

### Features

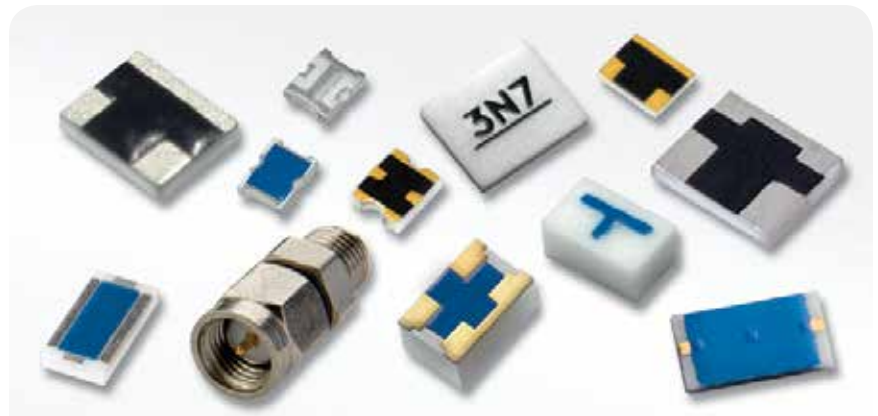
- Frequency Ranges from DC to 50 GHz
- Attenuation Values from 1 to 10 dB
- Negative and Positive Temperature Coefficients of Attenuation (TCA) Available
- Power Handling Up to 2 Watts
- Space and Military Qualified
- Surface Mount Packaging
- Wire Bondable Connections Available
- Impedance 50 and 75 Ohms
- RoHS Compliant Option Available

### Benefits

- Small Footprint
- Zero Distortion
- Totally Passive
- Power Handling up to 2 Watts
- Several Metallization Options Available
- Tailored Response to Variations Over Temperature
- Requires no DC power.

### Applications

- Power Amplifiers
- Military
- Mixers
- Satellite Communication
- Gain Blocks
- MMIC Amplifiers
- Directional Couplers
- Diode Detectors
- Broadcast (TV and Radio)



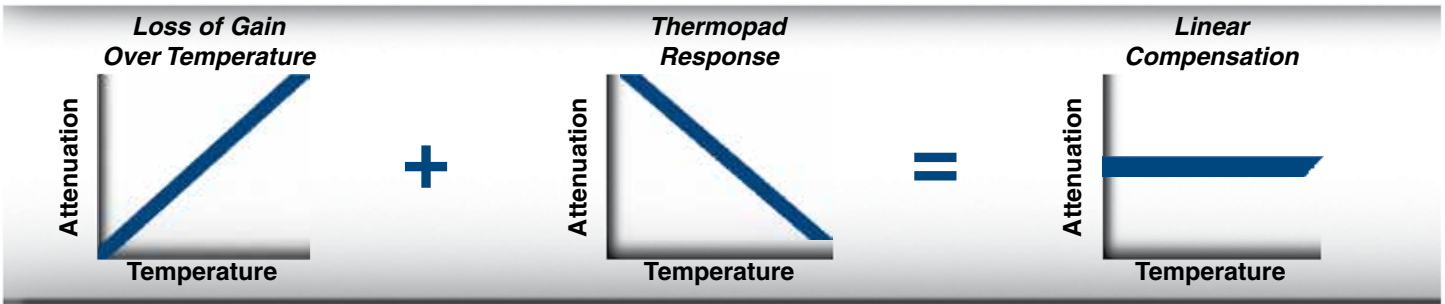
The Thermopad® is a totally passive, surface mountable temperature variable attenuator. It requires no bias or control voltages and does not generate signal distortion. The Thermopad can be used in place of a standard chip attenuator to combine level setting and temperature compensation in a single chip design. This will reduce component count, increase reliability, and lower system costs.

### Quick Selector Chart

Series	Frequency (GHz)	Power (Watts)	Footprint mm [inches]		Page
TVA	DC - 6	2.0	3.68 x 3.10	[0.145 x 0.122]	5
MTVA	DC - 18	0.2	1.90 x 1.52	[0.075 x 0.060]	6
WTVA	DC - 20	0.2	1.78 x 1.52	[0.070 x 0.060]	7
KTVA	16 - 36	0.1	3.05 x 1.65	[0.120 x 0.065]	8
QTVA	36 - 50	0.1	3.05 x 1.65	[0.120 x 0.065]	9
AN3	DC - 4	2.0	3.68 x 3.10	[0.145 x 0.122]	11
AN5	DC - 6	0.2	1.90 x 1.52	[0.075 x 0.060]	10
AN7	DC - 6	0.1	2.03 x 1.27	[0.080 x 0.050]	10
AN11	DC - 6	0.1	1.14 x 0.64	[0.045 x 0.025]	10
ETVA	DC - 3	2.0	4.06 x 3.68	[0.160 x 0.145]	13
CTVA (75Ω)	DC - 2	2.0	3.68 x 3.10	[0.145 x 0.122]	12
Coax TVA	DC - 6	2.0	7.92 x 19.05	[0.312 x 0.750]	14
HRTVA	DC - 6	2.0	3.68 x 3.10	[0.145 x 0.122]	15
HRMTVA	DC - 18	0.2	1.91 x 1.52	[0.075 x 0.060]	16

# Thermopad® Family

## General Specifications



- Small Footprint
- Surface Mountable
- Contributes No Signal Distortion
- Totally Passive
- Power Handling up to 2 Watts
- Several Metallization and Packaging Options Available
- Tailored Response to Cancel Amplifier Gain Variations Over Temperature
- Requires no DC Power

The Thermopad® is a totally passive absorptive microwave attenuator, which provides power dissipation that varies with temperature. The device can be used in any application that requires a known amount of attenuation change for a particular temperature shift. This is particularly useful for preventing gain loss over temperature in various amplifier applications.

In applications from DC - 50 GHz, EMC's Thermopad is the ideal temperature compensation solution for cost, size, performance, and reliability. The Thermopad can replace closed loop temperature compensation circuits with a single chip device requiring no bias or active control. Since the Thermopad produces no signal distortion it excels in applications involving multiple tones and complex modulation schemes such as cellular base station applications and radar. In high reliability, military, and spacecraft applications the Thermopad reduces system complexity and cost.

