



**THE DATASHEET OF  
F971A475MAAHT3**



# F97-HT3 Series

## High Temperature 135°C, Resin-molded Chip, High Reliability



### FEATURES

- Compliant to the RoHS3 directive 2015/863/EU
- High Temperature 135°C
- AEC-Q200 Qualified
- Failure Rate Level 0.5%/ 1000 hrs
- 100% Surge Current Tested



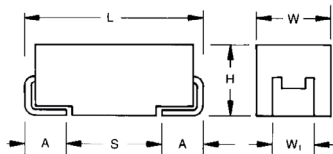
### APPLICATIONS

- Automotive Electronics (Engine ECU, Transmission, Oil Pump)
- Industrial Equipment

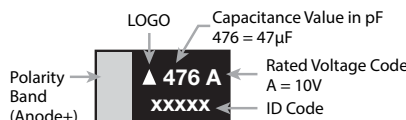
### CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L ± 0.20 (0.008)	W + 0.20 (0.008) -0.10 (0.004)	H + 0.20 (0.008) -0.10 (0.004)	W <sub>1</sub> ± 0.20 (0.008)	A + 0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
N	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W<sub>1</sub> dimension applies to the termination width for a dimensional area only



### A, B, C, N CASE



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

\*Capacitance code of "P" case products are as shown below.

### HOW TO ORDER

<b>F97</b>	<b>1C</b>	<b>335</b>	<b>M</b>	<b>A</b>		<b>HT3</b>
Type	Rated Voltage	Capacitance Code	Tolerance	Case Size	Packaging	Temperature Range
		pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	K = ±10% M = ±20%	See table above	See Tape & Reel Packaging Section	135°C MAX

### TECHNICAL SPECIFICATIONS

Category Temperature Range	-55 to +135°C
Rated Temperature	+95°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 95°C is not more than 0.1CV or 5µA, whichever is greater. After 1 minute's application of derated voltage, leakage current at 135°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

\*As for the surge voltage and derated voltage at 135°C, refer to page precautions for details.

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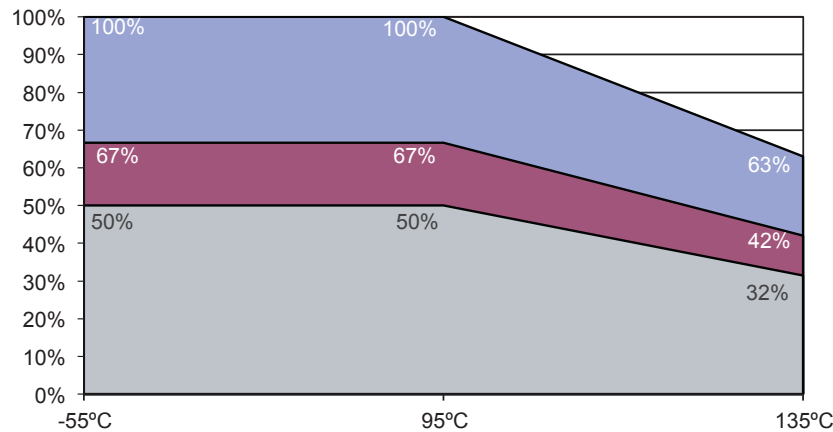
## CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

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
1	105			A	A	A	B
1.5	155				A		B
2.2	225			A		B	B
3.3	335	A	A	A	B	B	C
4.7	475		A/B	A/B	A		C
6.8	685					C	N
10	106		A/B	A/B/C		C/N	N
15	156	B	B			N	
22	226		A/B	B/C	C/N		
33	336	A/C	B/C	B/C/N			
47	476	B	B/C/N	C/N			
68	686		N				
100	107		C				

**Released ratings**

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

### Voltage vs Temperature Rating



- Rated Voltage
- Recommended Applications Voltage in General Circuit
- Recommended Applications Voltage in Low Impedance Circuit

