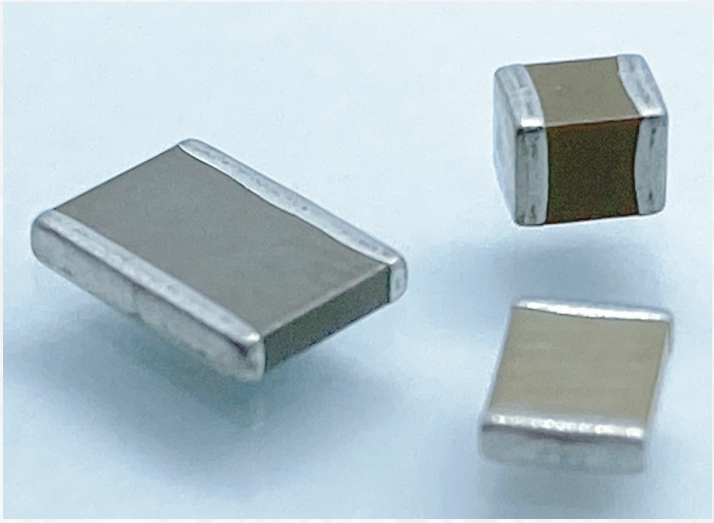
MULTILAYER CERAMIC CHIP CAPACITOR
- GMC SERIES -



APPLICATIONS

- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

FEATURES

- Large capacitance values in small sizes
- Excellent high frequency characteristics

CHIP CAPACITOR SELECTION

DIELECTRIC TYPE

- C0G / NP0 - Capacitance change with temperature is 0-30ppml°C which is less than -0.3%°C from -55°C to +125°C. Typical capacitance change with life is less than -0.1 % for NPOs, one-fifth that shown by most other dielectrics. NPO formulations show no aging characteristics.

Ultra stable class I dielectric: linear temperature coefficient, low loss, negligible change of electrical properties with time, voltage and frequency.

OPERATING TEMPERATURE RANGE	TEMPERATURE COEFFICIENT	DISSIPATION FACTOR	INSULATION RESISTANCE	DIELECTRIC WITHSTANDING VOLTAGE	AGING RATE	TEST PARAMETERS
-55°C to +125°C	0 ± 30PPM °C	0.1% Max, 0.02% Typical	• >100GΩ or 1000ΩF • 125°C V_{DCW}: 10GΩF or 100ΩF whichever is less	3 X V_{DCW}	0% per decade hour	• C<1000pF f=1MHz V=1.0Vrms ±0.2Vrms T=25°C • C>1000pF f=1KHz V=1.0Vrms ±0.2Vrms T=25°C

Stable Class II Dielectric

OPERATING TEMPERATURE RANGE	TEMPERATURE COEFFICIENT	DISSIPATION FACTOR	INSULATION RESISTANCE	DIELECTRIC WITHSTANDING VOLTAGE	AGING RATE	TEST PARAMETERS
X7R: -55°C to +125°C	± 15%	1.8% Typical	• At 25 °C (measured at rated VDC for 60–120 s): IR ≥ 10,000 MΩ or IR×C ≥ 1,000 MΩ·µF (whichever is smaller) • At 125 °C: IR ≥ 1,000 MΩ or IR×C ≥ 100 MΩ·µF (whichever is smaller)	2.5 X V_{DCW} (5 ± 1 seconds and charge / discharge dont exceeding 50 mA)	<2% per decade hour	• 1KHz 1.0Vrms +/-0.2Vrms 25c Values > or = to 10µF 0.5+/-0.1 V_{DCW} @120Hz
X5R: -55°C to +85°C	± 15%					
X6S: -55°C to +105°C	± 22%					
X7S: -55°C to +125°C	± 22%					
X7T: -55°C to +125°C	+ 22 / - 33%					
X8R: -55°C to +150°C	+15%	≤2.5% for ≥ 50V DC rating				
X8L: -55°C to + 150°C	± 15% between -55°C and +125°C +15% / -40% between +125°C and +150°C	≤3.5% for 25V and 16V DC rating				

- Z5U - Despite their capacitance instability, Z5U formulations are very popular because of their small size, temperature range low ESL, low ESR and excellent frequency response. These features are particularly important for decoupling application where only a minimum capacitance value is required.

- Y5U - Y5V formulations are for general purpose use in a limited temperature range. They have a wide temperature characteristic of +22% - 82% capacitance change over the operating temperature range of -30°C to +85°C. Y5Vs high dielectric constant allows the manufacture of very high capacitance values (up to 100µF) in small physical sizes.

High Capacitance Per Unit Volume: General Purpose Product

OPERATING TEMPERATURE RANGE	TEMPERATURE COEFFICIENT	TEMPERATURE VOLTAGE COEFFICIENT (ΔC MAX @ V_{DCW})	DISSIPATION FACTOR	INSULATION RESISTANCE	DIELECTRIC WITHSTANDING VOLTAGE	AGING RATE	TEST PARAMETERS
-30°C to +85°C	+22% -82%	N/A	3.0% Max, 2.0% Typical	• 10GΩ or 100ΩF whichever is less, 25°C, V_{DCW}	2.5 X V_{DCW}	3.0% per decade hour	• 1 KHz, 1 Vrms 25°C values > or = to 10uF 1.0Vrms 120Hz

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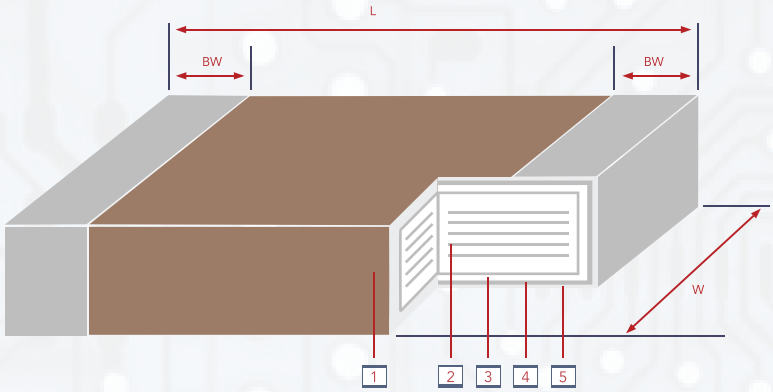
CONSTRUCTION AND DIMENSIONS



NO.	NAME		CLASS I DIELECTRIC	CLASS II DIELECTRIC
1	Ceramic Material		$CaZrO_3$	BatTi03
2	Inner Electrode		Ni	Ni
3	Termination	Inner Layer	Cu	Cu
4		Middle Layer	Ni	Ni
5		Outer Layer	Sn	Sn

CAPACITANCE VALUE & TOLERANCE

- Determined by circuit requirements. Note that chip prices decrease with lower capacitance value and looser tolerance.

CAPACITOR SIZE

- Select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating. All Cal-Chip capacitors conform to EIA specifications.

VOLTAGE

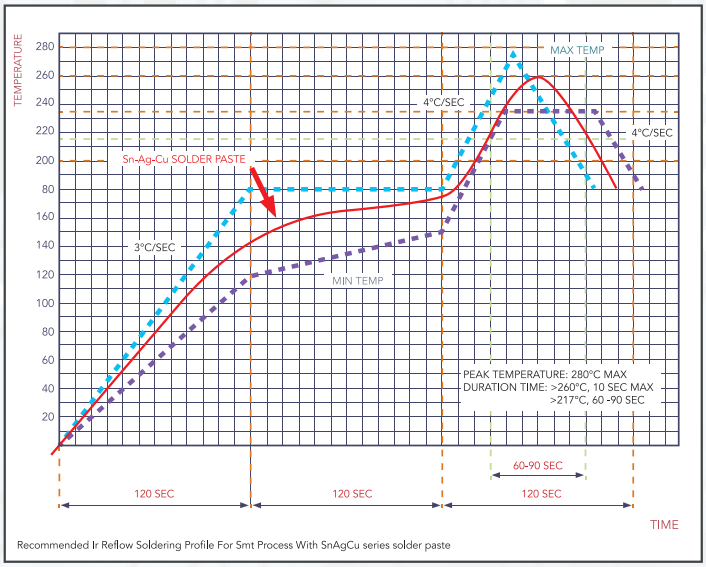
- Determined by circuit requirements.

CAPACITOR TERMINATION

- Nickel barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.

REFLOW SOLDERING CONDITIONS

- The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N2 within oven are recommended.



Recommended Ir Reflow Soldering Profile For Smt Process With SnAgCu series solder paste

PART NUMBER GUIDE

GMC	21	CG	102	J	50	NT	D
PRODUCT TYPE	DIMENSIONS	DIELECTRIC	CAPACITANCE	TOLERANCE	VOLTAGE DC	TERMINATION	PACKAGING CODE
	01: 1005 32: 1210 02: 0201 40: 1808 04: 0402 43: 1812 10: 0603 45: 1825 21: 0805 55: 2220 31: 1206 57: 2225	CG: COG/NPO X7R X5R X7S X7T X6S Y5V Z5U	0R5: 0.5pF 5R0: 5.0pF R75: 0.75pF 100: 10pF 101: 100pF 102: 1000pF 103: .01uF 104: .1uF 105: 1.0uF 106: 10uF 107: 100uF	A: +/- .05pF B: +/-.1pF C: +/-.25pF D: +/-.5pF F: +/-1% G: +/-2% J: +/-5% K: +/-10% M: +/-20% Z: -20%/+80%	4R0: 4.0V 6R3: 6.3V 10: 10V 16: 16V 25: 25V 35: 35V 50: 50V 63: 63V 100: 100V 200: 200V	NT: Sn/Ni PT: Pd/Ag	Blank: 7" reel C: See page 19 & 20 D: See page 19 & 20 G: See page 19 & 20 Q: See page 19 & 20