## Thermopad® Selector Tool

Print Downloads Help

Start Here! Enter your Product(s) Attenuation Tasks

Thermopad® Selector  
UP AUTO RESET

-55	24.60	4.67	19.93
-55	24.40	4.31	20.09
-15	24.25	3.9	20.35
5	24.10	3.46	20.54
25	23.98	3.09	20.79
45	23.60	2.77	20.83
65	23.40	2.49	20.91
85	23.15	2.25	20.9
105	22.80	2.04	20.76
125	22.40	1.88	20.52

Temp °C Amplifier Gain (dB) Thermopad Attn (dB) Compensated Attn (dB)

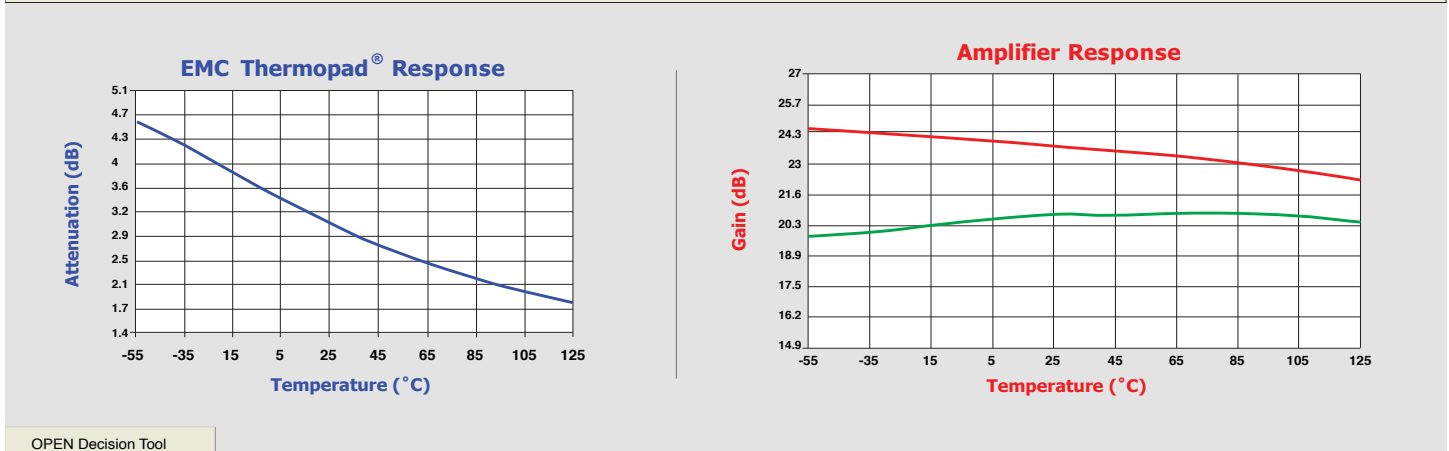
MTVA0200N05  
MTVA0200N06  
MTVA0200N07  
MTVA0300N03  
MTVA0300N04  
MTVA0300N05  
MTVA0300N06  
MTVA0300N07

NOW VIEWING: MTVA0300N05

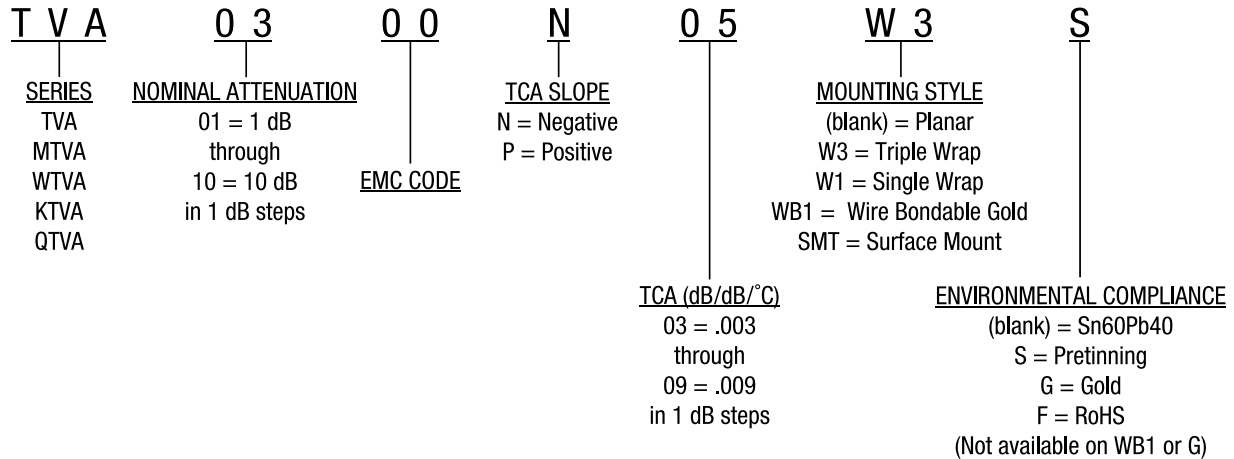
Application Notes  
View Product PDF  
Print Chart  
Request Quote

EMC Technology  
8851 S.W. Old Kansas Ave.  
Stuart, FL 34997

Step 1: Select a Product Step 2: Modify Amplifier Gain (dB) Step 3: Common Tasks



### Part Numbering Code



Note: Not every combination of attenuation and TCA values are available.

### Mounting Style Options

**Planar (no code)** Planar device for flip chip mounting offers the best RF performance and lowest cost.

**Triple Wrap (W3)** Metallization wraps around input, output, and ground terminals. Permits inspectable solder fillets when flip chip mounting.

**Surface Mount (SMT)** Metallization wraps around input, output, and ground terminals. For a true surface mount technology. (WTVA and TS09 series only). Or flip chip surface mount. (KFA, KTVA, QFA and QTVA).

**Single Wrap (W1)** Metallization wraps around ground terminal only. Full backside metallization.

**Single Wrap (WB1)** Metallization wraps around ground terminal only. Full backside metallization. Input and output terminals have gold metallization for wire bonding (MTVA series only).

**Double Wrap (WB2)** Metallization wraps around ground terminal only on 2 sides. Full backside metallization. Input and output terminals have gold metallization for wire bonding (WTVA and TS09 series only).

### Environmental Compliance Options

**Standard (no code)** Plated (with Sn60Pb40 solder) improves solderability (available on all of the above options except Option G and KTVA).

**Pretinned (S)** Pretinning (with Sn60Pb40 solder) improves solderability (available on all of the above options except Option G and KTVA).

**RoHS (F)** RoHS compliant option (excludes WB1, G, and S metallization options).

**Gold (G)** Planar device with gold metallization. Typically used for wire bonding (TVA, MTVA and HTVA series only).

**Note:** KTVA bondable unit backside ground metallization is platinum silver. Input and output terminals have gold metallization for wire bonding.

### Attenuator Selector Chart

FOOT PRINT	1512 3.68 X 3.10mm [0.145 x 0.122]	1615 4.06 X 3.68mm [0.160 x 0.145]	0706 1.78 X 1.52mm [0.070 x 0.060]	0805 2.03 X 1.27mm [0.080 x 0.050]	0806 1.91 X 1.52 mm [0.075 x 0.060]	1206 3.05 X 1.65mm [0.120 x 0.065]
THERMOPAD <sup>®</sup>	TVA	ETVA	WTVA	AN7	MTVA/AN5	KTVA/QTVA
FIXED	TS03	TS03	TS09	TS07	TS05	KFA/QFA

