



# MINIATURE SMD CHIP CHOKE COILS

## PK0406 Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR. (Ohm) Max	Rated Current (mA) Max
PK0406-1R0M-□□	1.0	100	7.96MHZ	120	0.035	2000
PK0406-1R2M-□□	1.2	100	7.96MHZ	120	0.058	1950
PK0406-1R5M-□□	1.5	100	7.96MHZ	120	<b>0.075</b>	1900
PK0406-1R8M-□□	1.8	100	7.96MHZ	120	0.110	1800
PK0406-2R2M-□□	2.2	100	7.96MHZ	100	0.120	1750
PK0406-2R7M-□□	2.7	100	7.96MHZ	80	0.125	1680
PK0406-3R3M-□□	3.3	100	7.96MHZ	75	0.130	1500
PK0406-3R9K-□□	3.9	100	7.96MHZ	70	0.135	1450
PK0406-4R7K-□□	4.7	100	7.96MHZ	50	0.140	1320
PK0406-5R6K-□□	5.6	100	7.96MHZ	45	0.145	1230
PK0406-6R8K-□□	6.8	100	7.96MHZ	30	0.15	1150
PK0406-8R2K-□□	8.2	100	7.96MHZ	22	0.16	1100
PK0406-100K-□□	10	80	2.52MHZ	20	0.23	1000
PK0406-120K-□□	12	80	2.52MHZ	17	0.24	970
PK0406-150K-□□	15	80	2.52MHZ	16	0.25	920
PK0406-180K-□□	18	80	2.52MHZ	12	0.33	860
PK0406-220K-□□	22	80	2.52MHZ	10	0.45	800
PK0406-270K-□□	27	80	2.52MHZ	9.5	0.50	710
PK0406-330K-□□	33	80	2.52MHZ	8.7	0.70	660
PK0406-390K-□□	39	70	2.52MHZ	8.2	0.74	600
PK0406-470K-□□	47	70	2.52MHZ	7.8	0.76	550
PK0406-560K-□□	56	50	2.52MHZ	7.6	0.80	500
PK0406-680K-□□	68	50	2.52MHZ	6.8	0.90	470
PK0406-820K-□□	82	50	2.52MHZ	6.0	0.95	430
PK0406-101K-□□	100	45	796KHZ	6.0	1.0	400
PK0406-121K-□□	120	45	796KHZ	5.5	1.1	370
PK0406-151K-□□	150	65	796KHZ	4.2	1.3	350
PK0406-181K-□□	180	65	796KHZ	3.6	1.5	320
PK0406-221K-□□	220	65	796KHZ	2.8	1.8	300
PK0406-271K-□□	270	50	796KHZ	2.4	1.9	275
PK0406-331K-□□	330	50	796KHZ	2.2	2.2	250
PK0406-391K-□□	390	50	796KHZ	2.0	2.7	220
PK0406-471K-□□	470	50	796KHZ	1.7	3.6	200
PK0406-561K-□□	560	50	796KHZ	1.5	4.2	190
PK0406-681K-□□	680	50	796KHZ	1.3	4.6	170
PK0406-821K-□□	820	50	796KHZ	1.1	5.7	155

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Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR. (Ohm) Max	Rated Current (mA) Max
PK0406-122K-□□	1200	90	252KHZ	0.9	8.2	140
PK0406-152K-□□	1500	80	252KHZ	0.8	13	120
PK0406-182K-□□	1800	80	252KHZ	0.8	15	110
PK0406-222K-□□	2200	80	252KHZ	0.8	17	100
PK0406-272K-□□	2700	80	252KHZ	0.8	19	90
PK0406-332K-□□	3300	70	252KHZ	0.7	26	83
PK0406-392K-□□	3900	70	252KHZ	0.65	30	76
PK0406-472K-□□	4700	65	252KHZ		45	70
PK0406-562K-□□	5600	65	252KHZ		48	62
PK0406-682K-□□	6800	65	252KHZ		56	56
PK0406-822K-□□	8200	65	252KHZ		62	52
PK0406-103K-□□	10000	45	79.6KHZ		72	47
PK0406-153K-□□	15000	45	79.6KHZ		120	35
PK0406-223K-□□	22000	45	79.6KHZ		160	24
PK0406-253K-□□	25000	45	79.6KHZ		180	20

## PK0608 Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	DCR. (Ohm) Max	Rated Current (mA) Max
PK0608-3R3K-□□	3.3	20	7.96MHZ	0.16	3500
PK0608-4R7K-□□	4.7	20	7.96MHZ	0.020	3000
PK0608-6R8K-□□	6.8	20	7.96MHZ	<b>0.022</b>	2500
PK0608-100K-□□	10	30	2.52MHZ	0.039	2000
PK0608-150K-□□	15	30	2.52MHZ	0.045	1700
PK0608-220K-□□	22	30	2.52MHZ	0.062	1400
PK0608-330K-□□	33	30	2.52MHZ	0.10	1100
PK0608-470K-□□	47	30	2.52MHZ	0.15	950
PK0608-680K-□□	68	30	2.52MHZ	0.22	800
PK0608-101K-□□	100	20	796KHZ	0.35	650
PK0608-151K-□□	150	20	796KHZ	0.43	540
PK0608-221K-□□	220	20	796KHZ	0.90	440
PK0608-331K-□□	330	20	796KHZ	1.50	350
PK0608-471K-□□	470	20	796KHZ	1.80	300
PK0608-681K-□□	680	20	796KHZ	2.5	250
PK0608-102-□□	1000	100	252KHZ	3.2	200
PK0608-122K-□□	1200	70	252KHZ	3.5	180

