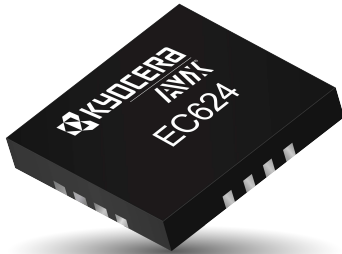


EC624 Active Steering™ Switch

Active Antenna Switch for High-Performance Wi-Fi Applications



KEY BENEFITS

- Higher throughput, longer range, and broader signal coverage
- More reliable connections and reduction of Wi-Fi “dead spots”
- Flexible antenna placement and seamless design integration
- Reduced system cost

FEATURES

- High Performance RF Tuning Switch**
- High Linearity Shuntless SP4T

- Active Steering Technology**
- Real-time optimization of Wi-Fi radio link performance
 - Up to 3dB improvement in radio link signal gain
 - Per-antenna / per-client / per-packet optimization

- Designed for High-Performance Wi-Fi Devices**
- Up to 8x8 MIMO support with EC477 Active Steering Processor

- Data-Over-Coax (DOC) Interface**
- Flexible antenna placement with optimal cost
 - Allows any combination of active + passive antennas in system design

- Small Footprint:**
- 16-pin FC LGA package
 - 2.0 x 2.0 mm Package Size

OVERVIEW

KYOCERA AVX’s EC624 Active Antenna Switch enables the “2x” performance and efficiency gains of Active Steering on a per-antenna basis. The EC624 works in conjunction with the EC477 Active Steering Processor to deliver the benefits of Wi-Fi Active Steering in a BOM efficient-solution and enables optimal antenna placement within the device for access point, gateway and client applications.

APPLICATIONS

- Access Points
- Set-top Boxes
- Wi-Fi Clients
- Wi-Fi Extenders
- Smart Appliances

TECHNOLOGY ADVANTAGES

The EC624 acts as a slave device to the EC477 Active Steering Processor to deliver real-time Wi-Fi radio link optimization for access point, gateway, and client applications. The EC624 performs the switching function to steer the Active Steering Antenna radiation pattern in order to maximize Wi-Fi radio link gain and performance. KYOCERA AVX patented Active Steering technology enables up to 3 dB radio link signal gain on a per-antenna basis to maximize throughput and coverage, and is additive to performance gains realized via Wi-Fi MIMO and beamforming techniques. In addition, KYOCERA AVX Active Steering Technology provides solution scalability to support next-generation 802.11ax applications.

DESIGN ADVANTAGES

The EC624 supports Ethertronics’ Data-Over-Coax (DOC) interface, which allows Active Steering signaling on the same physical cable as the primary RF feed without impacting the main Wi-Fi radio signal. The DOC interface eliminates the need for custom connectors and cables, which reduces the system bill of materials, enables easier placement of off-PCB antennas, and provides seamless integration of any combination of Active and passive antennas into device designs.

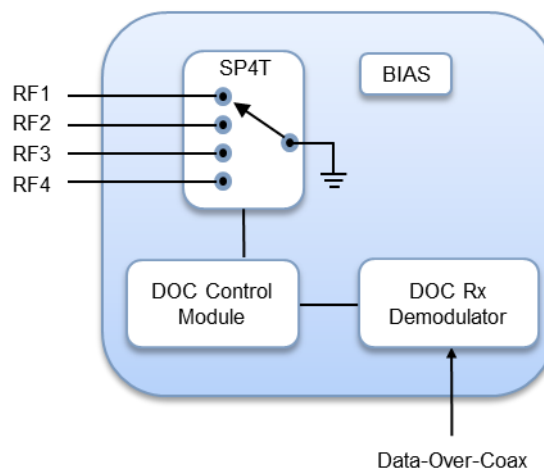


Figure 1: EC624 Block Diagram

*Preliminary information subject to change

Specifications

Table 1: Electrical Specifications @ 25° C, VDD = 2.6V

Parameter	Symbol	Minimum	Typical	Maximum	Units	Conditions
SP4T						
Operating Frequency	f_0	100		7000	MHz	
R_{ON}^1	R_{ON}		4		Ω	Any RF Port
C_{OFF}^1	C_{OFF}		180		fF	Any RF Port, measured at 2.4 GHz
Second Harmonic $2f_0^2$	$2f_0$		-87	-37	dBm	Pin +20 dBm, 2.535 GHz
			-87	-37	dBm	Pin +20 dBm, 5.15 GHz
Third Harmonic $3f_0^2$	$3f_0$		-85	-37	dBm	Pin +20 dBm, 2.535 GHz
			-88	-37	dBc	Pin +20 dBm, 5.15 GHz
IMD3 @ 950 MHz ² (Third Order Intermodulation Distortion)	IMD ₃ LB			-60	dBc	Two tones @ +7 dBm each, spaced by 100 MHz
	IMD ₃ HB			-70	dBc	Two tones @ +17 dBm each, spaced by 150 MHz
Switching Time	t_{SW}			500	ns	
DOC_{ET} Receiver						
Nominal Carrier Frequency	F_c		240		MHz	
Modulation	Mod		OOK			
Baud Rate	BR		15		MBPS	
Bit Error Rate	BER			1×10^{-4}		At reference sensitivity
Reference Sensitivity	MDS		80		mVpp	Carrier on voltage level
802.11AC Interference Rejection ⁴	IR _{11AC}	TBD			mVpp	To maintain BER at MDS At any 802.11AC frequency
Probability of False Alarm	P_{FA}			1×10^{-4}		Uncorrelated in band interferer at MDS

