KA101-10

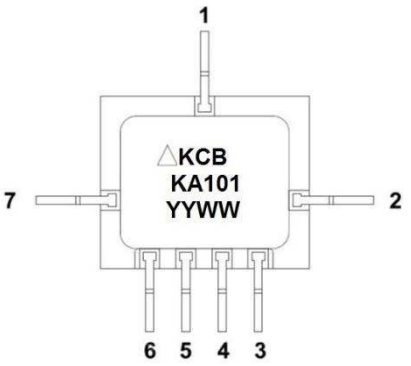
Preliminary 10/2013

400-2700 MHz Medium Power Amplifier

KCB SOLUTIONS
RF DESIGN & MANUFACTURING

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 making it idea for high performance commercial and high-reliability applications.



Features

- ❑ Tunable from 400 MHz to 2700 MHz (see application circuit)
- ❑ Wide bandwidths
- ❑ 30 dBm output power
- ❑ High Gain:
  - ~15 dB at 1575 MHz (TBR)
  - >11.5 dB from 2.0 GHz to 2.3 GHz(TBR)
- ❑ MIL-PRF-38535 class B and S screening available
- ❑ Single supply operation with on-chip bias circuitry, 4.75V to 5.5V

Pinout

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

Electrical Characteristics (+25°C)

Table 1. KA101 Electrical characteristics in 2.0 GHz to 2.3 GHz demo board, Vcc = 5V

Parameter	Symbol	Test Conditions	Limits	Typical Performance			Units
Frequency	f		2000-2300	2000	2150	2300	MHz
Gain	|S21|	Small Signal	>12	12.7	12.4	11.8	dB
Input Return loss	|S11|	Small Signal	≥12	18	18	18	dB
Output Return Loss	|S22|	Small Signal	≥10	15	15	15	dB
Reverse Transmission Loss	|S12|	Small Signal	≥20	27	27	27	dB
1 dB Compression	P1dB	CW	≥29	29.8	29.8	29.8	dBm
Saturated Output Power	Psat		≥30	31	30.8	30.8	dBm
3rd Order Intercept Point	OIP3		≥40	TBD	TBD	TBD	dBm
Noise Figure	NF			4.0	4.0	4.0	dB
Quiescent Current	Idq	No RF		188	188	188	mA
Operating current	Iop	At P1dB	≤400	470	440	440	mA
Saturation current	Isat	At Psat	TBD	TBD	TBD	TBD	mA

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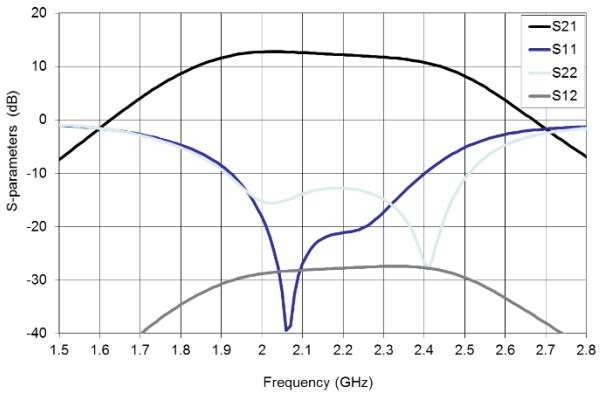
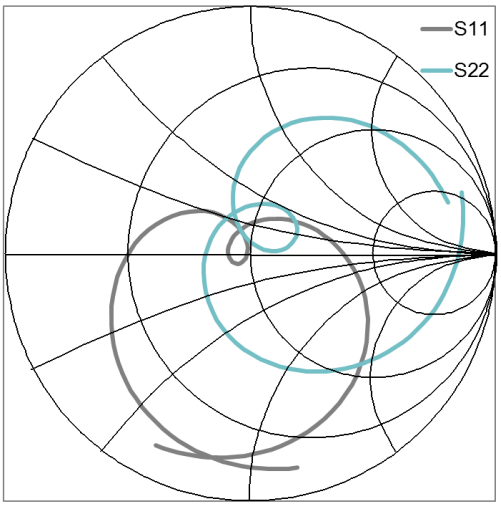
Typical Performance characteristics

