

# F38 Series

## Conductive Polymer, Miniature, Undertab Solid Electrolytic Chip Capacitors



### FEATURES

- Conductive Polymer Electrode
- Benign Failure Mode Under Recommended Use Conditions
- Compliant to the RoHS3 directive 2015/863/EU
- SMD Facedown
- Small and Low Profile
- High Volumetric Efficiency
- 100% Surge Current Tested



### APPLICATIONS

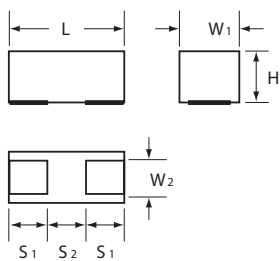
- Smartphone
- Tablet PC
- Wireless Module
- Portable Game
- Bulk Decoupling of SoC (System on Chip)

### CASE DIMENSIONS:

millimeters (inches)

Code	EIA Code	EIA Metric	L	W <sub>1</sub>	W <sub>2</sub>	H	S <sub>1</sub>	S <sub>2</sub>
M	0603	1608-09	1.60 <sup>+0.20</sup> <sub>-0.10</sub> (0.063 <sup>+0.008</sup> <sub>-0.004</sub> )	0.85 <sup>+0.20</sup> <sub>-0.10</sub> (0.033 <sup>+0.008</sup> <sub>-0.004</sub> )	0.65±0.10 (0.026±0.004)	0.80±0.10 <sup>-1</sup> (0.031±0.004)	0.50±0.10 (0.020±0.004)	0.60±0.10 (0.024±0.004)
S	0805	2012-09	2.00 <sup>+0.20</sup> <sub>-0.10</sub> (0.079 <sup>+0.008</sup> <sub>-0.004</sub> )	1.25 <sup>+0.20</sup> <sub>-0.10</sub> (0.049 <sup>+0.008</sup> <sub>-0.004</sub> )	0.90±0.10 (0.035±0.004)	0.80±0.10 (0.031±0.004)	0.50±0.10 (0.020±0.004)	1.00±0.10 (0.039±0.004)
U	0402	1106-06	1.10±0.05 (0.043±0.002)	0.60±0.05 (0.024±0.002)	0.35±0.05 (0.014±0.002)	0.55±0.05 (0.022±0.002)	0.30±0.05 (0.012±0.002)	0.50±0.05 (0.020±0.002)

### \*1 F380J476MMAAXE: 1.0mm Max.



### MARKING

U CASE

M CASE

S CASE



Rated Voltage Code

Rated Voltage Code

\*Capacitance Code

### HOW TO ORDER

**F38**

Type

**1A**

Rated Voltage

**225**

Capacitance Code

pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

**M**

Tolerance M=±20%

**M**

Case Size See table above



Packaging

Reel Dia (φ180)	Tape Width (mm)
A	8



Special Code

AXE = Rated temperature 60°C and H dimension 1.0mm Max.  
 AXEH3 = Rated temperature 60°C and H dimension 1.0mm Max., Low ESR  
 LZT = Rated temperature 60°C  
 LZTH1 = Rated temperature 60°C, Low ESR  
 AH1, AH2, AH3 = Low ESR

### TECHNICAL SPECIFICATIONS

Category Temperature Range:	-55 to +105°C
Rated Range:	+85°C or +60°C (*2)
Capacitance Tolerance:	±20% at 120Hz
Dissipation Factor:	Refer to next page (120Hz)
ESR 100kHz:	Refer to next page (120Hz)
Leaking Current:	Refer to next page At 20°C after application of rated voltage for 5 minutes Provided that: After 5 minute's application of rated voltage, leakage current at 105°C 10 times or less than 20°C specified value.
Termination Finish:	M, S case: Gold Plating (standard), U case: Sn-3.5Ag Plating (standard)

\*2 LZT and AXE: Rated temperature +60°C, Surge and Endurance test temperature +60°C



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at [www.avx.com/disclaimer/](http://www.avx.com/disclaimer/) by reference and should be reviewed in full before placing any order.

