

MICRO INDUCTORS

Features

1. Very high Self-Resonant Frequencies
2. Ultra miniature size and light(0.6mm ; ϕ0.3mm ; ϕ0.3mm)
3. No polarity
4. Terminal electrode has excellent solder heat resistance for soldering.
5. Elimination of lead throughout

Applications

1. Bluetooth module
2. CDMA, TDMA, GSM, PCS Phone
3. RF module of telecommunication products.
-Cellular phone, Cordless telephone, Pagers etc.
4. PAM (Power Amp Module)
5. Computer communications, Radar detectors.

Ordering Information

MI - 1 0 6 0 3 - 2 2 0 J J T
 (1) (2) (3) (4) (5) (6) (7) - - -

(1) Series

(2) Material

(3) Dimensions

The first two : length(mm)
 The last two : width(mm)

(4) Inductance

The first two digits are significant.
 The last digit is the number of zeros following.
 N : a decimal point placed between first two digits.

(5) Tolerance

S : ± 0.3nH
 J : ± 5%

(5) Termination

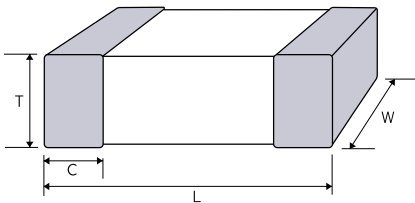
J : Nickel barrier

(7) Packing

B : Bulk pack
 T : Tape & Reel(ϕ 178mm [7inches])
 L : Tape & Reel(ϕ 254mm [10inches])

Shape and Dimensions

unit : mm[inches]



Type	L	W	T	C(max.)
MI-0603-	0.6 ± 0.03 [.024 ± .001]	0.3 ± 0.03 [.012 ± .001]	0.3 ± 0.03 [.012 ± .001]	0.20 [.008]
MI-1005-	1.0 ± 0.05 [.039 ± .002]	0.5 ± 0.05 [.020 ± .002]	0.5 ± 0.05 [.020 ± 0.02]	0.40 [.016]

Specifications

MI 0603

Part No.	Inductance (at 100MHz)		Q MIN	Q(Typ)					SRF(MHz)		DCR(Ω)		Rated current (mA) max.
	nH	Tolerance		100MHz	100MHz	800MHz	1000MHz	1800MHz	min.	max.	typ.		
MI-I0603-10NS	1.0	±0.3nH	3	3.9	11.5	12.5	16.5	20000	0.15	0.09	170		
MI-I0603-12NS	1.2		3	4.0	11.9	13.2	17.9	20000	0.15	0.10	170		
MI-I0603-15NS	1.5		3	4.1	11.9	13.3	17.8	20000	0.15	0.11	170		
MI-I0603-18NS	1.8		3	4.1	12.0	13.4	18.1	20000	0.20	0.13	170		
MI-I0603-22NS	2.2		3	4.2	11.8	13.2	18.5	18000	0.20	0.14	150		
MI-I0603-27NS	2.7		3	3.9	10.3	11.5	17.2	15000	0.25	0.15	150		
MI-I0603-33NS	3.3		3	4.3	11.5	12.9	18.2	13000	0.30	0.24	150		
MI-I0603-39NS	3.9		3	4.7	12.8	14.9	21.5	12000	0.35	0.27	150		
MI-I0603-47NS	4.7		3	5.0	12.4	14.2	20.0	10000	0.40	0.30	150		
MI-I0603-56NS	5.6		3.5	5.0	13.3	15.4	23.1	10000	0.45	0.35	150		
MI-I0603-68NJ	6.8	±5%	3.5	4.7	12.5	14.0	20.1	9000	0.50	0.38	150		
MI-I0603-82NJ	8.2		3.5	4.9	11.8	13.4	19.7	9000	0.60	0.39	150		
MI-I0603-100J	10		3.5	5.0	13.0	14.6	20.6	8000	0.70	0.54	150		
MI-I0603-120J	12		4	4.5	11.8	13.5	19.7	8000	0.85	0.62	100		
MI-I0603-150J	15		4	5.1	13.0	14.7	20.3	7000	0.90	0.75	100		
MI-I0603-180J	18		4	5.0	13.0	14.6	19.1	6000	1.10	0.90	100		
MI-I0603-220J	22		4	4.9	12.3	13.4	22.2	6000	1.90	0.95	100		

