# Type THAS,ThinPack, Aluminum Electrolytic Capacitor, 105 ºC

## High Energy Density, REACH and RoHS Compliant

At 9 mm thin, type THAS Thinpack offers the highest energy density available in a low profile aluminum electrolytic. It's ideal for the lowest profile circuits where high capacitance is needed for bulk storage. Look to type THAS to replace arrays of SMT solid tantalum or aluminum electrolytic capacitors.

## Highlights

- 9 mm thin
- Very high energy density (up to .9 J/cc)
- 5000 hr life @ 105 ºC
- REACH and RoHS Compliant

## Specifications

| | |
|---|---|
| **Temperature Range** | –55 °C to +105 °C ≤300 Vdc; -40 ºC to 105 ºC ≥500 Vdc |
| **Rated Voltage Range** | 10 Vdc to 500 Vdc |
| **Capacitance Range** | 40 µF to 18000 µF |
| **Capacitance Tolerance** | ±20% |
| **Leakage Current** | ≤ 0.002 CV µA, @ 25 °C and 5 mins. at rated voltage |
| **Ripple Current Multipliers** | |

**Temperature Multipliers**

| Temp | 45 | 55 | 65 | 75 | 85 | 95 | 105 |
|---|---|---|---|---|---|---|---|
| 0-300 VDC | 1.40 | 1.30 | 1.20 | 1.10 | 1.00 | 0.60 | 0.20 |
| 301-500 VDC | 1.30 | 1.25 | 1.15 | 1.10 | 1.00 | 0.60 | 0.20 |

**Ambient Air Temperature Multipliers (No heat sink)**

| Air Velocity m/sec | 0.25 | 1.00 | 2.50 | 5.00 |
|---|---|---|---|---|
| Ripple Current Multiplier | 1.00 | 1.20 | 1.50 | 1.70 |

**Frequency Multipliers**

| Rated Vdc/Freq | 50 | 60 | 120 | 360 | 1000 | 5000 | 20000 |
|---|---|---|---|---|---|---|---|
| 10-35 | 0.72 | 0.77 | 1.00 | 1.06 | 1.06 | 1.10 | 1.10 |
| 36-60 | 0.70 | 0.75 | 1.00 | 1.06 | 1.10 | 1.20 | 1.20 |
| 61-100 | 0.70 | 0.75 | 1.00 | 1.06 | 1.10 | 1.30 | 1.30 |
| 101-500 | 0.70 | 0.75 | 1.00 | 1.20 | 1.45 | 1.70 | 1.70 |

| | |
|---|---|
| **Low Temperature Characteristics** | Impedance ratio: $Z_{-55\,°C}/Z_{+25\,°C}$ @120 Hz ≤10 (5 - 20 Vdc), ≤3 (25 - 300 Vdc)<br>$Z_{-40\,°C}/Z_{+25\,°C}$ @120 Hz ≤10 (≥350 Vdc) |
| **DC Life Test** | 5000 h @ rated voltage at 105 °C<br>Δ Capacitance ±20% (<50 Vdc), Δ Capacitance ±10% (≥50 Vdc)<br>ESR 200% of limit<br>DCL 100% of limit<br>ΔThickness 0.5mm max |
| **Shelf Life Test** | 5 yrs @ 40 ºC<br>Capacitance 100% of limit<br>ESR 100% of limit<br>DCL ≤ 0.004 CV µA |

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**Vibration**
*Mounting: Vibration capability is dependent upon mounting restraint.*

All Sizes = 10g

**Vibration Test**

**Level**
The specimens, while deenergized or operating under the load conditions specified, shall be subjected to the vibration amplitude, frequency range, and duration specified for each case size.

**Amplitude**
The specimens shall be subjected to a simple harmonic motion having an amplitude of either 0.06-inch double amplitude (maximum total excursion) or peak level specified above, whichever is less. The tolerance on vibration amplitude shall be ±10 percent.

**Frequency Range**
The vibration frequency shall be varied logarithmically between the approximate limits of 10 to 2,000 Hz.

**Sweep Time and Duration**
The entire frequency range of 10 to 2,000 Hz and return to 10 Hz shall be traversed in 20 minutes. This cycle shall be performed 12 times in each of three mutually perpendicular directions (total of 36 times), so that the motion shall be applied for a total period of approximately 12 hours. Interruptions are permitted provided the requirements for rate of change and test duration are met.

