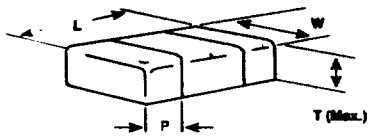
STYLE VJ0805
Monolithic Ceramic Chip Capacitors

VISHAY Vitramon



FEATURES

Vitramon® proprietary "Wet fabrication" process for manufacturing ceramic chip capacitors results in maximum capacitance per unit area. A full range of dielectrics and voltage ratings is available in industry standard E.I.A. 0805 size chips.

E.I.A. TYPE	STYLE	LENGTH (L)	WIDTH (W)	TERM. (P)	
				Min.	Max.
0805	VJ0805	.079 ± .008 [2.00 ± 0.2]	.049 ± .008 [1.24 ± 0.2]	.010 [0.25]	028 [0.71]

* See the Selector Guide on the next page for complete details on Thickness (T).

VJ0805	**Style**
Y	**Temperature Characteristic:** A = NPO, Y = X7R, U = Z5U, V = Y5V, X = BX, H = X8R.
104	**Capacitance:** Expressed in picofarads (pF). The first two digits are significant figures. The last digit is the number of zeros to follow. **Example:** Capacitance Code 104 = 100,000 pF. An "R" denotes a decimal point in which case all figures are significant.
K	**Capacitance Tolerance:*** NPO Dielectric: Tolerance: / For Capacitance Values: B = ± .10 pF. / 1 - 10 pF C = ± .25 pF. / 1 - 25 pF D = ± .50 pF. / 1 - 50 pF E = ± 0.5 %. / ≥ 20 pF F = ± 1%. / ≥ 10 pF G = ± 2%. / ≥ 5 pF J = ± 5%. / ≥ 2 pF K = ± 10%. / ≥ 1 pF X7R, X8R & BX Dielectric: (For All Capacitance Values) J = ± 5%. K = ± 10%. M = ± 20%. Z5U & Y5V Dielectric: (For All Capacitance Values) M = ± 20%. Z = + 80%, - 20%. P = + 100%, - 0%.
X	**Termination Material:** X = Nickel Barrier, Tin Plated Finish. F = Palladium-Silver.
X	**Voltage:** J = 16 V, X = 25 V, A = 50 V, B = 100 V, C = 200 V, E = 500 V.
M	**Marking Option:** A = No Marking. M = Marked with Vendor I.D. (V) plus E.I.A. capacitance code. Example: VJ0805Y104KXXMT is laser marked "VA5".
T	**Packaging Options:** Tape and Reel Packaging per EIA-481A: (Reels are plastic.) T = 7" Reel, Plastic Tape. C = 7" Reel, Paper Tape. R = 10 3/4" Reel, Plastic Tape. P = 10 3/4" Reel, Paper Tape. Bulk Packaging: B = Bulk, Plastic Vials. G = Cassettes.

* Special tolerances are available upon request.

GENERAL SPECIFICATIONS

Electrical characteristics @ + 25°C unless otherwise specified.

Capacitance Range: See Selector Guide.

Temperature Characteristic: (Specified at 0 Vdc.)
NPO: 0 ± 30PPM/°C.
X7R: ± 15%.
Z5U: + 22%, - 56%.
Y5V: + 22%, - 82%.
BX: ± 15% @ 0 Vdc. +15%, - 25% @ rated voltage.
X8R: ± 15%.

Operating Temperature Range:
NPO: - 55°C to + 125°C.
X7R: - 55°C to + 125°C.
Z5U: + 10°C to + 85°C.
Y5V: - 30°C to + 85°C.
BX: - 55°C to + 125°C.
X8R: - 55°C to + 150°C.

Voltage Ratings: Specified at maximum operating temperature.

Dissipation Factor:
NPO: 0.1% max.
X7R: 2.5% max., except 16 and 25 volt ratings, 3.5% max.
Z5U: 3.0% max.
Y5V: 3.5% max.
BX & X8R: 2.5% max.
Measured at 1 Vrms, 1 kHz except for NPO values ≤ 1000 pF measured at 1 MHz. Z5U and Y5V values are measured at 0.5 Vrms, 1 kHZ.

Insulation Resistance:
NPO, X7R, BX and X8R:
@ + 25°C and rated Vdc: 100 Gigohms min. or 1000 ohm-farads min., whichever is less.
@ + 125°C and rated Vdc: 10 Gigohms min. or 100 ohm-farads min., whichever is less.
Z5U and Y5V:
@ + 25°C and rated Vdc: 10 Gigohms min. or 100 ohm-farads min., whichever is less.
@ + 85°C and rated Vdc: 1Gigohms min. or 10 ohm-farads min., whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage for 5 ± 1 seconds, 50 milliamps (max.). For 500 volt ratings 200% of rated voltage.

