

KA101-01, -10, -54

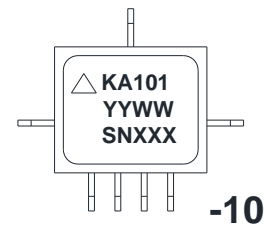
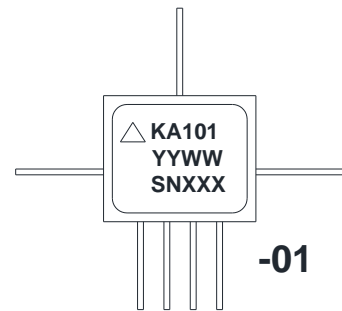
400-2700 MHz Medium Power Amplifier

Description

The KA101 is a high performance, ultra-wideband, medium power GaAs pHEMT amplifier with low noise, high linearity and high efficiency. The KA101 is supplied in a 7-lead hermetic microwave surface mount package with a copper tungsten base and in a space saving 3mm QFN package. The KA101 is ideal for high performance commercial and high-reliability applications.

Features

- ❑ Tunable from 400 MHz to 2700 MHz
- ❑ Wide bandwidths
- ❑ 30 dBm output power
- ❑ High Gain
- ❑ MIL-PRF-38535 class B and S screening available
- ❑ Single supply operation with on-chip bias circuitry, 4.75V to 5.5V



Electrical Characteristics (+25°C)

Parameter	Symbol	Test Conditions	Typical Performance 1000-1700 MHz Tuning		Typical Performance 1900-2400 MHz Tuning		Units
Frequency	f		1100	1600	2000	2300	MHz
Gain	S21	Small Signal	18.8	14.3	12.7	11.8	dB
Input Return loss	S11	Small Signal	18	18	18	18	dB
Output Return Loss	S22	Small Signal	16	18	15	15	dB
Reverse Transmission Loss	S12	Small Signal	29	26	27	27	dB
1 dB Compression	P1dB	CW	28.5	29.5	29.8	29.8	dBm
Noise Figure	NF		4	4	4	4	dB
Quiescent Current	Idq	No RF	188	188	188	188	mA
Operating current	Iop	At P1dB	400	400	470	440	mA

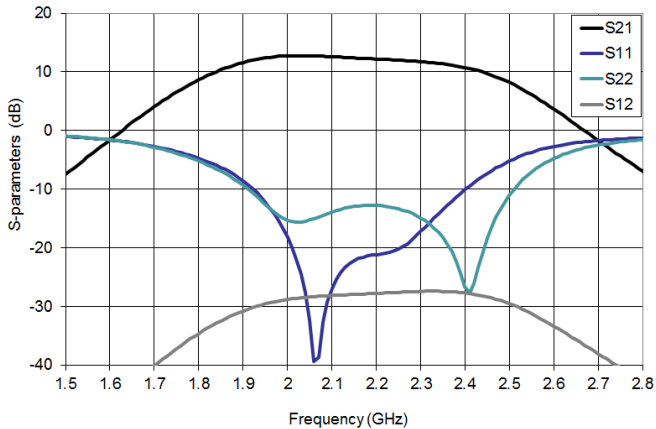
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400-2700 MHz Medium Power Amplifier

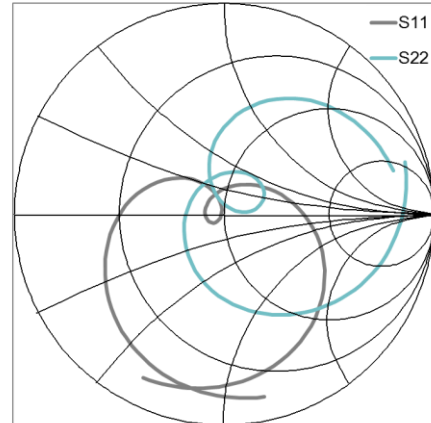
Typical Performance Characteristics

KA101-10, $T_c = 25^\circ \text{C}$, $V_{cc} = 5 \text{V}$, 1.9 GHz to 2.4 GHz tuning

