SOLID TANTALUM ELECTROLYTIC CAPACITORS

nichicon

F95 Conformal coated Chip

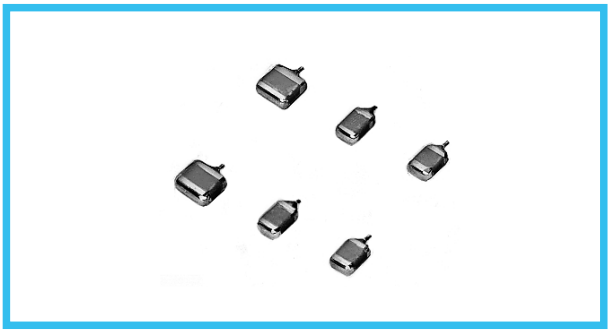
FRAMELESS™

For SMD | Smaller | For High Frequency

25-06191

F951C475MPAAQ

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

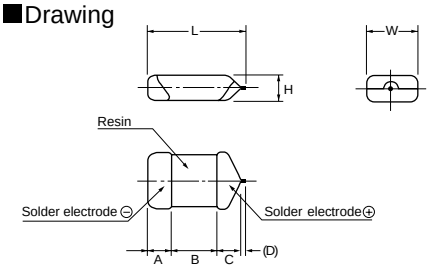


■Type numbering system (Example : 35V 1.5µF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
F	9	5	1	V	1	5	5	M	A		A	Q	2

- 12 13 14: Single face electrode
- 11: Taping code (Refer to page 309 for details)
- 10: Case code
- 9: Capacitance tolerance
- 8 7 6: Rated capacitance
- 5 4: Rated voltage
- 3 2 1: Series

■Drawing



Single-side electrodes
(Both electrodes at bottom side only)

■ Dimensions

(mm)

Case code	L	W	H	A	B	C	(D)
R	2.2 ± 0.3	1.25 ± 0.3	0.65MAX.	0.6 ± 0.3	0.8 ± 0.3	0.5MIN	(0.2)
P	2.2 ± 0.3	1.25 ± 0.3	1.0 ± 0.2	0.6 ± 0.3	0.8 ± 0.3	0.8 ± 0.3	(0.2)
Q	3.2 ± 0.2	1.6 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	1.2 ± 0.2	0.8 ± 0.2	(0.2)
S	3.2 ± 0.3	1.6 ± 0.3	1.0 ± 0.2	0.8 ± 0.3	1.2 ± 0.3	0.8 ± 0.3	(0.2)
A	3.2 ± 0.3	1.7 ± 0.3	1.4 ± 0.2	0.8 ± 0.3	1.2 ± 0.3	0.8 ± 0.3	(0.2)
T	3.5 ± 0.2	2.7 ± 0.2	1.0 ± 0.2	0.8 ± 0.2	1.2 ± 0.2	1.1 ± 0.2	(0.2)
B	3.3 ± 0.3	2.7 ± 0.3	1.8 ± 0.2	0.8 ± 0.3	1.2 ± 0.3	1.1 ± 0.3	(0.2)

D dimension only for reference

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 to +125˚C (Rated temperature : 85˚C)
Capacitance Tolerance	±20%, ±10% (at 120Hz) (However P Case ±20%)
Dissipation Factor (at 120Hz)	Refer to next page
ESR(100kHz)	Refer to next page
Leakage Current	Refer to next page Provided that • After 1 minute's application of rated voltage, leakage current at 85˚C, 10 times or less than 20˚C specified value. • After 1 minute's application of rated voltage, leakage current at 125˚C, 12.5 times or less than 20˚C specified value.
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., For 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	At −55˚C / +125˚C, 30 minutes each, For 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	Dipping Flow at 260˚C for 10 seconds, reflow at 260˚C for 10 seconds 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 at 85˚C, or derated voltage 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 neither exfoliation nor its sign at the terminal electrode. 5N (0.51kg・f) For 10 ± 1 seconds
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. R230 20 1mm 45 45

＊As for the surge and derated voltage at 125˚C, refer to page 308 for details.

■ Standard Ratings

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

( ) The series in parentheses are being developed.

