

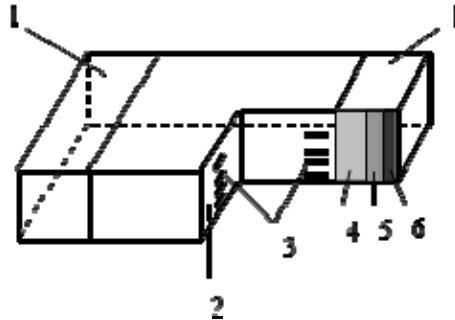
# 叠层片式电感器

## Multilayer Chip Inductors

1、适用范围：该规格书适合于本公司提供的叠层片式电感器。

Apply : The specification is only suited with the multiplayer chip inductors provided by suzhou Gujing Electronics CO.,LTD.

2、产品结构 (Structure)



- 1. 端电极 (External electrode)
- 2. 铁氧体&陶瓷材料 (Ferrites or Ceramics)
- 3. 内电极 (Internal electrode)
- 4. Ag 端电极
- 5. Ni 隔离层
- 6. Sn 保护层

3、产品命名 (Product Identification) :

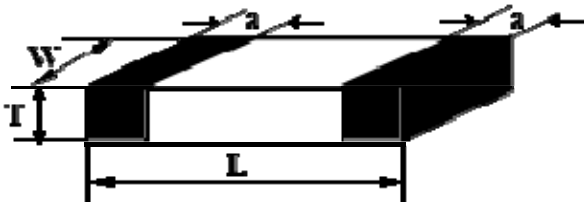
**GSTLI—3216—100—K—T**

①                      ②                      ③                      ④                      ⑤

① 产品系列 (Product class)

代码 (codes)	种类 (Types)
GSTLI	低频电感 (Low Frequency inductors)

②、外形尺寸 (External dimensions)



尺寸 Dimension	L	W	T	a
代码 Codes	mm (inch)	mm (inch)	mm (inch)	mm (inch)
<b>3216</b> (1206)	3.2±0.2 (0.126±0.008)	1.6±0.2 (0.063±0.008)	0.8±0.15 (0.03±0.006) 1.1±0.3 (0.043±0.012)	0.5±0.3 (0.020±0.012)

③ 标称感量&阻抗 (Rated Inductance & Impedance codes)

电感 (Inductor)	
代码 Codes	电感量 Inductance
1N0	1.0nH
10N	10nH
R10	0.1 $\mu$ H
1R0	1.0 $\mu$ H
100	10 $\mu$ H
101	100 $\mu$ H
102	1000 $\mu$ H

④ 标称偏差 (Rate Tolerance)

代码 Codes	允差 Tolerance
C	$\pm 0.2nH$
S	$\pm 0.3nH$
D	$\pm 0.5nH$
J	$\pm 5\%$
K	$\pm 10\%$
M	$\pm 20\%$
P	$\pm 25\%$

⑤ 包装方式 (Packing Type)

代码 Codes	方式 Type
T	盘装 (Tape)
B	散装 (Bulk)

4、测试要求 (Testing requirements)

项目 (Items)	内容 (Content)
环境要求 (Environment Required)	温度 (Temperature) : 10 $^{\circ}$ C-30 $^{\circ}$ C, 湿度 (Humidity) : 45%-75%RH。
测试仪器 (Testing Equipment)	电感量&品质因数&阻抗: HP4291B 阻抗分析仪&HP16192A 夹具。 Inductance & Q factor & Impedance: HP4291B Impedance analyzer & Fixture HP16192A。 直流电阻: HP4338B 毫欧表&HP16143B 夹具。 Dc resistance: HP4338B milliohm meter & fixture HP16143B.
测试条件 (Testing Conditions)	电感量、品质因数: 50mV 阻抗: 500mV 测试频率: 详见“5. 样品性能指标”。 Inductance、Q factors : 50mV Impedance: 500mV test frequency: View to “10.electrical characteristics”