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## RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Leakage Current (µA)	DF @ 120Hz (%)	ESR @ 100kHz (Ω)	100kHz RMS Current (mA)			*1 ΔC/C (%)	MSL
							25°C	95°C	135°C		
<b>6.3 Volt</b>											
F970J335#AAHT3	A	3.3	6.3	0.5	4	4.5	129	116	52	*	3
F970J156#BAHT3	B	15	6.3	0.9	6	2.0	206	186	82	*	3
F970J336#AAHT3	A	33	6.3	2.1	12	2.5	173	156	69	*	3
F970J336#CCHT3	C	33	6.3	2.1	6	1.1	316	285	126	*	3
F970J476#BAHT3	B	47	6.3	3.0	8	1.0	292	262	117	*	3
<b>10 Volt</b>											
F971A335#AAHT3	A	3.3	10	0.5	4	4.5	129	116	52	*	3
F971A475#AAHT3	A	4.7	10	0.5	6	4.0	137	123	55	*	3
F971A475#BAHT3	B	4.7	10	0.5	6	2.8	174	157	70	*	3
F971A106#AAHT3	A	10	10	1.0	6	3.0	158	142	63	*	3
F971A106#BAHT3	B	10	10	1.0	6	2.0	206	186	82	*	3
F971A156#BAHT3	B	15	10	1.5	6	2.0	206	186	82	*	3
F971A226#AAHT3	A	22	10	2.2	15	3.0	158	142	63	*	3
F971A226#BAHT3	B	22	10	2.2	8	1.9	212	190	85	*	3
F971A336#BAHT3	B	33	10	3.3	8	1.9	212	190	85	*	3
F971A336#CCHT3	C	33	10	3.3	6	1.1	316	285	126	*	3
F971A476#BAHT3	B	47	10	4.7	10	1.0	292	262	117	*	3
F971A476#CCHT3	C	47	10	4.7	8	0.9	350	315	140	*	3
F971A476#NCHT3	N	47	10	4.7	6	0.7	463	417	185	*	3
F971A686#NCHT3	N	68	10	6.8	6	0.6	500	450	200	*	3
F971A107#CCHT3	C	100	10	10.0	10	0.7	396	357	159	*	3
<b>16 Volt</b>											
F971C105#AAHT3	A	1	16	0.5	4	7.5	100	90	40	*	3
F971C225#AAHT3	A	2.2	16	0.5	4	5.0	122	110	49	*	3
F971C335#AAHT3	A	3.3	16	0.5	4	4.5	129	116	52	*	3
F971C475#AAHT3	A	4.7	16	0.8	8	4.0	137	123	55	*	3
F971C475#BAHT3	B	4.7	16	0.8	6	2.8	174	157	70	*	3
F971C106#AAHT3	A	10	16	1.6	8	3.5	146	132	59	*	3
F971C106#BAHT3	B	10	16	1.6	6	2.1	201	181	80	*	3
F971C106#CCHT3	C	10	16	1.6	6	1.5	271	244	108	*	3
F971C226#BAHT3	B	22	16	3.5	8	1.9	212	190	85	*	3
F971C226#CCHT3	C	22	16	3.5	8	1.1	316	285	126	*	3
F971C336#BAHT3	B	33	16	5.3	10	2.1	201	181	80	*	3
F971C336#CCHT3	C	33	16	5.3	8	1.1	316	285	126	*	3
F971C336#NCHT3	N	33	16	5.3	6	0.7	463	417	185	*	3
F971C476#CCHT3	C	47	16	7.5	10	1.1	316	285	126	*	3
F971C476#NCHT3	N	47	16	7.5	8	0.7	463	417	185	*	3
<b>20 Volt</b>											
F971D105#AAHT3	A	1	20	0.5	4	7.5	100	90	40	*	3
F971D155#AAHT3	A	1.5	20	0.5	4	6.7	106	95	42	*	3
F971D335#BAHT3	B	3.3	20	0.7	4	3.1	166	149	66	*	3
F971D475#AAHT3	A	4.7	20	0.9	8	4.0	137	123	55	*	3
F971D226#CCHT3	C	22	20	4.4	8	1.1	316	285	126	*	3
F971D226#NCHT3	N	22	20	4.4	6	0.7	463	417	185	*	3
<b>25 Volt</b>											
F971E684#AAHT3	A	0.68	25	0.5	4	7.6	99	89	40	*	3
F971E105#AAHT3	A	1	25	0.5	4	7.5	100	90	40	*	3
F971E225#BAHT3	B	2.2	25	0.6	4	3.8	150	135	60	*	3
F971E335#BAHT3	B	3.3	25	0.8	4	3.5	156	140	62	*	3
F971E685#CCHT3	C	6.8	25	1.7	6	1.8	247	222	99	*	3
F971E106#CCHT3	C	10	25	2.5	6	1.6	262	236	105	*	3
F971E106#NCHT3	N	10	25	2.5	6	1.0	387	349	155	*	3
F971E156#NCHT3	N	15	25	3.8	6	0.7	463	417	185	*	3
<b>35 Volt</b>											
F971V334#AAHT3	A	0.33	35	0.5	4	12.0	79	71	32	*	3
F971V474#AAHT3	A	0.47	35	0.5	4	10.0	87	78	35	*	3
F971V684#AAHT3	A	0.68	35	0.5	4	7.6	99	89	40	*	3
F971V105#BAHT3	B	1	35	0.5	4	4.0	146	131	58	*	3
F971V155#BAHT3	B	1.5	35	0.5	4	4.0	146	131	58	*	3
F971V225#BAHT3	B	2.2	35	0.8	4	3.8	150	135	60	*	3
F971V335#CCHT3	C	3.3	35	1.2	4	2.0	235	211	94	*	3
F971V475#CCHT3	C	4.7	35	1.6	6	1.8	247	222	99	*	3
F971V685#NCHT3	N	6.8	35	2.4	6	1.0	387	349	155	*	3
F971V106#NCHT3	N	10	35	3.5	6	1.0	387	349	155	*	3