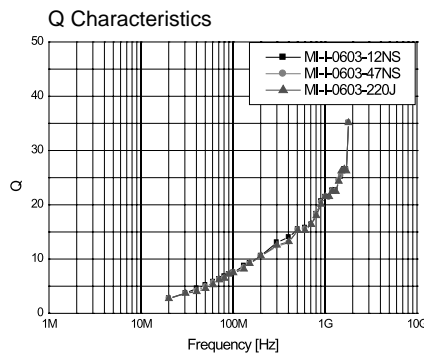
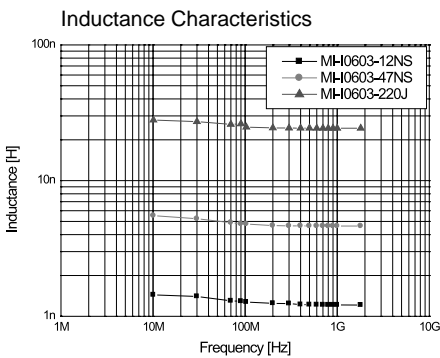
Test Equipment & Fixture

L, Q : RF Impedance Analyzer 4991A(Agilent), Test Fixture 16196C(Agilent)

SRF : Network Analyzer 8722ES (Agilent),

Rdc : TWA-161A, B

Electrical Characteristics



Specifications

MI 1005

Part No.	Inductance (at 100MHz)		Q MIN	Q(Typ)				SRF(MHz)	DCR(§)			Rated current (mA) max.
	nH	Tolerance		100MHz	100MHz	800MHz	1000MHz		1800MHz	min.	max.	
MI-I1005-10NS	1.0	±0.3nH	4.0	8.0	20.5	23.7	27.5	20000	0.10	0.06	300	
MI-I1005-12NS	1.2		4.0	8.4	21.2	24.9	28.6	20000	0.10	0.06	300	
MI-I1005-15NS	1.5		4.0	8.4	21.2	25.4	28.2	14000	0.20	0.08	300	
MI-I1005-18NS	1.8		4.0	9.2	21.5	26.9	30.2	13000	0.20	0.08	300	
MI-I1005-22NS	2.2		4.0	8.6	22.2	26.8	29.7	12000	0.20	0.09	250	
MI-I1005-27NS	2.7		4.5	8.4	22.8	26.0	35.8	10000	0.25	0.11	250	
MI-I1005-33NS	3.3		5.0	9.0	22.2	26.5	31.0	10000	0.25	0.14	250	
MI-I1005-39NS	3.9		5.0	9.2	23.1	26.6	37.9	10000	0.30	0.14	250	
MI-I1005-47NS	4.7		5.5	9.6	23.2	26.9	39.5	8000	0.30	0.15	200	
MI-I1005-56NS	5.6		5.5	8.8	23.3	27.0	41.0	7000	0.35	0.17	200	
MI-I1005-68NJ	6.8	±5%	5.5	8.5	21.3	27.1	40.0	6500	0.40	0.20	200	
MI-I1005-82NJ	8.2		5.5	9.1	22.7	27.2	41.5	5600	0.50	0.23	200	
MI-I1005-100J	10		5.5	8.3	22.5	27.5	42.1	5400	0.70	0.32	200	
MI-I1005-120J	12		7.0	8.6	24.1	27.4	42.8	4100	0.80	0.38	200	
MI-I1005-150J	15		7.0	8.9	22.4	28.5	42.9	4000	0.90	0.43	200	
MI-I1005-180J	18		7.0	9.3	24.6	30.4	41.3	3700	1.00	0.49	150	
MI-I1005-220J	22		7.0	8.7	23.4	26.2	40.0	3500	1.20	0.60	150	
MI-I1005-270J	27		7.0	9.0	26.5	30.2	38.1	3400	1.50	0.65	150	
MI-I1005-330J	33		7.0	8.6	24.8	28.0	36.4	3200	1.80	0.79	150	
MI-I1005-390J	39		7.0	9.1	24.1	26.1	25.7	2500	2.00	0.98	100	
MI-I1005-470J	47	7.0	8.7	24.6	26.5	23.0	2400	2.20	1.15	100		
MI-I1005-560J	56	7.0	9.0	24.5	25.8	23.5	2300	2.50	1.30	100		
MI-I1005-680J	68	7.0	10.1	25.5	27.7	20.7	2200	2.70	1.85	100		
MI-I1005-820J	82	7.0	10.3	24.5	25.9	20.4	2100	2.90	2.00	100		
MI-I1005-101J	100	7.0	9.2	23.2	24.2	16.6	2000	3.20	2.20	100		