# MINIATURE SMD CHIP CHOKE COILS

## PK0608 Series

Part No.	L @1KHz ( $\mu$ H)	Q Min	Q Test Freq.	DCR (Ohm) Max	Rated Current (mA) Max
PK0608-182K-□□	1800	70	252KHZ	5.0	155
PK0608-222K-□□	2200	70	252KHZ	6.8	140
PK0608-272K-□□	2700	70	252KHZ	7.2	125
PK0608-332K-□□	3300	70	252KHZ	10.5	115
PK0608-392K-□□	3900	70	252KHZ	11.7	105
PK0608-472K-□□	4700	70	252KHZ	13.6	95
PK0608-562K-□□	5600	70	252KHZ	16.6	85
PK0608-682K-□□	6800	70	252KHZ	19.6	80
PK0608-822K-□□	8200	70	252KHZ	25.2	70
PK0608-103K-□□	10000	70	79.6KHZ	29.5	65
PK0608-123K-□□	12000	50	79.6KHZ	33.8	60
PK0608-153K-□□	15000	50	79.6KHZ	45.4	55
PK0608-183K-□□	18000	50	79.6KHZ	50.4	50
PK0608-223K-□□	22000	50	79.6KHZ	80.0	45
PK0608-303K-□□	30000	50	79.6KHZ	91.5	40
PK0608-333K-□□	33000	50	79.6KHZ	98.5	35
PK0608-393K-□□	39000	50	79.6KHZ	140	32
PK0608-473K-□□	47000	50	79.6KHZ	160	30
PK0608-503K-□□	50000	50	79.6KHZ	170	29
PK0608-563K-□□	56000	50	79.6KHZ	250	28
PK0608-683K-□□	68000	50	79.6KHZ	282	25
PK0608-823K-□□	82000	50	79.6KHZ	312	23
PK0608-104K-□□	100000	30	25.2KHZ	380	20
PK0608-124K-□□	120000	30	25.2KHZ	430	18
PK0608-154K-□□	150000	30	25.2KHZ	520	16

## PK0707Series

Part No.	L @1KHz ( $\mu$ H)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR (Ohm) Max	Rated Current (mA) Max	
						I Sat	I rms
PK0707-1R0M-□□	1.0	10	7.96MHz	70	0.006	6.6	5.0
PK0707-1R5M-□□	1.5	10	7.96MHz	56	0.008	5.4	4.3
PK0707-2R2M-□□	2.2	10	7.96MHz	45	0.011	4.0	3.7
PK0707-3R3M-□□	3.3	10	7.96MHz	35	0.018	3.6	2.9
PK0707-4R7M-□□	4.7	10	7.96MHz	29	0.022	3.1	2.6
PK0707-6R8M-□□	6.8	10	7.96MHz	24	0.028	2.5	2.3
PK0707-100K-□□	10	20	2.52MHz	19	0.043	2.1	1.9

# MINIATURE SMD CHIP CHOKE COILS

## PK0707Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR (Ohm) Max	Rated Current (mA)Max	
						I Sat	I rms
PK0707-150K-□□	15	20	2.52MHz	15	0.056	1.7	1.6
PK0707-220K-□□	22	20	2.52MHz	12	0.086	1.4	1.3
PK0707-330K-□□	33	20	2.52MHz	94	0.14	1.1	1.0
PK0707-470K-□□	47	20	2.52MHz	7.6	0.17	0.96	0.94
PK0707-680K-□□	68	20	2.52MHz	62	0.28	0.79	0.73
PK0707-101K-□□	100	20	7.96MHz	50	0.33	0.66	0.67
PK0707-151K-□□	150	20	7.96MHz	40	0.56	0.53	0.52
PK0707-221K-□□	220	20	7.96MHz	32	0.72	0.44	0.46
PK0707-331K-□□	330	20	7.96MHz	2.5	1.10	0.36	0.37
PK0707-471K-□□	470	20	7.96MHz	2.0	1.70	0.30	0.30
PK0707-681K-□□	680	20	7.96MHz	1.7	2.30	0.25	0.26
PK0707-102K-□□	1000	70	2.52MHz	1.3	4.30	0.20	0.19
PK0707-152K-□□	1500	50	2.52MHz	1.3	5.00	0.17	0.16

## PK0807Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR (Ohm) Max	Rated Current (mA)Max	
						I Sat	I rms
PK0807-2R2M-□□	2.2	10	7.96MHz	60	0.011	5.5	4.0
PK0807-3R3M-□□	3.3	10	7.96MHz	38	0.013	3.8	3.4
PK0807-4R7M-□□	4.7	10	7.96MHz	30	0.017	3.7	3.0
PK0807-6R8M-□□	6.8	10	7.96MHz	24	0.023	2.8	2.6
PK0807-100K-□□	10	20	2.52MHz	19	0.031	2.5	2.2
PK0807-150K-□□	15	20	2.52MHz	15	0.042	2.0	1.9
PK0807-220K-□□	22	20	2.52MHz	12	0.070	1.6	1.5
PK0807-330K-□□	33	20	2.52MHz	10	0.092	1.3	1.2
PK0807-470K-□□	47	20	2.52MHz	8.2	0.130	1.1	1.0
PK0807-680K-□□	68	20	2.52MHz	6.6	0.160	0.91	0.97
PK0807-101K-□□	100	15	796KHz	54	0.230	0.75	0.81
PK0807-151K-□□	150	15	796KHz	4.3	0.400	0.61	0.61
PK0807-221K-□□	220	15	796KHz	3.5	0.530	0.50	0.53
PK0807-331K-□□	330	15	796KHz	2.8	0.780	0.41	0.44
PK0807-471K-□□	470	10	796KHz	2.3	1.0	0.34	0.39
PK0807-681K-□□	680	10	796KHz	1.9	1.5	0.28	0.32
PK0807-102K-□□	1000	20	252KHz	1.5	2.2	0.23	0.26
PK0807-152K-□□	1500	30	252KHz	1.2	3.5	0.18	0.21

