

High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

Suitable for most applications up to 20GHz, the AV-0607 series of TVA's are characterized by the behavior of decreased attenuation (increased gain) with increased temperature. TVA's are used in applications to passively correct temperature related gain compensation issues with reduced signal distortion, phase change, and intermodulation compared to active compensation techniques. Applications may include radar, satcom, circulators, mixers, LNA's, and more.

FEATURES

- Low noise thin film construction
- Up to 200mW power dissipation
- 99.5% Al₂O₃ substrate
- Nickel Barrier w/ 100% matte tin finish
- Well defined TCA from -40°C to + 125°C

APPLICATIONS

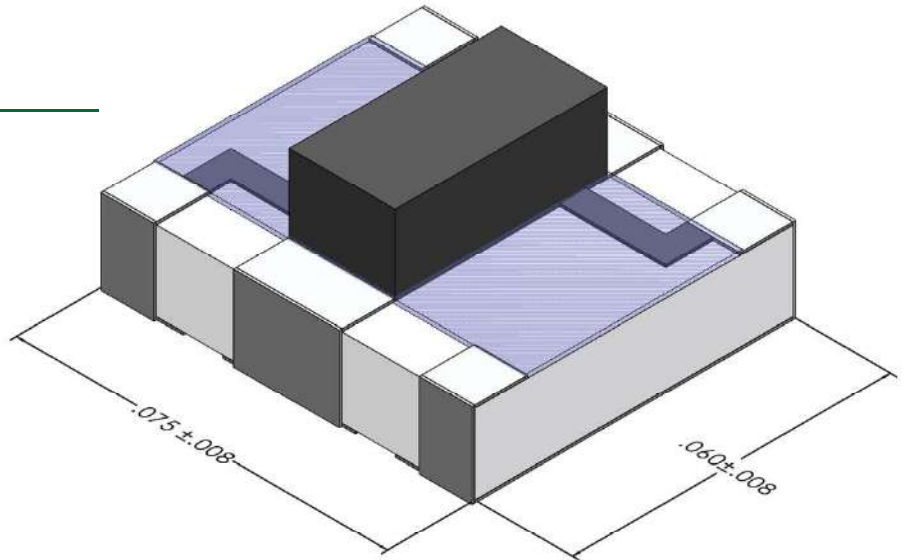
- RF power amplifiers
- Multiband communication
- Broadcast systems

DIMENSIONS

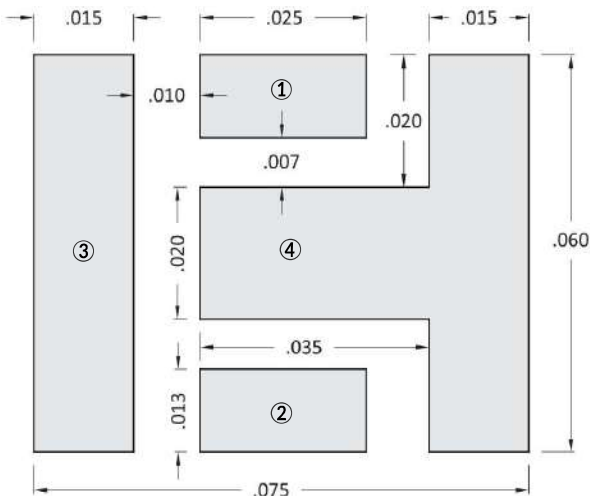
PART	LENGTH	WIDTH	HEIGHT
AV-0607-C	.060 ± .008	.075 ± .008	.043 (max)

SPECIFICATIONS

ITEM	SPECIFICATION
Standard Impedance:	50Ω Nominal
dB Value Range:	2dB - 9dB
N Value Range:	1 - 8 (varies by Atn value)
Available Configurations:	See ordering info
Power Rating (*70C Free Air)	160mW - 200mW
Attachment Method:	Solder
Operating Temperature:	-55° to 125° C
Storage Temperature:	-65° to 150° C
End Of Life:	No E.O.L. Planned
Moisture Level:	Level 1
Attenuation Accuracy @25°C:	DC - 15Ghz: ± 1dB 15 - 20Ghz: ± 1.5dB 20 - 24Ghz: ± 1.8dB
VSWR (Typical) @ 25°C:	DC - 20Ghz: ≤ 1.5:1 20 - 24Ghz: ≤ 1.8:1

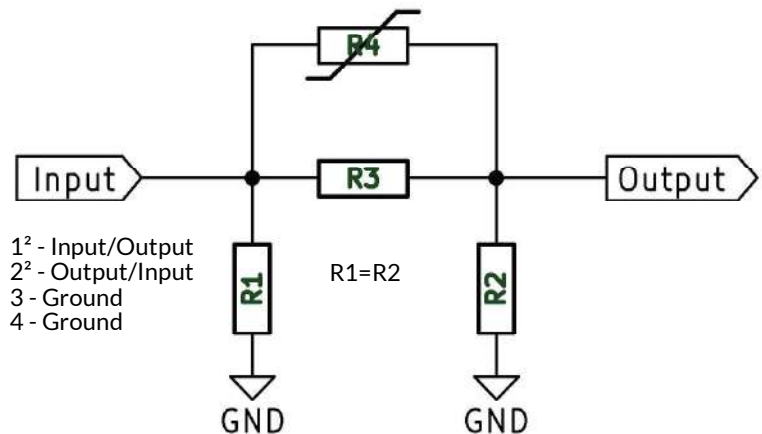


TERMINAL DIMENSIONS¹ & FUNCTION



1 - All dimensions in inches
2 - Device is electrically symmetrical

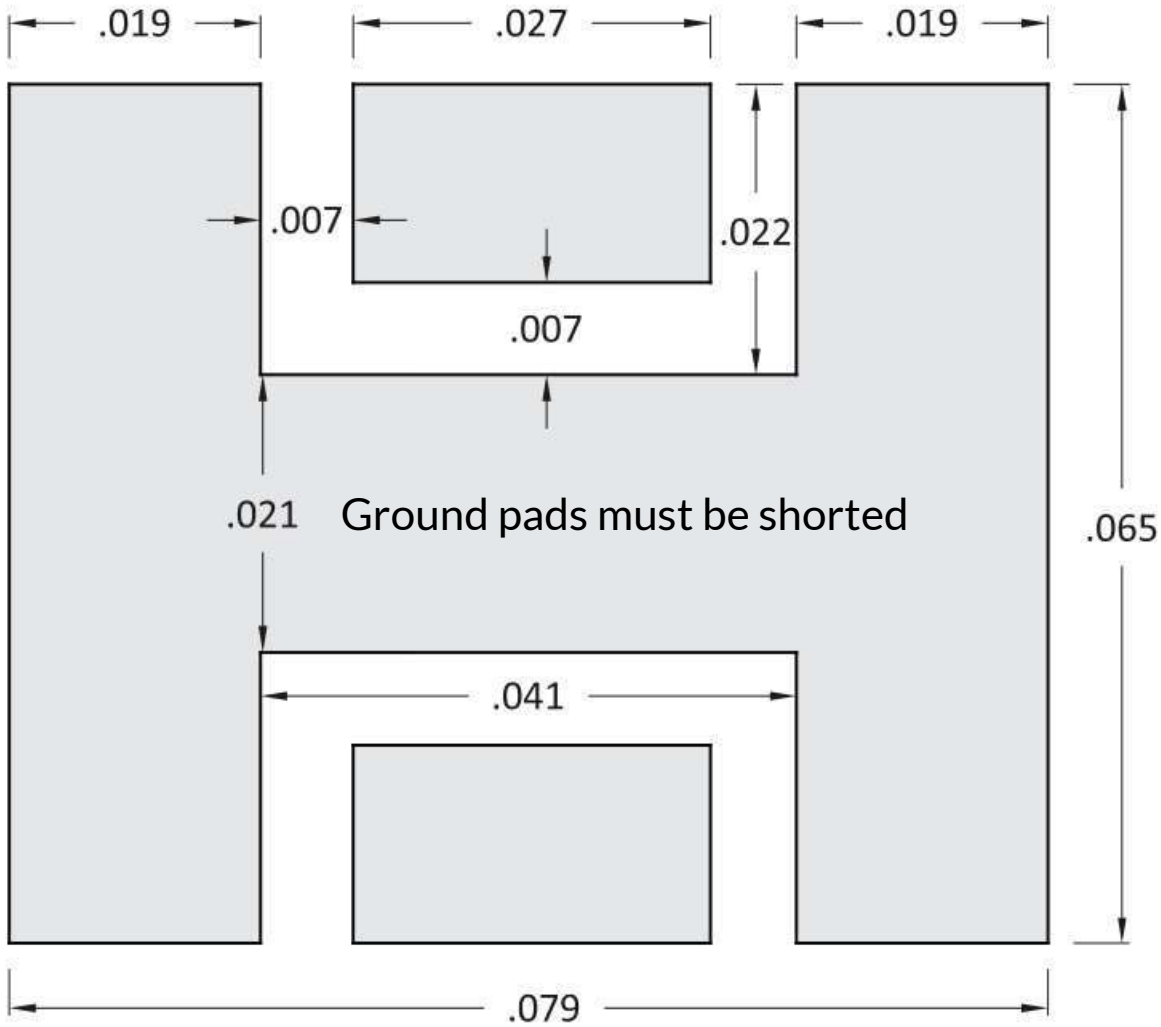
EQUIVALENT CIRCUIT DIAGRAM



1² - Input/Output
2² - Output/Input
3 - Ground
4 - Ground

R1=R2

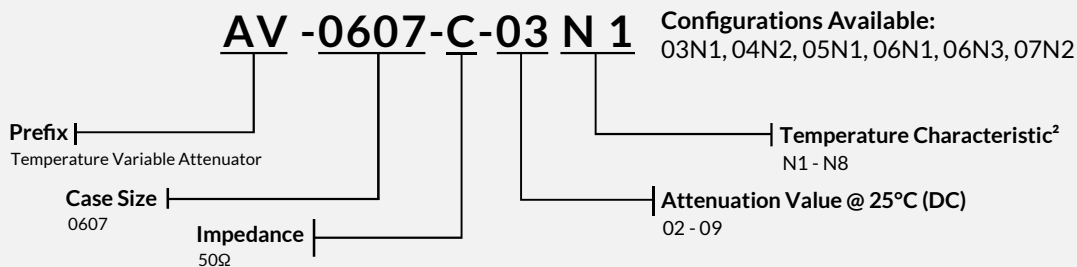
PCB LANDING EXAMPLE¹



1 - All dimensions in inches

ORDERING INFORMATION

Example: 0607 case size, 3dB @25°C, N1 temperature variable attenuator



2 - Temperature sensitivity decreases with increasing N value. N1 attenuation will decrease more than N9 for each °C increase. Contact your IMS Sales representative to request an evaluation of additional configuration requirements

For packaging options please visit our website www.ims-resistors.com/packaging

TEMPERATURE CHARACTERISTIC OF ATTENUATION (TCA)

$$TCA = \frac{S21_T - S21_{25^\circ C}}{(T - 25) * S21_{25^\circ C}} \frac{dB}{^\circ C}$$

- TCA - Temperature Coefficient of Attenuation in dB/°C
- T - Temperature during measurement or operation
- S21_T - Attenuation at Temperature T
- S21_{25°C} - Reference attenuation at 25°C

Designers may find it useful to solve the above formula to estimate attenuation at a target temperature (S21_T) as a function of a known TCA at some known or interpolated operating frequency, as well as the known attenuation at room temperature for a given part.

$$S21_T = S21_{25^\circ C} (TCA * T - 25 * TCA + 1) dB$$

TEMPERATURE CHARACTERISTIC OF ATTENUATION (TCA)

