

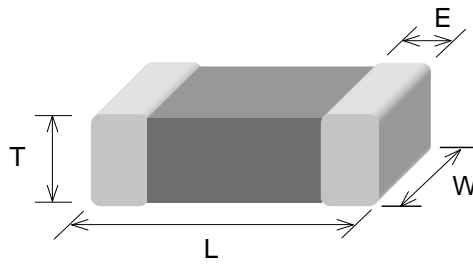


Chip Ferrite Bead for High Current (MHC-S Series) Engineering Spec.

■ PRODUCT DETAIL

Electrical Characteristics			Test Instruments
Z	Ω (Ref. Page 6~8)	TEST FREQ: MHz (Ref. Page 6~8)	•HP4291B RF IMPEDANCE / MATERIAL ANALYZER •HP4338A/B MILLIOHMMETER •Agilent 8720ES S-PARAMETER NETWORK ANALYZER •HP6632B SYSTEM DC POWER SUPPLY
DCR	Ω (Ref. Page 6~8)		
IDC	mA (Ref. Page 6~8)	TEST LEVEL: 250 mV	

■ SHAPES AND DIMENSIONS



Unit: mm

TYPE	1005 (EIA 0402)	1608 (EIA 0603)	2012 (EIA 0805)	3216 (EIA 1206)	3225 (EIA 1210)	4516 (EIA 1806)	4532 (EIA 1812)
L	1.00±0.10	1.60±0.15	2.00±0.20	3.20±0.20	3.20±0.20	4.50±0.25	4.50±0.25
W	0.50±0.10	0.80±0.15	1.25±0.20	1.60±0.20	2.50±0.20	1.60±0.20	3.20±0.25
T	0.50±0.10	0.80±0.15	0.90±0.20	1.10±0.20	1.30±0.20	1.60±0.20	1.50±0.25
E	0.25±0.10	0.30±0.20	0.50±0.30	0.50±0.30	0.50±0.30	0.60±0.40	0.60±0.40

■ PART NUMBER CODE

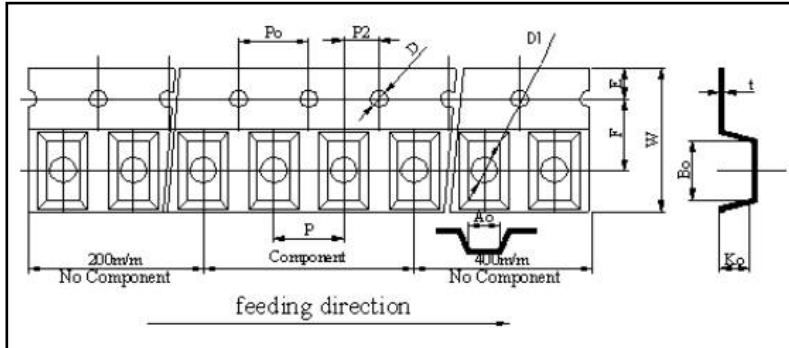
MHC 1608 S 12 1 P B P
 1 2 3 4 5 6 7 8

- 1 Series Name
- 2 Size Code: the first two digitals : length(mm), the last two digitals : width(mm)
- 3 Product Characteristics : S = For Standard
- 4 Impedance(Ω) \pm 25% } (ex : 600=60 Ω ; 121=120 Ω)
- 5 Fixed Decimal Point }
- 6 Rated Current Code

