



**INPAQ**

# PRODUCT SPECIFICATION

**DOCUMENT NO. ENS000157420**

DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
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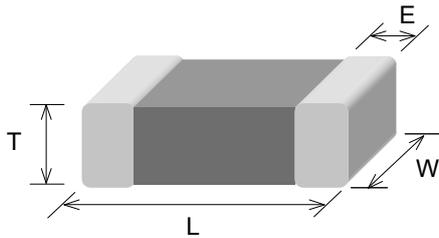


**High Current Chip Ferrite Bead for Automotive (MCB Series)**

**Engineering Spec.**

**Qualified based on AEC-Q200**

**■ SHAPES AND DIMENSIONS**



TYPE	1005 (EIA 0402)	1608 (EIA 0603)	2012 (EIA 0805)	3216 (EIA 1206)
L	1.00±0.10	1.60±0.15	2.00±0.20	3.20±0.20
W	0.50±0.10	0.80±0.15	1.25±0.20	1.60±0.20
T	0.50±0.10	0.80±0.15	0.90±0.20	1.10±0.20
E	0.25±0.10	0.30±0.20	0.50±0.30	0.50±0.30
Unit	mm	mm	mm	mm

**■ PART NUMBER CODE**

MCB 1005 S 700 I Z P  
 1 2 3 4 5 6 7

- 1 Series Name
- 2 Size Code: the first two digitals : length(mm), the last two digitals : width(mm)
- 3 Material Code
- 4 Impedance(The unit is in ohm(Ω) at 100MHz) : ex. 600 = 60Ω ; 121 = 120Ω
- 5 Rated Current Code

C=100mA	D=150mA	E=200mA	F=300mA	G=400mA
H=500mA	I=600mA	J=700mA	K=800mA	Z=others

- 6 Product Type : Z - Automotive Infotainment  
 H - Automotive Powertrain / Safety
- 7 Packaging : P - Paper tape, 7" reel.  
 E - Embossed plastic tape, 7" reel.

## ■ PART NUMBER AND CHARACTERISTICS TABLE

Part No.	Impedance ( $\Omega$ )+/-25%	Test Freq. (MHz)	DCR( $\Omega$ ) (Max.)	Rated Current (mA)	Thickness T (mm)
Infotainment					
<b>MCB1005 S series</b>					
MCB1005S700IZP	70	100	0.15	600	0.50
MCB1005S121ZZP	120	100	0.19	550	0.50
<b>MCB1005 B series</b>					
MCB1005B601EZP	600	100	0.65	200	0.50
MCB1005B102EZP	1000	100	0.75	200	0.50
MCB1005B182EZP	1800	100	1.40	200	0.50
<b>MCB1005 H series</b>					
MCB1005H750FZP	75	100	0.40	300	0.50
MCB1005H121FZP	120	100	0.55	300	0.50
MCB1005H221FZP	220	100	0.60	300	0.50
<b>MCB1608 S series</b>					
MCB1608S221JZP	220	100	0.25	700	0.80
MCB1608S471ZZP	470	100	0.35	550	0.80
MCB1608S601HZP	600	100	0.38	500	0.80
MCB1608S102ZZP	1000	100	0.50	450	0.80
MCB1608S152GZP	1500	100	0.60	400	0.80
MCB1608S182DZP	1800	100	0.70	150	0.80
MCB1608S202EZP	2000	100	0.90	200	0.80
MCB1608S222DZP	2200	100	1.50	150	0.80
MCB1608S252EZP	2500	100	0.70	200	0.80
<b>MCB1608 H series</b>					
MCB1608H200JZP	20	100	0.20	700	0.80
MCB1608H600IZP	60	100	0.25	600	0.80
MCB1608H750JZP	75	100	0.30	700	0.80
MCB1608H121KZP	120	100	0.25	800	0.80
MCB1608H241ZZP	240	100	0.45	250	0.80
MCB1608H601EZP	600	100	0.65	200	0.80
MCB1608H102EZP	1000	100	0.85	200	0.80
<b>MCB2012 S series</b>					
MCB2012S121EZP	120	100	0.15	200	0.90
MCB2012S151EZP	150	100	0.15	200	0.90
MCB2012S221EZP	220	100	0.20	200	0.90
MCB2012S601EZP	600	100	0.30	200	0.90
MCB2012S102KZP	1000	100	0.27	800	0.90