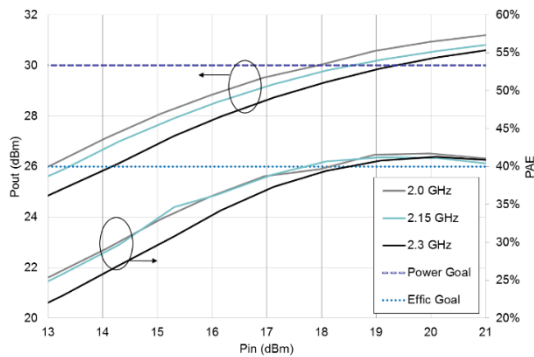
S-parameters (dB) vs. Frequency



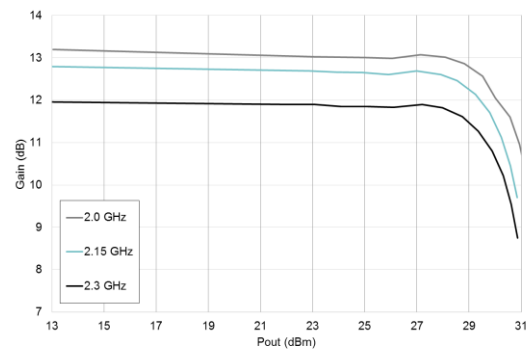
Reflection Coefficients (1.5 GHz to 2.8 GHz)



Pout and PAE vs Pin

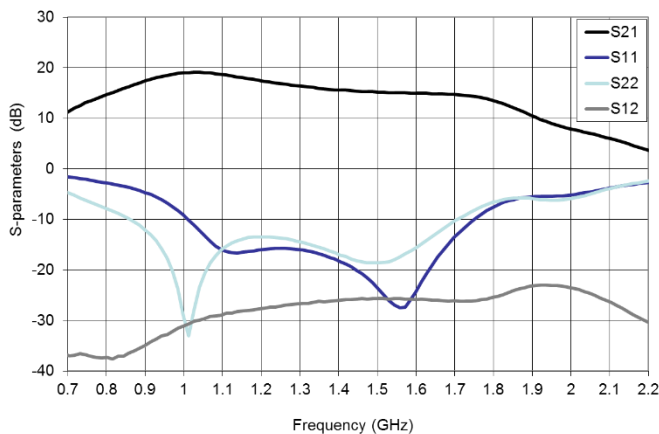


Gain vs Pout

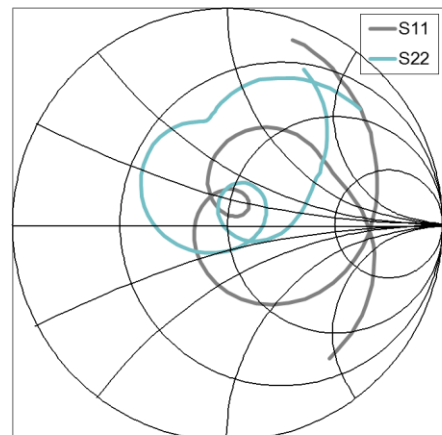


KA101-54, $T_c = 25^\circ \text{C}$, $V_{cc} = 5 \text{V}$, 1.0 GHz to 1.7 GHz tuning

S-parameters (dB) versus Frequency



Input and output reflection coefficients



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400-2700 MHz Medium Power Amplifier



KA101-01/KA101-10 S-parameters

$T_a = 25\text{ C}$, $Z_0 = 50\ \Omega$, $V_{cc} = 5\text{ V}$, $I = 188\text{ mA}$

Freq. MHz	S11		S21		S12		S22	
	dB	Ang	dB	Ang	dB	Ang	dB	Ang
200	-3.55	-167.85	20.45	-168.93	-48.02	81.95	-1.99	155.88
300	-1.73	-174.19	21.67	133.88	-42.11	76.00	-6.49	170.68
400	-1.46	176.64	20.12	100.12	-40.13	55.35	-2.90	-177.19
500	-1.55	170.98	18.18	87.92	-39.65	46.74	-1.88	174.91
600	-1.64	166.50	16.45	79.52	-39.16	42.73	-1.64	169.12
700	-1.71	162.69	15.06	72.34	-38.57	39.85	-1.57	164.64
800	-1.82	159.55	13.81	66.23	-38.07	38.25	-1.62	161.02
900	-1.83	157.15	12.83	60.92	-37.41	36.94	-1.61	158.27
1000	-1.80	154.42	11.99	55.35	-36.73	34.98	-1.55	155.33
1100	-1.79	151.76	11.22	49.95	-36.12	32.99	-1.53	152.18
1200	-1.80	149.19	10.53	44.77	-35.50	30.97	-1.54	149.34
1300	-1.82	146.67	9.90	39.68	-34.94	28.65	-1.55	146.57
1400	-1.85	144.23	9.36	34.76	-34.35	26.57	-1.58	143.89
1500	-1.89	141.69	8.87	29.87	-33.79	24.09	-1.61	141.22
1600	-1.93	139.22	8.44	24.87	-33.25	21.70	-1.64	138.52
1700	-1.98	136.74	8.06	19.85	-32.68	19.06	-1.68	135.76
1800	-2.03	134.00	7.71	14.64	-32.14	16.03	-1.73	132.85
1900	-2.10	131.20	7.38	9.47	-31.62	13.31	-1.78	129.88
2000	-2.18	128.46	7.09	4.21	-31.04	10.29	-1.83	126.73
2100	-2.28	125.22	6.83	-1.22	-30.49	6.84	-1.90	123.47
2200	-2.38	121.89	6.58	-6.78	-29.96	3.10	-1.96	119.75
2300	-2.49	118.33	6.36	-12.47	-29.44	-0.75	-2.05	115.72
2400	-2.59	114.53	6.15	-18.36	-28.94	-4.96	-2.13	111.29
2500	-2.71	110.23	5.93	-24.50	-28.47	-9.43	-2.24	106.45
2600	-2.81	105.77	5.72	-30.74	-28.03	-14.00	-2.35	101.20
2700	-2.90	101.01	5.50	-37.16	-27.61	-18.87	-2.47	95.46
2800	-2.97	96.02	5.27	-43.76	-27.24	-24.01	-2.59	89.18
2900	-3.04	90.64	4.99	-50.58	-26.92	-29.22	-2.70	82.35
3000	-3.05	85.28	4.71	-57.42	-26.63	-34.74	-2.79	74.93

