Multilayer Ceramic Capacitors for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)

REFLOW
AEC-Q200

■PART NUMBER

M	C	A	S	J	3	1	L	S	B	5	1	0	6	K	T	N	A	0	1
①				②	③		④	⑤	⑥		⑦			⑧	⑨	⑩			

①Series

Code (1)(2)(3)(4)	
MCAS	Multilayer Ceramic Capacitor (High dielectric type) for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified) Multilayer Ceramic Capacitor (Temperature compensating type) for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified) Medium-High voltage Multilayer Ceramic Capacitor for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)
MCAR	High frequency/Low loss Medium-High Voltage Multilayer Ceramic Capacitor for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)
MCBL	Three Terminals Low ESL Multilayer Ceramic Capacitors for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)
MCJC	Soft Termination Multilayer Ceramic Capacitor for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)
MCRL	LW Reversal Decoupling Low ESL Capacitor (LWDC™) for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)

(1) Product Group

Code	
M	Multilayer Ceramic Capacitor

(2) Category

Code	Recommended equipment
C	for Automotive Body/Infotainment & High Reliability (AEC-Q200 Qualified)

(3) Type

Code	
A	Two terminals
B	Three terminals
J	Soft Termination
R	LW reversal

(4) Features, Characteristics

Code	
S	Standard/General
R	High frequency/Low loss
C	Crack prevention
L	Low ESL

②Rated voltage

Code	Rated voltage[VDC]
P	2.5
A	4
J	6.3
L	10
E	16
T	25
G	35
U	50
H	100
Q	250
S	630
V	1000
X	2000

③Dimension(L×W)

Code	L×W [mm]	JIS(mm)	EIA(inch)
04	0.4 × 0.2	0402	01005
06	0.6 × 0.3	0603	0201
10	1.0 × 0.5	1005	0402
	0.52× 1.0 ※	0510	0204
16	1.6 × 0.8	1608	0603
	0.8 × 1.6 ※	0816	0306
21	2.0 × 1.25	2012	0805
	1.25× 2.0 ※	1220	0508
31	3.2 × 1.6	3216	1206
32	3.2 × 2.5	3225	1210
45	4.5 × 3.2	4532	1812

Note : ※LW reverse type(MCRL)

④Thickness

Code	Thickness[mm]
2	0.2
3	0.3
4	0.4
5	0.5
7	0.7
8	0.8
9	0.85
Q	1.15
G	1.25
L	1.6
N	1.9
Y	2.0 max
M	2.5

⑤Dimension tolerance

Code	Dimension code	L[mm]	W[mm]	T[mm]	Thickness code
A	10	1.0±0.10	0.5±0.10	0.5±0.10	5
	16	1.6+0.15/−0.05	0.8+0.15/−0.05	0.8+0.15/−0.05	8
	21	2.0+0.15/−0.05	1.25+0.15/−0.05	1.25+0.15/−0.05	G
	31	3.2±0.20	1.6±0.20	1.15±0.20	Q
				1.6±0.20	L
	32	3.2±0.30	2.5±0.30	1.9±0.30	N
				2.5±0.30	M
	45	4.5±0.40	3.2±0.30	2.0+0/−0.30	Y
B	06	0.6±0.09	0.3±0.09	0.3±0.09	3
	10	1.0+0.15/−0.05	0.5+0.15/−0.05	0.5+0.15/−0.05	5
	16	1.6+0.20/−0	0.8+0.20/−0	0.8+0.20/−0	8
	21	2.0+0.20/−0	1.25+0.20/−0	1.25+0.20/−0	G
	31	3.2±0.30	1.6±0.30	1.6±0.30	L
C	10	1.0+0.20/−0	0.5+0.20/−0	0.5+0.20/−0	5
	16	1.6+0.25/−0	0.8+0.25/−0	0.8+0.25/−0	8
	21	2.0+0.25/−0	1.25+0.25/−0	1.25+0.25/−0	G
D	16	1.6+0.30/−0	0.8+0.30/−0	0.8+0.30/−0	8
	21	2.0+0.30/−0	1.25+0.30/−0	1.25+0.30/−0	G
E	10	1.0+0.30/−0	0.5+0.30/−0	0.5+0.30/−0	5
G	10	1.0+0.20/−0	0.5+0.20/−0	0.4±0.10	4
H	31	3.2±0.15	1.6±0.15	0.85±0.10	9
				1.15±0.10	Q
J	21	2.0+0.15/−0.05	1.25+0.15/−0.05	0.85±0.10	9
L	21	2.0+0.20/−0	1.25+0.20/−0	0.85±0.10	9
	32	3.2±0.50	2.5±0.30	2.5±0.30	M
M	32	3.2±0.35	2.5±0.30	2.5±0.30	M
N	21	2.0±0.15	1.25±0.15	0.85±0.15	9
S	04	0.4±0.02	0.2±0.02	0.2±0.02	2
	06	0.6±0.03	0.3±0.03	0.3±0.03	3
	10	1.0±0.05	0.5±0.05	0.5±0.05	5
		0.52±0.05 ※	1.0±0.05	0.3±0.05	3
	16	1.6±0.10	0.8±0.10	0.7±0.10	7
				0.8±0.10	8
		0.8±0.10 ※	1.6±0.10	0.5±0.05	5
	21	2.0±0.10	1.25±0.10	0.85±0.10	9
				1.25±0.10	G
		1.25±0.15 ※	2.0±0.15	0.85±0.10	9
	31	3.2±0.15	1.6±0.15	1.6±0.20	L
	32	3.2±0.30	2.5±0.20	1.9±0.20	N
				2.5±0.20	M
	45	4.5±0.40	3.2±0.30	2.5±0.20	M