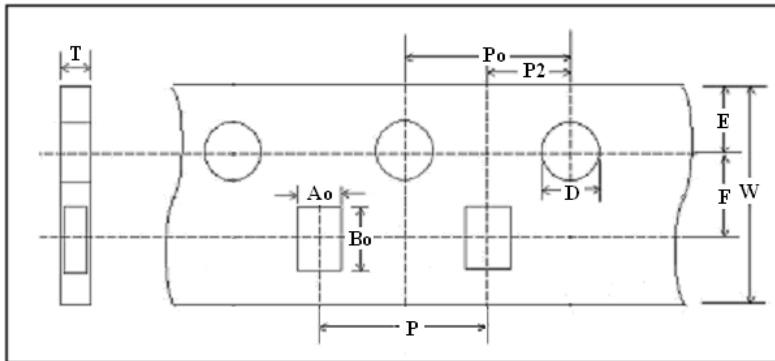
L=1000mA	M=1500mA	N=2000mA	P=2500mA
Q=3000mA	R=4000mA	U=5000mA	W=6000mA
- 7 Soldering: Green Parts: A— Soldering Lead-Free B— Lead-Free for whole chip
- 8 Packaging: P - Embossed paper tape, 7" reel.
 E - Embossed plastic tape, 7" reel.

