

# F97 Series



## Resin-Molded Chip, Improved Reliability J-Lead



### FEATURES

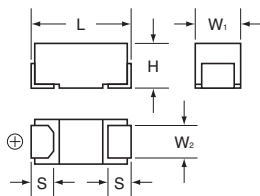
- Compliant to the RoHS2 directive 2011/65/EU
- Compliant to AEC-Q200
- Improved reliability - FR=0.5%/1000hrs (twice better than standard)
- SMD J-lead



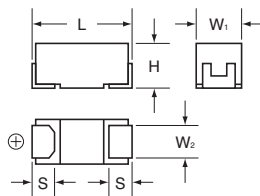
### APPLICATIONS

- Automotive electronics (Engine ECU)
- Industrial equipment

#### A, B CASE



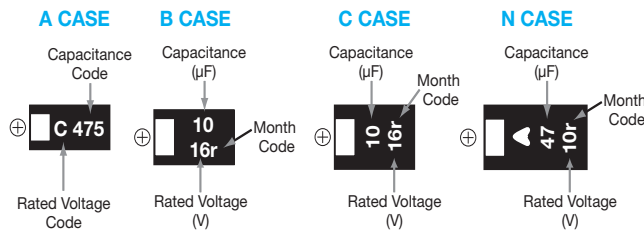
#### C, N CASE



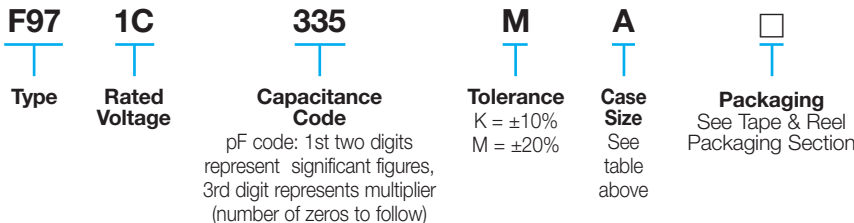
### CASE DIMENSIONS: millimeters (inches)

Code	L	W <sub>1</sub>	W <sub>2</sub>	H	S
A	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	1.20 ± 0.10 (0.047 ± 0.004)	1.60 ± 0.20 (0.063 ± 0.008)	0.80 ± 0.20 (0.031 ± 0.008)
B	3.50 ± 0.20 (0.126 ± 0.008)	2.80 ± 0.20 (0.110 ± 0.008)	2.20 ± 0.10 (0.087 ± 0.004)	1.90 ± 0.20 (0.075 ± 0.008)	0.80 ± 0.20 (0.031 ± 0.008)
C	6.00 ± 0.20 (0.236 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	2.20 ± 0.10 (0.087 ± 0.004)	2.50 ± 0.20 (0.098 ± 0.008)	1.30 ± 0.20 (0.051 ± 0.008)
N	7.30 ± 0.20 (0.287 ± 0.008)	4.30 ± 0.20 (0.169 ± 0.008)	2.40 ± 0.10 (0.094 ± 0.004)	2.80 ± 0.20 (0.110 ± 0.008)	1.30 ± 0.20 (0.051 ± 0.008)

### MARKING



### HOW TO ORDER



### TECHNICAL SPECIFICATIONS

Category Temperature Range:	-55 to +125°C
Rated Temperature:	+85°C
Capacitance Tolerance:	±20%, ±10% at 120Hz
Dissipation Factor:	Refer to next page
ESR 100kHz:	Refer to next page
Leakage Current:	After 1 minute's application of rated voltage, leakage current at 20°C is not more than 0.01CV or 0.5µA, whichever is greater. After 1 minute's application of rated voltage, leakage current at 85°C is not more than 0.1CV or 5µA, whichever is greater. After 1 minute's application of derated voltage, leakage current at 125°C is not more than 0.125CV or 6.3µA, whichever is greater.
Capacitance Change By Temperature	+15% Max. at +125°C +10% Max. at +85°C -10% Max. at -55°C



