

KA105

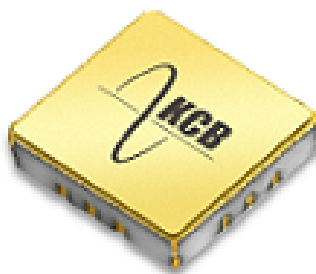
Driver Amplifier
0.05 – 3.8 GHz

DESCRIPTION

The KA105 is a GaAs pHEMT broadband Driver and Low noise Amplifier with high linearity in a hermetic Surface-Mount Technology (SMT) package for high reliability applications. This Amplifier offers good match from 0.1 to 1.5 GHz. Optimizing the bias inductor and coupling caps will extend the useable frequency range of the part down to 50 MHz and up to 3.8 GHz. It can be supplied and tested to the screening requirements of MIL-PRF-38534 Class H and K in addition to the required QCI.

FEATURES

- ✓ **Gain: 15 dB typical.**
- ✓ **OP1dB: +22 dBm typical.**
- ✓ **NASA EEE-INST-002 compliant.**
- ✓ **High Reliability Class B and S Screening Available.**
- ✓ **See Page 6 for MR HI –REL Ordering Details.**



APPLICATIONS

- ✓ **PA Driver**
- ✓ **Cascaded Gain Block**
- ✓ **GPS Transceivers**
- ✓ **IF Amplifier**

ELECTRICAL CHARACTERISTICS (-40 to +85°C)¹

Parameter	Symbol	Conditions	Min	Typical	Max	Units
Gain	S21	0.05 – 1.5 GHz	13.5			dB
		1.5 – 3.0 GHz	12.0			dB
		3.0 – 3.8 GHz	11.0			dB
Return Loss (I/O)	S11 / S22	0.05 – 3.0 GHz	9.0			dB
		3.0 – 3.8 GHz	7.0			dB
Supply Current	I _{DD}	VDD = 5V			95	mA