**Thermal Resistance**

| | | Thermal Resistance (°C/W) by Case Length | | | |
|---|---|---|---|---|---|
| **# of Sides heatsinked** | ***Insulation*** | ***36.4 (mm)*** | ***45.9 (mm)*** | ***53.8 (mm)*** | ***66.5 (mm)*** |
| **One Side** | Bare can | 6.60 | 5.20 | 4.44 | 3.60 |
| | Polyester | 7.78 | 6.13 | 5.24 | 4.24 |
| **Both Sides** | Bare can | 4.95 | 3.87 | 3.30 | 2.66 |
| | Polyester | 5.54 | 4.34 | 3.70 | 2.98 |

**Typical Weight**
Case AA - 19g, Case AB - 22g, Case AC - 26g, Case AD - 34g

**Terminals**
20 AWG copper wire with tin electroplate, 15 amps max

**Case Material**
Aluminum with a Stainless Steel Sleeve

**Ripple Current Capability**
The max ripple current capability is set by the target core temperature of 105 ºC. The Peak to Peak ac must be less than Vr/5 max.

**Air Cooled**
The ripple currents in the ratings tables are for 85 ºC ambient temperatures.

**Heatsink Cooled**
Temperature rise from the hottest internal spot, the core, to ambient air is

$$\Delta T = I^2(\text{Max ESR})(\theta cc + \theta ca), \text{ recommended max } \Delta T \text{ of } 20\ ^\circ C$$

where θcc is the thermal resistance from core to case and θca from case to ambient. To calculate maximum ripple capability with the THAS attached to a heatsink use the maximum core temperature and the values for θcc.

**Example**
As an illustration, suppose you operate an noninsulated THAS112M060AA0C in 85 ºC air and attach it to a commercial heatsink with a free-air thermal resistance of 2.7 ºC/W. Use a good thermal grease between the capacitor and the heatsink, and the total thermal resistance is 2.7 + 6.6 or 9.3 º C/W. The power which would heat the core to 105 °C is (105 - 85)/9.3 or 2.15 W. For an ESR of 117 mΩ, 2 .15 W equates to a ripple current of 4.28 A.

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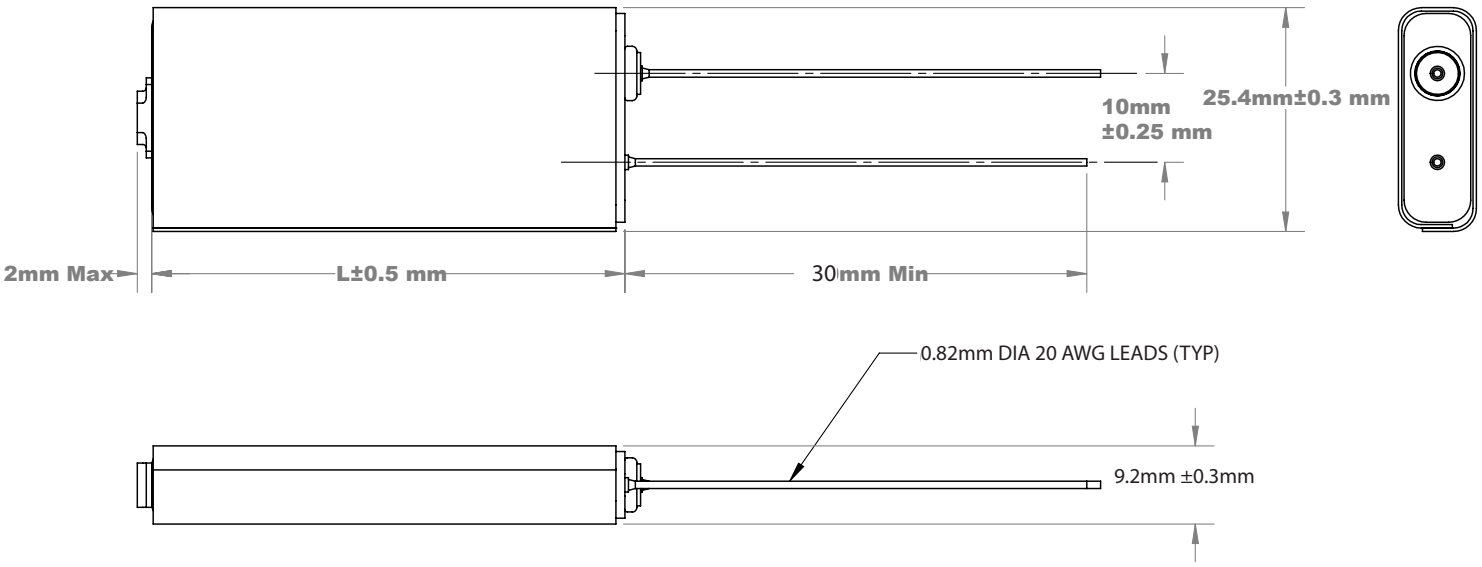
## Part Numbering System