03N1		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0043	-0.0039	-0.0036	-0.0033	-0.0032	-0.0030	-0.0029	-0.0028	-0.0025	-0.0021	-0.0016
	-25°C	-0.0048	-0.0042	-0.0040	-0.0037	-0.0035	-0.0034	-0.0032	-0.0031	-0.0028	-0.0023	-0.0018
	0°C	-0.0052	-0.0046	-0.0043	-0.0040	-0.0039	-0.0037	-0.0036	-0.0034	-0.0030	-0.0025	-0.0018
	50°C	-0.0050	-0.0041	-0.0038	-0.0033	-0.0032	-0.0030	-0.0026	-0.0023	-0.0018	-0.0014	-0.0006
	75°C	-0.0047	-0.0038	-0.0035	-0.0031	-0.0029	-0.0027	-0.0024	-0.0021	-0.0016	-0.0011	-0.0004
	100°C	-0.0042	-0.0035	-0.0031	-0.0028	-0.0026	-0.0024	-0.0022	-0.0019	-0.0015	-0.0010	-0.0004
	125°C	-0.0037	-0.0031	-0.0027	-0.0024	-0.0023	-0.0021	-0.0019	-0.0016	-0.0013	-0.0008	-0.0001

04N2		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0046	-0.0045	-0.0043	-0.0041	-0.0041	-0.0041	-0.0041	-0.0041	-0.0038	-0.0036	-0.0035
	-25°C	-0.0051	-0.0050	-0.0047	-0.0045	-0.0045	-0.0045	-0.0046	-0.0045	-0.0042	-0.0039	-0.0038
	0°C	-0.0057	-0.0056	-0.0053	-0.0051	-0.0051	-0.0051	-0.0052	-0.0052	-0.0047	-0.0044	-0.0044
	50°C	-0.0054	-0.0049	-0.0047	-0.0044	-0.0044	-0.0044	-0.0044	-0.0041	-0.0039	-0.0035	-0.0028
	75°C	-0.0049	-0.0044	-0.0041	-0.0038	-0.0038	-0.0039	-0.0038	-0.0034	-0.0032	-0.0028	-0.0021
	100°C	-0.0044	-0.0039	-0.0036	-0.0034	-0.0034	-0.0034	-0.0033	-0.0031	-0.0029	-0.0025	-0.0019
	125°C	-0.0039	-0.0034	-0.0032	-0.0030	-0.0030	-0.0030	-0.0029	-0.0027	-0.0025	-0.0021	-0.0015

05N1		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0109	-0.0105	-0.0099	-0.0090	-0.0081	-0.0073	-0.0064	-0.0054	-0.0042	-0.0029	-0.0017
	-25°C	-0.0110	-0.0104	-0.0099	-0.0091	-0.0083	-0.0075	-0.0066	-0.0057	-0.0044	-0.0032	-0.0020
	0°C	-0.0103	-0.0096	-0.0091	-0.0085	-0.0079	-0.0073	-0.0066	-0.0058	-0.0046	-0.0034	-0.0022
	50°C	-0.0077	-0.0069	-0.0066	-0.0063	-0.0060	-0.0057	-0.0054	-0.0048	-0.0041	-0.0032	-0.0022
	75°C	-0.0063	-0.0057	-0.0054	-0.0051	-0.0049	-0.0047	-0.0044	-0.0040	-0.0034	-0.0027	-0.0019
	100°C	-0.0053	-0.0047	-0.0045	-0.0042	-0.0041	-0.0039	-0.0037	-0.0033	-0.0028	-0.0022	-0.0015
	125°C	-0.0045	-0.0040	-0.0037	-0.0035	-0.0034	-0.0033	-0.0030	-0.0027	-0.0023	-0.0018	-0.0012

High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

TEMPERATURE CHARACTERISTIC OF ATTENUATION (TCA)

06N1		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0196	-0.0179	-0.0162	-0.0145	-0.0132	-0.0120	-0.0110	-0.0099	-0.0088	-0.0081	-0.0073
	-25°C	-0.0180	-0.0167	-0.0154	-0.0142	-0.0132	-0.0122	-0.0114	-0.0105	-0.0095	-0.0088	-0.0079
	0°C	-0.0148	-0.0139	-0.0133	-0.0127	-0.0123	-0.0118	-0.0115	-0.0109	-0.0100	-0.0095	-0.0089
	50°C	-0.0089	-0.0082	-0.0079	-0.0077	-0.0078	-0.0078	-0.0077	-0.0075	-0.0073	-0.0070	-0.0063
	75°C	-0.0071	-0.0065	-0.0062	-0.0061	-0.0062	-0.0062	-0.0061	-0.0060	-0.0058	-0.0056	-0.0050
	100°C	-0.0058	-0.0053	-0.0050	-0.0050	-0.0050	-0.0050	-0.0050	-0.0050	-0.0049	-0.0047	-0.0042
	125°C	-0.0048	-0.0044	-0.0042	-0.0041	-0.0041	-0.0041	-0.0042	-0.0041	-0.0040	-0.0039	-0.0034

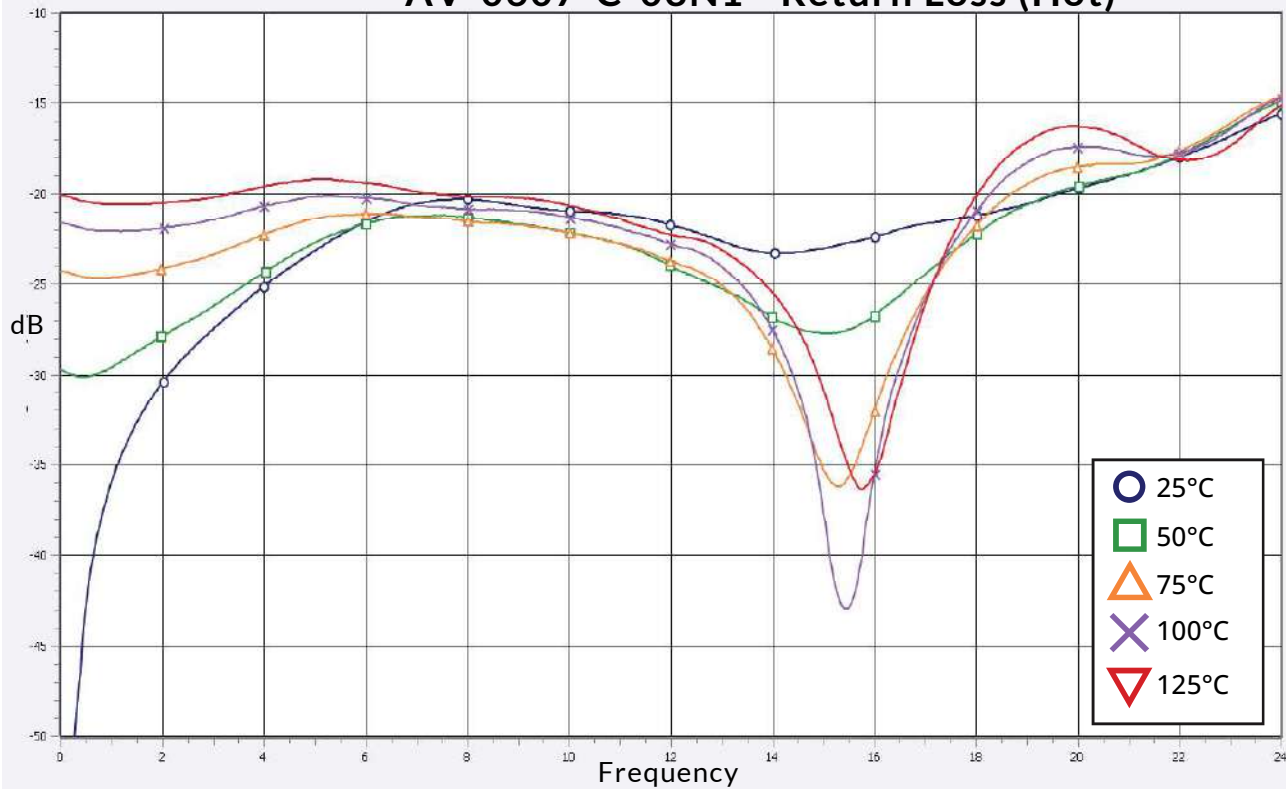
06N3		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0058	-0.0056	-0.0054	-0.0053	-0.0053	-0.0052	-0.0052	-0.0052	-0.0050	-0.0050	-0.0050
	-25°C	-0.0064	-0.0061	-0.0059	-0.0058	-0.0058	-0.0057	-0.0057	-0.0057	-0.0055	-0.0055	-0.0055
	0°C	-0.0072	-0.0069	-0.0066	-0.0065	-0.0066	-0.0064	-0.0065	-0.0065	-0.0062	-0.0062	-0.0063
	50°C	-0.0067	-0.0064	-0.0062	-0.0061	-0.0062	-0.0061	-0.0061	-0.0061	-0.0061	-0.0059	-0.0055
	75°C	-0.0054	-0.0051	-0.0049	-0.0049	-0.0050	-0.0049	-0.0049	-0.0049	-0.0049	-0.0049	-0.0044
	100°C	-0.0048	-0.0046	-0.0044	-0.0043	-0.0044	-0.0044	-0.0044	-0.0044	-0.0044	-0.0044	-0.0039
	125°C	-0.0042	-0.0040	-0.0038	-0.0038	-0.0039	-0.0039	-0.0039	-0.0039	-0.0039	-0.0039	-0.0038

07N2		0.01Ghz	2 Ghz	4 Ghz	6 Ghz	8 Ghz	10 Ghz	12 Ghz	14 Ghz	16 Ghz	18 Ghz	20 Ghz
Temperature	-40°C	-0.0155	-0.0147	-0.0138	-0.0127	-0.0119	-0.0111	-0.0103	-0.0097	-0.0091	-0.0086	-0.0081
	-25°C	-0.0148	-0.0139	-0.0132	-0.0123	-0.0116	-0.0110	-0.0103	-0.0098	-0.0092	-0.0086	-0.0080
	0°C	-0.0127	-0.0119	-0.0115	-0.0110	-0.0107	-0.0104	-0.0100	-0.0096	-0.0092	-0.0087	-0.0081
	50°C	-0.0085	-0.0079	-0.0077	-0.0076	-0.0076	-0.0077	-0.0076	-0.0074	-0.0074	-0.0071	-0.0066
	75°C	-0.0069	-0.0064	-0.0062	-0.0061	-0.0062	-0.0062	-0.0061	-0.0060	-0.0060	-0.0058	-0.0053
	100°C	-0.0056	-0.0052	-0.0051	-0.0050	-0.0051	-0.0051	-0.0050	-0.0050	-0.0050	-0.0048	-0.0044
	125°C	-0.0047	-0.0044	-0.0042	-0.0041	-0.0042	-0.0042	-0.0042	-0.0041	-0.0041	-0.0040	-0.0035