## 5、电气性能 (Electrical characteristics)

## STLI3216 系列

产品代号 Product Code	Ls( $\mu$ H)	Q min	Ir(mA) max	Rdc( $\Omega$ ) max	自谐振频率 (MHz) min	测试 频率 MHz	测试 电压	产品厚度 (mm)	数量 QTY
GSTLI3216-47NK	0.047	30	300	0.15	1000	50	50mV	0.8±0.15	Pcs
GSTLI3216-56NK	0.056	30	300	0.20	850	50	50mV	0.8±0.15	Pcs
GSTLI3216-R10K	0.10	35	250	0.25	350	25	50mV	0.8±0.15	Pcs
GSTLI3216-R15K	0.15	35	250	0.30	250	25	50mV	0.8±0.15	Pcs
GSTLI3216-R22K	0.22	35	250	0.40	170	25	50mV	0.8±0.15	Pcs
GSTLI3216-R27K	0.27	35	250	0.50	150	25	50mV	0.8±0.15	Pcs
GSTLI3216-R39K	0.39	35	200	0.65	135	25	50mV	0.8±0.15	Pcs
GSTLI3216-R56K	0.56	35	200	0.70	115	25	50mV	0.8±0.15	Pcs
GSTLI3216-R68K	0.68	35	200	0.80	105	25	50mV	0.8±0.15	Pcs
GSTLI3216-R82K	0.82	35	200	0.90	<b>100</b>	25	50mV	0.8±0.15	Pcs
GSTLI3216-1R0K	1.0	45	100	0.40	85	10	50mV	0.8±0.15	Pcs
GSTLI3216-1R2K	1.2	45	100	0.50	75	10	50mV	0.8±0.15	Pcs
GSTLI3216-1R5K	1.5	45	80	0.50	70	10	50mV	0.8±0.15	Pcs
GSTLI3216-1R8K	1.8	45	80	0.50	65	10	50mV	0.8±0.15	Pcs
GSTLI3216-2R2K	2.2	45	80	0.60	60	10	50mV	0.8±0.15	Pcs
GSTLI3216-2R7K	2.7	45	80	0.60	55	10	50mV	0.8±0.15	Pcs
GSTLI3216-3R3K	3.3	45	50	0.70	50	10	50mV	0.8±0.15	Pcs
GSTLI3216-3R9K	3.9	45	50	0.80	48	10	50mV	0.8±0.15	Pcs
GSTLI3216-4R7K	4.7	45	50	0.90	45	10	50mV	0.8±0.15	Pcs
GSTLI3216-5R6K	5.6	50	30	0.70	42	4	50mV	0.8±0.15	Pcs
GSTLI3216-6R8K	6.8	50	30	0.80	38	4	50mV	0.8±0.15	Pcs
GSTLI3216-8R2K	8.2	50	30	0.90	35	4	50mV	0.8±0.15	Pcs
GSTLI3216-100K	10	50	30	1.00	32	2	50mV	0.8±0.15	Pcs
GSTLI3216-120K	12	50	30	1.10	28	2	50mV	0.8±0.15	Pcs
GSTLI3216-180K	18	40	15	0.90	18	1	50mV	0.8±0.15	Pcs
GSTLI3216-220K	22	40	15	1.10	16	1	50mV	0.8±0.15	Pcs
GSTLI3216-270K	27	40	15	1.30	14	1	50mV	0.8±0.15	Pcs
GSTLI3216-330K	33	40	15	2.00	13	1	50mV	0.8±0.15	Pcs
GSTLI3216-390K	39	35	15	2.25	11	1	50mV	0.8±0.15	Pcs
GSTLI3216-470K	47	35	10	2.40	10	1	50mV	0.8±0.15	Pcs
GSTLI3216-560K	56	35	10	2.55	9	1	50mV	0.8±0.15	Pcs
GSTLI3216-680K	68	35	10	2.70	9	1	50mV	0.8±0.15	Pcs
GSTLI3216-820K	82	35	10	2.95	8	1	50mV	0.8±0.15	Pcs
GSTLI3216-101K	100	35	10	3.15	8	1	50mV	0.8±0.15	Pcs
GSTLI3216-151K	150	35	5	3.45	7	1	50mV	0.8±0.15	Pcs
GSTLI3216-181K	180	35	5	3.60	7	1	50mV	0.8±0.15	Pcs
GSTLI3216-221K	220	35	3	3.75	7	1	50mV	0.8±0.15	Pcs
GSTLI3216-271K	270	35	3	4.00	7	1	50mV	0.8±0.15	Pcs

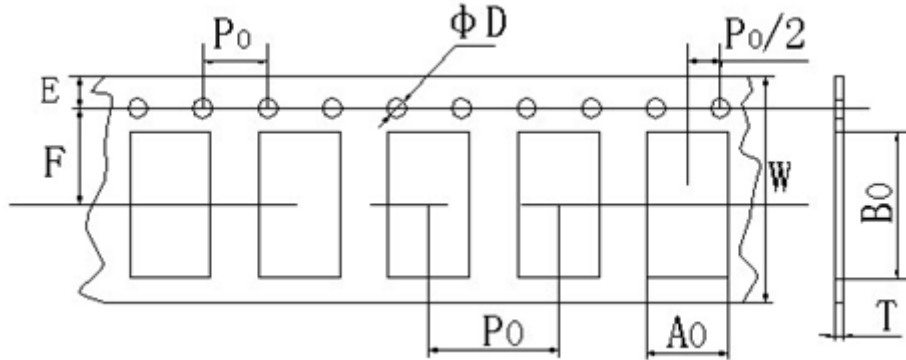
## 6、包装(Packaging specification)