■ TAPE AND REEL SPECIFICATIONS

PLASTIC CARRIER



PAPER CARRIER



■ TAPING DIMENSIONS

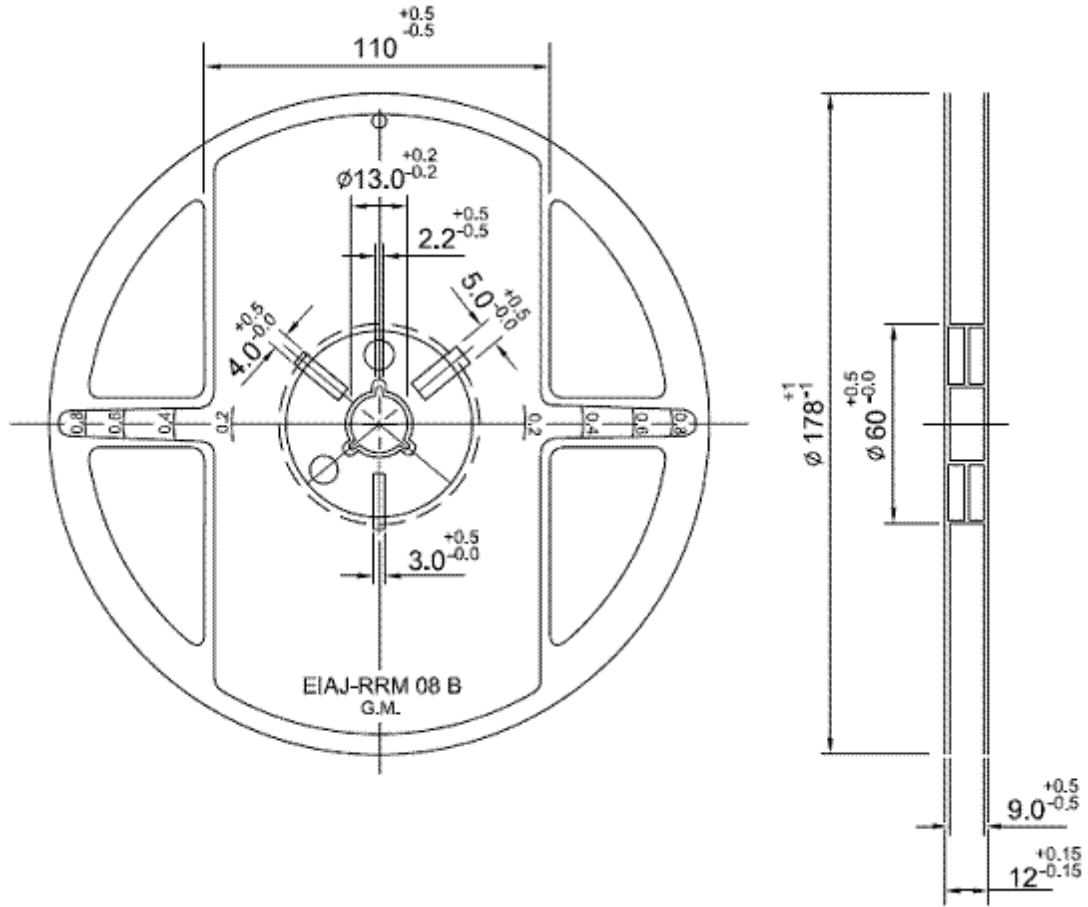
Unit: mm

Size	4532	4516	3225	3216	2012	1608	1005
Symbol	PLASTIC	PLASTIC	PLASTIC	PLASTIC	PAPER	PAPER	PAPER
W	12.0±0.10	11.7~12.3	7.70~8.30	7.90~8.30	8.00±0.10	8.00±0.10	8.00±0.10
P	8.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	2.00±0.05
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.05
F	5.50±0.05	5.50±0.05	3.50±0.05	3.50±0.05	3.50±0.10	3.50±0.10	3.50±0.05
D	1.55±0.05	1.55±0.05	1.55±0.05	1.55±0.05	1.56±0.10	1.56±0.10	1.55±0.05
D1	1.50~1.75	1.50~1.75	0.95~1.20	0.95~1.20	NA	NA	NA
Po	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
Po10	40.0±0.20	40.0±0.20	40.0±0.20	40.0±0.20	40.0±0.20	NA	NA
P2	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.10	2.00±0.10	2.00±0.05
Ao	3.66±0.10	1.83±0.10	2.57±0.10	1.85±0.10	1.50±0.05	1.05±0.05	0.62±0.03
Bo	4.95±0.10	4.85±0.10	3.40±0.10	3.43±0.10	2.30±0.05	1.85±0.05	1.12±0.03
Ko(T)	1.83±0.10	1.83±0.10	1.32±0.10	1.22±0.10	0.95±0.05	0.95±0.05	0.60±0.03

t	0.23±0.10	0.29±0.10	0.25±0.10	0.25±0.10	NA	NA	NA
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■ REEL DIMENSIONS

Unit: mm

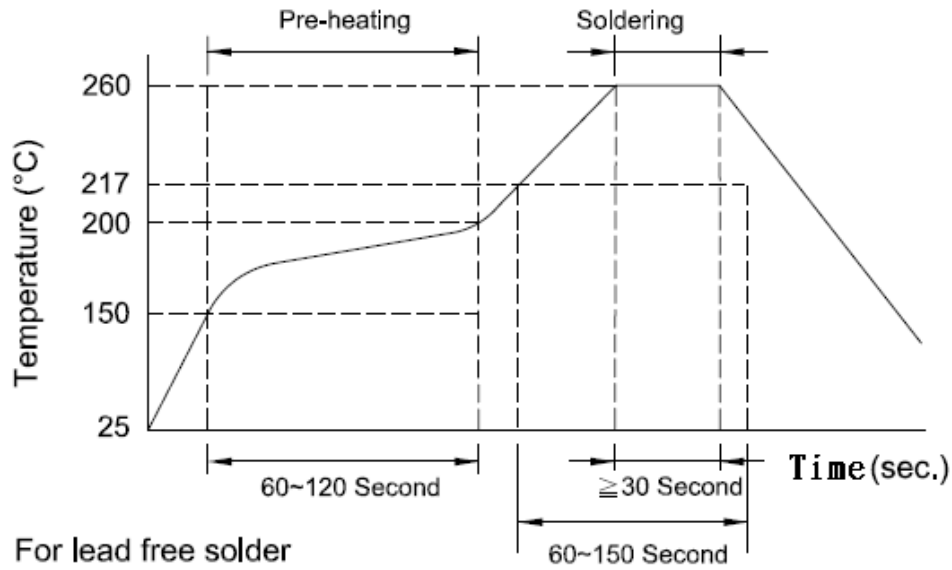


Reel Packaging Quantity								
PART SIZE (EIA SIZE)		1005 (0402)	1608 (0603)	2012 (0805)	3216 (1206)	3225 (1210)	4516 (1806)	4532 (1812)
7" REEL	Qty. (pcs)	10,000	4,000	4,000	3,000	2,000	2,000	1,000

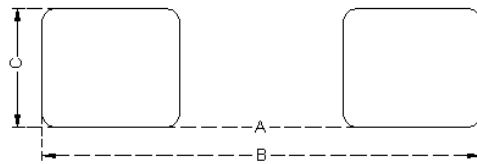
The Contents of a box :

- 4532(1812): 4 reels / inner box;
- 4516(1806): 4 reels / inner box;
- 3225(1210): 5 reels / inner box;
- 3216(1206): 5 reels / inner box;
- 2012(0805): 5 reels / inner box;
- 1608(0603): 5 reels / inner box;
- 1005(0402): 5 reels / inner box.

