	45	1,55								
2U7	2700	40	1,35								
3U3	3300	±10, ±20%	4MHz, 200mV	30	38	1,55	15				
3U9	3900				35	1,70					
4U7	4700				33	2,10					
5U6	5600				22	1,55					
6U8	6800				20	1,70					
8U2	8200				18	2,10					
100	10000	2MHz, 60mV	17	2,55	5						

SMD

0805 Multilayer Ferrite Chip Inductors Type

Code	Inductance (nH)	Tolerance	L/Q Freq. (MHz)	Q min.	SRF (MHz) min.	DCR (Ω) max.	IDC (mA) max.		
47N	47	±20%	50MHz, 200mV	20	320	0,20	300		
56N	56				320	0,20			
68N	68				280	0,20			
82N	82				255	0,20			
U10	100	±10, ±20%	25MHz, 200mV	20	235	0,30	250		
U12	120				220	0,30			
U15	150				200	0,40			
U18	180				185	0,40			
U22	220				170	0,50			
U27	270				150	0,50			
U33	330				145	0,55	200		
U39	390				135	0,65			
U47	470				25	25	125	0,65	150
U56	560						115	0,75	
U68	680						105	0,80	
U82	820						100	1,00	50
1U0	1000	±10, ±20%	10MHz, 200mV	45	75	0,40			
1U2	1200				65	0,50			
1U5	1500				60	0,50			
1U8	1800				55	0,60			
2U2	2200				50	0,65	30		
2U7	2700				45	0,75			
3U3	3300				41	0,80			
3U9	3900				38	0,90			
4U7	4700				35	1,00	15		
5U6	5600				32	0,90			
6U8	6800				29	1,00			
8U2	8200				26	1,10			
100	10000	2MHz, 60mV	2MHz, 60mV	24	1,15	5			
120	12000			22	1,25				
150	15000	1MHz, 60mV	1MHz, 60mV	30	19	0,80			
180	18000				18	0,90			
220	22000				16	1,10			

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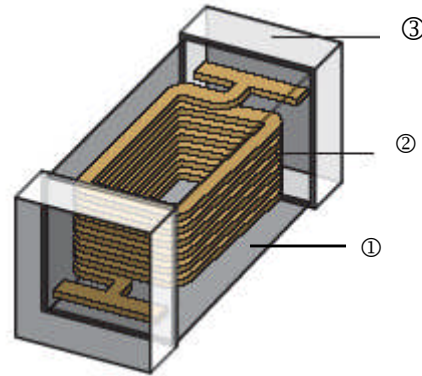
1206 Multilayer Ferrite Chip Inductors Type

Code	Inductance (nH)	Tolerance	L/Q Freq. (MHz)	Q min.	SRF (MHz) min.	DCR (Ω) max.	IDC (mA) max.			
47N	47	±20%	50MHz, 200mV	20	320	0,15	300			
56N	56				280	0,25				
68N	68				280	0,25				
82N	82				250	0,25				
U10	100	±10, ±20%	25MHz, 200mV	25	235	0,25	250			
U12	120				220	0,30				
U15	150				200	0,30				
U18	180				185	0,40				
U22	220				170	0,40	200			
U27	270				150	0,50				
U33	330				145	0,60	150			
U39	390				135	0,50				
U47	470				125	0,60				
U56	560				115	0,70				
U68	680				105	0,80	100			
U82	820				100	0,90				
1U0	1000				±10, ±20%	10MHz, 200mV	45	75	0,40	100
1U2	1200							65	0,50	
1U5	1500	60	0,50	80						
1U8	1800	55	0,50	70						
2U2	2200	50	0,60	60						
2U7	2700	45	0,60							
3U3	3300	41	0,70	50						
3U9	3900	38	0,80							
4U7	4700	35	0,90							
5U6	5600	32	0,70	25						
6U8	6800	29	0,80							
8U2	8200	26	0,90							
100	10000	2MHz, 60mV	35	24				1,00	15	
120	12000			22				1,05		
150	15000	1MHz, 60mV	35	19				0,70	5	
180	18000			18				0,75		
220	22000			16	0,90					
270	27000			14	0,90					
330	33000			13	1,05					