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### CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage					
μF	Code	6.3V (0J)	10V (1A)	16V (1C)	20V (1D)	25V (1E)	35V (1V)
0.33	334						A
0.47	474						A
0.68	684				A	A	A
1	105			A	A	A	A*
1.5	155			A	A		A*/B
2.2	225		A	A	A	A*/B	B
3.3	335	A	A	A	B	B	B*/C
4.7	475	A	A/B	A/B	A/B	B*/C	C
6.8	685	A/B	B	B	B*/C	C	C*/N
10	106		A/B	A/B/C	B*/C	C/N	N
15	156	B	B	B*/C	N	C*/N	
22	226	A/B	A/B	B/C/N	C/N	N*	
33	336	A/C	B/C/N	B/C/N		N*	
47	476	B/C	B*/C/N	C/N			
68	686	N	N				
100	107	N	C/N*				

Available Ratings

\*Codes under development – subject to change

Please contact to your local AVX sales office when these series are being designed in your application.

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### RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL (μA)	DF (%) @ 120Hz	ESR (Ω) @ 100kHz
<b>6.3 Volt</b>						
F970J335MAA	A	3.3	6.3	0.5	4	4.5
F970J475MAA	A	4.7	6.3	0.5	6	4.0
F970J685MAA	A	6.8	6.3	0.5	6	3.5
F970J685MBA	B	6.8	6.3	0.5	6	2.5
F970J156MBA	B	15	6.3	0.9	6	2.0
F970J226MAA	A	22	6.3	1.4	12	2.5
F970J226MBA	B	22	6.3	1.4	8	1.9
F970J336MAA	A	33	6.3	2.1	12	2.5
F970J336MCC	C	33	6.3	2.1	6	1.1
F970J476MBA	B	47	6.3	3.0	8	1.0
F970J476MCC	C	47	6.3	3.0	6	0.9
F970J686MNC	N	68	6.3	4.3	6	0.6
F970J107MNC	N	100	6.3	6.3	8	0.6
<b>10 Volt</b>						
F971A225MAA	A	2.2	10	0.5	4	5.0
F971A335MAA	A	3.3	10	0.5	4	4.5
F971A475MAA	A	4.7	10	0.5	6	4.0
F971A475MBA	B	4.7	10	0.5	6	2.8
F971A685MBA	B	6.8	10	0.7	6	2.5
F971A106MAA	A	10	10	1.0	6	3.0
F971A106MBA	B	10	10	1.0	6	2.0
F971A156MBA	B	15	10	1.5	6	2.0
F971A226MAA	A	22	10	2.2	15	3.0
F971A226MBA	B	22	10	2.2	8	1.9
F971A336MBA	B	33	10	3.3	8	1.9
F971A336MCC	C	33	10	3.3	6	1.1
F971A336MNC	N	33	10	3.3	6	0.7
F971A476MCC	C	47	10	4.7	8	0.9
F971A476MNC	N	47	10	4.7	6	0.7
F971A686MNC	N	68	10	6.8	6	0.6
F971A107MCC	C	100	10	10.0	10	0.7
<b>16 Volt</b>						
F971C105MAA	A	1	16	0.5	4	7.5
F971C155MAA	A	1.5	16	0.5	4	6.3
F971C225MAA	A	2.2	16	0.5	4	5.0
F971C335MAA	A	3.3	16	0.5	4	4.5
F971C475MAA	A	4.7	16	0.8	8	4.0
F971C475MBA	B	4.7	16	0.8	6	2.8
F971C685MBA	B	6.8	16	1.1	6	2.5
F971C106MAA	A	10	16	1.6	8	3.5
F971C106MBA	B	10	16	1.6	6	2.1

\* In case of capacitance tolerance ± 10% type, "K" will be put at 9th digit of type numbering system