| THAS | 412 | M | 025 | AA | 0 | C |
|---|---|---|---|---|---|---|
| **Type** | **Capacitance** | **Tolerance** | **Rated Voltage** | **Case Code** | **Insulation** | **Mounting Style** |
| **THAS** | **322** =3200 µF<br>**222** = 2200 µF<br>**162** = 1600 µF | **M=**±20% | **025** = 25 Vdc<br>**075** = 75 Vdc<br>**150** = 150 Vdc<br>**200** = 200 Vdc | **AA** = 36.4 mm<br>**AB** = 45.9 mm<br>**AC** = 53.8 mm<br>**AD** = 66.5 mm | **0** = bare can<br>**1** = polywrap | **C** = two leads |

## Outline Drawing

Note: The polyester tape wrap may add up to 0.020 inches to the thickness and width of the capacitor.

### Style C: No Tabs



# Type THAS,ThinPack, Aluminum Electrolytic Capacitor, 105 ºC

## Ratings

| Voltage | Cap (µF) | Catalog Part Number | Length (L) | ESR max 25 °C (Ω) | | Ripple (A) Case @ 85°C | |
|---|---|---|---|---|---|---|---|
| | | | | 120 Hz | 20 kHz | 120 Hz | 20 kHz |
| 10 Vdc @ 105 °C<br>12 Vdc Surge @ 25 °C | 8500 | THAS852M010AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 11000 | THAS113M010AB0C | 45.9 | 0.08 | 0.07 | 2.00 | 2.20 |
| | 14000 | THAS143M010AC0C | 53.8 | 0.07 | 0.06 | 2.60 | 2.86 |
| | 18000 | THAS183M010AD0C | 66.5 | 0.05 | 0.04 | 3.50 | 3.85 |
| 16 Vdc @ 105 °C<br>19.2 Vdc Surge @ 25 °C | 5900 | THAS592M016AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 8200 | THAS822M016AB0C | 45.9 | 0.08 | 0.07 | 2.20 | 2.42 |
| | 10000 | THAS103M016AC0C | 53.8 | 0.07 | 0.06 | 2.60 | 2.86 |
| | 13000 | THAS133M016AD0C | 66.5 | 0.05 | 0.04 | 3.50 | 3.85 |
| 20 Vdc @ 105 °C<br>24 Vdc Surge @ 25 °C | 5000 | THAS502M020AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 7000 | THAS702M020AB0C | 45.9 | 0.08 | 0.07 | 2.20 | 2.42 |
| | 8200 | THAS822M020AC0C | 53.8 | 0.07 | 0.06 | 2.60 | 2.86 |
| | 10000 | THAS103M020AD0C | 66.5 | 0.05 | 0.04 | 3.50 | 3.85 |
| 25 Vdc @ 105 °C<br>30 Vdc Surge @ 25 °C | 3500 | THAS352M025AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 4900 | THAS492M025AB0C | 45.9 | 0.08 | 0.07 | 2.60 | 2.86 |
| | 6000 | THAS602M025AC0C | 53.8 | 0.07 | 0.06 | 2.50 | 2.75 |
| | 7800 | THAS782M025AD0C | 66.5 | 0.05 | 0.04 | 3.10 | 3.41 |