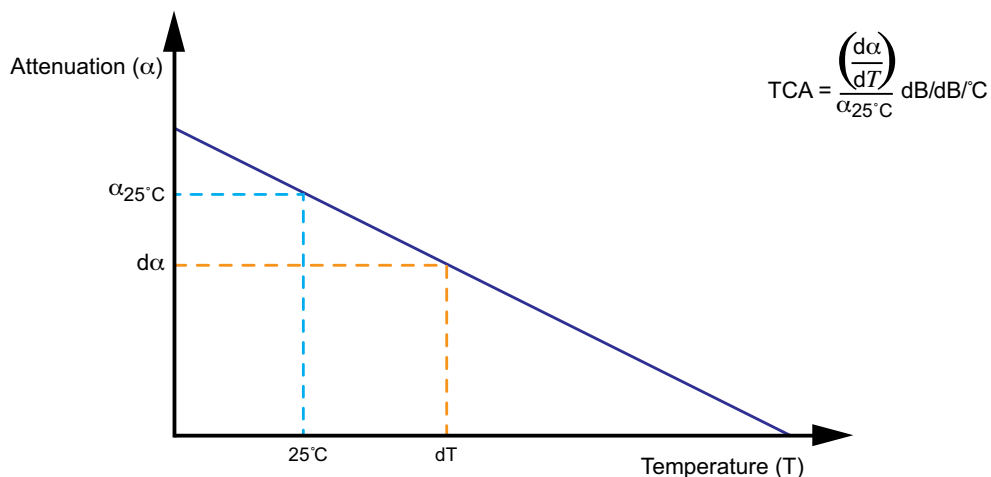
# Thermopad® Family

## General Specifications

### Thermopad® Temperature Shift Reference Chart (Attenuation Shift in dB per 10°C)

	TCA* dB/dB/ °C	Attenuation at 25°C									
		1 dB	2 dB	3 dB	4 dB	5 dB	6 dB	7 dB	8 dB	9 dB	10 dB
Negative Temperature Compensation	-0.003	-0.03	-0.06	-0.09	-0.12	-0.15	-0.18	-0.21	-0.24	-0.27	-0.30
	-0.004	-0.04	-0.08	-0.12	-0.16	-0.20	-0.24	-0.28	-0.32	-0.36	-0.40
	-0.005	-0.05	-0.10	-0.15	-0.20	-0.25	-0.30	-0.35	-0.40	-0.45	-0.50
	-0.006	-0.06	-0.12	-0.18	-0.24	-0.30	-0.36	-0.42	-0.48	-0.54	-0.60
	-0.007	-0.07	-0.14	-0.21	-0.28	-0.35	-0.42	-0.49	-0.56	-0.63	-0.70
	-0.009	-0.09	-0.18	-0.27	-0.36	-0.45	-0.54	-0.63	-0.72	-0.81	-0.90
	-0.010	-0.10	-0.20	-0.30	-0.40	-0.50	-0.60	For configurations not listed please contact our Sales Department			
	-0.011	-0.11	-0.22	-0.33	-0.44	-0.55	-0.66				
	-0.012	-0.12	-0.24	-0.36	-0.48	-0.60	-0.72				
	-0.013	-0.13	-0.26	-0.39	-0.52	-0.65	-0.78				
	-0.014	-0.14	-0.28	-0.42	-0.56	-0.70	-0.84				
	-0.015	-0.15	-0.30	-0.45	-0.60	-0.75	-0.90				
	-0.016	-0.16	-0.32	-0.48	-0.64	-0.80	-0.96				
Positive Temperature Compensation	0.003	0.03	0.06	0.09	0.12	0.15	0.18				
	0.005	0.05	0.10	0.15	0.20	0.25	0.30				
	0.006	0.06	0.12	0.18	0.24	0.30	0.36				
	0.007	0.07	0.14	0.21	0.28	0.35	0.42				
	0.008	0.08	0.16	0.24	0.32	0.40	0.48				
	0.009	0.09	0.18	0.27	0.36	0.45	0.54				

\*TCA is temperature coefficient of attenuation and is calculated using the following equation:

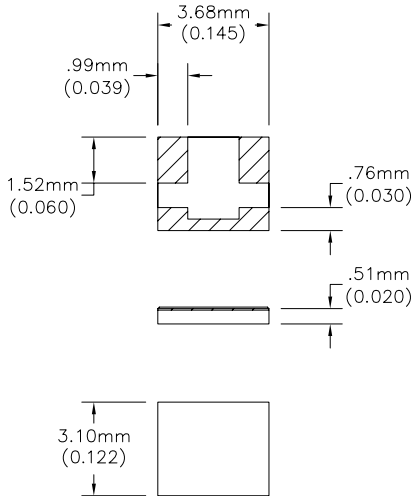




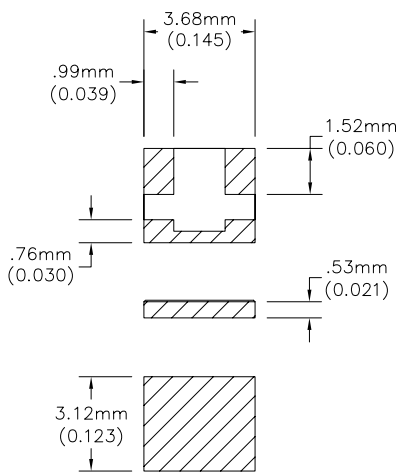
# TVA (6.0 GHz)

Thermopad®

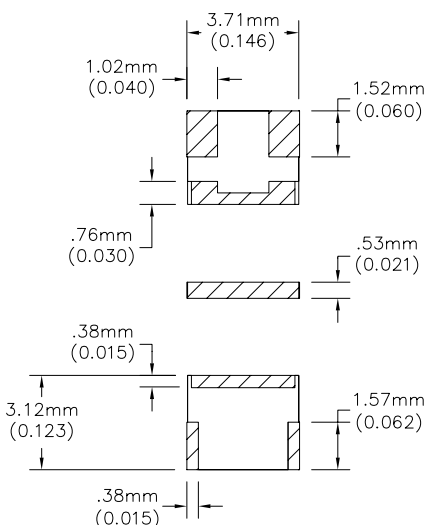
## TVA Planar Series



## TVA Single Wrap Series



## TVA Triple Wrap Series

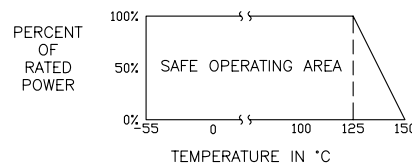


EMC Technology's TVA Thermopad®s are microwave absorptive attenuators which provide power dissipation that varies with temperature and operate in frequency ranges from DC to 6 GHz. This surface mount, temperature variable attenuator requires no bias or control voltages and generates zero distortion. This product is available with various metallization styles and plating options including gold for wire bonding applications, RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing. It is available in both negative and positive shifting temperature slopes.

