

Data Sheet

Customer: _____

Product: Multilayer Ferrite Chip Inductor – SMI Series _____

Size : 0603/0805/1206 _____

Issued Date: 26-September-2014 _____

Edition: Ver. 1 _____

Record of change

Date	Ver.	Description	Page
26-Sep.-2014	1		

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26-Sep.-2014	26-Sep.-2014	26-Sep.-2014	
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MULTILAYER CHIP INDUCTOR

SMI SERIES

■ Introductions

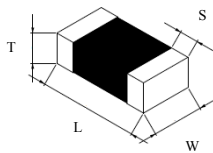
The SMI series multilayer ferrite chip inductors are widely used in high frequency application. Such as personal computers, portable equipment, modem, printer and other electronic devices.

■ Features

- * Excellent solderability and high heat resistance for either flow or reflow soldering.
- * No cross coupling between inductors due to magnetic shield. Ideal for high-density installation.
- * Superior Q characteristics guaranteed over the wide frequency allow high frequency application.
- * Completely monolithic structure gives high reliability and allows high SRF.

Unit (mm)


■ Chip Dimension



Terminal: Ag/Ni/Sn

Size	Length (L)	Width (W)	Thickness (T)	Terminal (S)
SMI 0603	1.60 ± 0.20	0.80 ± 0.20	0.80 ± 0.20	0.30 ± 0.20
SMI 0805 ($\leq 2.2\mu\text{H}$)	2.00 ± 0.20	1.20 ± 0.20	0.90 ± 0.20	0.50 ± 0.30
SMI 0805 ($\geq 2.7\mu\text{H}$)	2.00 ± 0.20	1.20 ± 0.20	1.25 ± 0.20	0.50 ± 0.30
SMI 1206	3.20 ± 0.20	1.60 ± 0.20	1.10 ± 0.20	0.50 ± 0.30

■ Part Numbering

SMI	0603	F	T	47N	K	
SERIES	SIZE	MATERIAL	PACKAGE	INDUCTANCE	TOLERANCE	INTERNAL CODE
	0603	F = Ferrite	T= Tape&Reel	47N= 47nH	K= ±10%	
	0805			R47= 0.47nH	M= ±20%	
	1206			220 = 22uH		

MULTILAYER CHIP INDUCTOR

SMI SERIES

■ Electrical Specification

■ Size 0603 Type

Part No.	Inductance	Q	Test Freq.	Tol.	S.R.F.(min)	RDC(max)	IDC(max)
	(nH)	(min)	(MHz)	(%)	(MHz)	(Ω)	(mA)
SMI 0603 FT 10N□□□	10	10	50	M	300	0.20	50
SMI 0603 FT 33N□□□	33	10	50	M	270	0.20	50
SMI 0603 FT 47N□□□	47	10	50	M	260	0.30	50
SMI 0603 FT 56N□□□	56	10	50	M	255	0.30	50
SMI 0603 FT 68N□□□	68	10	50	M	250	0.30	50
SMI 0603 FT 82N□□□	82	10	50	M	245	0.30	50
SMI 0603 FT R10□□□	100	15	25	M, K	240	0.50	50
SMI 0603 FT R12□□□	120	15	25	M, K	205	0.50	50
SMI 0603 FT R15□□□	150	15	25	M, K	180	0.60	50
SMI 0603 FT R18□□□	180	15	25	M, K	165	0.60	50
SMI 0603 FT R22□□□	220	15	25	M, K	150	0.80	50
SMI 0603 FT R27□□□	270	15	25	M, K	136	0.80	50
SMI 0603 FT R33□□□	330	15	25	M, K	125	0.85	35
SMI 0603 FT R39□□□	390	15	25	M, K	110	1.00	35
SMI 0603 FT R47□□□	470	15	25	M, K	105	1.35	35
SMI 0603 FT R56□□□	560	15	25	M, K	95	1.55	35
SMI 0603 FT R68□□□	680	15	25	M, K	85	1.70	35
SMI 0603 FT R82□□□	820	15	25	M, K	75	2.10	35
SMI 0603 FT 1R0□□□	1000	35	10	M, K	65	0.60	25
SMI 0603 FT 1R2□□□	1200	35	10	M, K	60	0.80	25
SMI 0603 FT 1R5□□□	1500	35	10	M, K	55	0.80	25
SMI 0603 FT 1R8□□□	1800	35	10	M, K	50	0.95	25
SMI 0603 FT 2R2□□□	2200	35	10	M, K	45	1.55	15
SMI 0603 FT 2R7□□□	2700	35	10	M, K	40	1.35	15
SMI 0603 FT 3R3□□□	3300	35	10	M, K	38	1.55	15
SMI 0603 FT 3R9□□□	3900	35	10	M, K	35	1.70	15
SMI 0603 FT 4R7□□□	4700	35	10	M, K	33	2.10	15
SMI 0603 FT 5R6□□□	5600	35	4	M, K	22	1.55	5
SMI 0603 FT 6R8□□□	6800	35	4	M, K	20	1.70	5
SMI 0603 FT 8R2□□□	8200	30	4	M, K	18	2.10	5
SMI 0603 FT 100□□□	10000	30	2	M, K	17	2.55	5
SMI 0603 FT 120□□□	12000	30	2	M, K	25	1.8	5
SMI 0603 FT 150□□□	15000	20	1	M, K	22	1.5	2
SMI 0603 FT 180□□□	18000	20	1	M, K	20	1.6	2
SMI 0603 FT 220□□□	22000	20	1	M, K	18	1.7	2
SMI 0603 FT 270□□□	27000	20	1	M, K	15	1.8	2
SMI 0603 FT 330□□□	33000	20	1	M, K	10	2.2	2

