# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP-COG TYPE GRM SERIES



### **FEATURES**

- Miniature size
- No Polarity
- Nickel Barrier Termination Standard highly resistant to metal migration

multata

Innovator in Electronics

Largest production capacity and

volume in the world

- Uniform dimensions and configuration
- Flow for GRM39, 40, 42-6 and Reflow Solderable
- Minimum series inductance
- Tape and Reel Packaging
- Wide selection of capacitance values and voltages

### **DIMENSIONS: mm**

	Size	EIA Code	L Length	W Width	T Thickness	g (min.) Insulation	e (min.) Termination
	GRM36	0402	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	0.3	0.1
	GRM39	0603	1.6 ± 0.1	0.80 ± 0.1	0.8 ± 0.1	0.5	0.35 ± 0.15
	GRM40	0805	2.0 ± 0.15	1.25 ± 0.15	1.40 max.	0.75	0.5 ± 0.25
	GRM42-6	1206	3.2 ± 0.15	1.6 ± 0.15	1.25 max.	1.0	0.55 ± 0.25
	GRM42-2	1210	3.2 ± 0.15	2.5 ± 0.15	1.5 max.	1.0	0.5 ± 0.25
e gmin. e	GRM43-2	1812	4.6 ± 0.3	$3.2\pm0.2$	2.75 max.	2.0	0.25
	GRM44-1	2220	5.6 ± 0.3	5.1 + 0.25 - 0.5	2.75 max.	2.0	0.25

### **SPECIFICATIONS**

	Rated Voltage/Temperature Characteristics/Capacitance Value								
Туре	COG								
	50V	100V	200V						
GRM36	1.0 ~ 160pF	—	—						
GRM39	1.0 ~ 510pF	1.0 ~ 160pF	1.0 ~ 10pF						
GRM40	1.0 ~ 2400pF	1.0 ~ 680pF	1.0 ~ 220pF						
GRM42-6	1.0 ~ 6200pF	1.0 ~ 2200pF	1.0 ~ 470pF						
GRM42-2	100 ~ 7500pF	100 ~ 4300pF	100 ~ 1000pF						
GRM43-2	1000pF ~ .013μF	1000pF ~ .012µF	330pF ~ 2700pF						
GRM44-1	1000pF ~ .049µ.F	1000pF ~ .030μF	1000pF ~ 6200pF						

		<u>GRM40</u>	<u> </u>	<u>J 050 A</u>	<u>D</u>			
CAPACITOR TYPE AND SIZE	3-DIGIT CODE appears as	TEMPERATURE CHARACTERISTICS	CAPACITANCE VALUE Expressed in picofarads	CAPACITANCE TOLERANCE	VOLTAGE Identified	<b>MARKING</b> A = Unmarl	PA(	CKAGING
	necessary to indicate	COG P2H	and identified by a three-digit number.	5pF or less C = ±.25pF	by a three-digit		Reel Diameter/ Tape Material	Code
	special thickness	K2H 52H	FIRST TWO digits	> Spr ≤ TUpr D = + Spr	number.		7″ Paper Tape	D
	requirements.	T2H	fiaures. Last diait	>10pF			7" Plastic Tape	L
	Please consult	U2J	specifies the number	$J = \pm 5\%$			13" Paper Tape	J
	your local	SL	of zeros to follow.	K = 10%			13" Plastic Tape	K
	sales office for dotails		For tractional values				Bulk	В
	ior deidlis.		is used as the decimal				Bulk Cassette	C
			point and the last digit becomes significant.				7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – TEMPERATURE COMPENSATING TYPE GRM SERIES



Largest production capacity and

volume in the world



### FEATURES

- Miniature size
- No Polarity
- Nickel Barrier Termination Standard highly resistant to metal migration
- Uniform dimensions and configuration
- Flow for GRM39, 40, 42-6 and Reflow Solderable
- Minimum series inductance
- Tape and Reel Packaging
- Wide selection of capacitance values and voltages

### **DIMENSIONS: mm**

	Size	EIA Code	L Length	W Width	T Thickness	g (min.) Insulation	e (min.) Termination
L W →	GRM36	0402	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	0.3	0.1
	GRM39	0603	1.6 ± 0.1	0.80 ± 0.1	0.8 ± 0.1	0.5	0.35 ± 0.15
	GRM40	0805	2.0 ± 0.15	1.25 ± 0.15	1.40 max.	0.75	0.5 ± 0.25
	GRM42-6	1206	3.2 ± 0.15	1.6 ± 0.15	1.25 max.	1.0	0.55 ± 0.25
	GRM42-2	1210	3.2 ± 0.15	2.5 ± 0.15	1.5 max.	1.0	0.5 ± 0.25
e gmin. e	GRM43-2	1812	4.6 ± 0.3	3.2 ± 0.2	2.75 max.	2.0	0.25
	GRM44-1	2220	5.6 ± 0.3	5.1 + 0.25 - 0.5	2.75 max.	2.0	0.25

	Temperature Characteristics/Capacitance Value											
Туре	P	2H	R	2H \$2		2H	Tź	2H	U	2J	S	il 🛛
	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
GRM39	1.0 ~ 160pF	1.0 ~ 120pF	1.0 ~ 160pF	1.0 ~ 150pF	1.0 ~ 220pF	1.0 ~ 120pF	1.0 ~ 390pF	1.0 ~ 39pF	1.0 ~ 750pF	1.0 ~ 430pF	1.0 ~ 750pF	1.0 ~ 430pF
GRM40	1.0 ~ 620pF	1.0 ~ 470pF	1.0 ~ 750pF	1.0 ~ 560pF	1.0 ~ 820pF	1.0~620pF	1.0 ~ 1800pF	1.0 ~ 220pF	1.0 ~ 3300pF	1.0 ~ 2000pF	1.0 ~ 3300pF	1.0 ~ 2000pF
GRM42-6	1.0 ~ 1600pF	1.0 ~ 1300pF	1.0 ~ 1600pF	1.0 ~ 1600pF	1.0 ~ 2000pF	1.0 ~1600pF	1.0 ~ 4300pF	1.0 ~ 510pF	1.0 ~ 8200pF	1.0 ~ 4700pF	1.0 ~ 8200pF	1.0 ~ 4900pF