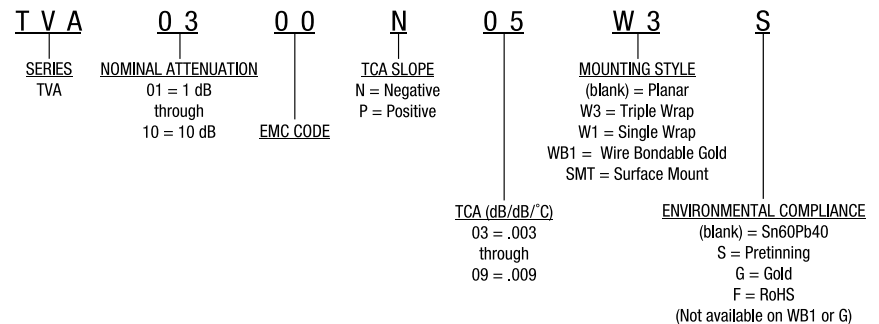
## Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish Gold and Wire Bondable Options Available

## Power Rating and Derating

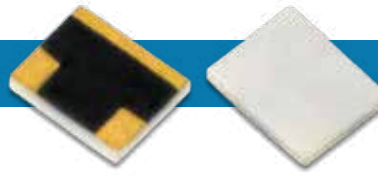


## Part Numbering Code



# MTVA (18.0 GHz)

## Mini Thermopad®

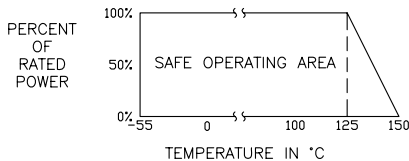


EMC Technology's MTVA Thermopad®s are microwave absorptive attenuators which offer a smaller physical size with increased frequency range. The series operates DC to 18 GHz. The MTVA version of the Thermopad also offers wire bondable terminals for use with alternative high frequency attachment methods and space applications. This product is available with various metallization styles and plating options including RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing

### Specifications

Size	1.52mm x 1.91mm [0.060in x 0.075in]
Impedance	50 Ohms
Frequency Range	Planar DC to 18 GHz W Series DC to 12.4 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish Gold and Wire Bondable Options Available

### Power Rating and Derating



### Part Numbering Code

**MTVA**    **03**    **00**    **N**    **05**    **W3**    **S**

**SERIES**  
MTVA

**NOMINAL ATTENUATION**  
01 = 1 dB  
through  
09 = 9 dB

**EMC CODE**

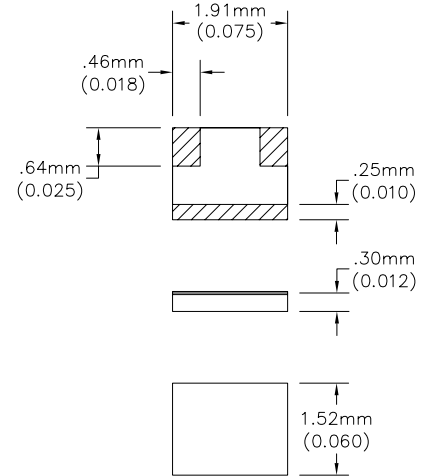
**TCA SLOPE**  
N = Negative  
P = Positive

**TCA (dB/dB/°C)**  
03 = .003  
through  
09 = .009

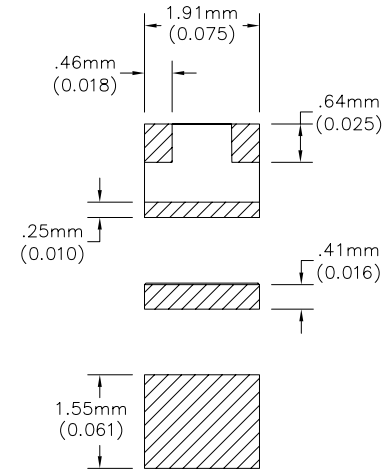
**MOUNTING STYLE**  
(blank) = Planar  
W3 = Triple Wrap  
W1 = Single Wrap  
WB1 = Wire Bondable Gold

**ENVIRONMENTAL COMPLIANCE**  
(blank) = Sn60Pb40  
S = Pretinning  
G = Gold  
F = RoHS  
(Not available on WB1 or G)

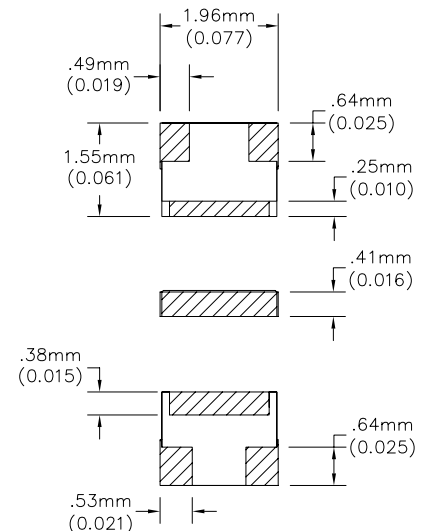
### MTVA Planar Series



### MTVA Single Wrap Series



### MTVA Triple Wrap Series

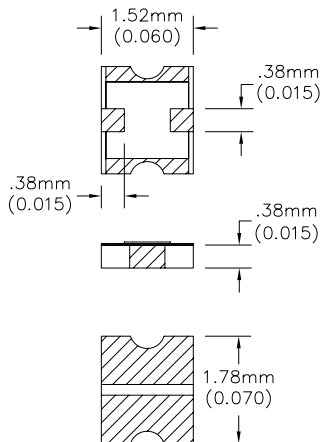




# WTVA (20.0 GHz)

Wide Band Thermopad®

## WTVA Double Wrap Wire Bond Series

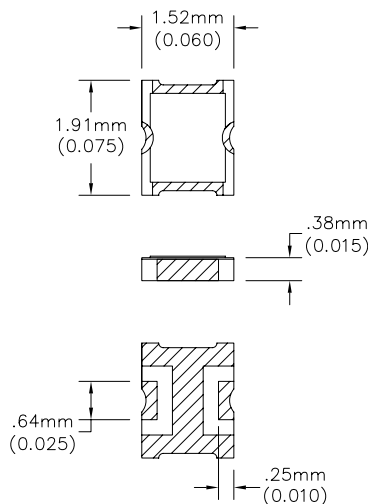


The WTVA is EMC's wide band temperature variable attenuator. This product provides a good linear shift from DC to 20 GHz and from -55°C to +125°C. EMC Technology's Thermopads® are microwave absorptive attenuators which provide power dissipation that varies with temperature. They are used to correct gain variations in amplifiers and other active components which tend to have gain anomalies over temperature. The WB2 style uses thick film gold wire bondable terminals. The SMTF style is a RoHS compliant surface mount configuration. The WTVA is the preferred version of EMC's Thermopad for use in satellite communications, broadband EW applications, and for high frequency and broadband amplifiers.

