F97-HT3 Series

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

FEATURES

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

LEAD-FREE

LEAD-FREE COMPATI-BLE COMPONENT

RoHS COMPLIANT

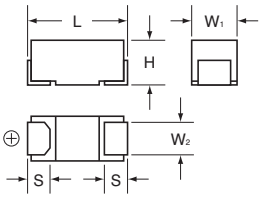
APPLICATIONS

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

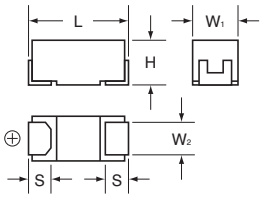
CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L	W_1	W_2	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 (0.126 ± 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)

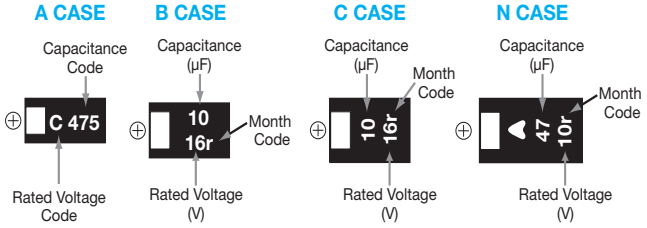
A, B CASE



C, N CASE



MARKING



HOW TO ORDER

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

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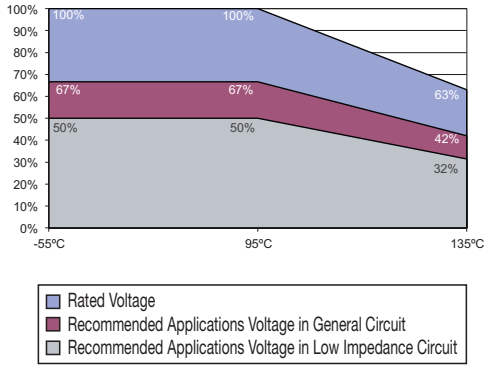
CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

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	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