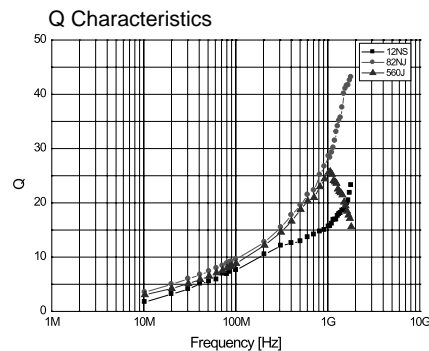
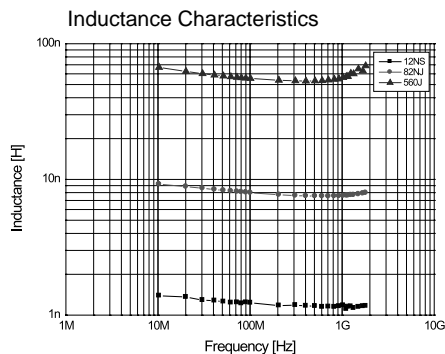
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SRF : Network Analyzer 8722ES (Agilent),

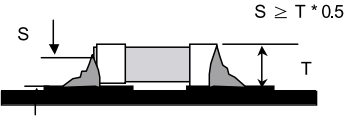
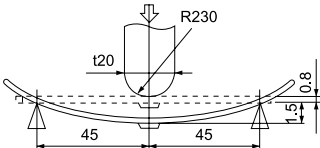
Rdc : TWA-161A, B

Electrical Characteristics



RELIABILITY AND TEST CONDITIONS

MICRO INDUCTORS

ITEM	REQUIREMENTS	TEST CONDITION
Operating temp. range	-55; ~+125;	—
Storage temp. & humidity range	-40; Max. 70% RH Max.	at packing condition
Resistance to solder heat	<ol style="list-style-type: none"> 1. No damage such as cracks should be caused in body element. 2. More than 75% of the terminal electrode shall be covered with new solder. 3. Inductance change : ; within 5% 4. Quality factor change : ; within 30% 	Preheat temperature : 100 to 150 ; Preheat time : 1 min. Solder temperature : 260 ; 10 ; Dipping time : 10 ; 0.5sec
Solderability	<ol style="list-style-type: none"> 1. More than 90% of the terminal electrode shall be covered with new solder. 2. Inductance change : ; within 5% 3. Quality factor change : ; within 30% 	Preheat temperature : 100 to 150 ; Preheat time : 1 min. Solder temperature : 230 ; 10 ; Dipping time : 3 ; 1sec
Reflow soldering	<ol style="list-style-type: none"> 1. More than 50% of the terminal electrode shall be covered with new solder. 	Preheat temperature : 150 ; Preheat time : 1 min. Solder temperature : 230 ; Dipping time : 10sec. (Reflow soldering profile)
Bending Test	<ol style="list-style-type: none"> 1. No mechanical damage 	