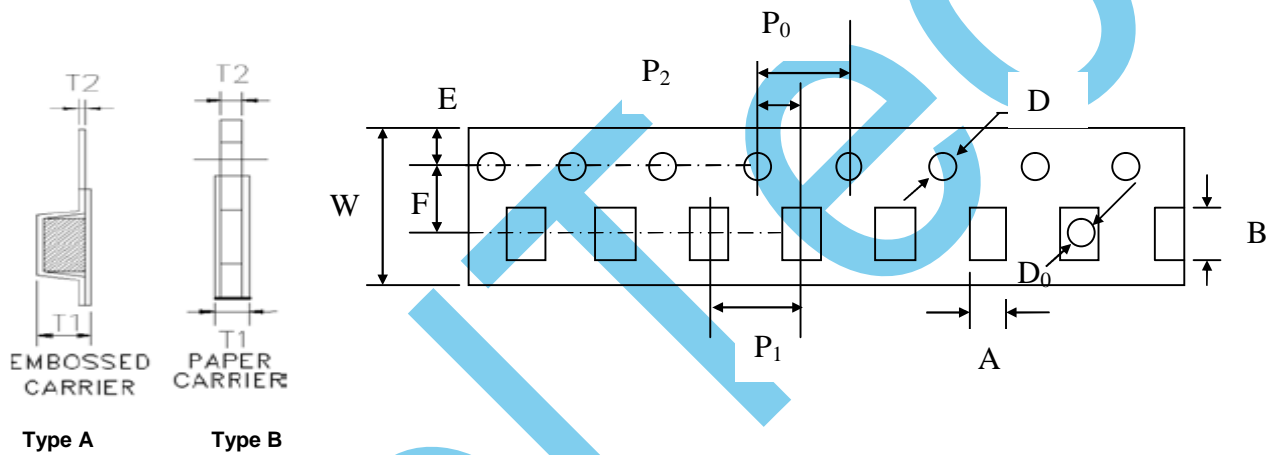
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SMD Construction

①	Ferrite	②	Internal Electrode
		③	Electrode Plating (Ag/Ni/Sn)



Tape Dimensions

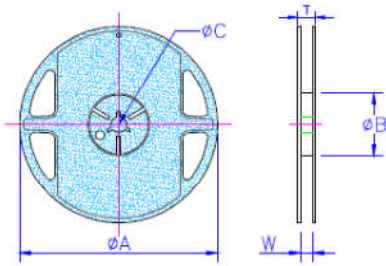


Type	Tape Dimensions									
	A ±0,1	B ±0,1	T1 ±0,05	T2 ±0,05	P0 ±0,1	P1 ±0,1	P2 ±0,05	Tape Type	W ±0,2	F ±0,05
0603 (paper tape)	1,05	1,85	0,95	-	4,0	4,0	2,0	B	8,0	3,5
0805 (≤2,2μH, paper tape)	1,50	2,42	0,95	-	4,0	4,0	2,0	B	8,0	3,5
0603 (embossed plastic tape)	1,01	1,80	1,02	0,22	4,0	4,0	2,0	A	8,0	3,5
0805 (≤2,2μH, embossed plastic tape)	1,42	2,25	1,04	0,22	4,0	4,0	2,0	A	8,0	3,5
0805 (≥2,7μH, embossed plastic tape)	1,50	2,35	1,45	0,22	4,0	4,0	2,0	A	8,0	3,5
1206	1,88	3,50	1,27	0,22	4,0	4,0	2,0	A	8,0	3,5

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SMD

Reel Dimensions

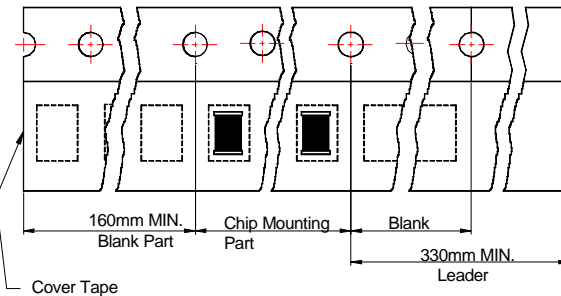


Type	ΦA	ΦB	W	T	C
0603	178±1	60,0±0,5	9,0±0,5	12,0±0,5	13±0,5
0805 (≤2,2μH)					
1206			9,5±0,5	12,0±0,5	
0805 (≥2,7μH)					

Lead Dimensions:

Carrier tape: Polystyrene for 0603, 0805, 1206
Paper for 0603, 0805 for ≤2,2μH

Cover type: Polystyrene

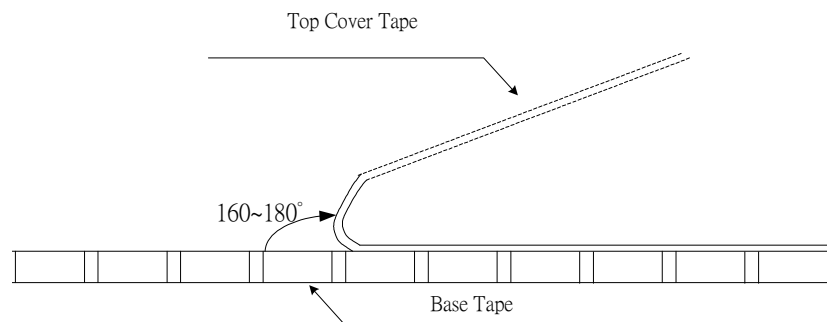


Cover Tape Peel off Strength

Peel-off force should be in the range of 0,1N~1N in the arrow direction at the following conditions:

Temperature: 5~35°C

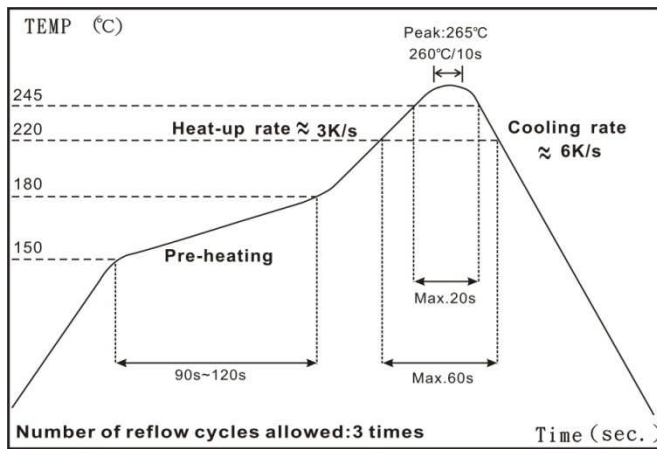
Humidity: 45~85%



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Lead Free Reflow Soldering Profile



Operating Temperature

Temperature range: $-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$

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 $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and a relative humidity less than 80%RH

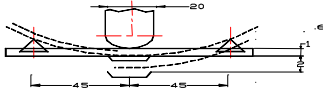
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Environmental Characteristics

Electrical Performance Test

Item	Requirement	Test Method
Inductance	Refer to standard electrical characteristic spec.	HP4291B
Q		HP4291B
SRF		HP4291B
DC Resistance RDC		Agilent 34401A
Rated Current IDC		Applied the current to coils, The inductance change should be less than 10% to initial value

Mechanical Performance Test

Item	Requirement	Test Method
Resistance to Soldering Heat	Appearance: No damage More than 75% of the terminal. Electrode should be covered with solder. Inductance: within $\pm 15\%$ of initial value Q: within $\pm 30\%$ of initial value Inductance: within $\pm 20\%$ of initial value (0603 over 12uH)	Pre-heating: 150°C, 1min. Solder Composition: Sn/Ag3.0/Cu0.5 (Pb-Free) Solder Temperature: 260 \pm 5°C (Pb-Free) Immersion Time: 10 \pm 1 sec.
Solderability	The electrodes shall be at least 90% covered with new solder coating	Pre-heating: 150°C, 1min. Solder Composition: Sn/Ag3.0/Cu0.5 (Pb-Free) Solder Temperature: 245 \pm 5°C (Pb-Free) Immersion Time: 4 \pm 1 sec.
Flexure Strength	The forces applied on the right conditions must not damage the terminal electrode and the ferrite.	Test device shall be soldered on the substrate Substrate Dimension: 100x40x1.6 mm Deflection: 2.0 mm Keeping Time: 30 sec. 
Vibration		*For 0402, substrate dimension is 100x40x0.8 mm Test device shall be soldered on the substrate Oscillation Frequency: 10 to 55 to 10Hz for 1 min. Amplitude: 1.5 mm Time: 2 hrs for each axis (X, Y & Z), total 6 hrs

SMD

Climatic Test

Item	Requirement	Test Method														
Damp Heat with Load	Appearance: No damage L change: within±10% of initial value Q change: within±30% of initial value	Temperature: 40±2°C Relative Humidity: 90 ~ 95% Time: 1000 hrs Measured after exposure in the room condition for 24 hrs														
Temperature Cycle		One cycle: <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25±3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25±2</td> <td>3</td> </tr> <tr> <td>3</td> <td>85±3</td> <td>30</td> </tr> <tr> <td>4</td> <td>25±2</td> <td>3</td> </tr> </tbody> </table> Total: 100 cycles Measured after exposure in the room condition for 24 hrs	Step	Temperature (°C)	Time (min.)	1	-25±3	30	2	25±2	3	3	85±3	30	4	25±2
Step	Temperature (°C)	Time (min.)														
1	-25±3	30														
2	25±2	3														
3	85±3	30														
4	25±2	3														
High Temperature Resistance		Temperature: 85±3°C Relative Humidity: 20% Applied Current: Rated Current Time: 1000 hrs Measured after exposure in the room condition for 24 hrs														
Low Temperature Resistance		Temperature: -25±3°C Relative Humidity: 0% Time: 1000 hrs Measured after exposure in the room condition for 24 hrs														

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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