



CCTC
三环集团

潮州三环（集团）股份有限公司
Chaozhou Three-Circle (Group) Co., Ltd.

地址：广东省潮州市凤塘三环工业城

邮编(Post Code)：515646

ADD：San Huan Industrial District ,Feng Tang Chao Zhou,GuangDong,China

承 认 书

SPECIFICATION FOR APPROVAL

客户名称：

CUSTOMER:

产品名称

叠层片式陶瓷电感

PARTNAME:

Multilayer Chip Ceramic Inductor

产品规格：

TCGL0603C 系列

SPECIFICATION:

承认书编号：

APPROVAL SHEET NO.:

DRAAW201A/0

发出日期：

ISSUED DATE:

制造 MANUFACTURER			客户 CUSTOMER		
批准 APPROVED	审核 CHECKED	经办 PREPARED	批准 APPROVED	审核 CHECKED	经办 PREPARED
梁俊	张磊	兀松			

潮州三环（集团）股份有限公司

地址：中国广东省潮州市凤塘三环工业城（潮州总部）

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MLCC事业部

品管课



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文件编号	DRAAW201A/0			页数	19
文件名称	叠层片式陶瓷电感(产品承认书)			制订日期	2022.9
版数	制定、修订日期	页数	制定、修订内容		登记者
A/0	2022-09-16	19	新制定		兀松

Document Serial No.	DRAAW201A/0			Page	19
Document Name	Specification for Multilayer Chip Ceramic Inductor			Set Date	2022.9
Version	Change Date	Pages	Content of Change		Registrant
A/0	2022-09-16	19	New Set		Song Wu



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ADD：San Huan Industrial District ,Feng Tang Chao Zhou,GuangDong,China

产品标准书 SPECIFICATION FOR APPROVAL	编号 Document No.
	DRAAW201A/0

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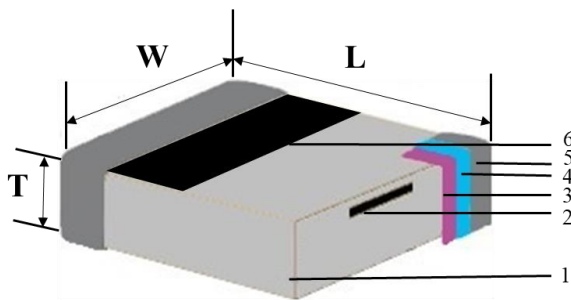
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1. 特性 Features

- (1) 高频电路使用的电感器
 - (2) 封闭式结构设计，具有高可靠性
 - (3) 工作温度范围：-55~ +125°C
- (1) Inductors used in high frequency circuits
 (2) Closed structure design with high reliability
 (3) Operating temperature range: -55~ +125°C

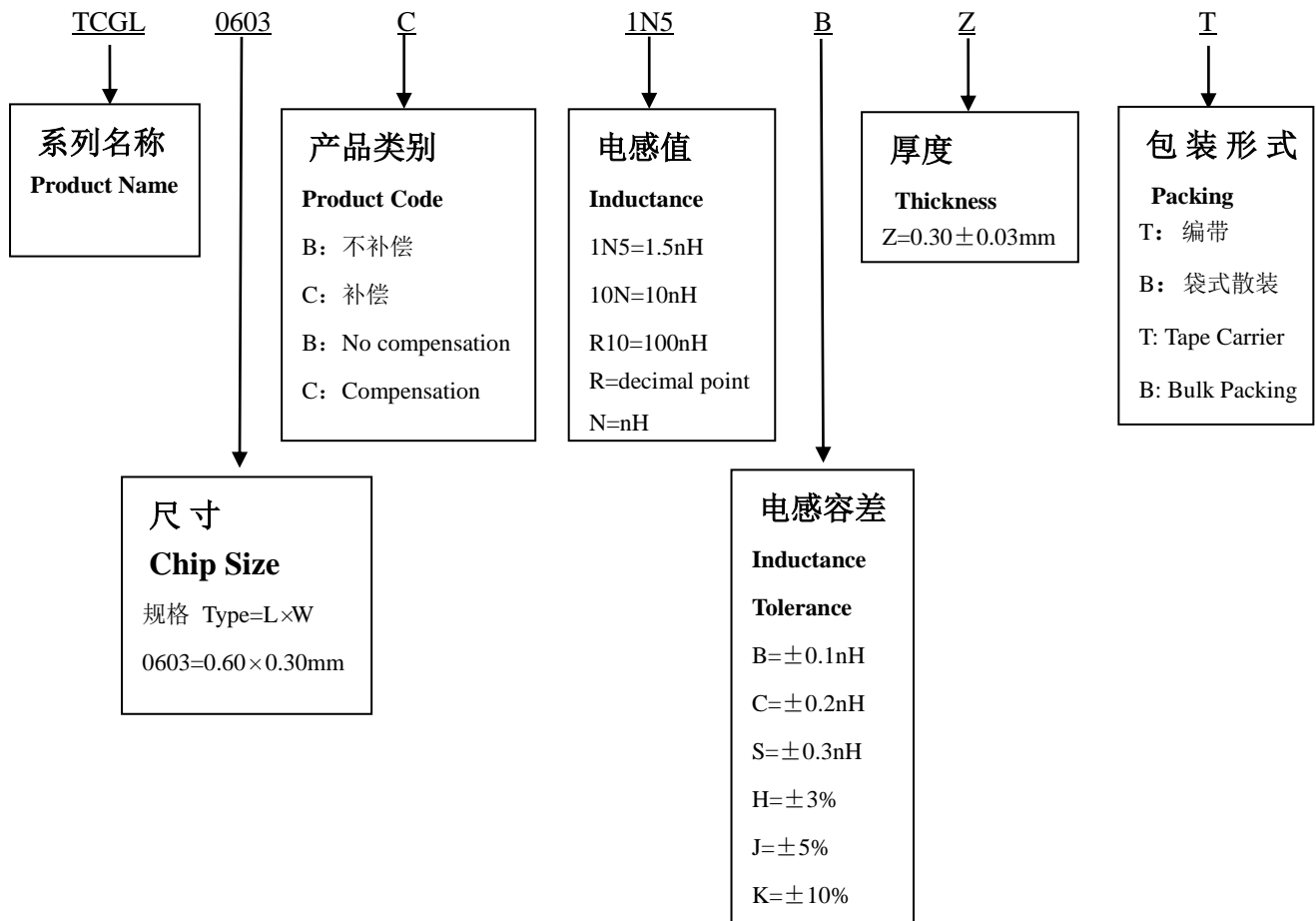
2. 产品结构 Product Frame



序号 Number	名称 Name
1	陶瓷介质 Ceramic
2	内电极 Inner electrode
3	外电极 External electrode
4	镍层 Nickel coating
5	锡层 Tin coating
6	标记 Mark

3. 产品规格型号命名规则 General Product Parts Numbering System

(例) (example)

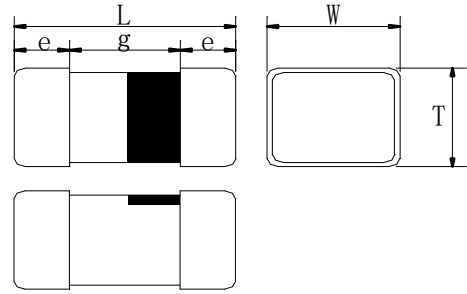




4.产品尺寸 Dimensions

规格： 0603

Chip Size： 0603



规格 Type	L(mm)	W(mm)	T(mm)	e(mm)	g min(mm)
0603	0.60±0.03	0.30±0.03	0.30±0.03	0.15±0.05	0.2