MS LEVEL 1

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NPO / COG

DIELECTRIC		NP0 / COG																													
DIMENSION (MM)		GMC01					GMC02				GMC04							GMC10				GMC21						GMC31			
L (L1)		0.4 ± 0.02					0.6 ± 0.03				1.0 ± 0.05							1.6 ± 0.2				2.0 ± 0.3						3.2 ± 0.3			
W		0.2 ± 0.02					0.3 ± 0.03				0.5 ± 0.05							0.8 ± 0.2				1.25 ± 0.2						1.6 ± 0.2			
BW (L2/LW)		0.07 ~ 0.14					0.15 ± 0.05				0.1 ~ 0.35							0.1 ~ 0.4				0.25 ~ 0.75						0.25 ~ 0.75			
RATED VOLTAGE		6.3	10	16	25	50	16	25	50	100	6.3	10	16	25	50	100	200	25	50	100	200	10	16	25	50	100	200	25	50	100	200
CAP. RANGE	0.1pF	R10					C	C	C	C	H	H	H	H	H																
	0.2	R20	A	A	A	A	C	C	C	C	H	H	H	H	H																
	0.3	R30	A	A	A	A	A	C	C	C	C	H	H	H	H	H															
	0.4	R40	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	0.47	R47						C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L		
	0.5	0R5	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	0.56	R56						C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L		
	0.6	0R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	0.68	R68										H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L		
	0.7	0R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	0.75	R75	A	A	A	A		C	C	C	C	H	H	H	H	H			L	L	L		J	J	J	J	J	J	L	L	L	
	0.8	0R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	0.82	R82						C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	0.9	0R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	1	1R0	A	A	A	A		C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	1.1	1R1	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H						J	J	J	J	J	J	L	L	L	L
	1.2	1R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	1.3	1R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	1.4	1R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H						J	J	J	J	J	J				
	1.5	1R5	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	1.6	1R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	1.7	1R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	1.8	1R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	1.9	1R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2	2R0	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	2.1	2R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2.2	2R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	2.3	2R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2.4	2R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	2.5	2R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2.6	2R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2.7	2R7	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	2.8	2R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	2.9	2R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	3	3R0	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	3.1	3R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	3.2	3R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H															
	3.3	3R3	A	A	A	A	A	C	C	C	C	H	H	H	H	H		H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	3.4	3R4	A	A	A	A		C	C	C	C	H	H	H	H	H																
	3.5	3R5	A	A	A	A		C	C	C	C	H	H	H	H	H																
	3.6	3R6	A	A	A	A	A	C	C	C	C	H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	3.7	3R7	A	A	A	A		C	C	C	C	H	H	H	H	H																
	3.8	3R8	A	A	A	A		C	C	C	C	H	H	H	H	H																
	3.9	3R9	A	A	A	A	A	C	C	C	C	H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	4	4R0	A	A	A	A		C	C	C	C	H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	4.1	4R1	A	A	A	A		C	C	C	C	H	H	H	H	H																
	4.2	4R2	A	A	A	A		C	C	C	C	H	H	H	H	H																
	4.3	4R3	A	A	A	A		C	C	C	C	H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	4.4	4R4	A	A	A	A		C	C	C	C	H	H	H	H	H																
	4.5	4R5	A	A	A	A		C	C	C	C	H	H	H	H	H																

MAX HEIGHT

A	C	H	J	L
0.22	0.33	0.55	0.70	0.90

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RATED VOLTAGE		6.3	10	16	25	50	16	25	50	100	6.3	10	16	25	50	100	200	25	50	100	200	10	16	25	50	100	200	25	50	100	200
CAP. RANGE	4.6pF	4R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L										
	4.7	4R7	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	4.8	4R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	4.9	4R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	5	5R0	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	5.1	5R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	5.2	5R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	5.3	5R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	5.4	5R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	5.5	5R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	5.6	5R6	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	5.7	5R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	5.8	5R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
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	6	6R0	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	6.1	6R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	6.2	6R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	6.3	6R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	6.4	6R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	6.5	6R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
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	6.7	6R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	6.8	6R8	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	6.9	6R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	7	7R0	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	7.1	7R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	7.2	7R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	7.3	7R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	7.4	7R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	7.5	7R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	7.6	7R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	7.7	7R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L								L	L	L	L
	7.8	7R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	7.9	7R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	8	8R0	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	8.1	8R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	8.2	8R2	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	8.3	8R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	8.3	8R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	8.4	8R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	8.5	8R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	8.6	8R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	8.7	8R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	8.8	8R8	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	8.9	8R9	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	9	9R0	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J	L	L	L	L
	9.1	9R1	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	9.2	9R2	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	9.3	9R3	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	9.4	9R4	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	9.5	9R5	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				
	9.6	9R6	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L											
	9.7	9R7	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L		J	J	J	J	J	J				

MAX HEIGHT

A	C	H	J	L
0.22	0.33	0.55	0.70	0.90

MS LEVEL 1

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NPO / COG

DIELECTRIC		NP0 / COG																													
DIMENSION (MM)		GMC01					GMC02				GMC04							GMC10				GMC21						GMC31			
L(L1)		0.4 ± 0.02					0.6 ± 0.03				1.0 ± 0.05							1.6 ± 0.2				2.0 ± 0.3						3.2 ± 0.3			
W		0.2 ± 0.02					0.3 ± 0.03				0.5 ± 0.05							0.8 ± 0.2				1.25 ± 0.2						1.6 ± 0.2			
BW(L2/LW)		0.07 ~ 0.14					0.15 ± 0.05				0.1 ~ 0.35							0.1 ~ 0.4				0.25 ~ 0.75						0.25 ~ 0.75			
RATED VOLTAGE		6.3	10	16	25	50	16	25	50	100	6.3	10	16	25	50	100	200	25	50	100	200	10	16	25	50	100	200	25	50	100	200
CAP. RANGE	9.8pF	9R8	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L										
	9.9	9R9	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L										
	10	100	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	11	110	A	A	A	A	A	C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	12	120	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	13	130	A	A	A	A	A	C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	15	150	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	16	160	A	A	A	A		C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	18	180	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	20	200	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	22	220	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	23	230										H	H	H	H	H																
	24	240	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	25	250										H	H	H	H	H																
	27	270	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	30	300	A	A	A	A		C	C	C	C	H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	33	330	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	36	360	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	38	380										H	H	H	H	H																
	39	390	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	40	400										H	H	H	H	H			L	L	L											
	42	420										H	H	H	H	H																
	43	430	A	A	A	A	A	C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	47	470	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	50	500										H	H	H	H	H	H		L	L	L											
	51	510	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	53	530																	L	L	L											
	56	560	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	60	600										H	H	H	H	H			L	L	L											
	62	620	A	A	A	A	A	C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	68	680	A	A	A	A	A	C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	70	700																	L	L	L											
	75	750	A	A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	80	800										H	H	H	H	H			L	L	L											
	82	820	A	A	A	A	A	C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	91	910	A	A	A	A		C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	100	101	A	A	A	A	A	C	C	C	C	H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	R	R	R	R
	110	111						C	C	C		H	H	H	H	H	H	H	L	L	L											
	120	121						C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	130	131						C	C	C		H	H	H	H	H			L	L	L		J	J	J	J	J	J	L	L	L	L
	150	151						C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	160	161										H	H	H	H	H			L	L	L		J	J	J	J	J	J	L	L	L	L
	180	181						C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	200	201						C	C	C		H	H	H	H	H			L	L	L		J	J	J	J	J	J	L	L	L	L
	220	221		A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	240	241		A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	250	251																	L	L	L											
	270	271		A	A	A		C	C	C		H	H	H	H	H	H		L	L	L	L	J	J	J	J	J	J	L	L	L	L
	300	301						C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	330	331		A	A	A		C	C	C		H	H	H	H	H	H	H	L	L	L	L	J	J	J	J	J	J	L	L	L	L
	360	361						C	C	C		H	H	H	H	H			L	L	L	L	J	J	J	J	J	J	L	L	L	L
	390	391						C	C	C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	M	L	L	L	L
	430	431						C	C	C		H	H	H	H	H			L	L	L		M	M	M	M	M	M	L	L	L	L
	470	471						C	C	C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	M	L	L	L	L

MAX HEIGHT						
A	C	H	J	L	M	R
0.22	0.33	0.55	0.70	0.90	0.95	1.45

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NPO / COG

DIELECTRIC		NP0 / COG																												
DIMENSION (MM)		GMC01					GMC02		GMC04							GMC10				GMC21					GMC31				
L(L1)		0.4 ± 0.02					0.6 ± 0.03		1.0 ± 0.05							1.6 ± 0.2				2.0 ± 0.3					3.2 ± 0.3				
W		0.2 ± 0.02					0.3 ± 0.03		0.5 ± 0.05							0.8 ± 0.2				1.25 ± 0.2					1.6 ± 0.2				
BW(L2/LW)		0.07 ~ 0.14					0.15 ± 0.05		0.1 ~ 0.35							0.1 ~ 0.4				0.25 ~ 0.75					0.25 ~ 0.75				
RATED VOLTAGE		6.3	10	16	25	50	25	50	6.3	10	16	25	50	100	200	25	50	100	200	16	25	50	100	200	25	50	100	200		
CAP. RANGE	500pF	501																		M	M	M	M							
	510	511					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M		L	L	L	L		
	560	561					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	L	L	L	L		
	620	621					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M		L	L	L	L		
	680	681					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	L	L	L	L		
	750	751					C		H	H	H	H	H	H		L	L	L		M	M	M	M	M	L	L	L	L		
	820	821					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	L	L	L	L		
	910	911					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	L	L	L	L		
	1000	102					C		H	H	H	H	H	H		L	L	L	L	M	M	M	M	M	L	L	L	L		
	1100	112							H	H	H	H	H			L	L	L		M	M	M	M	M						
	1200	122							H	H	H	H	H			M	M	M	M	M	M	M	M	M	L	L	L	L		
	1300	132							H	H	H	H	H			M	M	M		M	M	M	M	M						
	1500	152							H	H	H	H	H			M	M	M	M	M	M	M	M	M	L	L	L	L		
	1600	162							H	H	H	H	H			M	M	M												
	1800	182							H	H	H	H	H			M	M	M	M	M	M	M	M	M	L	L	L	L		
	2000	202							H	H	H	H				M	M	M		M	M	M	M	M						
	2200	222							H	H	H	H	H			M	M	M	M	R	R	R	R	R	L	L	L	L		
	2400	242														M	M	M		R	R	R	R	R	L	L	L	L		
	2700	272							H	H	H	H	H			M	M	M		R	R	R	R	R	L	L	L	L		
	3000	302														M	M			R	R	R	R	R	M	M	M	M		
	3300	332							H	H	H	H	H			M	M	M		R	R	R	R	R	M	M	M	M		
	3600	362																		R	R	R	R	R						
	3900	392														M	M	M		R	R	R	R	R	M	M	M	M		
	4300	432																		R	R	R	R	R						
	4700	472							I	I	I	I	I			M	M	M		R	R	R	R	R	M	M	M	M		
	5600	562							I	I	I	I	I			M	M	M		R	R	R	R		M	M	M	M		
	6200	622														M	M			R	R	R			M	M	M	M		
	6800	682							I	I	I	I	I			M	M	M		R	R	R	R		O	O	O	O		
	7500	752														M	M			R	R	R			O	O	O	O		
	8200	822														M	M	M		R	R	R	R		R	R	R	R		
	9100	912														M	M			R	R	R								
	0.01µF	103							I	I	I	I				L	L	L		R	R	R	R		R	R	R	R		
	0.012	123														M				R	R	R			U	U	U	U		
	0.015	153														M				R	R	R			U	U	U	U		
	0.018	183																		R	R	R			U	U	U	U		
	0.02	203																		R	R	R								
	0.022	223																		R	R	R	R		U	U	U			
	0.027	273																		R	R	R			U	U	U			
	0.03	303																		R	R									
	0.033	333																		R	R	R	R		U	U	U			
	0.039	393																							U	U	U			
	0.047	473																		R	R	R			U	U	U			
	0.056	563																							U	U	U			
	0.068	683																							U	U	U			
	0.082	823																							U	U	U			
	0.1	104																							T	T	U			
	0.12	124																												

