Safety Ceramic Capacitor
X1/Y1 Class SMD Encapsulated

MCS-P Series

MERITEK

FEATURE

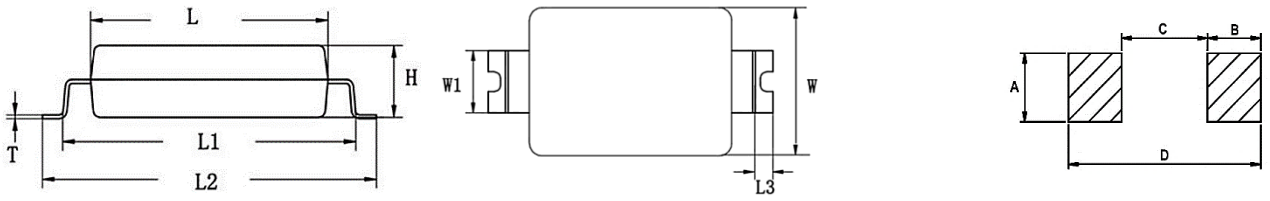
- Rated Capacitance Range: 10pF~2.2nF
- Temperature Characteristic: SL, Y5P, Y5U, Y5V
- 760/500VAC: X1/Y1 Class According to UL/IEC 60384-14
- Compact Construction Enabling High-Density PCB Layouts
- Application: EMI/RFI Suppression and Filtering, AC Converters and Primary and Secondary Coupling in SMPS

RoHS

ELECTRICAL CHARACTERISTICS

Size Code	Capacitance Range	Capacitance Tolerance	Rated AC Voltage	Dielectric Material	Dissipation Factor		Operating Temperature
					SL	Y5P, Y5U, Y5V	
3225	10pF~2200pF	±10%, ±20%	X1: 760V Y1: 500V	SL, Y5P, Y5U, Y5V	≤0.15%	≤2.5%	-40~+125ºC
3222							

DIMENSION



Unit: mm

EIA Size	L ±0.3	W ±0.3	H ±0.3	L1 ±0.3	L2 ±0.3	L3 ±0.3	W1±0.3	T±0.01	A±0.2	B±0.2	C±0.2	D±0.2
3225	8.1	6.0	2.5	10	11.4	0.7	2.5	0.15	3.6	2.2	10.0	17.2
3222	8.1	5.5	2.5	10	11.4	0.7	2.5	0.15	3.6	2.2	10.0	17.2

PART NUMBERING SYSTEM

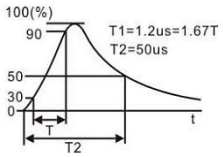
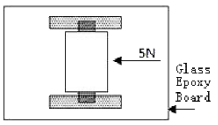
MCS	3225	B	101K	5	P
(1)	(2)	(3)	(4)	(5)	(6)

No.	Item	Code	Description	
(1)	Product Code	MCS	Safety Ceramic Capacitor, X1/Y1	
(2)	Size Code	3225	3225: 8.1 x 6.0 mm	3222: 8.1 x 5.5 mm
(3)	Dielectric Material	B	B: Y5P	S: SL, E: Y5U, F: Y5V
(4)	Nominal Capacitance	101K	100pF ±10% (K)	First two digits: Significant, Third: Multiplier
(5)	Rated AC Voltage Code	5	5: X1/Y1: 760V/500V	
(6)	Series Code	P	SMD Encapsulated Type, UL94-V0	

