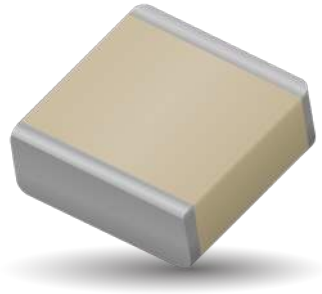
RF/Microwave Capacitors

RF/Microwave Multilayer Capacitors (MLC)

700E Series NPO Porcelain High RF Power Multilayer Capacitors



FEATURES

- Case E Size (.380" x .380")
- Capacitance Range 1pF to 2200pF
- Extended WVDC up to 7200 VDC
- Low ESR/ESL
- High Q
- High RF Power
- Ultra-Stable Performance
- High RF Current/Voltage
- Available with Encapsulation Option*

* For leaded styles only

GENERAL DESCRIPTION

KYOCERA AVX, the industry leader, offers new improved ESR/ESL performance for the 700 E Series RF Capacitors. This high Q multilayer capacitor is ultra-stable under high RF current and voltage applications with NPO performance. High density porcelain construction provides a rugged, hermetic package.

KYOCERA AVX offers an encapsulation option for applications requiring extended protection against arc-over and corona.

PACKAGING OPTIONS

Tape & Reel

Tray (96 pcs)

RoHS COMPLIANT

FUNCTIONAL APPLICATIONS

- Bypass
- Coupling
- Tuning
- Impedance Matching
- DC Blocking

CIRCUIT APPLICATIONS

- HF/RF Power Amplifiers
- Transmitters
- Antenna Tuning
- Plasma Chambers
- Medical (MRI coils)

ELECTRICAL SPECIFICATIONS

Temperature Coefficient (TCC)	0 ±30 PPM/°C (-55°C to +125°C)
Capacitance Range	1 pF to 2200 pF
Operating Temperature	-55°C to +125°C (No derating of working voltage).
Quality Factor	Greater than 10,000 (1 pF to 1000 pF) @ 1 MHz. Greater than 10,000 (1100 pF to 2200 pF) @ 1 KHz.
Insulation Resistance (IR)	1 pF to 2200 pF 10^5 Megohms min. @ 25°C at 500 VDC 10^4 Megohms min. @ 125°C at 500 VDC
Working Voltage (WVDC)	See Capacitance Values table
Dielectric Withstanding Voltage (DWV)	150% of WVDC for capacitors rated at 1250 volts DC or less for 5 seconds. 120% of WVDC for capacitors rated above 1250 Volts DC for 5 seconds
Aging Effects	None
Piezoelectric Effects	None
Capacitance Drift	± (0.02% or 0.02 pF), whichever is greater
Retrace	Less than ±(0.02% or 0.02 pF), whichever is greater.

ENVIRONMENTAL CHARACTERISTICS

Thermal Shock	Mil-STD-202, Method 107, Condition A
Moisture Resistance	Mil-STD-202, Method 106
Low Voltage Humidity	Mil-STD-202, Method 103, condition A, with 1.5 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours
Life Test	MIL-STD-202, Method 108, for 2000 hours, at 125°C. Voltage applied. 120% of WVDC for capacitors rated at 1250 volts DC or less. 100% of WVDC for capacitors rated above 1250 volts DC
Termination Styles	Available in various surface mount and leaded styles. See Mechanical Configurations
Terminal Strength	Terminations for chips and pellets withstand a pull of 10 lbs. min., 25 lbs. typical, for 5 seconds in direction perpendicular to the termination surface of the capacitor. Test per MIL-STD-202, method 211.