MAX HEIGHT

C	H	I	M	O	Q	R	T	U
0.33	0.55	0.65	0.95	1.10	1.40	1.45	1.80	1.90

MS LEVEL 1

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NPO / COG

DIELECTRIC		NP0 / COG																				
DIMENSION (MM)		GMC32					GMC40			GMC43			GMC45			GMC55			GMC57		
L(L1)		3.2 ± 0.3					4.57 ± 0.25			4.5 ± 0.35			4.5 ± 0.35			5.7 ± 0.4			5.7 ± 0.4		
W		2.5 ± 0.3					2.03 ± 0.25			3.2 ± 0.3			6.3 ± 0.4			5.0 ±0.4			6.3 ± 0.4		
BW (L2/LW)		0.25 ~ 0.75					0.25 ~ 0.75			0.25 ~ 0.75			0.40 ~ 1.10			0.50 ~ 1.20			0.50 ~ 1.20		
RATED VOLTAGE		16	25	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
CAP. RANGE	9.8pF	9R8																				
	9.9	9R9																				
	10	100	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	11	110	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	12	120	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	13	130	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	15	150	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	16	160	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	18	180	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	20	200	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	22	220	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	24	240	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	27	270	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	30	300	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	33	330	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	36	360	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	39	390	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	43	430	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	47	470	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	51	510	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	56	560	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	62	620	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	68	680	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	75	750	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	82	820	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	91	910	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	100	101	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	110	111	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	120	121	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	130	131	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	150	151	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	160	161	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	180	181	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	200	201	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	220	221	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V
	240	241	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	270	271	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	300	301	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	330	331	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	360	361	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	390	391	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	430	431	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	470	471	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

MAX HEIGHT	
R	V
1.45	2.20

NPO / COG

DIELECTRIC		NP0 / COG																				
DIMENSION (MM)		GMC32					GMC40			GMC43			GMC45			GMC55			GMC57		
L(L1)		3.2 ± 0.3					4.57 ± 0.25			4.5 ± 0.35			4.5 ± 0.35			5.7 ± 0.4			5.7 ± 0.4		
W		2.5 ± 0.3					2.03 ± 0.25			3.2 ± 0.3			6.3 ± 0.4			5.0 ±0.4			6.3 ± 0.4		
BW(L2/LW)		0.25 ~ 0.75					0.25 ~ 0.75			0.25 ~ 0.75			0.40 ~ 1.10			0.50 ~ 1.20			0.50 ~ 1.20		
RATED VOLTAGE		16	25	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
CAP. RANGE	500pF	501																				
	510	511	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	560	561	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	620	621						V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	680	681	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	750	751	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	820	821	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	910	911	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	1000	102	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	1100	112						V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	1200	122	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	1500	152	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	1800	182	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	2000	202						V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	2200	222	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	2400	242	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	2700	272	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	3000	302						V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	3300	332	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	3900	392	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	4700	472	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	5600	562	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	6800	682	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	7500	752	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	8200	822	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	0.01µF	103	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	0.012	123	T	T	T	T	T	V	V	V	V	V	V	V	V	V	V		V	V	V	V
	0.015	153	T	T	T	T	T	V		V	V	V	V	V	V	V	V		V	V	V	V
	0.018	183	V	V	V	V	V	V		V	V	V	V	V	V	V	V		V	V	V	V
	0.022	223	V	V	V	V	V			V	V	V	V	V	V	V	V		V	V	V	V
	0.027	273	V	V	V	V	V			V	V	V	V	V	V	V	V		V	V	V	V
	0.033	333	V	V	V	V	V			V	V	V	V	V		V	V		V	V	V	V
	0.039	393	V	V	V	V	V			Y	Y	Y	V	V		V	V		V	V	V	V
	0.047	473	V	V	V	V	V			Y	Y	Y	V	V		V	V		V	V	V	V
	0.056	563	V	V	V	V				Y	Y	Y	V	V		V	V		V	V	V	Y
	0.068	683	V	V	V	V				Y	Y	Y	V	V		V	V		V	V	V	Y
	0.082	823	V	V	V	V				Y	Y	Y	V			Y	Y		V	V	V	Y
	0.1	104	V	V	V	V				Y	Y	Y	V			Y	Y		V	V	V	Y
	0.12	124	A5	A5	A5					Y	Y		V			V	V		Y	Y		
	0.15	154	W	W	W					Y	Y		V			V	V					
	0.18	184								Y						V	V					
	0.22	224	W	W						A2						V	V					
	0.27	274														V	V					
	0.33	334														V	V					
	0.47	474														V						
	1	105																				
	2.2	225																				
	4.7	475																				

MAX HEIGHT

R	T	V	W	Y	A2	A5
1.45	1.8	2.20	2.3	2.8	3.5	2.60

MS LEVEL 1

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X8R & X8L

DIELECTRIC			X8R							
DIMENSION (MM)			GMC10				GMC21			
L(L1)			1.6 ± 0.10				2.0 ± 0.20			
W			0.8 ± 0.10				1.25 ± 0.20			
BW(L2/LW)			0.30 ± 0.15				0.50 ± 0.20			
RATED VOLTAGE			10	16	25	50	10	16	25	50
CAP. RANGE	1000pF	102								
	0.010uF	103		L	L	L				
	0.1	104		L	L	L				
	0.22	224		L	L	L				
	0.47	474		L	L	L				
	1.00	105						R	R	

DIELECTRIC			X8L							
DIMENSION (MM)			GMC10				GMC21			
L(L1)			1.60 ± 0.10				2.0 ± 0.20			
W			0.80 ± 0.10				1.25 ± 0.20			
BW(L2/LW)			0.30 ± 0.15				0.50 ± 0.20			
RATED VOLTAGE			10	16	25	50	10	16	25	50
CAP. RANGE	1000pF	102			L	L				
	0.010uF	103			L	L				
	0.1	104		L	L	L				
	0.22	224								
	0.47	474								
	1.00	105							R	R

X7R

DIELECTRIC			X7R																																							
DIMENSION (MM)			GMC01			GMC02					GMC04						GMC10									GMC21									GMC31							
L(L1)			0.4 ± 0.02			0.6 ± 0.03					1.0 ± 0.05						1.6 ± 0.2									2.0 ± 0.3									3.2 ± 0.3							
W			0.2 ± 0.02			0.3 ± 0.03					0.5 ± 0.05						0.8 ± 0.2									1.25 ± 0.2									1.6 ± 0.2							
BW(L2/LW)			0.07 ~ 0.14			0.15 ± 0.05					0.1 ~ 0.35						0.1 ~ 0.4									0.25 ~ 0.75									0.25 ~ 0.75							
RATED VOLTAGE			6.3	10	16	6.3	10	16	25	50	6.3	10	16	25	50	100	4	6.3	10	16	25	35	50	100	200	6.3	10	16	25	35	50	63	100	200	6.3	10	16	25	35	50	100	200
CAP. RANGE	56pF	560	A	A																																						
	68	680	A	A																																						
	82	820	A	A																																						
	100	101	A	A	A	C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
	120	121	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	150	151	A	A	A	C	C	C	C	C	H	H	H	H	H			L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	180	181	A	A		C	C	C	C	C	H	H	H	H	H			L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	200	201				C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	220	221	A	A	A	C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	240	241									H	H	H	H	H			L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	270	271	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	300	301									H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	330	331	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	360	361									H	H	H	H	H			L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	390	391	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	430	431																L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	470	471	A	A	A	C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	510	511									H	H	H	H	H			L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	560	561	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	620	621									H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	680	681	A	A	A	C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	750	751									H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	820	821	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	910	911																L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	1000	102	A	A		C	C	C	C	C	H	H	H	H	H	H		L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	1200	122	A	A		C	C	C	C		H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	1500	152	A	A		C	C	C	C	C	H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	1800	182				C	C	C	C	C	H	H	H	H	H					L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	2000	202									H	H	H	H	H					L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	2200	222	A	A	A	C	C	C	C	C	H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	2400	242																		L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	2700	272				C	C	C	C	C	H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	3000	302																		L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	3300	332				C	C	C	C	C	H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
	3600	362																		L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
	3900	392				C	C	C	C		H	H	H	H	H	H				L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R