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

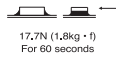
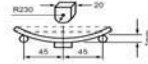
\*1: ΔC/C Marked "\*\*"  
 #: "M" for ±20% tolerance, "K" for ±10% tolerance.  
 Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

# F97-HT3 Series

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### QUALIFICATION TABLE

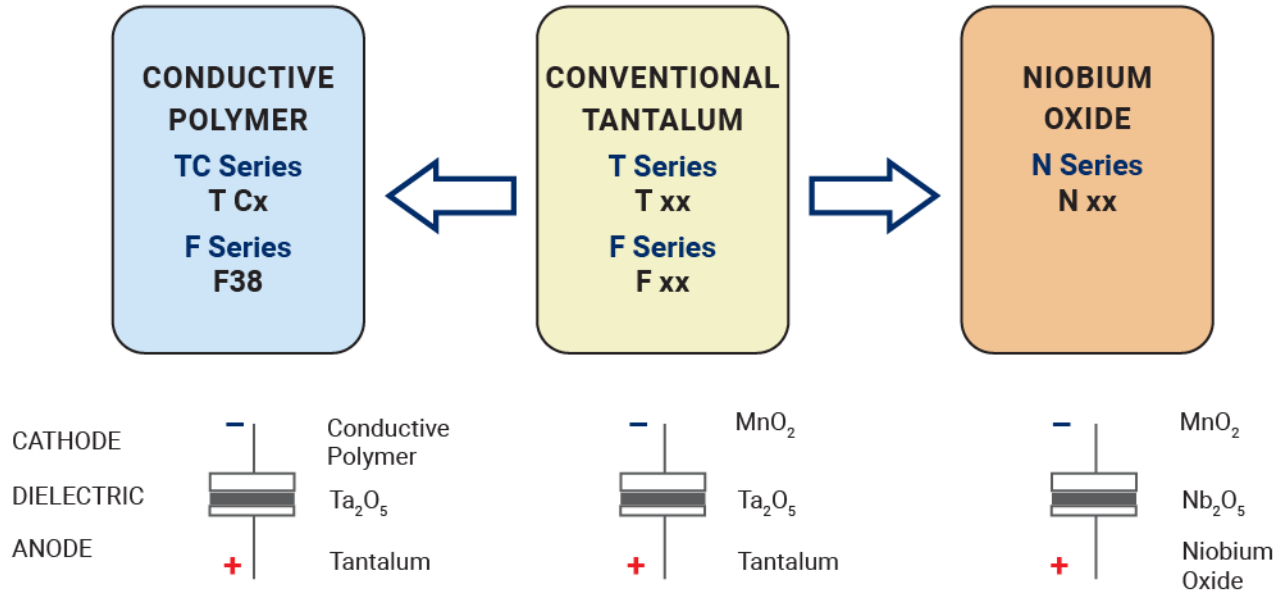
TEST	F97-HT3 series (Temperature range -55°C to +135°C)	
	Condition	
<b>Damp Heat (Steady State)</b>	At 85°C, 85% RH For 1000 hours (No voltage applied) Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... 125% or less than the initial specified value	
<b>Load Humidity</b>	After 1000 hours application of rated voltage in series with a 33Ω resistor at 85°C, 85% RH capacitors meet the characteristics requirements table below. Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... 120% or less than the Initial specified value Leakage Current..... 200% or less than the initial specified value	
<b>Temperature Cycles</b>	At -55°C / +135°C, For 30 minutes each, 1000 cycles Capacitance Change ..... Refer to the table above (*1) 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 ..... Refer to the table above (*1) 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 in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 95°C, capacitors shall meet the characteristic requirements table below. Capacitance Change ..... Refer to the table above (*1) 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 95°C, or derated voltage in series with a 3Ω resistor at 135°C, capacitors shall meet the characteristic requirements table below. Capacitance Change ..... Refer to the table above (*1) 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.	

