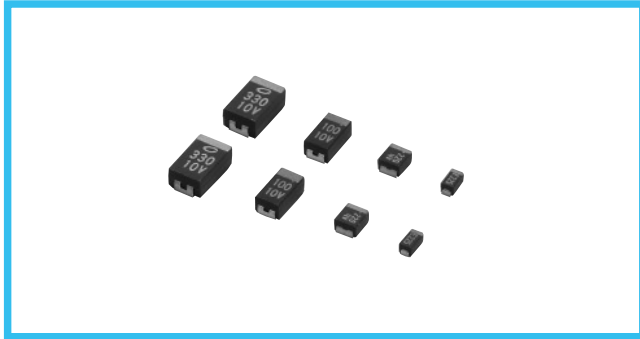
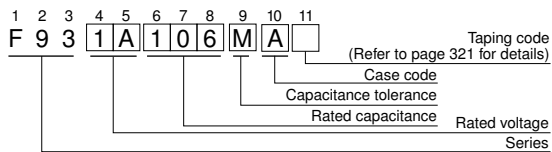


F93Resin-molded Chip,
Standard Series

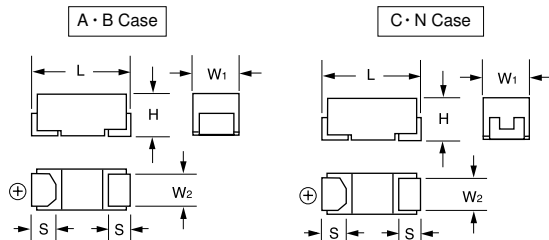
- Compliant to the RoHS directive (2002/95/EC).



■ Type numbering system (Example: 10V 10μF)



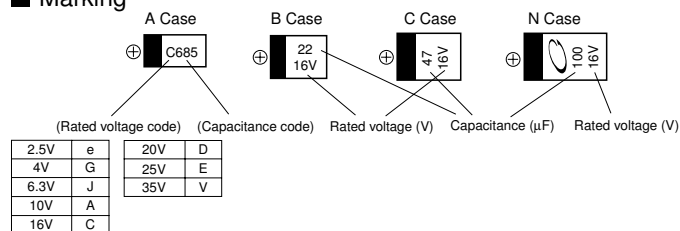
■ Drawing



■ Dimensions

Case code	L	W ₁	W ₂	H	S
A	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
B	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
N	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2

■ Marking



■ Standard Ratings

Cap. (μF)	V	4	6.3	10	16	20	25	35
Code		0G	0J	1A	1C	1D	1E	1V
0.68	684							A
1	105						A	A
1.5	155						A	A
2.2	225						A	A
3.3	335						A	B
4.7	475						A	B
6.8	685						A	B
10	106			A	A	A	A	C
15	156		A	A	A	A	A	C
22	226	A	A	A	A	A	A	C
33	336	A	A	A	A	A	A	C
47	476	A	A	A	A	A	A	C
68	686	A	A	A	A	A	A	C
100	107	A	A	A	A	A	A	C
150	157	B	B	B	B	B	B	C
220	227	(A) · B · C	B · C · N	N	N	N	N	C
330	337	C	N	N	N	N	N	C
470	477	N	N	N	N	N	N	C
680	687	N	N	N	N	N	N	C

■ Specifications

Item	Performance Characteristics
Category	–55 to +125°C (Rated temperature : +85°C)
Temperature Range	
Capacitance Tolerance	±20%, ±10% (at 120Hz)
Dissipation Factor (120Hz)	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)
Damp Heat (Steady State)	At 40°C 90 to 95% R.H. 500 hours (No voltage applied) Capacitance Change...Refer to next page (* 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 next page (* 1) Dissipation Factor...Initial specified value or less Leakage Current...Initial specified value or less
Resistance to Soldering Heat	Test condition: 10 seconds reflow at 260°C, 5 seconds immersion at 260°C Capacitance Change...Refer to next page (* 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 85°C, capacitors meet the characteristics requirements listed below. Capacitance Change...Refer to next page (* 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 meet the characteristic requirements listed below. Capacitance Change...Refer to next page (* 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 an aluminum 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 the capacitor, the pressure strength is applied with a specified jig at the center of the substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.

* As for the surge and derated voltage at 125°C, refer to page 320 for details.

() The series in parentheses are being developed.