MAX HEIGHT					
A	C	H	L	M	R
0.22	0.33	0.55	0.90	0.95	1.45

X7R

DIELECTRIC		X7R																																								
DIMENSION (MM)		GMC01			GMC02					GMC04							GMC10									GMC21									GMC31							
L(L1)		0.4 ± 0.02			0.6 ± 0.03					1.0 ± 0.05							1.6 ± 0.2									2.0 ± 0.3									3.2 ± 0.3							
W		0.2 ± 0.02			0.3 ± 0.03					0.5 ± 0.05							0.8 ± 0.2									1.25 ± 0.2									1.6 ± 0.2							
BW(L2/LW)		0.07 ~ 0.14			0.15 ± 0.05					0.1 ~ 0.35							0.1 ~ 0.4									0.25 ~ 0.75									0.25 ~ 0.75							
RATED VOLTAGE	CAP. RANGE	6.3	10	16	6.3	10	16	25	50	6.3	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100	200	6.3	10	16	25	35	50	63	100	200	6.3	10	16	25	35	50	100	200
4700pF	472				C	C	C	C		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
5600	562				C	C	C	C		H	H	H	H	H	H		L	L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
6800	682				C	C	C	C		H	H	H	H	H	H		L	L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
8200	822				C	C	C	C		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.01uF	103				C	C	C	C		H	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.012	123									H	H	H	H	H	H		L	L	L	L	L	L	L	L		M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.015	153									H	H	H	H	H	H		L	L	L	L	L	L	L	L		M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.018	183									H	H	H	H	H	H		L	L	L	L	L	L	L	L		M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.02	203																L	L	L	L	L	L	L			M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.022	223						C			H	H	H	H	H	H	H	L	L	L	L	L	L	L	L		M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.027	273									H	H	H	H	H	H		L	L	L	L	L	L	L	L		M	M	M	M	M	M	M	M	M	R	R	R	R	R	R	R	R
0.033	333									H	H	H	H	H	H		M	M	M	M	M	M	M	M		M	M	M	M	M	M	M	R	R	R	R	R	R	R	R	R	R
0.039	393									H	H	H	H	H	H		M	M	M	M	M	M	M	M		M	M	M	M	M	M	M	R	R	R	R	R	R	R	R	R	T
0.047	473									H	H	H	H	H	H		M	M	M	M	M	M	M	M		M	M	M	M	M	M	R	R	R	R	R	R	R	R	R	R	T
0.056	563									H	H	H	H	H	J		M	M	M	M	M	M	M	M		M	M	M	M	M	M	R	R	R	R	R	R	R	R	R	R	T
0.068	683									H	H	H	H	H	J		M	M	M	M	M	M	M	M		M	M	M	M	M	M	R	R	R	R	R	R	R	R	R	R	T
0.082	823									H	H	H	H	H	J		M	M	M	M	M	M	M			M	M	M	M	M	M	R	R		R	R	R	R	R	R	R	T
0.1	104				C	C	C			H	H	H	H	H	J		M	M	M	M	M	M	M	M		M	M	M	M	M	M	R	R		M	M	M	M	M	M	M	M
0.12	124																M	M	M	M	M	M	M			M	M	M	M	M	M	R	R		M	M	M	M	M	M	T	
0.15	154									H	H	H	H				M	M	M	M	M	M	M			R	R	R	R	R	R	R	R		P	P	P	P	P	P	T	
0.18	184																M	M	M	M	M	M	M			R	R	R	R	R	R	R	R		P	P	P	P	P	P	T	
0.22	224									I	I	I	I	I			M	M	M	M	M	M	M			R	R	R	R	R	R	R	R		Q	Q	Q	Q	Q	Q	T	
0.27	274										H	H					M	M	M	M	M	M	M			R	R	R	R	R	R				Q	Q	Q	Q	Q	Q	T	
0.33	334										H	H					M	M	M	M	M	M	M			R	R	R	R	R	R	R	R		Q	Q	Q	Q	Q	Q	T	
0.39	394																M	M	M	M	M	M	M			R	R	R	R	R	R				U	U	U	U	U	U	U	
0.47	474									H	H						M	M	M	M	M	M	M			R	R	R	R	R	R	R	R		U	U	U	U	U	U	U	
0.56	564																M	M	M	M						R	R	R	R	R	R				U	U	U	U	U	U	U	
0.68	684																M	M	M	M	M	M				R	R	R	R	R	R				U	U	U	U	U	U	U	
0.82	824																M	M	M	M						R	R	R	R						U	U	U	U	U	U	U	
1	105									H*	H*						M	M	M	M	M	M	N			R	R	R	R	R	R	R	R		T	T	T	T	T	T	T	
1.5	155																N	N	N							R	R	R	R	R	R				U	U	U	U	U	U		
2.2	225									I*1	I*1						L	L	L	O	O					R	R	R	R	R	R				A3	A3	A3	A3	A3	A3	U	
3.3	335																									R	R	R	R						U	U	U	U	U	U		
4.7	475																L	L	L	N						R	R	R	R	R	R				U	U	U	U	U	U	U	
6.8	685																									R	R	R							U	U	U	U	U			
10	106										J						N	N	N							Q	Q	Q	R						U	U	U	U	U	U		
22	226																									R	R								U	U	U					
33	336																																									
47	476																																									
100	107																																									
150	157																																									
220	227																																									

* L 1.0±0.10 | W 0.5±0.10
* 1 L 1.0±0.15 | W 0.5±0.15

MAX HEIGHT													
C	H	I	J	L	M	N	O	P	Q	R	A3	T	U
0.33	0.55	0.65	0.70	0.90	0.95	1.00	1.10	1.35	1.40	1.45	1.70	1.80	1.90

MS LEVEL 1

X7R

DIELECTRIC		X7R																																							
DIMENSION (MM)		GMC32									GMC40			GMC43						GMC45					GMC55						GMC57									
L(L1)		3.2 ± 0.3									4.57 ± 0.25			4.5 ± 0.35						4.5 ± 0.35					5.7 ± 0.4						5.7 ± 0.4									
W		2.5 ± 0.3									2.03 ± 0.25			3.2 ± 0.3						6.3 ± 0.4					5.0 ± 0.4						6.3 ± 0.4									
BW(L2/LW)		0.25 ~ 0.75									0.25 ~ 0.75			0.25 ~ 0.75						0.40 ~ 1.10					0.50 ~ 1.20						0.50 ~ 1.20									
RATED VOLTAGE		6.3	10	16	25	35	50	63	100	200	50	100	200	10	16	25	50	100	200	16	25	50	100	200	16	25	35	50	100	200	16	25	50	100	200						
CAP. RANGE	1000pF	102	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	1200	122	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	1500	152	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	1800	182	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	2200	222	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	2400	242	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	2700	272	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	3000	302	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	3300	332	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	3600	362	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	3900	392	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	4300	432	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	4700pF	472	O	O	O	O	O	O	O	O	O	R	R	R	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	5600	562	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	6800	682	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	8200	822	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.01uF	103	R	R	R	R	R	R	R	R	R	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.012	123	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.015	153	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.018	183	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.022	223	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.027	273	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.033	333	O	O	O	O	O	O	T	T	T	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.039	393	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.047	473	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.056	563	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.068	683	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.082	823	O	O	O	O	O	O	O	O	O	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.1	104	M	M	M	M	M	M	R	R	T	V	V	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.12	124	O	O	O	O	O	O	O	O	O	A1	A1	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.15	154	O	O	O	O	O	O	O	Y	Y	A1	A1	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.18	184	O	O	O	O	O	O	O	Y	Y	A1	A1	V	R	R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.22	224	O	O	O	O	O	O	O	O	R	A1	A1		R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.27	274	O	O	O	O	O	O	O	T	Y	A1	A1		R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.33	334	O	O	O	O	O	O	O	O	T	A1	A1		R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.39	394	O	O	O	O	R	R	Z	Z	Z	A1			R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.47	474	O	O	O	O	O	O	O	O	V	A1			R	R	R	R	R	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.56	564	R	R	R	R	R	R	R	Y	Y	A1			R	R	R	R	V	Y	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.68	684	O	O	O	O	O	O	O	T	Y	A1			R	R	R	V	V	Y	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	0.82	824	O	O	O	O	O	O	O	V					R	R	R	V	V	Y	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V						
	1	105	T	T	T	T	T	T	T	Y					V	V	V	V	V	Y	R	R	R	R	V	X	X	X	X	X	X	V	V	V	V	V						
	1.5	155	Z	Z	Z	Z	Z	Z	Z	Z					V	V	V	V	V		V	V	V	V	Y	V	V	V	V	V	V	Y	Y	Y	Y	Y						
	2.2	225	Y	Y	Y	Y	Y	Y	Y	Y					Y	Y	Y	Y	Y		V	V	V	V	Y	V	V	V	V	V	V	Y	Y	Y	Y	Y						
	3.3	335	Z	Z	Z	Z	Z	Z	Z	Z					Y	Y	Y	Y	Y		V	V	V	V		V	V	V	V	V		V	V	V	V						
	4.7	475	A3	A3	A3	A3	A3	A3	Z	Z					V	V	V	V	Y		V	V	V	V		V	V	V	V	V		V	V	V	V						
	6.8	685	Z	Z	Z	Z	Z								Y	Y	Y	Y			V	V	V	V		V	V	V	V	V		V	V	V	V						
	10	106	Z	Z	Z	Z	Z	Z	Y	Z					Y	Y	Y	Y			Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y	Y	Y						
	15	156	Y	Y	Y										A1	A1	A1									A1	A1														
	22	226	Y	Y	Y	Y									Y	Y	Y	A4								Y	Y	Y	Y	A4										
	33	336													Y	Y										V	V													
	47	476	Y	Y											A4	A4										X	X	A4												
																										A4	A4													
	100	107																																						

MAX HEIGHT

M	O	R	T	V	X	A3	Y	Z	A1	A4
0.95	1.10	1.45	1.80	2.2	2.5	2.7	2.8	2.9	3.1	3.4

X7S & X7T

DIELECTRIC		X7S																																																
DIMENSION (MM)		GMC02					GMC04						GMC10							GMC21								GMC31								GMC32								GMC43				GMC55		
L(L1)		0.6 ± 0.03					1.0 ± 0.05						1.6 ± 0.2							2.0 ± 0.3								3.2 ± 0.3								3.2 ± 0.3								4.5 ± 0.35				5.7 ± 0.4		
W		0.3 ± 0.03					0.5 ± 0.05						0.8 ± 0.2							1.25 ± 0.2								1.6 ± 0.2								2.5 ± 0.3								3.2 ± 0.33				5.0 ± 0.4		
BW (L2/LW)		0.25 ~ 0.75					0.1 ~ 0.35						0.1 ~ 0.4							0.25 ~ 0.75								0.25 ~ 0.75								0.25 ~ 0.75								0.25 ± 0.75				0.50 ~ 1.20		
RATED VOLTAGE		2.5	4	6.3	10	16	4/6.3	10	16	25	50	100	4/6.3	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100	4	6	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100	16	25	50	100	25	50	100
CAP. RANGE																																																		
1000pF	102						H	H	H	H	H	H	L	L	L	L	L	L	L																															
1500	152						H	H	H	H	H	H	L	L	L	L	L	L	L																															
2200	222						H	H	H	H	H	H	L	L	L	L	L	L	L																															
3300	332						H	H	H	H	H	H	L	L	L	L	L	L	L																															
4700pF	472						H	H	H	H	H	H	L	L	L	L	L	L	L																															
6800	682						H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.01uF	103						H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.022	223		C	C	C		H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.033	333						H	H	H	H	H		M	M	M	M	M	M	M																															
0.039	393						H	H	H	H	H		M	M	M	M	M	M	M																															
0.047	473		C	C	C		H	H	H	H	H		M	M	M	M	M	M	M																															
0.056	563						H	H	H	H	H		M	M	M	M	M	M	M																															
0.068	683						H	H	H	H	H		M	M	M	M	M	M	M																															
0.082	823						H	H	H	H			M	M	M	M	M	M	M																															
0.1	104		C	C	C	C	H	H	H	H			M	M	M	M	M	M	M																															
0.15	154												M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.22	224		D	D			I	I	I	I			M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.33	334						H	H	H				M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.47	474						H	H	H				M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.56	564												M	M	M					R	R	R	R	R																										
0.68	684						H	H					M	M	M	M	M			R	R	R	R	R	R	R																								
0.82	824												M	M	M					R	R	R	R																											
1	105	E	E	E			H	H					M	M	M	M	M			R	R	R	R	R	R	R	R																							
1.5	155						I	I					N	N	N					R	R	R	R	R	R	R		U	U	U	U	U	U	U	U															
2.2	225	H	H				J	J					L	L	N	N				R	R	R	R	R	R	R		U	U	U	U	U	U	U	U	Z	Z	Z	Z	Z	Z	Z	Z			Y	Y			
3.3	335												N	N						R	R	R	R	R				T	T	T	T	T	T	T	T	Z	Z	Z	Z	Z	Z	Z	Z			Y	Y			
4.7	475	H											L	L	N	N				R	R	R	R	R	R	R		U	U	U	U	U	U	U	U	Z	Z	Z	Z	Z	Z	Z	Z		V	V	Y			
6.8	685												N							R	R	R	R					U	U	U	U	U	U			Z	Z	Z	Z	Z	Z	Z	Z		Y	Y			V	V
10	106												N	N						R	R	R	R	R				U	U	U	U	U	U	U		Z	Z	Z	Z	Z	Y	Y	Y*			Y	Y		X	X
15	156																			R	R	R																											Y	Y
22	226																			R	R	R						U	U	U	U	U				Y	Y	Y	Y	Y				Y	A4	A4			Y	A1
33	336																											U	U							Y	Y	Y						Y						
47	476																											U	U							Y	Y	Y												
100	107																																			Y	Y	Y												