1. All electrical characteristics are measured at +25°C at a minimum.

OPERATING CHARACTERISTICS (-40 TO +85°C)¹

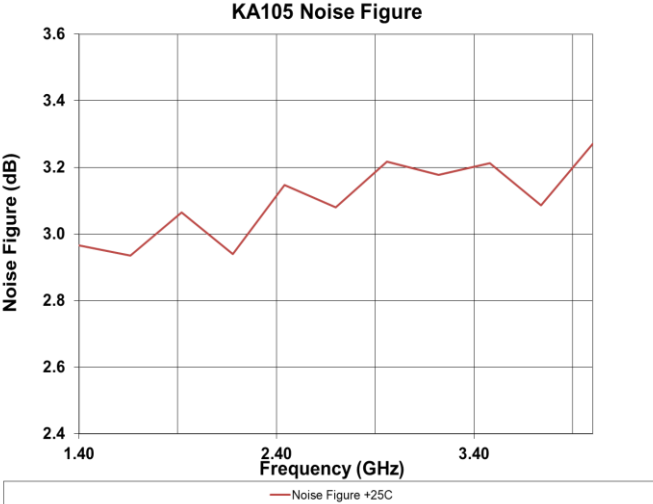
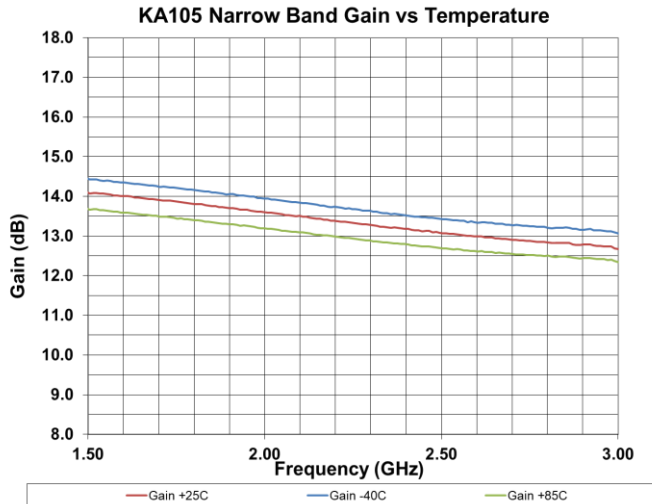
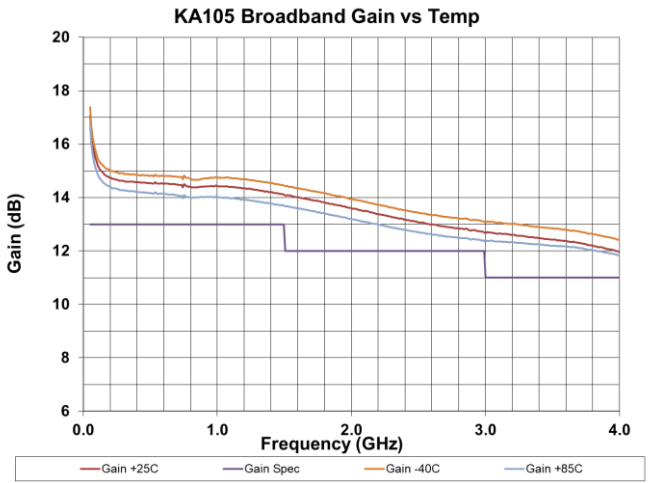
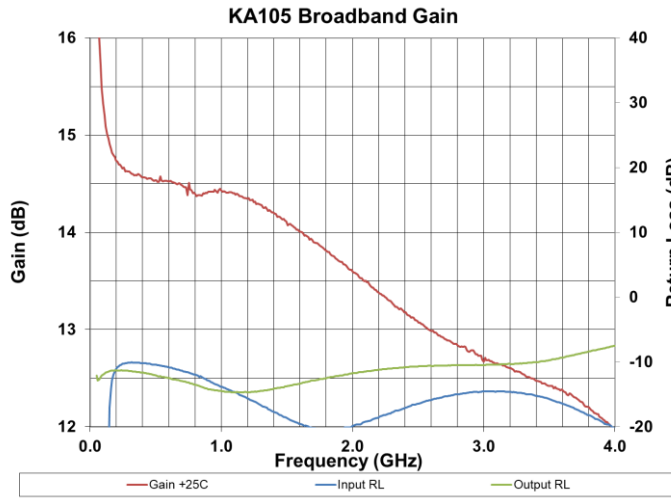
Parameter	Symbol	Conditions	Min	Typical	Max	Units
Output Compression Point	OP1dB	0.05 – 1.5 GHz		+22		dBm
		1.5 – 3.8 GHz		+22		dBm
3rd order output intercept point (+/- 1% spacing)	OIP3	0.05 – 1.5 GHz		+38		dBm
		1.5 – 3.8 GHz		+38		dBm
Noise Figure	NF	1.5 – 3.8 GHz		3.2		dB

1. All operating characteristics are guaranteed over full performance temperature range but not tested.

KA105 | Driver Amplifier 0.05 – 3.8 GHz

Typical Performance Data ($V_{CC}=5V$, $I_{CC} = 90$ mA Typ)

TYPICAL PERFORMANCE (+25 °C)



ABSOLUTE MAXIMUM RATINGS

Characteristic	Min.	Max.	Units
Supply voltage		9.0	V
RF Input power		+22	dBm
Operating temperature	-40	+105	°C
Storage temperature	-65	150	°C
Channel temperature (MTTF > 170 Hrs)		170	°C
Maximum Dissipated Power		1.0	W
ESD sensitivity (HBM)		250 (Class 1A)	V



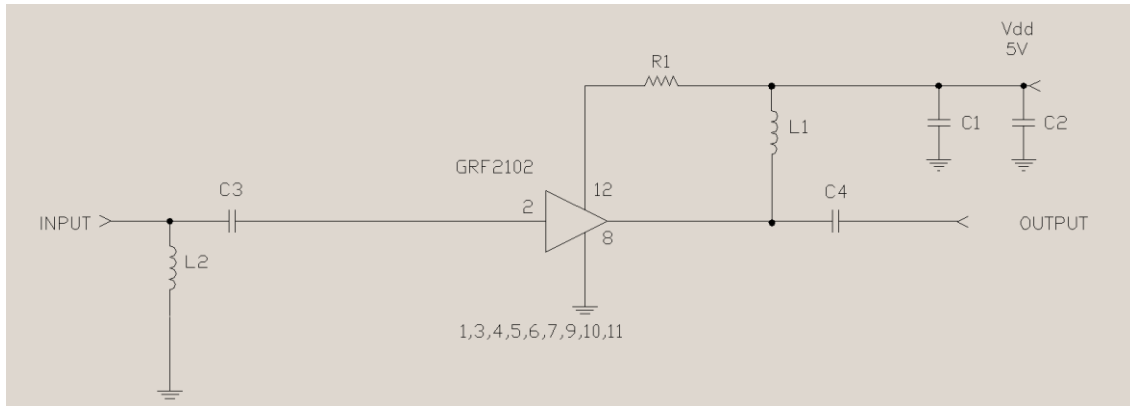
Caution: Class 1B (HBM 500V) Electrostatic Sensitive Device. Proper ESD precaution should be used when handling device.