# MINIATURE SMD CHIP CHOKE COILS

## PK0810Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR. (Ohm) Max	Rated Current (mA) Max
PK0810-3R3M-□□	3.3	30	7.96MHz	65	0.012	5000
PK0810-3R9K-□□	3.9	30	7.96MHz	55	0.014	4600
PK0810-4R7K-□□	4.7	30	7.96MHz	45	<b>0.016</b>	4300
PK0810-5R6K-□□	5.6	30	7.96MHz	38	0.020	3900
PK0810-6R8K-□□	6.8	30	7.96MHz	27	0.022	3700
PK0810-8R2K-□□	8.2	30	7.96MHz	21	0.024	3500
PK0810-100K-□□	10	50	2.52MHz	17	0.025	3200
PK0810-120K-□□	12	50	2.52MHz	15	0.027	3000
PK0810-150K-□□	15	50	2.52MHz	13	0.033	2800
PK0810-180K-□□	18	50	2.52MHz	12	0.039	2600
PK0810-220K-□□	22	50	2.52MHz	11	0.047	2400
PK0810-270K-□□	27	50	2.52MHz	10	0.052	2100
PK0810-330K-□□	33	50	2.52MHz	80.5	0.075	1900
PK0810-390K-□□	39	40	2.52MHz	7.7	0.082	1700
PK0810-470K-□□	47	40	2.52MHz	6.7	0.10	1500
PK0810-560K-□□	56	40	2.52MHz	6.4	0.15	1300
PK0810-680K-□□	68	30	2.52MHz	5.8	0.18	1200
PK0810-820K-□□	82	30	2.52MHz	5.2	0.20	1100
PK0810-101K-□□	100	30	796KHz	4.4	0.20	900
PK0810-121K-□□	120	30	796KHz	4.2	0.22	800
PK0810-151K-□□	150	30	796KHz	3.7	0.24	720
PK0810-181K-□□	180	30	796KHz	3.5	0.28	650
PK0810-221K-□□	220	20	796KHz	3.3	0.35	600
PK0810-271K-□□	270	20	796KHz	2.9	0.40	550
PK0810-331K-□□	330	20	796KHz	2.6	0.47	500
PK0810-391K-□□	390	20	796KHz	2.4	0.68	460
PK0810-471K-□□	470	20	796KHz	2.2	0.80	420
PK0810-561K-□□	560	20	796KHz	2.0	1.0	380
PK0810-681K-□□	680	20	796KHz	1.8	1.2	350
PK0810-821K-□□	820	20	796KHz	1.7	1.5	310
PK0810-102K-□□	1000	40	252KHz	1.5	1.8	280
PK0810-122K-□□	1200	40	252KHz	1.4	2.0	250
PK0810-152K-□□	1500	40	252KHz	1.3	2.4	230
PK0810-182K-□□	1800	40	252KHz	1.1	2.8	210
PK0810-222K-□□	2200	40	252KHz	1	3.3	190
PK0810-272K-□□	2700	40	252KHz	0.88	5.0	170

# MINIATURE SMD CHIP CHOKE COILS

## PK0810Series

Part No.	L @1KHz ( $\mu$ H)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR. (Ohm) Max	Rated Current (mA) Max
PK0810-392K-□□	3900	40	252KHz	0.72	6.2	140
PK0810-472K-□□	4700	40	252KHz	0.65	7.0	130
PK0810-562K-□□	5600	40	252KHz	0.58	9.1	120
PK0810-682K-□□	6800	40	252KHz	0.55	10	110
PK0810-822K-□□	8200	20	252KHz	0.5	15	100
PK0810-103K-□□	10000	20	79.6KHz	0.42	24	90
PK0810-473K-□□	47000	60	79.6KHz	0.2	80	40
PK0810-104K-□□	100000	20	79.6KHz	0.14	180	28

## PK1010Series

Part No.	L @1KHz ( $\mu$ H)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR. (Ohm) Max	Rated Current (mA) Max	
						I Sat	I rms
PK1010-3R3M-□□	3.3	10	7.96MHz	36	0.010	8.8	5.9
PK1010-4R7M-□□	4.7	10	7.96MHz	28	0.015	7.2	4.8
PK1010-6R8M-□□	6.8	10	7.96MHz	18	0.016	6.7	4.6
PK1010-100M-□□	10	20	2.52MHz	16	0.025	5.0	3.7
PK1010-150M-□□	15	20	2.52MHz	12	0.029	4.2	3.4
PK1010-200M-□□	22	20	2.52MHz	9.5	0.040	3.4	2.9
PK1010-330M-□□	33	20	2.52MHz	7.0	0.062	2.8	3.3
PK1010-470M-□□	47	20	2.52MHz	5.8	0.075	2.3	2.1
PK1010-680M-□□	68	20	2.52MHz	4.7	0.13	1.9	1.6
PK1010-101K-□□	100	20	796KHz	3.8	0.16	1.6	1.4
PK1010-151K-□□	150	20	796KHz	3.1	0.26	1.3	1.1
PK1010-221K-□□	220	20	796KHz	2.5	0.33	1.1	1.0
PK1010-331K-□□	330	20	796KHz	2.0	0.52	0.88	0.82
PK1010-471K-□□	470	10	796KHz	1.6	0.66	0.75	0.72
PK1010-681K-□□	680	10	796KHz	1.3	1.1	0.61	0.56
PK1010-102K-□□	1000	20	252KHz	1.1	1.4	0.51	0.50
PK1010-152K-□□	1500	30	252KHz	0.82	2.4	0.43	0.38
PK1010-222K-□□	2200	20	252KHz	0.76	3.2	0.35	0.33
PK1010-332K-□□	3300	30	252KHz	0.64	4.9	0.28	0.26
PK1010-472K-□□	4700	30	252KHz	0.54	7.6	0.24	0.21
PK1010-682K-□□	6800	30	252KHz	0.45	9.8	0.20	0.18
PK1010-103K-□□	10000	30	79.6KHz	0.38	18	0.17	0.14
PK1010-153K-□□	15000	50	79.6KHz	0.29	24	0.13	0.12