5.型号一览 Part Numbers

5.1 特性规格表 Specifications

规格型号	L 值		Q 值	L/Q 测定 频率	典型 Q 值					自共振频率	直流电阻	额定电 流
	标称值	容差			Typical Q @ Freq.							
Part Number	Nominal Value	Tolerance	Q Factor	L/Q Test Freq.	500	800	1800	2000	2400	Self-resonant Frequency	DC.Resistance	Rated Current
—	(nH)	—	min.	(MHz)	(MHz)					(MHz)min.	(Ω)max.	(mA)
TCGL0603C0N6BZT	0.6	±0.1nH	13	500	>16	>22	>35	>37	>41	10000	0.06	850
TCGL0603C0N6CZT	0.6	±0.2nH	13	500	>16	>22	>35	>37	>41	10000	0.06	850
TCGL0603C0N6SZT	0.6	±0.3nH	13	500	>16	>22	>35	>37	>41	10000	0.06	850
TCGL0603C0N7BZT	0.7	±0.1nH	13	500	>16	>22	>35	>37	>41	10000	0.06	800
TCGL0603C0N7CZT	0.7	±0.2nH	13	500	>16	>22	>35	>37	>41	10000	0.06	800
TCGL0603C0N7SZT	0.7	±0.3nH	13	500	>16	>22	>35	>37	>41	10000	0.06	800
TCGL0603C0N8BZT	0.8	±0.1nH	13	500	16	22	35	37	41	10000	0.07	800
TCGL0603C0N8CZT	0.8	±0.2nH	13	500	16	22	35	37	41	10000	0.07	800
TCGL0603C0N8SZT	0.8	±0.3nH	13	500	16	22	35	37	41	10000	0.07	800
TCGL0603C0N9BZT	0.9	±0.1nH	13	500	17	22	35	37	41	10000	0.07	750
TCGL0603C0N9CZT	0.9	±0.2nH	13	500	17	22	35	37	41	10000	0.07	750
TCGL0603C0N9SZT	0.9	±0.3nH	13	500	17	22	35	37	41	10000	0.07	750
TCGL0603C1N0BZT	1.0	±0.1nH	13	500	16	21	33	36	40	10000	0.08	750
TCGL0603C1N0CZT	1.0	±0.2nH	13	500	16	21	33	36	40	10000	0.08	750
TCGL0603C1N0SZT	1.0	±0.3nH	13	500	16	21	33	36	40	10000	0.08	750
TCGL0603C1N1BZT	1.1	±0.1nH	13	500	17	23	36	38	43	10000	0.10	750
TCGL0603C1N1CZT	1.1	±0.2nH	13	500	17	23	36	38	43	10000	0.10	750
TCGL0603C1N1SZT	1.1	±0.3nH	13	500	17	23	36	38	43	10000	0.10	750
TCGL0603C1N2BZT	1.2	±0.1nH	13	500	18	24	38	40	45	10000	0.10	750
TCGL0603C1N2CZT	1.2	±0.2nH	13	500	18	24	38	40	45	10000	0.10	750
TCGL0603C1N2SZT	1.2	±0.3nH	13	500	18	24	38	40	45	10000	0.10	750
TCGL0603C1N3BZT	1.3	±0.1nH	13	500	17	22	34	36	40	10000	0.12	600



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TCGL0603C1N3CZT	1.3	±0.2nH	13	500	17	22	34	36	40	10000	0.12	600
TCGL0603C1N3SZT	1.3	±0.3nH	13	500	17	22	34	36	40	10000	0.12	600
TCGL0603C1N4BZT	1.4	±0.1nH	13	500	18	23	36	39	43	10000	0.12	600
TCGL0603C1N4CZT	1.4	±0.2nH	13	500	18	23	36	39	43	10000	0.12	600
TCGL0603C1N4SZT	1.4	±0.3nH	13	500	18	23	36	39	43	10000	0.12	600
TCGL0603C1N5BZT	1.5	±0.1nH	13	500	17	22	33	35	39	10000	0.12	600
TCGL0603C1N5CZT	1.5	±0.2nH	13	500	17	22	33	35	39	10000	0.12	600
TCGL0603C1N5SZT	1.5	±0.3nH	13	500	17	22	33	35	39	10000	0.12	600
TCGL0603C1N6BZT	1.6	±0.1nH	13	500	17	22	33	35	38	10000	0.13	600
TCGL0603C1N6CZT	1.6	±0.2nH	13	500	17	22	33	35	38	10000	0.13	600
TCGL0603C1N6SZT	1.6	±0.3nH	13	500	17	22	33	35	38	10000	0.13	600
TCGL0603C1N7BZT	1.7	±0.1nH	13	500	17	22	33	35	39	10000	0.15	600
TCGL0603C1N7CZT	1.7	±0.2nH	13	500	17	22	33	35	39	10000	0.15	600
TCGL0603C1N7SZT	1.7	±0.3nH	13	500	17	22	33	35	39	10000	0.15	600
TCGL0603C1N8BZT	1.8	±0.1nH	13	500	17	22	34	35	39	9000	0.15	600
TCGL0603C1N8CZT	1.8	±0.2nH	13	500	17	22	34	35	39	9000	0.15	600
TCGL0603C1N8SZT	1.8	±0.3nH	13	500	17	22	34	35	39	9000	0.15	600
TCGL0603C1N9BZT	1.9	±0.1nH	13	500	18	24	36	38	42	9000	0.15	600
TCGL0603C1N9CZT	1.9	±0.2nH	13	500	18	24	36	38	42	9000	0.15	600
TCGL0603C1N9SZT	1.9	±0.3nH	13	500	18	24	36	38	42	9000	0.15	600
TCGL0603C2N0BZT	2.0	±0.1nH	13	500	17	24	38	39	44	8500	0.15	600
TCGL0603C2N0CZT	2.0	±0.2nH	13	500	17	24	38	39	44	8500	0.15	600
TCGL0603C2N0SZT	2.0	±0.3nH	13	500	17	24	38	39	44	8500	0.15	600
TCGL0603C2N1BZT	2.1	±0.1nH	13	500	17	24	37	39	44	8000	0.15	600
TCGL0603C2N1CZT	2.1	±0.2nH	13	500	17	24	37	39	44	8000	0.15	600
TCGL0603C2N1SZT	2.1	±0.3nH	13	500	17	24	37	39	44	8000	0.15	600
TCGL0603C2N2BZT	2.2	±0.1nH	13	500	17	24	38	40	43	7500	0.15	600
TCGL0603C2N2CZT	2.2	±0.2nH	13	500	17	24	38	40	43	7500	0.15	600
TCGL0603C2N2SZT	2.2	±0.3nH	13	500	17	24	38	40	43	7500	0.15	600
TCGL0603C2N3BZT	2.3	±0.1nH	13	500	17	24	37	39	43	7500	0.20	500
TCGL0603C2N3CZT	2.3	±0.2nH	13	500	17	24	37	39	43	7500	0.20	500
TCGL0603C2N3SZT	2.3	±0.3nH	13	500	17	24	37	39	43	7500	0.20	500
TCGL0603C2N4BZT	2.4	±0.1nH	13	500	16	21	31	33	36	7500	0.20	500
TCGL0603C2N4CZT	2.4	±0.2nH	13	500	16	21	31	33	36	7500	0.20	500
TCGL0603C2N4SZT	2.4	±0.3nH	13	500	16	21	31	33	36	7500	0.20	500
TCGL0603C2N5BZT	2.5	±0.1nH	13	500	17	22	33	34	38	7500	0.20	500
TCGL0603C2N5CZT	2.5	±0.2nH	13	500	17	22	33	34	38	7500	0.20	500
TCGL0603C2N5SZT	2.5	±0.3nH	13	500	17	22	33	34	38	7500	0.20	500
TCGL0603C2N6BZT	2.6	±0.1nH	13	500	17	22	33	35	38	7500	0.20	500
TCGL0603C2N6CZT	2.6	±0.2nH	13	500	17	22	33	35	38	7500	0.20	500
TCGL0603C2N6SZT	2.6	±0.3nH	13	500	17	22	33	35	38	7500	0.20	500
TCGL0603C2N7BZT	2.7	±0.1nH	13	500	17	21	33	35	38	7500	0.20	500
TCGL0603C2N7CZT	2.7	±0.2nH	13	500	17	21	33	35	38	7500	0.20	500
TCGL0603C2N7SZT	2.7	±0.3nH	13	500	17	21	33	35	38	7500	0.20	500



