KA120

Amplifier,
Low Noise
2-10 GHz

KCB SOLUTIONS
THE HIGHEST STANDARD IN RF

DESCRIPTION

The KA120 is a GaAs pHEMT broadband Low Noise Amplifier with high linearity in a hermetic surface mount package. This Amplifier offers excellent gain, Low noise and high linearity from 2 GHz to 10 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

- ✓ High Gain: 17 dB typical.
- ✓ Low Noise Figure: 2 dB typical @ 2-10 GHz.
- ✓ High OIP3: +26 dBm typical @ 2-10 GHz.
- ✓ NASA EEE-INST-002 compliant.
- ✓ High Reliability Class H and K Screening Available.
- ✓ See Page 6 for MFR HI –REL Ordering Details.

APPLICATIONS

- ✓ PA Driver
- ✓ Cascaded Gain Block
- ✓ IF Amplifier

TABLE1: ELECTRICAL CHARACTERISTICS (0 to +75 C)[1]

Parameter	Symbol	Conditions	Min	Typical	Max	Units
Gain	|S21|	2–10 GHz		17		dB
Gain Flatness					4	dB
Input VSWR		2–10 GHz		1.025		
Output VSWR		2–10 GHz		1.035		
Supply Current	I_{DD}	VDD = 5V		75		mA
Gate Voltage	V_{g1}			-0.6		V
Gate Voltage	V_{g2}			1.3		V

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

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TABLE 2: OPERATING CHARACTERISTICS (0 TO +75 °C)

Parameter	Symbol	Conditions	Min	Typical	Max	Units
Output 3rd Order Intercept Point	OIP3	2 GHz 6.5 GHz 10 GHz		+26 +25 +25		dBm dBm dBm
Output Compression Point	OP1dB	2 – 10 GHz		+19		dBm
Noise Figure	NF	2 – 10 GHz		+2.3		dB

TABLE 3: STABILITY CHARACTERISTICS (0 TO +75 °C)

Parameter	Symbol	Conditions	Min	Typical	Max	Units
K-Factor Stability[1]	K	10 – 3000 MHz	1.2			
B1-Factor Stability[1]	B1	10 – 3000 MHz	0		1	

Notes:

1. Guaranteed by design but not tested.

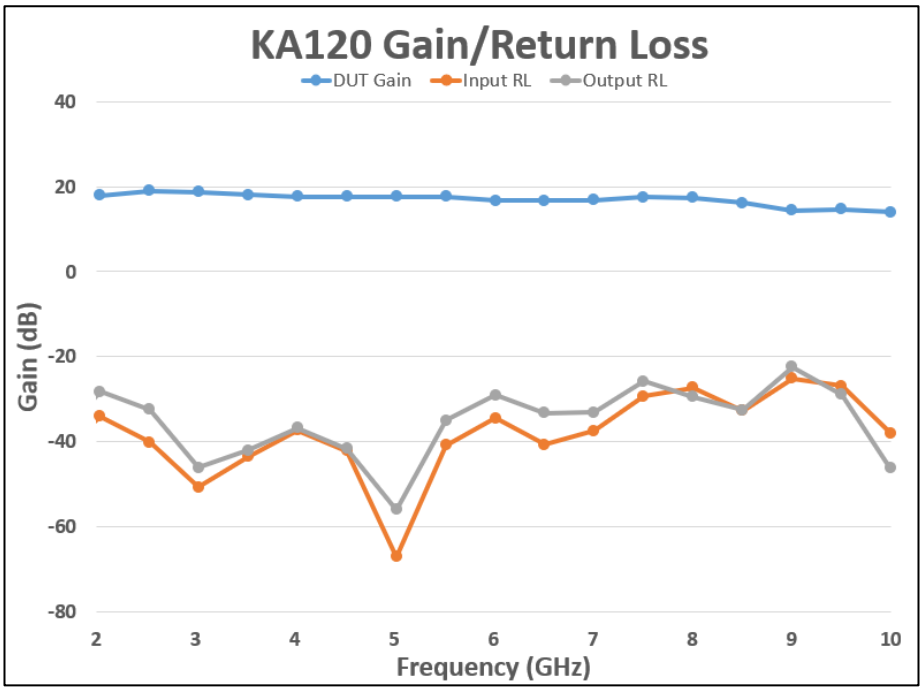
ABSOLUTE MAXIMUM RATINGS[1]