| 30 Vdc @ 105 °C<br>36 Vdc Surge @ 25 °C | 2900 | THAS292M030AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 4100 | THAS412M030AB0C | 45.9 | 0.08 | 0.07 | 2.60 | 2.86 |
| | 5000 | THAS502M030AC0C | 53.8 | 0.07 | 0.06 | 3.00 | 3.30 |
| | 6500 | THAS652M030AD0C | 66.5 | 0.05 | 0.04 | 3.50 | 3.85 |
| 35 Vdc @ 105 °C<br>42 Vdc Surge @ 25 °C | 2500 | THAS252M035AA0C | 36.4 | 0.12 | 0.09 | 2.00 | 2.20 |
| | 3500 | THAS352M035AB0C | 45.9 | 0.08 | 0.07 | 2.60 | 2.86 |
| | 4300 | THAS432M035AC0C | 53.8 | 0.07 | 0.06 | 3.00 | 3.30 |
| | 5600 | THAS562M035AD0C | 66.5 | 0.05 | 0.04 | 3.60 | 3.96 |
| 40 Vdc @ 105 °C<br>48 Vdc Surge @ 25 °C | 2100 | THAS212M040AA0C | 36.4 | 0.12 | 0.09 | 1.70 | 2.04 |
| | 3000 | THAS302M040AB0C | 45.9 | 0.08 | 0.07 | 2.20 | 2.64 |
| | 3700 | THAS372M040AC0C | 53.8 | 0.07 | 0.06 | 2.50 | 3.00 |
| | 4800 | THAS482M040AD0C | 66.5 | 0.05 | 0.04 | 3.10 | 3.72 |
| 50 Vdc @ 105 °C<br>60 Vdc Surge @ 25 °C | 1400 | THAS142M050AA0C | 36.4 | 0.12 | 0.09 | 1.70 | 2.04 |
| | 2000 | THAS202M050AB0C | 45.9 | 0.08 | 0.07 | 2.20 | 2.64 |
| | 2500 | THAS252M050AC0C | 53.8 | 0.07 | 0.06 | 2.50 | 3.00 |
| | 3200 | THAS322M050AD0C | 66.5 | 0.05 | 0.04 | 2.90 | 3.48 |
| 60 Vdc @ 105 °C<br>72 Vdc Surge @ 25 °C | 1100 | THAS112M060AA0C | 36.4 | 0.12 | 0.09 | 1.70 | 2.04 |
| | 1600 | THAS162M060AB0C | 45.9 | 0.08 | 0.07 | 2.20 | 2.64 |
| | 2000 | THAS202M060AC0C | 53.8 | 0.07 | 0.06 | 2.50 | 3.00 |
| | 2600 | THAS262M060AD0C | 66.5 | 0.05 | 0.04 | 3.10 | 3.72 |
| 75 Vdc @ 105 °C<br>90 Vdc Surge @ 25 °C | 680 | THAS681M075AA0C | 36.4 | 0.29 | 0.19 | 1.10 | 1.43 |
| | 940 | THAS941M075AB0C | 45.9 | 0.21 | 0.14 | 1.40 | 1.82 |
| | 1100 | THAS112M075AC0C | 53.8 | 0.17 | 0.11 | 1.60 | 2.08 |
| | 1500 | THAS152M075AD0C | 66.5 | 0.13 | 0.09 | 2.00 | 2.60 |
| 100 Vdc @ 105 °C<br>120 Vdc Surge @ 25 °C | 310 | THAS311M100AA0C | 36.4 | 0.29 | 0.19 | 1.10 | 1.43 |
| | 430 | THAS431M100AB0C | 45.9 | 0.21 | 0.14 | 1.40 | 1.82 |
| | 530 | THAS531M100AC0C | 53.8 | 0.17 | 0.11 | 1.60 | 2.08 |
| | 690 | THAS691M100AD0C | 66.5 | 0.13 | 0.09 | 2.00 | 2.60 |