Note 1:

- Derived as real (R_{ON}) and XC (C_{OFF}) part of S11 measurement.

Note 2:

- Reflected harmonics and IMD products.
- Measured equivalent to a 50 ohm through device.

Note 3:

- Time for RF envelope to transition from within 10% of its initial value, to within 10% of its final value.

Note 4:

- Residual level after application circuit rejection (nominally 40 dB)

*Preliminary information subject to change

Table 2: Operating Ranges

Parameter ⁴	Symbol	Minimum	Typical	Maximum	Unit	Conditions
Supply Voltage	V _{DD}	2.4	2.6	2.8	V	Supplied through DOC _{ET} Input
Power Supply Current	I _{DD}	1.95	2.3	2.67	mA	
Operating Temperature	T _{OP}	-30		+75	°C	
Storage Temperature	T _{ST}	-65		+150	°C	

Table 3: Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit	Conditions
Supply Voltage	V _{DD}	-0.3	5	V	
ESD Voltage (HBM, MIL)	HBM		1000	V	

*Preliminary information subject to change

Figure 2: Pin Configuration (Top View)

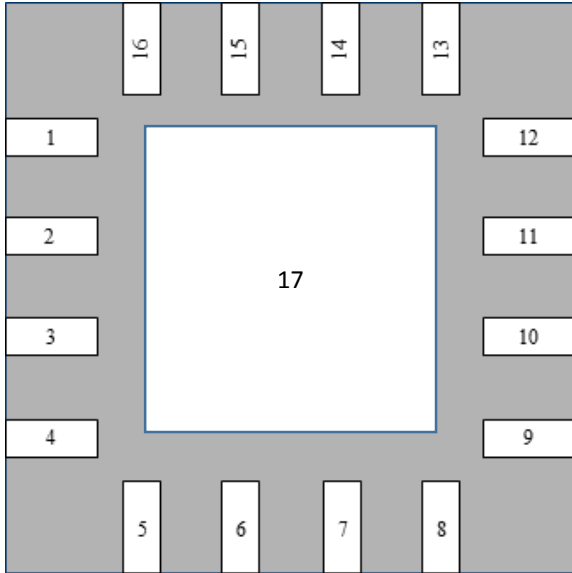


Table 4: EC624 Pin Description

Pin #	Pin Name	Pin Type	Description
1	GND	Ground	Ground
2	RSV1	Reserved	Ground in Application
3	RSV2	Reserved	Ground in Application
4	RSV3	Reserved	Do Not Connect
5	RES	Input	Bias Resistor
6	RSV4	Reserved	Do Not Connect
7	POR	Input	Time Constant Cap
8	RXIN_N	DOC Input	Ground in Application
9	RXIN_P	DOC Input	DOC Input
10	VDD	Power	Power Supply
11	RSV5	Reserved	Do Not Connect
12	GND	Ground	Ground
13	RF3	Input	RF Input 4
14	RF2	Input	RF Input 3
15	RF1	Input	RF Input 2
16	RF0	Input	RF Input 1
Paddle	GND	RF/DIG GND	Ground

Table 5: EC624 Mechanical Overview

Size	2.0 mm x 2.0 mm x 0.7 mm
Mounting	Surface Mount
Packaging	FC LGA, Tape & Reel

*Preliminary information subject to change

Figure 4: Product Marking Code

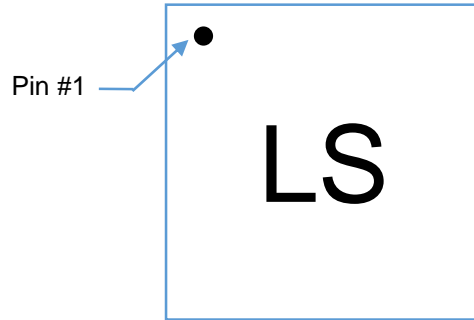


Table 7: EC624 Ordering Information

Order Code	Package	Shipping Method
EC624	16-Lead SMT 2.0 X 2.0 X 0.7 mm	3000 Units/T&R

*Preliminary information subject to change

Reference and Evaluation Boards

Evaluation Boards and Example Board Layouts are available upon request. Please contact an KYOCERA AVX representative for further information.

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