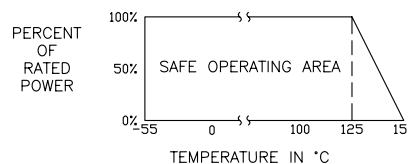
## Specifications

Size	1.52mm x 1.78mm [0.060in x 0.070in]
Impedance	50 Ohms
Frequency Range	DC to 20 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.25:1 Max DC-10 GHZ @ 25°C 1.45:1 Max 10-20 GHZ @ 25°C
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Wire Bondable or Lead Free Finish

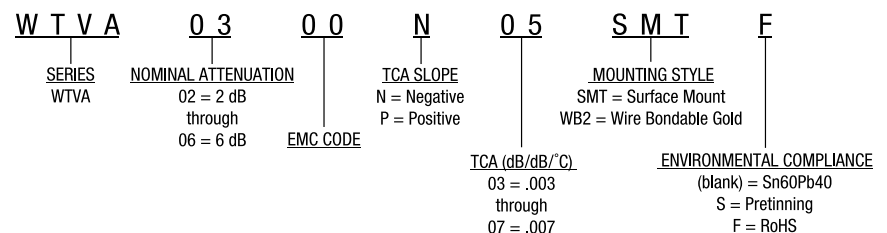
## WTVA Surface Mount Series



## Power Rating and Derating



## Part Numbering Code





# KTVA (36.0 GHz)

## K-Band Thermopad®

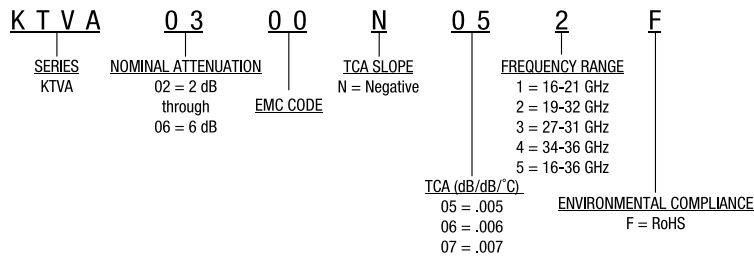


EMC Technology's KTVA high frequency Thermopads® are ideal for millimeter-wave amplifiers. KTVA is capable of handling 100 milliwatts input power and available in wire bondable and surface mount packages. Standard narrowband versions cover specific segments in K and Ka bands. An optimized broadband version operating from 16 to 36 GHz is also available. KTVA design also offers custom frequency band responses for narrow band applications with improved VSWR performance and attenuation accuracy. This product is space qualified and has flight history for those requiring pre-qualified heritage.

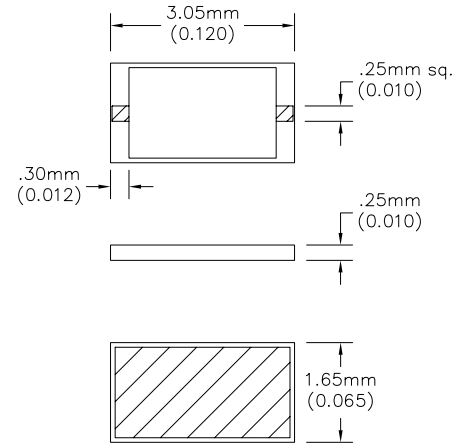
### Specifications

Size	3.05mm x 1.65mm [0.120in x 0.065in]
Impedance	50 Ohms
Frequency Range	16 to 36 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.35 Typical
Power Rating	100 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Bondable Gold or Lead Free Finish

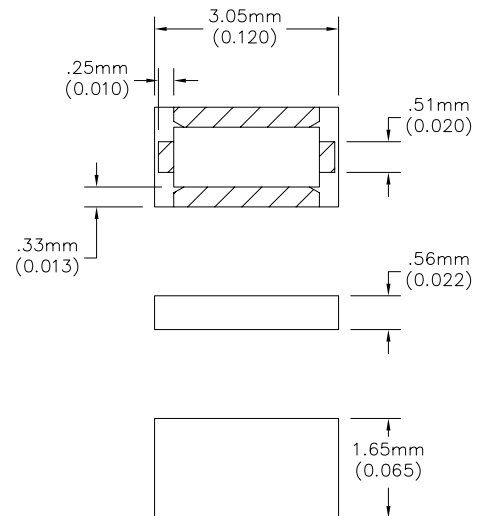
### Part Numbering Code - Wire Bond Series



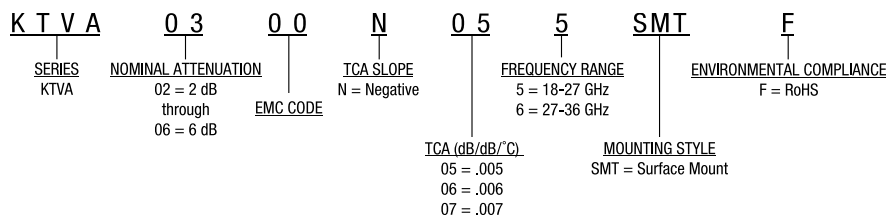
### KTVA Wire Bond Series



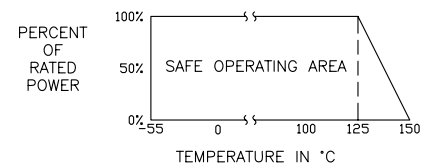
### KTVA Surface Mount Series



### Part Numbering Code - Surface Mount Series



### Power Rating and Derating



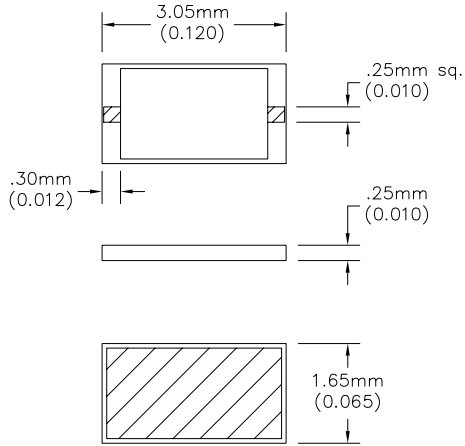




# QTV A (50.0 GHz)

Q-Band Thermopad®

## QTV A Wire Bond Series

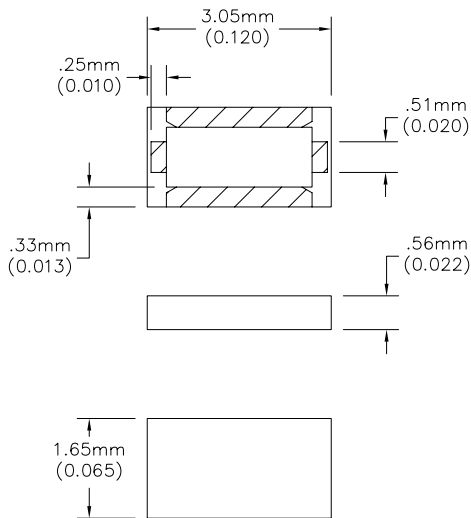


EMC Technology's QTV A high frequency Thermopads® are ideal for millimeter wave amplifiers. QTV A is capable of handling 200 milliwatts input power and available in wire bondable and surface mount packages. The devices feature optimized broadband response from 36 to 50 GHz. QTV A design also offers custom frequency band responses for narrow band applications with improved VSWR performance and attenuation accuracy.