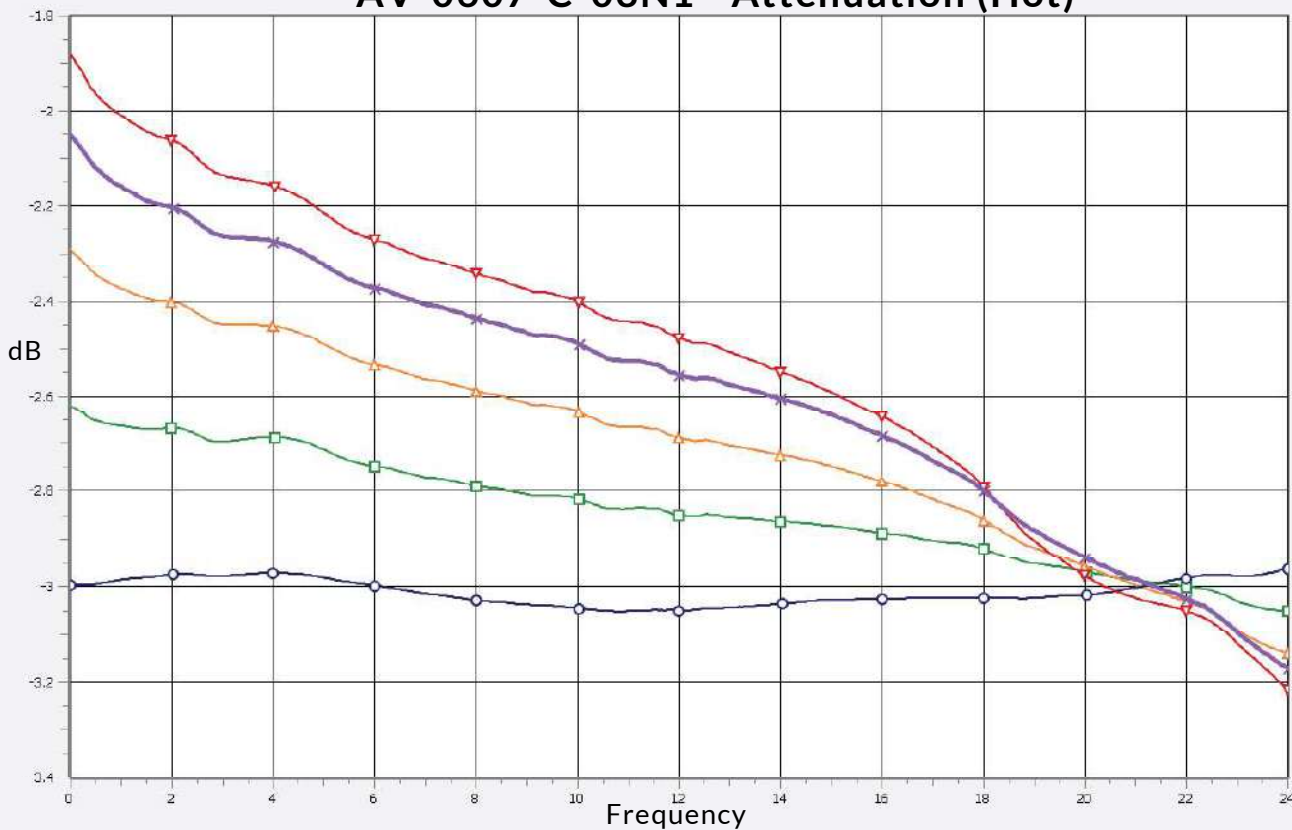
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TEMPERATURE CHARACTERISTIC DATA - 10MIL ROGERS 4350B

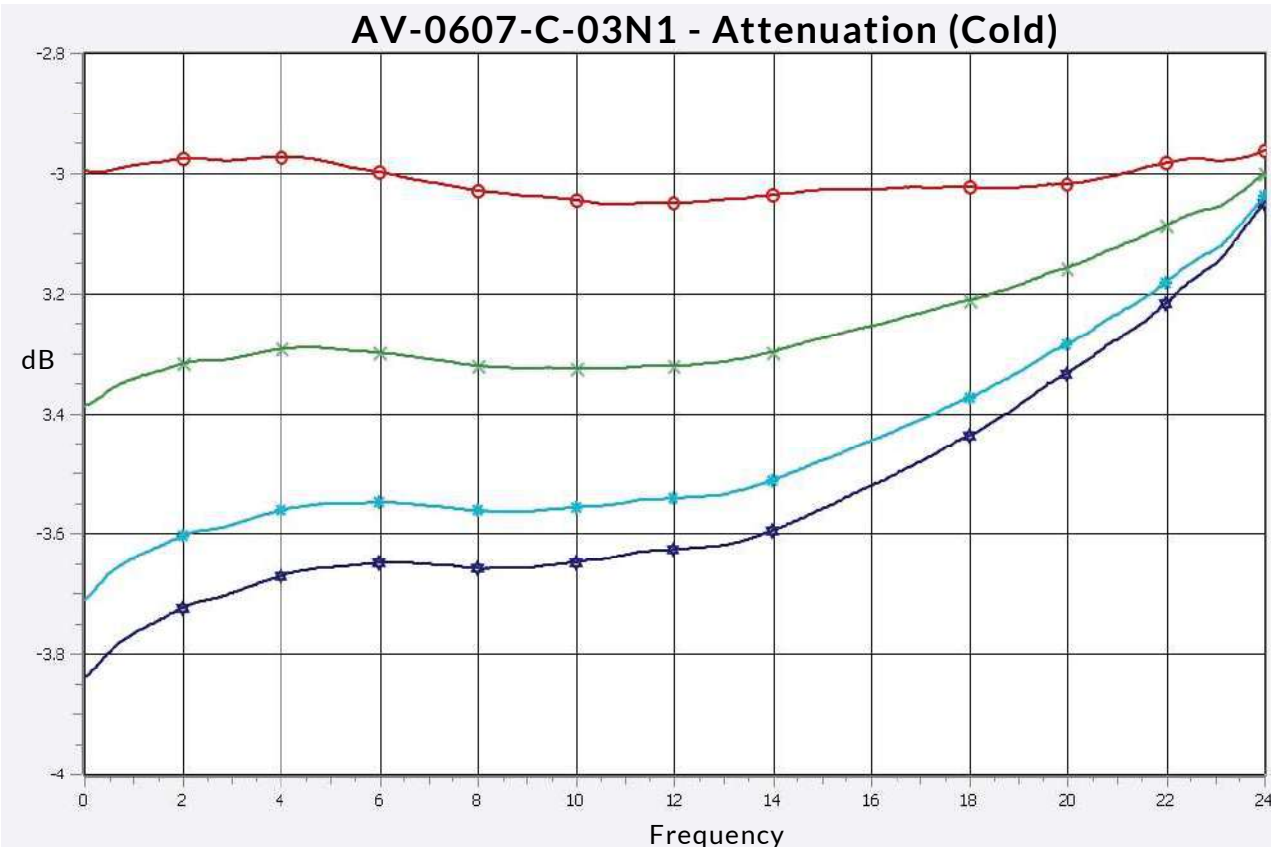
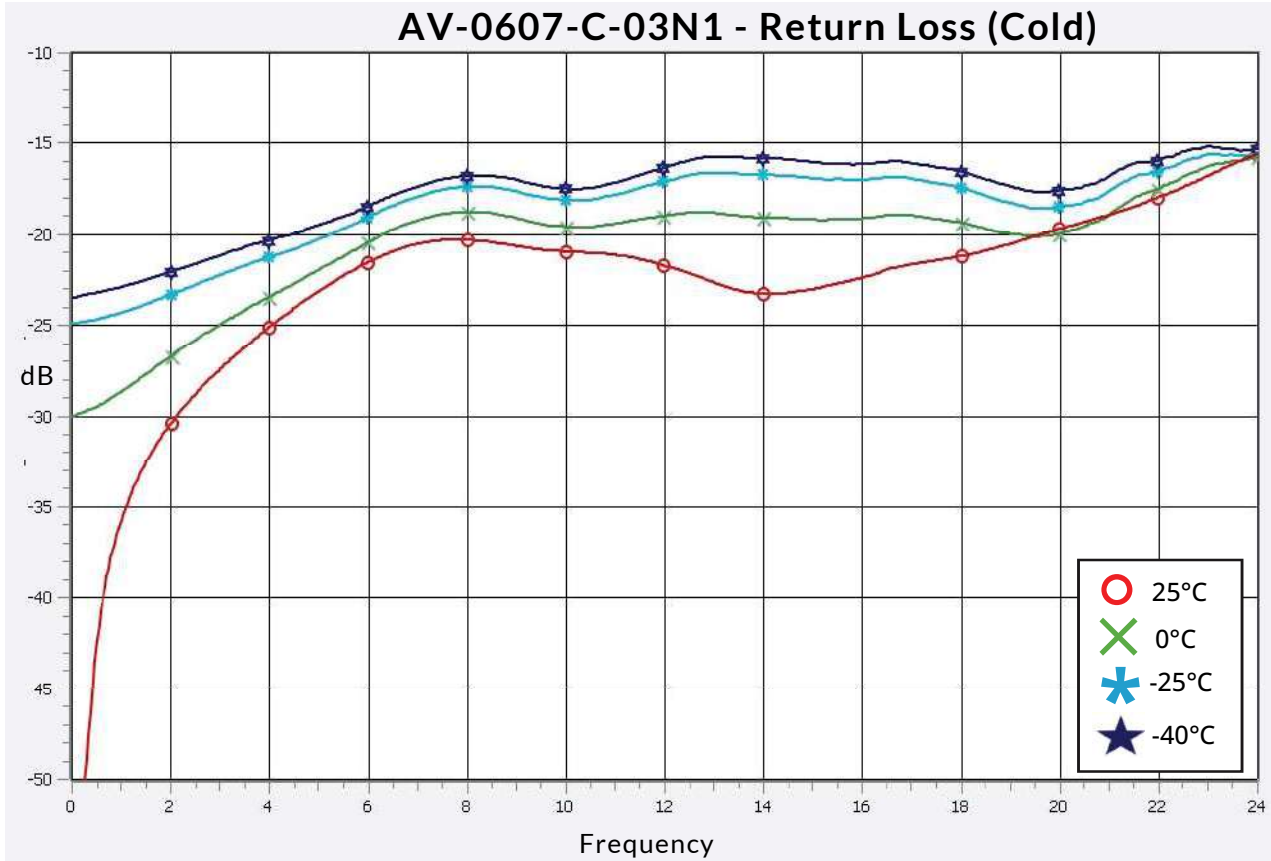
AV-0607-C-03N1 - Return Loss (Hot)