ELECTRICAL CHARACTERISTICS

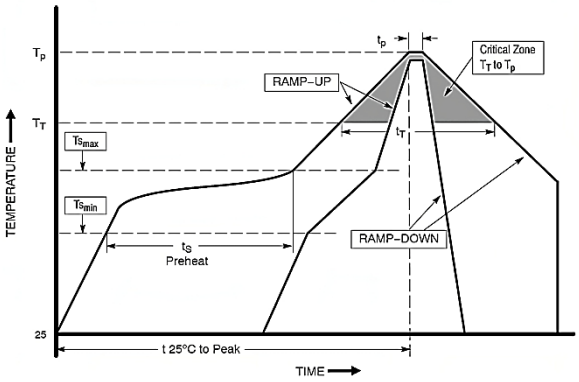
EIA Size	Temperature Coefficient	Nominal Capacitance		Tolerance	Part Number
		(pF)	Code	(%)	
3225	SL (S)	10	100	±10% (K)	MCS3225S100K5P
3225	SL (S)	12	120	±10% (K)	MCS3225S120K5P
3225	SL (S)	15	150	±10% (K)	MCS3225S150K5P
3225	SL (S)	18	180	±10% (K)	MCS3225S180K5P
3225	SL (S)	20	200	±10% (K)	MCS3225S200K5P
3225	SL (S)	27	270	±10% (K)	MCS3225S270K5P
3225	SL (S)	30	300	±10% (K)	MCS3225S300K5P
3225	SL (S)	33	330	±10% (K)	MCS3225S330K5P
3225	SL (S)	39	390	±10% (K)	MCS3225S390K5P
3225	SL (S)	47	470	±10% (K)	MCS3225S470K5P
3225	SL (S)	56	560	±10% (K)	MCS3225S560K5P
3225	SL (S)	68	680	±10% (K)	MCS3225S680K5P
3225	SL (S)	82	820	±10% (K)	MCS3225S820K5P
3225	Y5P (B)	100	101	±10% (K)	MCS3225B101K5P
3225	Y5P (B)	120	121	±10% (K)	MCS3225B121K5P
3225	Y5P (B)	150	151	±10% (K)	MCS3225B151K5P
3225	Y5P (B)	180	181	±10% (K)	MCS3225B181K5P
3225	Y5P (B)	200	201	±10% (K)	MCS3225B201K5P
3225	Y5P (B)	220	221	±10% (K)	MCS3225B221K5P
3225	Y5P (B)	270	271	±10% (K)	MCS3225B271K5P
3225	Y5P (B)	300	301	±10% (K)	MCS3225B301K5P
3225	Y5P (B)	330	331	±10% (K)	MCS3225B331K5P
3225	Y5P (B)	390	391	±10% (K)	MCS3225B391K5P
3225	Y5P (B)	470	471	±10% (K)	MCS3225B471K5P
3225	Y5U (E)	560	561	±20% (M)	MCS3225E561M5P
3225	Y5U (E)	680	681	±20% (M)	MCS3225E681M5P
3225	Y5U (E)	820	821	±20% (M)	MCS3225E821M5P
3225	Y5U (E)	1000	102	±20% (M)	MCS3225E102M5P
3225	Y5U (E)	1200	122	±20% (M)	MCS3225E122M5P
3225	Y5U (E)	1500	152	±20% (M)	MCS3225E152M5P
3225	Y5V (F)	1800	182	±20% (M)	MCS3225F182M5P
3225	Y5V (F)	2000	202	±20% (M)	MCS3225F202M5P
3225	Y5V (F)	2200	222	±20% (M)	MCS3225F222M5P
3222	SL (S)	10	100	±10% (K)	MCS3222S100K5P
3222	SL (S)	12	120	±10% (K)	MCS3222S120K5P
3222	SL (S)	15	150	±10% (K)	MCS3222S150K5P
3222	SL (S)	18	180	±10% (K)	MCS3222S180K5P
3222	SL (S)	20	200	±10% (K)	MCS3222S200K5P
3222	SL (S)	27	270	±10% (K)	MCS3222S270K5P
3222	SL (S)	30	300	±10% (K)	MCS3222S300K5P
3222	SL (S)	33	330	±10% (K)	MCS3222S330K5P
3222	SL (S)	39	390	±10% (K)	MCS3222S390K5P
3222	SL (S)	47	470	±10% (K)	MCS3222S470K5P
3222	SL (S)	56	560	±10% (K)	MCS3222S560K5P
3222	SL (S)	68	680	±10% (K)	MCS3222S680K5P
3222	SL (S)	82	820	±10% (K)	MCS3222S820K5P
3222	Y5P (B)	100	101	±10% (K)	MCS3222B101K5P
3222	Y5P (B)	120	121	±10% (K)	MCS3222B121K5P
3222	Y5P (B)	150	151	±10% (K)	MCS3222B151K5P
3222	Y5P (B)	180	181	±10% (K)	MCS3222B181K5P
3222	Y5P (B)	200	201	±10% (K)	MCS3222B201K5P
3222	Y5P (B)	220	221	±10% (K)	MCS3222B221K5P
3222	Y5P (B)	270	271	±10% (K)	MCS3222B271K5P
3222	Y5P (B)	300	301	±10% (K)	MCS3222B301K5P
3222	Y5P (B)	330	331	±10% (K)	MCS3222B331K5P
3222	Y5P (B)	390	391	±10% (K)	MCS3222B391K5P
3222	Y5P (B)	470	471	±10% (K)	MCS3222B471K5P
3222	Y5U (E)	560	561	±20% (M)	MCS3222E561M5P
3222	Y5U (E)	680	681	±20% (M)	MCS3222E681M5P
3222	Y5U (E)	820	821	±20% (M)	MCS3222E821M5P
3222	Y5U (E)	1000	102	±20% (M)	MCS3222E102M5P
3222	Y5U (E)	1200	122	±20% (M)	MCS3222E122M5P
3222	Y5U (E)	1500	152	±20% (M)	MCS3222E152M5P
3222	Y5V (F)	1800	182	±20% (M)	MCS3222F182M5P
3222	Y5V (F)	2000	202	±20% (M)	MCS3222F202M5P
3222	Y5V (F)	2200	222	±20% (M)	MCS3222F222M5P