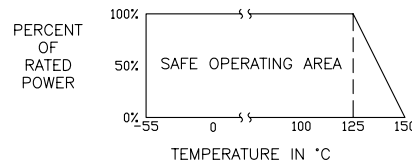
## Specifications

Size	3.05mm x 1.65mm [0.120in x 0.065in]
Impedance	50 Ohms
Frequency Range	36 to 50 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.35 Typical
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Bondable Gold or Lead Free Finish

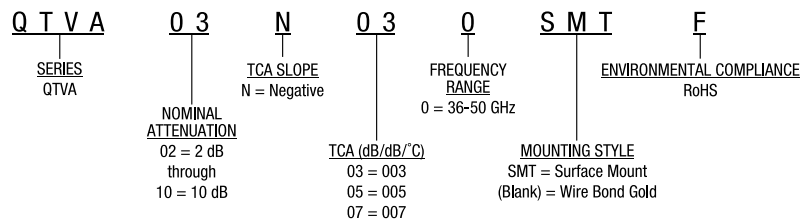
## QTV A Surface Mount Series



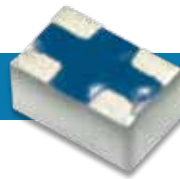
## Power Rating and Derating



## Part Numbering Code



# AN Series (6.0 GHz)



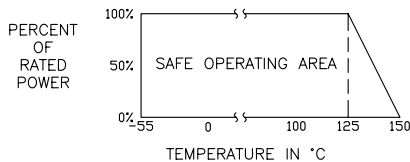
AN11, AN7, AN5 Thermopad®

The AN11, 7 and 5 series of temperature variable attenuators offers a cost effective passive temperature compensation solution for the commercial wireless industry. The series operates DC to 6 GHz. These products are sold on 1000 piece reels for high volume applications. Plating options include RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing. This product is packaged in 1000 piece reels for high volume applications.

## Specifications

Size	AN11 1.14mm x 0.64mm [0.045in x 0.025in]
	AN7 2.03mm x 1.27mm [0.080in x 0.050in]
	AN5 1.91mm x 1.52mm [0.075in x 0.060in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	AN5 200 Milliwatts AN7 AN11 100 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

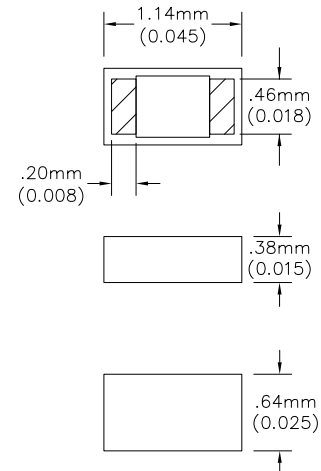
## Power Rating and Derating



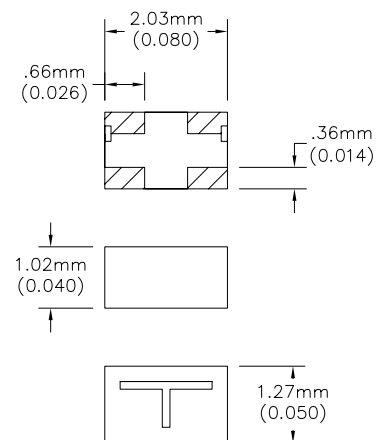
## Part Numbering Code

<b>A N 5</b>	-	<b>X</b>	<b>N</b>	<b>X</b>	<b>F</b>
<u>SERIES</u>		<u>NOMINAL ATTENUATION</u>		<u>TCA (dB/dB/°C)</u>	<u>ENVIRONMENTAL COMPLIANCE</u>
AN5		AN5 - 1 to 10 dB		3 = .003	(blank) = Sn60Pb40
AN7		AN7 - 1 to 7 dB		4 = .004	F = RoHS
AN11		AN11 - 1 to 2 dB		5 = .005	
				6 = .006	
				7 = .007	
				9 = .009	
			<u>TCA SLOPE</u>		
			N = Negative		

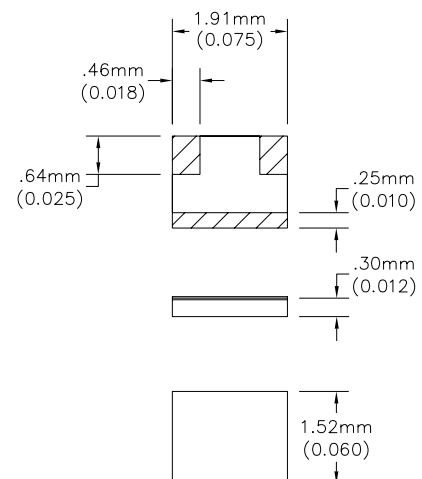
## AN11 Planar Series

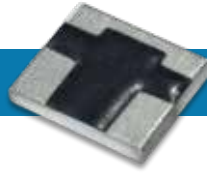


## AN7 Planar Series



## AN5 Planar Series

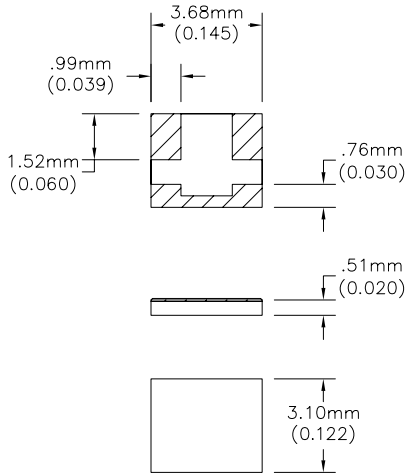




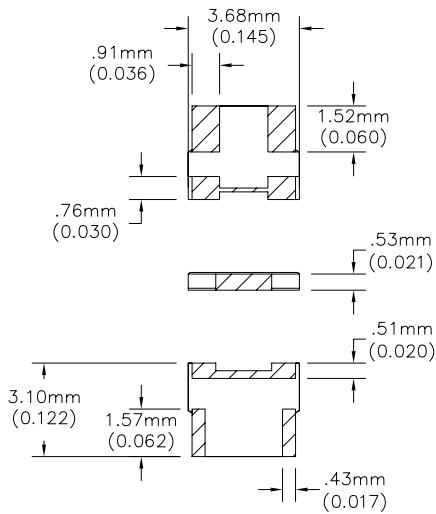
# AN Series (4.0 GHz)

AN3 Thermopad®

## AN3 Planar Series



## AN3 Triple Wrap Series

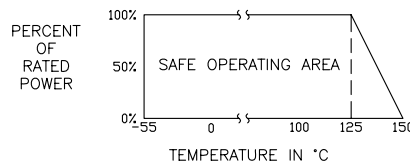


The AN3 series of temperature variable attenuators offers a cost effective passive temperature compensation solution for the commercial wireless industry. The series operates DC to 4 GHz. And is available with 2 metallization styles, planar and triple wrap. Plating options include RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder finish or 60/40 solder fused finish for easy reflow processing. This product is packaged in 1000 piece reels for high volume applications.