- * Tolerance: M=±20%, K=±10%
- * Operating Temperature: -40°C to +125°C
- * Inductance & Q value measured in HP4291B
- * SRF measured in HP4291B
- * DC Resistance RDC measured in Agilent 34401A
- * Unspecified values available on request.

MULTILAYER CHIP INDUCTOR

SMI SERIES

Size 0805 Type

Part No.	Inductance	Q	Test Freq.	Tol.	S.R.F.(min)	RDC(max)	IDC(max)
	(μ H)	(min)	(MHz)	(%)	(MHz)	(Ω)	(mA)
SMI 0805 FT 47N□□□	0.047	20	50	M	320	0.20	300
SMI 0805 FT 56N□□□	0.056	20	50	M	320	0.20	300
SMI 0805 FT 68N□□□	0.068	20	50	M	280	0.20	300
SMI 0805 FT 82N□□□	0.082	20	50	M	255	0.20	300
SMI 0805 FT R10□□□	0.10	20	25	M, K	235	0.30	250
SMI 0805 FT R12□□□	0.12	20	25	M, K	220	0.30	250
SMI 0805 FT R15□□□	0.15	20	25	M, K	200	0.40	250
SMI 0805 FT R18□□□	0.18	20	25	M, K	185	0.40	250
SMI 0805 FT R22□□□	0.22	20	25	M, K	170	0.50	250
SMI 0805 FT R27□□□	0.27	20	25	M, K	150	0.50	250
SMI 0805 FT R33□□□	0.33	20	25	M, K	145	0.55	250
SMI 0805 FT R39□□□	0.39	25	25	M, K	135	0.65	200
SMI 0805 FT R47□□□	0.47	25	25	M, K	125	0.65	200
SMI 0805 FT R56□□□	0.56	25	25	M, K	115	0.75	150
SMI 0805 FT R68□□□	0.68	25	25	M, K	105	0.80	150
SMI 0805 FT R82□□□	0.82	25	25	M, K	100	1.00	150
SMI 0805 FT 1R0□□□	1.00	45	10	M, K	75	0.40	50
SMI 0805 FT 1R2□□□	1.20	45	10	M, K	65	0.50	50
SMI 0805 FT 1R5□□□	1.20	45	10	M, K	60	0.50	50
SMI 0805 FT 1R8□□□	1.80	45	10	M, K	55	0.60	50
SMI 0805 FT 2R2□□□	2.20	45	10	M, K	50	0.65	30
SMI 0805 FT 2R7□□□	2.70	45	10	M, K	45	0.75	30
SMI 0805 FT 3R3□□□	3.30	45	10	M, K	41	0.80	30
SMI 0805 FT 3R9□□□	3.90	45	10	M, K	38	0.90	30
SMI 0805 FT 4R7□□□	4.70	45	10	M, K	35	1.00	30
SMI 0805 FT 5R6□□□	5.60	45	4	M, K	32	0.90	15
SMI 0805 FT 6R8□□□	6.80	45	4	M, K	29	1.00	15
SMI 0805 FT 8R2□□□	8.20	45	4	M, K	26	1.10	15
SMI 0805 FT 10□□□	10.0	45	2	M, K	24	1.15	15
SMI 0805 FT 12□□□	12.0	45	2	M, K	22	1.25	15
SMI 0805 FT 15□□□	15.0	30	1	M, K	19	0.80	5
SMI 0805 FT 18□□□	18.0	30	1	M, K	18	0.90	5
SMI 0805 FT 22□□□	22.0	30	1	M, K	16	1.10	5
SMI 0805 FT 27□□□	27.0	30	1	M, K	14	1.15	5
SMI 0805 FT 33□□□	33.0	30	1	M, K	13	1.25	5