* L 3.20±0.40 I W 2.50±0.3

DIELECTRIC		X7T																																															
DIMENSION (MM)		GMC02					GMC04						GMC10							GMC21								GMC31								GMC32								GMC43				GMC55		
L(L1)		0.6 ± 0.03					1.0 ± 0.05						1.6 ± 0.2							2.0 ± 0.3								3.2 ± 0.3								3.2 ± 0.3								4.5 ± 0.35				5.7 ± 0.4		
W		0.3 ± 0.03					0.5 ± 0.05						0.8 ± 0.2							1.25 ± 0.2								1.6 ± 0.2								2.5 ± 0.3								3.2 ± 0.33				5.0 ± 0.4		
BW(L2/LW)		0.15 ~ 0.05					0.1 ~ 0.35						0.1 ~ 0.4							0.25 ~ 0.75								0.25 ~ 0.75								0.25 ~ 0.75								0.25 ± 0.75				0.50 ~ 1.20		
RATED VOLTAGE		2.5	4	6.3	10	16	4/6.3	10	16	25	50	100	4/6.3	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100	4	6	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100	16	35	50	100	25	50	100
CAP. RANGE																																																		
1000pF	102						H	H	H	H	H	H	L	L	L	L	L	L	L																															
1500	152						H	H	H	H	H	H	L	L	L	L	L	L	L																															
2200	222						H	H	H	H	H	H	L	L	L	L	L	L	L																															
3300	332						H	H	H	H	H	H	L	L	L	L	L	L	L																															
4700pF	472						H	H	H	H	H	H	L	L	L	L	L	L	L																															
6800	682						H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.01uF	103						H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.022	223		C	C	C		H	H	H	H	H	H	L	L	L	L	L	L	L																															
0.033	333						H	H	H	H	H		M	M	M	M	M	M	M																															
0.039	393						H	H	H	H	H		M	M	M	M	M	M	M																															
0.047	473		C	C	C		H	H	H	H	H		M	M	M	M	M	M	M																															
0.056	563						H	H	H	H	H		M	M	M	M	M	M	M																															
0.068	683						H	H	H	H	H		M	M	M	M	M	M	M																															
0.082	823						H	H	H	H			M	M	M	M	M	M	M																															
0.1	104		C	C	C	C	H	H	H	H			M	M	M	M	M	M	M																															
0.15	154												M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.22	224		D	D			I	I	I	I			M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.33	334						H	H	H				M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.47	474						H	H	H				M	M	M	M	M	M		R	R	R	R	R	R	R	R																							
0.56	564												M	M	M					R	R	R	R	R																										
0.68	684						H	H					M	M	M	M	M			R	R	R	R	R	R	R																								
0.82	824												M	M	M					R	R	R	R																											
1	105	E	E	E			H	H					M	M	M	M	M			R	R	R	R	R	R	R	R																							
1.5	155						I	I					N	N	N					R	R	R	R	R	R	R		U	U	U	U	U	U	U	U															
2.2	225	H	H				J	J					L	L	N	N				R	R	R	R	R	R	R		U	U	U	U	U	U	U	U	Z	Z	Z	Z	Z	Z	Z	Z			Y	Y			
3.3	335												N	N						R	R	R	R	R				T	T	T	T	T	T	T	T	Z	Z	Z	Z	Z	Z	Z	Z			Y	Y			
4.7	475	H											L	L	N	N				R	R	R	R	R	R	R		U	U	U	U	U	U	U	U	Z	Z	Z	Z	Z	Z	Z	Z		V	V	Y			
6.8	685												N							R	R	R	R					U	U	U	U	U	U			Z	Z	Z	Z	Z	Z	Z	Z		Y	Y			V	V
10	106												N	N						R	R	R	R	R				U	U	U	U	U	U	U		Z	Z	Z	Z	Z	Y	Y	Y			Y	Y		X	X
15	156																			R	R	R																											Y	Y
22	226																			R	R	R						U	U	U	U	U				Y	Y	Y	Y	Y				Y	A4	A4			Y	A1
33	336																											U	U							Y	Y	Y						Y						
47	476																											U	U							Y	Y	Y												
100	107																																			Y	Y	Y												

MAX HEIGHT																		
C	D	E	H	I	J	L	M	N	P	R	T	U	V	X	Y	Z	A1	A4
0.33	0.35	0.39	0.55	0.65	0.70	0.90	0.95	1.00	1.35	1.45	1.80	1.90	2.2	2.5	2.8	2.9	3.1	3.4

Cal-Chip Electronics Inc.

X6S

DIELECTRIC: X6S

DIMENSION (MM)		GMC02						GMC04						
L(L1)		0.6 ± 0.03						1.0 ± 0.05						
W		0.3 ± 0.03						0.5 ± 0.05						
BW(L2/LW)		0.15 ± 0.05						0.1 ~ 0.35						
RATED VOLTAGE		4	6.3	10	16	25	35	4	6.3	10	16	25	35	50
2200	222	C	C	C	C	C								
4700pF	472	C	C	C	C	C								
0.01uF	103	C	C	C	C	C		H	H	H	H	H	H	H
0.012	123	C	C					H	H	H	H	H	H	H
0.015	153	C	C					H	H	H	H	H	H	H
0.018	183	C	C					H	H	H	H	H	H	H
0.022	223	C	C	C	C	C		H	H	H	H	H	H	H
0.027	273	C	C	C	C			H	H	H	H	H		
0.033	333	C	C	C	C			H	H	H	H	H	H	H
0.039	393	C	C											
0.047	473	C	C	C	C			H	H	H	H	H	H	H
0.056	563	C	C					H	H	H	H	H	J	J
0.068	683							H	H	H	H	H	J	J
0.082	823							H	H	H	H	H	J	J
0.1	104	C	C	C	C			H	H	H	H	H	J	J
0.12	124							H	H					
0.15	154							H	H	H	H			
0.18	184							H	H					
0.22	224	C	C					I	I	I	I	I	I	
0.27	274							H	H					
0.33	334							H	H	H	H			
0.39	394							H	H					
0.47	474	E	E	E	E			H	H	H	H			
0.56	564							H	H					
0.68	684							H	H	H	H			
0.82	824							H	H					
1	105	E	E	E	E			H	H	J	J	J	J	
1.5	155													
2.2	225	H	H					J	J	J	J	J		
2.7	275													
3.3	335													
3.9	395													
4.7	475							I	I					
6.8	685													
10	106							J	J	J				
15	156													
22	226							K						
33	336													
47	476													
68	686													
100	107													
150	157													
220	227													
330	337													

DIMENSION (MM)		GMC10							GMC21						
L(L1)		1.6 ± 0.2							2.0 ± 0.3						
W		0.8 ± 0.2							1.25 ± 0.2						
BW(L2/LW)		0.1 ~ 0.4							0.25 ~ 0.75						
RATED VOLTAGE		4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
2200	222														
4700pF	472														
0.01uF	103														
0.012	123														
0.015	153														
0.018	183														
0.022	223														
0.027	273														
0.033	333														
0.039	393														
0.047	473														
0.056	563														
0.068	683														
0.082	823														
0.1	104														
0.12	124														
0.15	154	M	M	M	M	M	M	M							
0.18	184	M	M	M	M	M									
0.22	224	M	M	M	M	M	M	M							
0.27	274	M	M	M	M										
0.33	334	M	M	M	M	M	M	M							
0.39	394	M	M	M	M	M									
0.47	474	M	M	M	M	M	M	M	R	R	R	R	R	R	R
0.56	564	M	M	M	M				R	R	R	R			
0.68	684	M	M	M	M	M	M	M	R	R	R	R	R	R	R
0.82	824	M	M	M	M				R	R	R	R			
1	105	M	M	M	M	M	M	M	R	R	R	R	R	R	R
1.5	155	N	N	N	N				R	R	R	R	R	R	R
2.2	225	N	N	N	N				R	R	R	R	R	R	R
2.7	275														
3.3	335	N	N	N	N				R	R	R	R	R	R	R
3.9	395														
4.7	475	L	L	L	N	N			R	R	R	R	R	R	R
6.8	685	N	N	N					R	R	R	R			
10	106	N	N	N	N				R	R	R	R	R	R	
15	156								R	R	R	R			
22	226	N	N	N					R	R	R	R			
33	336								R						
47	476	N							R	R					
68	686														
100	107								R						
150	157														
220	227														
330	337														

