CHIP COIL (CHIP INDUCTORS) LQP03TN□□□□H2D
Murata Standard Reference Specification 【AEC-Q200】

1.Scope

This reference specification applies to Chip coil (Chip Inductors) LQP03TN_H2 Series for automotive Electronics
based on AEC-Q200.

2.Part Numbering

(ex) LQ | P | 03 | T | N | 0N6 | B | H | 2 | D

Product ID	Structure	Dimension (L×W)	Applications and Characteristics	Category	Inductance	Tolerance	Features	Electrode	Packaging
LQ	P	03	T	N	0N6	B	H	2	D:Taping *B:Bulk

*Bulk packing also available. (A product is put in the plastic bag under the taping conditions.)

3.Rating

・Operating Temperature Range. –55°C to +125°C
(Ambient temperature: Rated current can be handled in this temperature range.)
・Storage Temperature Range. –55°C to +125°C

Customer Part Number	MURATA Part Number	Inductance		Q (min)	DC Resistance (Ω max)	Self Resonant Frequency (MHz)		Rated Current (mA)	ESD Rank
		(nH)	Tolerance			Min.	*Typ.		
	LQP03TN0N6BH2D	0.6	±0.1nH	14	0.07	20000	20000	850	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N6CH2D	0.6	±0.2nH	14	0.07	20000	20000	850	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N7BH2D	0.7	±0.1nH	14	0.08	20000	20000	800	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N7CH2D	0.7	±0.2nH	14	0.08	20000	20000	800	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N8BH2D	0.8	±0.1nH	14	0.08	18000	20000	800	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N8CH2D	0.8	±0.2nH	14	0.08	18000	20000	800	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N9BH2D	0.9	±0.1nH	14	0.10	18000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN0N9CH2D	0.9	±0.2nH	14	0.10	18000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N0BH2D	1.0	±0.1nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N0CH2D	1.0	±0.2nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N1BH2D	1.1	±0.1nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N1CH2D	1.1	±0.2nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N2BH2D	1.2	±0.1nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N2CH2D	1.2	±0.2nH	14	0.10	17000	20000	750	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N3BH2D	1.3	±0.1nH	14	0.15	17000	20000	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N3CH2D	1.3	±0.2nH	14	0.15	17000	20000	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N4BH2D	1.4	±0.1nH	14	0.15	16000	19600	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N4CH2D	1.4	±0.2nH	14	0.15	16000	19600	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N5BH2D	1.5	±0.1nH	14	0.15	15000	17900	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N5CH2D	1.5	±0.2nH	14	0.15	15000	17900	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N6BH2D	1.6	±0.1nH	14	0.15	15000	20000	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N6CH2D	1.6	±0.2nH	14	0.15	15000	20000	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N7BH2D	1.7	±0.1nH	14	0.15	15000	19100	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N7CH2D	1.7	±0.2nH	14	0.15	15000	19100	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N8BH2D	1.8	±0.1nH	14	0.15	15000	17700	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N8CH2D	1.8	±0.2nH	14	0.15	15000	17700	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N9BH2D	1.9	±0.1nH	14	0.15	12500	15100	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN1N9CH2D	1.9	±0.2nH	14	0.15	12500	15100	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N0BH2D	2.0	±0.1nH	14	0.15	12500	14800	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N0CH2D	2.0	±0.2nH	14	0.15	12500	14800	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N1BH2D	2.1	±0.1nH	14	0.15	11000	13900	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N1CH2D	2.1	±0.2nH	14	0.15	11000	13900	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N2BH2D	2.2	±0.1nH	14	0.15	11000	13400	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N2CH2D	2.2	±0.2nH	14	0.15	11000	13400	600	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N3BH2D	2.3	±0.1nH	14	0.20	10000	12900	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N3CH2D	2.3	±0.2nH	14	0.20	10000	12900	500	1C (1kV(DC) < 2kV(DC))