Note :※LW reverse type(MCRL)

⑥Temperature characteristics code

■High dielectric type

Code	Applicable standard		Temperature range[℃]	Ref. Temp.[℃]	Capacitance change	Capacitance tolerance	Tolerance code
B5	EIA	X5R	−55～＋ 85	25	±15%	±10%	K
						±20%	M
C6	EIA	X6S	−55～＋105	25	±22%	±10%	K
						±20%	M
B7	EIA	X7R	−55～＋125	25	±15%	±10%	K
						±20%	M
C7	EIA	X7S	−55～＋125	25	±22%	±10%	K
						±20%	M
D7	EIA	X7T	−55～＋125	25	＋22%/−33%	±10%	K
						±20%	M
L8	EIA	X7R	−55～＋125	25	±15%	±10%	K
						±20%	M
		X8L	−55～＋150	25	＋15%/−40%	±10%	K
						±20%	M

■Temperature compensating type

Code	Applicable standard		Temperature range[℃]	Ref. Temp.[℃]	Capacitance change	Capacitance tolerance	Tolerance code
CG	JIS	CG	−55～＋125	20	0±30ppm/℃	±0.05pF	A
						±0.1pF	B
						±0.25pF	C
	EIA	C0G		25		±0.5pF	D
						±2%	G
						±5%	J
CH	JIS	CH	−55～＋125	20	0±60ppm/℃	±0.1pF	B
						±0.25pF	C
	EIA	C0H		25		±0.5pF	D
						±5%	J
CJ	JIS	CJ	−55～＋125	20	0±120ppm/℃	±0.05pF	A
	EIA	C0J		25		±0.1pF	B
						±0.25pF	C
CK	JIS	CK	−55～＋125	20	0±250ppm/℃	±0.05pF	A
	EIA	C0K		25		±0.1pF	B
						±0.25pF	C

⑦Nominal capacitance

Code (example)	Nominal capacitance
0R5	0.5pF
010	1pF
100	10pF
101	100pF
102	1,000pF
103	0.01μF
104	0.1μF
105	1μF
106	10μF
107	100μF

Note : R＝Decimal point

⑧Capacitance tolerance

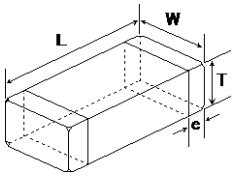
Code	Capacitance tolerance
A	±0.05pF
B	±0.1pF
C	±0.25pF
D	±0.5pF
G	±2%
J	±5%
K	±10%
M	±20%

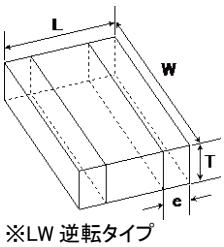
⑨Packaging

Code	Packaging
W	φ178mm Embossed Taping （1mm pitch）
F	φ178mm Taping （2mm pitch）
R	φ178mm Embossed Taping （4mm pitch）
T	φ178mm Taping （4mm pitch）
P	φ178mm Taping （4mm pitch） 3225 type（Thickness code M）