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TCGL0603C2N8BZT	2.8	±0.1nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C2N8CZT	2.8	±0.2nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C2N8SZT	2.8	±0.3nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C2N9BZT	2.9	±0.1nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C2N9CZT	2.9	±0.2nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C2N9SZT	2.9	±0.3nH	13	500	17	22	34	35	39	7500	0.20	500
TCGL0603C3N0BZT	3.0	±0.1nH	13	500	17	22	34	35	39	7500	0.25	450
TCGL0603C3N0CZT	3.0	±0.2nH	13	500	17	21	32	34	37	7500	0.25	450
TCGL0603C3N0SZT	3.0	±0.3nH	13	500	17	21	32	34	37	7500	0.25	450
TCGL0603C3N1BZT	3.1	±0.1nH	13	500	17	21	32	34	37	7500	0.25	450
TCGL0603C3N1CZT	3.1	±0.2nH	13	500	17	22	33	34	37	7500	0.25	450
TCGL0603C3N1SZT	3.1	±0.3nH	13	500	17	22	33	34	37	7500	0.25	450
TCGL0603C3N2BZT	3.2	±0.1nH	13	500	17	22	33	34	37	7500	0.25	450
TCGL0603C3N2CZT	3.2	±0.2nH	13	500	17	22	33	35	39	7500	0.25	450
TCGL0603C3N2SZT	3.2	±0.3nH	13	500	17	22	33	35	39	7500	0.25	450
TCGL0603C3N3BZT	3.3	±0.1nH	13	500	18	22	33	35	38	7500	0.25	450
TCGL0603C3N3CZT	3.3	±0.2nH	13	500	18	22	33	35	38	7500	0.25	450
TCGL0603C3N3SZT	3.3	±0.3nH	13	500	18	22	33	35	38	7500	0.25	450
TCGL0603C3N4BZT	3.4	±0.1nH	13	500	17	23	33	35	39	7000	0.25	450
TCGL0603C3N4CZT	3.4	±0.2nH	13	500	17	23	33	35	39	7000	0.25	450
TCGL0603C3N4SZT	3.4	±0.3nH	13	500	17	23	33	35	39	7000	0.25	450
TCGL0603C3N5BZT	3.5	±0.1nH	13	500	17	23	33	35	39	6500	0.25	450
TCGL0603C3N5CZT	3.5	±0.2nH	13	500	17	23	33	35	39	6500	0.25	450
TCGL0603C3N5SZT	3.5	±0.3nH	13	500	17	23	33	35	39	6500	0.25	450
TCGL0603C3N6BZT	3.6	±0.1nH	13	500	16	23	33	35	39	6500	0.30	400
TCGL0603C3N6CZT	3.6	±0.2nH	13	500	16	23	33	35	39	6500	0.30	400
TCGL0603C3N6SZT	3.6	±0.3nH	13	500	16	23	33	35	39	6500	0.30	400
TCGL0603C3N7BZT	3.7	±0.1nH	13	500	16	23	33	35	38	6500	0.30	400
TCGL0603C3N7CZT	3.7	±0.2nH	13	500	16	23	33	35	38	6500	0.30	400
TCGL0603C3N7SZT	3.7	±0.3nH	13	500	16	23	33	35	38	6500	0.30	400
TCGL0603C3N8BZT	3.8	±0.1nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C3N8CZT	3.8	±0.2nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C3N8SZT	3.8	±0.3nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C3N9BZT	3.9	±0.1nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C3N9CZT	3.9	±0.2nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C3N9SZT	3.9	±0.3nH	13	500	16	22	33	35	38	5800	0.30	400
TCGL0603C4N3HZT	4.3	±3%	13	500	16	21	32	34	37	5800	0.40	350
TCGL0603C4N3JZT	4.3	±5%	13	500	16	21	32	34	37	5800	0.40	350
TCGL0603C4N3SZT	4.3	±0.3nH	13	500	16	21	32	34	37	5800	0.40	350
TCGL0603C4N7HZT	4.7	±3%	13	500	16	21	31	32	34	5500	0.40	350
TCGL0603C4N7JZT	4.7	±5%	13	500	16	21	31	32	34	5500	0.40	350
TCGL0603C4N7SZT	4.7	±0.3nH	13	500	16	21	31	32	34	5500	0.40	350
TCGL0603C5N1HZT	5.1	±3%	13	500	16	21	31	32	34	4000	0.40	350
TCGL0603C5N1JZT	5.1	±5%	13	500	16	21	31	32	34	4000	0.40	350