■ RECOMMENDED SOLDERING CONDITIONS



■ LAND PATTERNS FOR REFLOW SOLDERING



■ SOLDER LAND INFORMATION

Unit: mm (inches)

Size	A	B	C
1005	0.4 ~ 0.6 (0.015 ~ 0.023)	1.6 ~ 2.6 (0.063 ~ 0.102)	0.4 ~ 0.7 (0.016 ~ 0.027)
1608	0.5 ~ 0.7 (0.019 ~ 0.027)	2.1 ~ 3.1 (0.083 ~ 0.122)	0.65 ~ 0.95 (0.026 ~ 0.037)
2012	1.0 ~ 1.2 (0.039 ~ 0.047)	3.0 ~ 4.0 (0.118 ~ 0.157)	0.8 ~ 1.1 (0.031 ~ 0.043)
3216	2.0 ~ 2.4 (0.079 ~ 0.094)	4.2 ~ 5.2 (0.165 ~ 0.204)	1.0 ~ 1.4 (0.039 ~ 0.055)
3225	2.1 ~ 2.3 (0.082 ~ 0.090)	4.2 ~ 5.2 (0.165 ~ 0.204)	2.2 ~ 2.5 (0.086 ~ 0.098)
4516	3.4 ~ 3.7 (0.133 ~ 0.145)	6.3 ~ 7.3 (0.248 ~ 0.287)	1.3 ~ 1.7 (0.051 ~ 0.067)
4532	3.4 ~ 3.7 (0.133 ~ 0.145)	6.3 ~ 7.3 (0.248 ~ 0.287)	2.9 ~ 3.2 (0.144 ~ 0.126)

■ RELIABILITY AND TEST CONDITION

Test item	Test condition	Criteria
Temperature Cycle	a. Temperature : -40 ~ +85°C b. Cycle : 100 cycles c. Dwell time : 30minutes d. Measurement : at ambient temperature 24 hrs after test completion	a. No mechanical damage b. Impedance value should be within ± 20 % of the initial value
Operational Life	a. Temperature : 125°C ± 5°C b. Test time : 1000 hrs c. Apply current : full rated current d. Measurement : at ambient temperature 24 hrs after test completion	a. No mechanical damage b. Impedance value should be within ± 20 % of the initial value
Biased Humidity	a. Temperature : 40°C ± 2°C b. Humidity : 90 ~ 95 % RH c. Test time : 1000 hrs d. Apply current : full rated current e. Measurement : at ambient temperature 24 hrs after test completion	a. No mechanical damage b. Impedance value should be within ± 20 % of the initial value

Resistance to Solder Heat	a. Solder temperature : $260 \pm 5^{\circ}\text{C}$ b. Flux : Rosin c. DIP time : 10 ± 1 sec	a. More than 95 % of terminal electrode should be covered with new solder b. No mechanical damage c. Impedance value should be within ± 20 % of the initial value
Adhesive Test	a. Reflow temperature : 245°C It shall be Soldered on the substrate applying direction parallel to the substrate b. Apply force(F) : 5 N c. Test time : 10 sec	a. No mechanical damage b. Soldering the products on PCB after the pulling test force > 5 N

Test item	Test condition	Criteria
Steam Aging Test	a. Temperature : 93°C b. Test time : 4 hrs(MHC1005) Others : 8 hrs c. Solder temperature : $235 \pm 5^{\circ}\text{C}$ d. Flux : Rosin e. DIP time : 5 ± 1 sec	More than 95 % of terminal electrode should be covered with new solder
Rated Current Test	a. Apply current : full rated current / 5min	Temperature rise should be less than 40°C