		<u>GRM40</u> – –	<u> </u>	<u>J 050 /</u>	A D		
CAPACITOR TYPE AND SIZE	3-DIGIT CODE appears as	TEMPERATURE CHARACTERISTICS	CAPACITANCE VALUE Expressed in picofarads	CAPACITANCE TOLERANCE	VOLTAGE Identified	MARKING PACKA A = Unmarked	GING
	necessary to indicate special	P2H P2H	and identified by a three-digit number. First two digits	SpF or less C = ±.25pF SpE < 10pE	by a three-digit pumbor	Reel Diameter/ Tape Material	Code
	thickness	S2H	represent significant	D = ±.50F	number.	7" Paper Tape	D
	requirements.	T2H	figures. Last digit	>10pF		7" Plastic Tape	L
	Please consult	U2J	specifies the number	$J = \pm 5\%$		13" Paper Tape	J
	your local	SL .	of zeros to tollow.			13" Plastic Tape	K
	for details		helow 10nF the letter "R"			Bulk	В
	ioi doidilj.		is used as the decimal			Bulk Cassette	C
			point and the last digit becomes significant.			7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP-HIGH DIELECTRIC CONSTANT TYPE X7R,Y5V **GRM SERIES**



Largest production capacity and

volume in the world



### **FEATURES**

- Miniature size
- No Polarity
- Nickel Barrier Termination Standard highly resistant to metal migration
- Uniform dimensions and
- configuration
  Flow for GRM39, 40, 42-6 and Reflow Solderable
- Minimum series inductance
- Tape and Reel Packaging
- Wide selection of capacitance values and voltages

### **DIMENSIONS: mm**

	Size	EIA Code	L Length	W Width	T Thickness	g (min.) Insulation	e (min.) Termination
	GRM36	0402	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	0.3	0.1
	GRM39	0603	1.6 ± 0.1	0.80 ± 0.1	0.8 ± 0.1	0.5	0.35 ± 0.15
	GRM40	0805	2.0 ± 0.15	1.25 ± 0.15	1.40 max.	0.75	0.5 ± 0.25
	GRM42-6	1206	3.2 ± 0.15	1.6 ± 0.15	1.25 max.	1.0	0.55 ± 0.25
	GRM42-2	1210	3.2 ± 0.15	2.5 ± 0.15	1.5 max.	1.0	0.5 ± 0.25
	GRM43-2	1812	$4.6 \pm 0.3$	$3.2 \pm 0.2$	2.75 max.	2.0	0.25
'e' gmin. 'e'	GRM44-1	2220	5.6 ± 0.3	5.1 + 0.25 - 0.5	2.75 max.	2.0	0.25

### **SPECIFICATIONS**

		Temperature Characteristics/Rated Voltage/Capacitance Value											
Туре		X7R						Y5V					
	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V		
GRM36		8200pF ~ .022µF	4700pF ~ 6800pF	220pF ~ 3900pF	_	—	_	.033μF ~ .11μF	.022µF	1000pF ~ .015µF	—		
GRM39	.12μF ~ .22μF	.012μF ~ .1μF	3900pF ~ .047µF	220pF ~ .018µF	220pF ~ 3400pF	220pF ~ 1800pF	.47μF ~ 1.0μF	.033μF ~ .22μF	1000pF ~ .15µF	1000pF ~ .068µF	1200pF ~ 4700pF		
GRM40	.56μF ~ 1.0μF	.015μF ~ .47μF	2000pF ~ .15μF	220pF ~ .1µF	220pF ~ .015µF	220pF ~ .01μF	2.2µF	.1µF ~ 2.2µF	2200pF ~ .33µF	2200pF ~ .22µF	1000pF ~ .022µF		
GRM42-6	2.2μF ~ 4.7μF	.1μF ~ 1.0μF	.022μF ~ .33μF	1000pF ~ .15µF	1000pF ~ .039µF	1000pF ~ .022µF	4.7μF*	.15μF ~ 4.7μF	.068µF ~ 1.5µF	.01μF ~ .47μF	.01μF ~ .057μF		
GRM42-2	—	.12μF ~ 1.5μF	.022μF ~ .33μF	.068µF ~ .22µF	.027μ ~ .1μF	1500pF ~ .047µF	—	.68µF ~ 2.2µF	1.0μF ~ 1.5μF	. <b>68</b> µF	.047μF ~ .12μF		
GRM43-2		.39μF ~ .56μF	.1µF ~ .56µF	.01μF ~ .47μF	.012μF ~ .22μF	.01μF ~ .15μF	_	3.3μF	1.5μF	1.5μF	.15μF ~ .33μF		
GRM44-1			.47μF ~ 1.2μF	0.56μF ~ 1.2μF	.056µF ~ .56µF	.022μF ~ .27μF	_		2.2µF	4.7μF	.33µF ~ .68µF		
										*4T dimensi	on = 1.6 ± .2mm		

### PART NUMBERING SYSTEM

		<u>GRM40</u>	<u> </u>	<u>( 050 A</u>	<u> </u>		
CAPACITOR TYPE AND SIZE	3-DIGIT CODE appears as	TEMPERATURE CHARACTERISTICS	CAPACITANCE VALUE Expressed in picofarads	CAPACITANCE TOLERANCE	<b>VOLTAGE</b> Identified	MARKING PACKAO A = Unmarked	GING
	necessary to indicate	X7R Y5V	and identified by a three-diait number.	X7R: K = ±10% M = ±20%	by a three-diait	Reel Diameter/ Tape Material	Code
	special		First two digits	Y5V: $Z = \frac{+80}{20}\%$	number.	7″ Paper Tape	D
	thickness		represent significant	-20		7" Plastic Tape	L
	requirements.		figures. Last digit			13" Paper Tape	J
	Please consult		specifies the number			13" Plastic Tape	K
	your local		of zeros to follow.			Bulk	B
	, sales office					Bulk Cassette	C
	for details.					7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – NICKEL BARRIER TERMINATION THIN TYPE GRM SERIES



### FEATURES

- This series is suited to flow and reflow soldering. Capacitor terminations are made of metal highly resistant to migration.
- Large capacitance values enable excellent by-pass effects to be realized.
- Its thin package makes this series ideally suited for the production of small electronic products and for mounting underneath ICs.

### APPLICATIONS

Thin equipment such as IC cards

muKata

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### **DIMENSIONS: mm**

	Size	L Length	W Width	T Thickness	g (min.) Insulation	e (min.) Termination
$\begin{array}{c c} \bullet & W \longrightarrow & \bullet & T \\ \hline \\ \hline \\ g \\ g \\ \end{bmatrix} \begin{array}{c} \bullet \\ L \\ L \\ \end{array} \end{array}$	GRM40-024	2.0 ± 0.1	1.25 ± 0.1	0.5 max.	0.7	0.2
<u>e</u> _/////////↓	GRM42-625	3.2 ± 0.15	1.6 ± 0.15	0.6 max.	1.5	0.3

### **SPECIFICATIONS**

Type	Rated	Temperature Characteristics/Capacitance Value						
.,,,,,	Voltage	COG	SL	X7R	Y5V			
	50V	0.5 ~ 360	220 ~ 470	220 ~ 6800	10000			
GRM40-024	25V	—	—	8200 ~ 10000	15000 ~ 33000			
	16V	_	_	12000 ~ 27000	47000 ~ 100000			
GRM42-625	25V	_	_	_	150000 ~ 220000			



# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – TANTALUM REPLACEMENT TYPE **GRM SERIES**



These new monolithic ceramic chip capacitors are specifically designed to replace tantalum and aluminum electrolytic capacitors in a variety of applications. The high frequency performance of these devices make them particularly suitable for use in secondary suppression circuits in switching power supplies and other circuits with high frequency performance requirements.