VITRAMON®, #10 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Selector Guide

CASE SIZE	STYLE	DIELECTRIC	VOLTAGE RATING (Vdc)	CAPACITANCE RANGE (pF) Min.	CAPACITANCE RANGE (pF) Max.	CHIP THICKNESS (T) Max.
0805	VJ0805	NPO	50	1.0	1200	.035 [0.89]
			50	1500	1800	.041 [1.04]
			100	1.0	820	.035 [0.89]
			100	1000	1200	.041 [1.04]
			100	—	1500	.052 [1.32]
			200	1.0	56	.035 [0.89]
			200	68	820	.041 [1.04]
			500	1.0	22	.035 [0.89]
			500	27	39	.041 [1.04]
			500	47	330	.035 [0.89]
			500	—	390	.041 [1.04]
		X7F	16	390	100000	.035 [0.89]
			16	120000	150000	.041 [1.04]
			16	180000	330000	.048 [1.12]
			25	390	100000	.035 [0.89]
			25	120000	150000	.041 [1.04]
			25	18000	220000	.048 [1.12]
			50	390	47000	.035 [0.89]
			50	—	56000	.041 [1.04]
			50	68000	82000	.052 [1.32]
			50	—	100000	.050 [1.27]
			50	—	120000	.048 [1.12]
			100	390	33000	.035 [0.89]
			100	—	39000	.041 [1.04]
			100	47000	56000	.052 [1.32]
			200	330	15000	.035 [0.89]
			200	—	18000	.041 [1.04]
			200	22000	27000	.052 [1.32]
		Z5U	25	10000	120000	.035 [0.89]
			25	150000	220000	.041 [1.04]
			25	270000	330000	.052 [1.32]
			50	10000	82000	.035 [0.89]
			50	—	100000	.043 [1.09]
			50	120000	150000	.052 [1.32]
		Y5V	16	220000	1200000	.035 [0.89]
			16	—	1500000	.041 [1.04]
			25	120000	470000	.041 [1.04]
			25	560000	680000	.052 [1.32]
		BX	25	390	82000	.035 [0.89]
			25	—	100000	.041 [1.04]
			50	390	33000	.035 [0.89]
			50	—	39000	.041 [1.04]
			50	47000	56000	.052 [1.32]
			100	390	5600	.035 [0.89]
			100	—	6800	.041 [1.04]
			100	8200	10000	.052 [1.32]
		X8R	25	470	68000	.035 [0.89]
			50	390	27000	.035 [0.89]
			50	—	33000	.041 [1.04]

* Capacitance measured at 1 Vrms, 1 kHz except NPO values ≤ 1000 pF are measured at 1 MHz.

VITRAMON®, #10 Route 25, Monroe, CT 06468, Mail: PO Box 544 Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

STYLE VJ0805
Monolithic Ceramic Chip Capacitors
General Performance Characteristics

TEST DESCRIPTION	TEST PARAMETERS	CRITERIA
Capacitance	MIL-C-55681, paragraph 4.7.4.	Within specified tolerance.
Dissipation Factor	MIL-C-55681, paragraph 4.7.5.	Within specified tolerance.
Insulation Resistance	MIL-C-55681, paragraph 4.7.6.	Within specified tolerance.
Dielectric Withstanding Voltage	MIL-C-55681, paragraph 4.7.9.	Within specified tolerance.
Temperature Coefficient of Capacitance	MIL-C-55681, paragraph 4.7.11.	Within specified tolerance.

TEST DESCRIPTION	TEST PARAMETERS	CRITERIA
Physical Dimensions	MIL-C-55681, paragraph 4.7.2.	Within specified tolerances.
Solderability	MIL-STD-202, Method 208.	Solder Coverage ≥ 95%.
Resistance to Solder Heat	MIL-STD-202, Method 210. Test Condition C, Procedure 2.	Cap, DF and IR within specified tolerances.
DPA (Destructive Physical Analysis)	E.I.A. RS-198.	No defects that exceed criteria outlined in EIA RS-469 paragraph 3.2.2, steps A through G.
3-Point Beam Load Test	Vitramon® Load Test Procedure.	Typical Force (lbs.) based on = .008 [0.20] test span. Thickness / NPO / X7R / Z5U .030 [0.76] / 13 / 11 / 9 .035 [0.89] / 18 / 14 / 12 .040 [1.02] / 23 / 20 / 17
Highly Accelerated Thermal Shock	Vitramon® Insulation Resistance After Thermal Shock (IRATS) specification 243-100-127.	IR ≥ one decade below general specifications limit.
Terminal Strength	E.I.A. RS-198, Method 303.	No loosening/rupturing of terminations.
Flexure	JIS-C-6429.	No mechanical damage. Cap, DF and IR within specified tolerances.