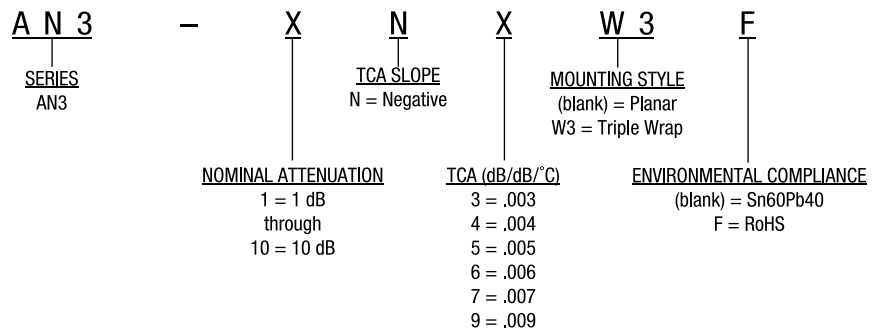
## Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	DC to 4 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

## Power Rating and Derating



## Part Numbering Code



# CTVA

## Broadband and Cable Thermopad®

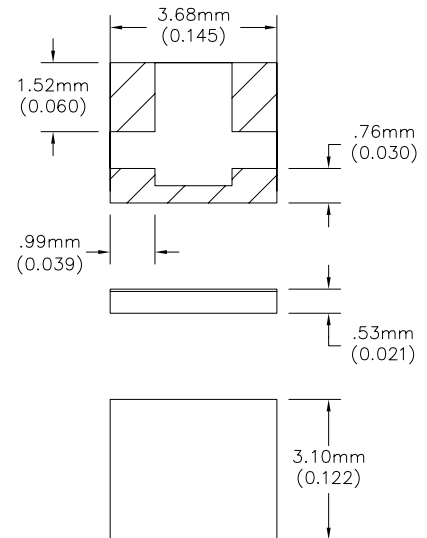


CTVA Thermopad® is a 75 ohm version of the standard temperature variable attenuator. It can be used in 75 ohm applications where variable dissipated power is required over temperature. This product is available with planar and triple wrap metallization styles. Available plating options include RoHS compliant silver over nickel finish, 60/40 low-temperature solder plating, and 60/40 solder fused finish.

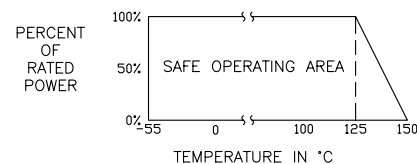
### Specifications

Size	3.10 mm x 3.68 mm [0.122 in x 0.145 in]
Impedance	75 Ohms
Frequency Range	DC to 4 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.25 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

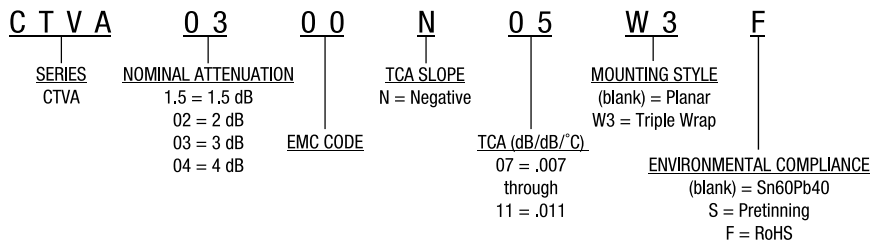
### CTVA Planar Series

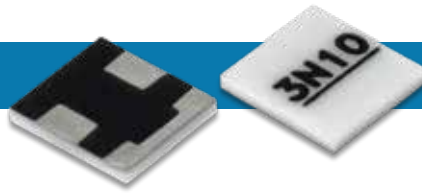


### Power Rating and Derating



### Part Numbering Code

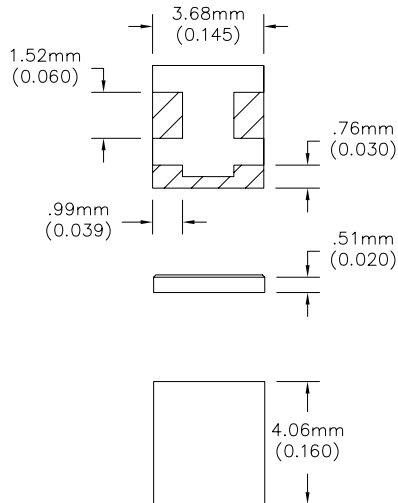




## ETVA (3.0 GHz)

Extended Shift Thermopad®

### ETVA Planar Series

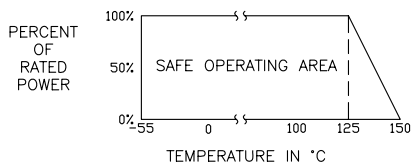


ETVA Thermopads® are microwave absorptive attenuators which provide power dissipation that varies with temperature and operate in frequency ranges from DC to 3 GHz. The ETVA features higher temperature coefficient of attenuation, therefore allowing for greater gain variation compensation. This surface mount, temperature variable attenuator requires no bias or control voltages and generates zero distortion. This product is available with various metallization styles and plating options including RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing.

### Specifications

Size	4.06 mm x 3.68 mm [0.160 in x 0.145 in]
Impedance	50 Ohms
Frequency Range	DC to 3 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

### Power Rating and Derating



### Part Numbering Code

<b>E T V A</b>	<b>0 3</b>	<b>0 0</b>	<b>N</b>	<b>0 5</b>	<b>S</b>
<u>SERIES</u> ETVA	<u>NOMINAL ATTENUATION</u> 03 = 3 dB through 06 = 6 dB	<u>EMC CODE</u>	<u>TCA SLOPE</u> N = Negative	<u>TCA (dB/dB/°C)</u> 10 = .010 through 16 = .016	<u>ENVIRONMENTAL COMPLIANCE</u> (blank) = Sn60Pb40 S = Pretinning F = RoHS

# Specialty Thermopads

## Coaxial Thermopad®



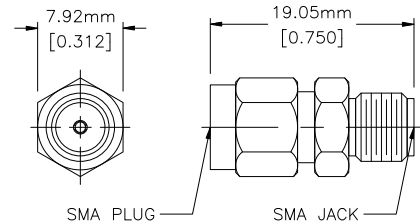
Combining EMC Technology components with Florida RF Labs connector expertise to offer the popular temperature variable attenuator in a coaxial package. The coaxial Thermopad® offers the same benefits as the standard temperature variable attenuator with the added benefit of an SMA plug to SMA jack interface.

### Specifications

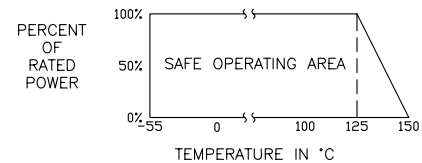
#### 42TVA

Size	19.05 mm x 7.92 mm [0.750 in x 0.312 in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.35 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Plated Thick Film
Body and Nut	Stainless Steel
Contact	Beryllium Copper
Dielectric	Tetrafluoroethylene
Interface	SMA Male/ SMA Female
Body	Passivated

