

CXM3572ER

Description

The CXM3572ER is a SP10T antenna switch module for GSM/UMTS/CDMA/LTE multi-mode handset. The CXM3572ER has a built-in dual low pass filter and a +1.8 V CMOS compatible decoder. The Sony GaAs junction gate pHEMT (JPHEMT) MMIC process is used for low insertion loss and high linearity. The device has low BOM with no DC blocking Capacitor.

Features

- Low Insertion Loss: 0.45 dB (Typ.) TRx (Cellular Band)
0.60 dB (Typ.) TRx (IMT Tx Band)
- High Linearity: IIP3 = 68 dBm
- Low Voltage Operation: $V_{DD} = 2.5$ V
- No DC Blocking Capacitors (Except sourcing DC bias)
- Small Package Size: VQFN-24P (2.4 mm × 3.2 mm × 0.85 mm Max.)
- Lead-Free and RoHS Compliant

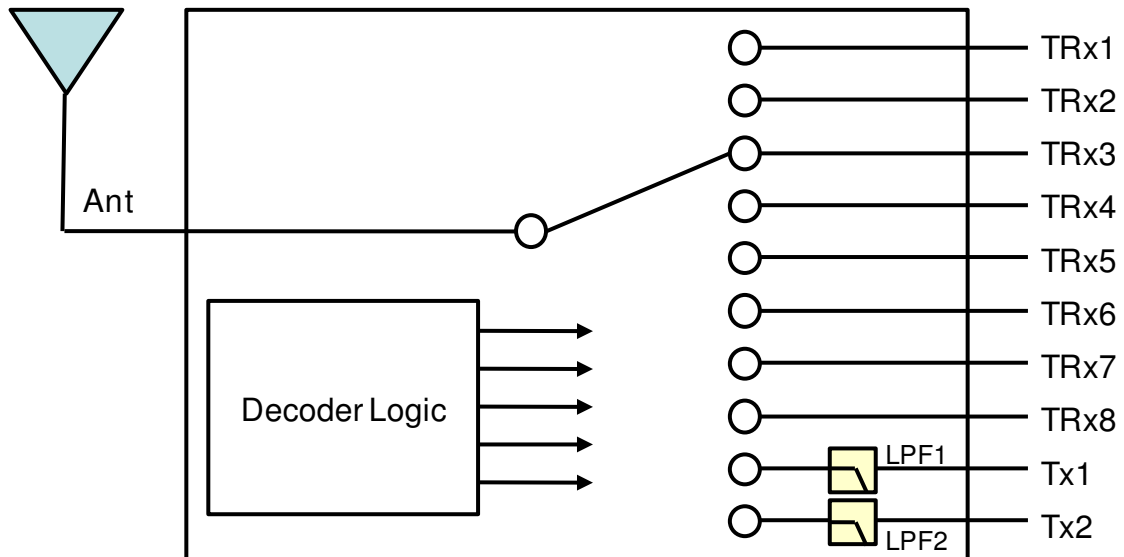
Structure

GaAs Junction Gate pHEMT (JPHEMT) MMIC Switch, CMOS Decoder

Absolute Maximum Ratings

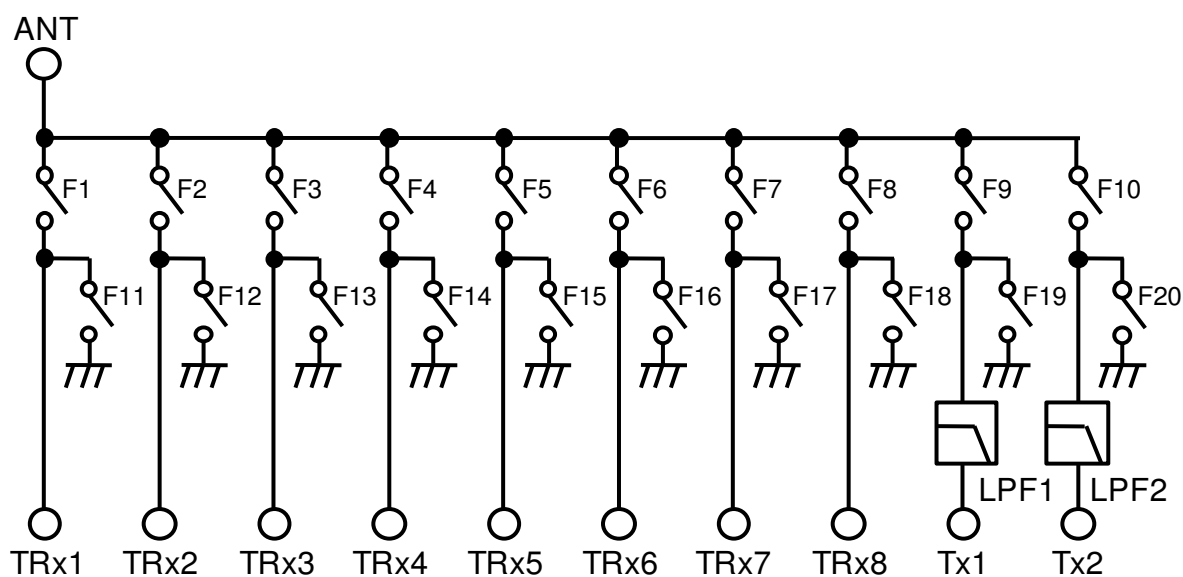
◆ Supply voltage	V_{DD}	6	V	(Ta = 25 °C)
◆ Control voltage	V_{ctl}	4	V	(Ta = 25 °C)
◆ Maximum input	[Tx1]	36	dBm	(Duty cycle = 12.5 % to 50 %) (Ta = 25 °C)
	[Tx2]	34	dBm	(Duty cycle = 12.5 % to 50 %) (Ta = 25 °C)
	[TRx]	32	dBm	(Ta = 25 °C)
◆ Operating temperature	Topr	−35 to +90	°C	
◆ Storage temperature	Tstg	−65 to +150	°C	