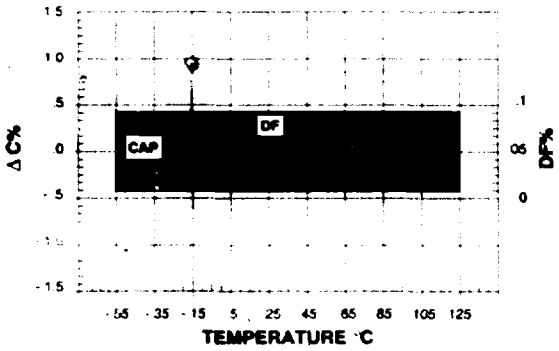
TEST DESCRIPTION	TEST PARAMETERS	CRITERIA
Moisture Resistance	MIL-STD-202, Method 106. Number of cycles increased to 20. Steps 7a and 7b omitted.	Cap, DF and IR within specified tolerances.
Load Life	MIL-STD-202, Method 108. 200% rated voltage, 2000 hrs. @ + 125°C.	Not to exceed criteria specified in MIL-C-55681, paragraph 3.19.
Low Voltage Humidity + 85°C/85% R.H.	MIL-STD-202, Method 103. 1.5 Vdc continuous applied through 100 kΩ resistor, 240 hrs. @ + 85°C and 85% R.H.	Not to exceed criteria specified in MIL-C-55681, paragraph 3.18.
Thermal Shock (Air-to-Air)	MIL-STD-202, Method 107. Test Condition A (Step 3 = + 125°C).	Not to exceed criteria specified in MIL-C-55681, paragraph 3.15.
Immersion	MIL-STD-202, Method 104. Test Condition B.	Not to exceed criteria specified in MIL-C-55681, paragraph 3.15.
HALT (Highly Accelerated Life Test)	800% rated voltage, 20 hrs. @ - 140°C.	Not to exceed criteria specified in MIL-C-55681, paragraph 3.19.
Extended Thermal Shock	MIL-STD-202, Method 107. Mounted on alumina substrate. 1000 cycles, - 55°C to + 125°C, 30 minutes each temperature.	Not to exceed criteria specified in MIL-C-55681, paragraph 3.19.

VITRAMON®, #10 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

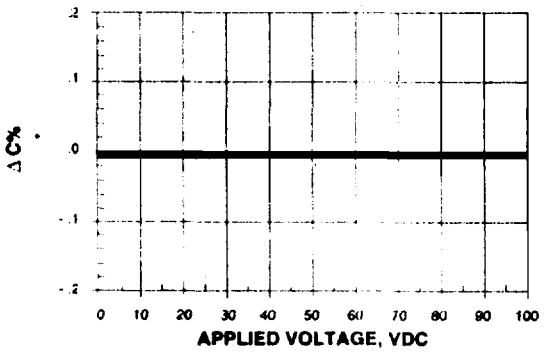
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - NPO Dielectric

VISHAY Vitramon

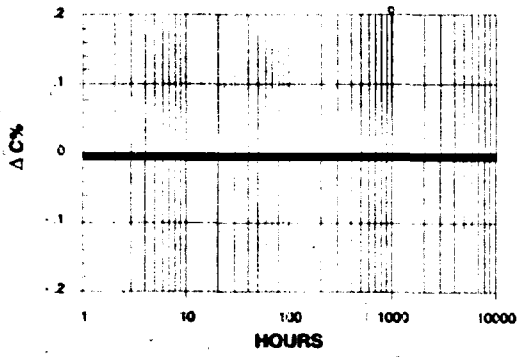
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



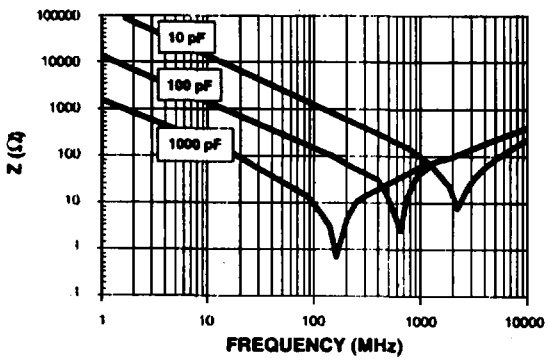
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

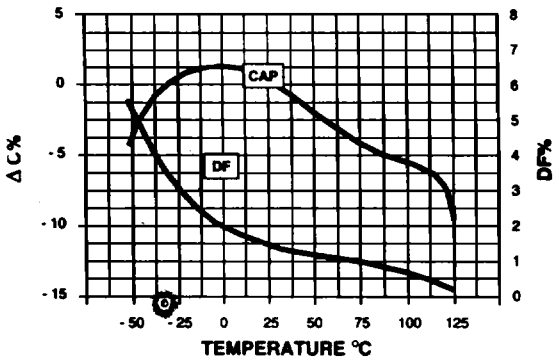


VITRAMON®, #10 Route 25, Monroe, CT 06468. Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