Lower ESR yields lower net impedance at higher frequencies. Thus a lower value of ceramic capacitance may be sufficient in bypassing and decoupling circuits.



Greater surface mounting flexibility and long-term reliability of ceramic capacitors adds to their overall performance vs. cost ratio as compared to electrolytics.

### **FEATURES\***

- Lower equivalent series resistance
- Lower dissipation factor
- Higher insulation resistance
- Higher break-down voltage
- No polarity considerations
- Long term dielectric stability
- Wider solder profile capability

Solvent wash compatibility

\*When compared to electrolytic capacitors

### **DIMENSIONS: mm**

Туре	EIA Code	L Length	W Width	T Thickness
GRM39	0603	1.6 ± 0.1	0.8 ± 0.1	0.8 ± 0.1
GRM40	0805	2.0 ± 0.15	1.25 ± 0.15	1.35 max.
GRM42-6	1206	3.2 ± 0.15	1.6 ± 0.15	1.25 max.

### **SPECIFICATIONS**

Type	Rated	Temperature Characteristics/Capacitance Value					
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Voltage	X7R	X5R	Y5V			
	10V	_		0.47µF ~ 1.0µF			
GRM39	16V	0.1µF	_	0.22µF			
	25V	—		0.1µF			
	10V	1.0µF	—	<b>2.2</b> μF			
CDM40	16V	0.22µF	0.47µF	0.47µF ~ 2.2µF			
GRM40	25V	0.1µF		_			
	50V			0.1µF ~ 0.22µF			
CDM/2-4	10V	1.0μF ~ 2.2μF	4.7μF	_			
GRM42-6	16V	_	0.47µF	2.2µF ~ 4.7µF			

		<u>GRM40</u> – –	<u> </u>	K <u>050</u> A	<u>D</u>		
CAPACITOR TYPE AND SIZE	3-DIGIT CODE appears as	TEMPERATURE CHARACTERISTICS	CAPACITANCE VALUE Expressed in picofarads	CAPACITANCE TOLERANCE	VOLTAGE Identified	MARKING PACKAC	GING
	necessary to indicate	X7R Y5V	and identified by a three-diait number.	X7R: K = $\pm 10\%$ M = $\pm 20\%$	by a three-diait	Reel Diameter/ Tape Material	Code
	special		First two digits	Y5V: $Z = \frac{+80}{20}\%$	number.	7" Paper Tape	D
	thickness		represent significant	-20		7" Plastic Tape	L
	requirements.		figures. Last digit			13" Paper Tape	J
	Please consult		specifies the number			13" Plastic Tape	K
	your local		of zeros to follow.			Bulk	В
	sales office					Bulk Cassette	C
	for details.					7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – TANTALUM REPLACEMENT TYPE GRM SERIES



### FEATURES

- Large capacitance at low cost because of the use of base-metal materials
- Terminations are made of metal highly resistant to migrations.
- Heat generation is low at high frequency because of low dielectric loss.
- Compared with aluminum electrolytic capacitors, capacitance can be lower to obtain the same smoothing performance.



 Ceramic capacitor has no polarity and ensures long life time. Ideal replacement for tantalum capacitors.

### APPLICATIONS

- DC-DC converter
- Noise elimination for LCD bias circuit (Use for only alumina, paper or glass epoxy board.)

### **DIMENSIONS: mm**

Туре	EIA Code	L Length	W Width	T Thickness	e	g
GRM220	0603	1.6 ± 0.1	0.8 ± 0.1		0.2 ~ 0.5	0.5 min.
GRM230	1206	3.2 ± 0.15	1.6 ± 0.15	Please refer to the Specifications table.	0.3 ~ 0.8	1.5 min.
GRM235	1210	3.2 ± 0.3	2.5 ± 0.2		0.3 min.	1.0 min.

### **SPECIFICATIONS**

Type	Thickness Capacitance Range/DC Rated Voltage (V)							
iyhe	T (mm)	100	50	25	16	10	Tolerance	
GRM220	0.8 ± 0.1	_	_	_	_	lμF		
GRM230	1.15 ± 0.1	_	_	_	4.7µF	10µF	Z: +80 -20%	
	1.15 ± 0.1							
GRM235	1.35 ± 0.15	—	—	6.8µF	6.8µF ~ 10µF	22µF		
	1.8 ± 0.2	1µF	4.7µF	10µF	_	_		

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – 2000V SURGE SUPPRESSION GRM SERIES



Murata Electronics announces a specialty 2000 volt surge suppression chip capacitor developed from Murata's original multi-layer process technology and ceramic materials. E.I.A. 1808 surface mountable size makes this capacitor especially suited for applications where small size (compared to thru-hole capacitors) and reliable performance are a criteria.

### **FEATURES**

High voltage rating: 1000VDC



continuous, 2250 volt surge capability

- Long profile (4.6mm) reduces risk of high voltage spark over
- Small size: 4.6 x 2.0mm
- Tested to IEEE std. 802.3, 2,250VDC for 60 seconds
- Popular values: 15pF, COG, 27pF COG, 68pF COG, 150pF X7R, 220pF X7R, 470pF X7R

### DIMENSIONS: mm



GRM43								
Length	L	4.6 ± 0.3						
Width	W	2.0 ± 0.2						
Insulation	g min.	2.0						
Termination	e min.	0.25						

Type	Rated	Temperature Characteristics/Capacitance Value			
.,,,,	Voltage	COG	X7R		
GRM43	1000V	15pF ~ 150pF	150pF ~ 1000pF		