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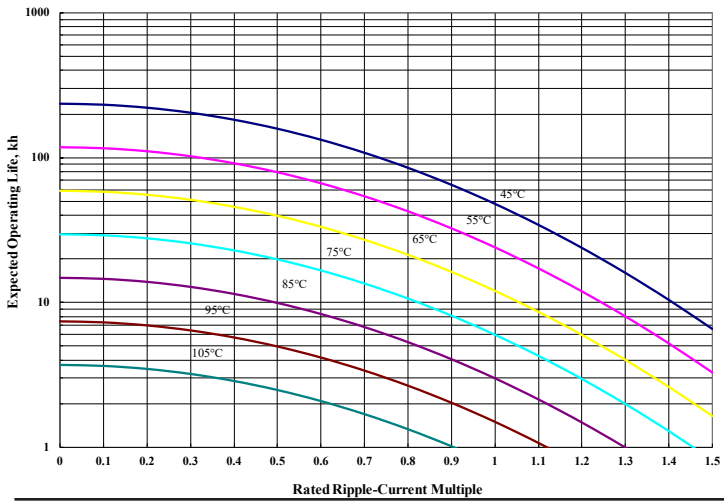
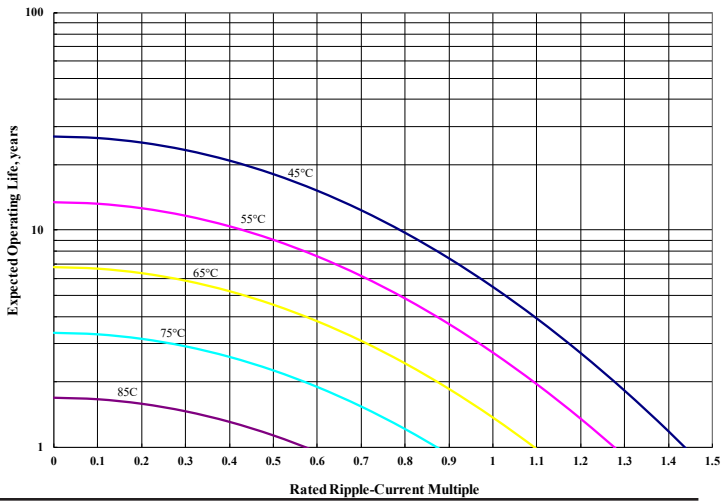
| Voltage | Cap (µF) | Catalog Part Number | Length (L) | ESR max 25 °C (Ω) 120 Hz | ESR max 25 °C (Ω) 20 kHz | Ripple (A) Case @ 85 °C 120 Hz | Ripple (A) Case @ 85 °C 20 kHz |
|---|---|---|---|---|---|---|---|
| 150 Vdc @ 105 °C<br>180 Vdc Surge @ 25 °C | 230 | THAS231M150AA0C | 36.4 | 0.80 | 0.40 | 0.60 | 1.02 |
| | 320 | THAS321M150AB0C | 45.9 | 0.58 | 0.29 | 0.80 | 1.36 |
| | 400 | THAS401M150AC0C | 53.8 | 0.47 | 0.24 | 1.00 | 1.70 |
| | 520 | THAS521M150AD0C | 66.5 | 0.37 | 0.18 | 1.20 | 2.04 |
| 200 Vdc @ 105 °C<br>240 Vdc Surge @ 25 °C | 120 | THAS121M200AA0C | 36.4 | 0.90 | 0.45 | 0.60 | 1.02 |
| | 170 | THAS171M200AB0C | 45.9 | 0.65 | 0.33 | 0.80 | 1.36 |
| | 210 | THAS211M200AC0C | 53.8 | 0.53 | 0.27 | 0.90 | 1.53 |
| | 270 | THAS271M200AD0C | 66.5 | 0.41 | 0.21 | 1.10 | 1.87 |
| 250 Vdc @ 105 °C<br>300 Vdc Surge @ 25 °C | 110 | THAS111M250AA0C | 36.4 | 0.90 | 0.45 | 0.60 | 1.02 |
| | 150 | THAS151M250AB0C | 45.9 | 0.65 | 0.33 | 0.80 | 1.36 |
| | 190 | THAS191M250AC0C | 53.8 | 0.53 | 0.27 | 0.90 | 1.53 |
| | 250 | THAS251M250AD0C | 66.5 | 0.41 | 0.21 | 1.10 | 1.87 |
| 300 Vdc @ 105 °C<br>350 Vdc Surge @ 25 °C | 90 | THAS900M300AA0C | 36.4 | 0.90 | 0.45 | 0.60 | 1.02 |