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TCGL0603C5N1SZT	5.1	±0.3nH	13	500	16	21	31	32	34	4000	0.40	350
TCGL0603C5N6HZT	5.6	±3%	13	500	16	21	33	34	37	4000	0.40	350
TCGL0603C5N6JZT	5.6	±5%	13	500	16	21	33	34	37	4000	0.40	350
TCGL0603C6N2HZT	6.2	±3%	13	500	16	21	30	31	33	4000	0.70	300
TCGL0603C6N2JZT	6.2	±5%	13	500	16	21	30	31	33	4000	0.70	300
TCGL0603C6N8HZT	6.8	±3%	13	500	16	21	29	30	30	4000	0.75	300
TCGL0603C6N8JZT	6.8	±5%	13	500	16	21	29	30	30	4000	0.75	300
TCGL0603C7N5HZT	7.5	±3%	13	500	16	21	30	30	32	4000	0.80	300
TCGL0603C7N5JZT	7.5	±5%	13	500	16	21	30	30	32	4000	0.80	300
TCGL0603C8N2HZT	8.2	±3%	13	500	16	21	31	32	34	4000	0.85	250
TCGL0603C8N2JZT	8.2	±5%	13	500	16	21	31	32	34	4000	0.85	250
TCGL0603C9N1HZT	9.1	±3%	13	500	16	20	30	31	32	4000	0.90	250
TCGL0603C9N1JZT	9.1	±5%	13	500	16	20	30	31	32	4000	0.90	250
TCGL0603C10NHZT	10	±3%	13	500	16	20	28	29	31	3800	0.95	250
TCGL0603C10NJZT	10	±5%	13	500	16	20	28	29	31	3800	0.95	250
TCGL0603C12NHZT	12	±3%	13	500	16	20	27	28	28	3400	1.00	250
TCGL0603C12NJZT	12	±5%	13	500	16	20	27	28	28	3400	1.00	250
TCGL0603C15NHZT	15	±3%	13	500	15	19	24	24	23	2600	1.10	250
TCGL0603C15NJZT	15	±5%	13	500	15	19	24	24	23	2600	1.10	250
TCGL0603C18NHZT	18	±3%	13	500	15	19	23	24	22	2300	1.40	200
TCGL0603C18NJZT	18	±5%	13	500	15	19	23	24	22	2300	1.40	200
TCGL0603C22NHZT	22	±3%	13	500	15	19	22	23	20	2200	1.90	150
TCGL0603C22NJZT	22	±5%	13	500	15	19	22	23	20	2200	1.90	150
TCGL0603C27NHZT	27	±3%	13	500	15	19	15	13	8	2000	2.10	140
TCGL0603C27NJZT	27	±5%	13	500	15	19	15	13	8	2000	2.10	140
TCGL0603C33NHZT	33	±3%	10	300	14	15	8	5	-	1800	2.20	120
TCGL0603C33NJZT	33	±5%	10	300	14	15	8	5	-	1800	2.20	120
TCGL0603C39NHZT	39	±3%	10	300	14	15	6	-	-	1600	2.40	120
TCGL0603C39NJZT	39	±5%	10	300	14	15	6	-	-	1600	2.40	120
TCGL0603C47NHZT	47	±3%	10	300	14	15	-	-	-	1500	2.90	100
TCGL0603C47NJZT	47	±5%	10	300	14	15	-	-	-	1500	2.90	100
TCGL0603C56NHZT	56	±3%	10	300	13	13	-	-	-	1400	3.50	100
TCGL0603C56NJZT	56	±5%	10	300	13	13	-	-	-	1400	3.50	100
TCGL0603C68NHZT	68	±3%	9	300	13	11	-	-	-	1200	3.50	100
TCGL0603C68NJZT	68	±5%	9	300	13	11	-	-	-	1200	3.50	100
TCGL0603C82NHZT	82	±3%	9	300	12	10	-	-	-	1000	4.00	100
TCGL0603C82NJZT	82	±5%	9	300	12	10	-	-	-	1000	4.00	100
TCGL0603CR10HZT	100	±3%	9	300	12	10	-	-	-	900	4.50	80
TCGL0603CR10JZT	100	±5%	9	300	12	10	-	-	-	900	4.50	80
TCGL0603CR12HZT	120	±3%	9	300	12	8	-	-	-	800	5.00	80
TCGL0603CR12JZT	120	±5%	9	300	12	8	-	-	-	800	5.00	80

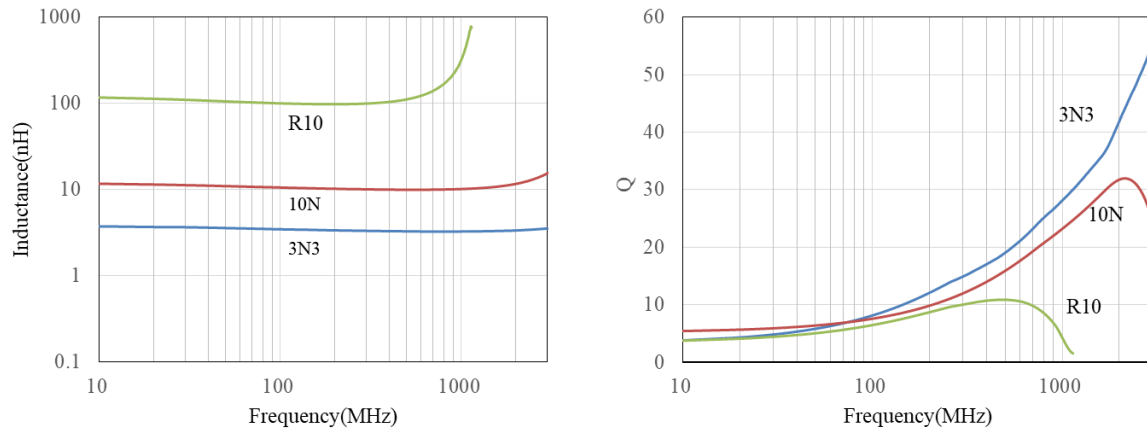
备注：短路块的残留电感值=0.430 nH。

Note: Residual inductance of short chip=0.430 nH.



5.2 典型电性能特性 Typical Electrical Characteristics

5.2.1 L/Q 值频率特性 Inductance/Q vs. Frequency Characteristics



6. 技术要求和测试条件 Specification and Test Condition

6.1 外观 Appearance

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	$l \leq 1/8L, w \leq 1/8W, t \leq 1/8T$ (任意一项不符合, 均判定不合格) $l \leq 1/8L, w \leq 1/8W, t \leq 1/8T$ (None is acceptable, All judged unqualified)	目视检查 Visual Inspection.

6.2 尺寸 Dimensions

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	在要求的范围内 Within the specified dimensions	使用游标卡尺 Using Vernier Caliper

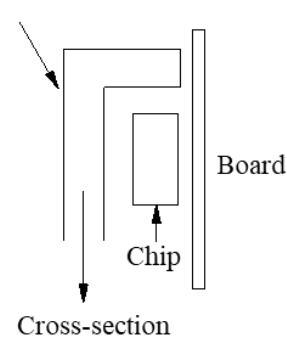
6.3 电性能 Electrical Performances

系列名称 Product Name	电性能 Electrical Performance	测试条件 Testing Condition
TCGL	L 值 Inductance	测试仪器: Keysight E4991A (夹具 Keysight 16197A) 或同等 级其它设备
	Q 值 Q factor	Measuring equipment: Keysight E4991A (Measuring fixture: Keysight 16197A) or the equivalent 测试频率: 0.1~27nH : 500MHz 33~120nH : 300MHz 130~470nH : 100MHz Measuring frequency: 0.1~27nH : 500MHz 33~120nH : 300MHz 130~470nH : 100MHz

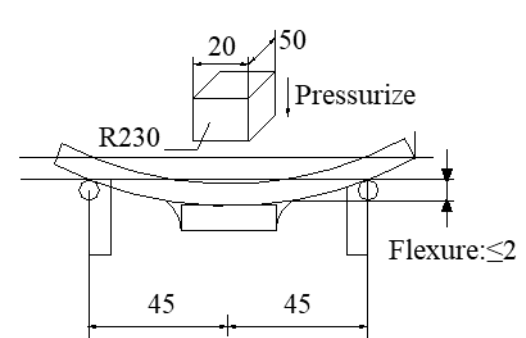


	直流电阻 DC.Resistance	测试仪器：Aglient 4338B 或同等级其它设备 Measuring equipment: Aglient 4338B or the equivalent
	自共振频率 Self-resonant frequency	测试仪器：Keysight N5230A\E4991A 或同等级其它设备 Measuring equipment: Keysight N5230A\E4991A or the equivalent
	额定电流 Rated current	测试仪器：Ans JS-155D 或同等级其它设备 Measuring equipment: Ans JS-155D or the equivalent