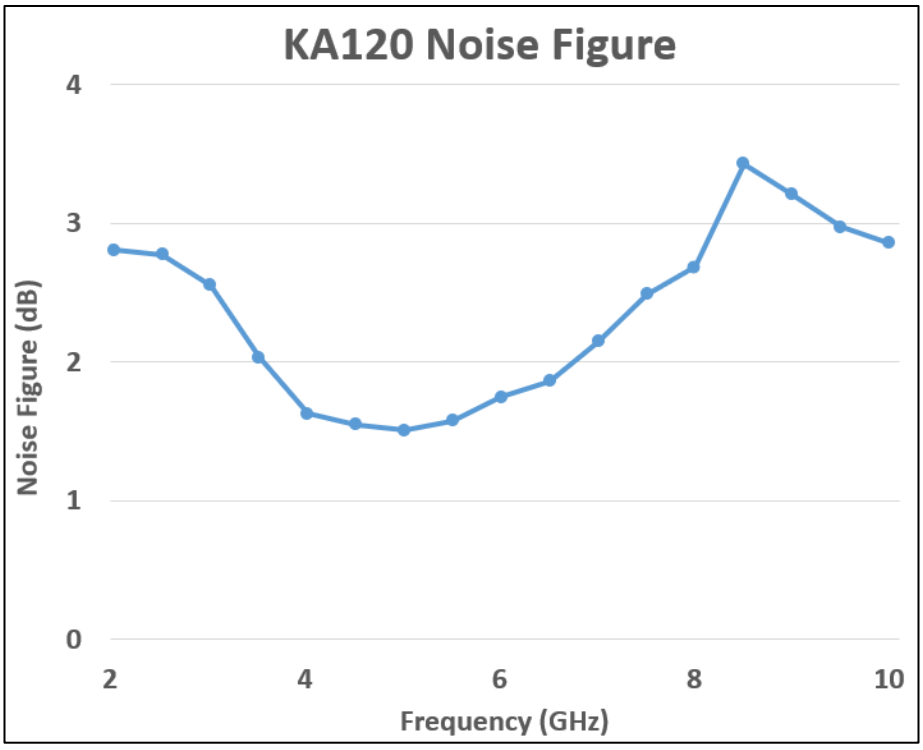
Characteristic	Symbols	Min.	Typ.	Max.	Units
Drain to Gate Voltage	Vd-Vg			10	V
Drain Voltage	Vd			7	V
Gate 1 Voltage Range Gate 2 Voltage Range	Vg1 Vg2			-2 to 0 -2 to +3	V V
Drain Current	Id			144	mA
RF Input power	Pin			+22	dBm
Operating temperature (No damage)[2]		-40		+105	°C
Storage temperature		-65		+150	°C
Channel temperature	MTTF > 9.7E+08 Hrs			+96	°C
Dissipated Power				1.01	W
Thermal resistance				44.2	°C/W
ESD sensitivity (Class 1A)	HBM	250			V

Notes

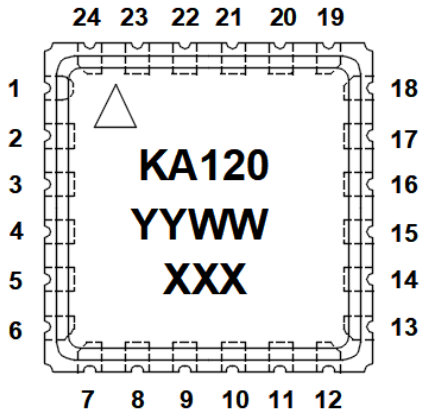
1. Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to this device. This is a stress rating only and functional operation of the device. At these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.
2. Device shall function but may not meet performance specifications.

TYPICAL PERFORMANCE (+25 °C)





DEVICE MARKING/PIN OUT:



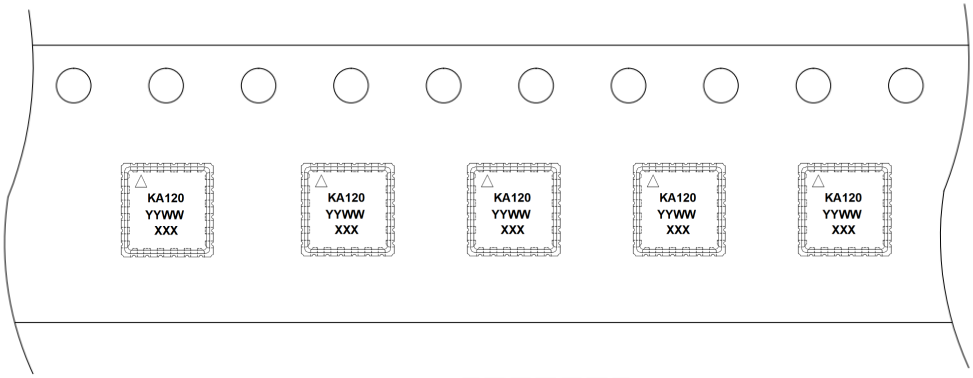
Pin	Function	Pin	Function
1	NC or GND	13	NC or GND
2	NC or GND	14	NC or GND
3	GND	15	GND
4	RF IN	16	RF OUT
5	GND	17	GND
6	NC or GND	18	NC or GND
7	NC or GND	19	NC or GND
8	NC or GND	20	V_D
9	NC or GND	21	NC or GND
10	V_{G1}	22	NC or GND
11	NC or GND	23	NC or GND
12	NC or GND	24	V_{G2}

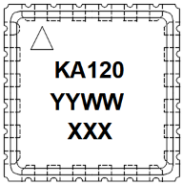
PACKAGE/MARKING NOTES:

- KA120: Part Number (See ordering information on page 8)
- XXX: Serial number (added for class H and K devices only)
- YYWW: Lot Date Code

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

TAPE AND REEL INFORMATION:





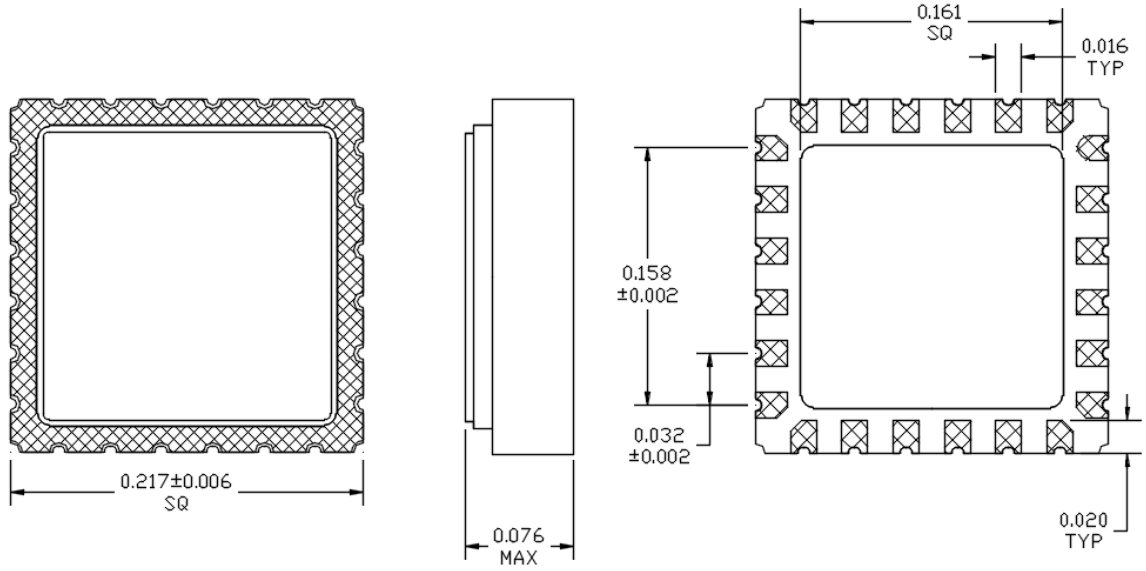
- A0 (Width) = 6.60 mm
- B0 (Length) = 6.60 mm
- K0 (Thickness) = 1.55 mm

ADDITIONAL NOTES:

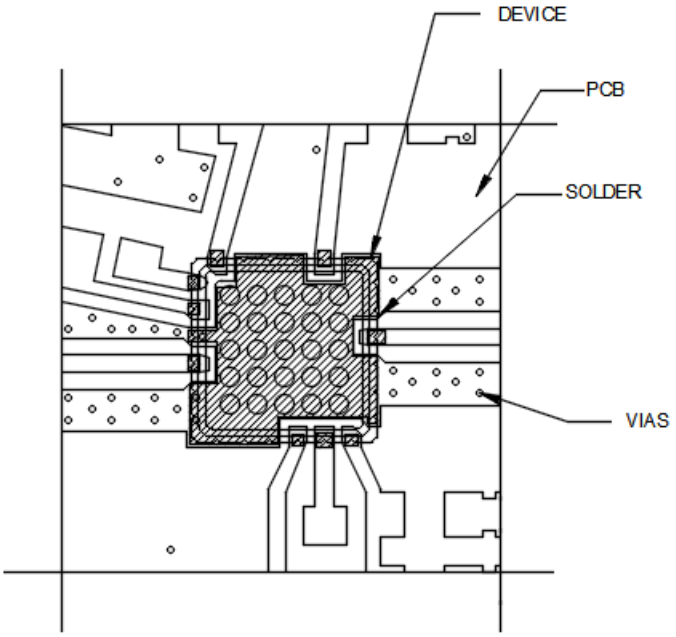
- Maximum reflow temperature: 320°C for 90 seconds maximum
- Package base is RF and DC ground

