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)

<table>
<thead>
<tr>
<th>Code</th>
<th>EIA Code</th>
<th>EIA Metric</th>
<th>L</th>
<th>W1</th>
<th>W2</th>
<th>H</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1206</td>
<td>3216-18</td>
<td>3.20 ± 0.20</td>
<td>1.60 ± 0.20</td>
<td>1.20 ± 0.10</td>
<td>1.60 ± 0.20</td>
<td>0.80 ± 0.20</td>
</tr>
<tr>
<td>B</td>
<td>1210</td>
<td>3528-21</td>
<td>3.50 ± 0.20</td>
<td>2.80 ± 0.20</td>
<td>2.20 ± 0.10</td>
<td>1.90 ± 0.20</td>
<td>0.80 ± 0.20</td>
</tr>
<tr>
<td>C</td>
<td>2312</td>
<td>6032-27</td>
<td>6.00 ± 0.20</td>
<td>3.20 ± 0.20</td>
<td>2.20 ± 0.10</td>
<td>2.50 ± 0.20</td>
<td>1.30 ± 0.20</td>
</tr>
<tr>
<td>N</td>
<td>2917</td>
<td>7343-30</td>
<td>7.30 ± 0.20</td>
<td>4.30 ± 0.20</td>
<td>2.40 ± 0.10</td>
<td>2.80 ± 0.20</td>
<td>1.30 ± 0.20</td>
</tr>
</tbody>
</table>

HOW TO ORDER
F97    1C    335    M    A    HT3

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)

<table>
<thead>
<tr>
<th>Capacitance</th>
<th>Rated Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>µF</td>
<td>Code</td>
</tr>
<tr>
<td>0.33</td>
<td>334</td>
</tr>
<tr>
<td>0.47</td>
<td>474</td>
</tr>
<tr>
<td>0.68</td>
<td>684</td>
</tr>
<tr>
<td>1</td>
<td>105</td>
</tr>
<tr>
<td>1.5</td>
<td>155</td>
</tr>
<tr>
<td>2.2</td>
<td>225</td>
</tr>
<tr>
<td>3.3</td>
<td>335</td>
</tr>
<tr>
<td>4.7</td>
<td>475</td>
</tr>
<tr>
<td>6.8</td>
<td>685</td>
</tr>
<tr>
<td>10</td>
<td>106</td>
</tr>
<tr>
<td>15</td>
<td>156</td>
</tr>
<tr>
<td>22</td>
<td>226</td>
</tr>
<tr>
<td>33</td>
<td>336</td>
</tr>
<tr>
<td>47</td>
<td>476</td>
</tr>
<tr>
<td>68</td>
<td>686</td>
</tr>
<tr>
<td>100</td>
<td>107</td>
</tr>
</tbody>
</table>

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

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**Voltage vs Temperature Rating**

- **Rated Voltage**
- **Recommended Applications Voltage in General Circuit**
- **Recommended Applications Voltage in Low Impedance Circuit**
## F97-HT3 Series

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

### RATINGS & PART NUMBER REFERENCE

<table>
<thead>
<tr>
<th>AVX Part No.</th>
<th>Case Size</th>
<th>Capacitance (μF)</th>
<th>Rated Voltage (V)</th>
<th>Leakage Current (μA)</th>
<th>DF @ 120Hz (%)</th>
<th>ESR @ 100kHz (Ω)</th>
<th>100kHz RMS Current (mA)</th>
<th>25°C</th>
<th>95°C</th>
<th>125°C</th>
<th>*ΔTJC (%)</th>
<th>MSL</th>
</tr>
</thead>
</table>

#### 6.3 Volt

- **F970J156#BAHT3**
  - Case: B
  - Capacitance: 15 μF
  - Voltage: 6.3 V
  - Leakage Current: 0.9 μA
  - DF: 2.0
  - ESR: 2.5
  - RMS Current: 206 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F970J685#BAHT3**
  - Case: B
  - Capacitance: 6.8 μF
  - Voltage: 6.3 V
  - Leakage Current: 0.5 μA
  - DF: 2.0
  - ESR: 2.5
  - RMS Current: 206 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F970J336#AAHT3**
  - Case: A
  - Capacitance: 33 μF
  - Voltage: 6.3 V
  - Leakage Current: 2.1 μA
  - DF: 1.6
  - ESR: 2.5
  - RMS Current: 316 mA
  - *ΔTJC: 85%
  - MSL: 3