MICRO INDUCTORS

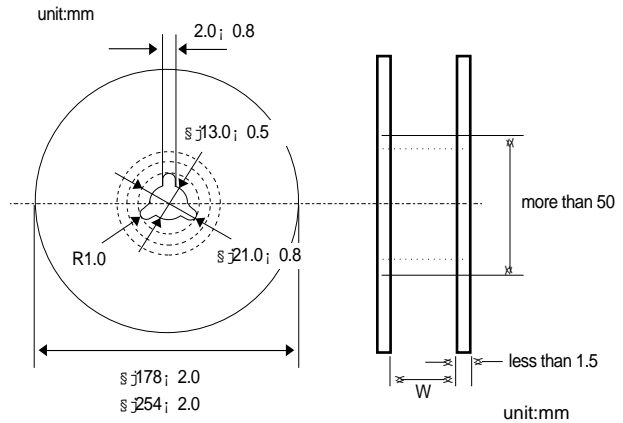
ITEM	REQUIREMENTS	TEST CONDITION
Drop	1. No mechanical damage	Drop 10 times on a concrete floor from a height of 91cm.
Vibration	1. No mechanical damage	Frequency : 10-55-10Hz Amplitude : 1.52 mm Direction and time : X,Y,Z directions for 2 hours
Thermal shock (Temperature cycle)	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%	Step1. -40 \pm 3 ; 30 \pm 3min. Step2. 85 \pm 3 ; 30 \pm 3min. Number of cycle : 100 times
Heat load resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%	Temperature : 85 \pm 2 ; Applied current : rated current Time : 1,000 hours Measured at room ambient temperature after placing for 24 hours
Low temp. resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%	Temperature : -40 \pm 5 ; Time : 1,000 hours Measured at room ambient temperature after placing for 24 hours
Humidity resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%	Temperature : 40 \pm 2 ; Humidity : 90-95% RH Time : 500 hours Measured at room ambient temperature after placing for 24 hours
Humidity load resistance	1. No mechanical damage 2. Inductance change : \pm within 5% 3. Quality factor change : \pm within 30%	Temperature : 40 \pm 2 ; Humidity : 90-95% RH Applied current : rated current Time : 500 hours Measured at room ambient temperature after placing for 24 hours

PACKING

STANDARD QUANTITY

Type	Q _i (PCS)	REMARKS
0603	15,000	
	10,000	
1005	50,000	BULK CASSETTE
	10,000	
1608	4,000	4mm pitch
	8,000	
2012	3,000	
	7,000	254mm
3216	3,000	
	7,000	254mm
4516	3,000	
4532	1,500	
5750	1,000	

REEL DIMENSION

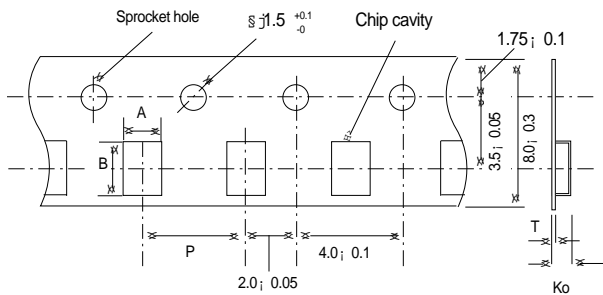


Type	W[mm]
0603, 1005, 1608, 2012, 3216 Array	9.0 ± 0.3
4516, 4532, 5750	13.0 ± 0.3

TAPING DIMENSION / 8mm wide

Embossing Tape

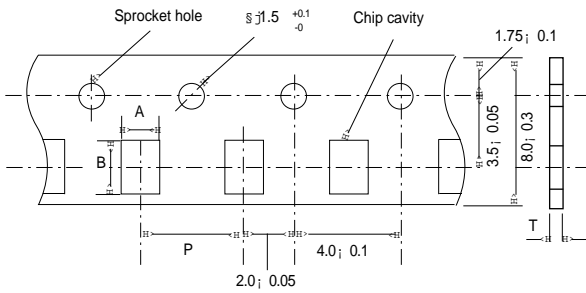
unit:mm



PRODUCT	Type	A _i 0.1	B _i 0.1	P _i 0.1	Ko _i 0.1	T(max.)
CHIP BEADS	1608	1.00	1.80	4.0	0.95	0.3
CHIP BEADS ARRAY						
CHIP FERRITE INDUCTOR	2012	1.45	2.25	4.0	0.08	0.3
CHIP EMI SUPPRESSION FILTER					1.00	
CHIP EMI FILTER ARRAY	2012	1.90	2.25	4.0	1.35	0.3
CHIP LC FILTER						
CHIP COMMON MODE FILTER	3216	1.90	3.60	4.0	1.00	0.3
CHIP FEEDTHRU						
CHIP VARISTOR	3216	1.90	3.60	4.0	1.35	0.3
CHIP VARISTOR ARRAY						
CHIP SURGE ABSORBER						