OUTLINE:

Dimensions are shown in inches.

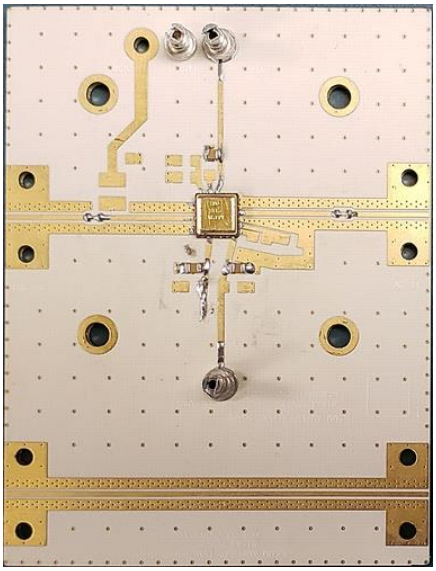


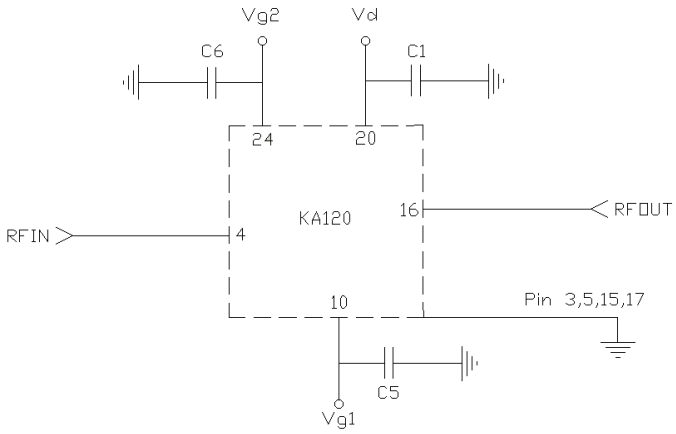
RECOMMENDED SOLDER LAYOUT:



NOTES:
1. TRANSMISSION LINES SCALED FOR
2. ROGERS RO4450, 0.010 INCHES THICK
3. GROUND ALL UNUSED PORTS.
4. MAXIMUM REFLOW TEMPERATURE: 265C FOR 90 SECONDS MAXIMUM.
5. DXF FILE AVAILABLE UPON REQUEST.
6. CONTACT KCB SOLUTIONS FOR FURTHER
7. GUIDANCE ON DEVICE PLACEMENT AND
8. ATTACHMENT.

EVALUATION BOARD AND SCHEMATIC:





Note: Pin 1,2,6-9,11-14,18,19,21-23 are NC or Grounded

C1,C5,C6: 0.01uF. Part #: ECJ-0EB1E103K

SCREENING FLOW (MIL-PRF-38534):

Test Inspection	MIL – STD -883		Requirement	
	Method	Condition	Class H	Class K
Element Evaluation	MIL-PRF-38534	Table C-1	Per Table	Per Table
Non-Destructive Bond Pull	2023		Process under SPC	100%
Internal Visual	2010	A = Class H, B = Class K	100%	100%
Temperature Cycle	1010	C, 10 Cycles	100%	100%
Acceleration	2001	B (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 Hrs/125°C	100%/240 Hrs/125°C
Final Electrical	Per Product Specification	+25°C	100%	100%
Group A Electrical	Per Product Specification	0°C/+75°C	45/0	45/0
Seal: Fine Leak Gross Leak	1014	A C	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 H and K part numbers.
4. Electrical Test Data will be recorded for each serial number and included in Final Test Report for all Class K part numbers.
5. Group A Electrical testing will include parameters in Table 1. The Dynamic test (Table 2) will be tested at +25c only.

ORDERING INFORMATION:

	Unscreened	Class H	Class K
KCB Solutions Part Number	KA120C	KA120H	KA120K