6.4 附着力 Adhesion

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	端电极无松动，也无其它不良现象 No removal of the terminations or other defect shall occur.	施加 2N 的压力，并保持 $10 \pm 1s$ 。速度：1.0mm/s。 The pressurizing force shall be 2N and the duration of application shall be $10 \pm 1sec$. Speed: 1.0mm/s 

6.5 抗弯曲 Resistance to Flexure

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	无明显可见损伤 No remarkable visual damage	测试板：玻璃纤维环氧树脂板 (100mm*40mm*0.8mm) 弯曲量：2mm 施力速度：0.5mm/s 保持时间：30s Test substrate: glass-epoxy substrate (100mm*40mm*0.8mm) Deflection: 2 mm Pressurizing speed: 0.5mm/s Holding time: 30s 



6.6 振动 Vibration

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	无明显可见损伤 L 值变化在±10%以内 No remarkable visual damage L change: within ±10%	振动频率：10~55~10Hz,振动周期 1min 振幅：1.5mm 测试时间：三个方向振动，每个方向振动 2h，共计 6h Oscillation frequency: 10 Hz to 55 Hz to 10 Hz, for approx. 1 min Total amplitude: 1.5 mm Test time: 3 directions perpendicular to each other, 2h for each direction (6 h in total)

6.7 可焊性 Solderability of Termination

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	端电极挂锡面积不小于 95%，针孔或粗糙面积小于 5% 95% min. coverage of both terminal electrodes and less than 5% have pin holes or rough spots.	助焊剂：浸入含有 25 (wt) % 的松香的乙醇助焊剂中 5-10s 预处理：高温 150±10°C，1-1.5min 焊接温度：240±5°C 浸入时间：3±1 秒 两侧端电极完全浸入焊锡炉 Flux: immersed in ethanol solution with a rosin content of 25(wt)% for 5 s to 10 s Pre-heating: 150°C±10°C/1 min to 1.5 min Solder temperature: 240±5°C Dipping time: 3±1 seconds. Completely soak both terminal electrodes in solder

6.8 耐焊接热 Resistance to Soldering Heat

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	无明显可见损伤 L 值变化在±10%以内 No remarkable visual damage L change: within ±10%	助焊剂：浸入含有 25 (wt) % 的松香的乙醇助焊剂中 5-10s 预处理：高温 150±10°C，1-2min 焊接温度：260±5°C 浸入时间：10±1 秒 后处理：试验后，在标准状态*下放置 24±2h Flux: immersed in ethanol solution with a rosin content of 25(wt)% for 5 s to 10 s Pre-heating: 150°C±10°C/1 min to 2 min Soldering temperature: 260±5°C Dipping time: 10±1 seconds. Post-treatment: left at a room condition for 24 h±2 h



6.9 温度快速循环 Temperature Cycle

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition		
TCGL	无明显可见损伤 L 值变化在±10%以内 Q 值变化在±20%以内 No remarkable visual damage L change: within ±10% Q change: within ±20%	按下列步骤进行 100 次循环： To perform 100 cycles of the stated environment		
		步骤 Step	温度 Temperature	时间 Time
		1	-55°C (+0°C,-3°C)	30min
		2	25°C	2~3 min
		3	125°C (+3°C,-0°C)	30 min
		4	25°C	2~3 min
后处理：试验后，在标准状态下放置 24±2h Post-treatment: left at a room condition for 24 h ± 2 h				

6.10 稳态湿热 Moisture Resistance (Steady state)

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition		
TCGL	无明显可见损伤 L 值变化在±10%以内 Q 值变化在±20%以内 No remarkable visual damage L change: within ±10% Q change: within ±20%	测试温度：40±2°C 湿度：90~95% RH 测试时间：1000h (+48h,-0h) 后处理：试验后，在标准状态下放置 24±2h Test temperature: 40±2°C Humidity: 90~95% RH Testing time: 1000h (+48h,-0h) Post-treatment: left at a room condition for 24 h ± 2 h		

6.11 耐湿负荷 Damp Heat with Load

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition		
TCGL	无明显可见损伤 L 值变化在±10%以内 Q 值变化在±20%以内 No remarkable visual damage L change: within ±10% Q change: within ±20%	测试温度：40±2°C 湿度：90~95% RH 负载电流：额定电流 测试时间：1000h (+48h,-0h) 后处理：试验后，在标准状态下放置 24±2h Test temperature: 40±2°C Humidity: 90~95% RH Applied current: rated current Testing time: 1000h (+48h,-0h) Post-treatment: left at a room condition for 24 h ± 2 h		



6.12 耐久性 Life Test

系列名称 Product Name	技术要求 Specification	测试条件 Testing Condition
TCGL	无明显可见损伤 L 值变化在 $\pm 10\%$ 以内 Q 值变化在 $\pm 20\%$ 以内 No remarkable visual damage L change: within $\pm 10\%$ Q change: within $\pm 20\%$	测试温度： $125 \pm 2^\circ\text{C}$ 负载电流：额定电流 测试时间：1000h (+48h,-0h) 后处理：试验后，在标准状态下放置 $24 \pm 2\text{h}$ Test temperature: $125 \pm 2^\circ\text{C}$ Applied current: rated current Testing time: 1000h (+48h,-0h) Post-treatment: left at a room condition for $24 \text{ h} \pm 2 \text{ h}$

备注：标准状态*为温度 $15^\circ\text{C}-35^\circ\text{C}$ 、相对湿度 25%-85%。测试结果如有疑问场合，以温度 $20 \pm 2^\circ\text{C}$ 、相对湿度 60%-70% 为测试状态。如无特殊指定要求，所有试验均在“标准状态”下实施。

7. 产品包装 Packing

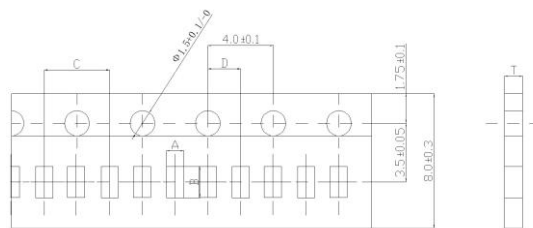
7.1 袋式散装 Bulk Packing

15,000 个/袋或按客户要求。Standard packing 15,000pcs/bag; others are according to customer request.

7.2 编带式包装 Tape Packing

规格 Type	尺寸 Size (mm)			编带数量(个/盘 pcs/reel)
	长度 L	宽度 W	厚度 T	纸带 Paper Tape
0603	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	15,000