# MINIATURE SMD CHIP CHOKE COILS

## PK1012 Series

Part No.	L @1KHz (uH)	Q Min	Q Test Freq.	SRF (MHz) Min	DCR (Ohm) Max	Rated Current (mA) Max	
						I Sat	I rms
PK1012-103K-□□	10000	100	79.6KHz	0.35	12	0.18	0.17
PK1012-123K-□□	12000	100	79.6KHz	0.31	13	0.16	0.16
PK1012-153K-□□	15000	100	79.6KHz	0.28	18	0.14	0.14
PK1012-183K-□□	18000	80	79.6KHz	0.26	25	0.13	0.12
PK1012-223K-□□	22000	80	79.6KHz	0.22	30	0.12	0.11
PK1012-273K-□□	27000	80	79.6KHz	0.20	35	0.11	0.10
PK1012-333K-□□	33000	60	79.6KHz	0.19	40	0.10	0.090
PK1012-393K-□□	39000	60	79.6KHz	0.17	50	0.090	0.080
PK1012-473K-□□	47000	60	79.6KHz	0.15	50	0.080	0.075
PK1012-563K-□□	56000	40	79.6KHz	0.13	65	0.075	0.070
PK1012-683K-□□	68000	40	79.6KHz	0.12	70	0.070	0.065
PK1012-823K-□□	82000	30	79.6KHz	0.10	100	0.060	0.055
PK1012-104K-□□	100000	30	79.6KHz	0.10	135	0.055	0.045

## PK1018Series

Part No.	L@1KHz(uH)	DCR(Ohm)Max	Rated current (A)Max	
			I Sat	I rms
PK1018-4R7K-□□	4.7	0.008	10.0	6.0
PK1018-6R8K-□□	6.8	0.011	8.0	5.5
PK1018-100K-□□	10	0.017	7.0	4.5
PK1018-150K-□□	15	0.022	5.5	4.0
PK1018-220K-□□	22	0.026	4.5	3.7
PK1018-330K-□□	33	0.032	3.8	3.3
PK1018-470K-□□	47	0.035	3.2	3.0
PK1018-680K-□□	68	0.047	2.6	2.6
PK1018-101K-□□	100	0.090	2.2	2.0
PK1018-151K-□□	150	0.0129	1.8	1.6
PK1018-221K-□□	220	0.162	1.5	1.5
PK1018-331K-□□	330	0.212	1.2	1.2
PK1018-471K-□□	470	0.380	1.00	1.0
PK1018-681K-□□	680	0.548	0.84	0.84
PK1018-102K-□□	1000	0.844	0.66	0.66
PK1018-152K-□□	1500	1.18	0.55	0.55
PK1018-222K-□□	2200	2.00	0.46	0.44
PK1018-332K-□□	3300	2.53	0.38	0.38



# MINIATURE SMD CHIP CHOKE COILS

## PK1018Series

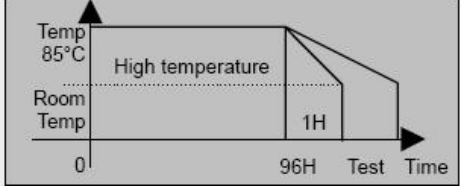
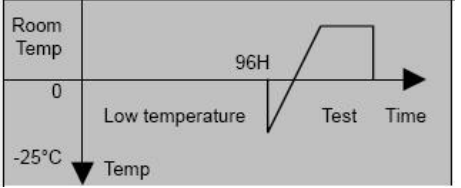
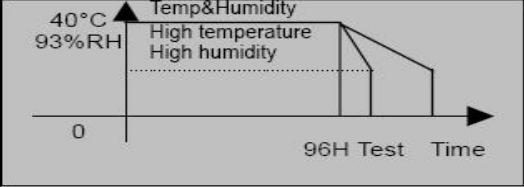
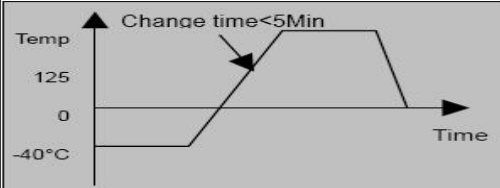
Part No.	L@1KHz(uH)	DCR(Ohm)Max	Rated current (A)Max	
			I Sat	I rms
PK1018-472K-□□	4700	3.19	0.32	0.32
PK1018-682K-□□	6800	5.69	0.26	0.25
PK1018-103K-□□	10000	7.30	0.22	0.22
PK1018-153K-□□	15000	10.5	0.18	0.18
PK1018-223K-□□	22000	21.8	0.14	0.13
PK1018-333K-□□	33000	25.7	0.12	0.12
PK1018-473K-□□	47000	36.1	0.10	0.10
PK1018-683K-□□	68000	57.3	0.08	0.08
PK1018-104K-□□	100000	89.7	0.06	0.06