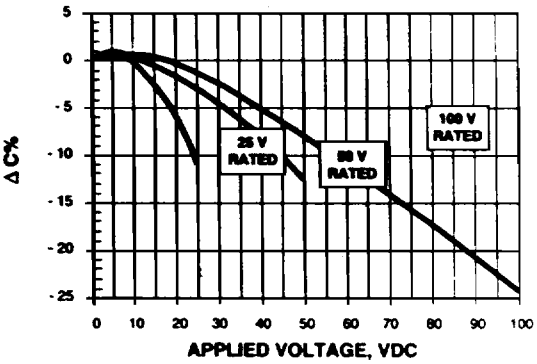
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - X7R Dielectric

VISHAY Vitramon

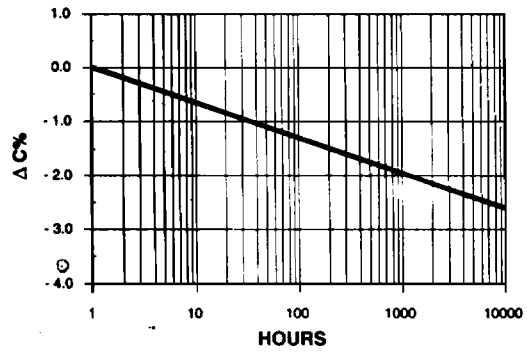
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



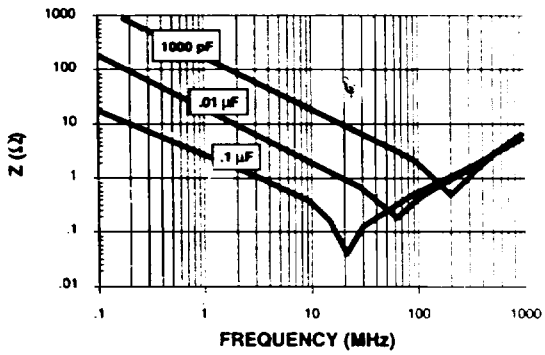
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

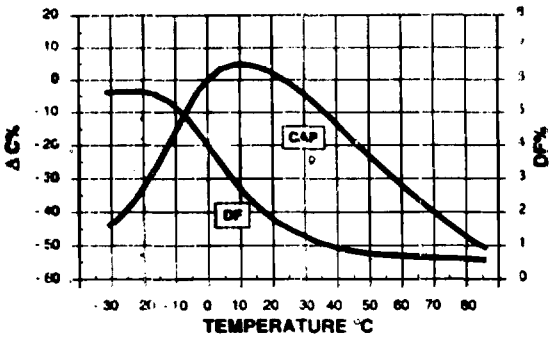


VITRAMON®, #10 Route 25, Monroe, CT 06468. Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

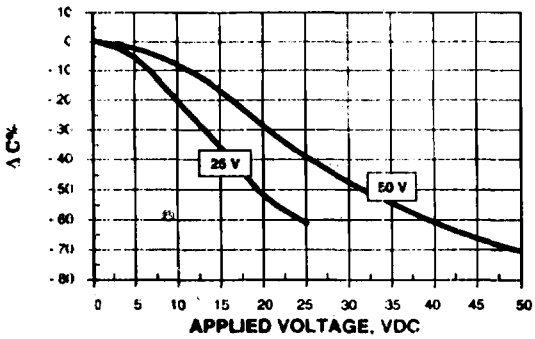
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - Z5U Dielectric

VISHAY Vitramon

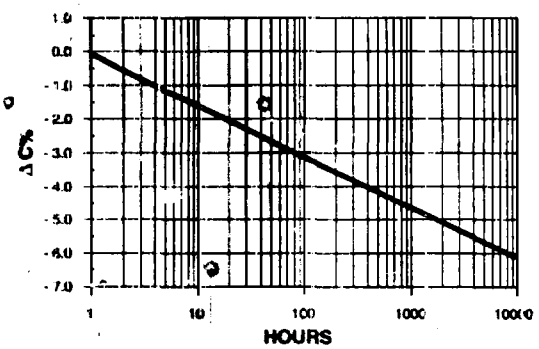
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



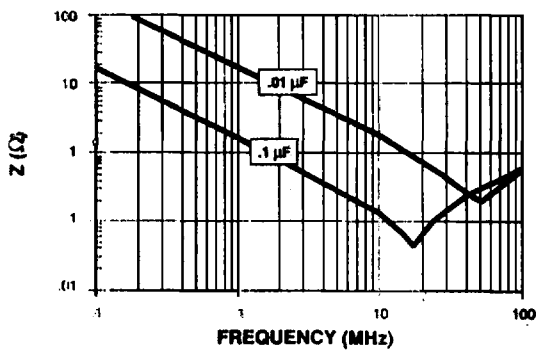
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