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

Capacitance		Rated Voltage					*Cap Code
µF	Code	4V (0G)	6.3V (0J)	8V (0K)	10V (1A)	25V (1E)	
1.0	105		U				A
2.2	225				M	M	J
4.7	475		U		M/S	S	S
10	106		M/M(AH1,AH2)/S/U		M/M(AH1)/S		a
22	226		M/M(AH3,AH1)/S/S(AH1)		M*/S		j
33	336		M**/S		S**		n
47	476		M**/M**(H3)/S/S(AH1)	S	S**		s
68	686		S**				w
100	107	S**	S**/S**(H1)				A

Released ratings. (Low ESR)

\*4 (AXE) Rated temperature 60°C and H dimension 1.0mm Max. Please contact AVX when you need detail spec.

\*\* (LZT) Rated temperature 60°C. Please contact AVX when you need detail spec.

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

### THE CORRELATIONS AMONG RATED VOLTAGE, SURGE VOLTAGE AND DERATED VOLTAGE

	F38 (Standard)			
Rated Voltage (V) ≤85°C	6.3	8	10	25
85°C Surge Voltage (V)	8	10	13	32
105°C Derated Voltage (V)	5	6.3	8	20

	F38-LZT, F38-AXE		
Rated Voltage (V) ≤60°C	4	6.3	10
60°C Surge Voltage (V)	5.2	8	13
85°C Derated Voltage (V)	2.8	4.5	7.2
105°C Derated Voltage (V)	2	3.3	5

### RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA)	DF @ 120Hz (%)	ESR @ 100kHz (mΩ)	100kHz RMS Current (mA)				*3 ΔC/C (%)	MSL
							45°C	60°C	85°C	105°C		
<b>4 Volt</b>												
F380G107MSALZT	S	100	4	80.0	10	200	474	332	-	237	*	3
<b>6.3 Volt</b>												
F380J105MUA	U	1	6.3	0.6	6	1500	100	-	70	50	*	3
F380J475MUA	U	4.7	6.3	20.0	10	1500	100	-	70	50	*	3
F380J106MMA	M	10	6.3	10.0	8	500	224	-	157	112	*	3
F380J106MMAAH1	M	10	6.3	10.0	8	300	289	-	202	144	*	3
F380J106MMAAH2	M	10	6.3	10.0	8	200	354	-	247	177	*	3
F380J106MSA	S	10	6.3	6.3	10	250	424	-	297	212	*	3
F380J106MUA	U	10	6.3	20.0	10	1500	100	-	70	50	*	3
F380J226MMA	M	22	6.3	13.9	10	500	224	-	157	112	*	3
F380J226MMAAH3	M	22	6.3	13.9	10	300	289	-	202	144	*	3
F380J226MMAAH1	M	22	6.3	13.9	10	200	354	-	247	177	*	3
F380J226MSA	S	22	6.3	13.9	10	200	474	-	332	237	*	3
F380J226MSAAH1	S	22	6.3	13.9	10	150	548	-	383	274	*	3
F380J336MMAALZT	M	33	6.3	41.6	10	500	224	157	-	112	*	3
F380J336MSA	S	33	6.3	20.8	10	200	474	-	332	237	*	3
F380J476MMAAXE	M	47	6.3	59.2	10	500	224	157	-	112	*	3
F380J476MMAAXEH3	M	47	6.3	59.2	10	300	289	202	-	144	*	3
F380J476MSA	S	47	6.3	29.6	10	200	474	-	332	237	*	3
F380J476MSAAH1	S	47	6.3	29.6	10	150	548	-	383	274	*	3
F380J686MSALZT	S	68	6.3	86.0	10	200	474	332	-	237	*	3
F380J107MSALZT	S	100	6.3	126.0	10	200	474	332	-	237	*	3
F380J107MSALZTH1	S	100	6.3	126.0	10	150	548	383	-	274	*	3
<b>8 Volt</b>												
F380K476MSA	S	47	8	37.6	10	200	474	-	332	237	*	3
<b>10 Volt</b>												
F381A225MMA	M	2.2	10	10.0	6	500	224	-	157	112	*	3
F381A475MMA	M	4.7	10	10.0	6	500	224	-	157	112	*	3
F381A475MSA	S	4.7	10	4.7	10	300	387	-	271	194	*	3
F381A106MMA	M	10	10	10.0	15	500	224	-	157	112	*	3
F381A106MMAAH1	M	10	10	10.0	15	300	289	-	202	144	*	3
F381A106MSA	S	10	10	10.0	6	200	474	-	332	237	*	3
F381A226MMAAXE	M	22	10	44.0	10	500	224	157	-	112	*	3
F381A226MSA	S	22	10	22.0	10	200	474	-	332	237	*	3
F381A336MSALZT	S	33	10	99.0	10	200	474	332	-	237	*	3
F381A476MSALZT	S	47	10	94.0	10	200	474	332	-	237	*	3
<b>25 Volt</b>												
F381E225MMA	M	2.2	25	10.0	10	500	224	-	157	112	*	3
F381E475MSA	S	4.7	25	11.8	10	500	300	-	210	150	*	3