Customer Part Number	MURATA Part Number	Inductance		Q (min)	DC Resistance (Ω max)	Self Resonant Frequency (MHz)		Rated Current (mA)	ESD Rank
		(nH)	Tolerance			Min.	*Typ.		
	LQP03TN2N4BH2D	2.4	±0.1nH	14	0.20	10000	12200	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N4CH2D	2.4	±0.2nH	14	0.20	10000	12200	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N5BH2D	2.5	±0.1nH	14	0.20	10000	12200	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N5CH2D	2.5	±0.2nH	14	0.20	10000	12200	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N6BH2D	2.6	±0.1nH	14	0.20	10000	13300	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N6CH2D	2.6	±0.2nH	14	0.20	10000	13300	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N7BH2D	2.7	±0.1nH	14	0.20	10000	13000	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N7CH2D	2.7	±0.2nH	14	0.20	10000	13000	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N8BH2D	2.8	±0.1nH	14	0.20	9500	11800	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N8CH2D	2.8	±0.2nH	14	0.20	9500	11800	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N9BH2D	2.9	±0.1nH	14	0.20	9500	12400	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN2N9CH2D	2.9	±0.2nH	14	0.20	9500	12400	500	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N0BH2D	3.0	±0.1nH	14	0.25	9500	11900	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N0CH2D	3.0	±0.2nH	14	0.25	9500	11900	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N1BH2D	3.1	±0.1nH	14	0.25	8000	11300	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N1CH2D	3.1	±0.2nH	14	0.25	8000	11300	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N2BH2D	3.2	±0.1nH	14	0.25	8000	10600	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N2CH2D	3.2	±0.2nH	14	0.25	8000	10600	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N3BH2D	3.3	±0.1nH	14	0.25	8000	10900	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N3CH2D	3.3	±0.2nH	14	0.25	8000	10900	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N4BH2D	3.4	±0.1nH	14	0.25	7000	9400	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N4CH2D	3.4	±0.2nH	14	0.25	7000	9400	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N5BH2D	3.5	±0.1nH	14	0.25	7000	9600	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N5CH2D	3.5	±0.2nH	14	0.25	7000	9600	450	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N6BH2D	3.6	±0.1nH	14	0.30	6000	9500	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N6CH2D	3.6	±0.2nH	14	0.30	6000	9500	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N7BH2D	3.7	±0.1nH	14	0.30	6000	8200	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N7CH2D	3.7	±0.2nH	14	0.30	6000	8200	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N8BH2D	3.8	±0.1nH	14	0.30	6000	8100	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N8CH2D	3.8	±0.2nH	14	0.30	6000	8100	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N9BH2D	3.9	±0.1nH	14	0.30	5700	7900	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN3N9CH2D	3.9	±0.2nH	14	0.30	5700	7900	400	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N0BH2D	4.0	±0.1nH	14	0.40	5300	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N0CH2D	4.0	±0.2nH	14	0.40	5300	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N1BH2D	4.1	±0.1nH	14	0.40	5300	8400	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N1CH2D	4.1	±0.2nH	14	0.40	5300	8400	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N2BH2D	4.2	±0.1nH	14	0.40	5300	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N2CH2D	4.2	±0.2nH	14	0.40	5300	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N3HH2D	4.3	±3%	14	0.40	5300	9800	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N3JH2D	4.3	±5%	14	0.40	5300	9800	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N7HH2D	4.7	±3%	14	0.40	4400	8800	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN4N7JH2D	4.7	±5%	14	0.40	4400	8800	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN5N1HH2D	5.1	±3%	14	0.40	4200	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN5N1JH2D	5.1	±5%	14	0.40	4200	8600	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN5N6HH2D	5.6	±3%	14	0.40	4000	8000	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN5N6JH2D	5.6	±5%	14	0.40	4000	8000	350	1C (1kV(DC) < 2kV(DC))
	LQP03TN6N2HH2D	6.2	±3%	14	0.60	4000	7900	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN6N2JH2D	6.2	±5%	14	0.60	4000	7900	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN6N8HH2D	6.8	±3%	14	0.60	3900	8000	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN6N8JH2D	6.8	±5%	14	0.60	3900	8000	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN7N5HH2D	7.5	±3%	14	0.60	3700	6700	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN7N5JH2D	7.5	±5%	14	0.60	3700	6700	300	1C (1kV(DC) < 2kV(DC))
	LQP03TN8N2HH2D	8.2	±3%	14	0.70	3600	6600	250	1C (1kV(DC) < 2kV(DC))

	LQP03TN8N2JH2D	8.2	±5%	14	0.70	3600	6600	250	1C (1kV(DC) < 2kV(DC))