### PART NUMBERING SYSTEM

GRM43	COG	151	K	XKV			1
<b>CAPACITOR TYPE AND SIZE</b> GRM – Nickel Barrier Plated	RTEMPERATURE CHARACTERISTICSCAPACITANCE VALUECAPACITANCE TOLERANCEVOLTAGE IdentifiedSIZECHARACTERISTICSVALUETOLERANCEIdentifiedelStandard TC'sIdentified by a $COG: J = \pm 5\%$ by a three-dCOG = 0 $\pm 30$ ppmthree-digit code. FirstK = $\pm 10\%$ digit code.VIDVIDVIDVIDVID		MARKING A = Unmarked	PACKAGING			
Tin (Standard)	$X7R = \pm 15\%$	two digits represent significant figures.	X7R: $K = \pm 10\%$ $M = \pm 20\%$		X = 2250VDC surge	Reel Diameter/ Tape Material	Code
		Last digit specifies the				7" Paper Tape	D
		number of zeros to tollow.				7" Plastic Tape	L
		150 = 15pr 270 = 27pr				13" Paper Tape	J
		$270 = 27 \mu r$ 680 - 68 nF				13" Plastic Tape	K
		$151 = 150 \mathrm{nF}$				Bulk	В
		151 – 15661				Bulk Cassette	C
Some values cannot be tap	ed. Consult your local MENA	Sales Office for additional markin	g and packaging infor	mation.		7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CERAMIC CHIP – 500 VOLT & 1000 VOLT RATED COG & X7R TYPE GRM SERIES



#### These new surface mount components are designed to meet the growing demand for miniature, reliable chip capacitors, especially where high volume automation is required. Applications include solid state relays, telecom, instrumentation, modems, computer peripherals, and others.

#### **FEATURES**

- Standard E.I.A. sizes
- Up to 2X rated voltage tested
- -55°C to +125°C rated

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mulaia

#### **BENEFITS**

- Compatible with SMT equipment
- Improves long term reliability
- Suitable for harsh environments

### \*EIA PREFERRED SIZE

I W	Size	EIA Code	L Length	W Width	T Thickness	g (min.) Insulation	e (min.) Termination
	GRM42-6	1206	3.2 ± 0.2	1.5 ± 0.2	1.25 max.	1.0	0.5 ± 0.25
	GRM42-2	1210	3.2 ± 0.2	2.5 ± 0.2	1.5 max.	1.0	0.5 ± 0.25
	GRM43	1808	4.6 ± 0.3	2.0 ± 0.2	2.0 max.	2.0	0.25
e g min. e	GRM43-2	1812	4.6 ± 0.3	3.2 ± 0.2	2.75 max.	2.0	0.25
	GRM44-1	2220	5.6 ± 0.3	5.1 <sup>+0.25</sup> <sub>-0.5</sub>	2.75 max.	2.0	0.25

### SPECIFICATIONS

**DIMENSIONS: mm** 

Type	Rated	Temperature Characteristics/Capacitance Value				
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Voltage	COG	X7R			
GRM42-6	500V	5pF ~ 470pF	500pF ~ 6800pF			
GRM42-2	500V	100pF ~ 1000pF	1000pF ~ .015pF			
CDM / 2	500V	200pF ~ 1200pF	5000pF ~ .020pF			
UKM43	1000V	10pF ~ 270pF	800pF ~ 3900pF			
CDM/3-3	500V	500pF ~ 2700pF	.01µF ~ .047µF			
0Km43-2	1000V	100pF ~ 560pF	1000pF ~ .01µF			
CDM / /_1	500V	1000pF ~ 7500pF	.020μF ~ .12μF			
GKM44-1	1000V	500pF ~ 1500pF	.01µF ~ .027µF			

### PART NUMBERING SYSTEM

GRM	<u>142-2</u>	<u>X7R</u>	103	K	500	<u> </u>	Ļ	7
CAPACITOR TYPE AND SIZE	TWO OR 3-DIGIT code appears as	TEMPERATURE CHARACTERISTICS	CAPACITANCE VALUE Identified by a three-digit		CAPACITANCE TOLERANCE	VOLTAGE Identified by	<b>MARKING</b> A = Unmarked	PACKAGING
GRM-Nickel necessary to Barrier Plated indicate special Tin (Standard) thickness	COGE = 0±30ppm represent significant X7R = +15% figures Last digits	$C = \pm .25 pF$ $D = \pm 5 nF$	a inree-aigit number. Athers	Reel Diameter/ Tape Material	Code			
GR-Palladium-	requirements.	the number of ze follow. For fractic	the number of zeros to	The second seco	(Over 10pF)	available upon	7" Paper Tape	D
Silver	Please consult		follow. For fractional value		$J = \pm 5\%$	request.	7" Plastic Tape	L
(Non-preferred)	your local MENA		below 10pF, the letter "R"		$K = \pm 10\%$ X7R: $K = \pm 10\%$	(1,000 volts codes as 1KV)	13" Paper Tape	J
	Sales Uttice		is used as the decimal				13" Plastic Tape	K
for details.		hecomes significant				Bulk	B	
			socomos significani.				Bulk Cassette	C
Some values cannot b	pe taped. Consult your loc	al MENA Sales Office for a	additional marking and packag	ing info	ormation.		7″ Paper 2mm pitch	Q

# MONOLITHIC CERAMIC CAPACITORS CONFORMAL COATED RADIAL LEADED CAPACITORS RPE110-RPE121/122 SERIES





### FEATURES

- Wide capacitance, T.C., voltage and tolerance range
- Industry standard sizes
- Tape and reel available for
- auto insertion
- Various lead spacing available
- Marking standard or to customer specification
- Epoxy coating meets UL94V-0

### **DIMENSIONS: mm**

RPE110	RPE131 RPE132	RPE121 RPE122	Size	L (max.)	H (max.)	H <sub>1</sub> (max.)	T (max.)	L.S.	d	WVDC
			RPE110	3.8	3.0	—	2.5	2.54 <sup>+0.6</sup> -0.1	0.4 ± 0.05	50 ~ 200
			RPE131- RPE132	5.0	3.5	5.5	3.15	2.54 <sup>+0.6</sup> / 5.08 <sup>+0.6</sup> -0.1	0.5 ± 0.05	25 ~ 500
			RPE121- RPE122	5.0	4.5	6.3	3.15	2.5/5.1	0.5 ± 0.05	50 ~ 500

### **SPECIFICATIONS**

Туре	Rated Voltage	COG	X7R	Z5U	Y5V
RPE110/131/132	50V	1pF ~ 1300pF	220pF ~ .1µF	1000pF ~ .1µF	.01µF ~ .22µF
	100V	1pF ~ 820pF	220pF ~ .012µF	1000pF ~ .015µF	.01µF ~ .015µF
	200V	1pF ~ 160pF	220pF ~ 5600pF	1000pF ~ 3300pF	N/A
	50V	1pF ~ 4700pF	220pF ~ .27µF	1000pF ~ .47µF	1000pF ~ .68µF
DDE101_100	100V	1pF ~ 4300pF	220pF ~ .1µF	1000pF ~ .15µF	1000pF ~ .068µF
KFE121-122	200V	1pF ~ 1100pF	220pF ~ .047µF	1000pF ~ .068µF	N/A
	500V	10pF ~ 1000pF	220pF ~ .022µF	N/A	N/A