DIMENSION (MM)		GMC31									GMC32								GMC43						
L(L1)		3.2 ± 0.3									3.2 ± 0.30								4.5 ± 0.35						
W		1.6 ± 0.2									2.5 ± 0.30								3.2 ± 0.30						
BW(L2/LW)		0.25 ~ 0.75									0.75 ± 0.25								0.25 ~ 0.75						
RATED VOLTAGE		2.5	4	6.3	10	16	25	35	50	100	2.5	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
2200	222																								
4700pF	472																								
0.01uF	103																								
0.012	123																								
0.015	153																								
0.018	183																								
0.022	223																								
0.027	273																								
0.033	333																								
0.039	393																								
0.047	473																								
0.056	563																								
0.068	683																								
0.082	823																								
0.1	104																								
0.12	124																								
0.15	154																								
0.18	184																								
0.22	224																								
0.27	274																								
0.33	334																								
0.39	394																								
0.47	474																								
0.56	564																								
0.68	684																								
0.82	824																								
1	105		T	T	T	T	T	T	T	T															
1.5	155		U	U	U	U	U	U	U	U															
2.2	225		U	U	U	U	U	U	U	U															
2.7	275																								
3.3	335		U	U	U	U	U	U	U							Z	Z	Z							
3.9	395																								
4.7	475		U	U	U	U	U	U	U	U						Z	Z	Z							
6.8	685		U	U	U	U	U	U								Z	Z	Z							
10	106		U	U	U	U	U	U	U	U				Z	Z	Z	Z	Z							
15	156		U	U	U	U																			
22	226		U	U	U	U	U							Y	Y	Y									
33	336		U	U	U																				
47	476		U	U	U								Y	Y	Y										
68	686		U																						
100	107		U	U							Z	Z	Z	Z					A1	A1					
150	157		U								Z	Z													
220	227	U	U								Z	Z	Z												
330	337										Z	Z													

CAPACITANCE RANGE

MAX HEIGHT

C	E	H	I	J	K	L	M	N	R	T	U	Y	Z	A1
0.33	0.39	0.55	0.65	0.70	0.80	0.90	0.95	1.00	1.45	1.80	1.90	2.8	2.9	3.1

X5R

DIELECTRIC		X5R																																			
DIMENSION (MM)		GMC01				GMC02							GMC04								GMC10								GMC21							
L(L1)		0.4 ± 0.02				0.6 ± 0.03							1.0 ± 0.05								1.6 ± 0.2								2.0 ± 0.3							
W		0.2 ± 0.02				0.3 ± 0.03							0.5 ± 0.05								0.8 ± 0.2								1.25 ± 0.2							
BW(L2/LW)		0.07 ~ 0.14				0.15 ± 0.05							0.1 ~ 0.35								0.1 ~ 0.4								0.25 ~ 0.75							
RATED VOLTAGE		4	6.3	10	16	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	63	100	4	6.3	10	16	25	35	50	100	4	6.3	10	16	25	35	50	100
CAP. RANGE	1000pF	102	A	A	A	A	C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	1200	122	A	A			C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	1500	152	A	A	A	A	C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	1800	182	A	A			C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	2200	222	A	A	A	A	C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	2700	272	A	A			C	C	C	C	C			H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	3300	332	A	A	A		C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	3900	392	A	A			C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	4700pF	472	A	A	A	A	C	C	C	C	C	C		H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	5600	562	A	A	A		C	C	C	C	C			H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	6800	682	A	A	A	A	C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	8200	822	A	A			C	C	C	C	C	C		H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.01uF	103	A	A	A	A	C	C	C	C	C	C	C	H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.012	123					C	C	C	C				H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.015	153	A	A			C	C	C	C				H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.018	183					C	C	C	C				H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.02	203																					L	L	L	L	L	L	L	L								
	0.022	223	A	A			C	C	C	C	C			H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.027	273	A	A			C	C	C	C				H	H	H	H	H	H	H			L	L	L	L	L	L	L	L								
	0.033	333	A	A			C	C	C	C				H	H	H	H	H	H	H			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	0.039	393					C	C	C	C				H	H	H	H	H	H	H			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	0.047	473	A	A			C	C	C	C				H	H	H	H	H	H	H			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	R
	0.056	563					C	C	C	C				H	H	H	H	H	J	J			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	R
	0.068	683	A	A			C	C	C	C				J	J	J	J	J	J	J			M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	R
	0.082	823					C	C	C	C				H	H	H	H	H	J	J			M	M	M	M	M	M	M		M	M	M	M	M	M	M	R
	0.1	104	A	A	A		C	C	C	C	C	C		H	H	H	H	H	J	J		H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	R
	0.12	124					C	C	C					H	H	H							M	M	M	M	M	M	M		M	M	M	M	M	M	R	
	0.15	154					C	C	C	C	D			H	H	H	H	H					M	M	M	M	M	M	M		R	R	R	R	R	R	R	
	0.18	184												H	H	H							M	M	M	M	M				R	R	R	R	R	R	R	
	0.22	224	A	A			C	C	C	C	D			I	I	I	I	I	H	H	H		M	M	M	M	M	M	M		R	R	R	R	R	R	R	R
	0.27	274	A	A										H	H	H							M	M	M	M					R	R	R	R	R	R	R	
	0.33	334					E	E	E					H	H	H	H	H	H				M	M	M	M	M	M	M		R	R	R	R	R	R	R	R
	0.39	394												H	H	H							M	M	M	M					R	R	R	R	R	R	R	
	0.47	474	B				C	C	C	E*				J	J	J	J	J	J	J			M	M	M	M	M	M	M		R	R	R	R	R	R	R	R
	0.56	564												H	H	H							M	M	M	M					R	R	R	R	R			
	0.68	684												H	H	H	H	H	H				M	M	M	M	M	M			R	R	R	R	R	R	R	
	0.82	824												H	H	H							M	M	M	M					R	R	R	R	R			
	1	105	F	F			C*	C*	C*	C*				H	H	H	H	H	H	H			M	M	M	M	M	M	M		R	R	R	R	R	R	R	R
	1.5	155					C	C															N	N	N	N					R	R	R	R	R			
	2.2	225					E*	E*	E*					I	I	I	I	I	I				N	N	N	N	N	N	N		R	R	R	R	R	R	R	
	3.3	335												H	J#	J#							N	N	N						R	R	R	R	R	R	R	
	4.7	475					H*	H*						J*	J*	J*	J*						N	N	N	N	N	N			R	R	R	R	R	R	R	R
	6.8	685																													R	R	R	R	R	R	R	
	10	106					H*							K*	K*	K*							N	N	N	N	N	N			R	R	R	R	R	R	S	
	15	156												H	H								N	N	N						R	R	R	R	R	R		
	18	186												I*	I*																								
	22	226												K*	K*	K*							N	N	N	N					R	R	R	R	R	R		
	33	336																													R	R	R					
	47	476																					N*	N*	N*						R	R	R					
	100	107																													R	R						

GMC02 - * L 0.6 ± 0.09 I W 0.3 ± 0.09
GMC04 - * L 1.00 ± 0.2 I W 0.5 ± 0.2
GMC04- # L 1.00-0.05/+0.2 / W 0.50-0.05/+0.2
GMC10 - * L1.6 ± 0.3 I W0.8+/-0.3

MAX HEIGHT

A	B	C	D	E	F	H	I	J	K	L	M	N	R	S
0.22	0.25	0.33	0.35	0.39	0.45	0.55	0.65	0.70	0.80	0.90	0.95	1.00	1.45	1.5

MS LEVEL 1

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X5R

DIELECTRIC		X5R																												
DIMENSION (MM)		GMC31								GMC32									GMC43							GMC55					
L(L1)		3.2 ± 0.3								3.2 ± 0.3									4.5 ± 0.35							5.7 ± 0.4					
W		1.6 ±0.2								2.5 ± 0.3									3.2 ± 0.3							5.0 ± 0.4					
BW(L2/LW)		0.25 ~ 0.75								0.25 ~ 0.75									0.25 ~ 0.75							0.50 ~ 1.2					
RATED VOLTAGE		4	6.3	10	16	25	35	50	100	4	6.3	10	16	25	35	50	63	100	6.3	10	16	25	35	50	100	6.3	10	16	25	50	100
CAP. RANGE	0.1	104	M	M	M	M	M	M	M	M	V	V	V	V	V	V	V	V	V												
	0.12	124	M	M	M	M	M	M	M	M	O	O	O	O	O	O	O	O	O												
	0.15	154	P	P	P	P	P	P	P	T	O	O	O	O	O	O	O	O	Y												
	0.18	184	P	P	P	P	P	P	P	T	O	O	O	O	O	O	O	O	Y												
	0.22	224	Q	Q	Q	Q	Q	Q	Q	T	O	O	O	O	O	O	O	O	O												
	0.27	274	Q	Q	Q	Q	Q	Q	Q	T	O	O	O	O	O	O	O	O	T												
	0.33	334	Q	Q	Q	Q	Q	Q	Q	T	O	O	O	O	O	O	O	O	O												
	0.39	394	U	U	U	U	U	U	U	U	O	O	O	O	O	R	R	Y	Y												
	0.47	474	U	U	U	U	U	U	U	U	O	O	O	O	O	O	O	O	O												
	0.56	564	U	U	U	U	U	U	U	U	R	R	R	R	R	R	R	R	Y												
	0.68	684	U	U	U	U	U	U	U	U	O	O	O	O	O	O	O	O	T												
	0.82	824	U	U	U	U	U	U	U	U	O	O	O	O	O	O	O	O	V												
	1	105	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	Y												
	1.5	155	U	U	U	U	U	U	U		Z	Z	Z	Z	Z	Z	Z	Z	Z												
	2.2	225	U	U	U	U	U	U	U	U	Y	Y	Y	Y	Y	Y	Y	Y	Y												
	3.3	335	U	U	U	U	U	U	U		Z	Z	Z	Z	Z	Z	Z	Z	Z	Y	Y	Y	Y	Y	Y	Y	V	V	V	V	V	V
	4.7	475	U	U	U	U	U	U	U	U	Z	Z	Z	Z	Z	Z	Z	Z	Z	V	V	V	V	V	V	Y	V	V	V	V	V	V
	6.8	685	U	U	U	U	U	U			Z	Z	Z	Z	Z					Y	Y	Y	Y	Y	Y		V	V	V	V	V	V
	10	106	U	U	U	U	U	U	U		Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y
	15	156	T	T	T	T	T	T			Y	Y	Y	Y						A1	A1	A1	A1				A1	A1	A1			
	22	226	T	T	T	T	T	T			Y	Y	Y	Y	Y					Y	Y	Y	Y				Y	Y	Y	Y	Y	
	33	336	T	T	T	T	T				V	V	V							Y	Y	Y					V	V	V			
	47	476	T	T	T	T	T				A3	A3	A3	A3	Y					A1	A1	A4					X	X	X	X		
	68	686	U	U	U						V	V								A1	A1						X	X				
	100	107	T	T	T						Y	Y	Y	Y						A1	A1						A1	A1				
	220	227	U*	U*							Y	Y	Y																			
	330	337									Y	Y																				