Customer Part Number	MURATA Part Number	Inductance		Q (min)	DC Resistance (Ω max)	Self Resonant Frequency (MHz)		Rated Current (mA)	ESD Rank
		(nH)	Tolerance			Min.	*Typ.		
	LQP03TN9N1HH2D	9.1	±3%	14	0.70	3300	5900	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN9N1JH2D	9.1	±5%	14	0.70	3300	5900	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN10NHH2D	10	±3%	14	0.70	3200	5800	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN10NJH2D	10	±5%	14	0.70	3200	5800	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN11NHH2D	11	±3%	14	0.80	2900	5400	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN11NJH2D	11	±5%	14	0.80	2900	5400	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN12NHH2D	12	±3%	12	0.70	2900	4300	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN12NJH2D	12	±5%	12	0.70	2900	4300	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN13NHH2D	13	±3%	12	0.80	2600	4300	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN13NJH2D	13	±5%	12	0.80	2600	4300	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN15NHH2D	15	±3%	12	0.70	2600	3800	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN15NJH2D	15	±5%	12	0.70	2600	3800	250	1C (1kV(DC) < 2kV(DC))
	LQP03TN16NHH2D	16	±3%	12	0.95	2200	3700	200	1C (1kV(DC) < 2kV(DC))
	LQP03TN16NJH2D	16	±5%	12	0.95	2200	3700	200	1C (1kV(DC) < 2kV(DC))
	LQP03TN18NHH2D	18	±3%	12	0.80	2200	3400	200	1C (1kV(DC) < 2kV(DC))
	LQP03TN18NJH2D	18	±5%	12	0.80	2200	3400	200	1C (1kV(DC) < 2kV(DC))
	LQP03TN20NHH2D	20	±3%	12	2.30	2200	3600	150	1C (1kV(DC) < 2kV(DC))
	LQP03TN20NJH2D	20	±5%	12	2.30	2200	3600	150	1C (1kV(DC) < 2kV(DC))
	LQP03TN22NHH2D	22	±3%	12	1.90	2200	3300	150	1C (1kV(DC) < 2kV(DC))
	LQP03TN22NJH2D	22	±5%	12	1.90	2200	3300	150	1C (1kV(DC) < 2kV(DC))
	LQP03TN24NHH2D	24	±3%	12	2.30	2000	3200	140	1C (1kV(DC) < 2kV(DC))
	LQP03TN24NJH2D	24	±5%	12	2.30	2000	3200	140	1C (1kV(DC) < 2kV(DC))
	LQP03TN27NHH2D	27	±3%	12	2.30	2000	2900	140	1C (1kV(DC) < 2kV(DC))
	LQP03TN27NJH2D	27	±5%	12	2.30	2000	2900	140	1C (1kV(DC) < 2kV(DC))
	LQP03TN30NHH2D	30	±3%	9	2.95	1700	2700	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN30NJH2D	30	±5%	9	2.95	1700	2700	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN33NHH2D	33	±3%	9	2.95	1700	2600	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN33NJH2D	33	±5%	9	2.95	1700	2600	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN36NHH2D	36	±3%	9	3.00	1500	2400	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN36NJH2D	36	±5%	9	3.00	1500	2400	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN39NHH2D	39	±3%	9	3.00	1500	2200	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN39NJH2D	39	±5%	9	3.00	1500	2200	120	1C (1kV(DC) < 2kV(DC))
	LQP03TN43NHH2D	43	±3%	9	3.60	1300	2200	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN43NJH2D	43	±5%	9	3.60	1300	2200	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN47NHH2D	47	±3%	9	3.60	1300	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN47NJH2D	47	±5%	9	3.60	1300	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN51NHH2D	51	±3%	9	3.90	1200	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN51NJH2D	51	±5%	9	3.90	1200	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN56NHH2D	56	±3%	9	3.90	1200	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN56NJH2D	56	±5%	9	3.90	1200	2000	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN62NHH2D	62	±3%	8	8	1100	1800	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN62NJH2D	62	±5%	8	8	1100	1800	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN68NHH2D	68	±3 %	8	8	1100	1500	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN68NJH2D	68	±5 %	8	8	1100	1500	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN75NHH2D	75	±3 %	8	10	1000	1400	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN75NJH2D	75	±5 %	8	10	1000	1400	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN82NHH2D	82	±3 %	8	10	1000	1400	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN82NJH2D	82	±5 %	8	10	1000	1400	100	1C (1kV(DC) < 2kV(DC))
	LQP03TN91NHH2D	91	±3 %	8	10	900	1300	80	1C (1kV(DC) < 2kV(DC))
	LQP03TN91NJH2D	91	±5 %	8	10	900	1300	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR10HH2D	100	±3 %	8	10	900	1300	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR10JH2D	100	±5 %	8	10	900	1300	80	1C (1kV(DC) < 2kV(DC))

