F93 Series

Resin-Molded Chip, Standard Tantalum J-Lead

FEATURES

- Compliant to the RoHS2 directive 2011/65/EU
- SMD J-lead

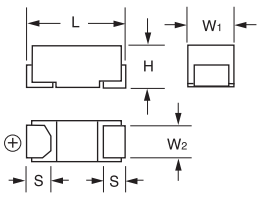
APPLICATIONS

- Low power DC/DC

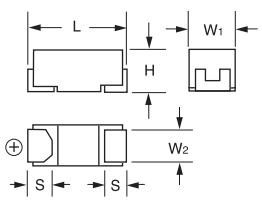
LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

A, B CASE



C, N CASE

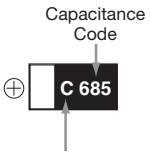


CASE DIMENSIONS: millimeters (inches)

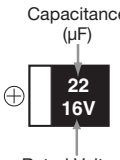
Code	L	W_1	W_2	H	S
A	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	1.20 ± 0.10 (0.047 ± 0.004)	1.60 ± 0.20 (0.063 ± 0.008)	0.80 ± 0.20 (0.031 ± 0.008)
B	3.50 ± 0.20 (0.126 ± 0.008)	2.80 ± 0.20 (0.110 ± 0.008)	2.20 ± 0.10 (0.087 ± 0.004)	1.90 ± 0.20 (0.075 ± 0.008)	0.80 ± 0.20 (0.031 ± 0.008)
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

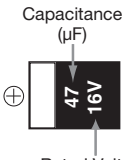
A CASE



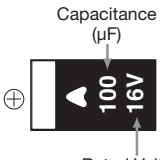
B CASE



C CASE



N CASE



4V	G	20V	D
6.3V	J	25V	E
10V	A	35V	V
16V	C		

HOW TO ORDER

F93	1A	106	M	A	□
Type	**Rated Voltage**	**Capacitance Code** pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** K = ±10% M = ±20%	**Case Size** See table above	**Packaging** See Tape & Reel Packaging Section

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	4V (0G)	6.3V (0J)	10V (1A)	16V (1C)	20V (1D)	25V (1E)	35V (1V)
0.68	684							A
1	105				A		A	A
1.5	155				A		A	A
2.2	225				A	A	A	A/B
3.3	335				A	A	A	B
4.7	475			A	A	A/B	A/B	B/C
6.8	685			A	A	A/B		C
10	106		A	A	A/B	A/B	B/C	C
15	156		A	A	A/B	C	C	N
22	226	A	A	A/B	A/B/C	B/C	C/N	N
33	336	A	A	A/B	B/C	C/N	N	
47	476	A	A/B	A/B/C	B*/C/N	C/N	N	
68	686	A	A/B	B/C	C/N	N*		
100	107	A/B	A/B/C	B/C/N	C/N			
150	157	B	B/C	C/N	N			
220	227	A*/B/C	B/C/N	N	N			
330	337	C	N	N				
470	447	N	N					
680	687	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