\*3: ΔC/C Marked "\*\*"

Moisture Sensitivity Level (MSL) is defined according to J-STD-020

Item	All Case (%)
Damp Heat, steady state	-20 to +30
Rapid change of temperature	±20
Resistance soldering heat	±20
Surge	±20
Endurance	±20

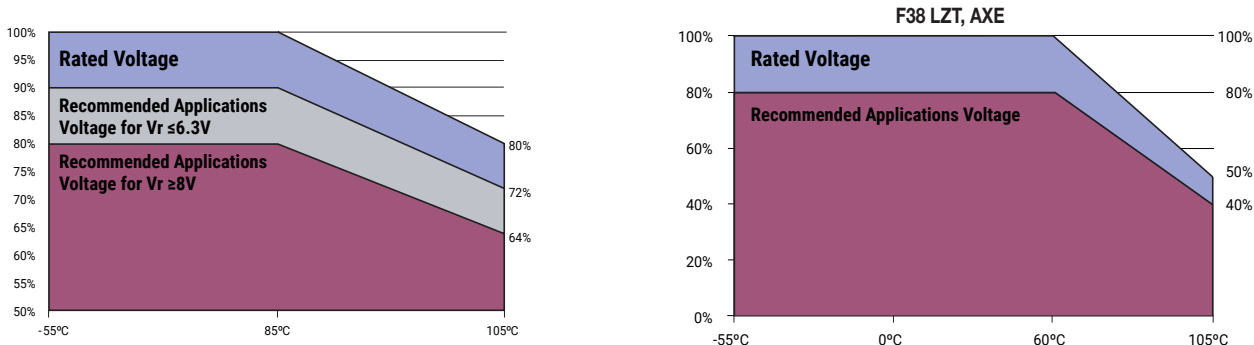
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### RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr



### QUALIFICATION TABLE

TEST	F38 series (Temperature Range -55°C to +105°C)	
	Condition	
<b>Damp Heat (Steady State)</b>	At 40°C, 90 to 95% R.H., 500 hours (No voltage applied) Capacitance Change ..... Refer to page 229 (*3) Dissipation Factor ..... 200% or less of initial specified value Leakage Current ..... 300% or less of initial specified value	
<b>Temperature Cycles</b>	At -55°C / +105°C, 30 minutes each, 5 cycles Capacitance Change ..... Refer to page 229 (*3) Dissipation Factor ..... 200% or less of initial specified value Leakage Current ..... 400% or less of initial specified value	
<b>Resistance to Soldering Heat</b>	5 seconds reflow at 260°C Capacitance Change ..... Refer to page 229 (*3) Dissipation Factor ..... 200% or less of initial specified value Leakage Current ..... 300% or less of initial specified value	
<b>Surge</b>	After application of surge voltage in series with a 1kΩ resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C or 60°C (*2), capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Refer to page 229 (*3) Dissipation Factor ..... 200% or less of initial specified value Leakage Current ..... 300% or less of initial specified value	
<b>Endurance</b>	After 1000 hours' application of rated voltage in series with a 3Ω resistor at 85°C or 60°C (*2), capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Refer to page 229 (*3) Dissipation Factor ..... 200% or less of initial specified value Leakage Current ..... 400% or less of initial specified value	
<b>Shear Test</b>	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.	
<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 substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.	