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

CAT.8100Z

F93

■ Standard Ratings

Rated Volt	Rated Capacitance (μF)	Case code	Part Number	Leakage Current (μA)	Dissipation Factor (%@120Hz)	ESR (Ω@100kHz)	*1 ΔC/C (%)
4V	22	A	F930G226MAA	0.9	6	2.5	*
	33	A	F930G336MAA	1.3	8	2.5	*
	47	A	F930G476MAA	1.9	18	2.5	*
	68	A	F930G686MAA	2.7	24	2.5	*
	100	A	F930G107MAA	4.0	30	2.0	*
	100	B	F930G107MBA	4.0	14	0.9	*
	150	B	F930G157MBA	6.0	16	0.7	*
	220	B	F930G227MBA	8.8	18	0.7	*
	220	C	F930G227MCC	8.8	12	0.7	*
	330	C	F930G337MCC	13.2	14	0.7	*
6.3V	470	N	F930G477MNC	18.8	16	0.3	*
	680	N	F930G687MNC	27.2	18	0.3	*
	10	A	F930J106MAA	0.6	6	3.0	*
	15	A	F930J156MAA	0.9	6	2.9	*
	22	A	F930J226MAA	1.4	8	2.5	*
	33	A	F930J336MAA	2.1	8	2.5	*
	47	A	F930J476MAA	3.0	18	2.5	*
	47	B	F930J476MBA	3.0	6	1.0	*
	68	A	F930J686MAA	4.3	20	2.0	*
	68	B	F930J686MBA	4.3	8	1.0	*
10V	100	A	F930J107MAA	6.3	35	2.0	±15
	100	B	F930J107MBA	6.3	14	0.9	*
	100	C	F930J107MCC	6.3	8	0.7	*
	150	B	F930J157MBA	9.5	18	0.9	*
	150	C	F930J157MCC	9.5	12	0.7	*
	220	B	F930J227MBA	13.9	30	1.2	±15
	220	C	F930J227MCC	13.9	14	0.7	*
	220	N	F930J227MNC	13.9	10	0.5	*
	330	N	F930J337MNC	20.8	14	0.5	*
	470	N	F930J477MNC	29.6	16	0.3	*
10V	6.8	A	F931A685MAA	0.7	6	3.5	*
	10	A	F931A106MAA	1.0	6	3.0	*
	15	A	F931A156MAA	1.5	8	2.9	*
	22	A	F931A226MAA	2.2	12	2.5	*
	33	A	F931A336MAA	3.3	18	2.5	*
	33	B	F931A336MBA	3.3	8	1.4	*
	47	A	F931A476MAA	4.7	40	2.0	±15
	47	B	F931A476MBA	4.7	8	1.0	*
	47	C	F931A476MCC	4.7	6	0.9	*
	68	B	F931A686MBA	6.8	12	0.9	±15
10V	68	C	F931A686MCC	6.8	8	0.8	*
	100	B	F931A107MBA	10.0	18	1.2	±15
	100	C	F931A107MCC	10.0	10	0.7	*
	100	N	F931A107MNC	10.0	8	0.6	*
	150	C	F931A157MCC	15.0	14	0.7	*
	150	N	F931A157MNC	15.0	10	0.6	*
	220	N	F931A227MNC	22.0	12	0.5	*
	330	N	F931A337MNC	33.0	18	0.5	*

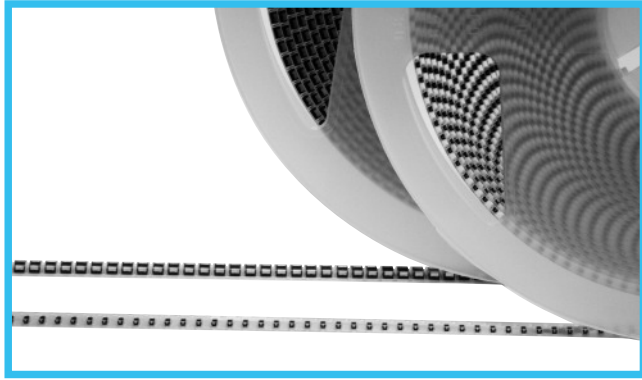
*1 : ΔC/C

Item	A · B · C · N Case (%)
Damp Heat	±10
Temperature cycles	±5
Resistance soldering heat	±5
Surge	±5
Endurance	±10