- * Tolerance: M=±20%, K=±10%
- * Operating Temperature: -40°C to +125°C
- * Inductance & Q value measured in HP4291B
- * SRF measured in HP4291B
- * DC Resistance RDC measured in Agilent 34401A
- * Unspecified values available on request.

MULTILAYER CHIP INDUCTOR

SMI SERIES

Size 1206 Type

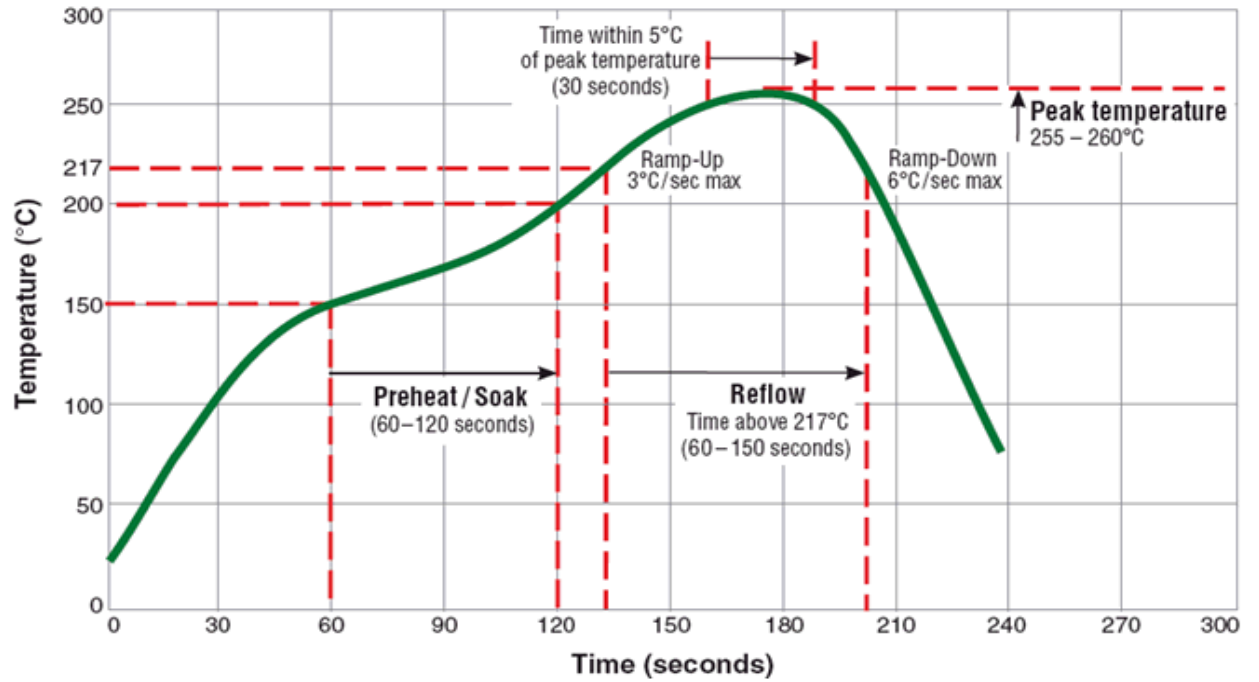
Part No.	Inductance	Q	Test Freq.	Tol.	S.R.F.(min)	RDC(max)	IDC(max)
	(μ H)	(min)	(MHz)	(%)	(MHz)	(Ω)	(mA)
SMI 1206 FT 47N□□□	0.047	20	50	M	320	0.15	300
SMI 1206 FT 56N□□□	0.056	20	50	M	280	0.25	300
SMI 1206 FT 68N□□□	0.068	20	50	M	280	0.25	300
SMI 1206 FT 82N□□□	0.082	20	50	M	250	0.25	300
SMI 1206 FT R10□□□	0.10	20	25	M, K	235	0.25	250
SMI 1206 FT R12□□□	0.12	20	25	M, K	220	0.30	250
SMI 1206 FT R15□□□	0.15	20	25	M, K	200	0.30	250
SMI 1206 FT R18□□□	0.18	20	25	M, K	185	0.40	250
SMI 1206 FT R22□□□	0.22	20	25	M, K	170	0.40	250
SMI 1206 FT R27□□□	0.27	20	25	M, K	150	0.50	250
SMI 1206 FT R33□□□	0.33	20	25	M, K	145	0.60	250
SMI 1206 FT R39□□□	0.39	25	25	M, K	135	0.50	200
SMI 1206 FT R47□□□	0.47	25	25	M, K	125	0.60	200
SMI 1206 FT R56□□□	0.56	25	25	M, K	115	0.70	150
SMI 1206 FT R68□□□	0.68	25	25	M, K	105	0.80	150
SMI 1206 FT R82□□□	0.82	25	25	M, K	100	0.90	150
SMI 1206 FT 1R0□□□	1.00	45	10	M, K	75	0.40	100
SMI 1206 FT 1R2□□□	1.20	45	10	M, K	65	0.50	100
SMI 1206 FT 1R5□□□	1.20	45	10	M, K	60	0.50	80
SMI 1206 FT 1R8□□□	1.80	45	10	M, K	55	0.50	70
SMI 1206 FT 2R2□□□	2.20	45	10	M, K	50	0.60	60
SMI 1206 FT 2R7□□□	2.70	45	10	M, K	45	0.60	60
SMI 1206 FT 3R3□□□	3.30	45	10	M, K	41	0.70	60
SMI 1206 FT 3R9□□□	3.90	45	10	M, K	38	0.80	50
SMI 1206 FT 4R7□□□	4.70	45	10	M, K	35	0.90	50
SMI 1206 FT 5R6□□□	5.60	45	4	M, K	32	0.70	25
SMI 1206 FT 6R8□□□	6.80	45	4	M, K	29	0.80	25
SMI 1206 FT 8R2□□□	8.20	45	4	M, K	26	0.90	25
SMI 1206 FT 100□□□	10.0	45	2	M, K	24	1.00	25
SMI 1206 FT 120□□□	12.0	45	2	M, K	22	1.05	15
SMI 1206 FT 150□□□	15.0	35	1	M, K	19	0.70	5
SMI 1206 FT 180□□□	18.0	35	1	M, K	18	0.75	5
SMI 1206 FT 220□□□	22.0	35	1	M, K	16	0.90	5
SMI 1206 FT 270□□□	27.0	35	1	M, K	14	0.90	5
SMI 1206 FT 330□□□	33.0	35	1	M, K	13	1.05	5