; Paper Tape

unit:mm

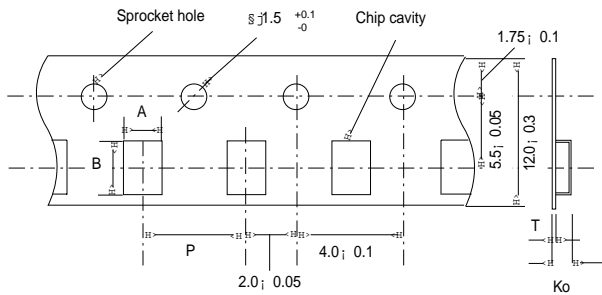


PRODUCT	Type	$A_i \pm 0.1$	$B_i \pm 0.1$	$P_i \pm 0.1$	T(max.)
MICRO INDUCTOR CHIP BEADS CHIP INDUCTOR CHIP VARISTOR CHIP SURGE ARRAY	0603	0.37 ± 0.02	0.67 ± 0.02	4.0 ± 0.1	0.45
	1005	0.65 ± 0.1	1.15 ± 0.1	2.0 ± 0.1	0.8
	1608	1.00 ± 0.1	1.8 ± 0.1	2.0 ± 0.1	1.1

TAPING DIMENSION / 12mm wide

; Embossing Tape

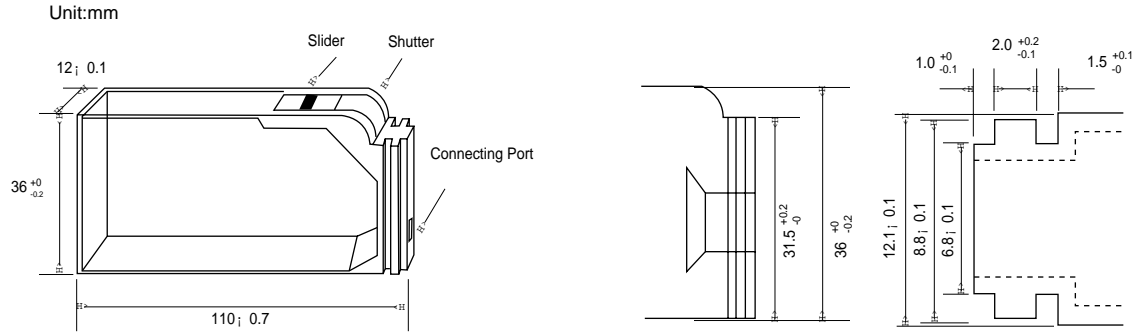
unit:mm



unit ; mm

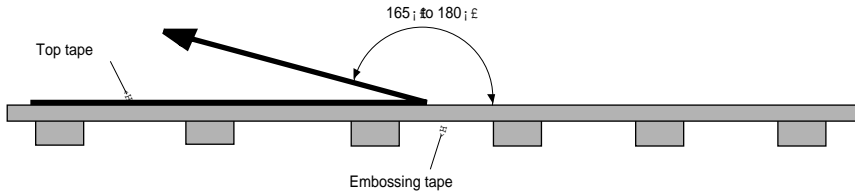
PRODUCT	Type	$A_i \pm 0.1$	$B_i \pm 0.1$	$P_i \pm 0.1$	$Ko_i \pm 0.1$	T(max.)
CHIP BEADS CHIP FEEDTHRU	4516	1.90	4.90	4.0	1.00	0.3
	4516	1.90	4.90	4.0	1.35	0.3
	4532	3.60	4.90	8.0	1.40	0.3
	5750	5.20	6.10	8.0	2.05	0.3

§ 1005 BULK CASSETTE DIMENSION



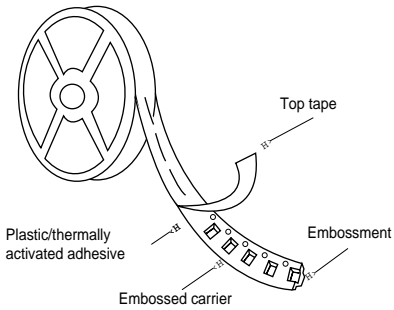
§ TOP TAPE STRENGTH

⌋ The force for tearing off top tape is 20 to 70 grams in the arrow direction.