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RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Leakage Current (µA)	DF @ 120Hz (%)	ESR @ 100kHz (Ω)	*1 ΔC/C (%)	MSL
6.3 Volt								
F970J335#AAHT3	A	3.3	6.3	0.5	4	4.5	∗	3
F970J475#AAHT3	A	4.7	6.3	0.5	6	4.0	∗	3
F970J685#AAHT3	A	6.8	6.3	0.5	6	3.5	∗	3
F970J685#BAHT3	B	6.8	6.3	0.5	6	2.5	∗	3
F970J156#BAHT3	B	15	6.3	0.9	6	2.0	∗	3
F970J226#AAHT3	A	22	6.3	1.4	12	2.5	∗	3
F970J226#BAHT3	B	22	6.3	1.4	8	1.9	∗	3
F970J336#AAHT3	A	33	6.3	2.1	12	2.5	∗	3
F970J336#CCHT3	C	33	6.3	2.1	6	1.1	∗	3
F970J476#BAHT3	B	47	6.3	3.0	8	1.0	∗	3
F970J476#CCHT3	C	47	6.3	3.0	6	0.9	∗	3
F970J686#NCHT3	N	68	6.3	4.3	6	0.6	∗	3
F970J107#NCHT3	N	100	6.3	6.3	8	0.6	∗	3
10 Volt								
F971A225#AAHT3	A	2.2	10	0.5	4	5.0	∗	3
F971A335#AAHT3	A	3.3	10	0.5	4	4.5	∗	3
F971A475#AAHT3	A	4.7	10	0.5	6	4.0	∗	3
F971A475#BAHT3	B	4.7	10	0.5	6	2.8	∗	3
F971A685#BAHT3	B	6.8	10	0.7	6	2.5	∗	3
F971A106#AAHT3	A	10	10	1.0	6	3.0	∗	3
F971A106#BAHT3	B	10	10	1.0	6	2.0	∗	3
F971A156#AAHT3	A	15	10	1.5	10	3.0	∗	3
F971A156#BAHT3	B	15	10	1.5	6	2.0	∗	3
F971A226#AAHT3	A	22	10	2.2	15	3.0	∗	3
F971A226#BAHT3	B	22	10	2.2	8	1.9	∗	3
F971A336#BAHT3	B	33	10	3.3	8	1.9	∗	3
F971A336#CCHT3	C	33	10	3.3	6	1.1	∗	3
F971A336#NCHT3	N	33	10	3.3	6	0.7	∗	3
F971A476#BAHT3	B	47	10	4.7	10	1.0	∗	3
F971A476#CCHT3	C	47	10	4.7	8	0.9	∗	3
F971A476#NCHT3	N	47	10	4.7	6	0.7	∗	3
F971A686#NCHT3	N	68	10	6.8	6	0.6	∗	3
F971A107#CCHT3	C	100	10	10.0	10	0.7	∗	3
16 Volt								
F971C105#AAHT3	A	1	16	0.5	4	7.5	∗	3
F971C155#AAHT3	A	1.5	16	0.5	4	6.3	∗	3
F971C225#AAHT3	A	2.2	16	0.5	4	5.0	∗	3
F971C335#AAHT3	A	3.3	16	0.5	4	4.5	∗	3
F971C475#AAHT3	A	4.7	16	0.8	8	4.0	∗	3
F971C475#BAHT3	B	4.7	16	0.8	6	2.8	∗	3
F971C685#BAHT3	B	6.8	16	1.1	6	2.5	∗	3
F971C106#AAHT3	A	10	16	1.6	8	3.5	∗	3
F971C106#BAHT3	B	10	16	1.6	6	2.1	∗	3
F971C106#CCHT3	C	10	16	1.6	6	1.5	∗	3
F971C156#CCHT3	C	15	16	2.4	6	1.2	∗	3
F971C226#BAHT3	B	22	16	3.5	8	1.9	∗	3
F971C226#CCHT3	C	22	16	3.5	8	1.1	∗	3
F971C226#NCHT3	N	22	16	3.5	6	0.7	∗	3
F971C336#BAHT3	B	33	16	5.3	10	2.1	∗	3
F971C336#CCHT3	C	33	16	5.3	8	1.1	∗	3
F971C336#NCHT3	N	33	16	5.3	6	0.7	∗	3
F971C476#CCHT3	C	47	16	7.5	10	1.1	∗	3
F971C476#NCHT3	N	47	16	7.5	8	0.7	∗	3
20 Volt								
F971D684#AAHT3	A	0.68	20	0.5	4	7.6	∗	3
F971D105#AAHT3	A	1	20	0.5	4	7.5	∗	3
F971D155#AAHT3	A	1.5	20	0.5	4	6.7	∗	3
F971D225#AAHT3	A	2.2	20	0.5	6	6.3	∗	3
F971D335#BAHT3	B	3.3	20	0.7	4	3.1	∗	3
F971D475#AAHT3	A	4.7	20	0.9	8	4.0	∗	3
F971D475#BAHT3	B	4.7	20	0.9	6	2.8	∗	3
F971D685#CCHT3	C	6.8	20	1.4	6	1.8	∗	3
F971D106#CCHT3	C	10	20	2.0	6	1.5	∗	3
F971D156#NCHT3	N	15	20	3.0	6	0.7	∗	3
F971D226#CCHT3	C	22	20	4.4	8	1.1	∗	3
F971D226#NCHT3	N	22	20	4.4	6	0.7	∗	3
25 Volt								
F971E684#AAHT3	A	0.68	25	0.5	4	7.6	∗	3
F971E105#AAHT3	A	1	25	0.5	4	7.5	∗	3
F971E225#BAHT3	B	2.2	25	0.6	4	3.8	∗	3
F971E335#BAHT3	B	3.3	25	0.8	4	3.5	∗	3
F971E475#CCHT3	C	4.7	25	1.2	6	1.8	∗	3
F971E685#CCHT3	C	6.8	25	1.7	6	1.8	∗	3
F971E106#CCHT3	C	10	25	2.5	6	1.6	∗	3
F971E106#NCHT3	N	10	25	2.5	6	1.0	∗	3
F971E156#NCHT3	N	15	25	3.8	6	0.7	∗	3
35 Volt								
F971V334#AAHT3	A	0.33	35	0.5	4	12.0	∗	3
F971V474#AAHT3	A	0.47	35	0.5	4	10.0	∗	3
F971V684#AAHT3	A	0.68	35	0.5	4	7.6	∗	3
F971V105#BAHT3	B	1	35	0.5	4	4.0	∗	3
F971V155#BAHT3	B	1.5	35	0.5	4	4.0	∗	3
F971V225#BAHT3	B	2.2	35	0.8	4	3.8	∗	3
F971V335#CCHT3	C	3.3	35	1.2	4	2.0	∗	3
F971V475#CCHT3	C	4.7	35	1.6	6	1.8	∗	3
F971V685#NCHT3	N	6.8	35	2.4	6	1.0	∗	3
F971V106#NCHT3	N	10	35	3.5	6	1.0	∗	3

#: "M" for ±20% tolerance, "K" for ± 10% tolerance.
Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

*1: ΔC/C Marked "∗"