| | 130 | THAS131M300AB0C | 45.9 | 0.65 | 0.33 | 0.80 | 1.36 |
| | 160 | THAS161M300AC0C | 53.8 | 0.53 | 0.27 | 0.90 | 1.53 |
| | 200 | THAS201M300AD0C | 66.5 | 0.41 | 0.21 | 1.10 | 1.87 |
| 350 Vdc @ 105 °C<br>400 Vdc Surge @ 25 °C | 80 | THAS800M350AA0C | 36.4 | 2.45 | 1.18 | 0.60 | 1.02 |
| | 110 | THAS111M350AB0C | 45.9 | 1.78 | 0.85 | 0.60 | 1.02 |
| | 130 | THAS131M350AC0C | 53.8 | 1.45 | 0.70 | 0.70 | 1.19 |
| | 170 | THAS171M350AD0C | 66.5 | 1.12 | 0.54 | 0.80 | 1.36 |
| 400 Vdc @ 105 °C<br>450 Vdc Surge @ 25 °C | 70 | THAS700M400AA0C | 36.4 | 2.45 | 1.18 | 0.60 | 1.02 |
| | 90 | THAS900M400AB0C | 45.9 | 1.78 | 0.85 | 0.60 | 1.02 |
| | 110 | THAS111M400AC0C | 53.8 | 1.45 | 0.70 | 0.70 | 1.19 |
| | 140 | THAS141M400AD0C | 66.5 | 1.12 | 0.54 | 0.80 | 1.36 |
| 450 Vdc @ 105 °C<br>500 Vdc Surge @ 25 °C | 60 | THAS600M450AA0C | 36.4 | 2.45 | 1.18 | 0.60 | 1.02 |
| | 80 | THAS800M450AB0C | 45.9 | 1.78 | 0.85 | 0.60 | 1.02 |
| | 100 | THAS101M450AC0C | 53.8 | 1.45 | 0.70 | 0.70 | 1.19 |
| | 130 | THAS131M450AD0C | 66.5 | 1.12 | 0.54 | 0.80 | 1.36 |
| 500 Vdc @ 105 °C<br>550 Vdc Surge @ 25 °C | 40 | THAS400M500AA0C | 36.3 | 5.61 | 2.81 | 0.30 | 0.51 |
| | 50 | THAS500M500AB0C | 45.9 | 4.07 | 2.04 | 0.40 | 0.68 |
| | 70 | THAS700M500AC0C | 53.8 | 3.32 | 1.66 | 0.50 | 0.85 |
| | 90 | THAS900M500AD0C | 66.5 | 2.56 | 1.28 | 0.50 | 0.85 |