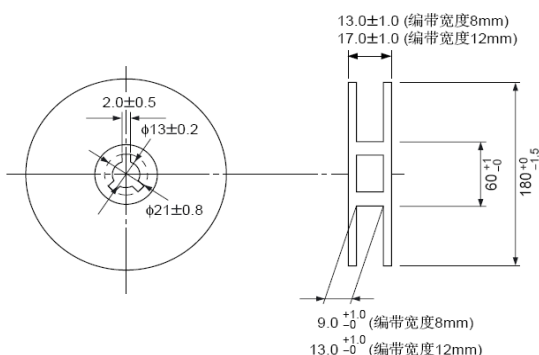
7.3 纸带尺寸 Dimensions of Packing Paper



Type	A	B	C	D	T
0603	0.36 ± 0.03	0.67 ± 0.03	4.0 ± 0.10	2.0 ± 0.05	0.42max

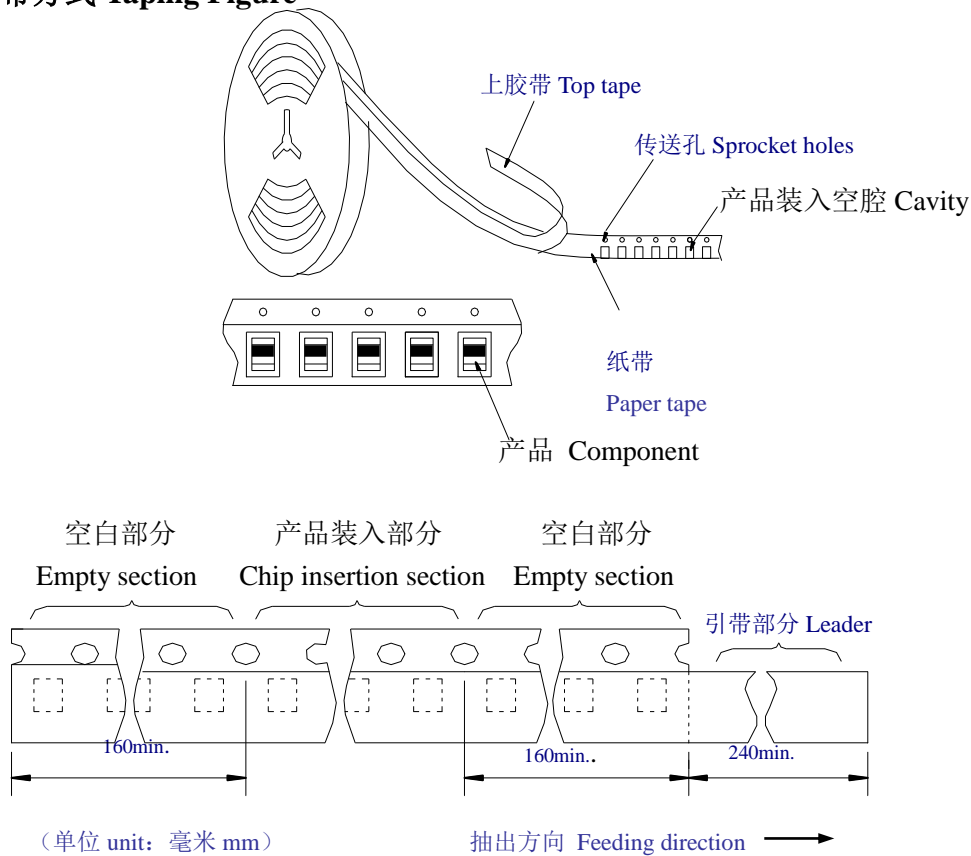
(单位 unit:毫米 mm)

7.4 编带盘尺寸 Dimensions of Reel



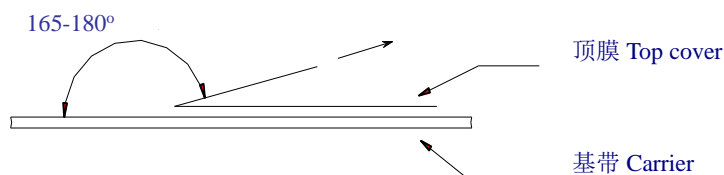


7.5 编带方式 Taping Figure



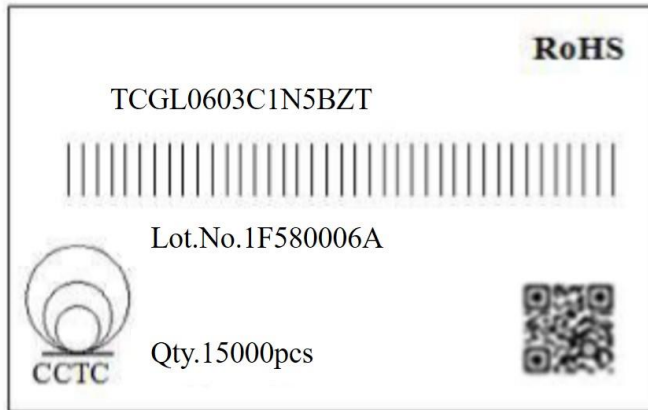
7.6 编带方法 Taping Method

- ① 包装电感器的编带是顺时针卷绕的，由上往下的方向拉出编带时，传送孔处于编带的右侧。
 - ② 在编带的前端，至少留出 5 个间距的引出带。
 - ③ 在编带时，必须按下图留出引出带部分或空白部分。
 - ④ 在盘带的安装中的产品装错的数量每盘必须小于表示数量的 0.1% 或 1 个为限，不连续发生错误。
 - ⑤ 上胶带和下胶带不应超出编带的边缘，不能挡住传送孔。
 - ⑥ 传送孔的累计误差为 10 个间距：±0.3 毫米以内。
 - ⑦ 上胶带的剥离力矩应在 0.1 至 0.6 牛顿以内，其方向如下图所示。
- ① Tapes for inductors are wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
 - ② The top tape and base tape are not attached at the end of the tape for a minimum of 5 pitches.
 - ③ Part of the leader and part of the empty tape shall be attached to the end of the tape as follows.
 - ④ Missing inductors number within 0.1% of the number per reel or 1pc, whichever is greater, and are not continuous.
 - ⑤ The top tape and bottom tape shall not protrude beyond the edges of the tape and shall not cover sprocket holes.
 - ⑥ Cumulative tolerance of sprocket holes, 10 pitches: ±0.3mm.
 - ⑦ Peeling off force: 0.1 to 0.6N in the direction shown down.





7.7 产品标签 Reel Label



(1) 标签内容 The Contents of Label

TCGL 0603 C 1N5 B Z T

① ② ③ ④ ⑤ ⑥ ⑦

①常规叠层片式陶瓷电感代号 Code of General Multilayer Chip Ceramic Inductor

②尺寸 Chip size

③产品类别 Product Code

④电感值 Inductance

⑤电感容差 Inductance Tolerance

⑥厚度 Thickness

⑦包装 Packing

(2) 产品批号 Lot.No.:1F580006A

(3) 数量 Qty: 15000pcs

(4) RoHS:绿色物料 GREEN PARTS

7.8 外包装 Package

7.8.1 包装箱 Carton

(1) 包装箱尺寸 Carton Size

L	W	H
41.0±3cm	38.5±3cm	20.2±3cm

(2) 数量 Quantity

900Kpcs /箱 The Quantity: 900Kpcs /one carton

1 内包装盒=150,000PCS 1 Inner Box=150,000PCS

1 包装箱 =150,000PCS ×6 包装盒=900,000PCS 1 Carton=150,000PCS ×6 Box =900,000PCS

RoHS 标识(根据客户要求张贴) RoHS Sign (According to customer request)

7.8.2 内包装盒 Inner Box

(1) 包装盒尺寸 Size

L	W	H
18±1cm	18.5±1cm	11.8±1cm

(2) 数量 Quantity

150Kpcs /盒 150Kpcs / Inner Box

1 盘=15000PCS 1 Reel=15,000PCS

1 包装盒=15,000PCS ×10 盘 =150,000PCS 1 Inner Box =15,000PCS ×10Reel =150,000PCS



8.MLCI 使用注意事项 Precautions on the Use of MLCI

8.1 电路板设计 PCB Design

8.1.1 电路板图案设计 Design of Land-patterns

下面图和表格给出了部分推荐的设计图案，可以防止安装时焊锡量过多。同时也给出了不正确的图案。

The following diagrams and tables show some examples recommended patterns to prevent excessive solder amounts (larger fillets which above the component end terminations)

Examples of improper pattern designs are also shown.