GMC31 - * L3.2 ± 0.3 | W1.6+/-0.3

MAX HEIGHT

M	O	P	Q	R	T	U	V	X	A3	Y	Z	A1	A4
0.95	1.1	1.35	1.40	1.45	1.80	1.90	2.2	2.5	2.7	2.8	2.9	3.1	3.4

Y5V

DIELECTRIC		Y5V/Z5U																																				
DIMENSION (MM)		GMC02	GMC04					GMC10					GMC21					GMC31					GMC32					GMC43					GMC55						
L(L1)		0.6 ± 0.03	1.0 ± 0.05					1.6 ± 0.2					2.0 ± 0.3					3.2 ± 0.3					3.2 ± 0.3					4.5 ± 0.35					5.7 ± 0.4						
W		0.3 ± 0.03	0.5 ± 0.05					0.8 ± 0.2					1.25 ± 0.2					1.6 ± 0.2					2.5 ± 0.3					3.2 ± 0.3					5.0 ± 0.4						
BW(L2/LW)		0.15 ± 0.05	0.1~0.35					0.1 ~ 0.4					0.25 ~ 0.75					0.25 ~ 0.75					0.25 ~ 0.75					0.25 ~ 0.75					0.50 ~ 1.20						
RATED VOLTAGE		6.3/10	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50		
0.01uF	103	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	R	R	R	R	R											
0.012	123	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.015	153	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.018	183	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.02	203	C											M	M	M	M	M						O	O	O	O	O											
0.022	223	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.027	273	C	H	H	H	H	H	L	L	L	L	L	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.03	303	C											M	M	M	M	M						O	O	O	O	O											
0.033	333	C	H	H	H	H	H	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.039	393	C	H	H	H	H	H	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O											
0.047	473	C	H	H	H	H	H	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O	R	R	R	R	R						
0.056	563	C	H	H	H	H	J	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O	R	R	R	R	R						
0.068	683	C	J	J	J	J	J	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.082	823	C	H	H	H	H	J	M	M	M	M	M	M	M	M	M	M	R	R	R	R	R	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.1	104	C	H	H	H	H	J	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	V	V	V	V	V	R	R	R	R	R	V	V	V	V	V	
0.12	124		H	H	H	H	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.15	154		H	H	H	H		M	M	M	M	M	R	R	R	R	R	P	P	P	P	P	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.18	184		H	H	H	H							R	R	R	R	R	P	P	P	P	P	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.22	224		I	I	I	I		M	M	M	M	M	R	R	R	R	R	Q	Q	Q	Q	Q	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.27	274		H	H	H			M	M	M	M	M	R	R	R	R	R	Q	Q	Q	Q	Q	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.33	334		H	H	H			M	M	M	M	M	R	R	R	R	R	Q	Q	Q	Q	Q	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.39	394		H	H	H			M	M	M	M	M	R	R	R	R	R	U	U	U	U	U	O	O	O	R	R	R	R	R	R	R	V	V	V	V	V	
0.47	474		H	H	H			M	M	M	M	M	R	R	R	R	R	U	U	U	U	U	O	O	O	O	O	R	R	R	R	R	V	V	V	V	V	
0.56	564		H	H	H			M	M	M	M	M	R	R	R	R	R	U	U	U	U	U	R	R	R	R	R	R	R	R	R	R	V	V	V	V	V	
0.68	684		H	H	H			M	M	M	M	M	R	R	R	R	R	U	U	U	U	U	O	O	O	O	O	R	R	R	R	V	V	V	V	V	V	
0.82	824		H	H	H			M	M	M	M	M	R	R	R	R	R	U	U	U	U	U	O	O	O	O	O	R	R	R	R	V	V	V	V	V	V	
1	105		H	H	H	H		M	M	M	M	M	R	R	R	R	R	T	T	T	T	T	T	T	T	T	T	V	V	V	V	V	V	V	V	V	V	
1.2	125																	U	U	U	U	U	Z	Z	Z	Z	Z	V	V	V	V	V	V	V	V	V	V	
1.5	155																	U	U	U	U	U	Z	Z	Z	Z	Z	V	V	V	V	V	V	V	V	V	V	
2.2	225							M	M	M			R	R	R	R	R	U	U	U	U	U	Z	Z	Z	Z	Z	Y	Y	Y	Y	Y	V	V	V	V	V	
2.7	275																																V	V	V	V	V	
3.3	335												R	R	R	R	R	U	U	U	U	U	Z	Z	Z	Z	Z	Y	Y	Y	Y	Y	V	V	V	V	V	
4.7	475							M	M				R	R	R	R	R	U	U	U	U	U	Z	Z	Z	Z	Z	V	V	V	V	V	V	V	V	V	V	
5.6	565																																V	V	V	V	V	
6.8	685												R	R	R			U	U	U	U	U	Z	Z	Z	Z		Y	Y	Y	Y	Y	V	V	V	V	V	
8.2	825																						Z	Z	Z	Z	Z											
10	106												R	R	R			U	U	U	U	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
15	156																						Y	Y	Y			A1	A1	A1	A1		A1	A1	A1			
22	226							N	N				R	R	R			T	T	T			Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	
33	336																	T	T				V	V				Y	Y	Y			V	V	V			
47	476							N					R	R				T	T				Y	Y	Y	Y		A1	A1	A1			X	X	X	X		
68	686																	T	T									A1					X	X				
100	107																	T	T				Y	Y				A1	A1				A1	A1	A1			
220	227																																					
330	337																																					

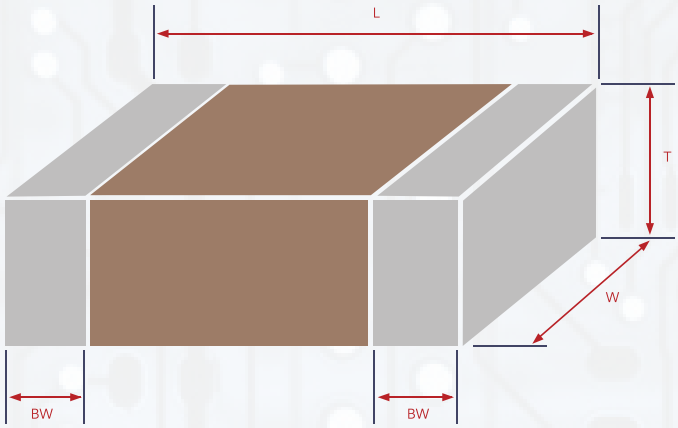
MAX HEIGHT

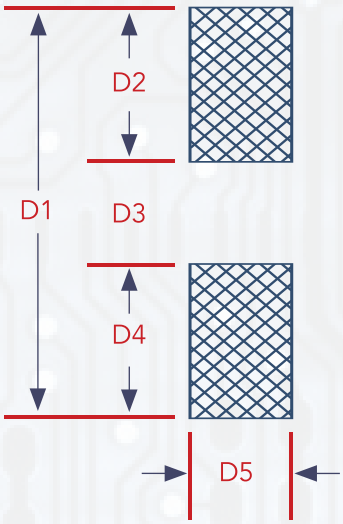
C	H	I	L	M	N	O	P	Q	R	T	U	V	X	Y	Z	A1
0.33	0.55	0.65	0.90	0.95	1.00	1.10	1.35	1.40	1.45	1.80	1.90	2.20	2.5	2.8	2.9	3.1

MS LEVEL 1

Cal-Chip Electronics Inc.
59 Steamwhistle Drive, Ivyland, PA 18974 | p. 215.942.8900 | www.calchip.com | quotes@calchip.com

LAND PATTERN & DIMENSIONS

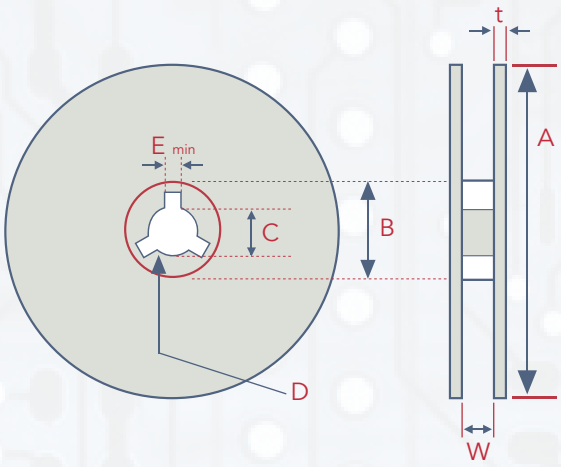




CASE SIZE	D1	D2	D3	D4	D5
0201 (0603)	0.85 (0.033)	0.30 (0.012)	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)
0402 (1005)	1.70 (0.067)	0.60 (0.024)	0.50 (0.020)	0.60 (0.024)	0.50 (0.020)
0603 (1608)	2.30 (0.091)	0.80 (0.031)	0.70 (0.028)	0.80 (0.031)	0.75 (0.030)
0805 (2012)	3.00 (0.118)	1.00 (0.039)	1.00 (0.039)	1.00 (0.039)	1.25 (0.049)
1206 (3216)	4.00 (0.157)	1.00 (0.039)	2.00 (0.079)	1.00 (0.039)	1.60 (0.063)
1210 (3225)	4.00 (0.157)	1.00 (0.039)	2.00 (0.079)	1.00 (0.039)	2.50 (0.098)
1808 (1808)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	2.00 (0.079)
1812 (4532)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	3.00 (0.118)
1825 (4564)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	6.35 (0.250)
2220 (5750)	6.60 (0.260)	1.00 (0.039)	4.60 (0.181)	1.00 (0.039)	5.00 (0.197)
2225 (5763)	6.60 (0.260)	1.00 (0.039)	4.60 (0.181)	1.00 (0.039)	6.35 (0.250)

PACKAGING (TAPING)

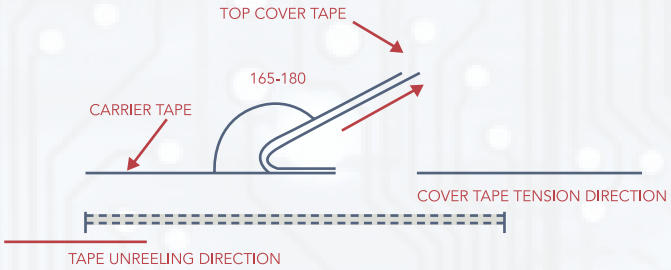
- Per EIA-481 - Reel Type Size

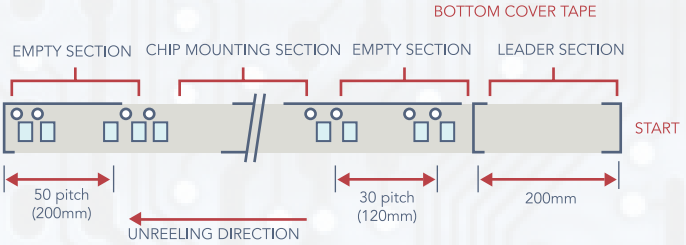


UNIT: MM

SYMBOL	TAPE WIDTH	A	B	C	D	E	W	t
7" Reel	8mm	Ø178±2.0	MINØ50	Ø13±0.5	21±0.8	2.0±0.5	10±0.5	0.9±0.2
	12mm	Ø178±2.0	MINØ50	Ø13±0.5	21±0.8	2.0±0.5	13±0.5	1.2±0.2
10" Reel	8mm	Ø258±2.0	MINØ70	Ø13±0.5	21±0.8	2.0±0.5	10±0.5	1.8±0.2
13" Reel	8mm	Ø330±2.0	MINØ70	Ø13±0.5	21±0.8	2.0±0.5	10±0.5	1.8±0.2
	12mm	Ø330±2.0	MINØ70	Ø13±0.5	21±0.8	2.0±0.5	13±0.5	2.2±0.2