RELIABILITY

<table>
<tr><th>Item</th><th>Test Conditions / Method</th><th>Specifications</th></tr>
<tr><td>Vibration</td><td>Frequency range: 10 ~ 55 Hz
Amplitude: 1.5mm within 1 min.
Direction: 3 mutually perpendicular directions, 2 hrs each.</td><td>No visible damage
<table>
<tr><th>Dielectric</th><th>ΔC/C</th><th>D.F</th></tr>
<tr><td>SL</td><td rowspan="2">Within tolerance range</td><td>≦0.15%</td></tr>
<tr><td>Y5P, Y5U, Y5V</td><td>≦2.5%</td></tr>
</table></td></tr>
<tr><td>Solderability</td><td>Solder: 245 ±3°C, 3 ±0.3 sec
Solder composition: Sn98Ag2</td><td>At least 75% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Pre-treatment: 150 +0/-10°C for 60 ±5 mins for Y5P&Y5U.
100~120°C for 1 min for SL&Y5V
Solder: 260 ±5°C, for 10 ±1 seconds
Test after standing at room temperature for 24±2 hrs</td><td>|ΔC/C|≦10%
No visible damage
Dielectric strength test pass</td></tr>
<tr><td>High Temperature Storage</td><td>Pre-test preparation: Capacitors must be stored at 125±2℃ for 1hr, then stand by 24 ±2 hrs at room temperature
Stored at 125 ±5°C for 1000 hrs
Test after standing at room temperature for 24±2 hrs</td><td>|ΔC/C|≦20%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Low Temperature Storage</td><td>Pre-test preparation: Capacitors must be stored at 125±2℃ for 1hr, then stand by 24 ±2 hrs at room temperature
Stored at -40 ±5°C for 1000± 24 hrs
Test after standing at room temperature for 24±2 hrs</td><td>|ΔC/C|≦20%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Damp Heat, Steady State</td><td>40 ±2°C, 90 ~ 95%RH for 500 ±12 hrs
Test after standing at room temperature for 1~2 hrs</td><td>|ΔC/C|≦15%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Damp Heat, with Load</td><td>40 ±2°C, 90 ~ 95%RH, applies rated voltage for 500 ±12 hrs
Test after standing at room temperature for 1~2 hrs</td><td>|ΔC/C|≦15%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Rapid Change of Temperature</td><td>Pre-test preparation: Capacitors must be stored at 125±2℃ for 1hr, then stand by 24 ±2 hrs at room temperature
The conditions shown below shall be repeated 5 cycles.
<table>
<tr><th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr>
<tr><td>1</td><td>-40+0/-3</td><td>30</td></tr>
<tr><td>2</td><td>25+0/-3</td><td>3</td></tr>
<tr><td>3</td><td>125+3/-0</td><td>30</td></tr>
<tr><td>4</td><td>25+0/-3</td><td>3</td></tr>
</table>
Test after standing at room temperature for 24±2 hrs</td><td>|ΔC/C|≦20%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Durability</td><td>Peak Voltage: Each test capacitor withstands three instances of 8KVDC peak voltage, followed by a life test. Conduct a 1000+48/-24-hour test at 125+2/-0°C with relative humidity not exceeding 50%, applies 1.7 time of rated voltage increases the voltage by AC1000V every hour for 0.1s.
Test after standing at room temperature for 1~2 hrs
 