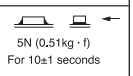
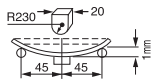
AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA)	DF (%) @ 120Hz	ESR (Ω) @ 100kHz	*1 ΔC/C (%)
4 Volt							
F930G226MAA	A	22	4	0.9	6	2.5	*
F930G336MAA	A	33	4	1.3	8	2.5	*
F930G476MAA	A	47	4	1.9	18	2.5	*
F930G686MAA	A	68	4	2.7	24	2.5	*
F930G107MAA	A	100	4	4.0	30	2.0	*
F930G107MBA	B	100	4	4.0	14	0.9	*
F930G157MBA	B	150	4	6.0	16	0.7	*
F930G227MBA	B	220	4	8.8	18	0.7	*
F930G227MCC	C	220	4	8.8	12	0.7	*
F930G337MCC	C	330	4	13.2	14	0.7	*
F930G477MNC	N	470	4	18.8	16	0.3	*
F930G687MNC	N	680	4	27.2	18	0.3	*
6.3 Volt							
F930J106MAA	A	10	6.3	0.6	6	3.0	*
F930J156MAA	A	15	6.3	0.9	6	2.9	*
F930J226MAA	A	22	6.3	1.4	8	2.5	*
F930J336MAA	A	33	6.3	2.1	8	2.5	*
F930J476MAA	A	47	6.3	3.0	18	2.5	*
F930J476MBA	B	47	6.3	3.0	6	1.0	*
F930J686MAA	A	68	6.3	4.3	20	2.0	*
F930J686MBA	B	68	6.3	4.3	8	1.0	*
F930J107MAA	A	100	6.3	6.3	35	2.0	±15
F930J107MBA	B	100	6.3	6.3	14	0.9	*
F930J107MCC	C	100	6.3	6.3	8	0.7	*
F930J157MBA	B	150	6.3	9.5	18	0.9	*
F930J157MCC	C	150	6.3	9.5	12	0.7	*
F930J227MBA	B	220	6.3	13.9	30	1.2	±15
F930J227MCC	C	220	6.3	13.9	14	0.7	*
F930J227MNC	N	220	6.3	13.9	10	0.5	*
F930J337MNC	N	330	6.3	20.8	14	0.5	*
F930J477MNC	N	470	6.3	29.6	16	0.3	*
10 Volt							
F931A475MAA	A	4.7	10	0.5	6	4.0	*
F931A685MAA	A	6.8	10	0.7	6	3.5	*
F931A106MAA	A	10	10	1.0	6	3.0	*
F931A156MAA	A	15	10	1.5	8	2.9	*
F931A226MAA	A	22	10	2.2	12	2.5	*
F931A226MBA	B	22	10	2.2	6	1.9	*
F931A336MAA	A	33	10	3.3	18	2.5	*
F931A336MBA	B	33	10	3.3	8	1.4	*
F931A476MAA	A	47	10	4.7	40	2.0	±15
F931A476MBA	B	47	10	4.7	8	1.0	*
F931A476MCC	C	47	10	4.7	6	0.9	*
F931A686MBA	B	68	10	6.8	12	0.9	±15
F931A686MCC	C	68	10	6.8	8	0.8	*
F931A107MBA	B	100	10	10.0	18	1.2	±15
F931A107MCC	C	100	10	10.0	10	0.7	*
F931A107MNC	N	100	10	10.0	8	0.6	*
F931A157MCC	C	150	10	15.0	14	0.7	*
F931A157MNC	N	150	10	15.0	10	0.6	*
F931A227MNC	N	220	10	22.0	12	0.5	*
F931A337MNC	N	330	10	33.0	18	0.5	*
16 Volt							
F931C105MAA	A	1	16	0.5	4	7.5	*
F931C155MAA	A	1.5	16	0.5	4	6.0	*
F931C225MAA	A	2.2	16	0.5	4	5.0	*
F931C335MAA	A	3.3	16	0.5	4	4.5	*
F931C475MAA	A	4.7	16	0.8	6	4.0	*
F931C685MAA	A	6.8	16	1.1	6	3.5	*
F931C106MAA	A	10	16	1.6	6	3.0	*
F931C106MBA	B	10	16	1.6	6	2.0	*
F931C156MAA	A	15	16	2.4	10	3.0	*
F931C156MBA	B	15	16	2.4	6	2.0	*
F931C226MAA	A	22	16	3.5	15	3.0	±15
F931C226MBA	B	22	16	3.5	8	1.9	*
F931C226MCC	C	22	16	3.5	6	1.1	*
F931C336MBA	B	33	16	5.3	8	1.9	*
F931C336MCC	C	33	16	5.3	6	1.1	*
F931C476MCC	C	47	16	7.5	8	0.9	*
F931C476MNC	N	47	16	7.5	6	0.7	*
F931C686MCC	C	68	16	10.9	10	0.8	±10
F931C686MNC	N	68	16	10.9	6	0.6	*
F931C107MCC	C	100	16	16.0	15	0.7	±10
F931C107MNC	N	100	16	16.0	10	0.6	*
F931C157MNC	N	150	16	24.0	15	0.6	*
F931C227MNC	N	220	16	35.2	25	0.7	±10
20 Volt							
F931D225MAA	A	2.2	20	0.5	4	5.0	*
F931D335MAA	A	3.3	20	0.7	4	4.5	*
F931D475MAA	A	4.7	20	0.9	6	3.0	*