Customer Part Number	MURATA Part Number	Inductance		Q (min)	DC Resistance (Ω max)	Self Resonant Frequency (MHz)		Rated Current (mA)	ESD Rank
		(nH)	Tolerance			Min.	*Typ.		
	LQP03TNR11HH2D	110	±3 %	8	12	800	1100	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR11JH2D	110	±5 %	8	12	800	1100	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR12HH2D	120	±3 %	8	12	800	1100	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR12JH2D	120	±5 %	8	12	800	1100	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR13HH2D	130	±3 %	5	9	650	960	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR13JH2D	130	±5 %	5	9	650	960	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR15HH2D	150	±3 %	5	9	650	880	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR15JH2D	150	±5 %	5	9	650	880	80	1C (1kV(DC) < 2kV(DC))
	LQP03TNR16HH2D	160	±3 %	5	11	600	840	70	1C (1kV(DC) < 2kV(DC))
	LQP03TNR16JH2D	160	±5 %	5	11	600	840	70	1C (1kV(DC) < 2kV(DC))
	LQP03TNR18HH2D	180	±3 %	5	11	600	790	70	1C (1kV(DC) < 2kV(DC))
	LQP03TNR18JH2D	180	±5 %	5	11	600	790	70	1C (1kV(DC) < 2kV(DC))

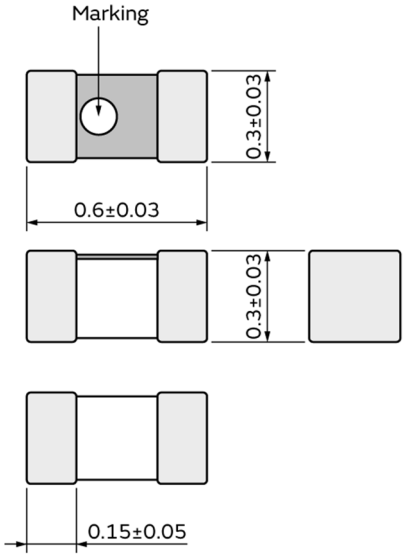
✱ Typical value is actual performance.

4. Testing Conditions

《Unless otherwise specified》
Temperature : Ordinary Temperature / 15°C to 35°C
Humidity : Ordinary Humidity / 25%(RH) to 85 %(RH)

《In case of doubt》
Temperature : 20°C ± 2°C
Humidity : 60%(RH) to 70 %(RH)
Atmospheric Pressure : 86kPa to 106 kPa

5. Appearance and Dimensions

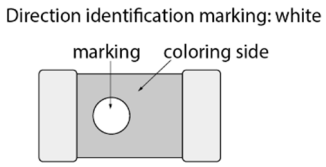


(in mm)

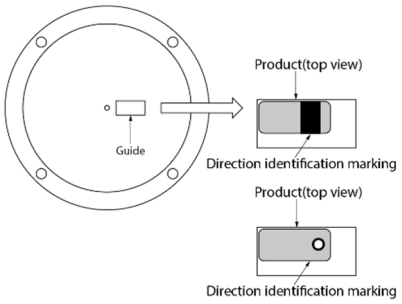
■Unit Mass (Typical value)

0.18 mg

6. Marking



7.Electrical Performance

No.	Item	Specification	Test Method
7.1	Inductance	Inductance shall meet item 3.	Measuring Equipment: KEYSIGHT E4991A or equivalent Measuring Frequency: (0.6nH～30nH) 500MHz (33nH～120nH) 300MHz (130nH～180nH) 100MHz Measuring Condition: Test signal level / about 0dBm Measurement terminal distance：0.2 mm Electrical length / 10mm Weight / about 1N to 5N Measuring Fixture: KEYSIGHT 16197A Position coil under test as shown in below and contact coil with each terminal by adding weight. Coloring side should be a topside, and should be in the direction of the fixture for position of chip coil.  Measuring Method:See the last page. <Electrical Performance:Measuring Method of Inductance/Q>
7.2	Q	Q shall meet item 3.	
7.3	DC Resistance	DC Resistance shall meet item 3.	Measuring Equipment:Digital multi meter
7.4	Self Resonant Frequency(S.R.F)	S.R.F shall meet item 3.	Measuring Equipment: KEYSIGHT N5230A or equivalent
7.5	Rated Current	Self temperature rise shall be limited to 25°C max.	The rated current is applied.

8.Q200 Requirement

8.1.Performance (based on Table 5 for Magnetics(Inductors / Transformer)