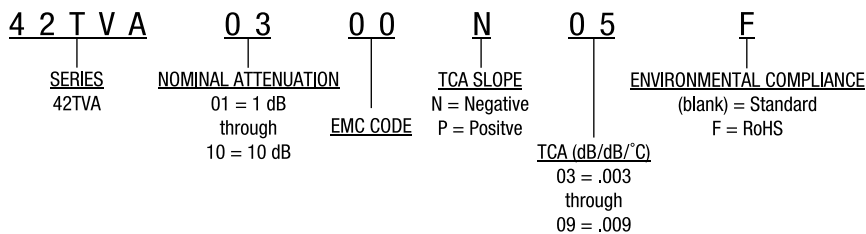
### 42TVA Series



### Power Rating and Derating



### Part Numbering Code

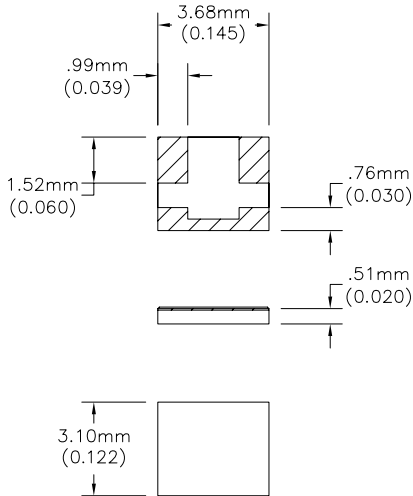




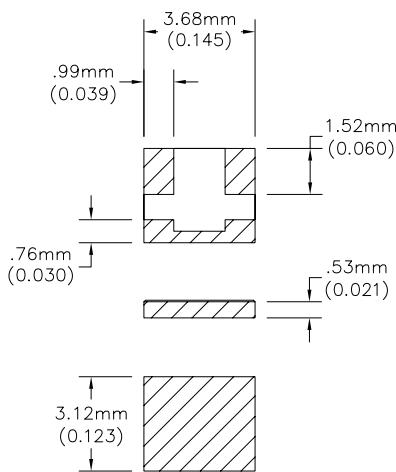
# HRT (6.0 GHz)

High Reliability Thermopad®

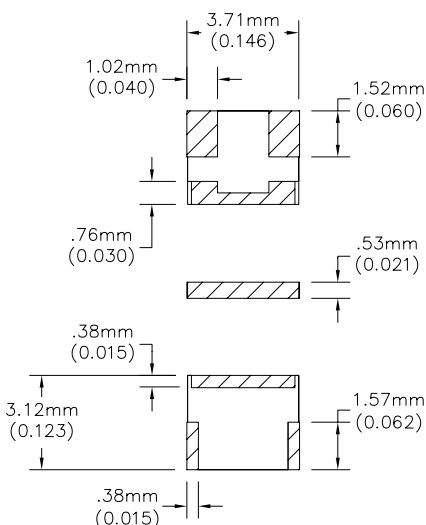
## HRT Planar Series



## HRT Single Wrap Series



## HRT Triple Wrap Series

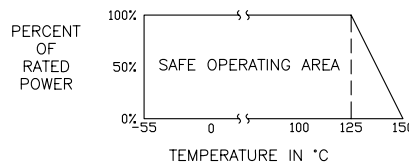


EMC's Thermopad®, temperature variable attenuator, is S-Level qualified for high reliability applications. As a completely passive temperature compensation solution, Thermopad offers the benefits of reduced system complexity and improved overall reliability, which are critical for space and military applications. The HR series of the TVA is optimized for DC to 6 GHz operation and may be ordered with group A, B, or C testing based on Mil-PRF-55342.

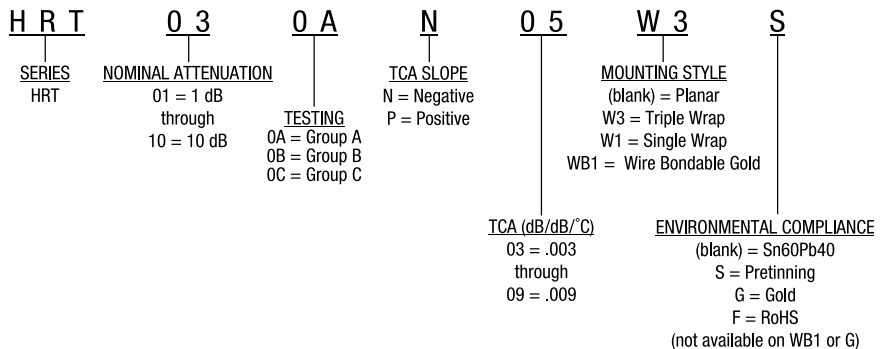
## Specifications

Size	3.10mm x 3.68mm [0.122 in x 0.145 in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55 °C to 150 °C
Substrate	Alumina
Resistive Material	Thick film
Terminal Material	Thick film, Nickel Barrier with Solder Plated Finish

## Power Rating and Derating



## Part Numbering Code



See page 105 for test plan.



# HRM (18.0 GHz)

High Reliability Mini Thermopad®

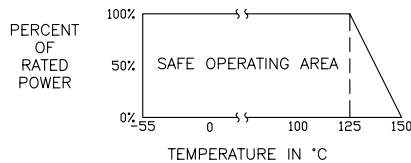


EMC's miniature size Thermopad®, temperature variable attenuator, is S-Level qualified for high reliability applications. As a completely passive temperature compensation solution, Thermopad offers the benefits of reduced system complexity and improved overall reliability, which are critical for space and military applications. The HR series of the MTVA is optimized for DC to 18 GHz operation and may be ordered with group A, B, or C testing based on Mil-PRF-55342.

## Specifications

Size	1.52 mm x 1.91 mm [0.060 in x 0.075 in]
Impedance	50 Ohms
Frequency Range	DC to 18 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated Finish

## Power Rating and Derating

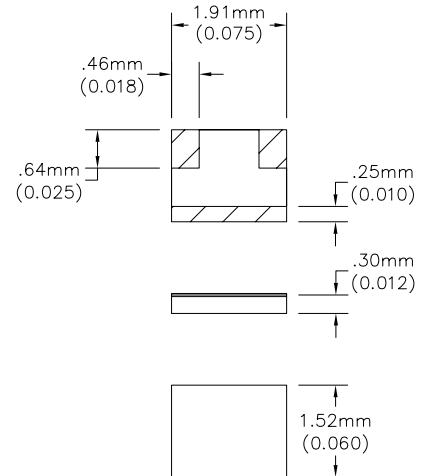


## Part Numbering Code

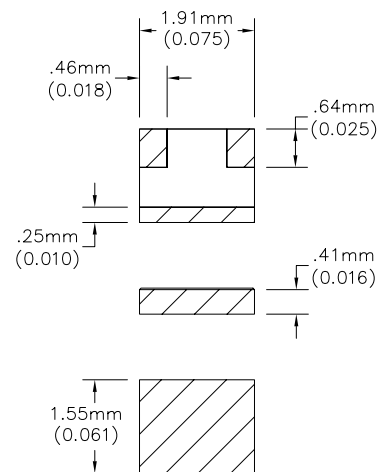
<b>HRM</b>	<b>03</b>	<b>0A</b>	<b>N</b>	<b>05</b>	<b>W3</b>	<b>S</b>
<b>SERIES</b> HRM	<b>NOMINAL ATTENUATION</b> 01 = 1 dB through 09 = 9 dB	<b>TESTING</b> 0A = Group A 0B = Group B 0C = Group C	<b>TCA SLOPE</b> N = Negative	<b>TCA (dB/dB/°C)</b> 03 = .003 through 09 = .009	<b>MOUNTING STYLE</b> (blank) = Planar W3 = Triple Wrap W1 = Single Wrap WB1 = Wire Bondable Gold	<b>ENVIRONMENTAL COMPLIANCE</b> (blank) = Sn60Pb40 S = Pretinning G = Gold F = RoHS (Not available on WB1)

See page 105 for test plan.

## HRM Planar Series



## HRM Single Wrap Series



## HRM Triple Wrap Series

