Wideband, Microwave, 0.5W

Monolithic Amplifier Subsystem AVM-273HPK+

50Ω 13 to 26.5GHz

VCM-1+
Case Style BG1482-1

AVM-273HP+
Case Style DG1677-1

Model
AVM-273HPK+
Kit Includes
VCM-1+
AVM-273HP+

The Big Deal

- Wideband 13 to 26.5 GHz
- Output power up to +27 dBm
- Excellent directivity, 43 dB typ. @ 20 GHz
- Unconditionally stable
- Excellent gain flatness, ±1 dB
- Sequencing and DC Control module included

Product Overview

Mini-Circuits' AVM-273HPK+ is a MMIC amplifier subsystem consisting of a MMIC amplifier and an auto-voltage sequencing module. The MMIC amplifier is designed using 0.15µm PHEMT technology and provides very wideband performance, medium power and unconditional stability. Furthermore, its outstanding isolation enables it to be used as a wideband isolation amplifier or buffer amplifier, making this an ideal amplifier for use in a variety of microwave systems including point-to-point radio, military EW and radar, DBS, and VSAT. The included voltage sequencing and DC control module enables plug-and-play operation without the need for external voltage sequencing circuits.

Key Features

Feature	Advantages
Wideband	Wide frequency coverage up to 26.5 GHz supports many microwave applications.
Pout up to +27 dBm	Can be used as a low-cost driver for high power amplifiers.
Excellent active directivity, 43 dB @ 20 GHz (directivity = isolation – gain)	Can be used as an inter-stage isolation amplifier, minimizing interaction of adjacent components.
Unconditionally stable	Eliminates the need for any compensating network to prevent unintended oscillation.
Small package	Small size for high power with low inductance, repeatable transitions, and excellent thermal contact to PCB.
Voltage Sequencing and DC Control Module included.	Provides correct voltage sequence and DC control, as well as reverse polarity protection, replacing over 20 discrete components and greatly simplifying circuit design.

Wideband, Microwave, 0.5W

Monolithic Amplifier Subsystem 13-26.5 GHz

Product Features

- Gain, 13 dB typ.
- Output Power, up to +27 dBm typ.
- Excellent directivity, 43 dB typ. at 20 GHz
- Unconditionally Stable
- Aqueous washable; 5 mm x 5 mm SMT package
- DC Control and voltage sequencing module included

Typical Applications

- Point to Point Radio
- Military EW and Radar
- DBS
- VSAT
- Wideband Isolation amplifier

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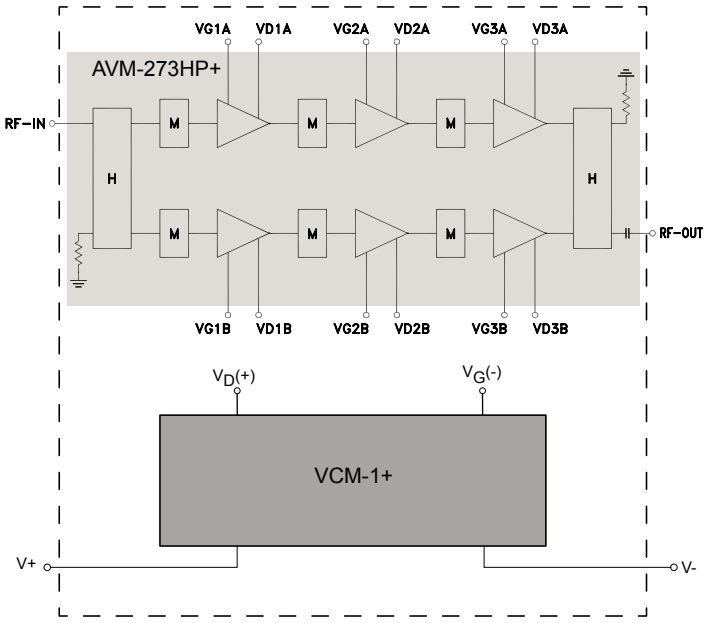
AVM-273HPK+

+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

Mini-Circuits' AVM-273HPK+ is a MMIC amplifier subsystem consisting of a MMIC amplifier and an auto-voltage sequencing module. The MMIC amplifier is designed using 0.15µm PHEMT technology and provides very wideband performance, medium power and unconditional stability. Furthermore, its outstanding isolation enables it to be used as a wideband isolation amplifier or buffer amplifier, making this an ideal amplifier for use in a variety of microwave systems including point-to-point radio, military EW and radar, DBS, and VSAT. The included voltage sequencing and DC control module enables plug-and-play operation without the need for external voltage sequencing circuits.

Simplified Schematic



Monolithic Amplifier Subsystem

Notes:
H - 90° Hybrid
M - Matching Network
VD and VG connections from VCM-1+ to AVM-273HP+ are required via application PCB; see Figure 1 for details.