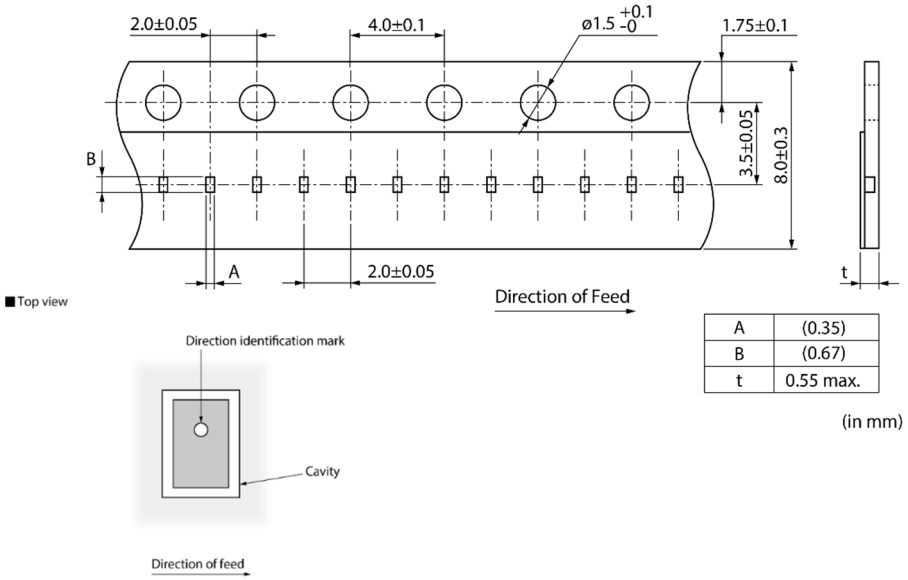
AEC-Q200 Rev.D issued June 1. 2010

AEC-Q200			Murata Specification / Deviation
No	Stress	Test Method	
3	High Temperature Exposure	1000hours at 125 deg C Set for 24hours at room temperature, then measured.	Meet Table A after testing. Table A Appearance: No damage Inductance change 0.6nH～30nH (at 500MHz): Within ±10% 33nH～120nH (at 300MHz) 130nH～180nH (at 100MHz)
4	Temperature Cycling	1000cycles -40 deg C to +125 deg C Set for 24hours at room temperature,then measured.	Meet Table A after testing.
7	Biased Humidity	1000hours at 85 deg C, 85%RH unpowered.	Meet Table A after testing.

AEC-Q200			Murata Specification / Deviation
No	Stress	Test Method	
8	Operational Life	Apply 125 deg C 1000hours Set for 24hours at room temperature, then measured	Meet Table A after testing.
9	External Visual	Visual inspection	No abnormalities
10	Physical Dimension	Meet ITEM 4 （Style and Dimensions）	No defects
12	Resistance to Solvents	Per MIL-STD-202 Method 215	Not Applicable
13	Mechanical Shock	Per MIL-STD-202 Method 213 Condition F: 1500g's(14.7N)/0.5ms/Half sine	Meet Table A after testing.
14	Vibration	5g's(0.049N) for 20 minutes, 12cycles each of 3 oritentations Test from 10-2000Hz.	Meet Table A after testing.
15	Resistance to Soldering Heat	No-heating Solder temperature 260C+/-5 deg C Immersion time 10s	Meet Table A after testing. Pre-heating 150C +/-10 deg C, 60s to 90s
17	ESD	Per AEC-Q200-002	ESD Rank: 1C（1KV~2KV）
18	Solderbility	Per J-STD-002	Method b : Not Applicable Pre-heating 150C +/-10 deg C, 60s to 90s 90% of the terminations is to be soldered.
19	Electrical Characterization	Measured : Inductance	No defects
20	Flammability	Per UL-94	Not Applicable
21	Board Flex	Epoxy-PCB(1.6mm_thickness) Deflection 2mm(min) Holding time 60s	Meet Table B after testing. Deviation for AEC-Q200 Epoxy-PCB thickness: 1.0 mm Table B Appearance: No damage DC resistance: Within ±10%
22	Terminal Strength	Per AEC-Q200-006 A force of 17.7N for 60s	Deviation for AEC-Q200 Applying force: 2 N Holding time: 5 s No defect

9.Specification of Packaging

9.1 Appearance and Dimensions of paper tape (8mm-wide)



A	(0.35)
B	(0.67)
t	0.55 max.

(in mm)

9.2 Specification of Taping

(1) Packing quantity (standard quantity)
15,000 pcs. / reel

(2) Packing Method
Products shall be packed in the cavity of the base tape and sealed by cover tape.

(3) Sprocket hole
The sprocket holes are to the right as the tape is pulled toward the user.

(4) Spliced point
Base tape and cover tape has no spliced point.

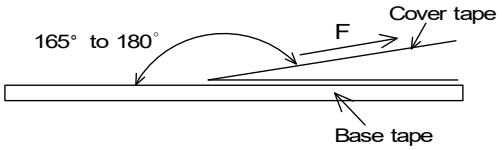
(5) Missing components number
Missing components number within 0.1 % of the number per reel or 1 pc. , whichever is greater, and are not continuous. The Specified quantity per reel is kept.

9.3 Pull Strength

Cover tape	5N min

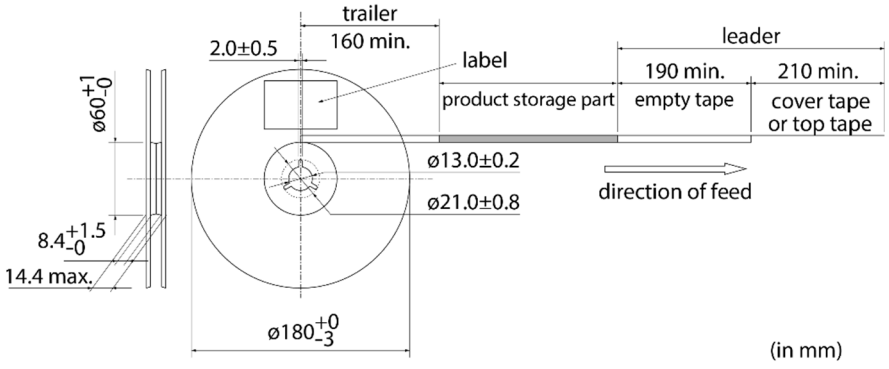
9.4 Peeling off force of cover tape

Speed of Peeling off	300mm/min
Peeling off force	0.1N to 0.6N (minimum value is typical)



9.5 Dimensions of Leader-tape, Trailer and Reel

There shall be leader-tape (cover tape and empty tape) and trailer-tape (empty tape) as follows.



(in mm)

9.6 Marking for reel

Customer part number, MURATA part number, Inspection number(∗1) , RoHS Marking (∗2), Quantity etc ・・・

∗1) <Expression of Inspection No.> □□ OOOO ×××
(1) (2) (3)

(1) Factory Code
(2) Date First digit : Year / Last digit of year
Second digit : Month / Jan. to Sep. → 1 to 9, Oct. to Dec. → O,N,D
Third, Fourth digit : Day
(3) Serial No.

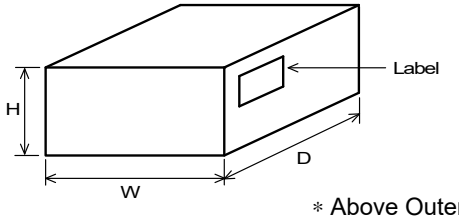
∗2) <Expression of RoHS Marking> ROHS – Y (△)
(1) (2)

(1) RoHS regulation conformity parts.
(2) MURATA classification number

9.7 Marking for Outside package (corrugated paper box)

Customer name, Purchasing order number, Customer part number, MURATA part number, RoHS Marking (∗2) ,Quantity, etc ・・・

9.8 Specification of Outer Case



Outer Case Dimensions (mm)			Standard Reel Quantity in Outer Case (Reel)
W	D	H	
186	186	93	5

∗ Above Outer Case size is typical. It depends on a quantity of an order.

10. ⚠ Caution

10.1Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life,body or property.

(1) Aircraft equipment
(2) Aerospace equipment
(3) Undersea equipment
(4) Power plant control equipment
(5) Medical equipment
(6) Transportation equipment (trains, ships, etc.)
(7) Traffic signal equipment
(8) Disaster prevention / crime prevention equipment
(9) Data-processing equipment
(10) Applications of similar complexity and / or reliability requirements to the applications listed in the above.

10.2 Fail Safe

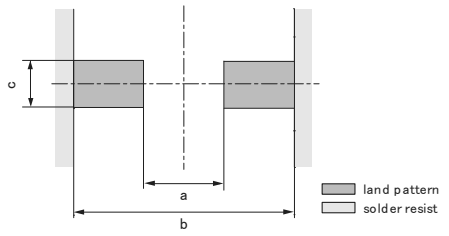
Be sure to provide an appropreate fail-safe function on your product to prevent from a second damage that may be caused by the abnormal function or the failure of our products.

11. Precautions for Use

This product is for use only with reflow soldering. It is designed to be mounted by soldering. If you want to use other mounting method, for example, using a conductive adhesive, be sure to conduct full assessments before use.
Also, if repeatedly subjected to temperature cycles or other thermal stress, due to the difference in the coefficient of thermal expansion with the mounting substrate, the solder (solder fillet part) in the mounting part may crack.
The occurrence of cracks due to thermal stress is affected by the size of the land where mounted, the solder volume, and the heat dissipation of the mounting substrate. Carefully design it when a large change in ambient temperature is assumed.

11.1 Land dimensions

The following diagram shows the recommended land dimensions for reflow soldering.



a	0.2~0.3
b	0.8~0.9
c	0.2~0.3

(in mm)

11.2 Mounting Conditions

・Please check the mounting condition before using.

・Using mounting conditions (nozzles, equipment conditions, etc.) that are not suitable for products may lead to pick up errors, misalignment, or damage to the product.

11.3 Flux, Solder

・ Use rosin-based flux.
Don't use highly acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value).
Don't use water-soluble flux.

・ Use Sn-3.0Ag-0.5Cu solder.

・ Standard thickness of solder paste :60μm~100μm.

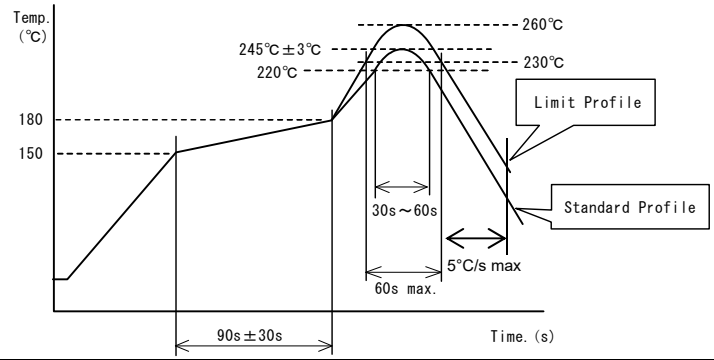
11.4 Reflow soldering conditions

・ Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 150°C max.

Insufficient pre-heating may cause cracks on the product, resulting in the deterioration of products quality.

・ Standard soldering profile and the limit soldering profile is as follows.
The excessive limit soldering conditions may cause leaching of the electrode and / or resulting in the deterioration of product quality.

・Reflow soldering profile



	Standard Profile	Limit Profile
Pre-heating	150°C～180°C 、90s±30s	
Heating	above 220°C、30s～60s	above 230°C、60s max.
Peak temperature	245°C±3°C	260°C,10s
Cycle of reflow	2 times	2 times
Cooling rate	5°C/s max	

11.5 Reworking with soldering iron

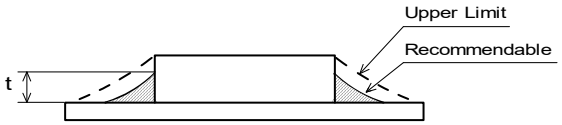
The following conditions must be strictly followed when using a soldering iron.

Pre-heating	150°C,1 min
Tip temperature	350°C max.
Soldering iron output	80W max.
Tip diameter	ϕ3mm max.
Soldering time	3(+1,-0)s
Time	2 times

Note : Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the products due to the thermal shock.

11.6 Solder Volume

・ Solder shall be used not to be exceeded the upper limits as shown below.



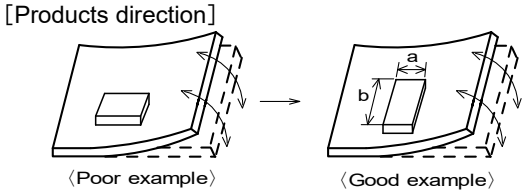
1/3T≦t≦T
T : thickness of product

Accordingly increasing the solder volume, the mechanical stress to Chip is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance.

11.7 Attention regarding P.C.B. bending

The following shall be considered when designing and laying out P.C.B.'s.

(1) P.C.B. shall be designed so that products are not subject to the mechanical stress due to warping the board.

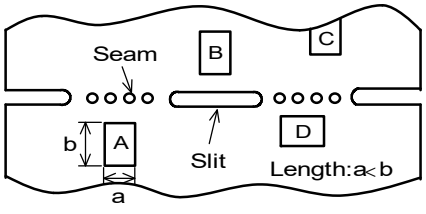


Products shall be located in the sideways direction (Length:a＜b) to the mechanical stress.

(2) Components location on P.C.B. separation.

It is effective to implement the following measures, to reduce stress in separating the board.
It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

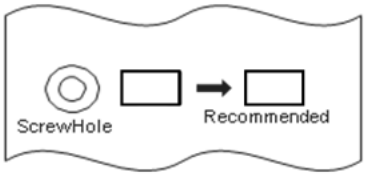
Contents of Measures	Stress Level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D *1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C



*1 A > D is valid when stress is added vertically to the perforation as with Hand Separation.
If a Cutting Disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.

(3) Mounting Components Near Screw Holes

When a component is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw. Mount the capacitor in a position as far away from the screw holes as possible.



11.8 Cleaning

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Before starting your production process, test your cleaning equipment / process to insur eit does not degrade this product.

11.9 Resin coating

When products are coated with resin, please contact us in advance.