- * Tolerance: M=±20%, K=±10%
- * Operating Temperature: -40°C to +125°C
- * Inductance & Q value measured in HP4291B
- * SRF measured in HP4291B
- * DC Resistance RDC measured in Agilent 34401A
- * Unspecified values available on request.

■ **Soldering Profile**

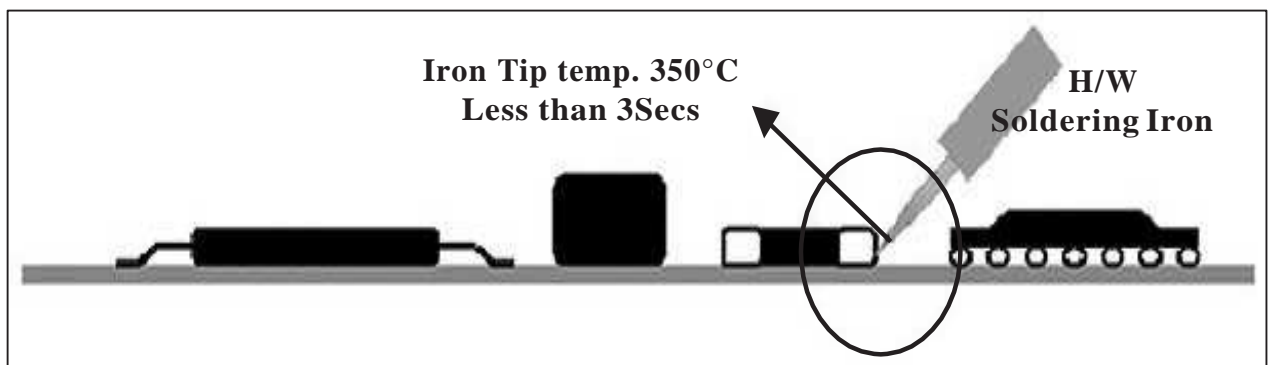
Reflow Soldering

Typical RoHS Reflow Profile



Manual Soldering

Soldering iron tip temperature: 350°C max / within 3 seconds.