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400-2700 MHz Medium Power Amplifier



KA101-54 S-parameters

$T_a = 25\text{ C}$, $Z_0 = 50\ \Omega$, $V_{cc} = 5\text{ V}$, $I = 188\text{ mA}$

Freq. MHz	S11		S21		S12		S22	
	dB	Ang	dB	Ang	dB	Ang	dB	Ang
200	-3.50	-164.72	21.75	-167.32	-48.04	85.37	-2.67	153.93
300	-2.03	-165.64	22.22	147.70	-42.39	87.08	-9.45	177.11
400	-1.59	-172.11	20.81	114.52	-39.96	70.70	-4.12	-158.18
500	-1.64	-174.95	18.94	104.30	-39.28	64.70	-2.73	-164.41
600	-1.73	-176.73	17.39	98.42	-38.73	63.37	-2.44	-167.62
700	-1.81	-177.88	16.20	94.15	-38.08	63.73	-2.37	-169.05
800	-1.89	-178.72	15.07	90.32	-37.41	64.59	-2.38	-169.67
900	-1.96	-179.33	14.24	87.18	-36.73	65.84	-2.42	-169.83
1000	-2.04	179.94	13.45	84.13	-36.06	66.74	-2.45	-169.84
1100	-2.12	179.26	12.81	81.33	-35.36	68.05	-2.51	-169.76
1200	-2.20	178.57	12.21	78.57	-34.67	68.86	-2.57	-169.59
1300	-2.30	177.66	11.65	75.76	-34.02	69.48	-2.64	-169.42
1400	-2.40	176.68	11.18	72.97	-33.35	70.15	-2.72	-169.34
1500	-2.51	175.50	10.76	70.08	-32.67	70.25	-2.80	-169.37
1600	-2.63	174.08	10.37	67.14	-32.02	70.15	-2.88	-169.48
1700	-2.77	172.46	10.00	64.09	-31.42	69.91	-2.96	-169.71
1800	-2.89	170.50	9.68	60.95	-30.79	69.40	-3.05	-170.17
1900	-3.04	168.25	9.37	57.55	-30.21	68.56	-3.14	-170.84
2000	-3.17	165.56	9.07	53.85	-29.65	67.36	-3.23	-171.64
2100	-3.30	162.49	8.73	50.29	-29.14	66.41	-3.28	-172.72
2200	-3.41	158.88	8.47	46.53	-28.58	64.83	-3.35	-174.44
2300	-3.52	154.90	8.17	42.38	-28.09	62.96	-3.43	-176.46
2400	-3.59	150.54	7.86	38.01	-27.63	60.62	-3.49	-178.80
2500	-3.62	145.94	7.51	33.56	-27.25	58.23	-3.54	178.64
2600	-3.59	141.03	7.14	29.01	-26.90	55.71	-3.55	175.61
2700	-3.53	136.08	6.75	24.43	-26.59	53.20	-3.55	172.08
2800	-3.42	131.12	6.32	19.68	-26.31	50.21	-3.54	168.24
2900	-3.27	126.35	5.83	14.93	-26.13	47.15	-3.50	164.16
3000	-3.09	121.92	5.32	10.18	-25.99	44.18	-3.43	159.71