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

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■ Standard Ratings

Rated Volt	Rated Capacitance (μF)	Case code	Part Number	*2 Leakage Current (μA)	Disspation Factor (%@120Hz)	ESR (Ω@100kHz)	*1 ΔC/C (%)
4V	15	P	F950G156MPAAQ2	0.6	10	1.8	*
	22	P	F950G226MPAAQ2	0.9	14	1.1	*
	33	P	F950G336MPAAQ2	1.3	14	1.1	*
	47	P	F950G476MPAAQ2	1.9	14	1.1	*
	47	Q	F950G476MQAAQ2	1.9	10	1.1	*
	47	S	F950G476MSAAQ2	1.9	10	0.8	*
	47	A	F950G476MAAAQ2	1.9	8	0.6	*
	68	S	F950G686MSAAQ2	2.7	10	0.8	*
	68	A	F950G686MAAAQ2	2.7	10	0.5	*
	100	P	F950G107MPAAQ2	4.0	30	1.2	±15
	100	Q	F950G107MQAAQ2	4.0	25	1.0	±15
	100	S	F950G107MSAAQ2	4.0	14	0.8	*
	100	A	F950G107MAAAQ2	4.0	12	0.5	*
	150	P	F950G157MPAAQ2	12.0	31	1.1	±20
	150	B	F950G157MBAAQ2	6.0	14	0.4	*
	220	Q	F950G227MQAAQ2	8.8	30	1.5	±20
	220	S	F950G227MSAAQ2	8.8	30	0.8	±15
	220	A	F950G227MAAAQ2	8.8	25	0.8	±15
	220	T	F950G227MTAAQ2	8.8	25	0.6	*
	220	B	F950G227MBAAQ2	8.8	16	0.4	*
	330	A	F950G337MAAAQ2	13.2	40	0.8	±20
	330	T	F950G337MTAAQ2	13.2	40	0.8	±20
	330	B	F950G337MBAAQ2	13.2	30	0.6	±15
	470	B	F950G477MBAAQ2	18.8	40	0.4	±20
6.3V	10	P	F950J106MPAAQ2	0.6	8	2.0	*
	15	P	F950J156MPAAQ2	0.9	10	1.8	*
	22	R	F950J226MRAAQ2	1.4	20	2.0	±20
	22	P	F950J226MPAAQ2	1.4	14	1.1	*
	33	P	F950J336MPAAQ2	2.1	14	1.1	*
	33	Q	F950J336MQAAQ2	2.1	10	2.0	*
	33	S	F950J336MSAAQ2	2.1	10	1.0	*
	33	A	F950J336MAAAQ2	2.1	8	0.8	*
	47	P	F950J476MPAAQ2	3.0	20	1.1	±15
	47	Q	F950J476MQAAQ2	3.0	10	1.1	*
	47	S	F950J476MSAAQ2	3.0	10	0.9	*
	47	A	F950J476MAAAQ2	3.0	10	0.6	*
	68	P	F950J686MPAAQ2	4.3	25	1.2	±15
	68	S	F950J686MSAAQ2	4.3	14	0.9	*
	68	A	F950J686MAAAQ2	4.3	12	0.5	*
	100	P	F950J107MPAAQ2	12.6	35	1.2	±20
	100	Q	F950J107MQAAQ2	6.3	30	1.1	±20
	100	S	F950J107MSAAQ2	6.3	20	0.9	±15
	100	A	F950J107MAAAQ2	6.3	14	0.5	*
	100	T	F950J107MTAAQ2	6.3	14	0.6	*
	100	B	F950J107MBAAQ2	6.3	14	0.4	*
	150	B	F950J157MBAAQ2	9.5	18	0.4	*
	220	B	F950J227MBAAQ2	13.9	30	0.4	*
	330	B	F950J337MBAAQ2	20.8	35	0.6	±20
10V	3.3	P	F951A335MPAAQ2	0.5	8	5.0	*
	4.7	P	F951A475MPAAQ2	0.5	8	4.0	*
	6.8	P	F951A685MPAAQ2	0.7	8	4.0	*
	10	R	F951A106MRAAQ2	1.0	18	3.0	±20
	10	P	F951A106MPAAQ2	1.0	8	3.0	*
	15	P	F951A156MPAAQ2	1.5	10	3.0	*
	22	P	F951A226MPAAQ2	2.2	14	3.0	*
	22	Q	F951A226MQAAQ2	2.2	10	2.0	*
	22	S	F951A226MSAAQ2	2.2	10	1.1	*
	22	A	F951A226MAAAQ2	2.2	6	0.9	*
	33	P	F951A336MPAAQ2	3.3	20	3.0	±15
	33	Q	F951A336MQAAQ2	3.3	18	3.0	±15
	33	S	F951A336MSAAQ2	3.3	10	1.1	*
	33	A	F951A336MAAAQ2	3.3	10	0.8	*
	47	S	F951A476MSAAQ2	4.7	14	1.1	±15
	47	A	F951A476MAAAQ2	4.7	10	0.8	*
	47	T	F951A476MTAAQ2	4.7	12	0.8	*
	47	B	F951A476MBAAQ2	4.7	8	0.4	*