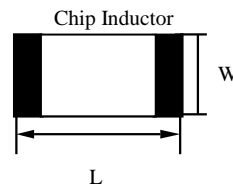
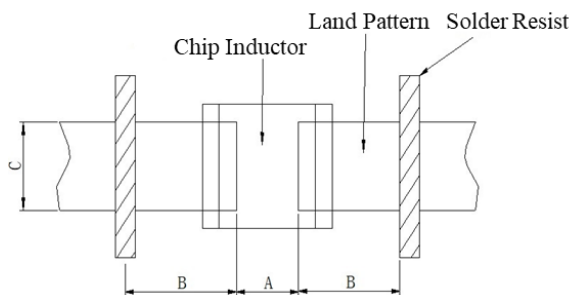
电路板设计推荐图案尺寸：

Recommended land dimensions for a typical chip inductor land patterns for PCBs

波峰焊接时推荐设计的尺寸 (单位: mm):

Recommended land dimensions for wave-soldering (unit: mm)

规格 SIZE		1608	2125	3216
尺寸	L	1.6	2.0	3.2
	W	0.8	1.25	1.6
A		0.8~1.0	1.0~1.4	1.8~2.5
B		0.5~0.8	0.8~1.5	0.8~1.7
C		0.6~0.8	0.9~1.2	1.2~1.6



再流焊接时推荐设计的尺寸 (单位: mm)

Recommended land dimensions for reflow-soldering (unit: mm)

规格 SIZE		0603	1005
尺寸	L	0.60	1.0
	W	0.30	0.5
A		0.20~0.25	0.35~0.45
B		0.20~0.30	0.40~0.50
C		0.25~0.35	0.45~0.55

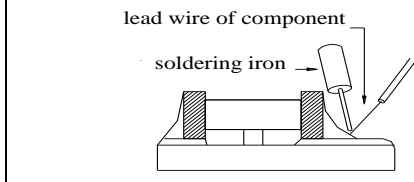
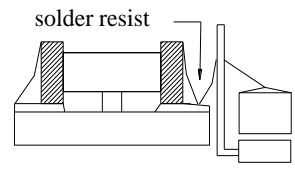
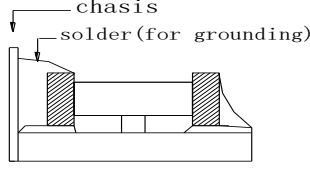
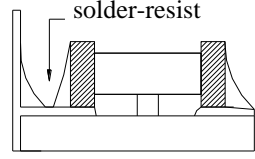
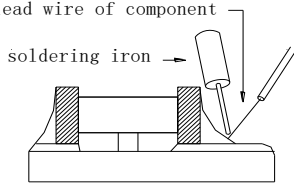
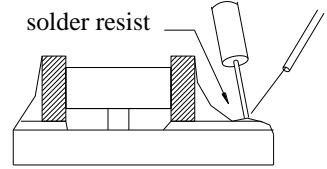
过量的焊锡会影响产品抵抗机械应力的能力，因此在设计图案时应引起注意。

Excess solder can affect the ability of chips to withstand mechanical stresses. Therefore, please take proper precautions when designing land-patterns.

在应用中一些焊接好与坏的情况：

Examples of good and bad solder application:

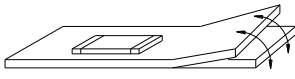
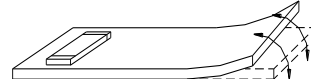


项目 Item	不推荐结构 Not recommended	推荐结构 Recommended
片状元件和带引线的元件的混合焊接 Mixed mounting of SMD and leaded component		
靠近底座的焊接 Component placement close to the chassis		
在片状元件附近带引线元件的焊接 Hand-soldering of leaded components near mounted components		

8.1.2 图案结构 Pattern Configurations

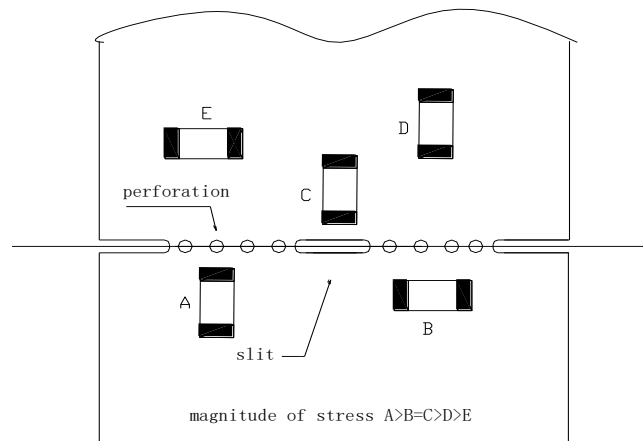
下面是电感器安装好与坏例子。选择贴装位置，应尽可能减小电路板在弯曲时受到的机械应力。

The following are examples of good and bad inductor layout, SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection.

	不推荐结构 Not recommended	推荐结构 Recommended
电路板弯曲 Deflection of the board		

对于电路板分拨的电感器，在分拨时受到的机械应力大小与电感器的安装有关。下面推荐了一些好的设计。

To layout the inductors for the breakaway PC board, it should be noted that the amount of mechanical stresses given depending on inductor layout. The example below shows recommendations for better design.



在沿着分拨线分拨电路板时，对产品施加的机械应力与使用的方法关系很大。分折电路板时片状元件受到的疲劳按照如下顺序增大：分折、剪切、V型槽、穿孔。因此，贴装时应该考虑电路板的分拨过程。

When breaking PC boards along their perforations, the amount of mechanical stress on the inductors can vary



according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, silt, -grooving, and perforation. Thus, any ideal SMD inductor layout must also consider the PCB splitting procedure.

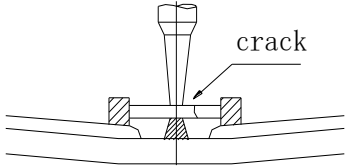
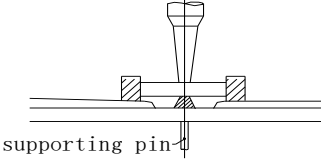
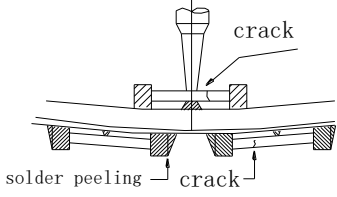
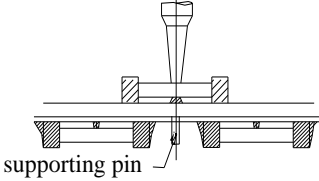
8.2 自动贴装注意事项 Considerations for Automatic Placement

8.2.1 贴装机的调整 Adjustment of Mounting Machine

- (1) 产品在电路板贴装时，不应该受到过大的冲击。
- (2) 必须定期对吸头和定位爪进行检查、维修和更换

(1) Excessive impact load should not be imposed on the inductors when mounting the PC boards.

(2) The maintenance and inspection of the mounters should be conducted periodically.