This IC is ESD sensitive device. Special handling precautions are required.

Block Diagram**SP10T Antenna Switch Module**

Block Diagram

SP10T 8TRx/2Tx

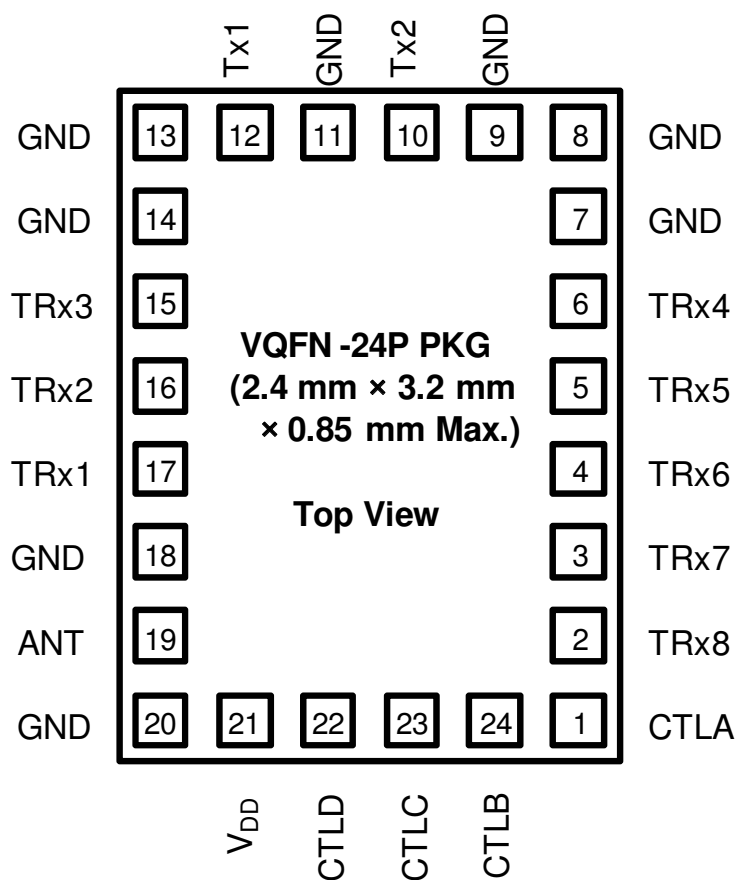


Truth Table

State	Active Path	CTL state				SW state(*1)																			
		CLTA	CTLB	CLTC	CLTD	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20
1	TRx1	L	L	H	L	H	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H
2	TRx2	H	L	H	L	L	H	L	L	L	L	L	L	L	L	H	L	H	H	H	H	H	H	H	H
3	TRx3	H	H	H	L	L	L	H	L	L	L	L	L	L	L	H	H	L	H	H	H	H	H	H	H
4	TRx4	H	L	H	H	L	L	L	H	L	L	L	L	L	L	H	H	H	L	H	H	H	H	H	H
5	TRx5	H	H	H	H	L	L	L	L	H	L	L	L	L	L	H	H	H	H	L	H	H	H	H	H
6	TRx6	H	L	L	H	L	L	L	L	L	H	L	L	L	L	H	H	H	H	H	L	H	H	H	H
7	TRx7	L	H	H	L	L	L	L	L	L	L	H	L	L	L	H	H	H	H	H	H	L	H	H	H
8	TRx8	L	H	L	L	L	L	L	L	L	L	L	H	L	L	H	H	H	H	H	H	H	L	H	H
9	Tx1	H	H	L	L	L	L	L	L	L	L	L	L	H	L	H	H	H	H	H	H	H	L	H	H
10	Tx2	H	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	L