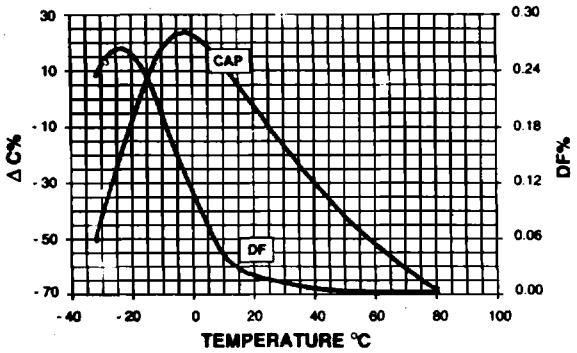


VITRAMON, 510 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

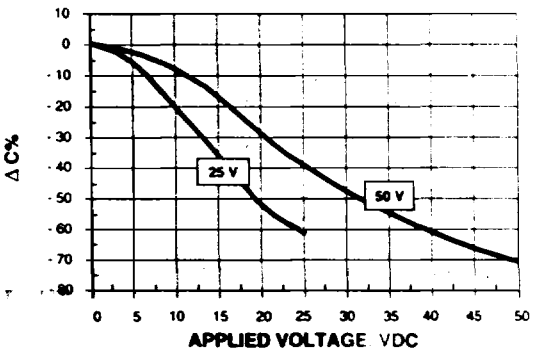
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - Y5V Dielectric

VISHAY Vitramon

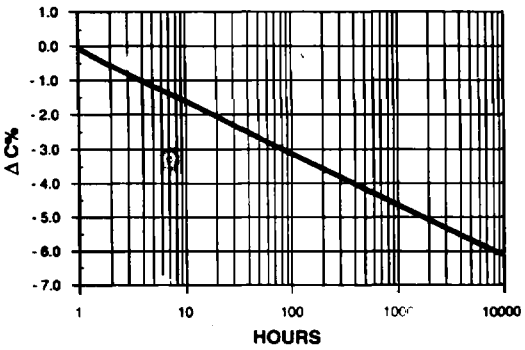
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



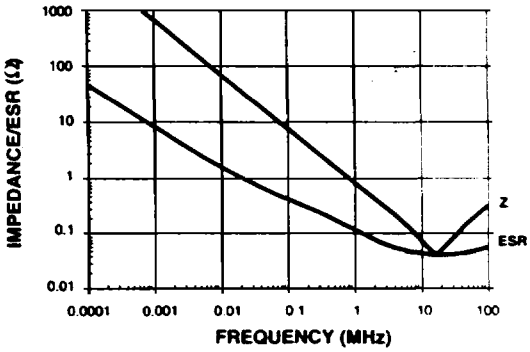
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

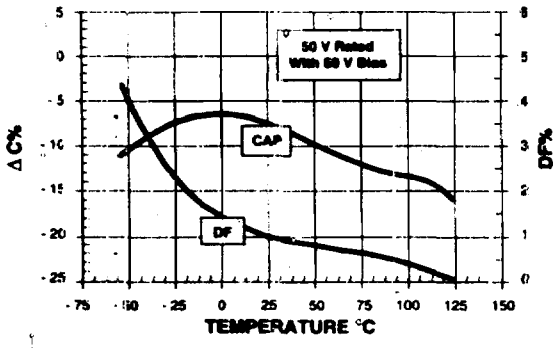


VITRAMON®, #10 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

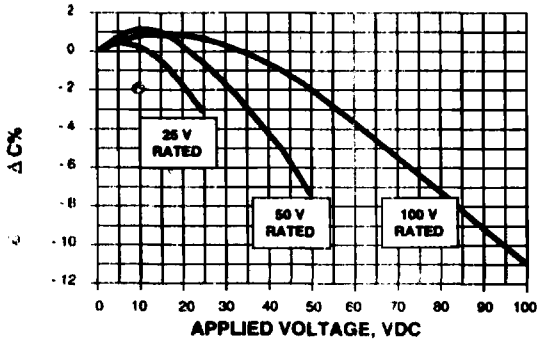
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - BX Dielectric

VISHAY Vitramon

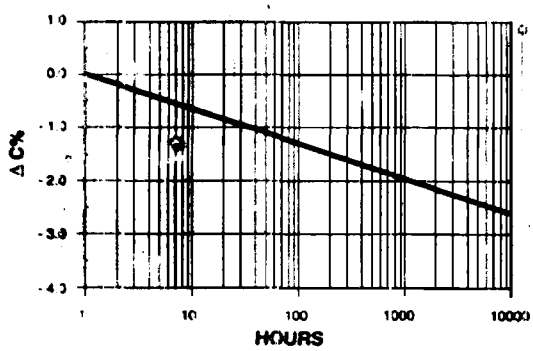
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



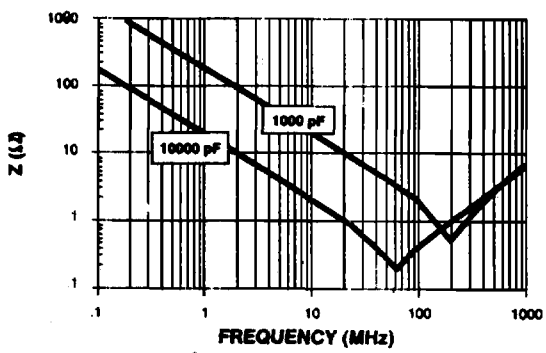
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