Electrical Specifications [1] at 25°C, Zo=50Ω

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units.
Frequency Range		13.0		26.5	GHz
DC Voltage (V+)		+5.9	+6.0	+6.3	V
DC Voltage (V-)		-5.5	-5.0	-4.5	V
DC Current (I+)			559	590	mA
DC Current (I-)			0.5		mA
Gain	13.0	—	12.8	—	dB
	14.0	—	12.8	—	
	16.0	—	13.6	—	
	18.0	12.0	15.1	—	
	20.0	—	14.7	—	
	24.0	—	13.8	—	
	26.5	—	13.2	—	
Input Return Loss	13.0		16.9		dB
	14.0		17.1		
	16.0		17.0		
	17.0		19.4		
	20.0		8.9		
	24.0		9.0		
	26.5		7.2		
Output Return Loss	13.0		8.1		dB
	14.0		12.7		
	16.0		19.3		
	17.0		16.6		
	20.0		8.0		
	24.0		10.6		
	26.5		8.8		
Directivity (Isolation- Gain)	20.0		43		dB
Output Power @ 1 dB compression	13.0		22.6		dBm
	14.0		24.3		
	16.0		26.3		
	17.0		26.4		
	20.0		26.6		
	24.0		26.5		
	26.5		25.7		
OIP3	13.0		28.7		dBm
	14.0		30.6		
	16.0		32.4		
	17.0		33.2		
	20.0		31.0		
	24.0		29.7		
	26.4		29.5		
Noise Figure	13.0		9.8		dB
	14.0		9.6		
	16.0		8.9		
	17.0		8.8		
	20.0		8.5		
	24.0		7.5		
	26.5		8.5		
DC Current Variation vs. Temperature (2)			0.32		mA/°C
DC Current Variation vs. Voltage			0.145		mA/mV
Thermal Resistance			16.3		°C/W

Absolute Maximum Ratings[3]

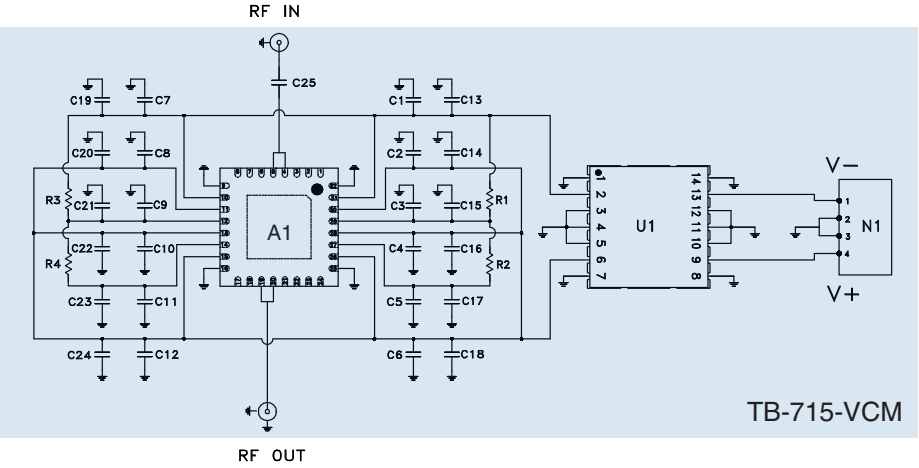
Operating Temperature [4]	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Channel Temperature	136°C
DC Voltage: V+	+7.4 V
DC Voltage: V-	-6 V
DC Current: V+	620mA
DC Current: V-	1mA
Power Dissipation	3.1 W
Input Power (CW)	16 dBm

Notes:
1. Measured on Mini-Circuits Test Board TB-715-5V.
   Gain, Output power at 1dB compression (P1dB), Noise Figure, Output IP3 (OIP3) are measured using Keysight N5242A PNA-X microwave network analyzer.
   Conditions:
   1. Gain: Pin=-25 dBm
   2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.
   3. V+ set to +6.1V to account for 1.1V drop in bias circuit resulting in +5V at drain (VD1 to VD3 (A&B))
2. (Current at 85°C - Current at -45°C)/130
3. Permanent damage may occur if any of these limits are exceeded. These maximum ratings are not intended for continuous normal operation.
4. Defined with reference to ground pad temperature.

Bias Sequence and Conditions

NOTE: to prevent damage to the AVM-273HPK+, and to ensure proper operation, all bias voltages must be applied through the VCM-1+ module.