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

Part No.	Impedance ( $\Omega$ )+/-25%	Test Freq. (MHz)	DCR( $\Omega$ ) (Max.)	Rated Current (mA)	Thickness T (mm)
<b>Infotainment</b>					
<b>MCB2012 S series</b>					
MCB2012S152JZP	1500	100	0.35	700	0.90
MCB2012S202HZP	2000	100	0.50	500	0.90
<b>MCB2012 H series</b>					
MCB2012H222EZP	2200	100	0.60	200	0.90

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Part No.	Impedance ( $\Omega$ )+/-25%	Test Freq. (MHz)	DCR( $\Omega$ ) (Max.)	Rated Current (mA)	Thickness T (mm)
Powertrain / Safety					
<b>MCB1005 S series</b>					
MCB1005S700IHP	70	100	0.15	600	0.50
MCB1005S121HHP	120	100	0.25	500	0.50
MCB1005S241FHP	240	100	0.35	300	0.50
MCB1005S301FHP	300	100	0.35	300	0.50
MCB1005S102EHP	1000	100	1.00	200	0.50
<b>MCB1005 B series</b>					
MCB1005B601EHP	600	100	0.65	200	0.50
MCB1005B102EHP	1000	100	0.75	200	0.50
MCB1005B182EHP	1800	100	1.40	200	0.50
<b>MCB1005 H series</b>					
MCB1005H750FHP	75	100	0.40	300	0.50
MCB1005H121FHP	120	100	0.55	300	0.50
MCB1005H221FHP	220	100	0.60	300	0.50
<b>MCB1608 S series</b>					
MCB1608S221JHP	220	100	0.25	700	0.80
MCB1608S471ZHP	470	100	0.35	550	0.80
MCB1608S601HHP	600	100	0.38	500	0.80
MCB1608S102ZHP	1000	100	0.50	450	0.80
MCB1608S152GHP	1500	100	0.60	400	0.80
MCB1608S182DHP	1800	100	0.70	150	0.80
MCB1608S202EHP	2000	100	0.90	200	0.80
MCB1608S222DHP	2200	100	1.50	150	0.80
MCB1608S252EHP	2500	100	0.70	200	0.80
<b>MCB1608 H series</b>					
MCB1608H200JHP	20	100	0.20	700	0.80
MCB1608H600IHP	60	100	0.25	600	0.80
MCB1608H750JHP	75	100	0.30	700	0.80
MCB1608H121KHP	120	100	0.25	800	0.80
MCB1608H241ZHP	240	100	0.45	250	0.80
MCB1608H601EHP	600	100	0.65	200	0.80
MCB1608H102EHP	1000	100	0.85	200	0.80
<b>MCB2012 S series</b>					
MCB2012S121EHP	120	100	0.15	200	0.90
MCB2012S151EHP	150	100	0.15	200	0.90
MCB2012S221EHP	220	100	0.20	200	0.90
MCB2012S601EHP	600	100	0.30	200	0.90
MCB2012S102KHP	1000	100	0.27	800	0.90

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

Part No.	Impedance ( $\Omega$ )+/-25%	Test Freq. (MHz)	DCR( $\Omega$ ) (Max.)	Rated Current (mA)	Thickness T (mm)
<b>Powertrain / Safety</b>					
<b>MCB2012 S series</b>					
MCB2012S152JHP	1500	100	0.35	700	0.90
MCB2012S202HHP	2000	100	0.50	500	0.90
<b>MCB2012 H series</b>					
MCB2012H222EHP	2200	100	0.60	200	0.90
<b>MCB3216 S series</b>					
MCB3216S601EHE	600	100	0.90	200	1.10

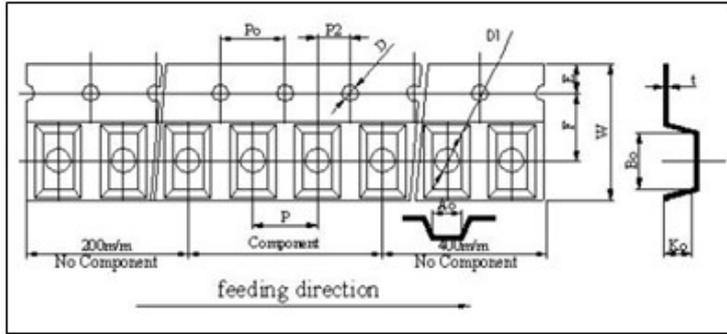
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## ■ TEST INSTRUMENTS

