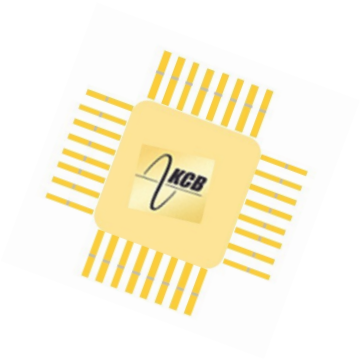
KCB828

High Isolation SP4T
0.02 – 4 GHz

KCB SOLUTIONS
THE HIGHEST STANDARD IN RF

DESCRIPTION

KCB828 is a GaAs pHEMT Non-Reflective high performance, low loss switch in a 32 lead quad flat, Hermetic Surface-Mount Technology (SMT) package for Harsh Environments ideal for Defense and Satellite application. This device can be ordered with the 100% screening requirements of MIL-PRF-38535 Class B and S, in addition to the required QCI.



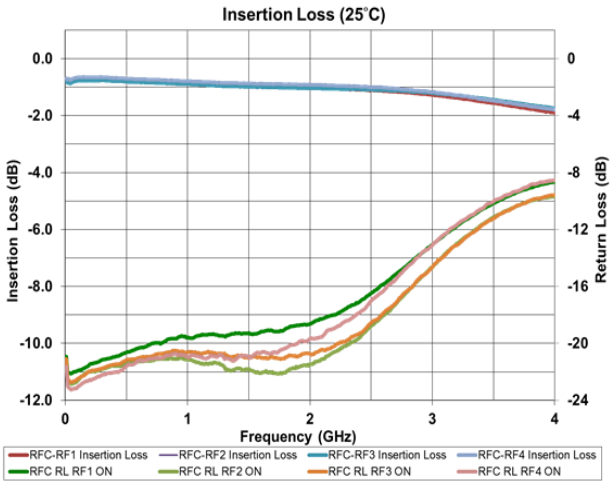
FEATURES

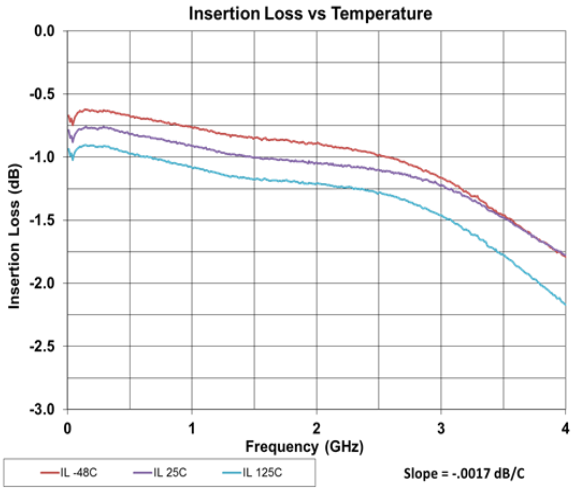
- ✓ **Low Loss: 1.0 dB @ 2 GHz; Isolation: 50 dB @ 2 GHz.**
- ✓ **Non Reflective Match in Off State (S22).**
- ✓ **NASA EEE-INST-002 compliant.**
- ✓ **Successfully Tested to 1M RAD TID.**
- ✓ **High Reliability Class B and S Screening Available.**
- ✓ **See Page 5 for MFR HI –REL Ordering Details.**