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS CONFORMAL COATED RADIAL LEADED CAPACITORS RPE123-117 SERIES





### FEATURES

- Wide capacitance, T.C., voltage and tolerance range
- Industry standard sizes
- Tape and reel available for auto insertion
- Various lead spacing available
- Marking standard or to customer specification
- Epoxy coating meets UL94V-0

### **DIMENSIONS: mm**

RPE113	RPE123	Size	L (max.)	H (max.)	Hı	T (max.)	L.S.	d	WVDC
		RPE123	7.5	5.0	7.0	3.15	5.08 <sup>+0.6</sup> -0.1	0.5 ±0.05	50 ~ 200
*		RPE113	7.6	7.6	—	4.0	5.1	0.5 ±0.05	50 ~ 500
		RPE114	10.0	10.0	_	4.0	5.0	0.5 ±0.05	50 ~ 500
		RPE117	12.5	12.5		5.1	10.0	0.5 ±0.05	50 ~ 500

### **SPECIFICATIONS**

Туре	Rated Voltage	COG	X7R	Z5U	Y5V
	50V	5100pF ~ .016μF	.33µF ~ .47µF	.47μF ~ 1.0μF	.68µF ~ 1.0µF
RPE123	100V	4700pF ~ 6800µF	.12μF ~ .15μF	N/A	.1μF ~ .15μF
	200V	1200pF ~ 1600µF	.056µF ~ .082µF	N/A	N/A
	50V	.018µF ~ .020µF	.56μF ~ 1.0μF	1.5µF ~ 2.2µF	1.0µF ~ 1.5µF
DDE119	100V	7500pf ~ .016µF	.18μF ~ .47μF	.22μF ~ .68μF	.22μF ~ .47μF
KFEIIJ	200V	1800pF ~ 3900pf	.1µF ~ .18µF	.10μF ~ .15μF	N/A
	500V	1100pF ~ 6800pf	.027 µF ~ .056µF	N/A	N/A
	50V	.022µF ~ .039µF	1.2µF ~ 2.2µF	3.3µF	2.2µF ~ 4.7µF
DDE114	100V	.018µF ~ .033µF	.56μF ~ 1.0μF	1.0µF	.47μF ~ 1.0μF
KFE114	200V	$4300 \text{pF} \sim .010 \mu \text{F}$	.22μF ~ .56μF	.22μF ~ .47μF	N/A
	500V	N/A	.068µF ~ .15µF	N/A	N/A
	50V	.043µF ~ .068µF	2.7µF ~ 3.3µF	4.7µF	<b>6.8</b> μF
DDC117	100V	.036µF ~ .056µF	1.2µF ~ 2.2µF	1.5µF ~ 2.2µF	1.5µF ~ 3.3µF
KFEII/	200V	.011µF ~ .030µF	.68µF ~ 1.8µF	. <b>68</b> μF ~ 1.5μF	N/A
	500V	N/A	.18µF ~ .47µF	N/A	N/A

### PART NUMBERING SYSTEM



### MONOLITHIC CERAMIC CAPACITORS CONFORMAL COATED LEADED – TEMPERATURE COMPENSATING TYPE — RPEP2H-U2J SERIES





### FEATURES

- Wide capacitance, T.C., voltage and tolerance range
- Industry standard sizes
- Tape and reel available for
- auto insertion
- Various lead spacing available
  Marking standard or to customer
- specification
- Epoxy coating meets UL94V-0

### **DIMENSIONS: mm**

RPE110	RPE131/121	RPE132/122	Size	L (max.)	H (max.)	H <sub>1</sub> (max.)	T (max.)	L.S.	d
			RPE110	3.8	3.0	—	2.5	2.54 <sup>+0.6</sup> _0.1	0.4 ± 0.05
			RPE121/122	5.0	4.5	6.3	3.15	2.54 <sup>+0.6</sup> /	0.5_
			RPE131/132	5.0	3.5	5.5	3.15	5.08 <sup>+0.6</sup> _0.1	± 0.05

### **SPECIFICATIONS**

Туре	Rated Voltage	P2H	R2H	S2H	T2H	U2J
DDE110	50V	1pF ~ 360pF	1pF ~ 560pF	1pF ~ 470pF	1pF ~ 390pF	1pF ~ 1800pF
KI LITU	100V	1pF ~ 360pF	1pF ~ 510pF	1pF ~ 430pF	1pF ~ 510pF	1pF ~ 960pF
DDE191/199	50V	1pF ~ 2400pF	1pF ~ 2700pF	1pF ~ 3300pF	1pF ~ 1200pF	1pF ~ 7500pF
KT E1217 122	100V	1pF ~ 2200pF	1pF ~ 2400pF	1pF ~ 3000pF	1pF ~ 240pF	15pF ~ 4700pF

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS CONFORMAL COATED LEADED – ALUM. ELECTROLYTICS REPLACEMENT TYPE—RPE210-260 SERIES



These new monolithic ceramic capacitors are specifically designed to replace aluminum electrolytic capacitors in a variety of applications. The high frequency performance of these devices makes them particularly suitable for use in the secondary suppression circuits in switching power supplies and other circuits with high frequency performance requirements.

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CAPACITORS

- Non-polarized
- Increased high frequency performance reduces total capacitance requirements for equivalent impedance
- Epoxy coating meets UL94V-0

### FEATURES

High long term reliability (10 to 20 years)

### **DIMENSIONS: mm**



Туре	W1 max.	L	T max.	F	d	Lead Style	WVDC
RPE210*	10.0	7.5	4.0	5.0 ± 0.8	0.6 ± 0.05	1	25 ~ 100VDC
RPE220*	12.0	10.0	4.0	5.0 ± 0.8	0.6 ± 0.05	2	25 ~ 100VDC
RPE230	15.0	12.5	5.0	10.0 ± 0.8	0.6 <sup>+0.06</sup> -0.05	1	25 ~ 100VDC
RPE240	17.5	17.5	5.0	15.0 ± 0.8	0.8 <sup>+0.06</sup> -0.05	1	25 ~ 100VDC
RPE250	18.0	24.0	7.5	15.0 ± 0.8	0.8 <sup>+0.08</sup> -0.05	2	25 ~ 75VDC
RPE260	21.0	35.0	7.5	25.4 ± 1.5	0.8 <sup>+0.08</sup> -0.05	2	25 ~ 75VDC

\*Available in Tape and Ammo.