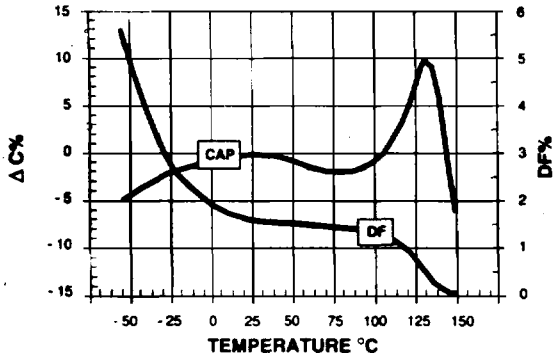


VITRAMON®, 10 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

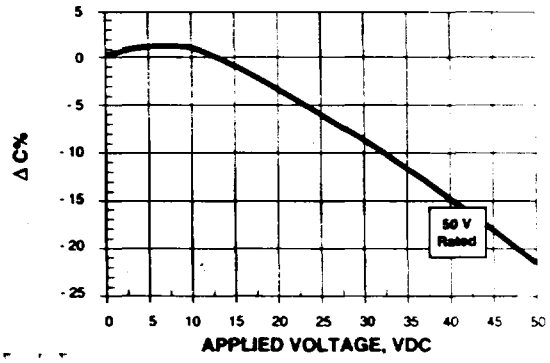
STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Typical Characteristics - X8R Dielectric

VISHAY Vitramon

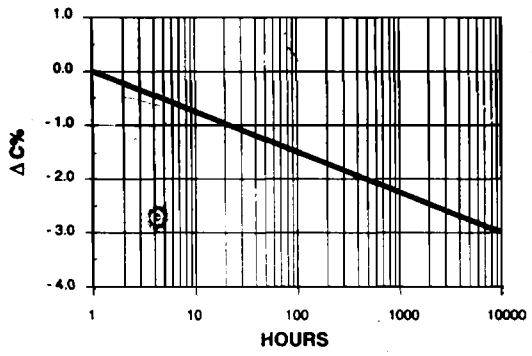
CAPACITANCE AND DISSIPATION FACTOR VS TEMPERATURE



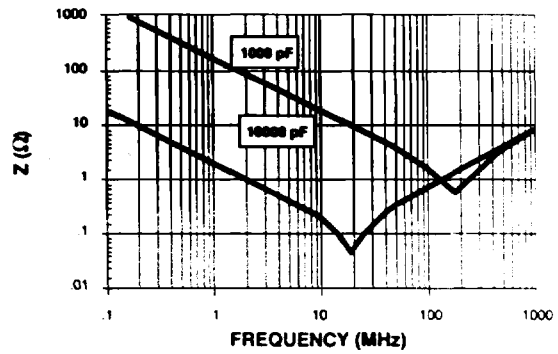
VOLTAGE COEFFICIENT OF CAPACITANCE



AGING



IMPEDANCE VS FREQUENCY

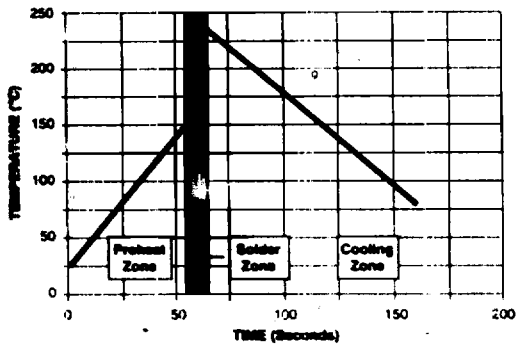


VITRAMON®, #10 Route 25, Monroe, CT 06468, Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Wave and Reflow Soldering, Vapor Phase Reflow

VISHAY Vitramon

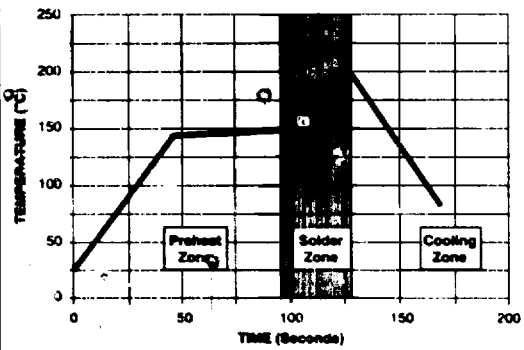
WAVE SOLDERING PROFILE



Vitramon® offers the following recommendations:

1. Set dwell time in the solder wave 2 to 3 seconds. Solder pot set at + 240°C to + 250°C. Belt speed at 3 to 5 feet/minute.
2. Adjust Flux station (foam, spray or wave) topside preheat at + 80°C to + 105°C.
3. Set preheat ≈ + 100°C below the solder wave temperature. Usually maximum underside PC board temperature at last preheat zone is + 150°C. Preheat rate should be 1.5 to 2.5°C/second.
4. Do not force cool the PC board. Maintain a uniform profile.
5. Finally check that the delta difference between the solder temperature and the temperature as the PC board leaves the last preheat zone is + 100°C or less. Chip size and mass make some types more prone to thermal shocking during the soldering operation, leading to insulation resistance (IR) failures in use. Vitramon® **does not** recommend wave soldering chips ≥ 1825 size.