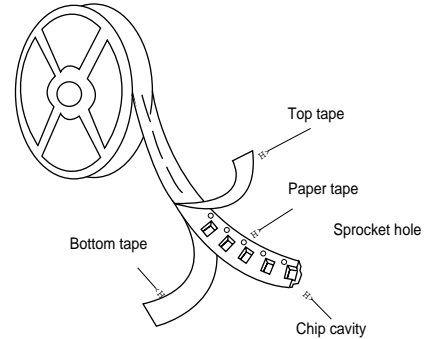


§ TAPING MATERIAL

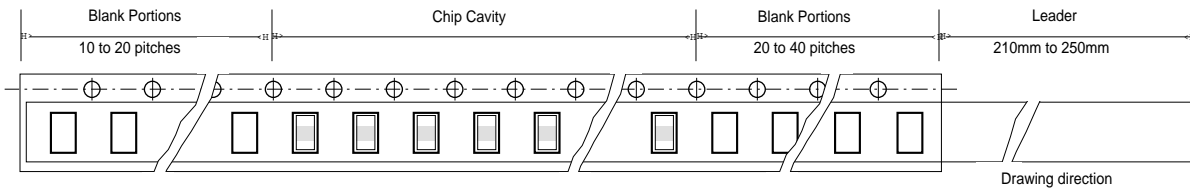
⌋ Embossed Tape



⌋ Paper Tape



§ LEADER AND BLANK PORTION

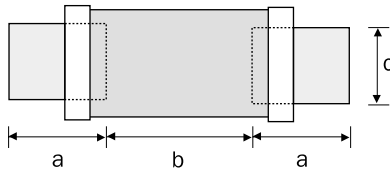


⌋ The pitch holes shift within ± 0.3 mm for cumulative 10 pitches.

LAND PATTERN DESIGN

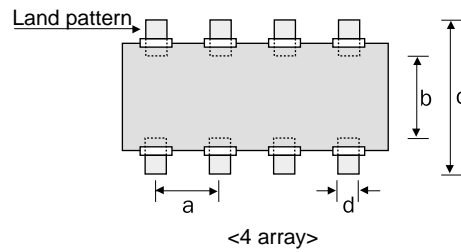
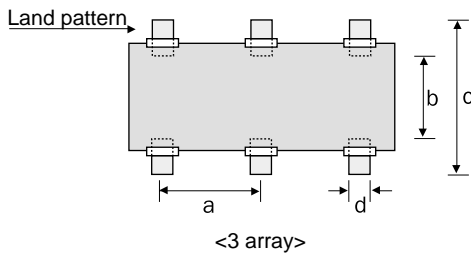
BEAD, INDUCTOR, VARISTOR, SURGE ABSORBER

unit ; mm



SIZE	a	b	c
0603	0.22	0.25	0.32
1005	0.7	0.4	0.5
1608	1.0	0.6	0.8
2012	1.0	1.0	1.0
3216	1.1	2.2	1.4
4516	1.5	3.0	1.4
4532	1.8	3.0	3.0
5750	2.0	4.0	5.8

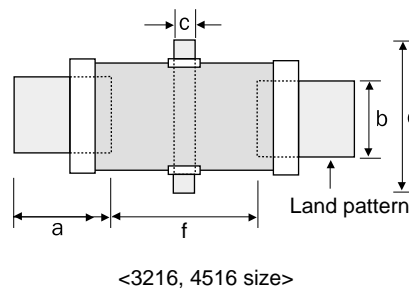
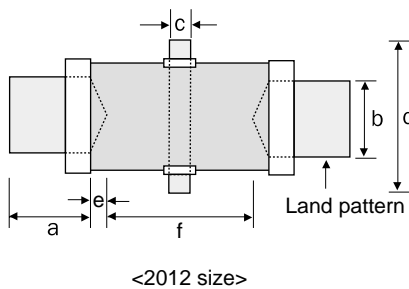
ARRAY