### **SPECIFICATIONS**

Type	Rated Voltage and Capacitance Range								
iyhe	25V	50V	75V	100V					
RPE210	2.2, 3.3, 4.7µF	1.5, 2.2, 3.3μF	—	1.0, 1.5µF					
RPE220	6.8, 10µF	4.7µF	—	2.2µF					
RPE230	15μF	6.8, 10µF	—	3.3, 4.7µF					
RPE240	22, 33µF	15, 22μF	—	6.8µF					
RPE250	47μF	33µF	10µF	_					
RPE260	68, 100µF	47, 68µF	15, 22µF	_					

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS HIGH VOLTAGE CHIP-630VDC TO 3.15KVDC GHM1000/1500/2000 SERIES



### FEATURES

- A new multi-layer structure for small, surface-mountable devices capable of operating at high-voltage
- Sn plated external electrodes allow mounting without silver compound solder.
- The GHM1030 type and 1525/1530 type for flow and reflow soldering, and other types for reflow soldering

### APPLICATIONS

Ideal use on high-frequency pulse



circuit such as snubber circuit for switching power supply, DC-DC converter, ballast (inverter fluorescent lamp). (R Characteristics)

 Ideal for use as the ballast in liquid crystal back-lighting inverters. (SL Characteristics)

				Terr	m Chan /Can Va	lus (nE) /DC Dat	ad Valtura			Dimonsions (n	1
GHM1000/150	'pe O Sorios		Part	Ien	ip. Cnar./Cap. va	live (pr)/ DC Kat	ea voitage			Dimensions (n	nm)
011111000/150	V Jenes		Number	K 630	250	620	<u>ე</u> ს ა	L 215k	— L	W	T
				100 220	230	030	28	3.1 JK			10+0
emin, qı	min.		GHM1030	100 ~ 330						0.2 1.6 ± 0.2	1.0 <u>-0.3</u> 1.95 +0
→  <b> </b>		<b>-</b>	CUM1029	470 ~ 1000				10 00	45.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1.25 <u>0.3</u>
		1	GHMIU38	_		_		10 ~ 82	4.3 ±	$0.3  2.0 \pm 0.2$	2.0 ± 0.3
		w	GHM1040		—		120 ~ 220		4.5 ±	0.3 3.2 ± 0.3	2.0 <u>+</u> 0.3
					—	—		100			2.5 <sup>+0</sup> _0.3
			GHM1525▼	—	1000 ~ 6800	—	_	—	20+	02 125+02	1.0 +0
	L —			—	10000		—	—	2.0 2		1.25 <sup>+0</sup> _0.3
				15000 ~ 22000	—		—			1.0 <sup>+0</sup> 0.3	
		GHM1530▼	—	33000	1000 ~ 10000	—	—	3.2 ±	0.2 1.6 ± 0.2	1.25 <sup>+0</sup> _0.3	
			—	47000	—	—	—			1.5 <sup>+0</sup> <sub>-0.3</sub>	
Туре	е	g	CUM1525 <b>V</b>		68000	15000 ~ 22000		_	20.	0.0 0.5.00	1.5 <sup>+0</sup> _0.3
GHM1030	0.3	1.5	GHW1232 .		100000	_		_	3.2 ±	$0.3  2.5 \pm 0.2$	2.0 <sup>+0</sup> <sub>-0.3</sub>
GHM1038	0.3	2.9			_	33000 ~ 47000		_			1.5 <sup>+0</sup> <sub>-03</sub>
GHM1040	0.3	2.9			150000	68000	_				2.0 <sup>+0</sup> <sub>-0 3</sub>
GHM1525	0.3	15	GHM1540*		220000	_			4.5 ± 0.4	0.4 3.2 ± 0.3	2.5 +0 3
GHM1535	0.3	1.5				100000					2.6 <sup>+0</sup> / <sub>-0.3</sub>
GHM1540	0.3	2.5			330000 ~ 470000	150000	_	_			2.0 <sup>+0</sup> / <sub>0.3</sub>
GHM1545	0.3	3.5	GHM1545		_	220000	_	_	5.7 ±	0.4 5.0 ± 0.4	2.7 +0 2
			Capacitance Step	E6	E6	E12	_	_			-0.5
									Operating T	emperature Range: -	-55 ~ +125℃
AC250V Type			Part	Temp. Char.	/Cap. Value (pF)	/DC Rated Voltaa	ie Dim	ensions (i	nm)	_	
GHM2000 Series		Number		R /AC250V (r		,- I	W	т	Rema	rks	
			0000140		10000 470		<b>57 04</b>		•		
Type      e      g        ↓      GHM2143      0.3      3.5		GHM2143	10000 ~ 47000			5.7 ± 0.4	2.8 ± 0.3	2.0 ± 0.3	Test Voltage: AC57	5V (r.m.s.), 60s	
		GHM2145		100000		5.7 ± 0.4	5.0 ± 0.4 2.0 ± 0.3		.3		
T	GHM214	13 0.3 3.5	GHM2243		470 ~ 470	0	5.7 ± 0.4	$2.8\pm0.3$	2.0 ± 0.3	Test Voltage: AC150	0V (r.m.s.), 60s
e min. g min.	3HM224	•• 0.3 3.3	Capacitance Step				E3				
									Operatina	Temperature Ranae:	-25 ~ +85°C

#### PART NUMBERING SYSTEM



\*Available in European market only. For more detailed information regarding this product line, see Catalog No. C-22-C. To receive additional information on Murata Products call 1-800-831-9172.

# MONOLITHIC CERAMIC CAPACITORS SAFETY STANDARD RECOGNIZED GHM3000 SERIES



### **FEATURES**

- Safety standard recognized chip monolithic ceramic capacitor for AC line
- Small size and large capacitance at high-voltage operating due to monolithic structure
- Sn-plated terminals allow mounting without silver compound solder.
- For reflow soldering
  IEC 384-14 (2nd ed.) Class X1, Y2 (Adaptable to the circuit where basic insulation is required.)
- 125°C guaranteed

### **DIMENSIONS** (mm)

Safety Standard Recognized GHM3000 Series	Part Number	L Length	W Width	T Thickness	e	g
EIN	GHM3145X7R103K-GB					
Nat	GHM3145X7R153K-GB	57	5.0	2.0	0.3	4.0
	GHM3145X7R223K-GB	J./	5.0		0.5	4.0
e min.g min. → I	GHM3145X7R333K-GB			2.7		
	GHM3045X7R101K-GC					
	GHM3045X7R151K-GC		5.0			
W I	GHM3045X7R221K-GC					
	GHM3045X7R331K-GC			2.0		
	GHM3045X7R471K-GC				0.3	
I>	GHM3045X7R681K-GC	5.7				4.0
Т	GHM3045X7R102K-GC					
	GHM3045X7R152K-GC					
	GHM3045X7R222K-GC					
	GHM3045X7R332K-GC					
	GHM3045X7R472K-GC					