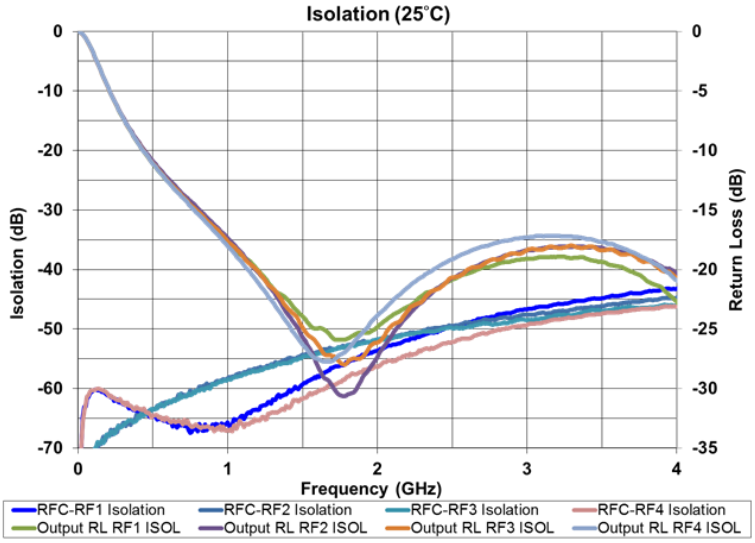
ELECTRICAL CHARACTERISTICS (+25°C)

Parameter	Conditions	Min	Typical	Max	Units
Insertion Loss	DC – 1.0 GHz 1.0 – 2.0 GHz 2.0 – 2.5 GHz 2.5 – 4.0 GHz		0.9 1.0 1.1 1.5	1.10 1.20 1.30 1.90	dB dB dB dB
RF1/RF2 Return Loss (ON-State)	0.02 – 2.0 GHz 2.0 – 3.0 GHz 3.0 – 4.0 GHz	19 15 12	22 22 18		dB dB dB dB
RF1/RF2 Return Loss (OFF-State)	0.02 – 0.1 GHz 0.1 – 0.5 GHz 0.5 – 2.0 GHz 2.0 – 3.0 GHz 3.0 – 4.0 GHz	0 5 9 12 12	0 8 11 15 15		dB dB dB dB
Isolation	DC – 1.0 GHz 1.0 – 2.0 GHz 2.0 – 2.5 GHz 2.5 – 4.0 GHz	45 40 35 33	55 50 45 38		dB dB dB dB
1 dB Input Compression (P1dB)	Vdd = 5V		+30		dBm
Third Order Output Intercept Point (IP3)	+7 dBm Input Tones, 1 MHz Spacing		+47		dBm
Switching Speed: (Rise/Fall) (ON/OFF)	 10/90% or 90/10% RF 50%CTL to 90/10% RF		 40 125		 nS nS

TYPICAL PERFORMANCE (+25°C)