### 1) 纸制载带(Paper belt)

材料(Material):

载带(Load belt): 纸板(Paper)

盖带(Cover belt): 聚乙烯(Polyethylene)



尺寸(Dimensions):

单位(Units): mm

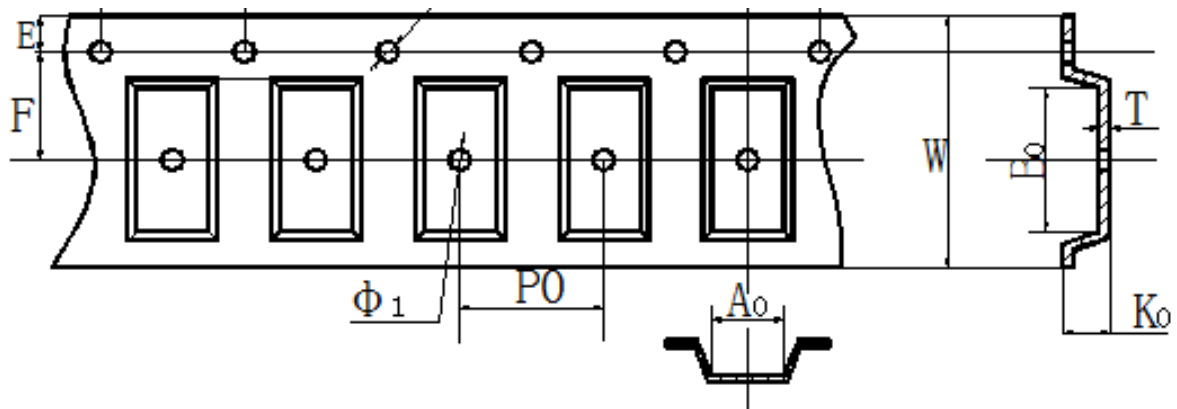
代号(Codes)	A0	B0	ΦD	E	F	P0	T	W
3216	1.78±0.10	3.48±0.10	1.50	1.75	3.50	4.00	0.95	8.00

### 2). 塑料载带(Plastic belt)

材料(Materials):

载带(Load belt): 聚碳酸酯(Polycarbonate)

盖带(Cover belt): 聚乙烯(Polyethylene)



尺寸(Dimensions):

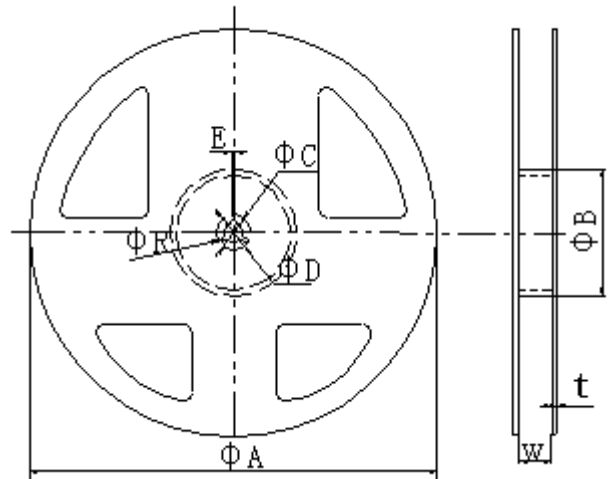
单位(Unit): mm

	A0	B0	K0	Φ	Φ1	E	F	P0	T	W
321611	1.78± 0.10	3.48± 0.10	1.10±0.10	1.50	1.00	1.75	3.50	4.00	0.23	8.00

3). 卷轮 (Reel)

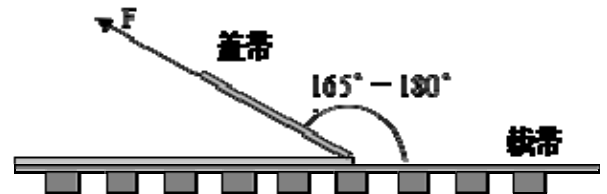
单位(Unit): mm[inch]