CAPACITANCE VALUES

Cap. Code	Cap. (pF)	Tol.	Rated WVDC		Cap. Code	Cap. (pF)	Tol.	Rated WVDC		Cap. Code	Cap. (pF)	Tol.	Rated WVDC		CAP. CODE	CAP. (pF)	TOL.	RATED WVDC	
			STD.	EXT.				STD.	EXT.				STD.	EXT.				STD.	EXT.
1R0	1.0				5R1	5.1				390	39				271	270			
1R1	1.1				5R6	5.6				430	43				301	300			
1R2	1.2				6R2	6.2				470	47				331	330		3600	
1R3	1.3				6R8	6.8	B, C, D			510	51			EXTENDED VOTAGE	361	360			
1R4	1.4			EXTENDED VOLTAGE	7R5	7.5			EXTENDED VOLTAGE	560	56			7200	391	390			
1R5	1.5				8R2	8.2				620	62				431	430			
1R6	1.6				9R1	9.1				680	68				471	470			
1R7	1.7				100	10				750	75				511	510			
1R8	1.8				110	11				820	82				561	560		2500	
1R9	1.9				120	12				910	91				621	620			
2R0	2.0	B, C, D	3600		130	13		3600		101	100	F, G, J, K, M	3600		681	680	F, G, J, K, M		N/A
2R1	2.1			7200	150	15			7200	111	110				751	750			
2R2	2.2				160	16				121	120			EXT. VOLT.	821	820			
2R4	2.4				180	18	F, G, J, K, M			131	130			5000	911	910			
2R7	2.7				200	20				151	150				102	1000			
3R0	3.0				220	22				161	160				112	1100			
3R3	3.3			EXTENDED VOLTAGE	240	24			EXTENDED VOLTAGE	181	180				122	1200		1000	
3R6	3.6				270	27				201	200				152	1500			
3R9	3.9				300	30				221	220			N/A	182	1800			
4R3	4.3				330	33				241	240				222	2200			
4R7	4.7				360	36													

VRMS = 0.707 X WVDC

• SPECIAL VALUES, TOLERANCES, MATCHING, AND CAPACITOR ASSEMBLIES ARE AVAILABLE. • KYOCERA AVX'S CUSTOM POWER CAPACITOR ASSEMBLY CATALOG, LISTS ASSEMBLY
OPTIONS. • DIFFERENT WORKING VOLTAGES ARE AVAILABLE • ENCAPSULATION OPTION AVAILABLE. PLEASE CONSULT FACTORY.

HOW TO ORDER

700 E 391 K W 3600 X T**

Series — 700

Case Size — E
See mechanical dimensions below

Capacitance — 391
EIA Capacitance Code in pF.
First two digits = significant figures or "R" for decimal place.
Third digit = number of zeros or after "R" significant figures

Capacitance Tolerance Code — K

Code	B	C	D	F	G	J	K	M
Tol.	±.1 pF	±.25 pF	±.5 pF	±1%	±2%	±5%	±10%	±20%

Packaging — T
T = Tape and Reel, 250 pc qty. Please see last Column Mechanical Configuration Table for Box and Tray Options

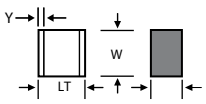
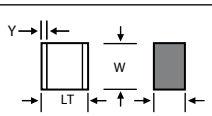
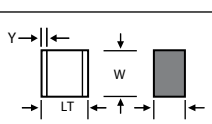
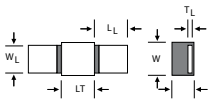
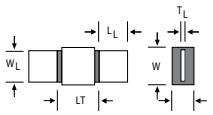
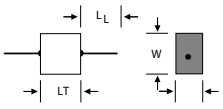
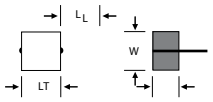
Laser Marking (Optional) — X**

Voltage Rating — 3600

Termination Style Code — W
Please see 2nd Column Mechanical Configuration Table

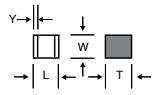
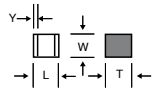
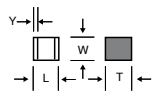
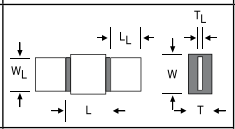
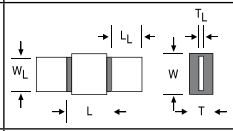
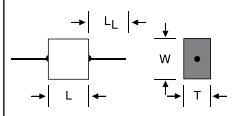
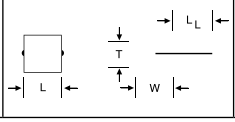
**Optional
The above part number refers to a 700 E Series (case size E) 390 pF capacitor, K tolerance (±10%), 3600 WVDC, with W termination (Tin /Lead, Solder Plated over Nickel Barrier), laser marking and Tape and Reel Packaging.