Tc =25° C, Vcc = +5V, 2.0 GHz to 2.3 GHz tuning

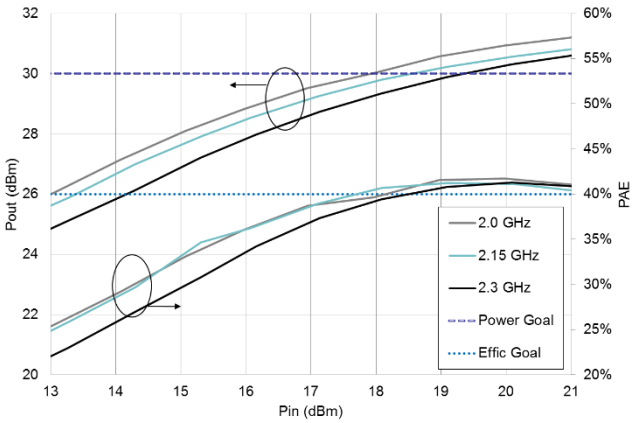
S-parameters (dB) versus Frequency



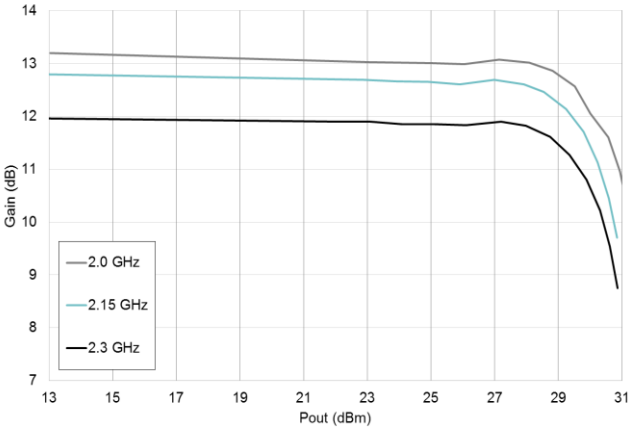
Reflection Coefficients
(1.5 GHz to 2.8 GHz)



Pout and PAE vs Pin



Gain vs Pout



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.

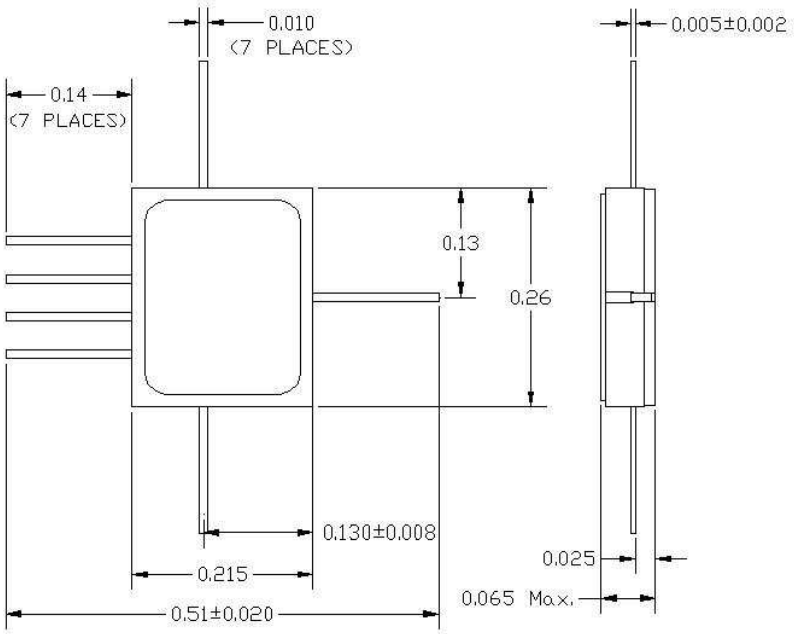
Screening Flow

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% 320 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 Gross Leak	1014	 A C	100%	100%
External Visual	2009		100%	100%

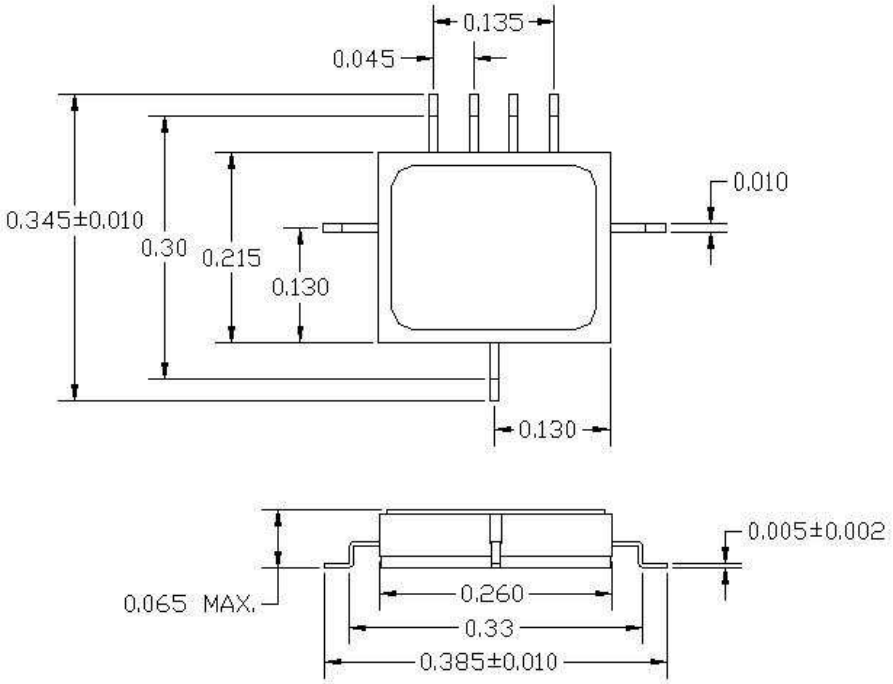
Ordering Information

KCB Solutions Part Number	Screening Level
KA101-01 (straight leads) KA101-10 (gullwing)	Unscreened
KA101-_ _B	Class B Screening
KA101-_ _S	Class S Screening

-01 Outline Drawing



-10 Outline Drawing



Application Circuit: 2000 – 2300 MHz