#### 10 Volt

- **F971C336#NCHT3**
  - Case: N
  - Capacitance: 33 μF
  - Voltage: 16 V
  - Leakage Current: 5.3 μA
  - DF: 6.0
  - ESR: 4.0
  - RMS Current: 463 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D106#CCHT3**
  - Case: C
  - Capacitance: 10 μF
  - Voltage: 20 V
  - Leakage Current: 2.0 μA
  - DF: 4.0
  - ESR: 1.1
  - RMS Current: 316 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971A107#CCHT3**
  - Case: C
  - Capacitance: 100 μF
  - Voltage: 10 V
  - Leakage Current: 10.0 μA
  - DF: 0.7
  - ESR: 7.5
  - RMS Current: 396 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971A686#NCHT3**
  - Case: N
  - Capacitance: 68 μF
  - Voltage: 10 V
  - Leakage Current: 6.8 μA
  - DF: 6.0
  - ESR: 0.6
  - RMS Current: 500 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971A476#NCHT3**
  - Case: N
  - Capacitance: 47 μF
  - Voltage: 10 V
  - Leakage Current: 4.7 μA
  - DF: 6.0
  - ESR: 0.7
  - RMS Current: 463 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971A476#CCHT3**
  - Case: C
  - Capacitance: 47 μF
  - Voltage: 10 V
  - Leakage Current: 4.7 μA
  - DF: 4.0
  - ESR: 0.9
  - RMS Current: 350 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971A336#CCHT3**
  - Case: C
  - Capacitance: 33 μF
  - Voltage: 10 V
  - Leakage Current: 3.3 μA
  - DF: 1.1
  - ESR: 1.1
  - RMS Current: 316 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971C336#BAHT3**
  - Case: B
  - Capacitance: 33 μF
  - Voltage: 16 V
  - Leakage Current: 5.3 μA
  - DF: 10
  - ESR: 2.1
  - RMS Current: 201 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D105#AAHT3**
  - Case: A
  - Capacitance: 1 μF
  - Voltage: 16 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.5
  - RMS Current: 100 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D684#AAHT3**
  - Case: A
  - Capacitance: 0.68 μF
  - Voltage: 25 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 1.9
  - RMS Current: 212 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971E225#BAHT3**
  - Case: B
  - Capacitance: 2.2 μF
  - Voltage: 25 V
  - Leakage Current: 0.6 μA
  - DF: 1.3
  - ESR: 0.7
  - RMS Current: 206 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971E684#AAHT3**
  - Case: A
  - Capacitance: 0.68 μF
  - Voltage: 25 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 1.9
  - RMS Current: 212 mA
  - *ΔTJC: 85%
  - MSL: 3

#### 16 Volt

- **F971C105#AAHT3**
  - Case: A
  - Capacitance: 1 μF
  - Voltage: 16 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.5
  - RMS Current: 100 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D105#AAHT3**
  - Case: A
  - Capacitance: 1 μF
  - Voltage: 20 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.5
  - RMS Current: 100 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D684#AAHT3**
  - Case: A
  - Capacitance: 0.68 μF
  - Voltage: 25 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 1.9
  - RMS Current: 212 mA
  - *ΔTJC: 85%
  - MSL: 3

#### 20 Volt

- **F971D864#AAHT3**
  - Case: A
  - Capacitance: 0.68 μF
  - Voltage: 20 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.6
  - RMS Current: 99 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D105#AAHT3**
  - Case: A
  - Capacitance: 1 μF
  - Voltage: 20 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.6
  - RMS Current: 99 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D535#BAHT3**
  - Case: B
  - Capacitance: 3.5 μF
  - Voltage: 20 V
  - Leakage Current: 0.7 μA
  - DF: 3.1
  - ESR: 1.6
  - RMS Current: 166 mA
  - *ΔTJC: 85%
  - MSL: 3

