AMMC-5026

2 - 35 GHz GaAs MMIC Traveling Wave Amplifier

Description

AMMC-5026 is a broadband PHEMT GaAs MMIC Traveling Wave Amplifier designed for medium output power and high gain over the full 2GHz to 35 GHz frequency range.

Lifecycle status: Active

Features

Frequency Range: 2 - 35 GHz

Gain: 10.5 dB

Gain Flatness: /- 0.8 dB

Return Loss: Input: 17 dB; Output: 15 dB

Output Power (P-1dB):
24 dBm at 10 GHz
23 dBm at 20 GHz
22 dBm at 26 GHz

Noise Figure (6 - 19 GHz): < 4 dB

Applications

Broadband gain block

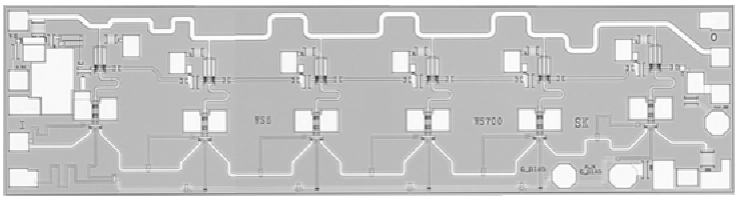
Broadband driver amplifier

10 Gb/s Fiber Optics

AMMC-5026

2 – 35 GHz GaAs MMIC Traveling Wave Amplifier

Data Sheet



Chip Size: 3050 x 840 µm (119 x 33 mils)
Chip Size Tolerance: ±10 µm (±0.4 mils)
Chip Thickness: 100 ± 10 µm (4 ± 0.4 mils)
Pad Dimensions: 75 x 75 µm (2.9 ± 0.4 mils)

Description

The AMMC-5026 is a broadband PHEMT GaAs MMIC Traveling Wave Amplifier (TWA) designed for medium output power and high gain over the full 2 GHz to 35 GHz frequency range. The design employs a 6-section cascode connected FET structure to provide flat gain and medium power as well as uniform group delay. For improved reliability and moisture protection, the die is passivated at the active areas.

Applications

- Broadband gain block
- Broadband driver amplifier
- 10 Gb/s Fiber Optics

Features

- Frequency range: 2 – 35 GHz
- Gain: 10.5 dB
- Gain flatness: ±0.8 dB
- Return loss:
  Input 17 dB, Output: 15 dB
- Output power (P-1dB):
  24 dBm at 10 GHz
  23 dBm at 20 GHz
  22 dBm at 26 GHz
- Noise figure (6 – 19 GHz): ≤ 4 dB

Absolute Maximum Ratings[1]

Symbol	Parameters/Conditions	Units	Min.	Max.
V_{dd}	Positive Drain Voltage	V		10
I_{dd}	Total Drain Current	mA		450
V_{g1}	First Gate Voltage	V	-5	
I_{g1}	First Gate Current	mA	-9	+5
V_{g2}	Second Gate Voltage	V	-3	+3.5
I_{g2}	Second Gate Current	mA	-10	
P_{in}	CW Input Power	dBm		23
T_{ch}	Channel Temperature	°C		+150
T_b	Operating Backside Temperature	°C	-55	
T_{stg}	Storage Temperature	°C	-65	+165
T_{max}	Max. Assembly Temp (60 sec max)	°C		+300

Notes:
1. Operation in excess of any one of these conditions may result in permanent damage to this device.

AMMC-5026 DC Specifications/Physical Properties[1]

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
I_{dss}	Saturated Drain Current (V_{dd}=7 V, V_{g1}=0 V, V_{g2}=open circuit)	mA	250	350	450
V_{p1}	First Gate Pinch-off Voltage (V_{dd}=7 V, I_{dd}=0.1 I_{dss}, V_{g2}=open circuit)	V		-1.2	
V_{g2}	Second Gate Self-bias Voltage (V_{dd}=7 V, I_{dd}=150 mA, V_{g2}=open circuit)	V		3.5	
I_{dsoff} (V_{g1})	First Gate Pinch-off Current (V_{dd}=7 V, V_{g1}=3.5 V, V_{g2}=open circuit)	mA		75	
θ_{ch-b}	Thermal Resistance[2] (Backside temperature, T_b = 25°C)	°C/W		28	

Notes:

1. Backside temperature T_b = 25°C unless otherwise noted.
2. Channel-to-backside Thermal Resistance (θ_{ch-b}) = 38°C/W at $T_{channel}$ (T_c) = 150°C as measured using the liquid crystal method. Thermal Resistance at backside temperature (T_b) = 25°C calculated from measured data.