## Typical Performance Curves

Type THAS Operating Life in Kilohours vs Ripple Current




Type THAS Operating Life in Years vs Ripple Current



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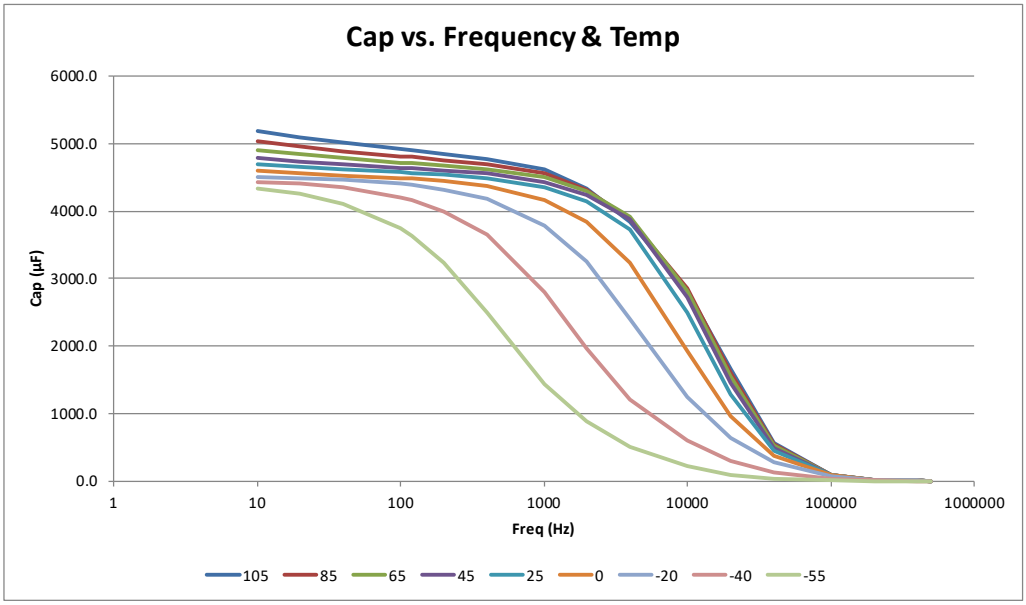
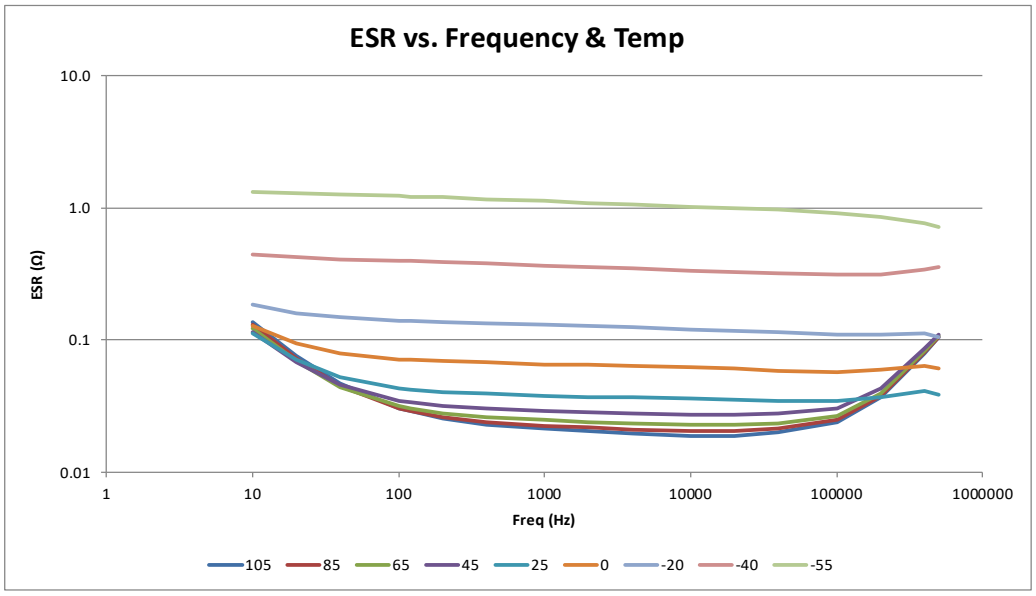
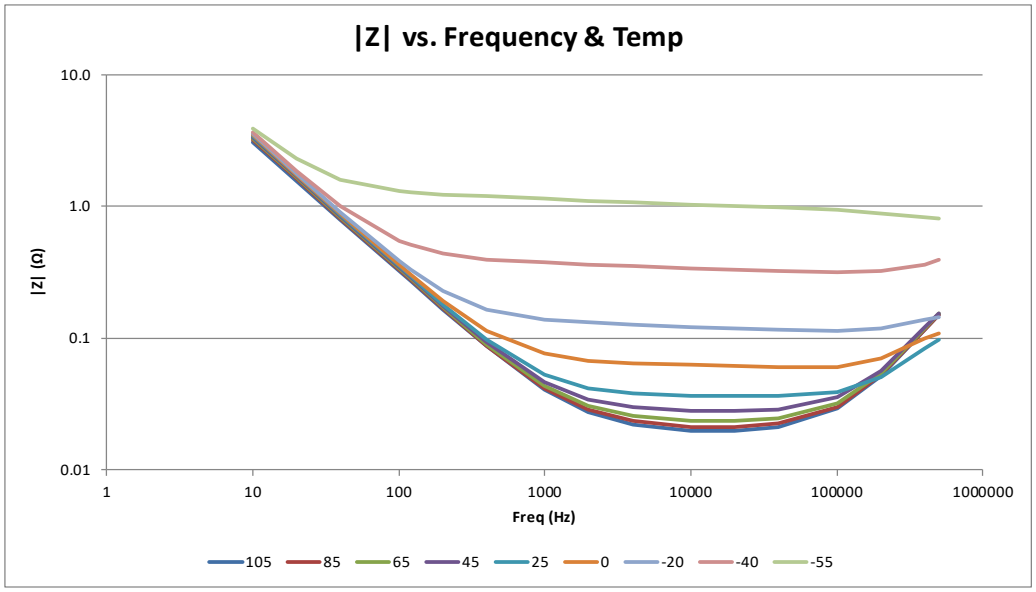
## Typical Performance Curves

THAS502M020AA0C



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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

**«FORSTAR»** (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

FORSTAR®

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