(*1) State "L" means a switch "OFF", State "H" means a switch "ON"

Pin Configuration



DC Bias Conditions

(Ta = 25 °C)

Item	Min.	Typ.	Max.	Unit
V _{DD}	2.5	2.8	5.0	V
V _{ctl} (H)	1.35	1.8	3.3	V
V _{ctl} (L)	0	—	0.45	V

Electrical Characteristics

 $V_{DD} = 2.5\text{ V}$, $T_a = 25\text{ }^{\circ}\text{C}$

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	IL	ANT - TRx1	*1, *2, *3, *11	-	0.45	0.55	dB
			*4	-	0.54	0.69	
			*5, *12	-	0.58	0.73	
			*6	-	0.64	0.79	
			*7, *8	-	0.85	1.05	
		ANT - TRx2	*1, *2, *3, *11	-	0.45	0.55	
			*4	-	0.54	0.69	
			*5, *12	-	0.58	0.73	
			*6	-	0.62	0.77	
			*7, *8	-	0.75	0.95	
		ANT - TRx3	*1, *2, *3, *11	-	0.47	0.57	
			*4	-	0.54	0.69	
			*5, *12	-	0.58	0.73	
			*6	-	0.61	0.76	
			*7, *8	-	0.75	0.95	
		ANT - TRx4	*1, *2, *3, *11	-	0.49	0.59	
			*4	-	0.55	0.70	
			*5, *12	-	0.59	0.74	
			*6	-	0.61	0.76	
			*7, *8	-	0.73	0.93	
		ANT - TRx5	*1, *2, *3, *11	-	0.47	0.57	
			*4	-	0.54	0.69	
			*5, *12	-	0.58	0.73	
			*6	-	0.61	0.76	
			*7, *8	-	0.75	0.95	
		ANT - TRx6	*1, *2, *3, *11	-	0.47	0.57	
			*4	-	0.54	0.69	
			*5, *12	-	0.58	0.73	
			*6	-	0.61	0.76	
			*7, *8	-	0.75	0.95	
		ANT - TRx7	*1, *2, *3, *11	-	0.55	0.65	
			*4	-	0.65	0.80	
			*5, *12	-	0.70	0.85	
			*6	-	0.75	0.90	
			*7, *8	-	1.00	1.20	
		ANT - TRx8	*1, *2, *3, *11	-	0.55	0.65	
			*4	-	0.64	0.79	
			*5, *12	-	0.68	0.83	
			*6	-	0.73	0.88	
			*7, *8	-	0.95	1.15	
		ANT - Tx1	*8	-	1.20	1.30	
		ANT - Tx2	*9	-	1.27	1.42	

$V_{DD} = 2.5 \text{ V}$, $T_a = 25^\circ \text{C}$

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
Isolation	ISO.	Tx1 - TRx1, 2, 3, 4, 5, 6 (Tx1 Active)	*9	33	-	-	dB
		Tx1 - TRx7, 8 (Tx1 Active)		40	-	-	
		Tx2 - TRx1, 2, 3, 4, 5, 6 (Tx2 Active)	*10	28	-	-	
		Tx2 - TRx7, 8 (Tx2 Active)		40	-	-	
		TRx1 - TRx4, 5, 6, 7, 8 (The input port is Active)	*1, *2, *3, *11	33	-	-	
			*4, *5, *6, *12	27	-	-	
		TRx2, 3 - TRx4, 5, 6, 7, 8 (The input port is Active)	*1, *2, *3, *11	40	-	-	
			*4, *5, *6, *12	33	-	-	
		TRx5 - TRx1, 2, 3 (TRx5 Active)	*7, *8	26	-	-	
		TRx1 - TRx2 (TRx1, 2 Active)	*1, *2, *3, *11	29	-	-	
			*4, *5, *6, *12	19	-	-	
		TRx1 - TRx3 (TRx1, 3 Active)	*1, *2, *3, *11	36	-	-	
			*4, *5, *6, *12	26	-	-	
		TRx2 - TRx3 (TRx2, 3 Active)	*1, *2, *3, *11	28	-	-	
			*4, *5, *11	19	-	-	
		TRx4 - TRx5 (TRx4, 5 Active)	*1, *2, *3, *11	26	-	-	
			*4, *5, *6, *12	18	-	-	
			*7, *8	16	-	-	
		TRx4 - TRx6 (TRx4, 6 Active)	*1, *2, *3, *11	33	-	-	
			*4, *5, *6, *12	24	-	-	
		TRx4 - TRx7, 8 (TRx4, 7, 8 Active)	*1, *2, *3, *11	35	-	-	
			*4, *5, *6, *12	30	-	-	
		TRx5 - TRx6 (TRx4, 5 Active)	*1, *2, *3, *11	25	-	-	
			*4, *5, *6, *12	18	-	-	
			*7, *8	15	-	-	
		TRx5 - TRx7, 8 (TRx5, 7, 8 Active)	*1, *2, *3, *11	30	-	-	
			*4, *5, *6, *12	25	-	-	
		TRx7 - TRx 8 (TRx7, 8 Active)	*1, *2, *3, *10	25	-	-	
			*4, *5, *6, *12	18	-	-	