- **F971D476#BAHT3**
  - Case: B
  - Capacitance: 4.7 μF
  - Voltage: 20 V
  - Leakage Current: 0.9 μA
  - DF: 4.0
  - ESR: 1.3
  - RMS Current: 157 mA
  - *ΔTJC: 85%
  - MSL: 3

#### 25 Volt

- **F971E864#AAHT3**
  - Case: A
  - Capacitance: 0.68 μF
  - Voltage: 25 V
  - Leakage Current: 0.5 μA
  - DF: 4.0
  - ESR: 7.6
  - RMS Current: 99 mA
  - *ΔTJC: 85%
  - MSL: 3

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F97-HT3 Series
High Temperature 135°C, Resin-molded Chip, High Reliability

RATINGS & PART NUMBER REFERENCE

<table>
<thead>
<tr>
<th>AVX Part No.</th>
<th>Case Size</th>
<th>Capacitance (μF)</th>
<th>Rated Voltage (V)</th>
<th>Leakage Current (μA)</th>
<th>DF @ 120Hz (%)</th>
<th>ESR @ 100kHz (Ω)</th>
<th>10kHz RMS Current (mA)</th>
<th>*1 ΔC/ΔT (%)</th>
<th>MSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>F971E106#CCHT3</td>
<td>C</td>
<td>10</td>
<td>25</td>
<td>2.5</td>
<td>6</td>
<td>1.6</td>
<td>262</td>
<td>236</td>
<td>105</td>
</tr>
<tr>
<td>F971E106#NCHT3</td>
<td>N</td>
<td>10</td>
<td>25</td>
<td>2.5</td>
<td>6</td>
<td>1.0</td>
<td>387</td>
<td>349</td>
<td>155</td>
</tr>
<tr>
<td>F971E156#NCHT3</td>
<td>N</td>
<td>15</td>
<td>25</td>
<td>3.8</td>
<td>6</td>
<td>0.7</td>
<td>463</td>
<td>417</td>
<td>185</td>
</tr>
<tr>
<td>F971V334#AHT3</td>
<td>A</td>
<td>0.33</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>12.0</td>
<td>79</td>
<td>71</td>
<td>32</td>
</tr>
<tr>
<td>F971V474#AHT3</td>
<td>A</td>
<td>0.47</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>10.0</td>
<td>87</td>
<td>78</td>
<td>35</td>
</tr>
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<td>F971V084#AHT3</td>
<td>A</td>
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<td>0.5</td>
<td>4</td>
<td>7.6</td>
<td>99</td>
<td>89</td>
<td>40</td>
</tr>
<tr>
<td>F971V105#AHT3</td>
<td>B</td>
<td>1.5</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>4.0</td>
<td>146</td>
<td>131</td>
<td>58</td>
</tr>
<tr>
<td>F971V125#AHT3</td>
<td>B</td>
<td>2.2</td>
<td>35</td>
<td>0.8</td>
<td>4</td>
<td>4.0</td>
<td>146</td>
<td>131</td>
<td>58</td>
</tr>
<tr>
<td>F971V335#CCHT3</td>
<td>C</td>
<td>3.3</td>
<td>35</td>
<td>1.2</td>
<td>4</td>
<td>2.0</td>
<td>235</td>
<td>211</td>
<td>94</td>
</tr>
<tr>
<td>F971V475#CCHT3</td>
<td>C</td>
<td>4.7</td>
<td>35</td>
<td>1.6</td>
<td>4</td>
<td>1.8</td>
<td>247</td>
<td>222</td>
<td>99</td>
</tr>
<tr>
<td>F971V684#AAHT3</td>
<td>A</td>
<td>0.68</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>7.6</td>
<td>99</td>
<td>89</td>
<td>40</td>
</tr>
<tr>
<td>F971V474#AAHT3</td>
<td>A</td>
<td>0.47</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>10.0</td>
<td>87</td>
<td>78</td>
<td>35</td>
</tr>
<tr>
<td>F971V334#AAHT3</td>
<td>A</td>
<td>0.33</td>
<td>35</td>
<td>0.5</td>
<td>4</td>
<td>12.0</td>
<td>79</td>
<td>71</td>
<td>32</td>
</tr>
</tbody>
</table>