Rated Volt	Rated Capacitance (μF)	Case code	Part Number	Leakage Current (μA)	Dissipation Factor (%@120Hz)	ESR (Ω@100kHz)	*1 ΔC/C (%)
16V	2.2	A	F931C225MAA	0.5	4	5.0	*
	3.3	A	F931C335MAA	0.5	4	4.5	*
	4.7	A	F931C475MAA	0.8	6	4.0	*
	6.8	A	F931C685MAA	1.1	6	3.5	*
	10	A	F931C106MAA	1.6	6	3.0	*
	10	B	F931C106MBA	1.6	6	2.0	*
	15	A	F931C156MAA	2.4	10	3.0	*
	15	B	F931C156MBA	2.4	6	2.0	*
	22	A	F931C226MAA	3.5	15	3.0	±15
	22	B	F931C226MBA	3.5	8	1.9	*
16V	22	C	F931C226MCC	3.5	6	1.1	*
	33	B	F931C336MBA	5.3	8	1.9	*
	33	C	F931C336MCC	5.3	6	1.1	*
	47	C	F931C476MCC	7.5	8	0.9	*
	47	N	F931C476MNC	7.5	6	0.7	*
	68	N	F931C686MNC	10.9	6	0.6	*
	100	C	F931C107MCC	16.0	15	0.7	±10
	100	N	F931C107MNC	16.0	10	0.6	*
	150	N	F931C157MNC	24.0	15	0.6	*
	220	N	F931C227MNC	35.2	25	0.7	±10
20V	2.2	A	F931D225MAA	0.5	4	5.0	*
	3.3	A	F931D335MAA	0.7	4	4.5	*
	4.7	A	F931D475MAA	0.9	6	3.0	*
	4.7	B	F931D475MBA	0.9	6	2.8	*
	6.8	A	F931D685MAA	1.4	6	3.5	*
	6.8	B	F931D685MBA	1.4	6	2.5	*
	10	A	F931D106MAA	2.0	8	3.5	*
	10	B	F931D106MBA	2.0	6	2.1	*
	15	C	F931D156MCC	3.0	6	1.2	*
	22	B	F931D226MBA	4.4	8	1.9	*
20V	22	C	F931D226MCC	4.4	8	1.1	*
	33	C	F931D336MCC	6.6	8	1.1	*
	33	N	F931D336MNC	6.6	6	0.7	*
	47	C	F931D476MCC	9.4	10	1.1	*
	47	N	F931D476MNC	9.4	8	0.7	*
25V	1	A	F931E105MAA	0.5	4	7.5	*
	1.5	A	F931E155MAA	0.5	4	6.7	*
	2.2	A	F931E225MAA	0.6	6	6.3	*
	3.3	A	F931E335MAA	0.8	6	6.0	*
	4.7	A	F931E475MAA	1.2	8	4.0	*
	4.7	B	F931E475MBA	1.2	6	2.8	*
	10	B	F931E106MBA	2.5	12	1.9	*
	10	C	F931E106MCC	2.5	6	1.5	*
	15	C	F931E156MCC	3.8	8	1.2	*
	22	C	F931E226MCC	5.5	8	1.1	*
25V	22	N	F931E226MNC	5.5	6	0.7	*
	33	N	F931E336MNC	8.3	8	0.7	*
	47	N	F931E476MNC	11.8	8	0.7	*
35V	0.68	A	F931V684MAA	0.5	4	7.6	*
	1	A	F931V105MAA	0.5	4	7.5	*
	1.5	A	F931V155MAA	0.5	6	7.5	*
	2.2	A	F931V225MAA	0.8	6	7.0	*
	2.2	B	F931V225MBA	0.8	4	3.8	*
	3.3	B	F931V335MBA	1.2	4	3.5	*
	4.7	B	F931V475MBA	1.6	8	3.1	*
	4.7	C	F931V475MCC	1.6	6	1.8	*
	6.8	C	F931V685MCC	2.4	6	1.8	*
	10	C	F931V106MCC	3.5	6	1.6	*
35V	15	N	F931V156MNC	5.3	6	0.7	*
	22	N	F931V226MNC	7.7	8	0.7	*

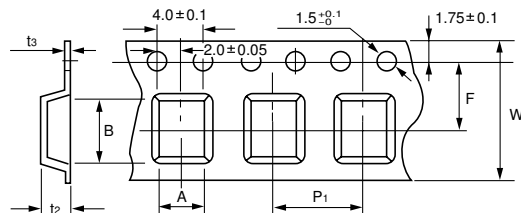
* In case of capacitance tolerance ±10% type, [K] will be put at 9th digit of type numbering system.

Taping Specifications for Automatic Insertion (Chip Type Capacitors)

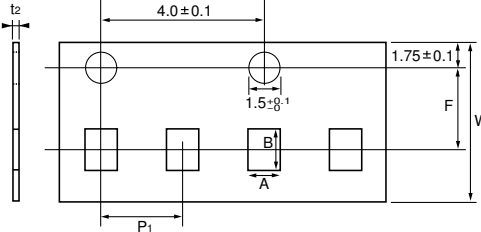


Carrier Tape Dimensions (mm)