MECHANICAL CONFIGURATION

Series & Case Size	Term. Code	Case Size & Type	Outline W/T is a Termination Surface	Body Dimensions inches (mm)			Lead and Termination Dimensions and Material		Pkg Type	Pkg Code
				Length (L)	Width (W)	Thickness (T)	Overlap (Y)	Materials		
700E	W	E Solder Plate		.380+.015 -.010 (9.65+0.38-0.25)	.380 ±.010 (9.65 ±0.25)	170 (4.32) max.	.040 (1.02) max.	Tin/Lead, Solder Plated over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	P	E Pellet		.380+.040 -.010 (9.65+1.02-0.25)				Heavy Tin/Lead Coated, over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	T	E Solderable Nickel Barrier		.380+.015 -.010 (9.65+0.38-0.25)				***RoHS Compliant*** Tin Plated over Nickel Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	MS	E Microstrip		.380+.035-.010 (9.65+0.89-0.25)			N/A	High Purity Silver Leads L_L = .750 (19.05) min W_L = .350 ±.010 (8.89 ±0.25) T_L = .010 ±.005 (0.25 ±0.13) Leads are Attached with High Temperature Solder.	Tray, 16 or 32 pcs	J16 J32
700E	AR	E Axial Ribbon							Tray, 16 or 32 pcs	J16 J32
700E	AW	E Axial Wire						Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 2.25 (57.2) min.	Box, 20 pcs	B20
700E	RW	E Radial Wire						Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 1.0 (25.4) min.	Tray, 16 or 64 pcs	J16 J64

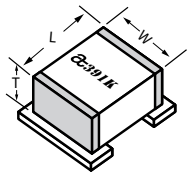
Custom lead styles and lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

MECHANICAL CONFIGURATION

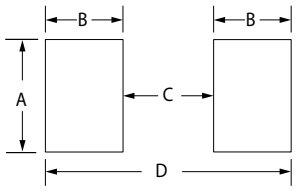
Series & Case Size	Term. Code	Case Size & Type	Outline W/T is a Termination Surface	Body Dimensions inches (mm)			Lead and Termination Dimensions and Material		Pkg Type	Pkg Code
				Length (L)	Width (W)	Thickness (T)	Overlap (Y)	Materials		
700E	WN	E Non-Mag Solder Plate		.380+.015 -.010 (9.65+0.38-0.25)	.380 ±.010 (9.65 ±0.25)	.170 (4.32) max.	.040 (1.02) max.	Tin/Lead, Solder Plated over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	PN	E Non-Mag Pellet		.380+.040 -.010 (9.65+1.02-0.25)				Heavy Tin/Lead Coated, over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	TN	E Non-Mag Solderable Barrier		.380+.015 -.010 (9.65+0.38-0.25)				***RoHS Compliant*** Tin Plated over Non-Magnetic Barrier Termination	T&R, 250 pcs Tray, 24 or 96 pcs	T J24 J96
700E	MN	E Non-Mag Microstrip		.380+.035 -.010 (9.65+0.89-0.25)			N/A	High Purity Silver Leads L_L = .750 (19.05) min W_L = .350 ±.010 (8.89 ±0.25) T_L = .010 ±.005 (0.25 ±0.13) Leads are Attached with High Temperature Solder.	Tray, 16 or 32 pcs	J16 J32
700E	AN	E Non-Mag Axial Ribbon							Tray, 16 or 32 pcs	J16 J32
700E	BN	E Non-Mag Axial Wire						Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 2.25 (57.2) min.	Box, 20 pcs	B20
700E	RN	E Non-Mag Radial Wire						Silver-plated Copper Leads Dia. = .032 ±.002 (.813 ±.051) L_L = 1.0 (25.4) min.	Tray, 16 or 64 pcs	J16 J64

Custom lead styles and lengths are available; consult factory. All leads are high purity silver attached with high temperature solder and are **RoHS** compliant.