■ GENERAL TECHNICAL DATA

Operating temperature range : $- 55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
 Storage Condition : Less than 40°C and 70% RH
 Storage Time: 6 months(Size:1005)
 12 months(Size:1608 above)
 Soldering method: Reflow or Wave Soldering

■ PART NUMBER AND CHARACTERISTICS TABLE

	Impedance (Ω) +/-25%	Test Freq. (MHz)	DCR(Ω) (Max.)	Rated Current (mA)
MHC1005 Series				
MHC1005S100NB_	10	100	0.09	2000
MHC1005S300NB_	30	100	0.09	2000
MHC1005S600LB_	60	100	0.2	1000
MHC1005S121MB_	120	100	0.15	1500
MHC1608 Series				
MHC1608S300QB_	30	100	0.04	3000
MHC1608S600QB_	60	100	0.04	3000
MHC1608S800QB_	80	100	0.04	3000
MHC1608S121PB_	120	100	0.07	2500
MHC1608S221NB_	220	100	0.09	2000
MHC1608S301NB_	300	100	0.09	2000
MHC1608S471LB_	470	100	0.20	1000
MHC1608S601LB_	600	100	0.20	1000
MHC2012 Series				
MHC2012S110WB_	11	100	0.015	6000
MHC2012S310WB_	31	100	0.015	6000
MHC2012S400RB_	40	100	0.03	4000
MHC2012S600QB_	60	100	0.04	3000
MHC2012S800UB_	80	100	0.02	5000
MHC2012S900UB_	90	100	0.02	5000
MHC2012S121UB_	120	100	0.02	5000
MHC2012S221QB_	220	100	0.04	3000
MHC2012S251QB_	250	100	0.04	3000
MHC2012S301NB_	300	100	0.09	2000
MHC2012S331NB_	330	100	0.09	2000
MHC2012S601NB_	600	100	0.09	2000

	Impedance (Ω) +/-25%	Test Freq. (MHz)	DCR(Ω) (Max.)	Rated Current (mA)
MHC3216 Series				
MHC3216S300WB_	30	100	0.015	6000
MHC3216S500WB_	50	100	0.015	6000
MHC3216S600QB_	60	100	0.04	3000
MHC3216S750QB_	75	100	0.04	3000
MHC3216S800RB_	80	100	0.03	4000
MHC3216S900QB_	90	100	0.04	3000
MHC3216S121WB_	120	100	0.015	6000
MHC3216S151NB_	150	100	0.09	2000
MHC3216S501PB_	500	100	0.07	2500
MHC3216S601PB_	600	100	0.07	2500
MHC3216S122LB_	1200	100	0.2	1000
MHC3225 Series				
MHC3225S600MB_	60	100	0.15	1500
MHC3225S102NB_	1000	50	0.09	2000
MHC4516 series				
MHC4516S600WB_	60	100	0.015	6000
MHC4516S471NB_	470	100	0.09	2000
MHC4516S851MB_	850	100	0.15	1500
MHC4532 series				
MHC4532S800WB_	80	100	0.015	6000
MHC4532S121WB_	120	100	0.015	6000
MHC4532S601QB_	600	50	0.04	3000
MHC4532S681QB_	680	50	0.04	3000
MHC4532S132QB_	1300	60	0.04	3000

** For special part number which is not shown in the above table, please refer to appendix.

■ PART COMPOSITION DECLARATION

Composition part	Material Name	Element name composition	CAS No.	Substance Mass(mg)	
				mass(mg)	%
Ceramic body	Ferrite Powder	Fe	7439-89-6	3.0055	53.1%
		Cu	7440-50-8	0.1075	1.9%
		Ni	7440-02-0	0.8490	15.0%
		Zn	7440-66-6	0.9056	16.0%
	Silver Conductor	Ag	7440-22-4	0.3962	7.0%
	Internal Electrode	Ag	7440-22-4	0.3283	5.8%
Termination	Plating	Ni	7440-02-0	0.0113	0.2%
External electrode	Solder	Sn	7440-31-5	0.0566	1.0%