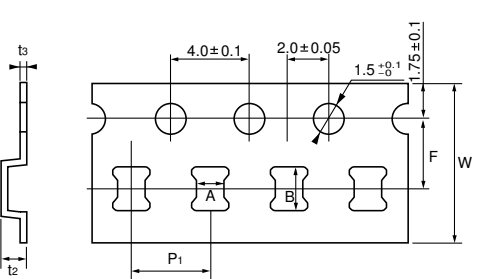
F91 · F92 · F93 · F97 · F98 M



F98U

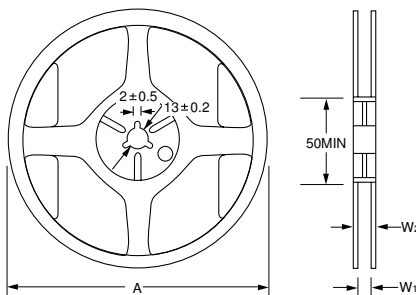


F98 S



Case code	W	A	B	F	P ₁	t ₂	t ₃
U	8.0±0.3	0.73±0.08	1.20±0.05	3.5±0.05	2.0±0.1	0.7MAX.	—
M		0.97±0.05	1.85±0.05	3.5±0.05		0.95±0.05	0.20±0.05
S		1.35±0.1	2.15±0.1	3.5±0.1		1.4MAX.	
P	8.0±0.3	1.55±0.1	2.3±0.1		4.0±0.1	(1.7MAX.)	
A		1.9±0.1	3.5±0.1	3.5±0.05		2.1MAX. (1.7)	
B		3.3±0.1	3.8±0.1			2.4MAX. (1.7)	
C	12.0±0.3	3.6±0.1	6.3±0.1	5.5±0.05	8.0±0.1	2.9MAX.	
N		4.8±0.1	7.7±0.1			3.5MAX.	

Reel Dimensions (mm)



Item	Reel Diameter (mm)	
	φ180	φ330
A	φ180 ±0.3	φ330 ±2

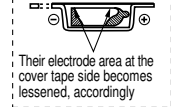
Item	Tape width (mm)	
	8	12
W ₁	9.0 ±0.3	13 ±0.3
W ₂	11.4 ±1.0	15.4 ±1.0

Note: The above shows the dimensions of φ180 reel.
In case of φ330 reel, the appearance shape is slightly different.

Type numbering system

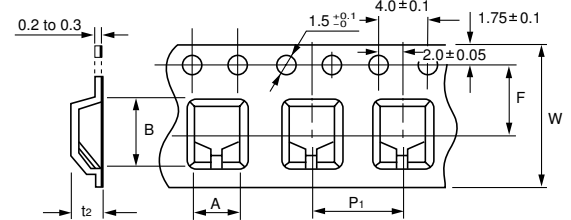
1	2	3	4	5	6	7	8	9	10	11	12	13	14
F	9	3	0	J	1	0	6	M	A	A			
F	9	5	1	V	1	5	5	M	A	A	Q	2	
Series			Rated capacitance			Case code			Capacitance tolerance				

F95 series have single-side electrode structures as illustrated below, code "AQ2" is added at the end of each type number to distinguish from other case sizes.



Tape Width (mm)	Polarity	Taping code		Applicable case size		
		Reel Dia φ180 mm	Reel Dia φ330 mm	F91 · F92 · F93 · F97 · F98	F95 · MUSE F95	F72 · F75
8	R (Anode is at opposite side of feeding holes.)	A	E	M · S · P A · B	P · Q · S A · T · B R	—
12	R (Anode is at opposite side of feeding holes.)	C	G	C · N	—	U · C · D R · M

F95 · MUSE F95 · F72 · F75



Type	Case code	W	A	B	F	P ₁	t ₂
F95 · MUSE F95	R	8.0±0.3	1.4±0.2	2.6±0.2	3.5±0.05	4.0±0.1	1.05MAX.
	P		2.0±0.2	3.6±0.2			1.5MAX.
	Q · S		2.1±0.2	3.7±0.2			1.5MAX.
	A		3.0±0.2	3.6±0.2			2.0MAX.
	T		3.1±0.2	3.7±0.2			1.5MAX.
F72	B	12.0±0.3	6.5±0.2	7.6±0.2	5.5±0.1	8.0±0.1	2.4MAX.
	R		6.5±0.2	7.6±0.2			2.2MAX.
	M		3.7±0.2	7.6±0.2			2.5MAX.
F75	U		4.8±0.2	7.9±0.2			2.7MAX.
	C		6.5±0.2	7.6±0.2			3.6MAX.
	D						3.9MAX.
	R						4.6MAX.

Standard Packaging Quantity

Series	Case code	Qty (pcs./reel)	
		Reel Dia. φ180	Reel Dia. φ330
F98	U	10000	—
	M · S	4000	—
F92	P	3000	8000
	A · B	2500	8000
F91	A	2000	8000
	B	2000	6000
F93	C · N	500	2500
	R · P	3000	10000
F95	Q · S · A · T	2500	10000
	B	2000	8500
F72	R	1000	—
	M	500	—
F75	U · C · D · R	500	—