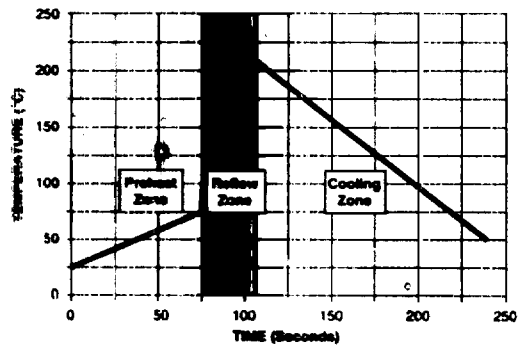
REFLOW SOLDERING PROFILE



The reflow soldering process using no-clean solder paste for mounting ceramic chip capacitors has grown wide acceptance. Chip capacitors may develop thermally induced cracks if the temperature changes in reflow process are not controlled. Vitramon® offers the following recommendations:

1. Set peak reflow temperature at + 200°C to + 250°C based on paste melting point. Typical paste melting point ≈ + 183°C. Dwell at peak temperature should be 5 seconds.
2. First preheat zone temperature elevation at + 150°C ± 10°C, ramp rate 3°C/second.
3. Second preheat zone temperature + 150°C ± 10°C, ramp rate of .1°C/second. Set preheat for ≤ 60 seconds. *Long preheat times could cause solder balls near the capacitor/other components.*
4. Adjust reflow zone temperatures to + 150°C ± 10°C to + 225°C ± 5°C at ramp of 4 to 5°C/second. Total time at reflow over + 200°C should not exceed 15 to 20 seconds.
5. Use natural cooling at the final cooling zone. Maintain a uniform profile.

VAPOR PHASE REFLOW PROFILE



With vapor phase reflow heat reaches the product uniformly and quickly because of vapor condensation heating. During condensation heating a dense vapor condenses on all exposed surfaces. Due to the inherent low boiling point (+ 215°C) for liquids used in vapor phase, ceramic chips can be reflowed without thermal shock damage. Vitramon® offers the following recommendations:

1. Preheat or pre-bake zone duration should be about 1.5 to 2 minutes. Infrared heating can be used for preheat sections.
2. Vapor phase zone maximum temperature is + 215°C with typical settings at + 210°C.
3. Total duration is typically 4 to 5 minutes, use natural cooling at the final cooling zone.

VITRAMON®, #10 Route 25 Monroe, CT 06468. Mail: PO Box 544, Bridgeport, CT 06601 • Phone (203) 268-6261 • Fax 203-452-5670

STYLE VJ0805
Monolithic Ceramic Chip Capacitors
Soldering, Pad Layout and Packaging

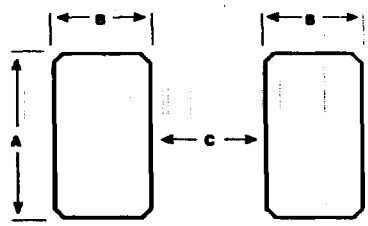
VISHAY Vitramon

Soldering by Soldering Iron

Preheat part before soldering to a temperature of + 100°C to + 120°C (hotplate, blow drier). The soldering iron must be temperature controlled, not to exceed + 280°C with a maximum soldering time of 5 seconds. Use a 30W (maximum) soldering iron with a tip diameter of 3mm (maximum). It is advisable to effect the transmission of heat through the soldering material.

Soldering Flux

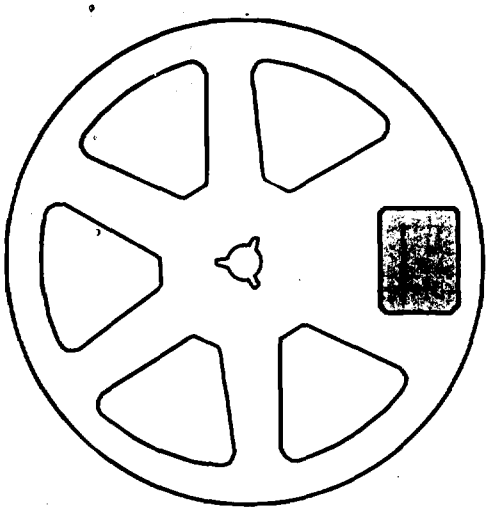
- Use mildly activated rosin flux RMA or RA types or low residue liquid fluxes (no-clean flux).
- Flux residues from no-clean flux can be removed with aqueous cleaners. During wave soldering ensure that the majority of solvents are removed at preheat.