Rated Volt	Rated Capacitance (μF)	Case code	Part Number	*2 Leakage Current (μA)	Disspation Factor (%@120Hz)	ESR (Ω@100kHz)	*1 ΔC/C (%)
10V	68	B	F951A686MBAAQ2	6.8	12	0.4	*
	100	A	F951A107MAAAQ2	10.0	35	1.0	±15
	100	T	F951A107MTAAQ2	10.0	20	0.6	±15
	100	B	F951A107MBAAQ2	10.0	14	0.4	*
16V	1	P	F951C105MPAAQ2	0.5	8	8.0	*
	1.5	P	F951C155MPAAQ2	0.5	8	8.0	*
	2.2	P	F951C225MPAAQ2	0.5	8	6.0	*
	3.3	P	F951C335MPAAQ2	0.5	8	6.0	*
	4.7	R	F951C475MRAAQ2	0.8	12	6.0	±20
	4.7	P	F951C475MPAAQ2	0.8	10	4.0	*
	10	P	F951C106MPAAQ2	1.6	10	4.0	*
	10	Q	F951C106MQAAQ2	1.6	8	3.0	*
	10	S	F951C106MSAAQ2	1.6	8	2.0	*
	10	A	F951C106MAAAQ2	1.6	6	1.4	*
	15	S	F951C156MSAAQ2	2.4	8	2.0	*
	15	A	F951C156MAAAQ2	2.4	8	1.4	*
	22	Q	F951C226MQAAQ2	3.5	12	3.0	*
	22	S	F951C226MSAAQ2	3.5	10	2.0	±15
	22	A	F951C226MAAAQ2	3.5	8	1.4	*
	22	T	F951C226MTAAQ2	3.5	8	1.4	*
	22	B	F951C226MBAAQ2	3.5	6	0.5	*
	33	B	F951C336MBAAQ2	5.3	8	0.5	*
	47	B	F951C476MBAAQ2	7.5	10	0.6	*
20V	2.2	P	F951D225MPAAQ2	0.5	6	6.0	*
	2.2	S	F951D225MSAAQ2	0.5	6	5.0	*
	3.3	A	F951D335MAAAQ2	0.7	6	2.0	*
	4.7	S	F951D475MSAAQ2	0.9	8	4.0	*
	4.7	A	F951D475MAAAQ2	0.9	6	1.5	*
	6.8	Q	F951D685MQAAQ2	1.4	10	4.0	*
	6.8	A	F951D685MAAAQ2	1.4	8	1.5	*
	10	A	F951D106MAAAQ2	2.0	8	1.5	*
	10	B	F951D106MBAAQ2	2.0	6	0.8	*
	22	B	F951D226MBAAQ2	4.4	8	0.8	*
25V	1	R	F951E105MRAAQ2	0.5	10	10.0	±10
	1	P	F951E105MPAAQ2	0.5	6	8.0	*
	1	S	F951E105MSAAQ2	0.5	6	8.0	*
	1.5	S	F951E155MSAAQ2	0.5	6	7.0	*
	2.2	R	F951E225MRAAQ2	0.6	15	15.0	±20
	2.2	P	F951E225MPAAQ2	0.6	8	6.0	±15
	2.2	S	F951E225MSAAQ2	0.6	6	7.0	*
	2.2	A	F951E225MAAAQ2	0.6	6	3.2	*
	3.3	A	F951E335MAAAQ2	0.8	6	2.8	*
	4.7	P	F951E475MPAAQ2	1.2	10	8.0	±15
	4.7	Q	F951E475MQAAQ2	1.2	10	4.0	±15
	4.7	S	F951E475MSAAQ2	1.2	8	4.0	*
	4.7	A	F951E475MAAAQ2	1.2	8	2.0	*
	10	A	F951E106MAAAQ2	2.5	12	2.0	±15
	10	B	F951E106MBAAQ2	2.5	6	0.9	*
35V	1	P	F951V105MPAAQ2	0.5	8	10.0	±10
	1	S	F951V105MSAAQ2	0.5	6	8.0	*
	1	A	F951V105MAAAQ2	0.5	4	4.4	*
	1.5	A	F951V155MAAAQ2	0.5	6	4.4	*
	2.2	A	F951V225MAAAQ2	0.8	6	4.4	*
	3.3	B	F951V335MBAAQ2	1.2	6	1.6	*
	4.7	B	F951V475MBAAQ2	1.7	6	1.6	*

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

*1 : ΔC/C

Item	P・Q・S・A・T・B Case (%)
Damp Heat	±10
Tempereature cycles	±5
Resistance soldering heat	±5
Surge	±5
Endurance	±10

*2 : Leakage Current
After 1 minute's application of rated voltage, leakage current at 20˚C.