\* As for the surge voltage and derated voltage at 135°C, refer to page precautions for details.

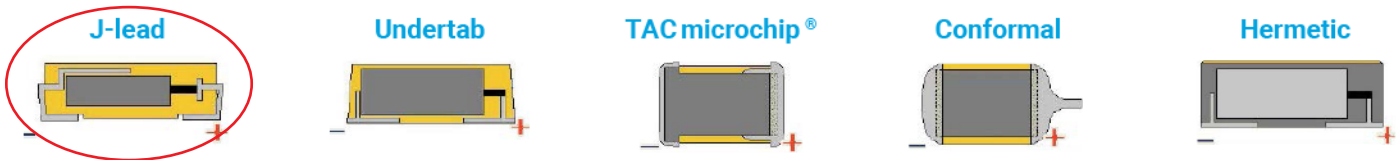
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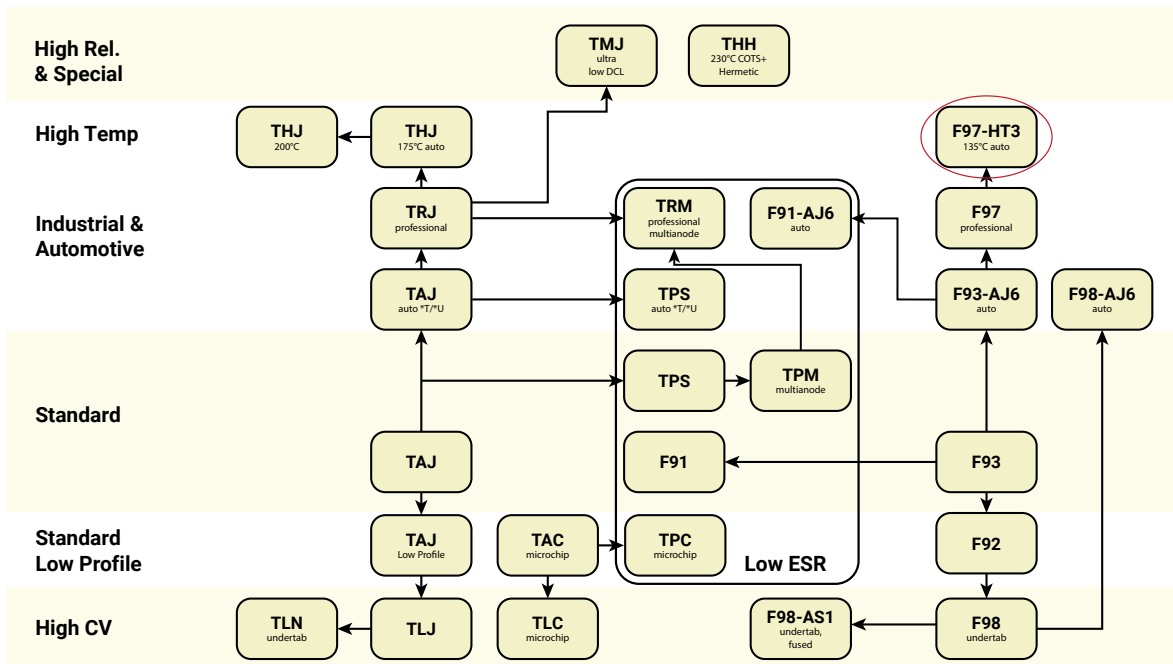
## SOLID ELECTROLYTIC CAPACITOR ROADMAP



## FIVE CAPACITOR CONSTRUCTION STYLES



## SERIES LINE UP : CONVENTIONAL SMD MnO<sub>2</sub>



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