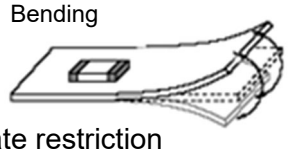
11.10 Restriction and handling of a substrate

・Don’t mount on FPC（Flexible printed circuits）

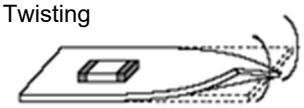
(1)There is a possibility of chip cracking caused by PCB expansion/contraction with heat, because stress on a chip is different depending on PCB material and structure.
When the thermal expansion coefficient greatly differs between the board used for mounting and the chip, it will cause cracking of the chip due to the thermal expansion and contraction.
The chip is assumed to be mounted on the PCB of glass-epoxy material, and we don't test with other PCB material which has different thermal expansion coefficient from Glass-epoxy.
When other PCB materials are considered, please be sure to evaluate by yourself.

(2)After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate.
Excessive mechanical stress may cause cracking in the product.
In case of the mounting on flexible PCB, there is a possibility of chip cracking caused by mechanical stress even from small bending or twisting.
When the flexible PCB is considered, please be sure to evaluate by yourself.

Bending



Twisting



Substrate restriction

・Don’t mount on FPC（Flexible printed circuits）
・When components are mounted on substrate of under 6-layers, please contact us in advance.
To mount components on FPC or substrate of under 6-layers may cause of cracking issue by stress.

11.11 Operating Environment

Do not use this product under the following environmental conditions, on deterioration of the Insulation Resistance of the Ceramic material and/or corrosion of Conductor material may result from the use.

(1) in the corrodible atmosphere such as acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc.(the sea breeze, Cl_2, H_2S, NH_3, SO_2, NO_2,etc)
(2) in the atmosphere where liquid such as organic solvent, may splash on the products.
(3) in the atmosphere where the temperature / humidity changes rapidly and it is easy to dew.

11.12 Storage and transportation

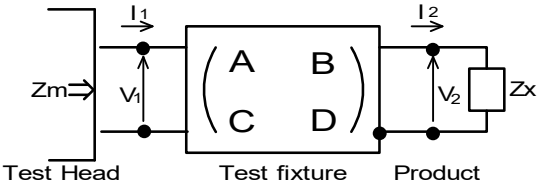
Storage period	Use the product within 12 months after delivery. If you do not use the product for more than 12 months, check solderability before using it.
Storage conditions	• The products shall be stored in a room not subject to rapid changes in temperature and humidity. The recommended temperature range is -10°C to +40°C. The recommended relative humidity range is 15% to 85%. Keeping the product in corrosive gases, such as sulfur, chlorine gas or acid may cause the poor solderability. • Do not place the products directly on the floor; they should be placed on a palette so that they are not affected by humidity or dust. • Avoid keeping the products in a place exposed to direct sunlight, heat or vibration. • Do not keep products in bulk packaging. Doing so may cause collision between the products or between the products and other products, resulting in chipping or wire breakage. • Avoid storing the product by itself bare (i.e. exposed directly to air).
Transportation	Excessive vibration and impact reduces the reliability of the products. Exercise caution when handling the products.

12.⚠ Note

(1)Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
(2)You are requested not to use our product deviating from the reference specifications.
(3)The contents of this reference specification are subject to change without advance notice.
Please approve our product specifications or transact the approval sheet for product specifications before ordering.

<Electrical Performance:Measuring Method of Inductance/Q>

(1) Residual elements and stray elements of test fixture can be described by F-parameter shown in following.



$$\begin{pmatrix} V_1 \\ I_1 \end{pmatrix} = \begin{pmatrix} A & B \\ C & D \end{pmatrix} \begin{pmatrix} V_2 \\ I_2 \end{pmatrix}$$

(2) The impedance of chip coil Zx and measured value Zm can be described by input/output current/voltage.

$$Zm=\frac{V_1}{I_1} \quad , \quad Zx=\frac{V_2}{I_2}$$

(3) Thus,the relation between Zx and Zm is following;

$$Zx=\alpha\frac{Zm-\beta}{1-Zm\,\Gamma}$$

where, α = D / A =1
β = B / D =Zsm-(1-Yom Zsm)Zss
Γ = C / A =Yom

(Zsm:measured impedance of short chip
Zss:residual impedance of short chip (0.480nH)
Yom:measured admittance when opening the fixture)

(4) Lx and Qx shall be calculated with the following equation.

$$Lx=\frac{Im(Zx)}{2\pi f} \quad , \quad Qx=\frac{Im(Zx)}{Re(Zx)}$$

Lx :Inductance of chip coil
Qx:Q of chip coil
f :Measuring frequency