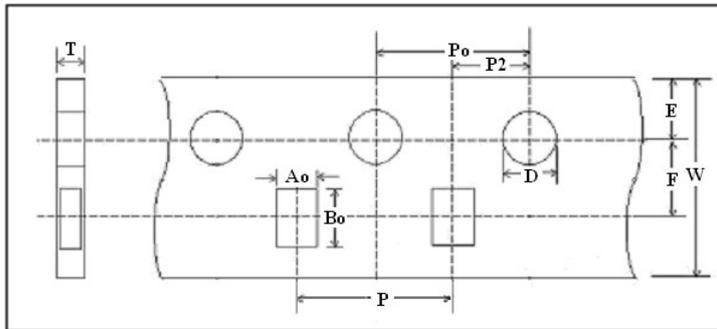
- TEST LEVEL: 250 mV
- Agilent E4991A/B RF IMPEDANCE MATERIAL ANALYZER or EQUIVALENT
- Agilent 4338B MILLIOHMMETER
- Agilent E5071C ENA SERIES NETWORK ANALYZER
- HP6632B SYSTEM DC POWER SUPPLY

■ TAPE AND REEL SPECIFICATIONS

PLASTIC CARRIER



PAPER CARRIER

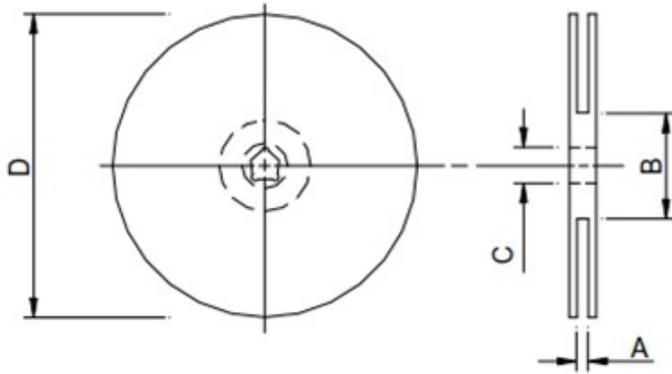


■ TAPING DIMENSIONS

Unit : mm

Size	3216	2012	1608	1005
Symbol	PLASTIC	PAPER	PAPER	PAPER
W	7.90~8.30	8.00±0.10	8.00±0.10	8.00±0.10
P	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±0.05
F	3.50±0.05	3.50±0.10	3.50±0.10	3.50±0.05
D	1.55±0.05	1.56±0.10	1.56±0.10	1.55±0.05
D1	0.95~1.20	NA	NA	NA
Po	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	NA	NA
P2	2.00±0.05	2.00±0.10	2.00±0.10	2.00±0.05
Ao	1.85±0.10	1.50±0.05	1.05±0.05	0.62±0.03
Bo	3.43±0.10	2.30±0.05	1.85±0.05	1.12±0.03
Ko(T)	1.22±0.10	0.95±0.05	0.95±0.05	0.60±0.03
t	0.25±0.10	NA	NA	NA

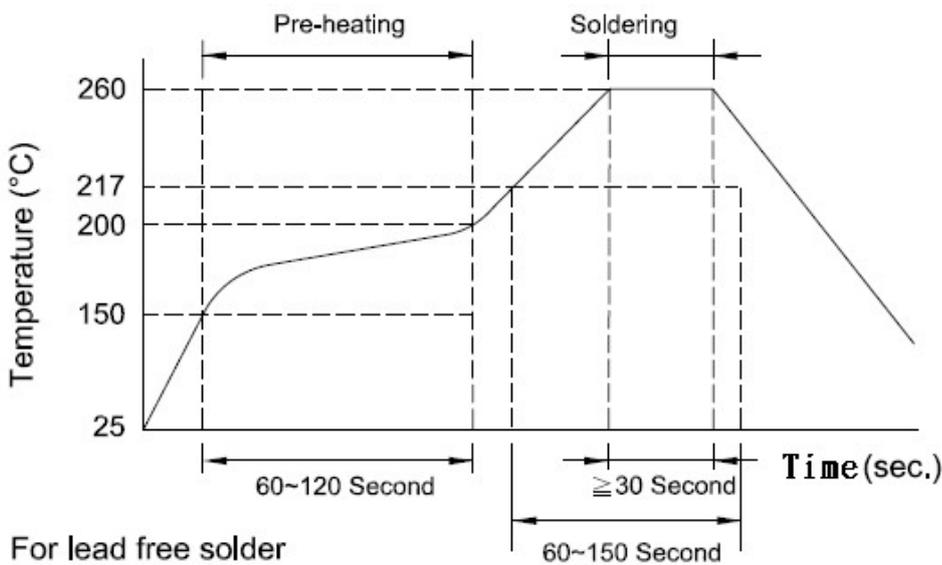
■ REEL DIMENSIONS



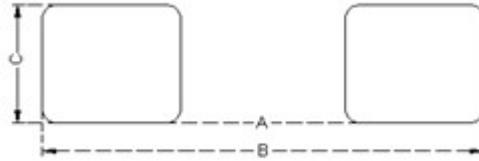
Type	7"
A(mm)	10±1.5
B(mm)	50 or more
C(mm)	13.2±1.0
D(mm)	178±2.0

