

# F97-HT3 Series



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



## FEATURES

- High temperature 135°C
- AEC-Q200 qualified
- Failure rate level 0.5%/ 1000 hrs



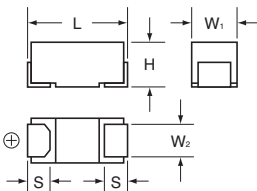
## APPLICATIONS

- Automotive electronics (Engine ECU, Transmission, Oil pump)
- Industrial equipment

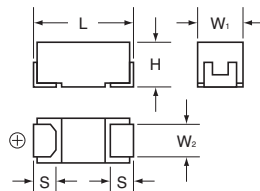
## CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L	W <sub>1</sub>	W <sub>2</sub>	H	S
A	1206	3216-18	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	1210	3528-21	3.50 ± 0.20 (0.138 ± 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	2312	6032-27	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	2917	7343-30	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)

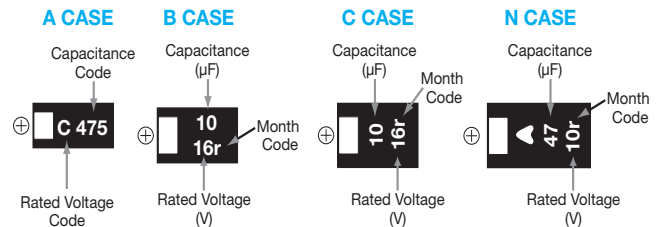
### A, B CASE



### C, N CASE



## MARKING



## 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 +135°C +10% Max. at +95°C -10% Max. at -55°C

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



# F97-HT3 Series



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

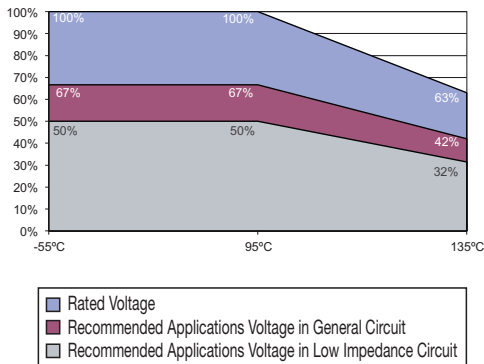
## CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

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

Released ratings

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

Voltage vs Temperature Rating



# F97-HT3 Series



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

## RATINGS & PART NUMBER REFERENCE

AVX Part No.	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
F970J475#AAHT3	A	4.7	6.3	0.5	6	4.0	137	123	55	*	3
F970J685#AAHT3	A	6.8	6.3	0.5	6	3.5	146	132	59	*	3
F970J685#BAHT3	B	6.8	6.3	0.5	6	2.5	184	166	74	*	3
F970J156#BAHT3	B	15	6.3	0.9	6	2.0	206	186	82	*	3
F970J226#AAHT3	A	22	6.3	1.4	12	2.5	173	156	69	*	3
F970J226#BAHT3	B	22	6.3	1.4	8	1.9	212	190	85	*	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
F970J476#CCHT3	C	47	6.3	3.0	6	0.9	350	315	140	*	3
F970J686#NCHT3	N	68	6.3	4.3	6	0.6	500	450	200	*	3
F970J107#NCHT3	N	100	6.3	6.3	8	0.6	500	450	200	*	3
<b>10 Volt</b>											
F971A225#AAHT3	A	2.2	10	0.5	4	5.0	122	110	49	*	3
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
F971A685#BAHT3	B	6.8	10	0.7	6	2.5	184	166	74	*	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#AAHT3	A	15	10	1.5	10	3.0	158	142	63	*	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
F971A336#NCHT3	N	33	10	3.3	6	0.7	463	417	185	*	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
F971C155#AAHT3	A	1.5	16	0.5	4	6.3	109	98	44	*	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
F971C685#BAHT3	B	6.8	16	1.1	6	2.5	184	166	74	*	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
F971C156#CCHT3	C	15	16	2.4	6	1.2	303	272	121	*	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
F971C226#NCHT3	N	22	16	3.5	6	0.7	463	417	185	*	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>											
F971D684#AAHT3	A	0.68	20	0.5	4	7.6	99	89	40	*	3
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
F971D225#AAHT3	A	2.2	20	0.5	6	6.3	109	98	44	*	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
F971D475#BAHT3	B	4.7	20	0.9	6	2.8	174	157	70	*	3
F971D685#CCHT3	C	6.8	20	1.4	6	1.8	247	222	99	*	3
F971D106#CCHT3	C	10	20	2.0	6	1.5	271	244	108	*	3
F971D156#NCHT3	N	15	20	3.0	6	0.7	463	417	185	*	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
F971E475#CCHT3	C	4.7	25	1.2	6	1.8	247	222	99	*	3
F971E685#CCHT3	C	6.8	25	1.7	6	1.8	247	222	99	*	3