<b>A</b>	<b>B</b>
178±2 [7.008±0.079]	60±1 [2.362±0.039]
<b>C</b>	<b>D</b>
13.0±0.5 [0.512±0.020]	21.0±0.8 [0.827±0.031]
<b>E</b>	<b>W</b>
2.0±0.5 [0.079±0.020]	10.0±1.0 [0.394±0.039]
<b>t</b>	<b>R</b>
2.0±0.5 [0.079±0.020]	1.0 [0.039]



4). 盖带剥离强度 (Separate strength)

项目 (Item)	指标 (Requirements)
剥离速度 (Separate speed)	300mm/min
剥离拉力 (Separate strength)	0.3-0.7N
剥离角度 (Separate angle)	165° - 180°



5). 包装数量 (Chip quantities per reel)

产品规格 Type or serial	产品厚度 (mm) Height	数量 (pcs) /Reel	
		纸带 (Paper belt)	胶带 (Plastic belt)
3216	0.8±0.15	4000	
	1.1±0.3		3000

7、可靠性及测试条件 (Reliability and Test Method)

项目 Items	实验条件 Test Conditions	要求 Requirements																					
1. 使用温度范围 Operating Temperature Range	GSTLI 系列: $-40^{\circ}\text{C}$ ~ $+85^{\circ}\text{C}$ GSTLI Series: $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$																						
2. 储存温度范围 Storage Temperature Range	载带盘装: $0^{\circ}\text{C}$ ~ $60^{\circ}\text{C}$ ; packed with tape & reel: $0^{\circ}\text{C}$ to $60^{\circ}\text{C}$ ; 散装: GSTLI 系列: $-40^{\circ}\text{C}$ ~ $+85^{\circ}\text{C}$ Bulk: GSTLI Series : $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$																						
3. 可焊性 Solderability	预热: $120^{\circ}\text{C}$ ~ $150^{\circ}\text{C}$ 时间 60 秒 焊剂: Sn-Ag2.5-Cu0.5 焊接温度: $255 \pm 5^{\circ}\text{C}$ 助焊剂: 松香 浸焊时间: $4 \pm 1\text{s}$ Preheat: $120^{\circ}\text{C}$ to $150^{\circ}\text{C}$ , 60 seconds Solder: Sn-Ag2.5-Cu0.5 Solder temperature: $255 \pm 5^{\circ}\text{C}$ Flux: Rosin Dip time: $4 \pm 1$ seconds	超过 90% 的端电极被焊锡覆盖  More than 90% of the terminal electrode shall be covered with solder.																					
4. 耐焊接热 Soldering Heat Resistance	预热: $120^{\circ}\text{C}$ ~ $150^{\circ}\text{C}$ 时间 60 秒 焊剂: Sn-Ag2.5-Cu0.5 焊接温度: $260 \pm 5^{\circ}\text{C}$ 助焊剂: 松香 浸焊时间: $10 \pm 1\text{s}$ Preheat: $120^{\circ}\text{C}$ to $150^{\circ}\text{C}$ , 60 seconds Solder: Sn-Ag2.5-Cu0.5 Solder temperature: $260 \pm 5^{\circ}\text{C}$ Flux: Rosin Dip time: $10 \pm 1$ seconds	超过 75% 的端电极被焊锡覆盖且器件不应破裂  The chip shall not be cracked. More than 75% of terminal electrode shall be covered with solder.																					
5. 附着力 Terminal Strength	<table border="1"> <thead> <tr> <th>Type</th> <th>F(kgf)</th> <th>Time(S)</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.1</td> <td><math>30 \pm 5</math></td> </tr> <tr> <td>1608</td> <td>0.2</td> <td><math>30 \pm 5</math></td> </tr> <tr> <td>2012</td> <td>0.4</td> <td><math>30 \pm 5</math></td> </tr> <tr> <td>3216</td> <td>0.5</td> <td><math>30 \pm 5</math></td> </tr> <tr> <td>3225</td> <td>1.0</td> <td><math>30 \pm 5</math></td> </tr> <tr> <td>4532</td> <td>1.5</td> <td><math>30 \pm 5</math></td> </tr> </tbody> </table> 	Type	F(kgf)	Time(S)	1005	0.1	$30 \pm 5$	1608	0.2	$30 \pm 5$	2012	0.4	$30 \pm 5$	3216	0.5	$30 \pm 5$	3225	1.0	$30 \pm 5$	4532	1.5	$30 \pm 5$	实验过程及结束后, 端电极以及瓷体不应破裂  The terminal electrode and the ferrite shall not be damaged by the forces applied
Type	F(kgf)	Time(S)																					
1005	0.1	$30 \pm 5$																					
1608	0.2	$30 \pm 5$																					
2012	0.4	$30 \pm 5$																					
3216	0.5	$30 \pm 5$																					
3225	1.0	$30 \pm 5$																					
4532	1.5	$30 \pm 5$																					
6. 抗弯强度 Bending Strength	<table border="1"> <thead> <tr> <th>Type</th> <th>L(mm)</th> <th>N(kgf)</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.5</td> <td>1.0</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>1.5</td> </tr> <tr> <td>2012</td> <td>1.4</td> <td>2.5</td> </tr> <tr> <td>3216</td> <td>2.0</td> <td>3.0</td> </tr> <tr> <td>3225</td> <td>2.0</td> <td>3.2</td> </tr> <tr> <td>4532</td> <td>2.5</td> <td>4.5</td> </tr> </tbody> </table> 	Type	L(mm)	N(kgf)	1005	0.5	1.0	1608	1.0	1.5	2012	1.4	2.5	3216	2.0	3.0	3225	2.0	3.2	4532	2.5	4.5	实验过程及结束后, 端电极以及瓷体不应破裂  The chips shall not be damaged by the forces applied, under proper condition.
Type	L(mm)	N(kgf)																					
1005	0.5	1.0																					
1608	1.0	1.5																					
2012	1.4	2.5																					
3216	2.0	3.0																					
3225	2.0	3.2																					
4532	2.5	4.5																					