unit ; mm

SIZE	array	a	b	c	d
3216	3 array	1.0	0.8	3.0	0.5
3216	4 array	0.8	0.8	3.0	0.4

EMI SUPPRESSION FILTER, LC FILTER, FEEDTHRU CAPACITOR

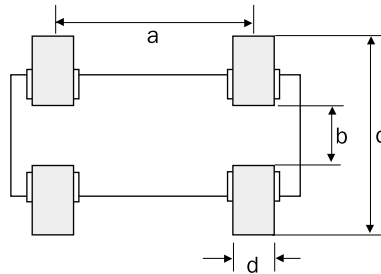


unit ; mm

SIZE	a	b	c	d	e	f
2012	1.0	1.0	0.4	2.0	0.1	1.4
3216	1.1	1.4	0.6	2.4	-	2.4
4516	1.5	1.4	0.8	2.4	-	3.4

LAND PATTERN DESIGN

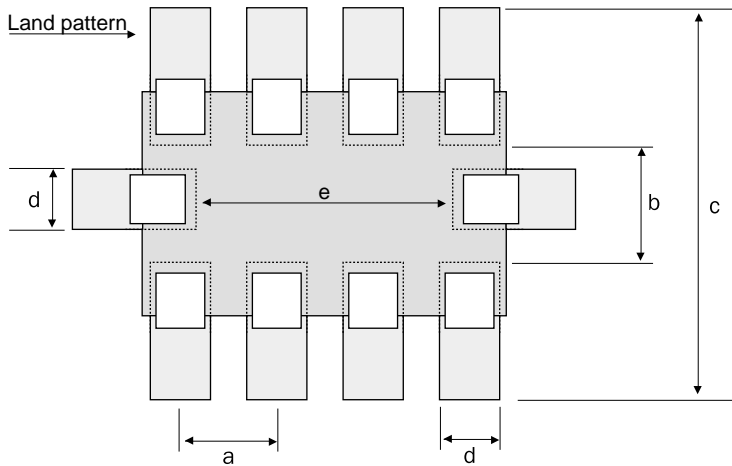
COMMON MODE FILTER, VARISTOR ARRAY



unit ; mm

SIZE	POLE(Array)	a	b	c	d
2012	2 POLE	1.20	0.60	2.60	0.40
2012	2 Array	0.76	0.38	2.16	0.46
3216	2 POLE	2.10	0.80	3.00	0.60
3216	2 Array	1.96	0.76	2.54	0.90

EMI FILTER ARRAY

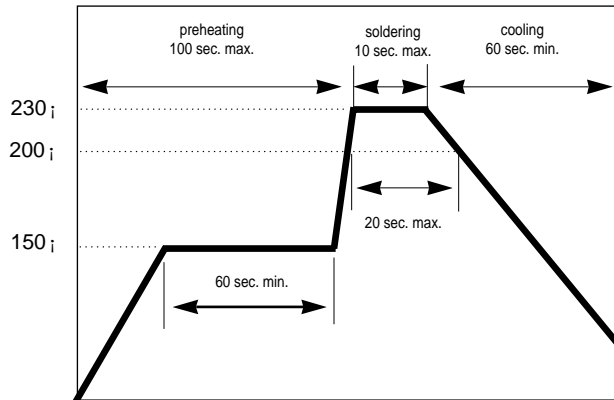


unit ; mm

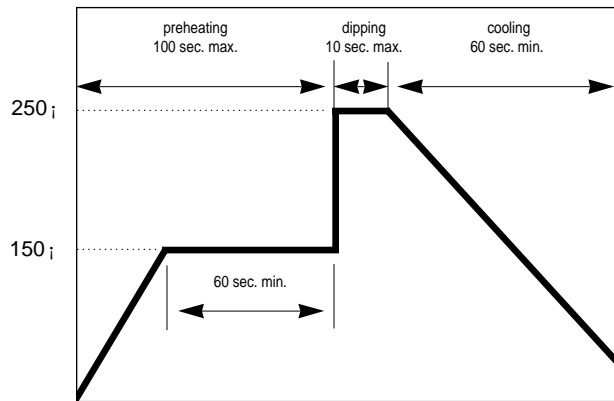
SIZE	POLE(Array)	a	b	c	d	e
3216	4 Array	0.8	0.8	3.0	0.4	2.4

SOLDERING PROFILE

REFLOW SOLERING PROFILE



FLOW SOLDERING PROFILE



MANUAL SOLDERING