SUGGESTED MOUNTING PAD DIMENSIONS



Horizontal
Electrode Orientation

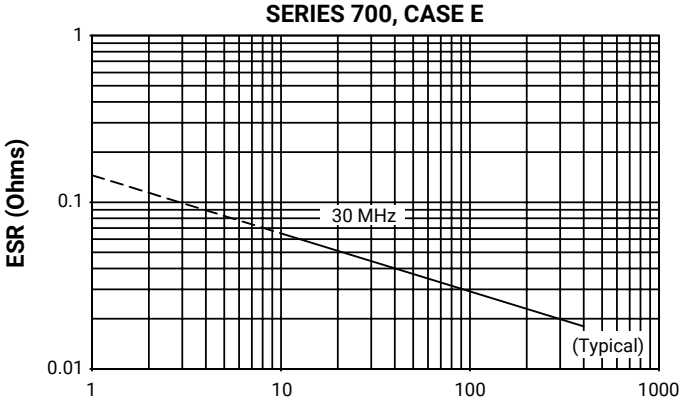


Mount Type	Case E				
	Pad Size	A Min.	B Min.	C Min.	D Min.
Horizontal Mount	Normal	.405	.050	.325	.425
	High Density	.383	.030	.325	.385

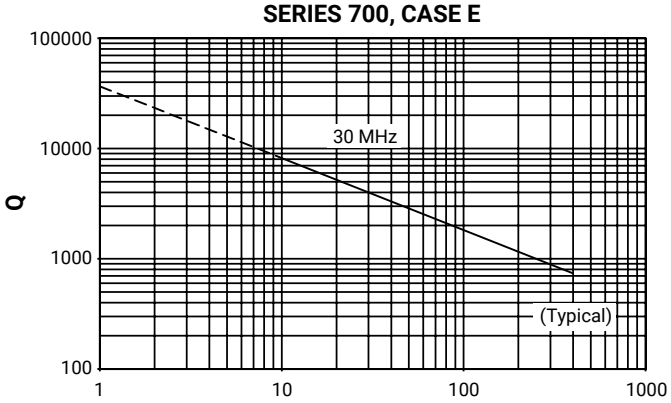
Dimensions are in inches.