1. Unit shall survive operation without damage over the temperature range but not tested.



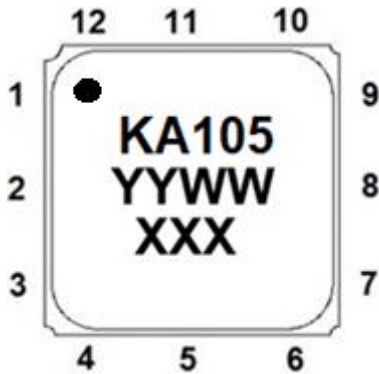
KA105 | Driver Amplifier 0.05 – 3.8 GHz

APPLICATION SCHEMATIC



Components	Part Descriptions	Manufactures	Part Number	Value
C1	0603 Capacitor	ATC	600S200JW250XT	20 pF
C2	0805 Capacitor	Kemet	C0805C104M5RAC7800	0.1uF
C3,C4	0603 Capacitor	TDK	C1608NPO2E102J080AA	1000 pF
R1	0603 Resistor	Vishay Dale	CRCW2512383RFKEG	383 Ohm
L1	0603 Inductor	CoilCraft	0603LS-241XJE	240 nH
L2	6003 Inductor	CoilCraft	0603LS-151XJE	150 nH

DEVICE MARKING/PIN OUT:



PIN	Designation	PIN	Designation
1	GND	7	GND
2	RF IN	8	RF OUT/ V_{DD}
3	GND	9	GND
4	GND	10	GND
5	GND	11	GND
6	GND	12	V_{SEL}

PACKAGE/MARKING NOTES:

- Lid: ASTM F-15 Alloy
- Base/Walls: Alumina
- Lid/Bottom Finish: Gold over Nickel
- KA105: Part Number
- YYWW: Lot Date Code
- XXX: Serial number (added for class B and S devices only)

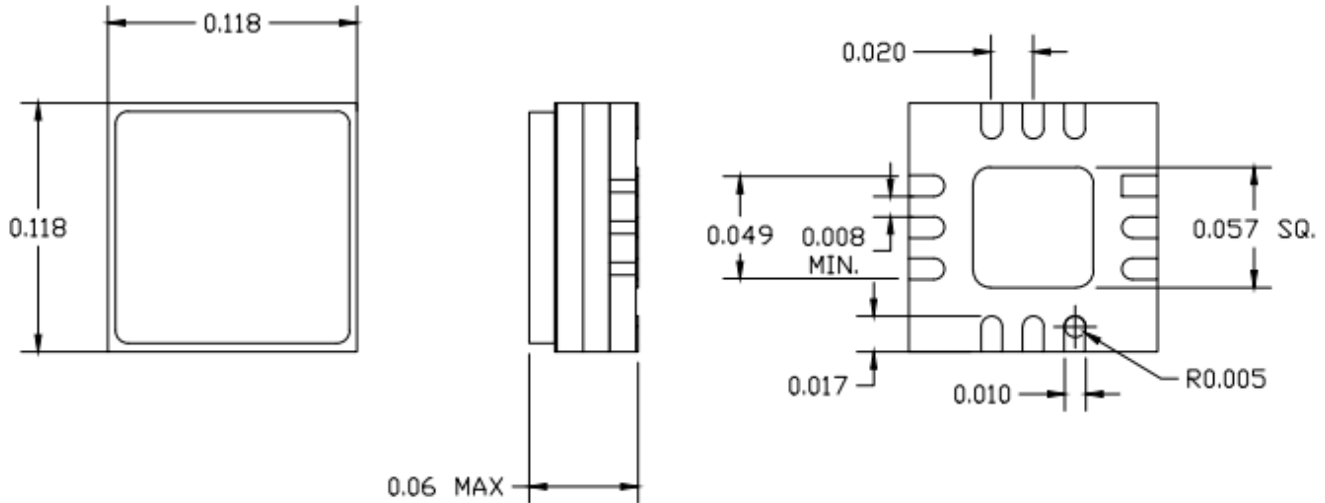
ADDITIONAL NOTES:

- Maximum reflow temperature: 265°C
- Package base is RF ground
- External blocking capacitors required on all RF ports

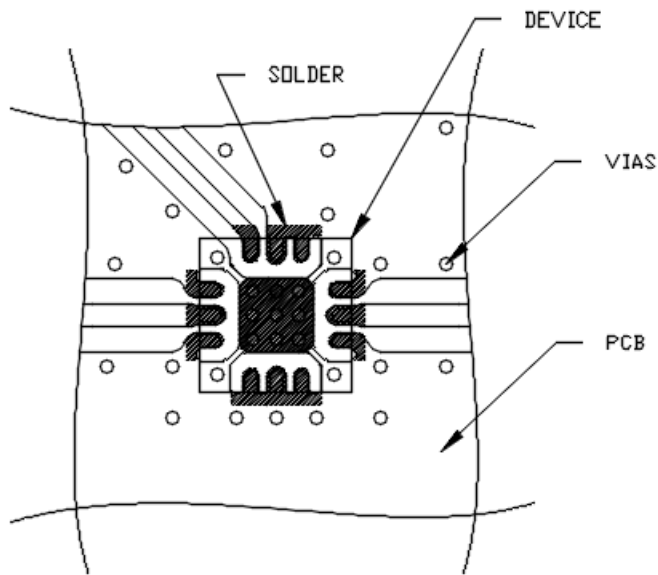
KA105 | Driver Amplifier 0.05 – 3.8 GHz

OUTLINE:

Dimensions are shown in inches.



RECOMMENDED SOLDER LAYOUT:

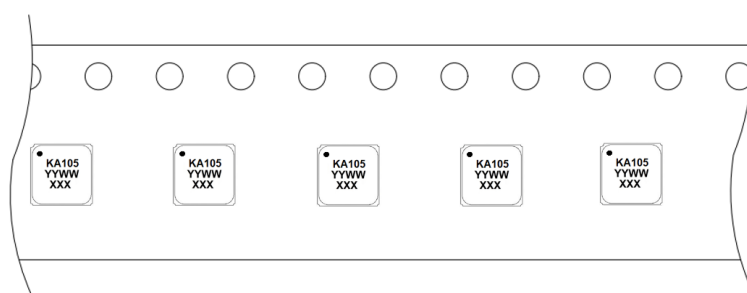


NOTES:

1. TRANSMISSION LINES SCALED FOR ROGERS RO4003, 0.008 INCHES THICK
2. GROUND ALL UNUSED PORTS
3. MAXIMUM REFLOW TEMPERATURE: 265C.
4. DXF FILE AVAILABLE UPON REQUEST.
5. CONTACT KCB SOLUTIONS FOR FURTHER GUIDANCE ON DEVICE PLACEMENT AND ATTACHMENT

KA105 | Driver Amplifier 0.05 – 3.8 GHz

TAPE & REEL:



- W = 12mm
- P0 = 4mm
- P1 = 8mm
- P2 = 2mm

SCREENING FLOW:

Test Inspection	MIL – STD -883		Requirement	
	Method	Condition	Class B	Class S
Wafer Lot Acceptance /1	5007		N/A	Per Wafer Lot
Non-Destructive Bond Pull	2023		SPC	SPC
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	2 views	N/A	100%
Electrical Test	Small Signal Testing	+25 °C	100%	100%
Burn In	1015	A	100%/160 Hours/ 125 °C	100%/240 Hours/ 125 °C
Final Electrical	Small Signal Testing	+25 °C	100%	100%
PDA Calculation	5004	25% Δ IL / 100% Δ Icc	5%	5%/3% functional
Group A Electrical /5	Per Product Specification	-55 °C + 125 °C	45/0	45/0
Leak Test	1014 A and C	1 x 10 ⁻⁸ Max	100%	100%
External Visual	2009		100%	100%

Notes:

1. Product under configuration control per KCB QAP 015.
2. Customer will be notified of all class 1 changes for Class B and S part numbers.
3. Wafer Lot Acceptance will include 100% die visual, SEM analysis and Lot Traceability.
4. Electrical Test Data will be recorded for each serial number and included in Final Test Report for all Class S part numbers.
5. Group A Electrical testing will include the Small Signal at the Min/Max operating condition. The Dynamic test (P1dB, IP3, SS) will be tested at +25c only.

ORDERING INFORMATION:

	Unscreened	Class B	Class S
KCB Solutions Part Number	KA105C	KA105B	KA105S