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL (μA)	DF (%) @ 120Hz	ESR (Ω) @ 100kHz
F971C106MCC	C	10	16	1.6	6	1.5
F971C156MCC	C	15	16	2.4	6	1.2
F971C226MBA	B	22	16	3.5	8	1.9
F971C226MCC	C	22	16	3.5	8	1.1
F971C226MNC	N	22	16	3.5	6	0.7
F971C336MBA	B	33	16	5.3	10	2.1
F971C336MCC	C	33	16	5.3	8	1.1
F971C336MNC	N	33	16	5.3	6	0.7
F971C476MCC	C	47	16	7.5	10	1.1
F971C476MNC	N	47	16	7.5	8	0.7
<b>20 Volt</b>						
F971D684MAA	A	0.68	20	0.5	4	7.6
F971D105MAA	A	1	20	0.5	4	7.5
F971D155MAA	A	1.5	20	0.5	4	6.7
F971D225MAA	A	2.2	20	0.5	6	6.3
F971D335MBA	B	3.3	20	0.7	4	3.1
F971D475MAA	A	4.7	20	0.9	8	4.0
F971D475MBA	B	4.7	20	0.9	6	2.8
F971D685MCC	C	6.8	20	1.4	6	1.8
F971D106MCC	C	10	20	2.0	6	1.5
F971D156MNC	N	15	20	3.0	6	0.7
F971D226MCC	C	22	20	4.4	8	1.1
F971D226MNC	N	22	20	4.4	6	0.7
<b>25 Volt</b>						
F971E684MAA	A	0.68	25	0.5	4	7.6
F971E105MAA	A	1	25	0.5	4	7.5
F971E225MBA	B	2.2	25	0.6	4	3.8
F971E335MBA	B	3.3	25	0.8	4	3.5
F971E475MCC	C	4.7	25	1.2	6	1.8
F971E685MCC	C	6.8	25	1.7	6	1.8
F971E106MCC	C	10	25	2.5	6	1.6
F971E106MNC	N	10	25	2.5	6	1.0
F971E156MNC	N	15	25	3.8	6	0.7
<b>35 Volt</b>						
F971V334MAA	A	0.33	35	0.5	4	12.0
F971V474MAA	A	0.47	35	0.5	4	10.0
F971V684MAA	A	0.68	35	0.5	4	7.6
F971V155MBA	B	1.5	35	0.5	4	4.0
F971V225MBA	B	2.2	35	0.8	4	3.8
F971V335MCC	C	3.3	35	1.2	4	2.0
F971V475MCC	C	4.7	35	1.6	6	1.8
F971V685MNC	N	6.8	35	2.4	6	1.0
F971V106MNC	N	10	35	3.5	6	1.0

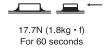
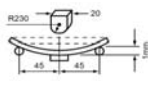


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### QUALIFICATION TABLE

TEST	F97 series (Temperature range -55°C to +125°C)	
	Condition	
<b>Damp Heat (Steady State)</b>	At 85°C, 85% R.H., 1000 hours (No voltage applied) Capacitance Change ..... Within ±10% of the initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... 125% or less than the initial specified value	
<b>Load Humidity</b>	After 1000 hour's application of rated voltage in series with a 33Ω resistor at 85°C, 85% R.H., capacitors meet the characteristics requirements table below. Capacitance Change ..... Within ±10% of the initial value Dissipation Factor ..... 120% or less than the initial specified value Leakage Current ..... 200% of less than the initial specified value	
<b>Temperature Cycles</b>	At -55°C / +125°C, 30 minutes each, 1000 cycles Capacitance Change ..... Within ±5% of the initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less	
<b>Resistance to Soldering Heat</b>	10 seconds reflow at 260°C, 5 seconds immersion at 260°C. Capacitance Change ..... Within ±5% of the initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less	
<b>Solderability</b>	After immersing capacitors completely into a solder pot at 245°C for 2 to 3 seconds, more than 3/4 of their electrode area shall remain covered with new solder.	
<b>Surge</b>	After application of surge voltage in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C, capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Within ±5% of the initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less	
<b>Endurance</b>	After 2000 hours' application of rated voltage in series with a 3Ω resistor at 85°C, or derated voltage in series with a 3Ω resistor at 125°C, capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Within ±10% of the initial value Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less	
<b>Shear Test</b>	After applying the pressure load of 17.7N for 60 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on a substrate, there shall be found neither exfoliation nor its sign at the terminal electrode..	
<b>Terminal Strength</b>	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.	
<b>Failure Rate</b>	0.5% per 1000 hours at 85°C, V <sub>R</sub> with 0.1Ω/V series impedance, 60% confidence level.	