PERFORMANCE DATA

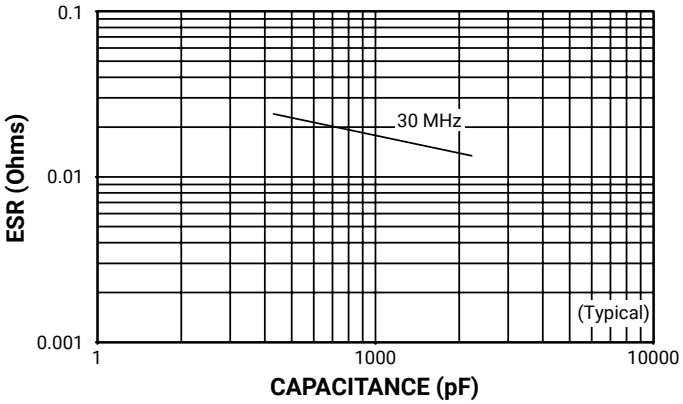
ESR VS. CAPACITANCE
SERIES 700, CASE E



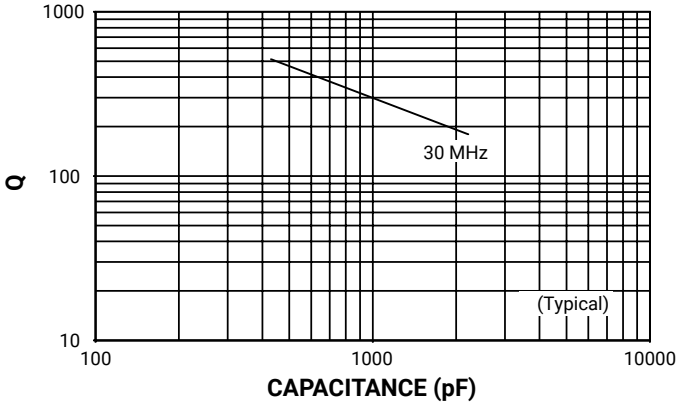
Q VS. CAPACITANCE
SERIES 700, CASE E



ESR VS. CAPACITANCE
SERIES 700, CASE E

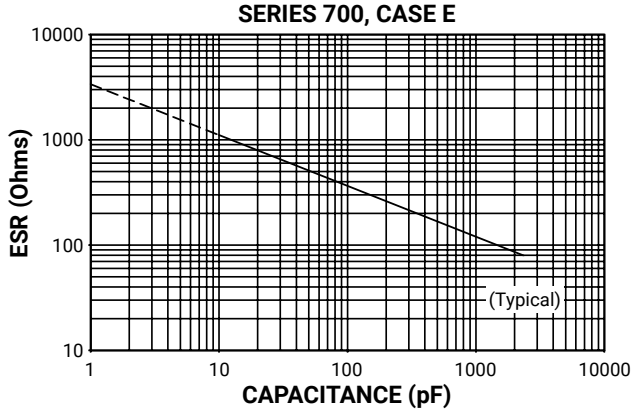


ESR VS. CAPACITANCE
SERIES 700, CASE E

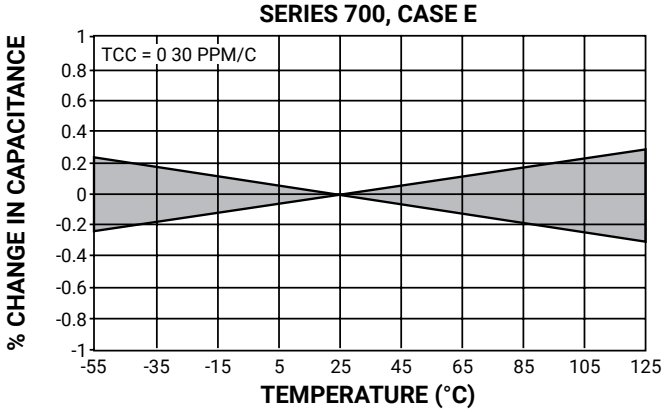


PERFORMANCE DATA

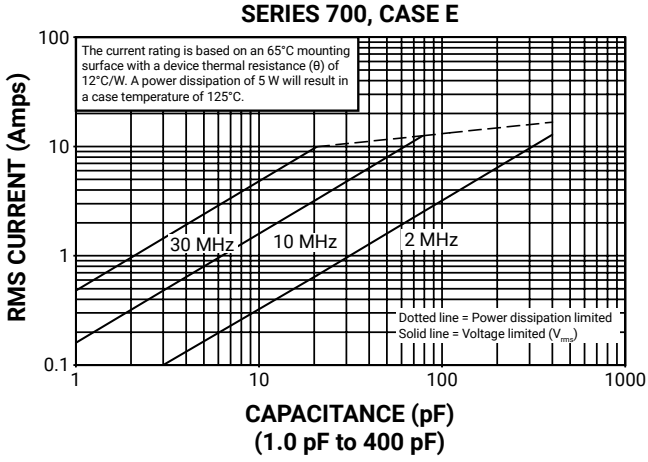
SERIES RESONANCE VS. CAPACITANCE
SERIES 700, CASE E



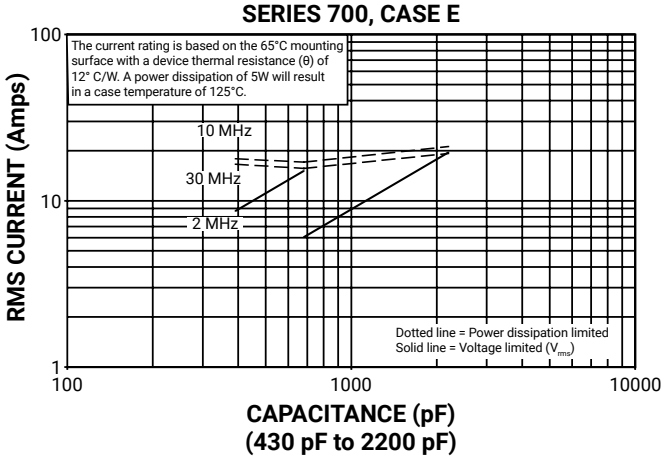
CAPACITANCE CHANGE VS. TEMPERATURE
SERIES 700, CASE E



CURRENT RATING VS. CAPACITANCE
SERIES 700, CASE E



CURRENT RATING VS. CAPACITANCE
SERIES 700, CASE E



CURRENT RATING VS. CAPACITANCE
SERIES 700, CASE E, EXTENDED VOLTAGE