可靠性及测试条件 (续)  
Reliability and Test Method(Continue)

<p>7. 高温寿命 High Temperature Resistance</p>	<p>实验温度: 85±2℃ 实验时间: 1000h 施加电流: 额定电流 实验方法: 将器件焊接在 PCB 板上</p> <p>Temperature: 85±2℃ Testing time: 1000h Applied current: Rated current Mounted method: Soldering onto PCB board.</p>	<ul style="list-style-type: none"> <li>● 实验结束后 24 小时测量</li> <li>● 瓷体不被破坏, 外观应合格</li> <li>● 对片式电感器: 电感量变化率: <math>L_s \leq 1000\text{nH}</math>, 不超过 ±10% <math>1000\text{nH} &lt; L_s &lt; 10 \mu\text{H}</math>, 不超过 ±20% <math>L_s \geq 10 \mu\text{H}</math>, 不超过 ±30% 品质因数变化率: ±30%</li> </ul>
<p>8. 恒定湿热 Humidity Resistance</p>	<p>湿度: 90% ~ 95% 温度: 40±2℃ 实验时间: 21 天 实验方法: 将器件焊接在 PCB 板上</p> <p>Humidity: 90 to 95% RH Temperature: 40±2℃ Testing time: 21days Mounted method: Soldering onto PCB board.</p>	<ul style="list-style-type: none"> <li>● 对片式磁珠: 阻抗变化率: ±30%</li> </ul>
<p>9. 温度变化 Thermal Shock</p>	<p>温度: -40℃ ±3℃ ~ +85℃ ±3℃ ~ -40℃ ±3℃ 每个温度点保持 30 分钟 循环周期: 32 个 实验方法: 将器件焊接在 PCB 板上</p> <p>Temperature: -40℃ ±3℃ — +85℃ ±3℃ — -40℃ ±3℃ kept stabilized for 30 minutes each . Cycles: 32 cycles Mounted method: soldering onto PCB board.</p>	<ul style="list-style-type: none"> <li>● The appearance of chips shall not be damaged.</li> <li>● Measured after testing for 24 hours</li> <li>● For multilayer chip inductors: <math>L_s \leq 1000\text{nH}</math>, <math>L_s</math> changed within ±10% of the initial value. <math>1000\text{nH} &lt; L_s &lt; 10 \mu\text{H}</math>, <math>L_s</math> changed within ±20% of the initial value. <math>L_s \geq 10 \mu\text{H}</math>, <math>L_s</math> changed within ±30% of the initial value.</li> </ul>
<p>9. 振动 Vibration</p>	<p>频率: 10-55-10Hz 振幅: 1.50mm 振动方向: X、Y、Z 三个方向各 20 次。</p> <p>Frequency range: 10-55-10Hz Amplitude: 1.50mm Directions: 20 times in each directions : X, Y and Z.</p>	<ul style="list-style-type: none"> <li>● For multilayer chip beads: <math> Z </math> changed within ±30% of the initial value.</li> </ul>
<p>10. 抗溶性 Solvent Resistance</p>	<p>溶剂: 三氯乙烯 清洗方式: 100 瓦的超声清洗机 清洗时间: 3 分钟</p> <p>Solvent: Trichloroethylene Washer: Ultrasonic washer(100w) Washing time: 3min</p>	