

KCB810

Amplifier,
Linear Power
0.4–2.7 GHz

DESCRIPTION

The KCB810 is a high performance, ultra-wideband, medium power GaAs pHEMT amplifier with low noise, high linearity and high efficiency. This device provides excellent linearity and a typical 1 dB Output Compression Point (OP1dB) of +30.3 dBm, making it ideal for use in the driver stage of infrastructure transmit chains. The KCB810 uses an 8-lead Hermetic Surface-Mount Technology (SMT) package for Defense and Satellite application. The device can be supplied and tested to the screening requirements of Mil-PRF-38535 Class B and S, in addition to the required QCI.



FEATURES

- ✓ Wideband Frequency Range: 400 MHz to 2700 MHz
- ✓ Low Noise Figure: 3.8 dB
- ✓ High OIP3
- ✓ Typical OP1dB = +30.3 dBm
- ✓ MIL-PRF-38535 Class B and S Screening Available
- ✓ Single Supply Operation with On-Chip Bias Circuitry

APPLICATIONS

- ✓ Microwave Radios
- ✓ Military Radios
- ✓ Space Missions
- ✓ VSAT
- ✓ Telecom Infrastructure
- ✓ Test Equipment

TABLE I: ELECTRICAL CHARACTERISTICS (+25°C)¹ ($V_{CC} = +5V$, $F = 1643.5$ MHz)

Parameter	Symbol	Conditions	Min	Typical	Max	Units
Small Signal Gain	S21	0.4 – 2.7 GHz		14.5		dB
Input Return Loss	S11	0.4 – 2.7 GHz		17		dB
Output Return Loss	S22	0.4 – 2.7 GHz		17		dB
Reverse Isolation	S12	0.4 – 2.7 GHz		26		dB
Quiescent Current	I _{cc}	No RF		140		mA

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

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TABLE 2: OPERATING CHARACTERISTICS:

Parameter	Symbol	Conditions	Min	Typical	Max	Units
1 dB Output Compression Point	OP1dB	CW		+30.3		dBm
Third Order Output Intercept Point	OIP3	Pout = +10dBm		+43.0		dBm
Noise Figure	NF	0.4 – 2.7 GHz		3.8		dB
Operational Current	Icc	@ OP1dB		390		mA
Supply voltage			4.75	5.0	5.5	V
Operating Frequency					2700	MHz
Operating Case Temp			-55	+25	+125	°C

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

TABLE 3: ABSOLUTE MAXIMUM RATINGS

Characteristic	Min.	Max.	Units
Supply voltage		+6.0	V
RF Input power		+20	dBm
Supply current		400	mA
Storage temperature	-55	+125	°C
Junction temperature		+150	°C/W
ESD sensitivity (HBM)		250 (Class 1A)	V



Caution: Class 1A (HBM 250V) Electrostatic Sensitive Device. Proper ESD precaution should be used when handling device.

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TYPICAL PERFORMANCE: ($V_{CC} = +5\text{ V}$, $I_{CQ} = 150\text{mA}$ nominal, as measured on evaluation board)

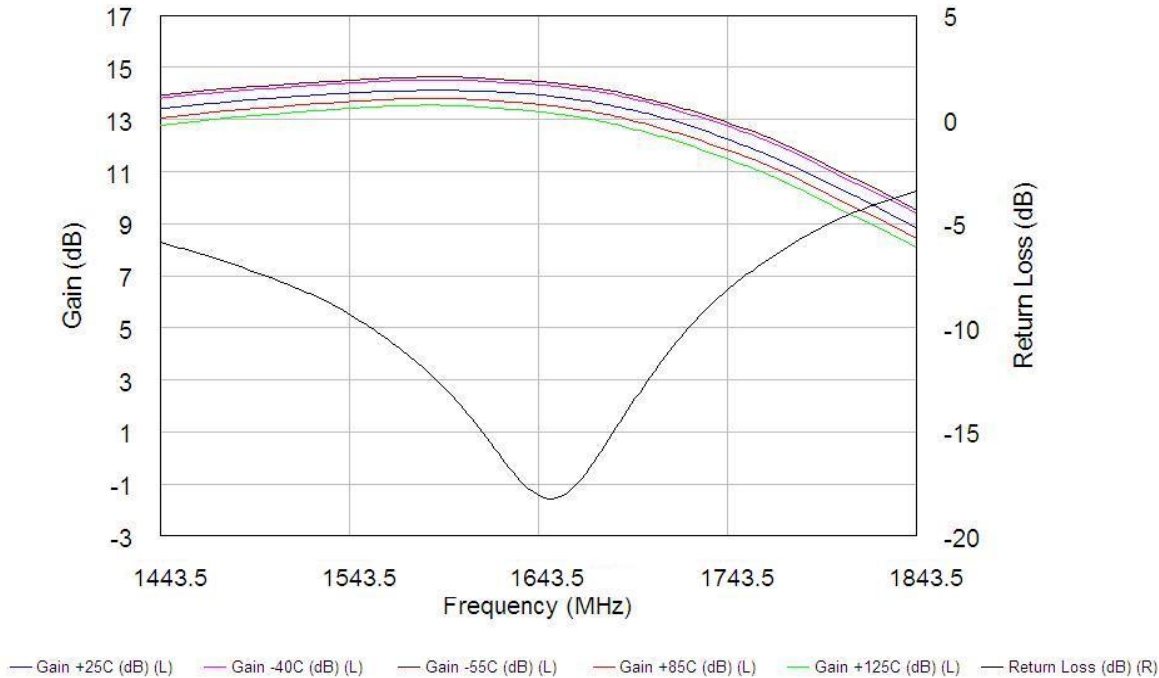


FIGURE 1: DEVICE MARKING/PIN OUT



XXX = Serial # will be added for Class B and S Part #

PIN	Designation	PIN	Designation
1	RF IN	5	RF OUT
2	RF IN	6	RF OUT
3	NC	7	RF OUT
4	NC	8	RF OUT

PACKAGE NOTES:

- Body: Glass 7052 w AL/load
- Lid/Leads: ASTM F-15 Alloy
- Base: ASTM F-15 Alloy
- Plating Finish: Gold over Nickel

ADDITIONAL NOTES:

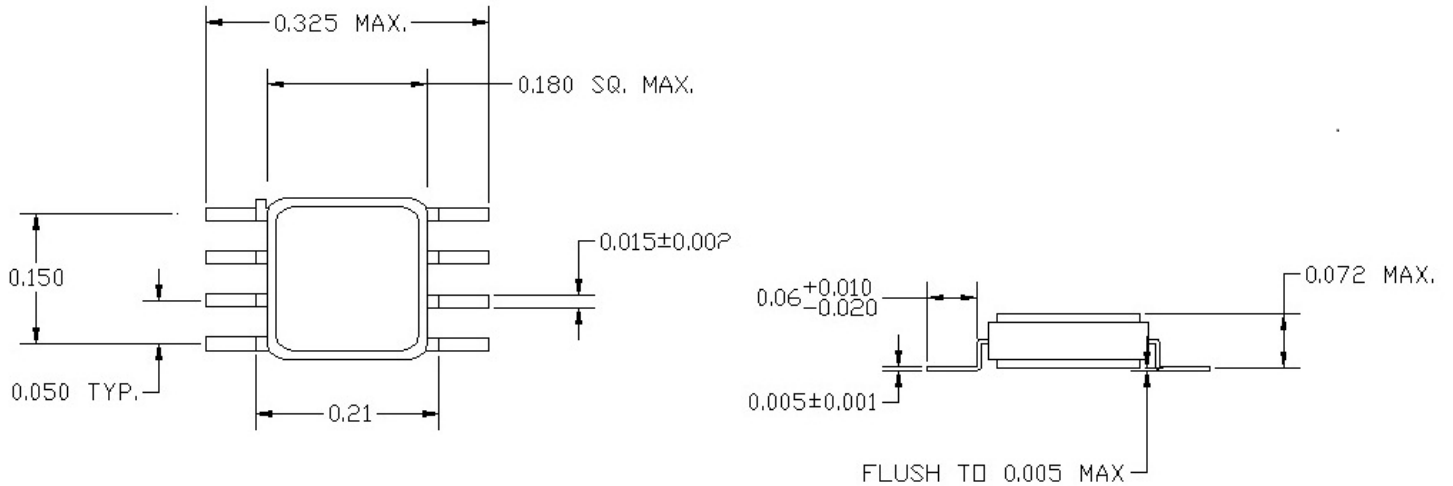
- Maximum reflow temperature: 265°C for 90 seconds maximum
- Package base is RF ground



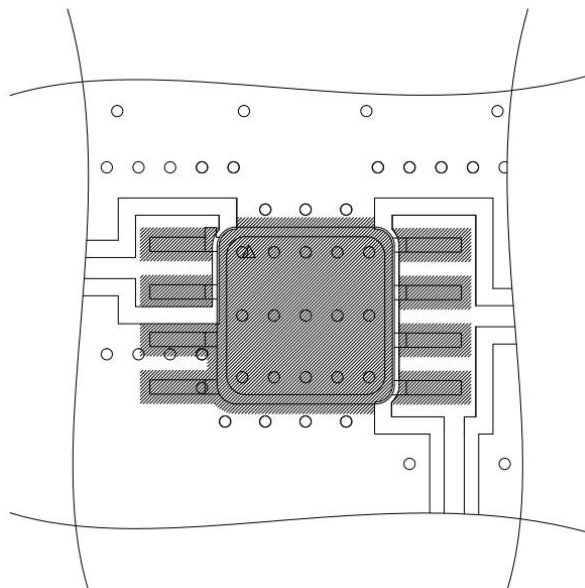
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FIGURE 2: OUTLINE