## PK1213 Series

Part No.	L@1KHz(uH)	DCR(Ohm)Max	Rated current (A)Max	
			I Sat	I rms
PK1213-100M-□□	10	0.023	8.0	5.1
PK1213-150K-□□	15	0.028	6.5	4.5
PK1213-220K-□□	22	0.035	5.5	4.2
PK1213-330K-□□	33	0.043	4.5	3.7
PK1213-470K-□□	47	0.052	3.6	3.4
PK1213-680K-□□	68	0.068	3.1	3.0
PK1213-101K-□□	100	0.097	2.6	2.5
PK1213-151K-□□	150	0.14	2.1	2.1
PK1213-221K-□□	220	0.20	1.7	1.7
PK1213-331K-□□	330	0.30	1.4	1.4
PK1213-471K-□□	470	0.43	1.10	1.1
PK1213-681K-□□	680	0.61	0.95	0.99
PK1213-102K-□□	1000	1.00	0.78	0.78
PK1213-152K-□□	1500	1.30	0.64	0.68
PK1213-222K-□□	2200	2.00	0.53	0.55
PK1213-332K-□□	3300	3.10	0.43	0.44
PK1213-472K-□□	4700	4.40	0.36	0.37
PK1213-682K-□□	6800	6.50	0.30	0.30
PK1213-103K-□□	10000	10.0	0.24	0.24

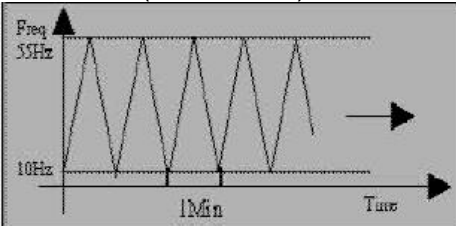
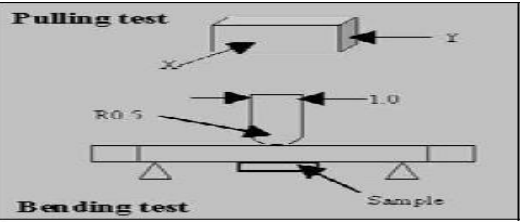
# MINIATURE SMD CHIP CHOKE COILS

## FOR SMT /SMD Products

	Item(项目)	Required Characteristics (要求)	Test Method / Condition (测试方法)
Environmental tests ( 环境试验)	High temperature Storage test Reference documents: <b>MIL-STD-202G</b> <b>Method 108A</b> 高温储存试验	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1.无明显的外观缺陷 2.感值变化不超过10% 3.质量因数变化不超过30% 4.直流电阻变化不超过10%	Temperature: $85 \pm 2^\circ\text{C}$ Time : $96 \pm 2$ hours Tested not less than 1 hour, nor more than 2 hours at room temperature.  温度: $85 \pm 2^\circ\text{C}$ 时间: $96 \pm 2$ 小时 样品在室温下放置1小时,不超2小时时间必须测试.
	Low temperature Storage test Referencedocuments: <b>IEC 68-2-1A 6.1 6.2</b> 低温储存试验	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1.无明显的外观缺陷 2.感值变化不超过10% 3.质量因数变化不超过30% 4.直流电阻变化不超过10%	Temperature: $-25 \pm 2^\circ\text{C}$ Time : $96 \pm 2$ hours Tested not less than 1 hour, nor more than 2 hours at room temperature.  温度: $-25 \pm 2^\circ\text{C}$ 时间: $96 \pm 2$ 小时 样品在室温下放置1小时,不超2小时时间必须测试.
	Humidity Test Reference documents: <b>MIL-STD-202G Method 103B</b> 湿度测试	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1.无明显的外观缺陷 2.感值变化不超过10% 3.质量因数变化不超过30% 4.直流电阻变化不超过10%	1. Dry oven at a temperature of $40^\circ \pm 5^\circ\text{C}$ for 24 hours. 2. Measurements At the end of this period 3. Exposure: Temperature: $40 \pm 2^\circ\text{C}$ , Humidity: $93 \pm 3\% \text{RH}$ Time : $96 \pm 2$ hours 4. Tested while the specimens are still in the chamber 5. Tested not less than 1 hour, nor more than 2 hours at room temperature.  1.样品必须先先在 $40^\circ \pm 5^\circ$ 条件下干燥24小时 2.干燥后测试 3.暴露: 温度: $40 \pm 2^\circ\text{C}$ , 湿度: $93 \pm 3\% \text{RH}$ 时间 : $96 \pm 2$ hours 4.暴露结束后,在试验箱中进行测试. 5.样品在室温下放置1小时,不超2小时时间必须测试.
	Thermal shock test Reference documents: <b>MIL-STD-202G Method 107G</b> 热冲击测试	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ For T: weight $\leq 28\text{g}$ : 15Min; $28\text{g} \leq \text{weight} \leq 136\text{g}$ : 30Min 1.无明显的外观缺陷 2.感值变化小于10% 3.质量因数变化小于30% 4.直流电阻变化小于10%	First $-40^\circ\text{C}$ for T time, next $+125^\circ\text{C}$ T time as 1 cycle.Go through 20 cycles.  从 $-40^\circ\text{C}$ 作用T分钟,然后温度冲击到 $125^\circ\text{C}$ 作用T分钟,作为一个循环,共作用20次.