⑩Internal code

■STANDARD EXTERNAL DIMENSIONS



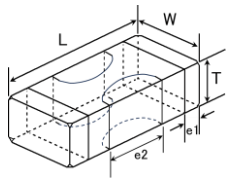


※LW 逆転タイプ

Type	JIS (mm)	EIA (inch)	Dimension [mm] (inch)				
			L	W	T	*1	e
MCAS□04	0402	01005	0.4±0.02 (0.016±0.001)	0.2±0.02 (0.008±0.001)	0.2±0.02 (0.008±0.001)	2	0.1±0.03 (0.004±0.001)
MCAS□06	0603	0201	0.6±0.03 (0.024±0.001)	0.3±0.03 (0.012±0.001)	0.3±0.03 (0.012±0.001)	3	0.15±0.05 (0.006±0.002)
MCAR□10 MCAS□10	1005	0402	1.0±0.05 (0.039±0.002)	0.5±0.05 (0.020±0.002)	0.5±0.05 (0.020±0.002)	5	0.25±0.10 (0.010±0.004)
MCJC□10	1005	0402	1.0±0.05 (0.039±0.002)	0.5±0.05 (0.020±0.002)	0.5±0.05 (0.020±0.002)	5	0.25+0.15/−0.1 (0.010+0.006/−0.004)
MCRL□10 ※	0510	0204	0.52±0.05 (0.020±0.002)	1.0±0.05 (0.039±0.002)	0.3±0.05 (0.012±0.002)	3	0.18±0.08 (0.007±0.003)
MCAS□16 MCAR□16	1608	0603	1.6±0.10 (0.063±0.004)	0.8±0.10 (0.031±0.004)	0.7±0.10 (0.028±0.004)	7	0.35±0.25 (0.014±0.010)
					0.8±0.10 (0.031±0.004)	8	
MCJC□16	1608	0603	1.6±0.10 (0.063±0.004)	0.8±0.10 (0.031±0.004)	0.8±0.10 (0.031±0.004)	8	0.35+0.3/−0.25 (0.014+0.012/−0.010)
MCRL□16 ※	0816	0306	0.8±0.10 (0.031±0.004)	1.6±0.10 (0.063±0.004)	0.5±0.05 (0.020±0.002)	5	0.25±0.15 (0.010±0.006)
MCAS□21 MCAR□21	2012	0805	2.0±0.10 (0.079±0.004)	1.25±0.10 (0.049±0.004)	0.85±0.10 (0.033±0.004)	9	0.5±0.25 (0.020±0.010)
					1.25±0.10 (0.049±0.004)	G	
MCJC□21	2012	0805	2.0±0.10 (0.079±0.004)	1.25±0.10 (0.049±0.004)	0.85±0.10 (0.033±0.004)	9	0.5+0.35/−0.25 (0.020+0.014/−0.010)
					1.25±0.10 (0.049±0.004)	G	
MCRL□21 ※	1220	0508	1.25±0.15 (0.049±0.006)	2.0±0.15 (0.079±0.006)	0.85±0.10 (0.033±0.004)	9	0.3±0.2 (0.012±0.008)
MCAS□31	3216	1206	3.2±0.15 (0.126±0.006)	1.6±0.15 (0.063±0.006)	0.85±0.10 (0.033±0.004)	9	0.5+0.35/−0.25 (0.020+0.014/−0.010)
					1.15±0.10 (0.045±0.004)	Q	
					1.6±0.20 (0.063±0.008)	L	
MCJC□31	3216	1206	3.2±0.15 (0.126±0.006)	1.6±0.15 (0.063±0.006)	1.15±0.10 (0.045±0.004)	Q	0.6+0.4/−0.3 (0.024+0.016/−0.012)
					1.6±0.20 (0.063±0.008)	L	
MCAS□32	3225	1210	3.2±0.30 (0.126±0.012)	2.5±0.20 (0.098±0.008)	1.9±0.20 (0.075±0.008)	N	0.6±0.3 (0.024±0.012)
					2.5±0.20 (0.098±0.008)	M	
MCJC□32	3225	1210	3.2±0.30 (0.126±0.012)	2.5±0.20 (0.098±0.008)	1.9±0.20 (0.075±0.008)	N	0.6+0.4/−0.3 (0.024+0.016/−0.012)
					2.5±0.20 (0.098±0.008)	M	
MCAS□45	4532	1812	4.5±0.40 (0.177±0.016)	3.2±0.30 (0.126±0.012)	2.0+0/−0.30 (0.079 +0/−0.012)	Y	0.6±0.4 (0.024±0.016)
					2.5±0.20 (0.098±0.008)	M	0.9±0.6 (0.035±0.024)
MCJC□45	4532	1812	4.5±0.40 (0.177±0.016)	3.2±0.30 (0.126±0.012)	2.0+0/−0.30 (0.079 +0/−0.012)	Y	0.6±0.4 (0.024±0.016)

Note :※LW reverse type(MCRL), *1.Thickness code

■STANDARD EXTERNAL DIMENSIONS



※Three terminals type

Type	JIS (mm)	EIA (inch)	Dimension [mm] (inch)					
			L	W	T	*1	e	
MCBL□10 ※	1005	0402	1.0±0.05 (0.039±0.002)	0.5±0.05 (0.020±0.002)	0.4±0.10 (0.016±0.004)	4	e1	0.2±0.10 (0.008±0.004)
							e2	0.35±0.10 (0.014±0.004)

Note :※Three terminals type(MCBL), *1.Thickness code

■STANDARD QUANTITY

Type			Thickness		Standard quantity[pcs]	
Code	JIS(mm)	EIA(inch)	[mm]	Code	Paper tape	Embossed tape
04	0402	01005	0.2	2	—	40000
06	0603	0201	0.3	3	15000	—
10	1005	0402	0.4	4	10000	—
			0.5	5		
	0510 ※	0204 ※	0.3	3		
16	1608	0603	0.7	7	4000	—
			0.8	8		
			0.8	8	3000 (Soft Termination)	3000 (Soft Termination)
	0816 ※	0306 ※	0.5	5	—	4000
21	2012	0805	0.85	9	4000	—
			1.25	G	—	3000
			1.25	G	—	2000 (Soft Termination)
	1220 ※	0508 ※	0.85	9	4000	—
31	3216	1206	0.85	9	4000	—
			1.15	Q	—	3000
			1.6	L	—	2000
32	3225	1210	1.9	N	—	2000
			2.5	M	—	1000
45	4532	1812	2.0 max	Y	—	1000
			2.5	M	—	500

Note : ※.LW Reverse type(MCRL)