### **SPECIFICATIONS**

Part Number	Capacitance (pF)	Capacitance Tolerance	Rated Voltage	Test Voltage	Temperature Range	Temperature	Recognized Standard
GHM3145X7R103K-GB	10000						
GHM3145X7R153K-GB	15000	±10%	AC 250 V(r.m.s.)	DC 1075 V, 60 s	−55 ~ +125°C	X7R char. (±15%)	IEC384-14 (2nd ed.)
GHM3145X7R223K-GB	22000					≈Range: —55 ~ +125°C	EN132400
GHM3145X7R333K-GB	33000						
GHM3045X7R101K-GC	100						
GHM3045X7R151K-GC	150						
GHM3045X7R221K-GC	220						
GHM3045X7R331K-GC	330						
GHM3045X7R471K-GC	470					V7D char (+15%)	IEC384-14 (2nd ed.)
GHM3045X7R681K-GC	680	±10%	AC 250 V(r.m.s.)	AC 1500 V(r.m.s.), 60 s	−55 ~ +125°C	∧/ K (IIUI. (±13/0) ≫ Dango: 55 195°C	EN132400
GHM3045X7R102K-GC	1000					~ KullyeJJ ~ +12J C	UL1414: Line By Pass
GHM3045X7R152K-GC	1500						
GHM3045X7R222K-GC	2200						
GHM3045X7R332K-GC	3300						
GHM3045X7R472K-GC	4700						

### PART NUMBERING SYSTEM



millaia Innovator in Electronics

# MONOLITHIC CERAMIC CAPACITORS NICKEL BARRIERED TERMINATION TYPE GRM400 SERIES – LOW DISTORTION



- This series features a low dissipation factor and low distortion.
- Low shock noise\* without piezoelectric effects
- This series is suited to flow and reflow soldering techniques without the need for silver.
- This series is suitable for most automatic placement equipment.



### APPLICATIONS

Low distortion in general electronic equipment

\*Noise resulting from mechanical stress.

### **DIMENSIONS: mm**

	Type (EIA Code)	Dimensions						
		L	W	T	e	g		
	GRM420 (0603)	1.6 ± 0.1	0.8 ± 0.1		0.2 ± 0.5	0.5 min.		
	GRM425 (0805)	2.0 ± 0.1	1.25 ± 0.1	Please refer to the Specifications table.	0.2 ± 0.7	0.7 min.		
	GRM430 (1206)	3.2 ± 0.15	1.6 ± 0.15		0.3 ± 0.8	1.5 min.		

### **SPECIFICATIONS**

Туре	Thickness	Temp. Char.	В	R	
(EIA Code)	T(mm)	DC Rated Voltage (V)	50	16	
GRM420 (0603)	0.8 ± 0.1		1000 ~ 3300	3900 ~ 10000	
GRM425 (0805)		0.7 <sup>+0</sup> <sub>-0.2</sub>	1000 ~ 10000	12000 ~ 15000	
0111123 (0003)		0.1 <sup>+0</sup> <sub>-0.2</sub>	12000 ~ 15000	18000 ~ 33000	
		0.7 <sup>+0</sup> <sub>-0.2</sub>	18000	—	
GRM430 (1206)	1.0 <sup>+0</sup> 0.2		22000 ~ 39000	47000 ~ 68000	
		1.25 <sup>+0</sup> 0.2	—	82000 ~ 100000	
Capacitance Tolerance			K : ±10%, M : ±20%		

### PART NUMBERING SYSTEM



For more detailed information regarding this product line in North America, consult us. To receive additional information on Murata Products call 1-800-831-9172.

### MONOLITHIC CERAMIC CAPACITORS MINIATURE CERAMIC CAPACITORS MA SERIES



### FEATURES

- Miniature size
- Very high Q at high frequencies
- High RF power capabilities
- Impervious to environmental conditions
- Low dissipation factors
- Excellent retrace capability (not applicable for X7R styles)
- High temperature stability
- Low noise

muRata

CAPACITORS

- Meets Mil-C-55681 with respect to: Shock, Vibration, Moisture Resistance, Solderability, Barometric Pressure, Temperature Cycling, Immersion and Salt Spray
- Packaging options
- Lot processing data available

CASE "1" CASE "2"

4X ACTUAL SIZE

For filtering, coupling and impedance matching in most RF circuits, the MA Series chips and leaded devices offer outstanding performance and reliability with the greatest range of values and configurations. MA Series capacitors are also available in military grade CDR styles, consult factory.

CONFIGURATIONS AND DIMENSIONS-CASE SIZE 1 & 2

MA Series ceramic fixed capacitors are miniature, high performance precision components having extremely high Q and high power capabilities from low frequencies to gigahertz ranges. These "porcelain" multilayer capacitors are extremely stable with variations in temperature, voltage and frequency, and are capable of withstanding the environments encountered in space applications.

MA Series capacitors are designed for miniature state-of-the-art circuit applications. They are small, easy to apply and have extreme reliability. Units are available in ultra-miniature case size 1 (.055" x .055" x .055") or miniature case size 2 (.110" x .110" x .100"). Standard case size 1 units are available as chips. Standard case size 2 units are available as chips and also in a leaded configuration.

Clean-room manufacturing technology assures product reliability and automated processing reduces costs and cycle time. Key stages of the operation are monitored and controlled with SPC techniques. Flexibility in design allows the production of nonstandard values while maintaining consistent quality objectives.

Please contact the factory for availability of special configurations or high-reliability screening.

Туре				C	Dimensions: m	m	Band	
P90 ± 20 ppm/°C	COG ± 30 ppm/°C	X7R	Configuration	Length	W ± .25	T max.	Υ +.25 1	Termination
MA18	MA58	MA78	Y T W	1.8 max.	1.4	1.4 <sup>†</sup>	.25	Palladium Silver, Ni Interface & Solder (Sn 62)
MA28	MA68	MA88		.130 max.	2.8	2.5 <sup>‡</sup>	.4	Palladium Silver, Ni Interface & Solder (Sn 62)

11.65 max. Thickness, X7R \$2.92 max. Thickness, X7R T.C.