Recommended Application Circuit

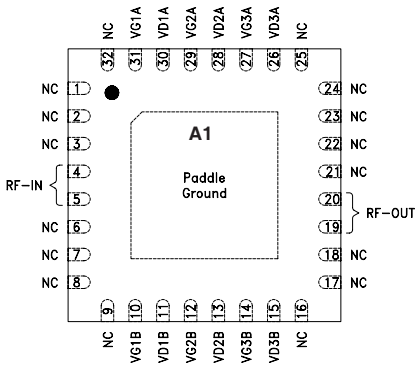


Component	Value/ Part Number	Size
A1	AVM-273HP+ *(Supplied in Subsystem)*	—
U1	VCM-1+ *(Supplied in Subsystem)*	—
N1	CONN VERTICAL HEADER 4 POS	—
C1,C6,C7, C12-C24	0.1 uF	.04 x .02
C2-C5, C8-C11	470 pF	.02 x .01
C25	0.1 uF	.04 x .02
R1-R4	0 Ohm	.08 x .05

Fig 1. Schematic of Test Board TB-715-VCM
VCM-1+ incorporates current stabilization, automtic voltage sequencing, reverse voltage protection circuitry.

AVM-273HP+ Pad Description

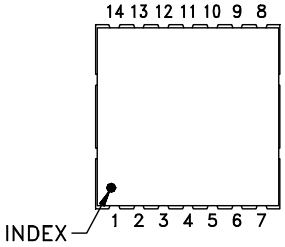
Top View



Function	Pad Number	Description (See Application Circuit)
RF-In	4,5	RF Input
RF-Out	19,20	RF-Output (DC blocked)
VG1 A	31	Gate Voltage of first stage amplifier (Top)
VG2 A	29	Gate Voltage of second stage amplifier (Top)
VG3 A	27	Gate Voltage of third stage amplifier (Top)
VD1 A	30	Drain Voltage of first stage amplifier (Top)
VD2 A	28	Drain Voltage of second stage amplifier (Top)
VD3 A	26	Drain Voltage of third stage amplifier (Top)
VG1 B	10	Gate Voltage of first stage amplifier (Bottom)
VG2 B	12	Gate Voltage of second stage amplifier (Bottom)
VG3 B	14	Gate Voltage of third stage amplifier (Bottom)
VD1 B	11	Drain Voltage of first stage amplifier (Bottom)
VD2 B	13	Drain Voltage of second stage amplifier (Bottom)
VD3 B	15	Drain Voltage of third stage amplifier (Bottom)
NC	1-3, 6-9, 16-18, 21-25, 32	No Connection, not used internally

VCM-1+ Pad Description

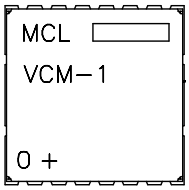
Top View



Function	Pad Number	Description
V- Out	2	Negative Output
V+ Out	6	Positive Output
V+ In	9	Positive Input
V- In	13	Negative Input
GND	1,3,4,5,7,8, 10,11,12,14	Ground

Product Marking

Product Marking



Additional Detailed Technical Information *additional information is available on our dash board.*	
Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	**AVM-273HP+** DG1677-1 (SOT 89) *Plastic package, exposed paddle, lead finish: tin-silver over nickel* **VCM-1+** BG1482-1 (14 Pin) *Case material: Nickel-Silver Alloy* *Base: Printed wiring laminate*
Tape & Reel **Standard quantities available on reel**	*13" reels with 10, 20, 50 devices*
Suggested Layout for PCB Design	PL-448
Evaluation Board	TB-715-VCM

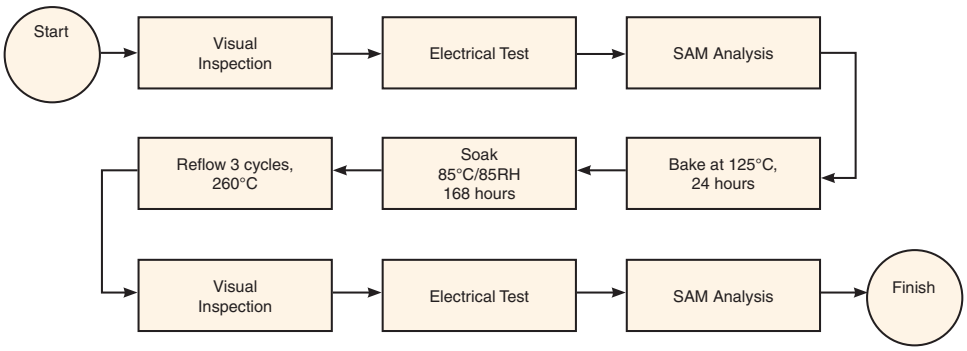
ESD Rating (AVM-273HP+)

Human Body Model (HBM): Class 1A in accordance with JESD22-A114F
Machine Model (MM): Class A (pass 25V) in accordance JESD22-A115

MSL Rating (AVM-273HP+)

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL Test Flow Chart



Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp