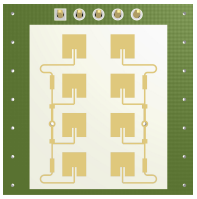
K-LC2 RADAR TRANSCEIVER

Product Information

Features

- 24 GHz K-band miniature I/Q transceiver
- 140MHz sweep FM input
- 2 x 4 patch antenna
- 2 balanced mixer with 50MHz bandwidth
- Excellent noise cancelling ability though I/Q technology
- Beam aperture 80°/34°
- 15dBm EIRP output power
- 25x25mm^2 surface, <6.5mm thickness
- Lowcost design



K-LC2 Actual Size

Applications

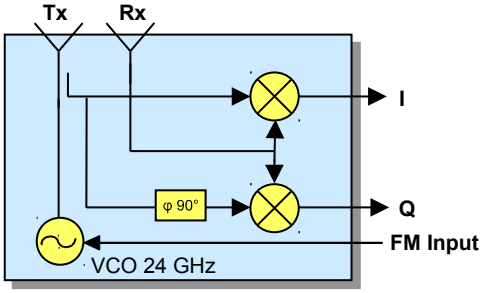
- Direction sensitive movement detectors
- Security systems
- Object speed measurement systems
- Simple ranging detection using FSK
- Industrial sensors

Description

K-LC2 is a 2 x 4 patch Doppler module with an asymmetrical beam for lowcost short distance applications. Its typical applications are movement sensors in the security and presence detection domain.
In building automation this module may be an alternative for infrared PIR or AIR systems thanks to its outstanding performance/cost ratio.

The module is extremely small and lightweight. With its IF bandwidth from DC to 50MHz it opens many new applications. FSK is possible thanks to the unique RFbeam oscillator design. This allows to use this lowcost module even in ranging applications.
Powerful starterkits (ST100 and ST200) with signal conditioning and visualization on the PC's are available.

Blockdiagram



Characteristics

Parameter	Conditions / Notes	Symbol	Min	Typ	Max	Unit
Operating conditions						
Supply voltage		V_{cc}	4.75	5.0	5.25	V
Supply current	VCO Pin open	I_{cc}		35	45	mA
VCO input voltage		U_{vco}	-0.5		2.0	V
VCO pin resistance	Driving voltage source Note 1	R_{vco}		570		Ω
Operating temperature		T_{op}	-20		+60	°C
Storage temperature		T_{st}	-20		+80	°C
Transmitter						
Transmitter frequency	VCO pin left open, T_{amb}=-20°C .. +60°C	f_{TX}	24.050	24.125	24.250	GHz
Frequency drift vs temperature	V_{cc}=5.0V, -20°C .. +60°C Note 2	Δf_{TX}		-0.9		MHz/°C
Frequency tuning range		Δf_{vco}		140		MHz
VCO sensitivity		S_{vco}		-55		MHz/V
VCO Modulation Bandwidth	Δf=20MHz	B_{VCO}		3		MHz
Output power	EIRP	P_{TX}	+12	+15	+17	dBm
Output power deviation	Full VCO tuning range	ΔP_{TX}			+/- 1	dBm
Spurious emission	According to ETSI 300 440	P_{spur}			-30	dBm
Turn-on time	Until oscillator stable, Δf_{TX} < 5MHz	t_{on}		1		µs
Receiver						
Mixer Conversion loss	f_{IF} = 1kHz, IF load = 1kΩ	D_{mixer1}		-6		dB
	f_{IF} = 20MHz, IF load = 50Ω	D_{mixer2}		-11		dB
Antenna Gain	F_{TX}=24.125GHz Note 3	G_{Ant}		8.6		dBi
Receiver sensitivity	f_{IF} =500Hz,B=1kHz,R_{IF} =1kΩ,S/N=6dB	P_{RX1}		-96		dBm
	f_{IF} =1MHz,B=20MHz,R_{IF} =50Ω,S/N=6dB	P_{RX1}		-84		dBm
Overall sensitivity	f_{IF} =500Hz,B=1kHz,R_{IF} =1kΩ,S/N=6dB	D_{system}		-111		dBc
IF output						
IF output resistance		R_{IF}		50		Ω
IF frequency range	-3dB Bandwidth, IF load = 50Ω	f_{IF}	0		50	MHz
IF noise power	f_{IF} =500Hz, IF load = 50Ω	$P_{IFnoise1}$		-134		dBm/Hz
	f_{IF} =1MHz, IF load = 50Ω	$P_{IFnoise2}$		-164		dBm/Hz
IF noise voltage	f_{IF} =500Hz, IF load = 1kΩ	$U_{IFnoise1}$		-147		dBV/Hz
	f_{IF} =500Hz, IF load = 1kΩ	$U_{IFnoise1}$		45		nV/√Hz
IF output offset voltage	Full VCO range, no object in range	U_{IF}	-200		200	mV
I/Q amplitude balance	f_{IF} =500Hz, U_{IF} = 1mVpp	ΔU_{IF}		3		dB
I/Q phase shift	f_{IF} = 1Hz - 20kHz	φ	80	90	100	°
Supply rejection	Rejection supply pins to IF output	D_{supply}		25		dB

Ordering Information

Part#: RFbeam K-LC2