$V_{DD} = 2.5 \text{ V}$, $T_a = 25^\circ \text{C}$

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit
VSWR	VSWR	ANT - Tx1	824 to 915 MHz	-	-	2.00	-
		ANT - Tx2	1710 to 1910 MHz	-	-	1.50	
		ANT - TRx1, 2, 3, 4, 5, 6, 7, 8	600 to 2170 MHz	-	-	1.50	
Harmonics	2fo	ANT - TRx1, 2, 3, 4, 5, 6, 7, 8	*3, *4, *5	-	-	-40	dBm
	3fo			-	-	-40	
	2fo	ANT - Tx1	*9	-	-	-36	
	3fo			-	-	-36	
	2fo	ANT - Tx2	*10	-	-	-36	
	3fo			-	-	-36	
Attenuation	ATT	Tx1 - ANT	1648 to 1830 MHz	25	-	-	dB
			2472 to 2745 MHz	25	-	-	
			3290 to 4120 MHz	20	-	-	
			4120 to 6405 MHz	14	-	-	
			6405 to 10000 MHz	20	-	-	
			10000 to 12750 MHz	15	-	-	
		Tx2 - ANT	3420 to 3820 MHz	25	-	-	
			5130 to 5730 MHz	25	-	-	
			6840 to 12750 MHz	20	-	-	
Inter Modulation Product Power in Rx Band	IMD2	ANT - TRx1, 2, 3, 4, 5, 6, 7, 8	*13, *26, *27	-	-	-105	dBm
	IMD3		*13, *28, *29	-	-	-105	
	IMD2	ANT - TRx1, 2, 3, 4, 5, 6	*13,*14,*15,*18,*19,*22,*23	-	-	-105	
	IMD3		*13,*16,*17,*20,*21,*24,*25	-	-	-105	
	IMD2	ANT - TRx7, 8	*13,*14,*15,*18,*19,*22,*23	-	-	-99	
	IMD3		*13,*16,*17,*20,*21,*24,*25	-	-	-105	
Input IIP3	IIP3	ANT - TRx1, 2, 3, 4, 5, 6, 7, 8	*13, *30, *31	-	68	-	μs
Switching Time	T_s	Active mode	50 % Ctl to 90 % RF	-	3	5	
Strat UP Time	T_{st}		$V_{DD} = 0$ to 2.8 V	-	6	50	
Control Current	I_{ctl}		$V_{ctl} = 1.8 \text{ V}$	-	1	5	
Supply Current	I_{dd}	Active mode	$V_{DD} = 2.8 \text{ V}$	-	0.23	0.40	mA

Electrical Characteristics are measured with all RF ports terminated in 50 Ω .

Corresponding Band of TRx (UMTS / CDMA)

- *1 Pin = 26 dBm, 452 to 468 MHz (Band Class 5)
- *2 Pin = 25 dBm, 704 to 787 MHz (Band 13, Band 17)
- *3 Pin = 26 dBm, 824 to 960 MHz (Band 5, Band 8)
- *4 Pin = 26 dBm, 1428 to 1511 MHz (Band 11, Band 21)
- *5 Pin = 26 dBm, 1710 to 1990 MHz (Band 1 Tx, Band 2 Tx, Band 3 Tx, Band4 Tx)
- *6 Pin = 10 dBm, 2110 to 2170 MHz (Band 1 Rx, Band 4 Rx)
- *7 Pin = 26 dBm, 2300 to 2400 MHz (Band 40)
- *8 Pin = 26 dBm, 2500 to 2690 MHz (Band 7)
- *9 Pin = 35 dBm, 824 to 915 MHz (GSM850/900 Tx)
- *10 Pin = 32 dBm, 1710 to 1910 MHz (GSM1800/1900 Tx)
- *11 Pin = 10 dBm, 869 to 960 MHz (GSM850/900 Rx)
- *12 Pin = 10 dBm, 1805 to 1990 MHz (GSM1800/1900 Rx)

*13 Measured with the recommended circuit 1