MULTILAYER CHIP INDUCTOR

SMI SERIES

■ Specification & Test Method

Mechanical Characteristics

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. *For 0402, substrate dimension is 100x40x0.8 mm
Vibration		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

Electrical Characteristics

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

Climatic Characteristics

Item	Requirement	Test Method															
Damp Heat with Load	Appearance: No damage L change: within $\pm 10\%$ of initial value Q change: within $\pm 30\%$ of initial value	Temperature: 40 \pm 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\pm3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25\pm2</td> <td>3</td> </tr> <tr> <td>3</td> <td>85\pm3</td> <td>30</td> </tr> <tr> <td>4</td> <td>25\pm2</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 \pm 3	30	2	25 \pm 2	3	3	85 \pm 3	30	4	25 \pm 2	3
Step		Temperature (°C)	Time (min.)														
1		-25 \pm 3	30														
2	25 \pm 2	3															
3	85 \pm 3	30															
4	25 \pm 2	3															
High Temperature Resistance	Temperature: 85 \pm 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 \pm 3°C Relative Humidity: 0% Time: 1000 hrs Measured after exposure in the room condition for 24 hrs																

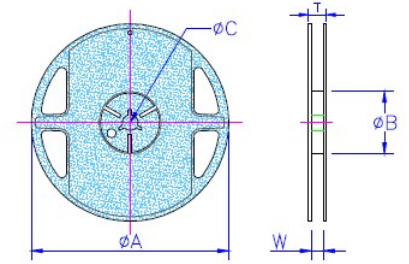
MULTILAYER CHIP INDUCTOR

SMI SERIES

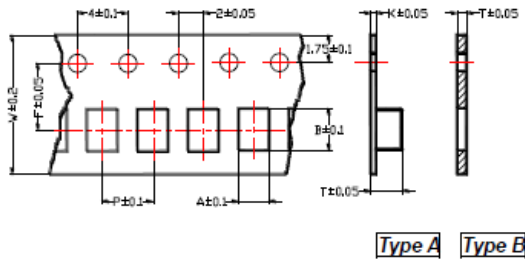
■ Packaging

Packaging Quantity & Reel Specifications

Type	ΦA	ΦB	ΦC	W	T	Q'TY
SMI0603	178±2.0	60±0.5	13±0.3	9±0.3	12±1.0	4000
SMI0805(≤2.2uH)	178±2.0	60±0.5	13±0.3	9±0.3	12±1.0	4000
SMI0805(≥2.7uH)	178±2.0	60±0.5	13±0.3	12±0.3	12±1.0	3000
SMI1206	178±2.0	60±0.5	13±0.3	9±0.3	12±1.0	3000



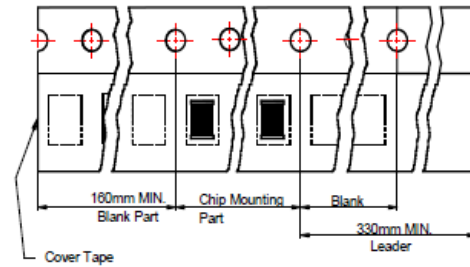
Taping Specifications



Type A **Type B**

Tape Material

Carrier tape : Polystyrene for 0805(≤2.2uH) 1206
Paper for 0603 0805(≥2.7uH)
Cover type : Polystyrene



Unit: mm

Type	A	B	T	W	P	F	K	Tape Type
SMI0603	1.05	1.85	0.95	8.0	4.0	3.5	-	B
SMI0805(≤2.2uH)	1.50	2.42	0.95	8.0	4.0	3.5	-	B
SMI0805(≥2.7uH)	1.50	2.35	1.45	8.0	4.0	3.5	0.22	A
SMI1206	1.88	3.50	1.27	8.0	4.0	3.5	0.22	A