# F97-HT3 Series



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

## RATINGS & PART NUMBER REFERENCE

AVX Part No.	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		
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

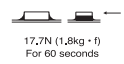
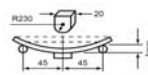
\*1: ΔC/C Marked “\*”

#: “M” for ±20% tolerance, “K” for ±10% tolerance.

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

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

## 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 page 115 (*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 page 115 (*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 page 115 (*1) Dissipation Factor .....Initial specified value or less Leakage Current.....Initial specified value or less	
<b>Resistance to Soldering Heat</b>	10 seconds reow at 260°C, 5 seconds immersion at 260°C. Capacitance Change ...Refer to page 115 (*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 page 115 (*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 page 115 (*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.	

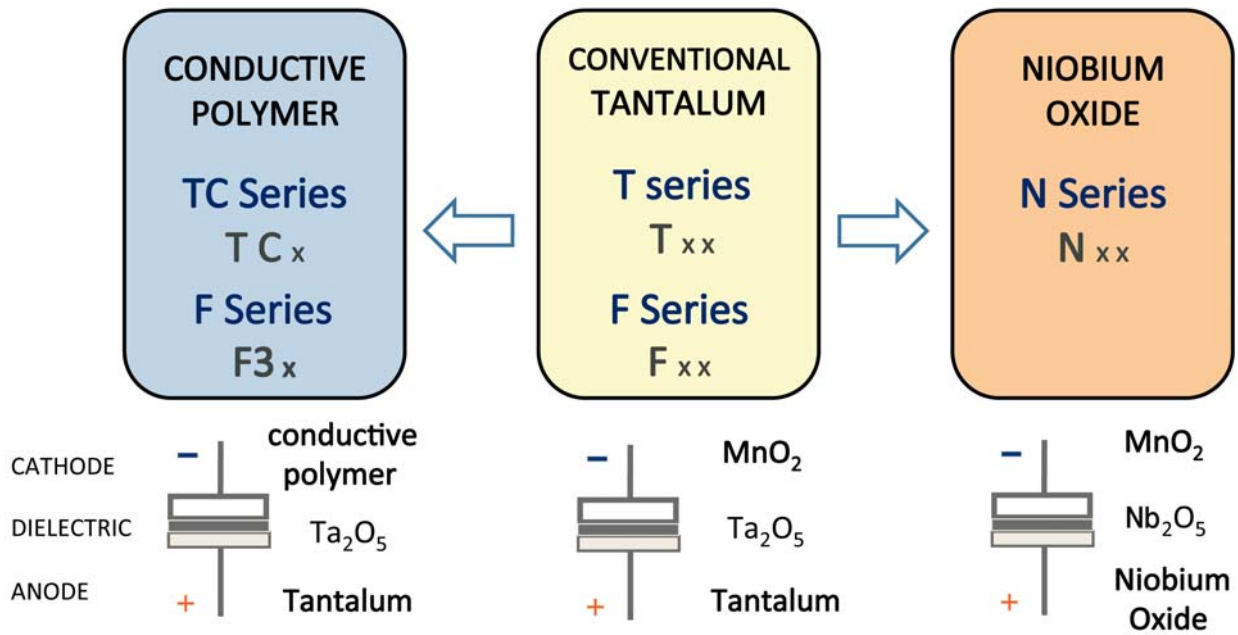
\* As for the surge voltage and derated voltage at 135°C, refer to page precautions for details.

# F97-HT3 Series

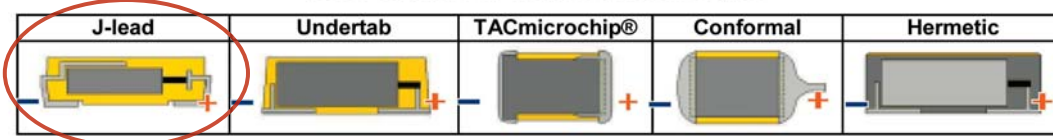


High Temperature 135°C, Resin-molded Chip, High Reliability

## AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



### Five Capacitor Construction Styles



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