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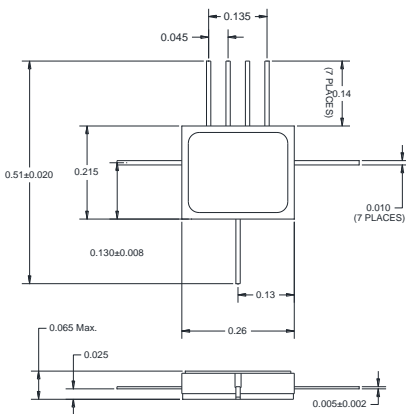
Absolute Maximum Ratings

Characteristic	Min Value	Max Value	Units
Supply Voltage (Vdd)		6	Volts
RF Input Power		TBD	dBm
Supply Current		TBD	mA
Storage Temperature	-55	+150	° C
Operating Case Temp	-55	+125	° C
Junction Temperature		+150	° C

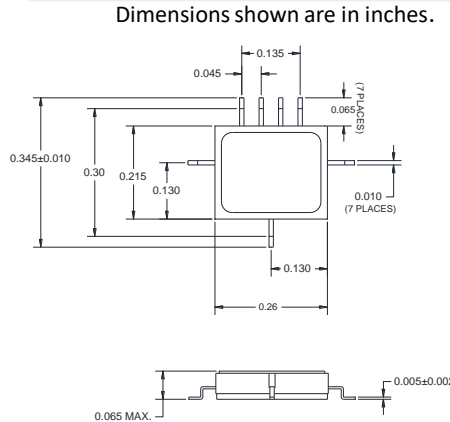
Note: Thermal Resistance Θ_{JC} TBD, all values TBR
 Exceeding any of the limits listed here may result in permanent damage to the device.

Outline Drawings

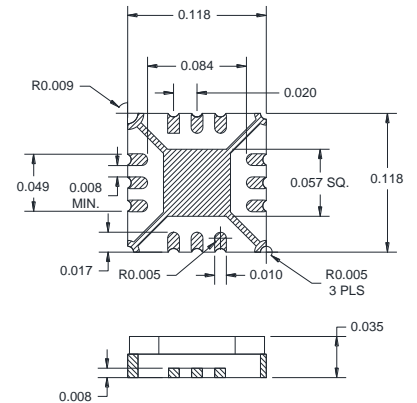
Dimensions shown are in inches.



KA101-01

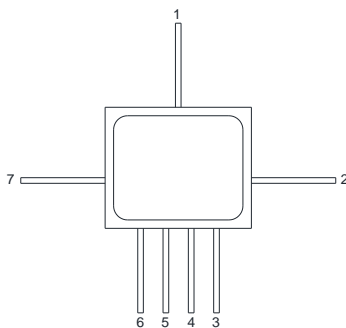


KA101-10

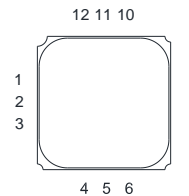


KA101-54

Pin Outs



0 (backside)	GND
1	GND
2	RF out
3	GND
4	GND
5	GND
6	GND
7	RF in



0 (backside)	GND
1	NC
2	RF IN
3	NC
4	NC
5	NC
6	NC
7	NC
8	RF out
9	GND
10	GND
11	GND
12	GND

Screening Flow

Test Inspection	MIL – STD -883		Requirement	
	Method	Condition	Class B	Class S
Wafer Lot Acceptance	5007		N/A	Per Wafer Lot
Non-Destructive Bond Pull	2023		Process under Statistical Control	100%
Internal Visual	2010	A= Class S B = Class B	100%	100%
Temperature Cycle	1010	C	100%	100%
Acceleration	2001	E (Y1 only)	100%	100%
PIND	2020	A (5 Cycles)	N/A	100%
Serialization	Per Product Specification		100%	100%
Radiographic	2012		N/A	100%
Electrical Test	Per Product Specification	+25°C	100%	100%
Burn In	1015	A	100% 160 Hours @ 125°C	100% 240 Hours @ 125 °C
Final Electrical	Per Product Specification	+25°C	100%	100%
Group A Electrical	Per Product Specification	-55°C + 125°C	45/0	45/0
Seal				
Fine Leak	1014	A C	100%	100%
Gross Leak				
External Visual	2009		100%	100%

Ordering Information

KCB Solutions Part Number	Screening Level
KA101-01C(straight leads) KA101-10C (gullwing) KA101-54C (3 mm QFN)	Unscreened
KA101-__B	Class B Screening
KA101-__S	Class S Screening