RF Specifications[3,4]

(V_{dd} = 7V, I_{dd} (Q) = 150 mA, Z_{in} = Z_0 = 50Ω)

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.
$\|S_{21}\|^2$	Small-signal Gain		dB	8.5	10.5	12.5
$\Delta\|S_{21}\|^2$	Small-signal Gain Flatness		dB		±0.75	±1.5
RL_{in}	Input Return Loss		dB	13	17	
RL_{out}	Output Return Loss		dB	12	15	
$\|S_{12}\|^2$	Isolation		dB	23	26	
P_{-1dB}	Output Power @ 1 dB Gain Compression	f = 10 GHz	dBm	22	24	
P_{sat}	Saturated Output Power	f = 10 GHz	dBm		26	
OIP3	Output 3rd Order Intercept Point, RF_{in1} = RF_{in2} = - 20 dBm, f = 10 GHz, Δf = 2 MHz		dBm		31	
NF	Noise Figure	f = 10 GHz f = 20 GHz	dB dB		3.6 4.3	
H2	Second Harmonic (P_{in} = 12 dBm at 10 GHz)		dBc		-20	-17.5
H3	Third Harmonic (P_{in} = 12 dBm at 10 GHz)		dBc		-30	-28

Notes:

1. Data measured in wafer form, T_{chuck} = 25°C.
2. 100% on wafer RF test is done at frequency = 2, 10, 22, 26.5, and 35 GHz, except as noted.

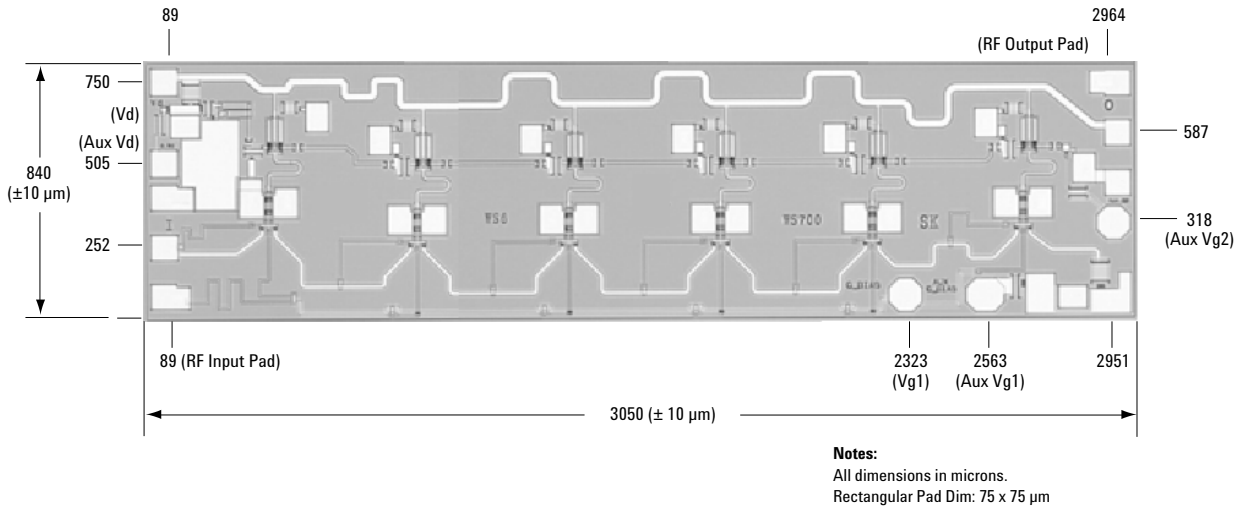


Figure 16. AMMC-5026 Bonding Pad Locations. (dimensions in micrometers)

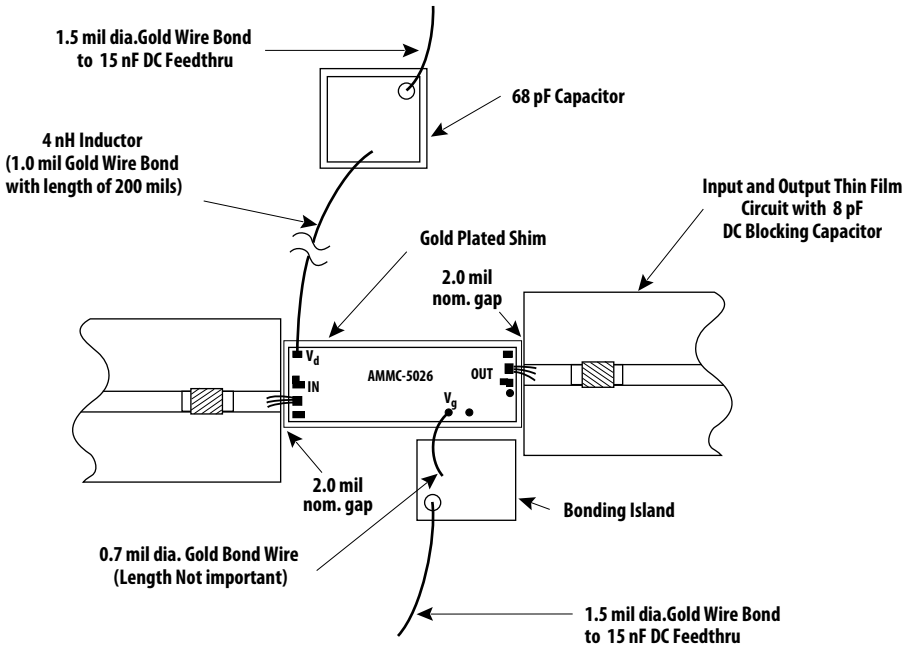


Figure 17. AMMC-5026 Assembly Diagram.

Ordering Information

AMMC-5026-W10 = 10 devices per tray
AMMC-5026-W50 = 50 devices per tray