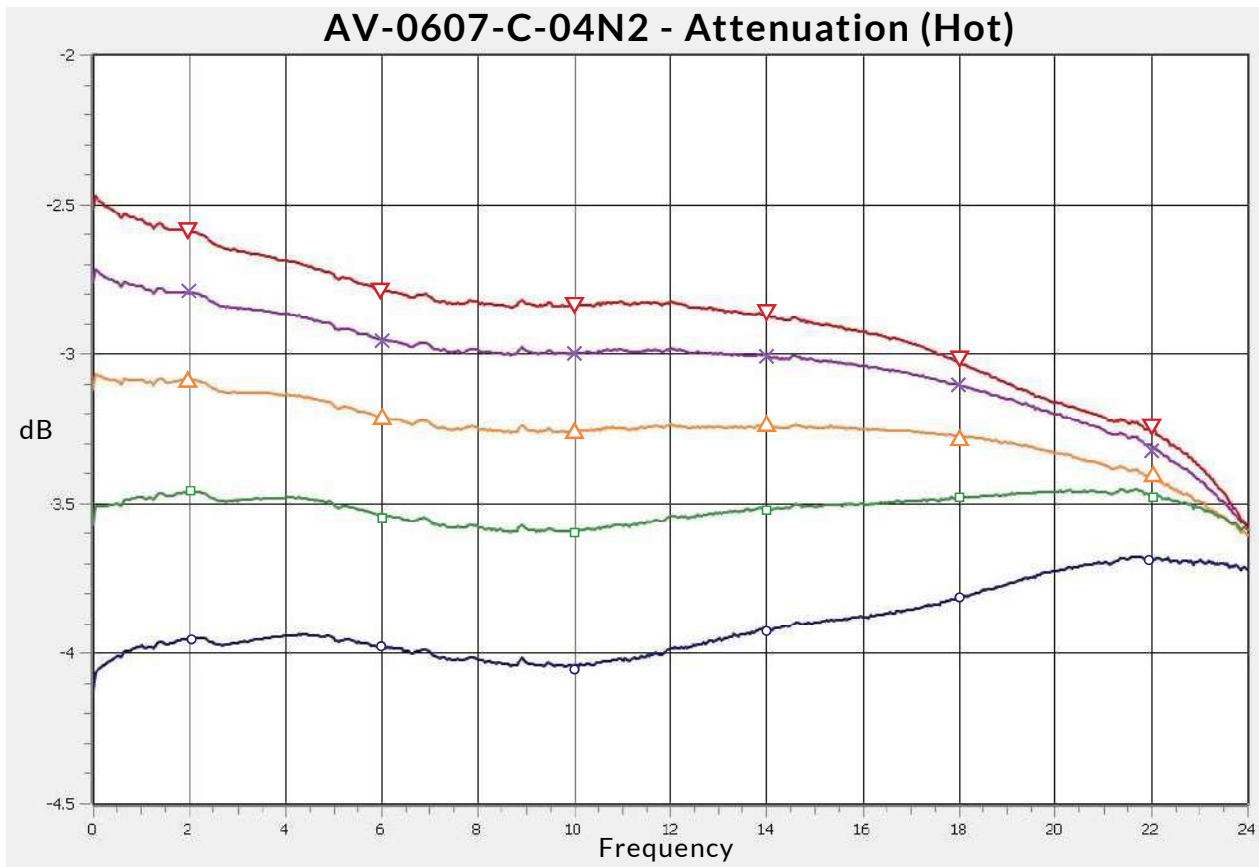
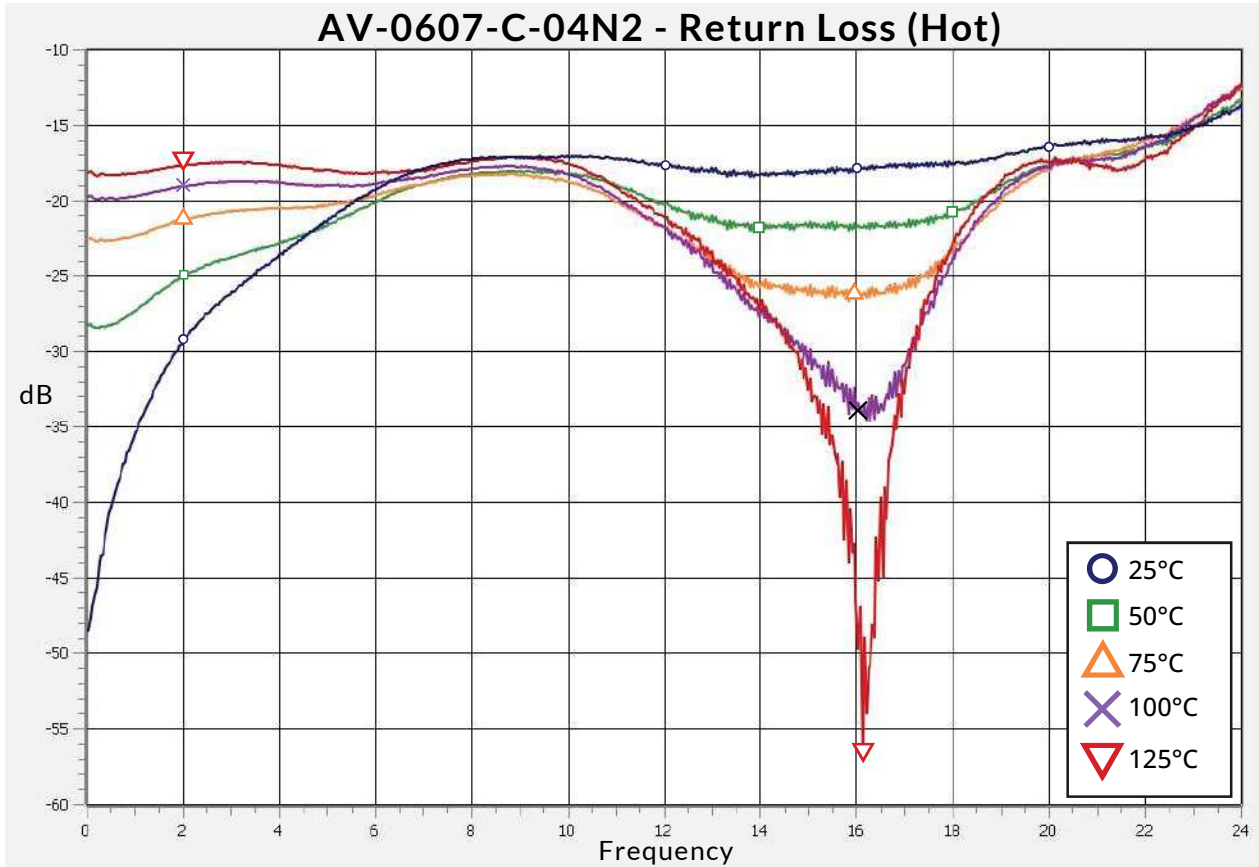
AV-0607-C-03N1 - Attenuation (Hot)



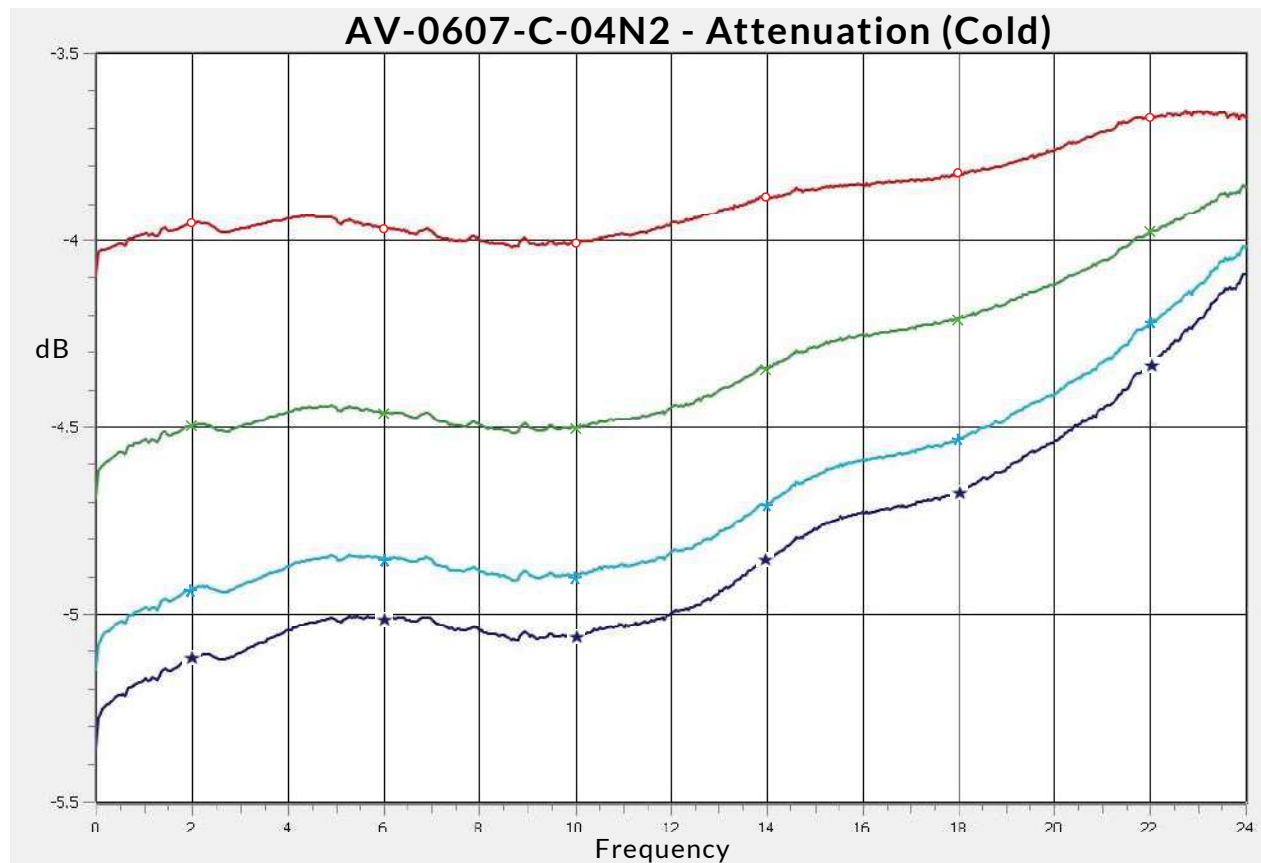
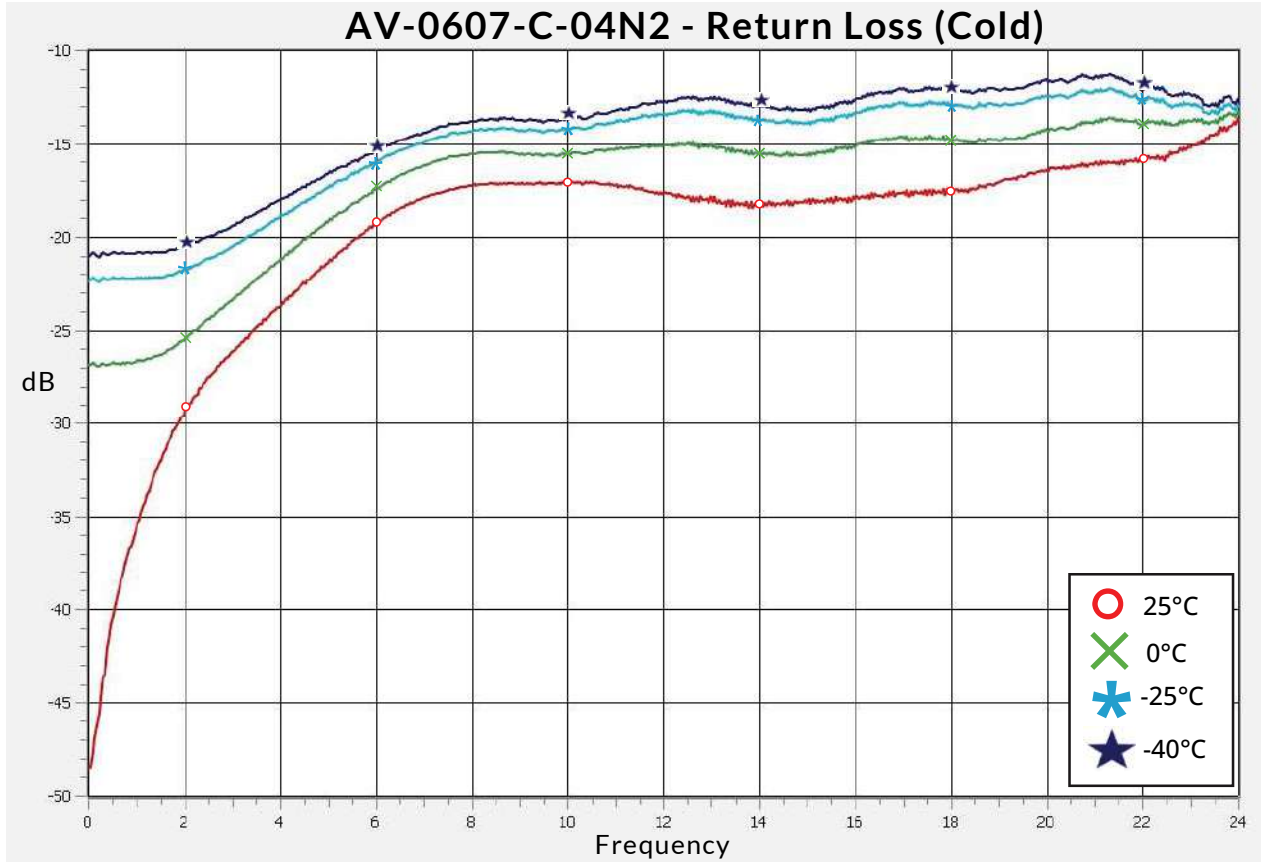
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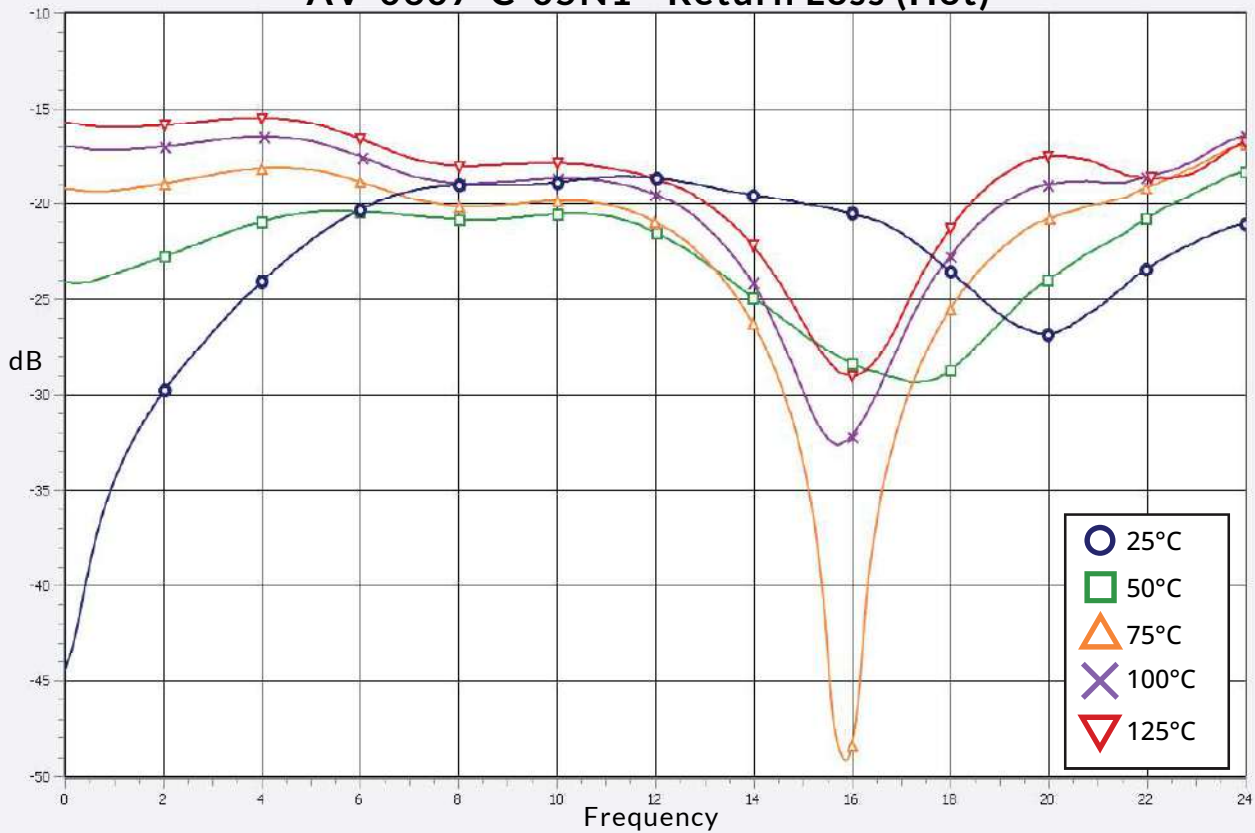


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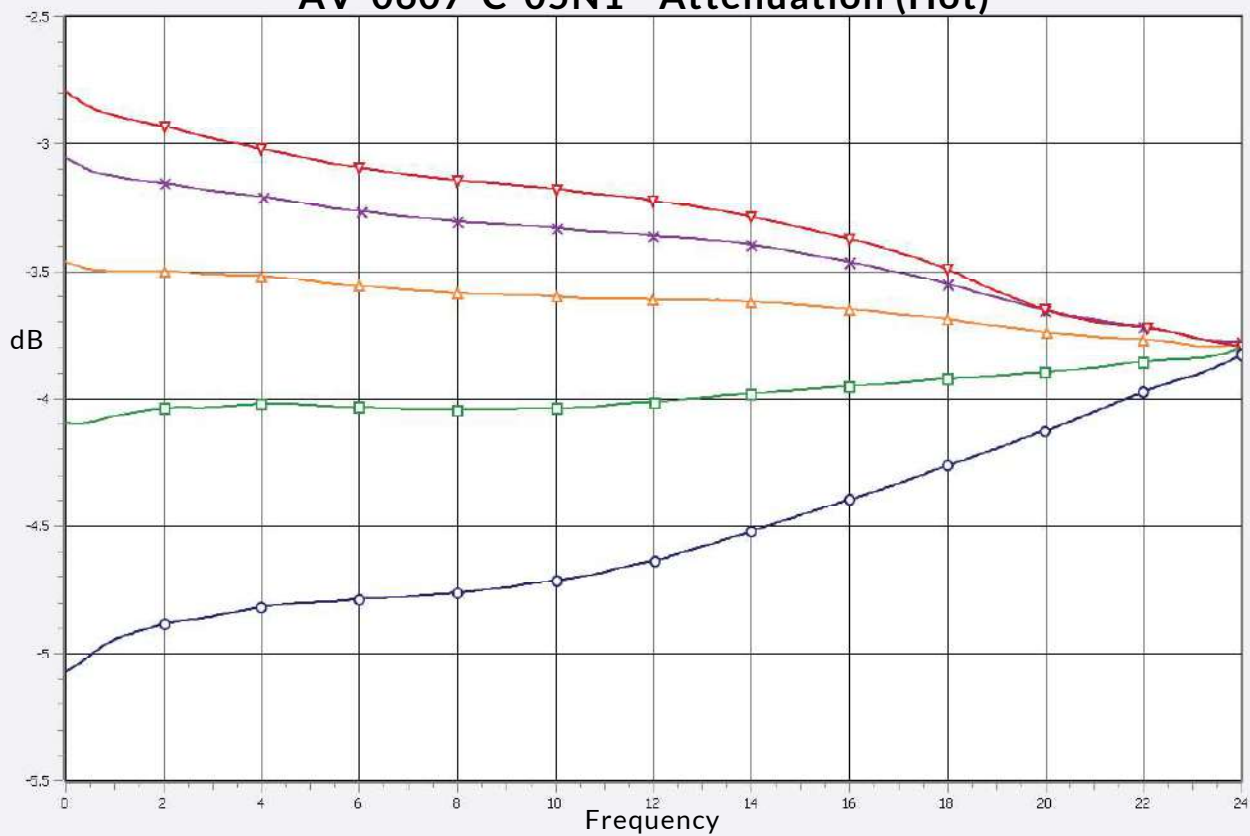


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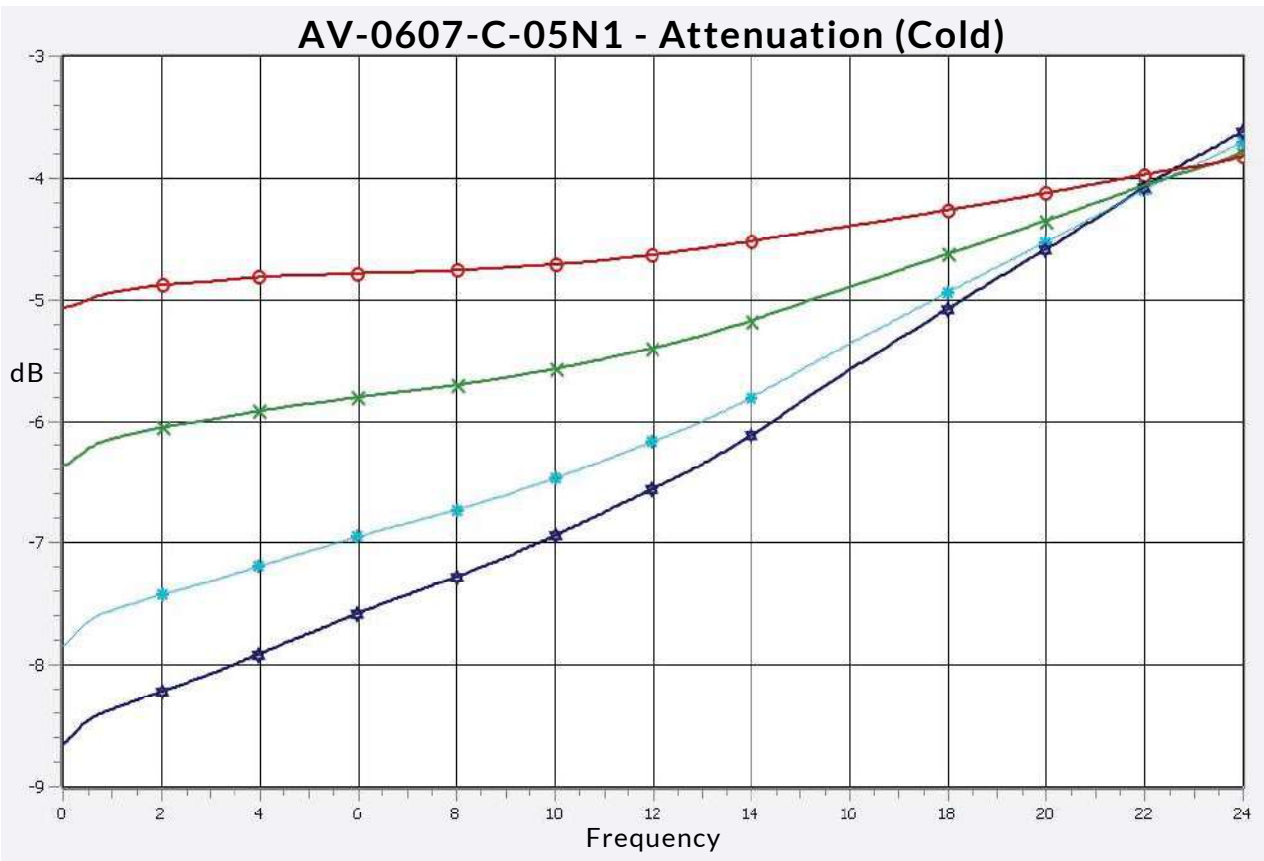
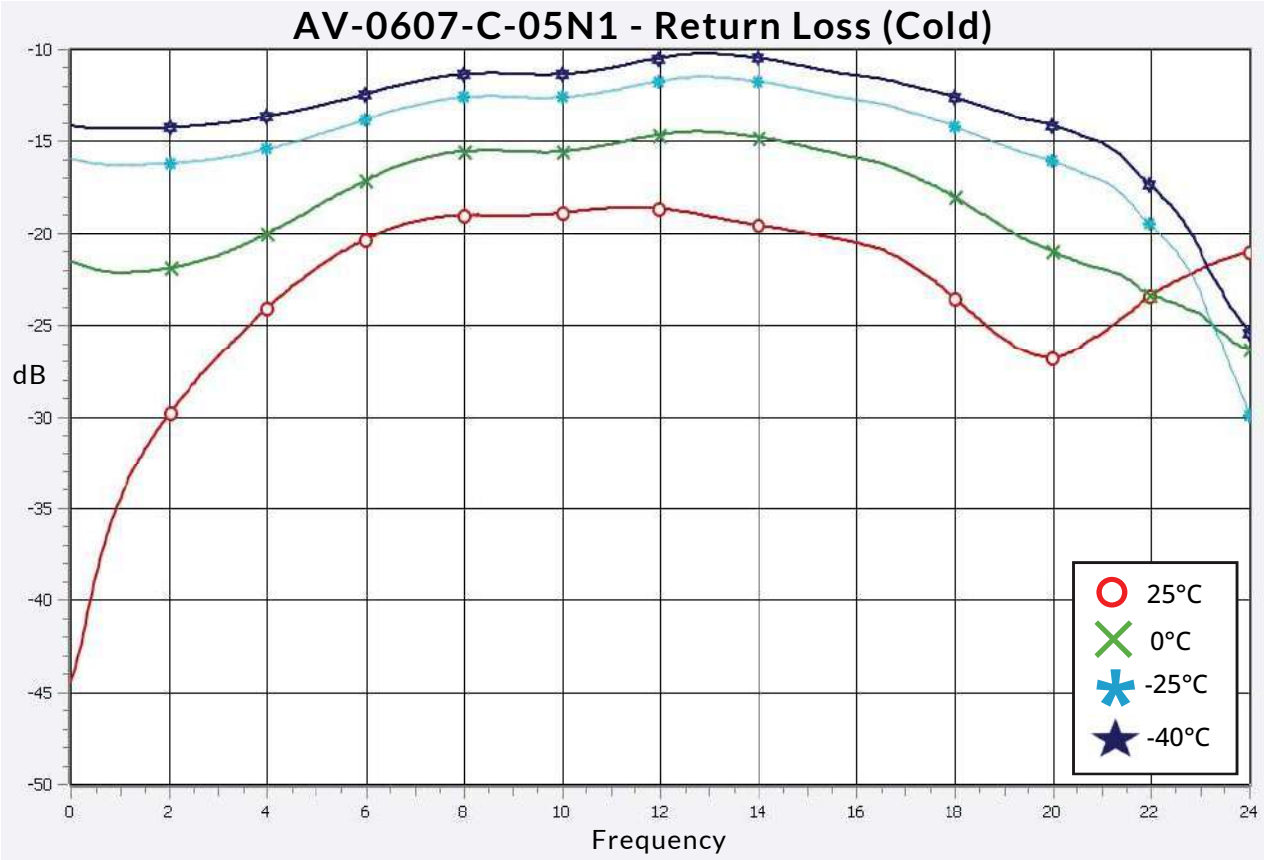
AV-0607-C-05N1 - Return Loss (Hot)



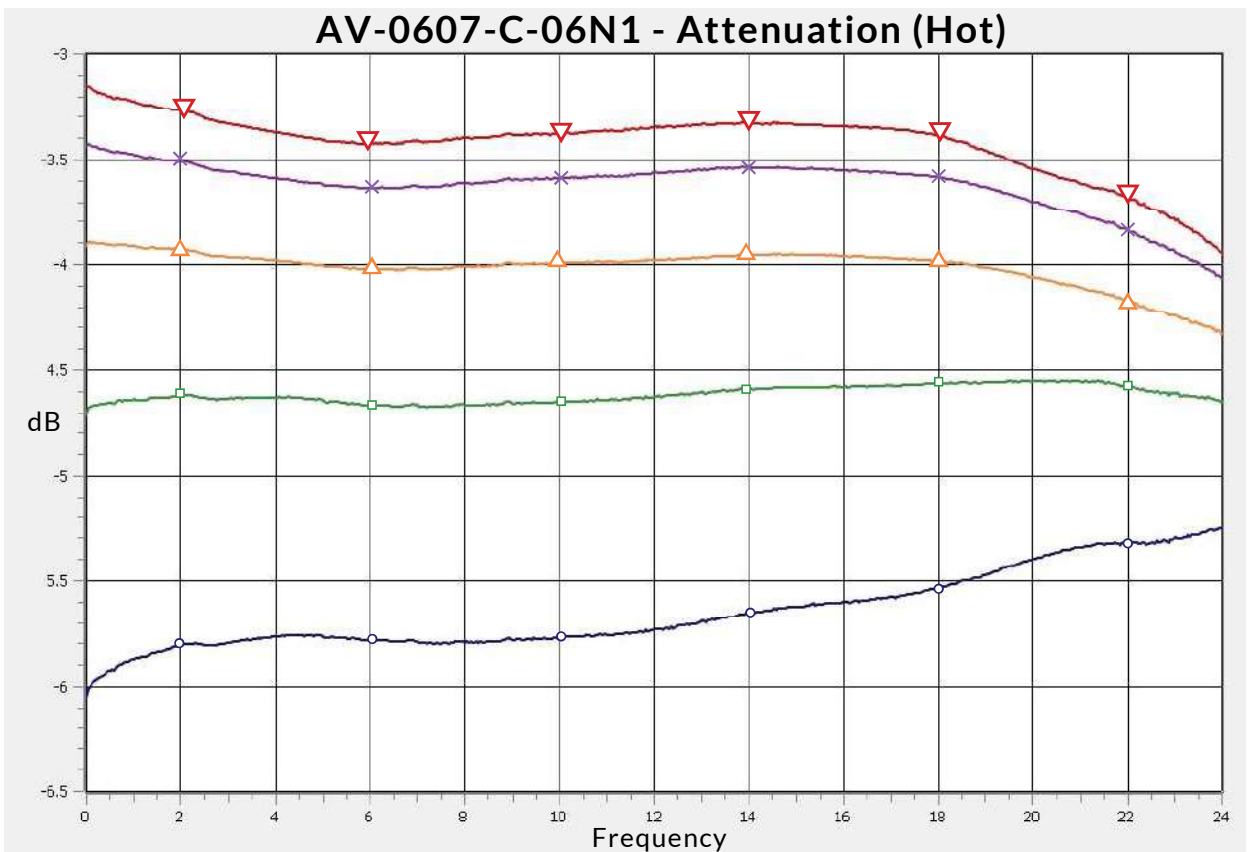
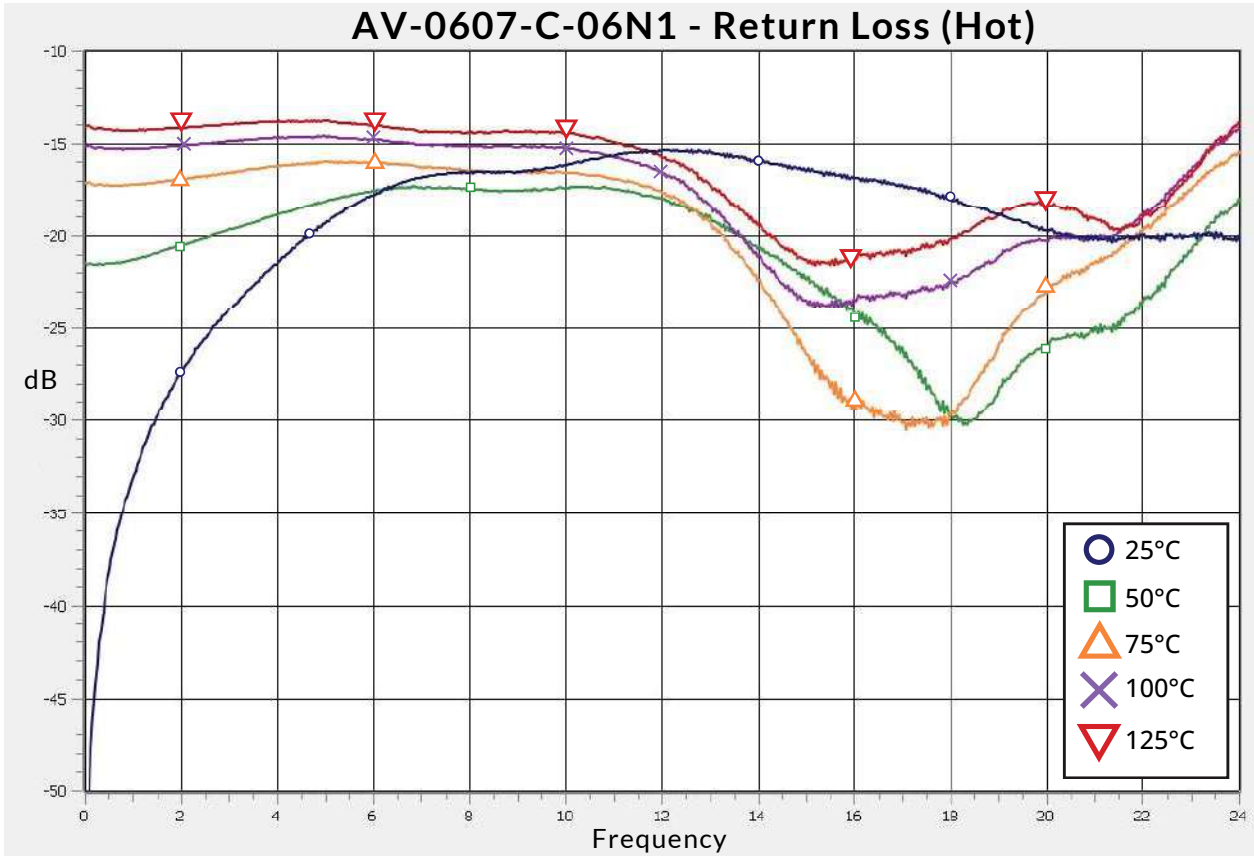
AV-0607-C-05N1 - Attenuation (Hot)



High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

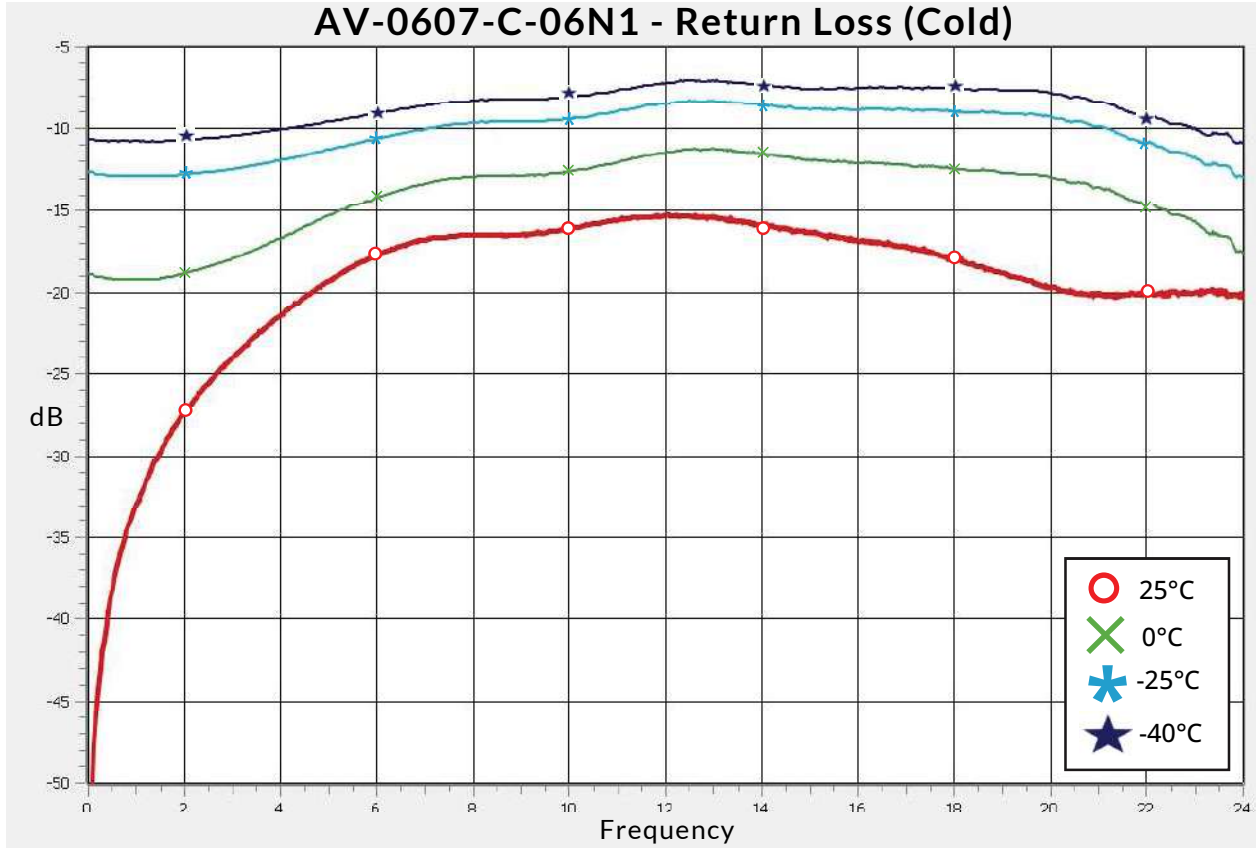


High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

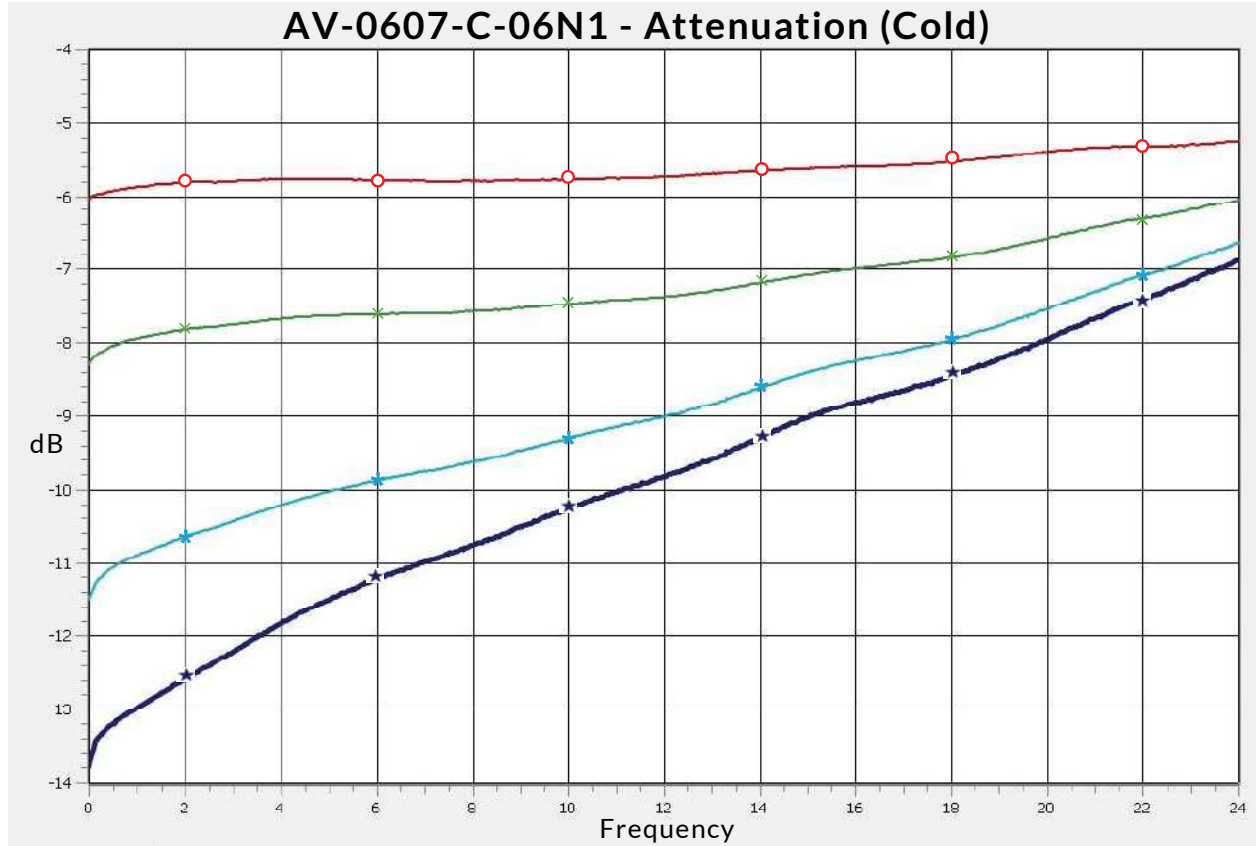


High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

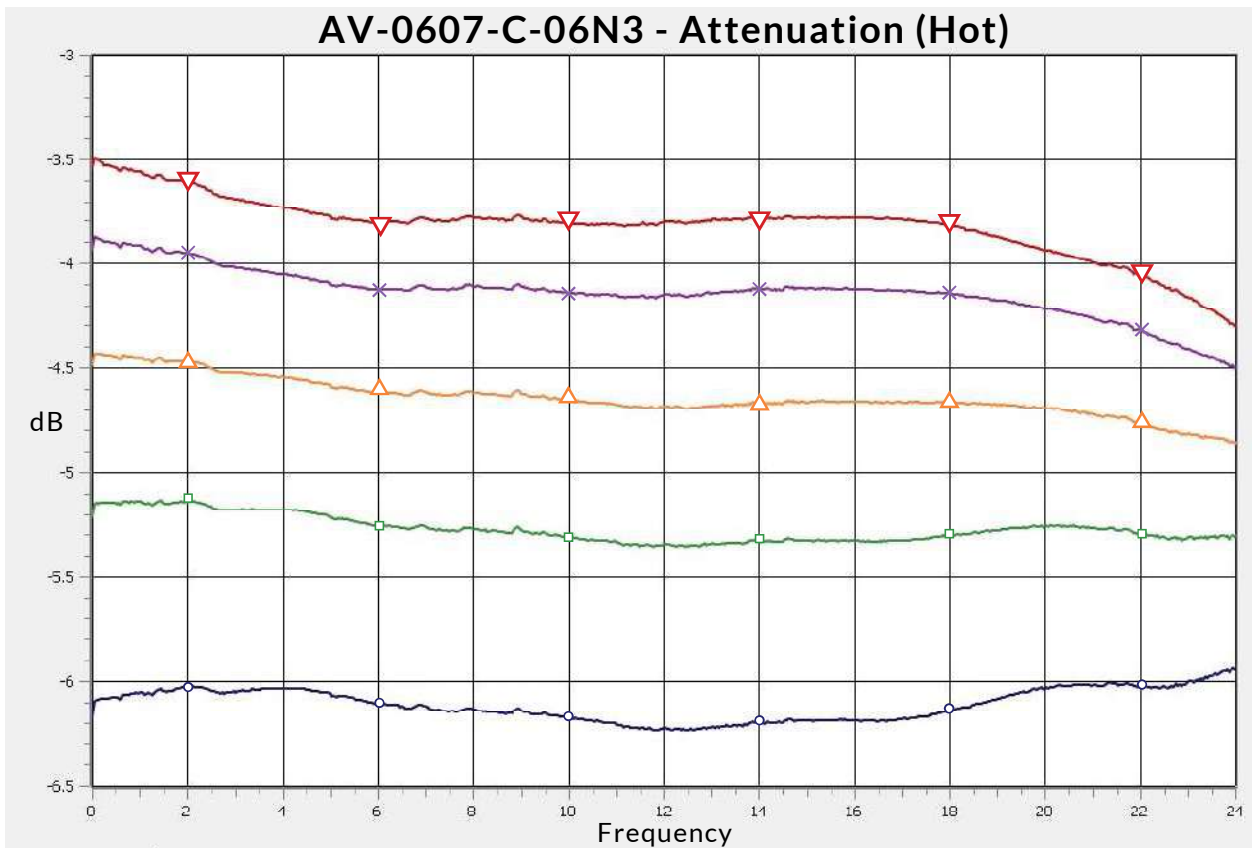
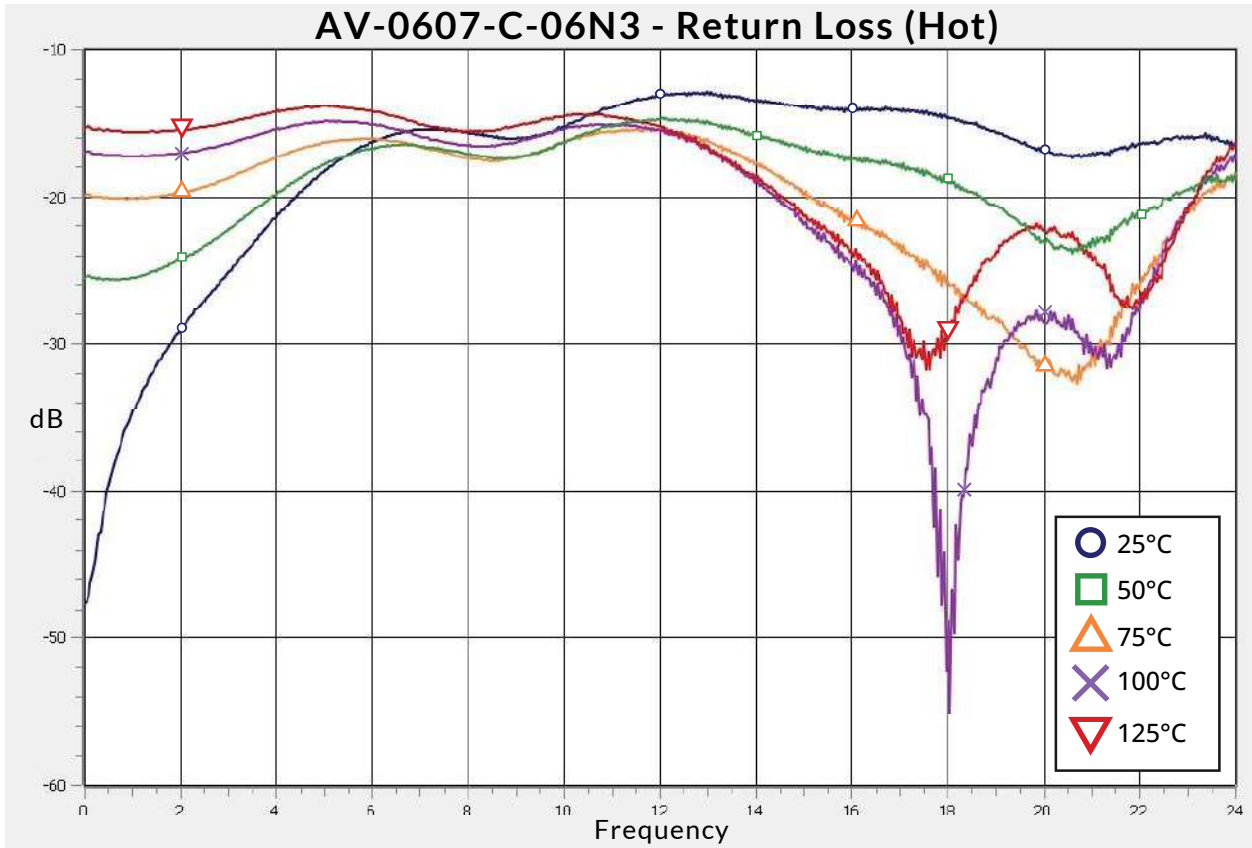
AV-0607-C-06N1 - Return Loss (Cold)