# MINIATURE SMD CHIP CHOKE COILS

## FOR SMT /SMD Products

	Item(项目)	Required Characteristics (要求)	Test Method / Condition (测试方法)
Environmental tests ( 环境试验)	Solderability test Reference documents: <b>MIL-STD-202G Method 208H</b> <b>IPC J-STD-002B</b> 可焊性测试	Terminals area must have 95% min. Solder coverage 端子必须有95%以上着锡	1. Dip pads in flux then dip in solder pot at 245±5°C for 5seconds. 2. Solder: Sn(96)/Ag(4) 3. Flux: rosin flux 1. 端子侵入着焊剂,然后侵入245±5°C锡炉中5秒 2. 焊料: Sn(96)/Ag(4) 3. 助焊剂: 松香助焊剂
	Heat endurance of Reflow soldering Reference documents: <b>IPC J-STD-020B</b> 过再流焊测试	1. No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1. 无明显的外观缺陷 2. 感值变化不超过10% 3. 质量因数变化不超过30% 4. 直流电阻变化不超过10%	1. Refer to the next page reflow curve Go through 3 t times 2. The peak temperature : 245±5°C 1.参照下页回流焊曲线过三次 2.峰值温度为: 245±5°C
	Vibration test Reference documents: <b>MIL-STD-202G Method 201A</b> 振动测试	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1.无明显的外观缺陷 2.感值变化不超过10% 3.质量因数变化不超过30% 4.直流电阻变化不超过10%	Apply frequency 10~55Hz. 0.75mm amplitude in each of perpendicular direction for 2 hours.(total 6 hours)  用10~55Hz 振动频率0.75mm振幅沿X,Y,Z方向各振动2小时.(共6小时)
	Drop test Reference documents: <b>MIL-STD-202G Method 203C</b> 落下试验	1.No case deformation or change in appearance. 2. $\Delta L/L \leq 10\%$ 3. $\Delta Q/Q \leq 30\%$ 4. $\Delta DCR/DCR \leq 10\%$ 1.无明显的外观缺陷 2.感值变化不超过10% 3.质量因数变化不超过30% 4.直流电阻变化不超过10%	Packaged & Drop down from 1m with 981m/s <sup>2</sup> (100G) attitude In 1angle 1 ridges & 2 surfaces orientations. 将产品包装后从1米高度自然落下至试验板上1角1棱2面
	Terminal strength push test Reference documents: <b>JIS C 5321:1997</b> 端子强度试验	Pulling test: Define: A: sectional area of terminal A $\leq$ 8mm <sup>2</sup> force $\geq$ 5N time:30sec 8mm <sup>2</sup> <A $\leq$ 20mm <sup>2</sup> force $\geq$ 10N time: 10sec 20mm <sup>2</sup> <A force $\geq$ 20N time: 10sec Bending test: Soldering the products on PCB, after the pulling test and bending test ,terminal should not pull off 定义: A: 焊接端子截面积 A $\leq$ 8mm <sup>2</sup> 推力 $\geq$ 5牛顿 时间: 30秒 8mm <sup>2</sup> <A $\leq$ 20mm <sup>2</sup> 推力 $\geq$ 10牛顿 时间: 1秒 20mm <sup>2</sup> <A 推力 $\geq$ 5牛顿 时间: 10秒 弯折测试: 将产品焊于PCB上,分别经过推力测试弯折测试后,端子不会发生松脱	Bend the testing PCB at middle point, the deflection shall be 2mm  将PCB对中弯折,到达挠度2mm

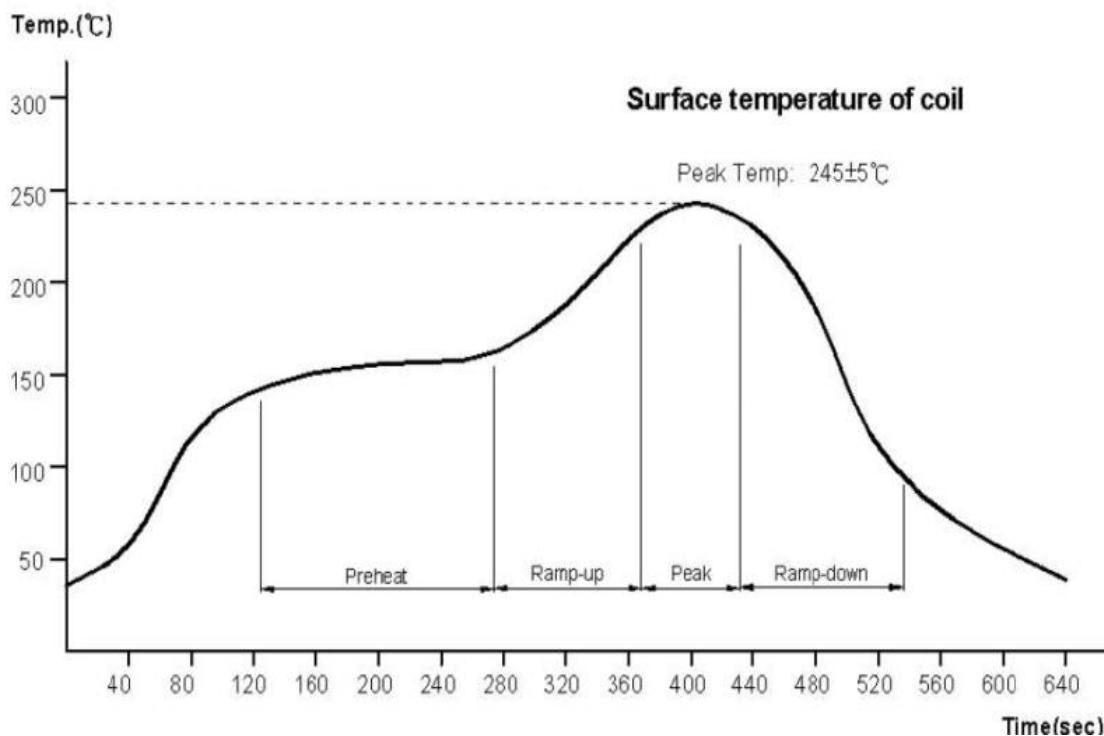
# MINIATURE SMD CHIP CHOKE COILS

Resistance to solvent test Reference documents: IEC 68-2-45:1993 耐溶剂性试验	No case deformation or change in appearance or obliteration of marking 无外观破坏及标记破损	To dip parts into IPA solvent for 5±0.5Min, then drying them at room temp for 5Min, at last, to brushing making 10 times. 在 IPA 溶剂中浸泡 5±0.5 分钟, 室温下干燥 5 分钟, 然后擦拭 10 次.
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## FOR SMT /SMD Products