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

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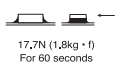
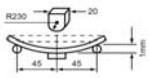
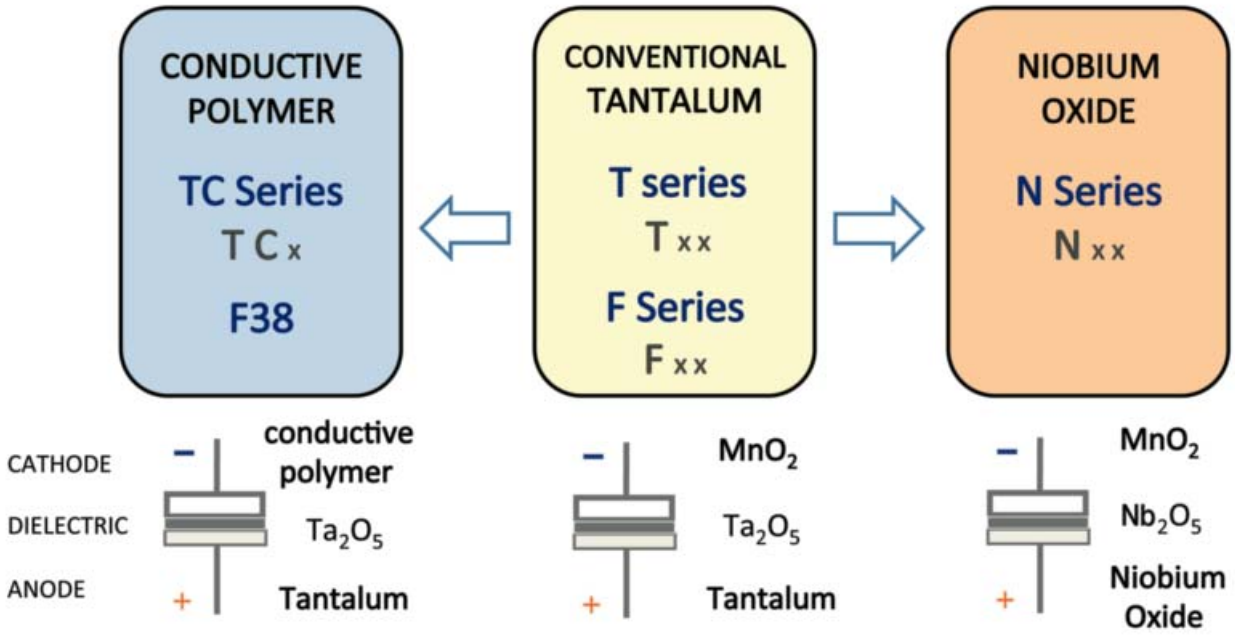
QUALIFICATION TABLE

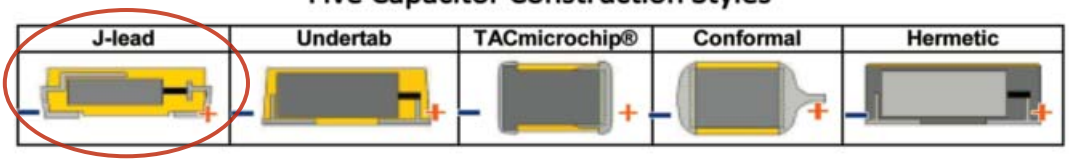
TEST	F97-HT3 series (Temperature range -55°C to +135°C) Condition
Damp Heat (Steady State)	At 85°C, 85% RH For 1000 hours (No voltage applied) Capacitance Change....Refer to page 114 (*1) Dissipation Factor .... Initial specied value or less Leakage Current .... 125% or less than the initial specified value
Load Humidity	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 114 (*1) Dissipation Factor .....120% or less than the Initial specified value Leakage Current.....200% or less than the initial specified value
Temperature Cycles	At -55°C / +135°C,For 30 minutes each,1000 cycles Capacitance Change ...Refer to page 114 (*1) Dissipation Factor .....Initial specified value or less Leakage Current.....Initial specified value or less
Resistance to Soldering Heat	10 seconds reow at 260°C, 5 seconds immersion at 260°C. Capacitance Change ...Refer to page 114 (*1) Dissipation Factor .....Initial specified value or less Leakage Current.....Initial specified value or less
Solderability	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.
Surge*	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 114 (*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 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 114 (*1) Dissipation Factor .....Initial specified value or less Leakage Current.....Initial specified value or less
Shear Test	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. 
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 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.

AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



Five Capacitor Construction Styles



SERIES LINE UP: CONVENTIONAL SMD MnO_2