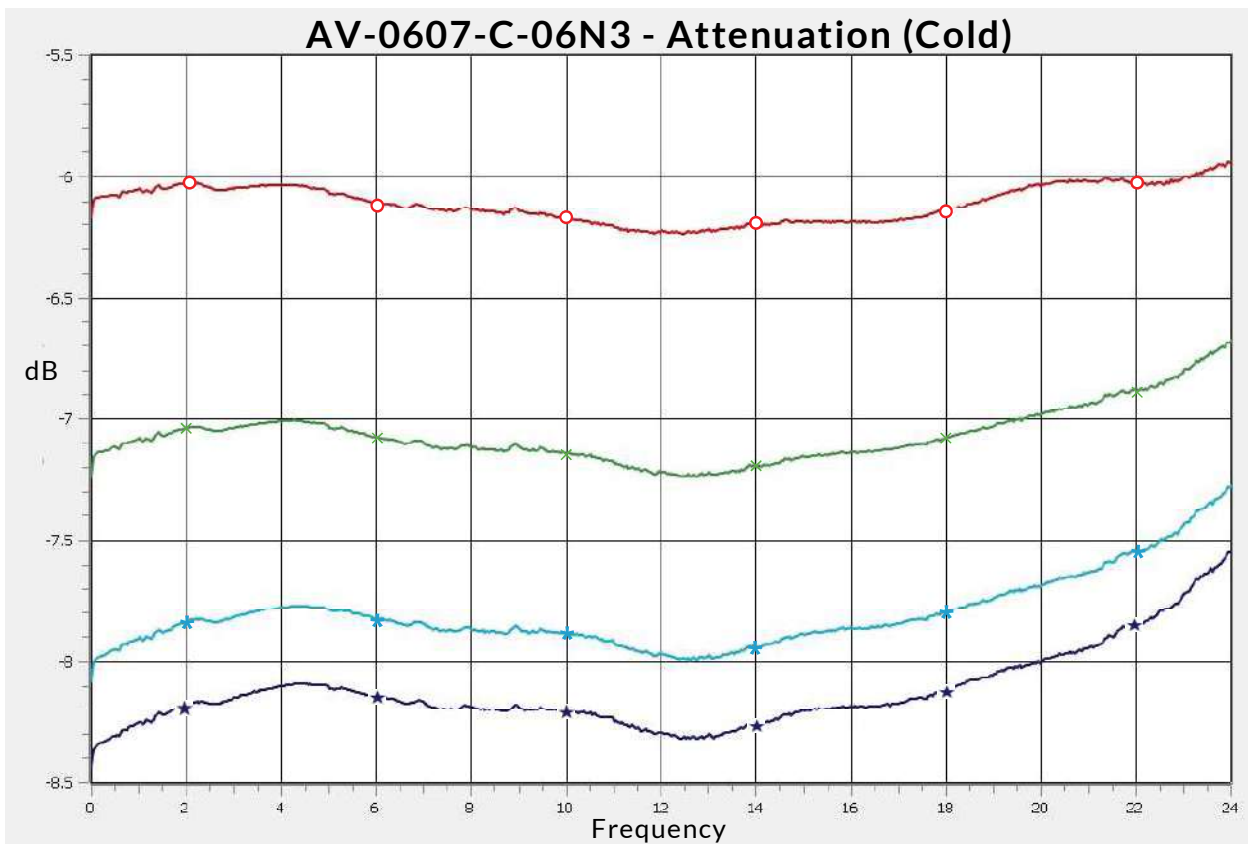
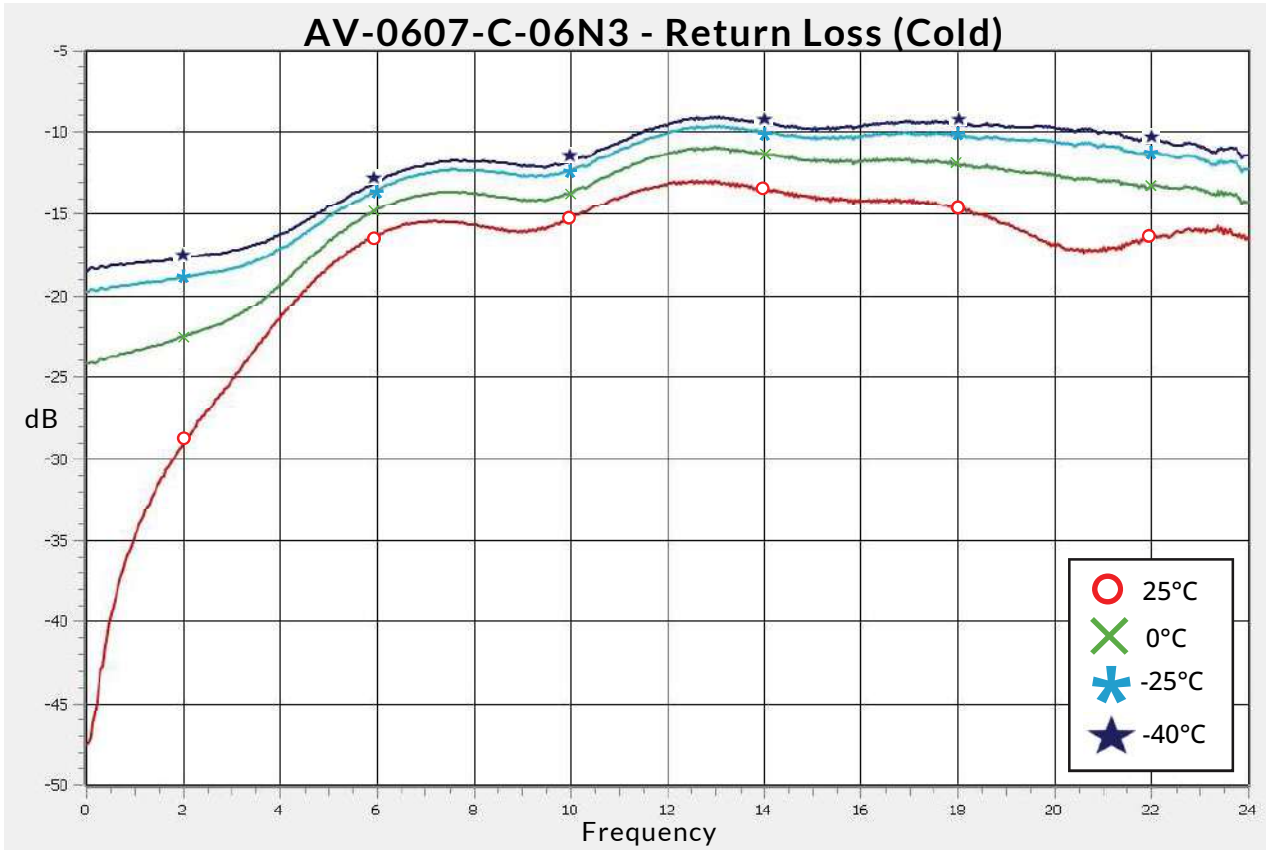
AV-0607-C-06N1 - Attenuation (Cold)



High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

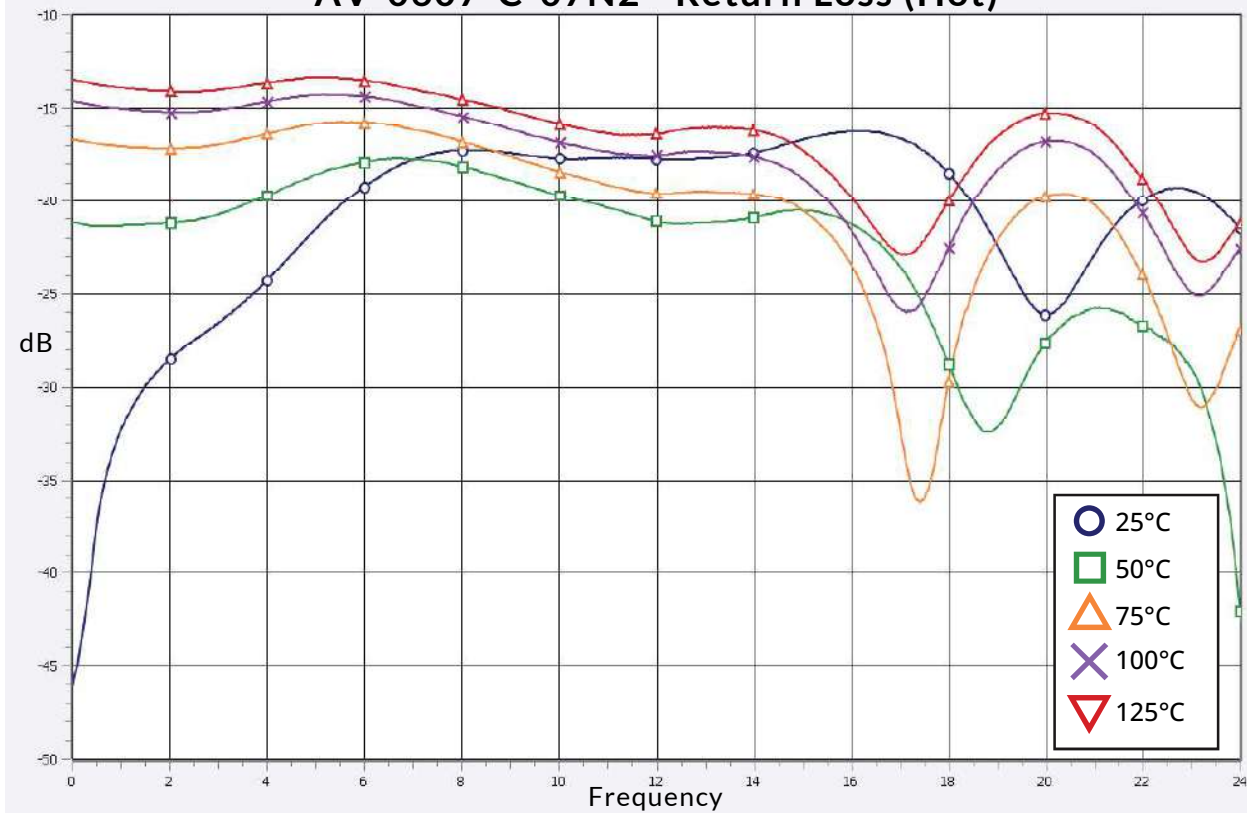


High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

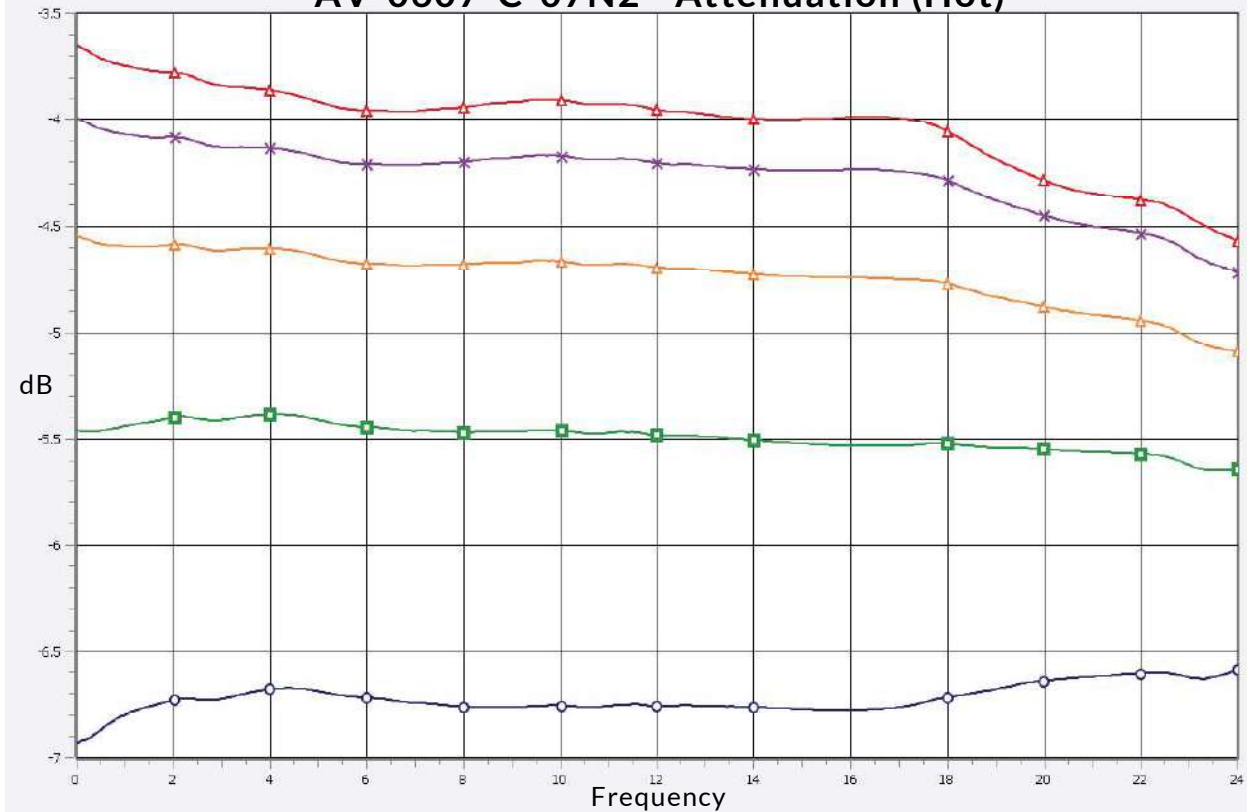


High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

AV-0607-C-07N2 - Return Loss (Hot)



AV-0607-C-07N2 - Attenuation (Hot)



High Frequency Thin Film SMT Temperature Variable Attenuator (TVA)