	Item(项目)	Required Characteristics (要求)	Test Method / Condition (测试方法)
Electrical Characteristic tests (电特性试验)	Electronic characteristic test Of major products 主要产品电特性测试	Refer to catalogue of specific products 参照具体产品目录页	Refer to catalogue of specific products 参照具体产品目录页
	Overload test Reference documents: JIS C5311-6.13 过负荷试验	1. During the test no smoke, no peculiar, smell, no fire 2. The characteristic is normal after test 1. 试验过程中无冒烟, 异味, 着火等, 2. 试验后产品特性正常.	Apply twice as rated current for 5 minutes. 通两倍额定电流 5 分钟
	voltage resistance test Reference documents: MIL-STD-202G Method 301 绝缘耐压测试	1. During the test no breakdown 2. The characteristic is normal after test 1. 试验过程中无击穿 2. 试验后产品特性正常	1. For parts with two coils 2. DC1000V, Current: 1mA, Time: 1Min. 1. 只针对 SMT 二绕组以上 2. 电压 DC1000V, 电流 1mA, 时间 1 分钟

## Curve of Heat endurance of Reflow soldering test



A test is made under the conditions mentioned above. And it is left 1 hour in the normal temperature and humidity. After that, no mechanical and electrical defeat should be found out. The reflow condition is according to the machine used by .

# MINIATURE SMD CHIP CHOKE COILS

## Application Notice (应用须知)

### 1. Storage Conditions (储存条件)

To maintain the solderability of terminal electrodes:

- (1) Temperature and humidity conditions: Less than 40°C and 70% RH.
- (2) Recommended ceramic chip inductors should be used within 6 months from the time of delivery.
- (3) The packaging material should be kept where no chlorine or sulfur exists in the air.

为了维持端面电极的焊锡性:

- (1) 温度及湿度条件: 小于40°C and 70% RH。
- (2) 建议陶瓷芯片电感最好货到6个月内使用。
- (3) 包装材料应避免含氯及硫的环境。

### 2. Handling (搬运)

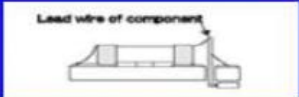
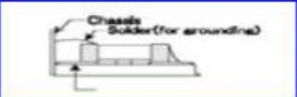
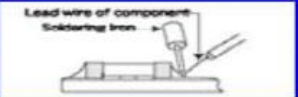



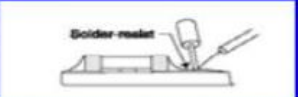
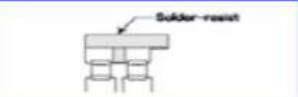
- (1) The use of tweezers or vacuum pick ups is strongly recommended for individual components.
- (2) Bulk handling should ensure that abrasion and mechanical shock are minimized.
- (3) Chip multilayer ceramic inductors should be handled with care to avoid damage or contamination from perspiration and skin oils.

- (1) 使用的镊子及真空组件拾取头建议于其它组件分开。
- (2) 散装搬运时应注意将摩擦及机械冲击减至最低。
- (3) 芯片陶瓷电感应小心搬运以避免破损和皮肤出油的污染。

### 3. Design of Land Pattern ( Land Pattern的设计)

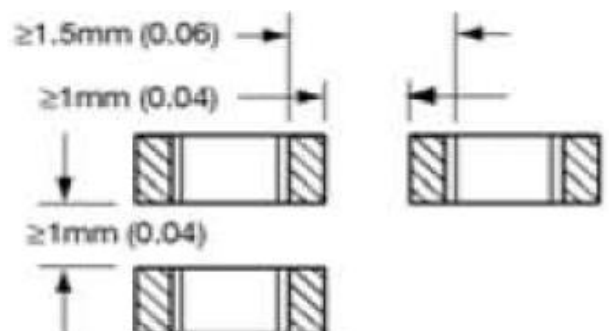
Component pads should be designed to achieve good solder filets and minimize component movement during reflow soldering. Pad designs are given below for the most common sizes of multilayer ceramic inductors for both wave and reflow soldering. The basis of these designs is:

- (1) Pad width equal to component width. It is permissible to decrease this to as low as 85% of component width but it is not advisable to go below this.
- (2) Pad overlap 0.5mm beneath component.
- (3) Pad extension 0.5mm beyond components for reflow and 1.0mm for wave soldering.
- (4) Example of good and bad solder application.

Items	Mixed mounting of SMD and leaded components	Component placement close to the chassis	Hand-soldering of leaded components near mounted components	Horizontal component placement
Bad				
Good				

### 5) Components Spacing.

For wave soldering components, must be spaced sufficiently far apart to avoid bridging or shadowing (inability of solder to penetrate properly into small spaces). This is less important for reflow soldering but sufficient space must be allowed to enable rework should it be required.