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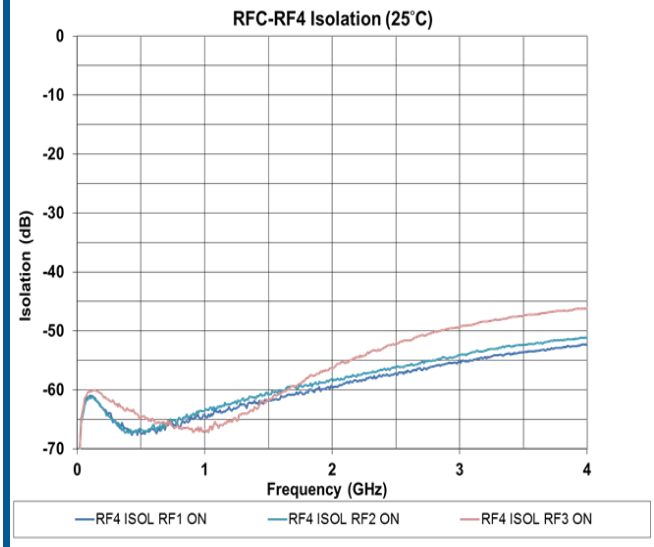
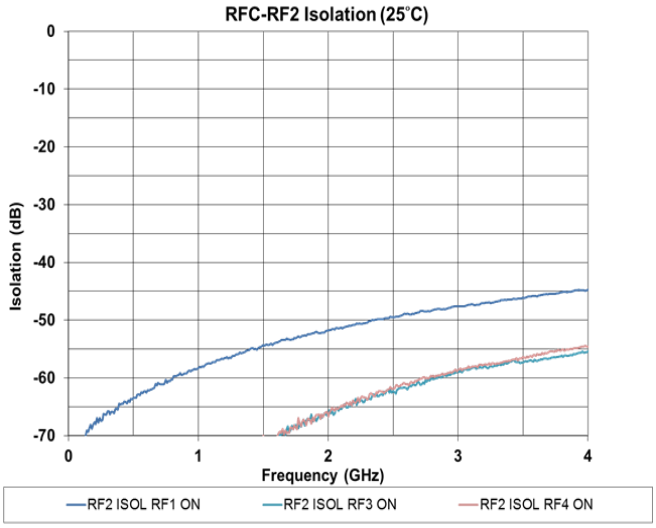
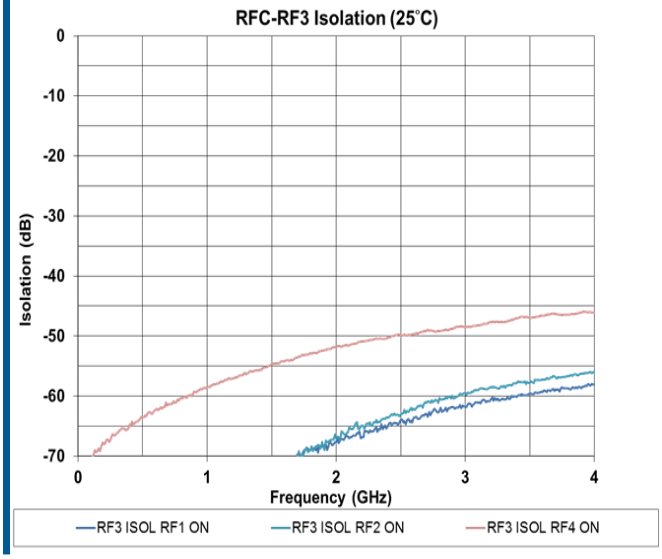
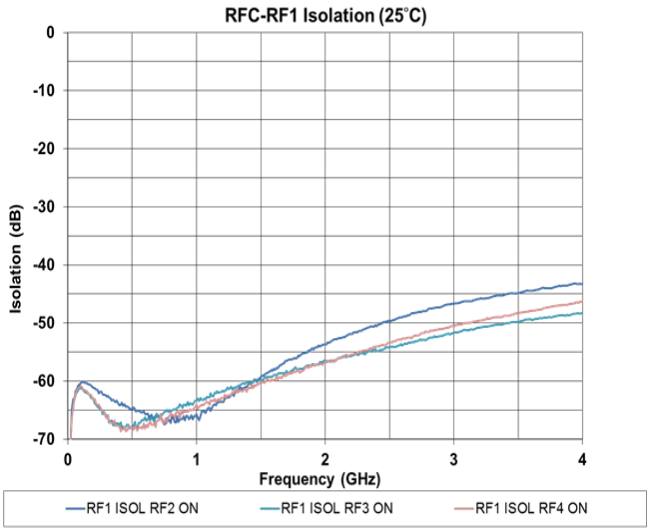








TRUTH TABLE/NEGATIVE CONTROL

RF Path "On"	Ctl 1	Ctl 2	Ctl 3	Ctl 4	Ctl 5	Ctl 6	Ctl 7	Ctl 8
RFC – RF1	0	-5	-5	0	-5	0	-5	0
RFC – RF2	-5	0	0	-5	-5	0	-5	0
RFC – RF3	-5	0	-5	0	0	-5	-5	0
RFC – RF4	-5	0	-5	0	-5	0	0	-5

TRUTH TABLE/POSITIVE CONTROL

RF Path "On"	Ctl 1	Ctl 2	Ctl 3	Ctl 4	Ctl 5	Ctl 6	Ctl 7	Ctl 8
RFC – RF1	+5	0	0	+5	0	+5	0	+5
RFC – RF2	0	+5	+5	0	0	+5	0	+5
RFC – RF3	0	+5	0	+5	+5	0	0	+5
RFC – RF4	0	+5	0	+5	0	+5	+5	0