**F97-HT3 series (Temperature range -55°C to +135°C)**

**QUALIFICATION TABLE**

<table>
<thead>
<tr>
<th>Item</th>
<th>All Case (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damp Heat</td>
<td>±10</td>
</tr>
<tr>
<td>Temperature cycles</td>
<td>±5</td>
</tr>
<tr>
<td>Resistance soldering heat</td>
<td>±5</td>
</tr>
<tr>
<td>Surge</td>
<td>±5</td>
</tr>
<tr>
<td>Endurance</td>
<td>±10</td>
</tr>
<tr>
<td>Load Humidity</td>
<td>±10</td>
</tr>
</tbody>
</table>

**TEST**

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damp Heat (Steady State)</td>
</tr>
<tr>
<td>At 85°C, 85% RH For 1000 hours (No voltage applied)</td>
</tr>
<tr>
<td>Capacitance Change...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ...125% or less than the initial specified value</td>
</tr>
<tr>
<td>Leakage Current .......Initial specified value or less</td>
</tr>
<tr>
<td>Load Humidity</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Capacitance Change ...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ........Initial specified value or less</td>
</tr>
<tr>
<td>Temperature Cycles</td>
</tr>
<tr>
<td>At -55°C / +135°C,For 30 minutes each,1000 cycles</td>
</tr>
<tr>
<td>Capacitance Change ...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Dissipation Factor ...Reference to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ........Initial specified value or less</td>
</tr>
<tr>
<td>Resistance to Soldering Heat</td>
</tr>
<tr>
<td>10 seconds row at 260°C, 5 seconds immersion at 260°C.</td>
</tr>
<tr>
<td>Capacitance Change ...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Dissipation Factor ...Reference to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ........Initial specified value or less</td>
</tr>
<tr>
<td>Solderability</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Surge*</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Capacitance Change ...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Dissipation Factor ...Reference to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ........Initial specified value or less</td>
</tr>
<tr>
<td>Endurance*</td>
</tr>
<tr>
<td>After 2000 hours application of rated voltage in series with a 33Ω resistor at 95°C, or derated voltage in series with a 33Ω resistor at 135°C, capacitors shall meet the characteristic requirements table below.</td>
</tr>
<tr>
<td>Capacitance Change ...Refer to page 115 (*)</td>
</tr>
<tr>
<td>Dissipation Factor ...Reference to page 115 (*)</td>
</tr>
<tr>
<td>Leakage Current ........Initial specified value or less</td>
</tr>
<tr>
<td>Shear Test</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Terminal Strength</td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

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

**Abbreviations**

- **DF**: Dissipation Factor
- **ESR**: Equivalent Series Resistance
- **MSL**: Moisture Sensitivity Level

**Notes**

- *: ΔC/ΔT Marked *"*
- #: M for ±20% tolerance, K for ±10% tolerance.
- Moisture Sensitivity Level (MSL) is defined according to J-STD-020.
F97-HT3 Series
High Temperature 135°C, Resin-molded Chip, High Reliability

AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP

CONDUCTIVE POLYMER
TC Series
T C x
F Series
F3 x

CONVENTIONAL TANTALUM
T series
T x x
F Series
F x x

NIOBIUM OXIDE
N Series
N x x

CATHODE
DIELECTRIC
Tantalum
Ta2O5

MnO2
Nb2O5

Five Capacitor Construction Styles

J-lead
Undertab
TACmicrochip®
Conformal
Hermetic

SERIES LINE UP: CONVENTIONAL SMD MnO2

Industrial & Automotive

THJ 200°C
THJ 175°C auto

TMJ professional
TRJ professional

THH 230°C Hermetic
TAJ auto "Y" / "U"

THF 135°C auto

Low Profile & High CV

TLN undertab
TLJ microchip

F97-HT3
F97
F91-AJ6 auto
F93-AJ6 auto

F91
F93

F98-AS1 undertab, fused
F98 undertab

F98

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