

# Technical Characteristics

## High Reliability Product Offering

### Fixed Attenuator Products

Standard Product Series	HR (High Reliability) Series	Test Plan	Frequency Range (GHz)	Input Power CW (Watts)	Component Size (Inches)	Component Size (mm)
TS03	HR03	TP-8965	DC-12.4	2.00	0.145 X 0.122	3.68 X 3.10
TS05	HR05	TP-8965	DC-18	0.10	0.075 X 0.060	1.90 X 1.52
TS09	HR09	TP-9030	DC-20	0.20	0.060 X 0.075	1.52 X 1.90
KFA	HRKFA	TP-9010	16-36	0.20	0.120 X 0.065	3.05 X 1.65

### Thermopad® Products

Standard Product Series	HR (High Reliability) Series	Test Plan	Frequency Range (GHz)	Input Power CW (Watts)	Component Size (Inches)	Component Size (mm)
TVA	HRT	TP-8965	DC-6	2.00	0.145 X 0.122	3.68 X 3.10
MTVA	HRM	TP-8965	DC-18	0.20	0.075 X 0.060	1.90 X 1.52
WTVA	HRW	TP-9030	DC-20	0.20	0.060 X 0.075	1.52 X 1.90
KTVA	HRK	TP-9010	16-36	0.10	0.120 X 0.065	3.05 X 1.65

### Diamond RF Resistives® Products (Resistors, Terminations, Attenuators)

Standard Product Series	HR (High Reliability) Series	Test Plan	Frequency Range (GHz)	Input Power CW (Watts)	Component Size (Inches)	Component Size (mm)
CR0402D	HRXCR0402D	TP-9046	DC-30	10	0.045 X 0.025	1.14 X 0.64
CR0505D	HRXCR0505D	TP-9046	DC-18	25	0.055 X 0.055	1.40 X 1.40
CR0603D	HRXCR0603D	TP-9046	DC-18	40	0.065 X 0.035	1.65 X 0.89
CR1010D	HRXCR1010D	TP-9046	DC-12.4	62.5	0.105 X 0.105	2.67 X 2.67
CT0402D	HRXCT0402D	TP-9046	DC-26.5	5	0.045 X 0.025	1.14 X 0.64
CT0505D	HRXCT0505D	TP-9046	DC-20	30	0.055 X 0.055	1.40 X 1.40
CT0603D	HRXCT0603D	TP-9046	DC-28	30	0.065 X 0.035	1.65 X 0.89
CT1310D	HRXCT1310D	TP-9046	DC-14	70	0.130 X 0.105	3.30 X 2.67
CT2010D	HRXCT2010D	TP-9046	DC-12.4	150	0.205 X 0.105	5.21 X 2.67
CA0505D	HRXCA0505D	TP-9046	DC-26.5	25	0.055 X 0.055	1.40 X 1.40

# HR Series Attenuators and Thermopads

## Test Parameters per Test Plan TP-8965

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
<b>Group A Inspection</b>			
Visual / Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
Initial Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Thermal Shock	100%	MIL-PRF-55342, MIL-STD-202, Method 107	10 Cycles -55°C to +125°C
Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Burn In	100%	MIL-PRF-55342, MIL-STD-202, Method 108	Maximum Rated Input Power @ 125°C for *Exception 168 Hours
Final Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Percent Defective Allowable (PDA)	100%	Per Smiths Interconnect TP-8965	10% allowable
Subgroup 1 [TVA product only]	3		
Temperature Coefficient of Attenuation TCA (If Temp Variable Product)	3	Per Smiths Interconnect TP-8965	-55°C to +125°C - ±0.001 dB/dB/°C allowable
<b>Group B Inspection</b>			
Subgroup 1	3		
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Low Temperature Operation	3	MIL-PRF-55342	Maximum Rated Input Power @-55°C *Exception -55°C
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
High Temperature Exposure	3	MIL-PRF-55342	100 hours @ *Exception 125°C
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Termination Adhesion	3	MIL-PRF-55342, MIL-STD-202, Method 211	Test Condition A - Pull Test - *Exception 15 Grams
Bondability	3	MIL-PRF-55342	Mounted to metallized substrate, a minimum of 2 bonds per chip using .001" diameter gold wire - Pull rate 50 ± 10 seconds per inch max
Termination Solderability (Resistance to Soldering Heat)	3	MIL-PRF-55342, MIL-STD-202, Method 210	Test Condition B - Solder Dip - Sn/Pb 220°C for 5 seconds
Terminal Lead Strength	3	MIL-PRF-55342, MIL-STD-202, Method 221	Test Condition A - 1.5 pounds for 15 seconds
Subgroup 2	4		
Initial Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 70°C for 1000 Hours, Electrical measurements made @ 250, 500, 1000 hours
Final Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value

# HR Series Attenuators and Thermopads

Test Parameters per Test Plan TP-8965

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
<b>Group C Inspection</b>	<b>4</b>		
Initial Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Load Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 70°C for 1000 Hours, Electrical measurements made @ 0, 250, 500, 1000 hours
Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value

## Sample Quantities and Lead Times

Product Series Test Sample Requirements and Lead Times for TP-8965

Test Level	Fixed Attenuators: HR03/HR05	Thermopads: HRT/HRM	Lead time
Group A Total TCA	None None Required	3 Samples Total Add 3 Samples TCA	12 Weeks ARO
Group A & B Total Group B Sub-group 1 Group B Sub-group 2	7 Samples Total Add 3 Samples Add 4 Samples Burn-In	10 Samples Total Add 3 Samples Add 4 Samples Burn-In	18 Weeks ARO
Group A, B & C Total Group C Life	11 Samples Total Add 4 Samples for Stepped Burn-In	14 Samples Total Add 4 Samples for Stepped Burn-In	20 Weeks ARO

# HR Series Attenuators and Thermopads

## Test Parameters per Test Plan TP-9010

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
<b>Group A Inspection</b>			
Thermal Shock	100%	MIL-PRF-55342, MIL-STD-202, Method 107	10 Cycles -55°C to +125°C
Burn In/Bake	100%	MIL-PRF-55342, MIL-STD-202, Method 108	Stabilization Bake @ 150°C for *Exception 100 Hours
Final Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR Attenuation mid frequency band Limits per datasheet and dB Value
Subgroup 1 [TVA product only]	3		
Temperature Coefficient of Attenuation TCA (If Temp Variable Product)	3	Per Smiths Interconnect TP-9010	-55°C to +125°C - ±0.001 dB/dB/°C allowable
<b>Group B Inspection</b> <b>7</b>			
Subgroup 1	3		
High Temperature Exposure	3	MIL-PRF-55342	100 hours @ *Exception 125°C
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR Attenuation mid frequency band Limits per datasheet and dB Value
Bondability	3	MIL-PRF-55342	Mounted to metallized substrate, a minimum of 2 bonds per chip using .001" diameter gold wire - Pull rate 50 ± 10 secondsper inch max
Termination Solderability (Resistance to Soldering Heat)	3	MIL-PRF-55342, MIL-STD-202, Method 210	Test Condition B - Solder Dip - Sn/Pb 220°C for 5 seconds
Subgroup 2	4		
Load Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 100°C for 1000 Hours, Electrical measurements made after 1000 hours
Final Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR Attenuation mid frequency band Limits per datasheet and dB Value
<b>Group C Inspection</b> <b>4</b>			
Load Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 100°C for 1000 Hours, Electrical measurements made after 1000 hours
Final Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR Attenuation mid frequency band Limits per datasheet and dB Value

# Sample Quantities and Lead Times

## Product Series Test Sample Requirements and Lead Times for TP-9010

Test Level	Fixed Attenuators: HRKFA	Thermopads: HRK	Lead time
Group A Total TCA	None None Required	3 Samples Total Add 3 Samples TCA	12 Weeks ARO
Group A & B Total Group B Sub-group 1 Group B Sub-group 2	7 Samples Total Add 3 Samples Add 4 Samples Burn-In	10 Samples Total Add 3 Samples Add 4 Samples Burn-In	18 Weeks ARO
Group A, B & C Total Group C Life	11 Samples Total Add 4 Samples for Stepped Burn-In	14 Samples Total Add 4 Samples for Stepped Burn-In	20 Weeks ARO

# HR Series Attenuators and Thermopads

## Test Parameters per Test Plan TP-9030

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
<b>Group A Inspection</b>			
Initial Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Thermal Shock	100%	MIL-PRF-55342, MIL-STD-202, Method 107	10 Cycles -55°C to +125°C
Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Burn In/Bake	100%	MIL-PRF-55342, MIL-STD-202, Method 108	Stabilization Bake @ 150°C for *Exception 168 Hours
Final Electrical (RF) Inspection	100%	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Percent Defective Allowable (PDA)	100%	Per Smiths Interconnect TP-9030	10% allowable
Subgroup 1 [TVA product only]	3		
Temperature Coefficient of Attenuation TCA (If Temp Variable Product)	3	Per Smiths Interconnect TP-9030	-55°C to +125°C - ±0.001 dB/dB/°C allowable
<b>Group B Inspection</b>			
Subgroup 1	3		
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Low Temperature Operation	3	MIL-PRF-55342	Maximum Rated Input Power @-55°C *Exception -55°C
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
High Temperature Exposure	3	MIL-PRF-55342	100 hours @ *Exception 150°C
Electrical (RF) Inspection	3	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Termination Adhesion	3	MIL-PRF-55342, MIL-STD-202, Method 211	Test Condition A - Pull Test - *Exception 15 Grams
Bondability	3	MIL-PRF-55342	Mounted to metallized substrate, a minimum of 2 bonds per chip using .001" diameter gold wire - Pull rate 50 ± 10 seconds per inch max
Termination Solderability (Resistance to Soldering Heat)	3	MIL-PRF-55342, MIL-STD-202, Method 210	Test Condition B - Solder Dip - Sn/Pb 22-°C for 5 seconds
Subgroup 2	4		
Initial Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value
Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 70°C for 1000 Hours, Electrical measurements made @ 250, 500, 1000 hours
Final Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ 1.0 GHz @ 25°C - Limits per datasheet and dB Value

# HR Series Attenuators and Thermopads

## Test Parameters per Test Plan TP-9030

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
<b>Group C Inspection</b>	<b>4</b>		
Initial Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value
Load Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 125°C for 1000 Hours, Electrical measurements made @ 0, 250, 500, 1000 hours
Electrical (RF) Inspection	4	MIL-PRF-55342	VSWR @1.0 GHz and Attenuation @ DC & 1.0 GHz - Limits per datasheet and dB Value

# Sample Quantities and Lead Times

## Product Series Test Sample Requirements and Lead Times for TP-9030

Test Level	Fixed Attenuators: HRKFA	Thermopads: HRK	Lead time
Group A Total TCA	None None Required	3 Samples Total Add 3 Samples TCA	12 Weeks ARO
Group A & B Total Group B Sub-group 1 Group B Sub-group 2	7 Samples Total Add 3 Samples Add 4 Samples Burn-In	10 Samples Total Add 3 Samples Add 4 Samples Burn-In	18 Weeks ARO
Group A, B & C Total Group C Life	11 Samples Total Add 4 Samples for Stepped Burn-In	14 Samples Total Add 4 Samples for Stepped Burn-In	20 Weeks ARO

# HR Series Diamond RF Resistives

per Test Plan TP-9046

Test	Sample Qty	Test Standard and Method	Test Condition
Pre-Cap Visual and Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification

## Group A Inspection

Visual / Mechanical	100%	MIL-PRF-55342	30X to 60X Magnification
Initial Electrical (RF) Inspection	100%	MIL-PRF-55342	DC Resistance / DC Attenuation - Limits per datasheet and dB Value
Thermal Shock	100%	MIL-PRF-55342, MIL-STD-202, Method 107	10 Cycles -55°C to +125°C
Burn In/Bake	100%	MIL-PRF-55342, MIL-STD-202, Method 108	Stabilization Bake @ 150°C for *Exception 168 Hours
Final Electrical (RF) Inspection	100%	MIL-PRF-55342	DC Resistance / DC Attenuation - Limits per datasheet and dB Value
Percent Defective Allowable (PDA)	100%	Per Smiths Interconnect TP-8965	10% allowable

## Group B Inspection

**6**

Subgroup 1	3		
Resistance to Temperature Characteristics	3	MIL-PRF-55342, MIL-STD-202, Method 304	DC Resistance / DC Attenuation @ -55°C and 125°C and calculate percent change
Final Electrical (RF) Inspection	3	MIL-PRF-55342	DC Resistance / DC Attenuation - Limits per datasheet and dB Value
Bondability	3	MIL-PRF-55342	Mounted to metallized substrate, a minimum of 2 bonds per chip using .001" diameter gold wire - Pull rate 50 ±10 seconds per inch max
Termination Solderability (Resistance to Soldering Heat)	3	MIL-PRF-55342, MIL-STD-202, Method 210	Test Condition B - Solder Dip - Sn/Pb 220°C for 5 seconds

## Group C Inspection

**3**

Initial Electrical (RF) Inspection	4	MIL-PRF-55342	DC Resistance / DC Attenuation - Limits per datasheet and dB Value
Load Life Test	4	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 100°C for 1000 Hours, Electrical measurements made @ 0, 250, 500, 1000 hours
Final Electrical (RF) Inspection	4	MIL-PRF-55342	DC Resistance / DC Attenuation - Limits per datasheet and dB Value

# Sample Quantities and Lead Times

Product Series Test Sample Requirements and Lead Times for TP-9046

Test Level	Diamond Rf Resistives	Lead time
Group A Total	None	14 Weeks ARO
Group A & B Total	<b>6 Samples Total</b>	20 Weeks ARO
Group B TCR	Add 3 samples	
Group B Bondability	Add 3 samples	
Group A, B & C Total	<b>9 Samples Total</b>	22 Weeks ARO
Group C Life	Add 3 Samples for Stepped Burn-In	