\*2 LZT and AXE: Rated temperature 60°C, Surge and Endurance test temperature 60°C

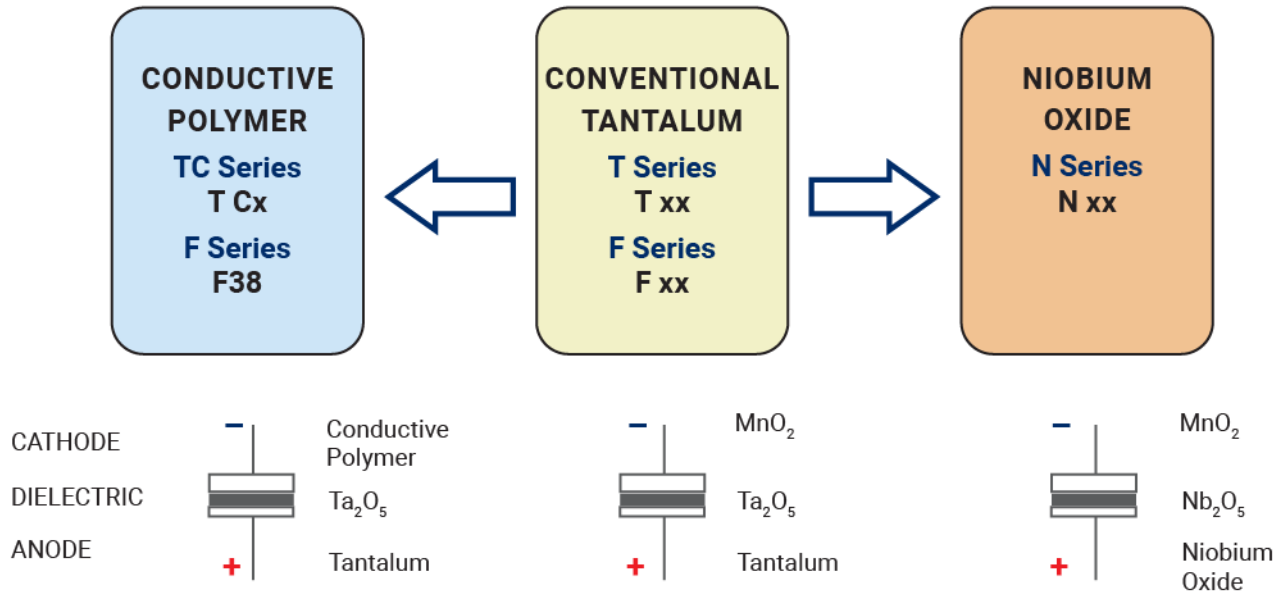
**NOTICE: DESIGN, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

# F38 Series

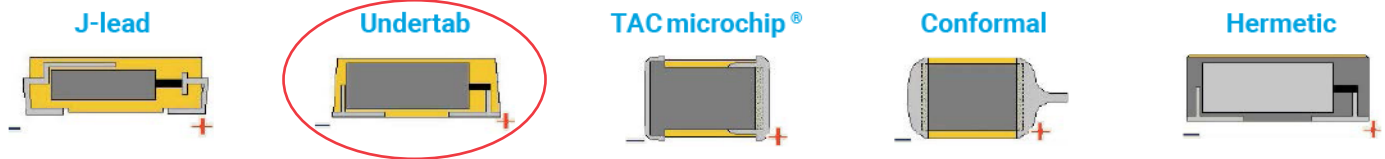
## Conductive Polymer, Miniature, Undertab Solid Electrolytic Chip Capacitors



### SOLID ELECTROLYTIC CAPACITOR ROADMAP



### FIVE CAPACITOR CONSTRUCTION STYLES



### SERIES LINE UP : Conductive Polymer