F931D475MBA	B	4.7	20	0.9	6	2.8	*
F931D685MAA	A	6.8	20	1.4	6	3.5	*
F931D685MBA	B	6.8	20	1.4	6	2.5	*
F931D106MAA	A	10	20	2.0	8	3.5	*
F931D106MBA	B	10	20	2.0	6	2.1	*
F931D156MCC	C	15	20	3.0	6	1.2	*
F931D226MBA	B	22	20	4.4	8	1.9	*
F931D226MCC	C	22	20	4.4	8	1.1	*
F931D336MCC	C	33	20	6.6	8	1.1	*
F931D336MNC	N	33	20	6.6	6	0.7	*
F931D476MCC	C	47	20	9.4	10	1.1	*
F931D476MNC	N	47	20	9.4	8	0.7	*
25 Volt							
F931E105MAA	A	1	25	0.5	4	7.5	*
F931E155MAA	A	1.5	25	0.5	4	6.7	*
F931E225MAA	A	2.2	25	0.6	6	6.3	*
F931E335MAA	A	3.3	25	0.8	6	6.0	*
F931E475MAA	A	4.7	25	1.2	8	4.0	*
F931E475MBA	B	4.7	25	1.2	6	2.8	*
F931E106MBA	B	10	25	2.5	12	1.9	*
F931E106MCC	C	10	25	2.5	6	1.5	*
F931E156MCC	C	15	25	3.8	8	1.2	*
F931E226MCC	C	22	25	5.5	8	1.1	*
F931E226MNC	N	22	25	5.5	6	0.7	*
F931E336MNC	N	33	25	8.3	8	0.7	*
F931E476MNC	N	47	25	11.8	8	0.7	*
35 Volt							
F931V684MAA	A	0.68	35	0.5	4	7.6	*
F931V105MAA	A	1	35	0.5	4	7.5	*
F931V155MAA	A	1.5	35	0.5	6	7.5	*
F931V225MAA	A	2.2	35	0.8	6	7.0	*
F931V225MBA	B	2.2	35	0.8	4	3.8	*
F931V335MBA	B	3.3	35	1.2	4	3.5	*
F931V475MBA	B	4.7	35	1.6	8	3.1	*
F931V475MCC	C	4.7	35	1.6	6	1.8	*
F931V685MCC	C	6.8	35	2.4	6	1.8	*
F931V106MCC	C	10	35	3.5	6	1.6	*
F931V156MNC	N	15	35	5.3	6	0.7	*
F931V226MNC	N	22	35	7.7	8	0.7	*

*1: ΔC/C Marked "∗"

Item	All Case (%)
Damp Heat	±10
Temperature cycles	±5
Resistance soldering heat	±5
Surge	±5
Endurance	±10

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

QUALIFICATION TABLE

TEST	F93 series (Temperature range -55ºC to +125ºC) Condition
Damp Heat (Steady State)	At 40°C, 90 to 95% R.H., 500 hours (No voltage applied) Capacitance Change ..... Refer to page 20 (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Temperature Cycles	-55°C / +125°C, 30 minutes each, 5 cycles Capacitance Change ..... Refer to page 20 (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Resistance to Soldering Heat	10 seconds reflow at 260°C, 5 seconds immersion at 260°C. Capacitance Change ..... Refer to page 20 (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Surge	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 85ºC, capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Refer to page 20 (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Endurance	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 ..... Refer to page 20 (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 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. 
Terminal Strength	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 substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. 
Failure Rate	1% per 1000 hours at 85°C, VR with 0.1Ω/V series impedance, 60% confidence level.

We can supply the type of compliance to AEC-Q200. Please contact to your local AVX sales office when these series are being designed in your application.