7" Reel Packaging Quantity				
PART SIZE (EIA SIZE)	1005 (0402)	1608 (0603)	2012 (0805)	3216 (1206)
Qty.(pcs)	10,000	4,000	4,000	3,000
BOX	5 reels / inner box	5 reels / inner box	5 reels / inner box	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 (0.016)	1.2 ~ 1.4 (0.047 ~ 0.055)	0.5 (0.020)
1608	0.7 (0.028)	1.8 ~ 2.0 (0.071 ~ 0.079)	0.7 (0.028)
2012	1.2 (0.047)	3.0 ~ 4.0 (0.118 ~ 0.157)	1.0 (0.039)
3216	2.0 (0.079)	4.2 ~ 5.2 (0.165 ~ 0.205)	1.2 (0.047)

■ GENERAL TECHNICAL DATA

Operating temperature range: - 55°C ~ +125°C

Storage Condition: Less than 40°C and 70% RH

Storage Time: 6 months Max. (Size: 1005)

12 months Max. (Size: 1608 above)

Soldering method: Reflow

## ■ RELIABILITY AND TEST CONDITION

Test item	Test condition	Criteria
<b>High Temperature Exposure</b>	1. Temperature : $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 2. Test time : 1000 hrs Measurement : at ambient temperature 24 hrs after test completion	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value
<b>Temperature Cycle</b>	1. Temperature : $-55 \sim +125^{\circ}\text{C}$ 2. Cycle : 1000 cycles 3. Dwell time : 30minutes Measurement : at ambient temperature 24 hrs after test completion	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value
<b>Biased Humidity</b>	1. Temperature : $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2. Humidity : 85 % RH 3. Test time : 1000 hrs 4. Apply current : full rated current Measurement : at ambient temperature 24 hrs after test completion	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value
<b>Operational Life</b>	1. Temperature : $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 2. Test time : 1000 hrs 3. Apply current : full rated current Measurement : at ambient temperature 24 hrs after test completion	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value
<b>Mechanical Shock</b>	Condition F : 1500g's/0.5ms/Half sine	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value
<b>Vibration Test</b>	5g's for 20 minutes, 12cycles each of 3 orientations Test from 10-2000Hz., 12cycles each of 3 orientations	1. No mechanical damage 2. Impedance value should be within $\pm 30\%$ of the initial value

Test item	Test condition	Criteria												
<b>Resistance to Solder Heat</b>	1. Solder temperature : $260 \pm 5^{\circ}\text{C}$ 2. Flux : Rosin 3. DIP time : $10 \pm 1$ sec	1. More than 95 % of terminal electrode should be covered with new solder 2. No mechanical damage 3. Impedance value should be within $\pm 30$ % of the initial value												
<b>ESD</b>	Classification Levels 1C 1000 V (DC) to < 2000 V (DC)	1. No mechanical damage 2. Impedance value should be within $\pm 30$ % of the initial value												
<b>Solderability Test</b>	1. Solder temperature : $235 \pm 5^{\circ}\text{C}$ 2. Flux : Rosin 3. DIP time : $5 \pm 1$ sec	1. More than 95 % of terminal electrode should be covered with new solder 2. No mechanical damage												
<b>Board Flex</b>	Epoxy-PCB(1.6mm) Deflection 2mm(min) 60s minimum holding time	No mechanical damage.												
<b>Terminal Strength</b>	<table border="1"> <thead> <tr> <th>Size</th> <th>Apply Force(F)</th> <th>Test Time</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>5N</td> <td><math>10 \pm 1</math> sec</td> </tr> <tr> <td>1608</td> <td>10 N</td> <td><math>10 \pm 1</math> sec</td> </tr> <tr> <td><math>\geq 2012</math></td> <td>17.7 N</td> <td><math>60 \pm 1</math> sec</td> </tr> </tbody> </table>	Size	Apply Force(F)	Test Time	1005	5N	$10 \pm 1$ sec	1608	10 N	$10 \pm 1$ sec	$\geq 2012$	17.7 N	$60 \pm 1$ sec	No mechanical damage
Size	Apply Force(F)	Test Time												
1005	5N	$10 \pm 1$ sec												
1608	10 N	$10 \pm 1$ sec												
$\geq 2012$	17.7 N	$60 \pm 1$ sec												