Dimensions shown are in inches



RECOMMENDED SOLDER LAYOUT

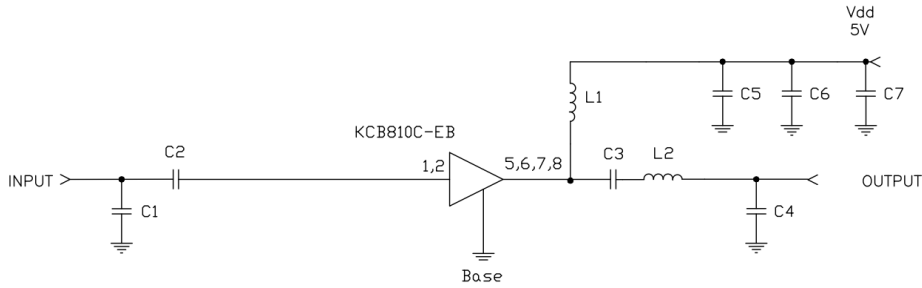


NOTES:

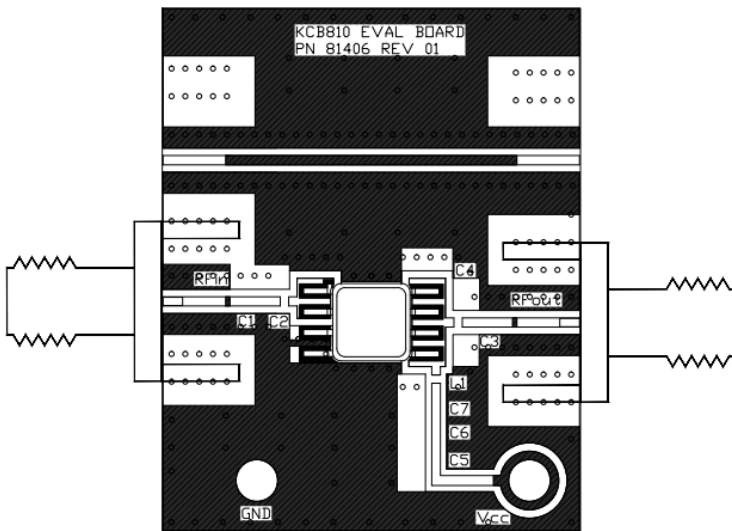
1. TRANSMISSION LINES SCALED FOR ROGERS FR-4, 0.012 INCHES THICK
2. GROUND ALL UNUSED PORTS
3. MAXIMUM REFLOW TEMPERATURE: 265C.
4. DXF FILE AVAILABLE UPON REQUEST.
5. CONTACT KCB SOLUTIONS FOR FURTHER GUIDANCE ON DEVICE PLACEMENT AND ATTACHMENT

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Evaluation Schematic:



Component	Value	Component	Value	Component	Value
C1	3.9 pF	C4	3.9 pF	C7	1 uF
C2	18 pF	C5	10 pF	L1	8.7 nH
C3	4.7 pF	C6	100 pF	L2	2.7 nH



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TABLE 4: SCREENING FLOW:

Test Inspection	MIL – STD -883		Requirement	
	Method	Condition	Class B	Class S
Wafer Lot Acceptance	5007		Per Table	Per Wafer Lot
Non-Destructive Bond Pull	2023		Process under SPC	Process under SPC
Internal Visual	2010	A = Class S, B = Class B	100%	100%
Temperature Cycle	1010	C, 10 Cycles	100%	100%
Acceleration	2001	E (Y1 only)	100%	100%
PIND	2020	A (5 Cycles)	N/A	100%
Serialization	IAW Figure 1		100%	100%
Radiographic	2012	2 Views	N/A	100%
Electrical Test	Table 1	+25°C	100%	100%
Burn In	1015	A	100%/160 Hrs@125°C	100%/240 Hrs@125°C
Final Electrical	Table 1	+25°C	100%	100%
PDA Calculation	5004	25% Δ IL / 100% Δ I _{cc}	5%	5%/3% Functional
Group A Electrical ⁵	Table 1 Table 2	-40°C and + 85°C +25°C only	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 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	KCB810C	KCB810B	KCB810S