### PART NUMBERING SYSTEM

	<u>M</u>	A <u>1/2</u>	8		<u>A</u>	<u>N</u>	
CUBIC MONOLITHIC	A-STD SERIES	DIMENSIONAL AND T.C. CODE 1, 2: P90 5, 6: COG 7, 8: X7R	TERMINATION CODE: 8: Pd/Ag, Ni interface, Solder (Sn62) (Preferred) 2: MicroStrip	CAPACITANCE CODE: Expressed in picofarads and identified by a three-digit number. First two digits represent significant figures. Last digit specifies the number of zeros to follow. For values below 10pF the letter "R" is used as the decimal point and the last digit becomes significant.	TOLERANCES: *B: ±0.1pF *C: ±0.25pF *D: ±0.5pF F: ±1% G: ±2% J: ±5% **K: ±10% **M: ±20% **XC% *Available below 10; **X7R Styles	NO MARKING DF only	7″ Reel Plastic Tape

# MONOLITHIC CERAMIC CAPACITORS SOLDER COATED/HIGH FREQUENCY TYPE GRM700 SERIES



### FEATURES

- Negligible inductance is achieved by its monolithic structure, so the series can be used at frequencies above 1GHz.
- Nickel barriered terminations of GRM type improve solderability and decrease solder leaching.
- This series is designed for both flow (except GRM710) and reflow soldering.



### APPLICATIONS

 High-frequency and high-power circuits

### **DIMENSIONS: mm**

Туре	L Length	W Width	T Thickness	e	g
GRM706	1.25 <sup>+0.5</sup> _0.3	1.0 <sup>+0.5</sup> _0.3	1.2 max.	0.15 min.	0.3 min.
GRM708	2.0 <sup>+0.5</sup> _0.3	1.25 <sup>+0.5</sup> _0.3	1.45 max.	0.2 min.	0.5 min.
GRM710	3.2 <sup>+0.6</sup> _0.4	2.5 <sup>+0.5</sup> _0.3	1.9 max.	0.3 min.	0.5 min.

### SPECIFICATIONS: pF

•	Temperature Characteristics/DC Rated Voltage (V)						
Туре	COG						
	200	100	50				
GRM706	0.5 ~ 13	15 ~ 22	24 ~ 51				
GRM708	0.5 ~ 51	56 ~ 91	100 ~ 160				
GRM710	0.5 ~ 160	180 ~ 510	560 ~ 1000				

### PART NUMBERING SYSTEM

	<u>GRM 708</u> <u>C</u>	DG 220	<u>K</u> <u>100</u>	A	L
CAPACITOR TYPE AND SIZE GRM = Nickel Barrier layer tin.	TEMPERATURE CHARACTERISTICS Standard TC COG = 0 ± 30ppm/°C - 55°C to + 125°C	<b>CAPACITANCE VALUE</b> Expressed in picofarads and identified by a three- digit number. First two digits represent significant figures. Last digit specifies the number of zeros to follow. For values below 10pF, the letter "R" is used as the decimal point and the last digit becomes significant.	$\label{eq:constraint} \begin{array}{l} \textbf{CAPACITANCE} \\ \textbf{TOLERANCE} \\ \textbf{COG: (10pF or less)} \\ \textbf{C} = \pm .25pF \\ \textbf{D} = \pm .5pF \\ \textbf{(Over 10pF)} \\ \textbf{J} = \pm .5\% \\ \textbf{K} = \pm .10\% \end{array}$	VOLTAGE Identified by a three-digit number.	MARKING PACKAGING A = No Marking B = Bulk L = 7" Reel

# MONOLITHIC CERAMIC CAPACITORS LOW ESL WIDE WIDTH TYPE LL SERIES





### **FEATURES**

- Low ESL, good for noise reduction for
- high frequency Small, high cap.

### **APPLICATIONS**

- High speed micro processor
- High frequency digital equipment

### **DIMENSIONS: mm**

Туре	L Length	W Width	T Thickness
LL0306	0.8 ± 0.1	1.6 ± 0.1	0.6 ?
LL0508	1.25 ± 0.1	2.0 ± 0.1	10 ?
LL0612	1.6 ± 0.15	3.2 ± 0.15	1.25 ?

### SPECIFICATIONS: pF

	Temperature Characteristics/DC Rated Voltage (V)									
Туре	X7R				Z5U			Y5V		
	50	25	16	50	25	16	50	25	16	
LL0306	2200 ~ 5600	6800 ~ 8200	10000 ~ 15000	10000	15000 ~ 22000	_	15000	22000	33000 ~ 68000	
LL0508	4700 ~ 39000	27000 ~ 47000	33000 ~ 100000	33000 ~ 68000	47000 ~ 150000	—	68000 ~ 100000	100000 ~ 150000	150000 ~ 330000	
LL0612	10000 ~ 120000	82000 ~ 150000	100000 ~ 330000	100000 ~ 220000	150000 ~ 470000	—	220000 ~ 330000	470000	470000 ~ 1000000	
Cap. Tol.	K: ±10% M: ±20%		K: ±10% M: ±20% Z. <sup>+80</sup> / <sub>20</sub> %				Z: +80%			

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS FOR WIRE-BONDING/DIE-BONDING MLC MICRO CHIP—GM250 SERIES



### FEATURES

- Better microwave characteristics
- Suitable for by-passing
- High density mounting

### **APPLICATIONS**



### **DIMENSIONS: mm**



### **SPECIFICATIONS**

	Temperature Characteristics/DC Rated Voltage (V)					
Туре	X7R	Y5V				
	16V					
GM250	1000, 1500 2200pF	4700, 10000pF				
Capacitance Tolerance	K:±10% M:±20%	Z:+ <sup>80</sup> %				

### PART NUMBERING SYSTEM



# MONOLITHIC CERAMIC CAPACITORS CAPACITOR ARRAYS GNM SERIES

# 2225

### FEATURES

- High density mounting due to mounting space saving
- Mounting cost saving
  - (one placement instead of four)
- Four capacitors on one chip

### APPLICATIONS

- Cellular phones, pagers
- Camcorders
- Personal computers
- Audio
- LCD

### **DIMENSIONS: mm**

Туре	L Length	W Width	T Thickness	a	b	C
GNM25-401 (0805)	2.0 ± 0.15	1.25 ± 0.15	1.0 max.	0.2 ± 0.1	0.5 ± 0.05	0.25 ± 0.05
GNM30-401 (1206)	3.2 ± 0.15	1.6 ± 0.15	0.8 ± 0.1	0.2 ± 0.1	0.8 ± 0.1	0.4 ± 0.05

### SPECIFICATIONS: pF

Type	DC Rated	Temperature Characteristics			
iyhe	Voltage (V)	COG	X7R	Y5V	
	100	10 ~ 150	220 ~ 4700	680 ~ 4700	
GNM30-401	50	10 ~ 330 680 ~ 15000		22000 ~ 47000	
	25	—	18000	_	
	16	—	22000 ~ 39000	68000 ~ 150000	
Capacitanc	e Tolerance	(C = 10pF) D: ±0.5pF (C > 10pF) J: ±5% K: ± 10%	K: ±10% M: ±20%	Z: <sup>+80</sup> %	

### PART NUMBERING SYSTEM



For more detailed information regarding this product line, contact us. To receive additional information on Murata Products call 1-800-831-9172.

CAPACITORS