- Carrier Tape (Standard)





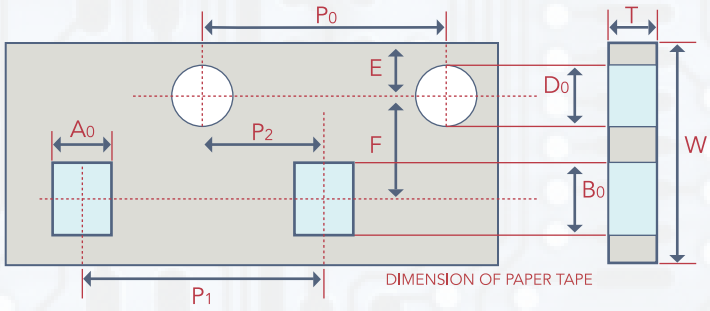
- To peel off the cover tape by the method shown in the right figure apply a peel-off force of 20GF - 60GF (card board); 10GF - 75GF (plastic tape).

- The cover tape should not touch the top or bottom of the chip.

- If the cover tape has been peeled off it may be difficult to remove the chip due to punch-hole clearance, dirt, and debris. Make sure therefore that no paper waste will adhere to and block the absorption nozzle.

- If the cover tape has been peeled off from the top, stick it back on with a suitable adhesive.

- Follow the illustration for the start and end of the winding operation.



CARDBOARD CARRIER TAPE FOR 01005, 0201, 0402, 0603, 0805, 1206

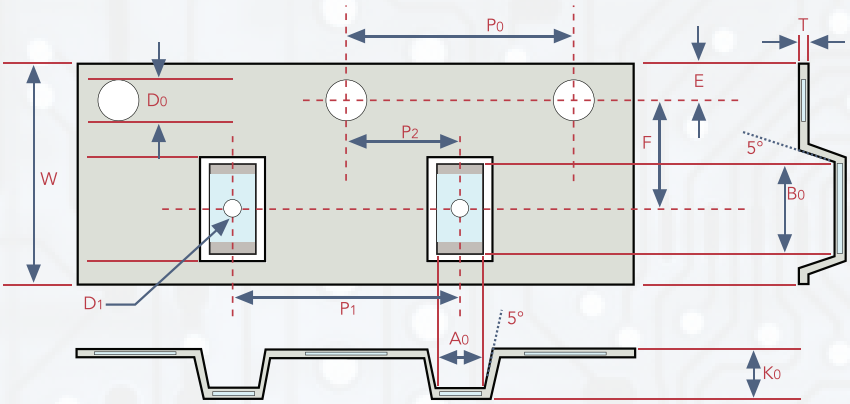
UNIT: MM

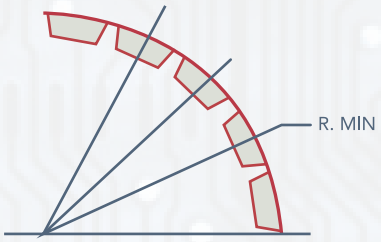
TYPE	A_0	B_0	T	K_0	W	P_0	$10XP_0$	P_1	P_2	D_0	D1	E	F	MOUNTING HOLE	STD. REEL QTY 7"	OPTIONAL REEL QTY (10/13")
1005	0.25±0.04	0.45±0.04	0.36±0.05	*	8.0±0.30	4.0±0.10	40.0±0.10	2.0±0.5	2.0±0.5	1.5±0.1	*	1.75±0.1	3.5±0.05	Angular Punch Hole	20,000	50,000 D
0201	0.39±0.07	0.69±0.07	<0.50	*	8.0±0.10	4.0±0.10	40.0±0.10	2.0±0.5	2.0±0.5	1.55±0.05	*	1.75±0.05	3.5±0.05		10,000 15,000	50,000 D
0402	0.7±0.20	1.2±0.20	<0.80	*	8.0±0.10	4.0±0.10	40.0±0.10	2.0±0.5	2.0±0.5	1.55±0.05	*	1.75±0.05	3.5±0.05		10,000	20,000 C 40,000 D 50,000 G
0603	1.1±0.20	1.9±0.20	<1.20	*	8.0±0.10	4.0±0.10	40.0±0.10	4.0±0.5	4.0±0.5	1.55±0.05	*	1.75±0.05	3.5±0.05		4,000	10,000 D 15,000 G
0805	1.65±0.20	2.4±0.20	<1.30	*	8.0±0.10	4.0±0.10	40.0±0.10	4.0±0.5	4.0±0.5	1.55±0.05	*	1.75±0.05	3.5±0.05		4,000	10,000 D 15,000 G 20,000 Q
1206	2.0±0.20	3.6±0.20	<1.30	*	8.0±0.10	4.0±0.10	40.0±0.10	4.0±0.5	4.0±0.5	1.55±0.05	*	1.75±0.05	3.5±0.05		4,000	10,000 D 15,000 G 20,000 Q

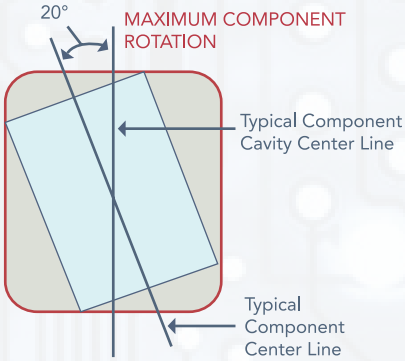
MS LEVEL 1

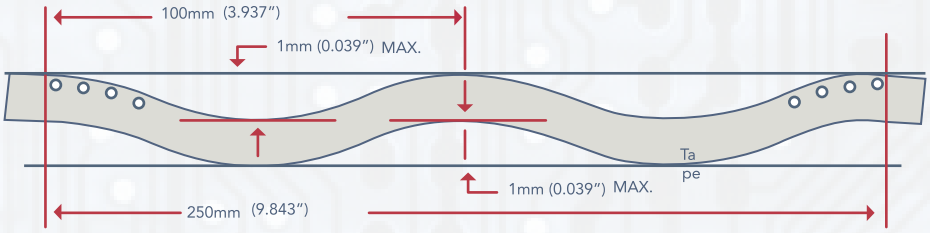
PACKAGING (TAPING)

- Tape & Reel Dimensions









Embossed plastic carrier tape for 0805/1206/1210/1808/1812/1825/2220 AND 2225 type

TYPE	A_0	B_0	T	K_0	W	P_0	$10XP_0$	P_1	P_2	D_0	D_1	E	F	MOUNTING HOLE	STD. REEL QTY 7"	OPTIONAL REEL QTY (10/13")
0805	<1.80	<2.70	0.23±0.10	<2.50	8.0±0.20	4.0±0.10	40.0±0.20	4.0±0.10	2.0±0.05	1.5±0.10	1.0±0.10	1.75±0.10	3.5±0.05	Angular Punch Hole	2,000 3,000	10,000 D 15,000 G
1206	<2.30	<4.00	0.23±0.10	<2.50	8.0±0.20	4.0±0.10	40.0±0.20	4.0±0.10	2.0±0.05	1.5±0.10	1.0±0.10	1.75±0.10	3.5±0.05		2,000 3,000	8,000 D 10,000 G
1210	<3.20	<3.95	0.23±0.10	<3.00	8.0±0.20	4.0±0.10	40.0±0.20	4.0±0.10	2.0±0.05	1.5±0.10	1.0±0.10	1.75±0.10	3.5±0.05		500 1,000 2,000 3,000	4,000 D 8,000 G
1808	<2.50	<5.30	0.25±0.10	<2.50	12.0±0.20	4.0±0.10	40.0±0.20	4.0±0.10	2.0±0.05	1.5±0.10	1.0±0.10	1.75±0.10	5.5±0.10		1,000 2,000 3,000	
1812	<3.90	<5.30	0.25±0.10	<3.50	12.0±0.20	4.0±0.10	40.0±0.20	8.0±0.10	2.0±0.05	1.5±0.10	1.5±0.10	1.75±0.10	5.5±0.10		500 1,000	3,000 D
1825	<6.80	<5.30	0.30±0.10	<3.10	12.0±0.20	4.0±0.10	40.0±0.20	8.0±0.10	2.0±0.05	1.5±0.10	1.5±0.10	1.75±0.10	5.5±0.10		500 1,000	
2220	<5.80	<6.50	0.30±0.10	<3.10	12.0±0.20	4.0±0.10	40.0±0.20	8.0±0.10	2.0±0.05	1.5±0.10	1.5±0.10	1.75±0.10	5.5±0.10		500 700 1,000	1,000 D
2225	<6.80	<6.50	0.30±0.10	<3.10	12.0±0.20	4.0±0.10	40.0±0.20	8.0±0.10	2.0±0.05	1.5±0.10	1.5±0.10	1.75±0.10	5.5±0.10		500 700	

WARRANTY:
All passive components supplied by Cal-Chip Electronics, Inc. 59 Steamwhistle Drive, Ivyland, PA. 18974, are under warranty for a period of 2 years from the date of manufacture. Product will meet or exceed all reliability and test specifications expressed by Cal-Chip for the above mentioned time period provided storage conditions (stated below) are met. Product Storage Instructions:

1) Product must be kept away from direct sunlight.
2) Product must be stored in the following conditions - Temperature; 5 to 35 degrees Celsius / 40 to 95 degrees Fahrenheit Humidity; 45 to 85%
3) Product to be kept free of moisture, dirt and debris.

WHEN THESE CONDITIONS ARE NOT MET, PRODUCT LIFE COULD BE SHORTENED***

NOTICE: Specifications are subject to change without notice. Contact your nearest Cal-Chip Sales Office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable, but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required. Specifications are typical and may not apply to all applications.

BARCODE LABEL