	不推荐结构 Not recommended	推荐结构 Recommended
单面贴装 Single-sided mounting		
双面贴装 Double-sided mounting		

8.3 推荐焊接曲线 Recommended Soldering Profile

8.3.1 说明 Explanation

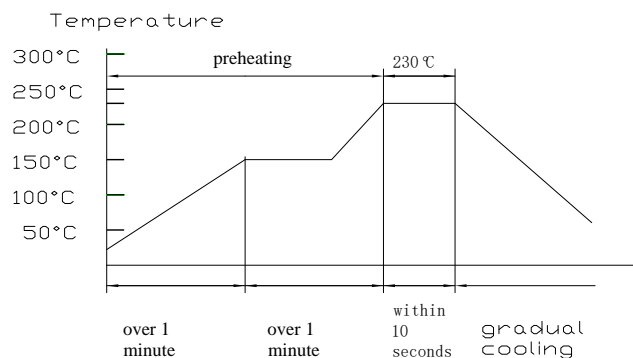
- (1) 产品推荐使用回流焊接工艺；
- (2) 大尺寸产品适用于回流焊接工艺

(1) Reflow soldering is recommended;

(2) Reflow soldering is suitable for bigger size MLCIs

8.3.2 锡铅焊接曲线 Recommended Sn&Pb Soldering Profile

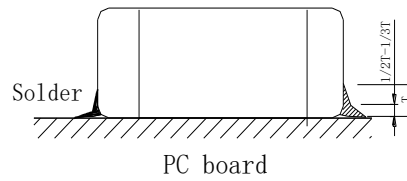
(1) 回流焊 Reflow Soldering



注意 Caution

①. 理想状况的焊锡高度为电感器厚度的 1/2 ~ 1/3，如下图所示：

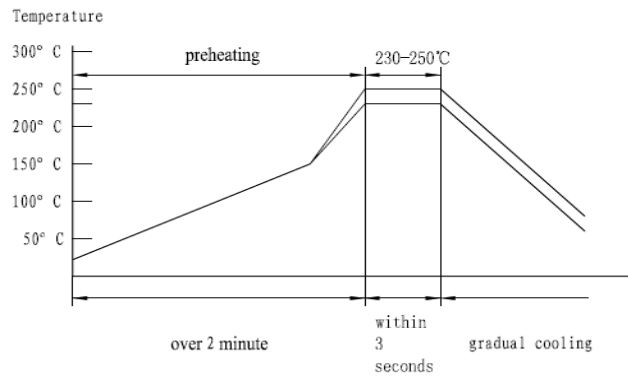
①. The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of inductor, as shown below:



②. 过长的焊接时间会影响端头的可焊性，焊接时间尽可能保持与推荐时间一致。

②. Because excessive dwell times can detrimentally affect solder ability, soldering duration should be kept as close to recommended times as possible.

(2) 波峰焊 Wave Solder Profile



注意 Caution

- ①. 确保电感器充分预热。
- ②. 产品预热和焊接温度差不超过 100~130°C。
- ③. 焊接后尽可能慢速冷却。
- ①. Make sure the inductors are preheated sufficiently.
- ②. The temperature difference between the inductor and melted solder should not be greater than 100 to 130°C.
- ③. Cooling after soldering should be gradual as possible.

(3) 手工焊接 Hand Soldering

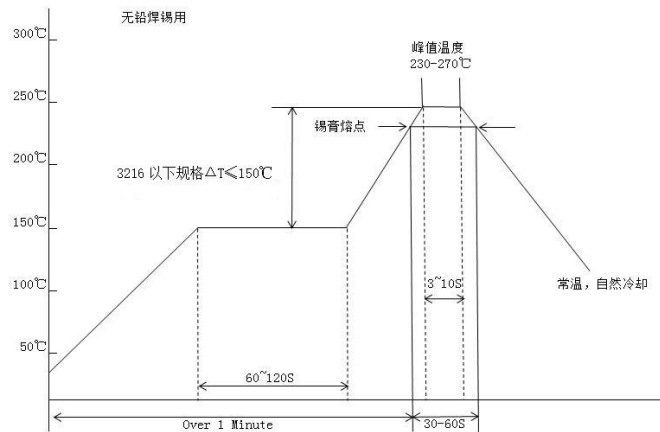
预热 Preheat	烙铁头温度 Tip temperature of soldering iron	烙铁头直径 Tip diameter of soldering iron	焊接时间 Soldering time	锡膏量 Solder mass	限制条件 Restrictive condition
$\Delta \leq 130^{\circ}\text{C}$	$\leq 350^{\circ}\text{C}$	建议 $\leq 1\text{mm}$ Suggest $\leq 1\text{mm}$	$\leq 5\text{s}$	$\leq 1/2$ 芯片厚度 $\leq 1/2$ the thickness of inductor	请勿使用烙铁头直接接触 电感产品 The soldering iron should not directly touch the inductor.

注意 Caution

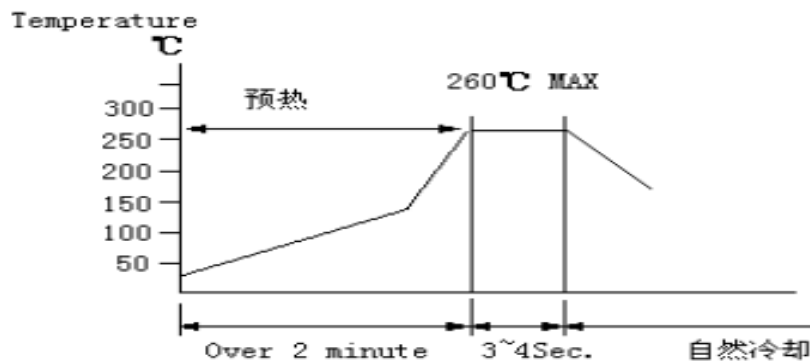
- ①. 用尖端最大直径 1.0mm 功率 20W 的焊接烙铁。
- ②. 焊接烙铁不要直接接触产品。
- ①. Use a 20w soldering iron with a maximum tip diameter of 1.0mm.
- ②. The soldering iron should not directly touch the inductor.

(4) 无铅焊接曲线 Recommended Pb-Free Soldering Profile

回流焊接 Reflow solder



波峰焊接 Wave solder profile



8.4 分拨电路板 Handling of Substrate

- (1) 在电感器或其它贴装后，必须注意因电路板弯曲或变形带来的应力。
- (2) 分拨电路板时必须使用专用的夹具，不可以用手拨断。

(1) When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board.

(2) Board separation should not be done manually, but by using the appropriate devices.

8.5 保存 Storage

- (1) 在下列环境中保存产品：温度 5~40°C；湿度 ≤70% RH。
- (2) 产品自生产之日保存期为一年，产品使用之前请勿拆开编带。
- (3) 编带拆开后，产品应在三个月内使用。

(1) Keep the storage environment conditions as following: Temperature: 5~40°C; Humidity: ≤70% RH.

(2) Don't open the tape until the parts are to be used, and store them within one year since the date printed on the reel.

(3) Use the chips within 3 months after the tape is opened.

8.6 环保申明 Environmental Declaration

- (1) 我司所有 MLCI 产品均符合 RoHS 2.0 标准。
- (2) 我司所有 MLCI 产品均符合最新的 REACH 法规要求。
- (3) 我司所有 MLCI 产品均符合 HF 要求。

(1) All MLCI products of our company comply with RoHS 2.0.

(2) All MLCI products of our company comply with the latest REACH regulations.

(3) All MLCI products of our company comply with HF requirements.