</td><td>|ΔC/C|≦20%
No visible damage
I.R>5000MΩ
Dielectric strength test pass</td></tr>
<tr><td>Welding Strength</td><td>Weld the capacitor onto the test fixture as shown in the diagram, apply a 5N pushing force in the direction of the arrow. Solder the capacitor using reflow soldering and handle with care to avoid damage from heat shocks.
 
</td><td>No pin misalignment or other adverse events</td></tr>
<tr><td>Dielectric Strength</td><td>The capacitor withstands the test voltage of 4000VAC (r.m.s) for 60s between the two terminals, voltage rise time> 0.3s</td><td>No breakdown or arcing</td></tr>
<tr><td>Insulation Resistance</td><td>Charging at 500VDC for 60 ±5s</td><td>>10000MΩ</td></tr>
</table>

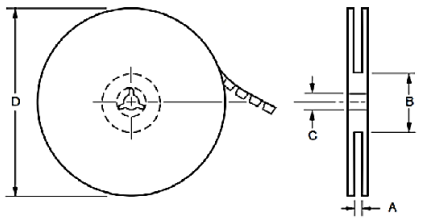
RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	130°C
	Temp. Max $T_{s(max)}$	170°C
	Time (min. to max.) (t_s)	60~120 seconds
$T_{s(max)}$ to T_L (Ramp-up rate)		3°C/second max.
Average ramp up rate (T_L) to peak		3°C/second max.
Reflow	Temp. (T_L)	230°C
	Time (min. to max.) (t_L)	60~120 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of peak Temperature (t_p)		20 seconds max.
Ramp-down Rate		6°C/second

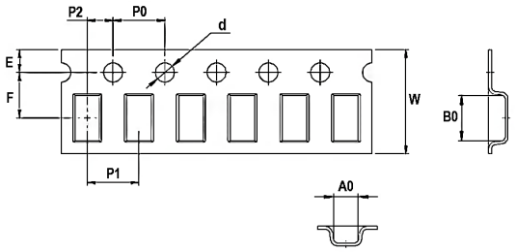


PACKAGING DIMENSION

Reel Specification



Plastic Tape Specification



EIA Size	Reel Dimension (mm)				Tape Dimensions (mm)									Quantity
	A ±0.2	B ±3.0	C ±1	D 0/-2	A0 ±0.1	B0 ±0.1	E ±0.1	F ±0.1	W ±0.2	P1 ±0.1	P0 ±0.1	P2 ±0.05	d ±0.1	Pcs Per Reel
3225	24.4	100	13.3	380	6.5	12.2	1.75	7.5	24.0	8.0	4.0	2.0	1.5	4000
3222	24.4	100	13.3	380	6.5	12.2	1.75	7.5	24.0	8.0	4.0	2.0	1.5	4000