# MINIATURE SMD CHIP CHOKE COILS

电极的焊接衬垫的设计应能达到良好的焊料涂布及减少组件在回焊时的移动。以下是对一般最常见的积层陶瓷电感尺寸在波焊或回焊时的焊接衬垫设计。这些设计的基本如下：

- (1) 焊接衬垫的宽度与组件的宽度相同。减少至组件宽度的85%是允许的，但减的更多并不明智。
- (2) 焊接衬垫与组件底部交迭0.5mm。
- (3) 对回焊而言，焊接衬垫延伸出组件0.5mm；波焊则多出1.0mm。
- (4) 良好与不良的锡料运用的例子
- (5) 组件间隔：

对于波焊的组件，必须有足够的间隔以避免bridging及shadowing (焊料无法完全穿透狭小的空间)。间隔对回焊较不那么重要，但仍要有足够的间隔以防有重工之需。

## 4. Preheat (预热)

It is important to avoid the possibility of thermal shock during soldering and carefully controlled preheat is therefore required. The rate of preheat should not exceed  $4^{\circ}\text{C} / \text{second}$  and a target figure  $2^{\circ}\text{C} / \text{second}$  is recommended. Although an  $80^{\circ}\text{C}$  to  $120^{\circ}\text{C}$  temperature differential is preferred, recent developments allow a temperature differential between the component surface and the soldering temperature of  $150^{\circ}\text{C}$  (Maximum) for component of 1210 size and below with a maximum thickness of 1.25mm. The user is cautioned that the risk of thermal shock increases as chip size or temperature differential increases.

在焊接中避免热冲击的可能性是很重要的，因此预热是必须的。预热的温度上升不应超过 $4^{\circ}\text{C}/\text{秒}$ ，建议值是 $2^{\circ}\text{C}/\text{秒}$ 。虽然一个 $80^{\circ}\text{C}$ 到 $120^{\circ}\text{C}$ 的温度差是常用的，但近来的研究显示，对一个1210尺寸、厚度小于1.25mm的组件，组件的表面温度和焊接温度相差最大至 $150^{\circ}\text{C}$ 是可行的。使用者需注意热冲击会随着组件尺寸或温度差增加而增加。

## 5. Solderability (焊锡性)

Terminations to be well soldered after immersion in a 60/40 tin/lead solder bath at  $235 \pm 5^{\circ}\text{C}$  for  $2 \pm 1$  seconds. 端面浸入  $235 \pm 5^{\circ}\text{C}$  60/40锡/铅的锡炉中  $2 \pm 1$  秒即能获得良好的焊接。

## 6. Selection of Flux (助焊剂的选择)

Since flux may have a significant effect on the performance of component, it is necessary to verify the following conditions prior to use;

- (1) Flux used should be with less than or equal to 0.1 wt% (equivalent to chlorine) of halogenated content. Flux having a strong acidity content should not be applied.
- (2) When soldering component on the board, the amount of flux applied should be controlled at the optimum level.
- (3) When using water-soluble flux, special care should be taken to properly clean the boards.

由于助焊剂对组件的表现影响很大，所以使用前应先确认以下的条件：

- (1) 助焊剂的用量应小于或等于卤化物（相等于氯含量）重含量的0.1%。助焊剂内含强酸应避免使用。
- (2) 在焊接组件至基板时，助焊剂的使用量应控制在最佳水平。
- (3) 在使用水溶性的助焊剂时，应特别注意基板的清洁。

## 7. Soldering (焊接)

Mildly activated rosin fluxes are preferred. The minimum amount of solder to give a good joint should be used. Excessive solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. 3L terminations are suitable for all waves and reflow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

活化温和的松香助焊剂是受欢迎的。在能获得良好的结合之下，尽可能使用最少量的助焊剂。过量的焊料会因焊料、芯片及基板间膨胀系数的不同而导致应力造成损坏。三禮的端面适合波焊及回焊系统。如果手工焊接是无可避免，最好是使用利用热风的焊接工具。

## 8. Soldering (焊接)

### (1) Solder Reflow (回焊):

Recommended temperature profiles for reflow soldering are shown in Figures 1.

建议的回焊温度曲线如图表一。

### (2) Solder Wave (波焊):

Wave soldering is perhaps the most rigorous of surface mount soldering processes due to the steep rise in temperature seen by the circuit when immersed in the molten solder wave, typically at 240°C. Wave soldering of ceramic chip inductors larger than 1812 size is discouraged due to the risk of thermal damage to the inductor. Recommended temperature profile for wave soldering is shown in Figure 2.

波焊或许是最严苛的表面黏着焊接制程，因为当浸入熔融的焊波时会有陡峭的温升，一般是240°C。

大于1812尺寸的陶瓷积层电感的波焊，因为会有热冲击造成电感损坏的风险，

所以并不鼓励，建议的波焊温度曲线如图表二。

### (3) Soldering Iron (Figure 3.) 烙铁 (图表三)

Ceramic capacitor attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron

must be employed the following precautions are recommended.

陶瓷电感以烙铁焊接并不鼓励，因其受制于固有的制程控制限制。如果一定要使用烙铁时，建议应先注意以下几点。

- Preheat circuit and capacitors to 150°C.
- 预热线路及电阻至150°C.
- Never contact the ceramic with the iron tip.
- 烙铁的尖端绝对不可碰触陶瓷.
- Use a 20 watt soldering iron with tip diameter of 1.0mm.
- 使用功率20瓦、烙铁尖端直径为1.0mm的烙铁.
- 280°C tip temperature (max).
- 烙铁尖端最高温度为280°C.
- 1.0 mm tip diameter (max).
- 烙铁尖端直径最大为1.0mm.
- Limit soldering time to 3 sec.
- 焊接时间不超过三秒.

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