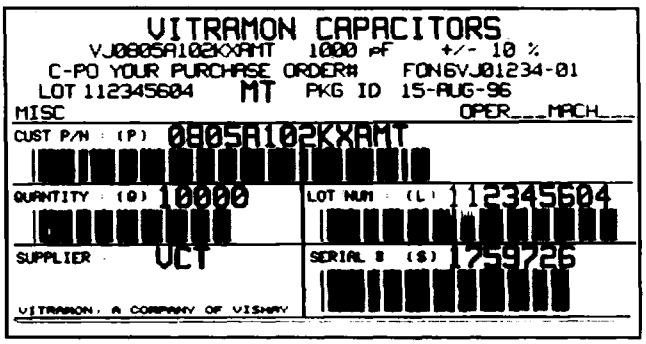
SIZE	0805	
A (Min.)	.050 [1.27]	.030 [0.76]
SOLDER	Reflow Solder	Wave Solder
B (Min.)	.040 [1.02]	.060 [1.52]
C (Nom.)	.040 [1.02]	.040 [1.02]

* Numbers in brackets indicate millimeters.

MARKING OF VITRAMON® REELS



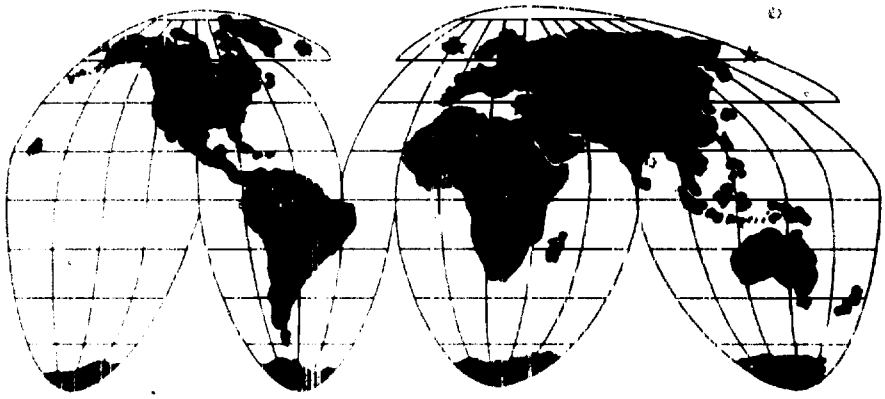
Each Vitramon® reel has a Bar Code label describing the following details: manufacturer, chip size, capacitance, tolerance, customer purchase order number, manufacturing lot number and quantity of components.



Tape Size: 8 mm.
Reel Size: 7 inch. **Quantity:** 2,500 - 4,000 pieces.*
Reel Size: 10 3/4 inch. **Quantity:** 10,000 pieces.*

* Dependent on chip thickness.

VITRAMON® - LOCATOR GUIDE



VITRAMON®
Mail Address:
PO Box 544
Bridgeport, CT 06601
Factory Address:
#10 Route 25
Monroe, CT 06468
Phone: (203) 268-6261
Fax: 203-452-5670

VITRAMON®
3435 Chip Drive, NE
PO Box 11786
Roanoke, VA 24022-1786
Phone: (703) 982-6706
Fax: 703-342-3652

VITRAMON Limited
Wycombe Lane
Woobum Green
Bucks HP10 0HH
ENGLAND
Phone: 011-44-1628-536300
Fax: 011-44-1628-525435

VITRAMON GmbH
Muhlbachstrasse 7
Postfach 1420
71504 Backnang-Waldrems
GERMANY
Phone: 011-49-7191-8050
Fax: 011-49-7191-8140

VITRAMON France
Zi Sud - Rue Copernic
BP113
F-41102 Vendome Cedex
FRANCE
Phone: 011-33-5423-5423
Fax: 011-33-5480-2092

VITRAMON Israel
PO Box 852
Industrial Park
Ramat Gabriel
Migdal Ha Emek
10500
ISRAEL
Phone: 011-972-6-54-55-72
Fax: 011-972-6-54-55-74

VITRAMON Pty. Limited
12 Harrow Road
PO Box 94
Auburn, NSW 2144
AUSTRALIA
Phone: 011-61-2-9646-1888
Fax: 011-61-2-9646-2188

VITRAMON Japan Limited
No. 44 Kowa Bldg.
2 - 7, Higashiyama 1-Chome
Meguro-ku, Tokyo 153
JAPAN
Phone: 011-81-3-5721-1970
Fax: 011-81-3-5721-1499

VITRAMON® HAS WORLDWIDE APPROVAL
USA: ISO 9001, MIL-C-55681
France: CECC 30 and ESA/SCC 3001.
England: BS 9075 N 001, ESA/SCC 3009 and CECC.
Germany: ESA/SCC 3009, CECC 32 and ISO 9001.

PRINTED IN U.S.A. 8/96