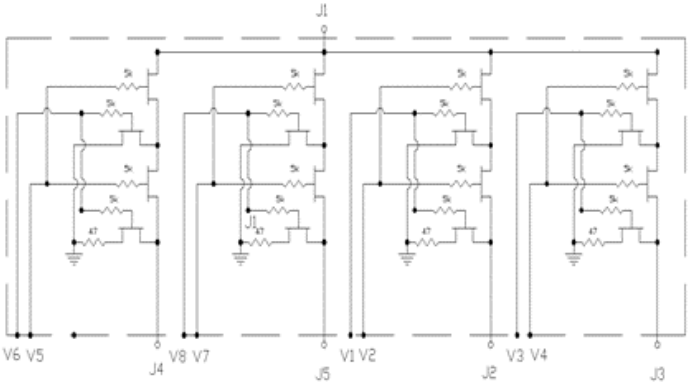
Note: External blocking capacitors are required on all RF ports for positive control operation. Capacitor should be selected to allow for low frequency operation.

ABSOLUTE MAXIMUM RATINGS

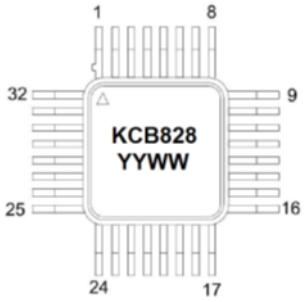
Exceeding Max limits may cause damage

Characteristic	Min.	Max.	Units
Control Voltage Positive control (0/+5)	-0.2	+9.0	Volts
Control Voltage (A+B) Negative Control (-5/0)	-9.0	+0.2	
RF Input Power		+30	dBm
Storage Temperature	-65	+150	°C
Operating Case Temp	-55	+125	°C
Junction Temperature		+175	°C

SCHEMATIC



PINOUT

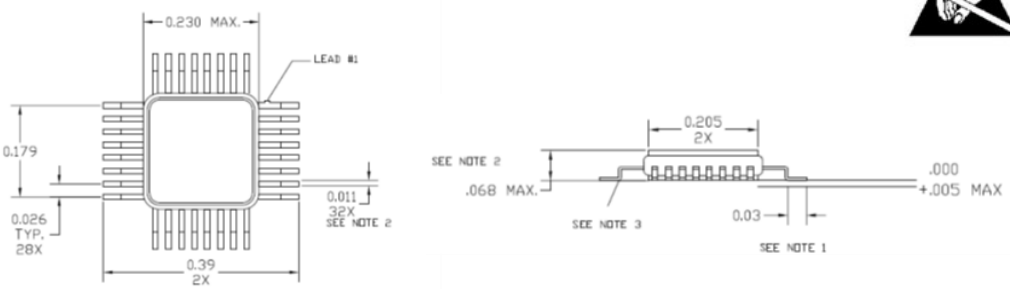


XXX = Serial number will be added for Class B and S Part numbers

1	GND	17	CTL8
2	GND	18	CTL7
3	GND	19	CTL6
4	RFC	20	CTL5
5	GND	21	CTL4
6	GND	22	CTL3
7	GND	23	CTL2
8	GND	24	CTL1
9	N/C	25	N/C
10	GND	26	GND
11	RF1	27	RF3
12	GND	28	GND
13	RF2	29	RF4
14	GND	30	GND
15	GND	31	GND
16	N/C	32	N/C

OUTLINE DRAWING

Dimensions are shown in inches.



Electrostatic Sensitive Device. Proper ESD precaution should be used when handling device.

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MFR HI-REL 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^{O}C	100%	100%
Burn In	1015	A	100%/160 Hours/125^{O}C	100%/240 Hours/125 ^{O}C
Final Electrical	Small Signal Testing	+25^{O}C	100%	100%
PDA Calculation	5004	25% Δ IL / 100% Δ Icc	5%	5%/3% functional
Group A Electrical /5	Per Product Specification	-55^{O}C + 125^{O}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 and Ic 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	KCB828C	KCB828B	KCB828S