SONY

High Power DP3T Switch with Logic Control

CXM3513ER

Description

The CXM3513ER can be used in wireless communication systems, for example, triple-band W-CDMA handsets. This IC has a decoder with 3 CMOS control inputs. The Sony JPHEMT process is used for low insertion loss and low distortion characteristic.
(Applications: Antenna switch for cellular handsets, triple-band W-CDMA)

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Features

- ◆ Low insertion loss: 0.36dB @900MHz, 0.43dB @1.95GHz
- ◆ 3 CMOS compatible control lines

Package

Small package size: 20-pin VQFN (2.4mm × 3.2mm × 0.9mm)

Structure

GaAs JPHEMT MMIC

Absolute Maximum Ratings

(Ta = 25℃)

◆ Bias voltage	V_{DD}	7	V
◆ Control voltage	Vctl	5	V
◆ Operating temperature	Topr	–35 to +85	℃
◆ Storage temperature	Tstg	–65 to +150	℃

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

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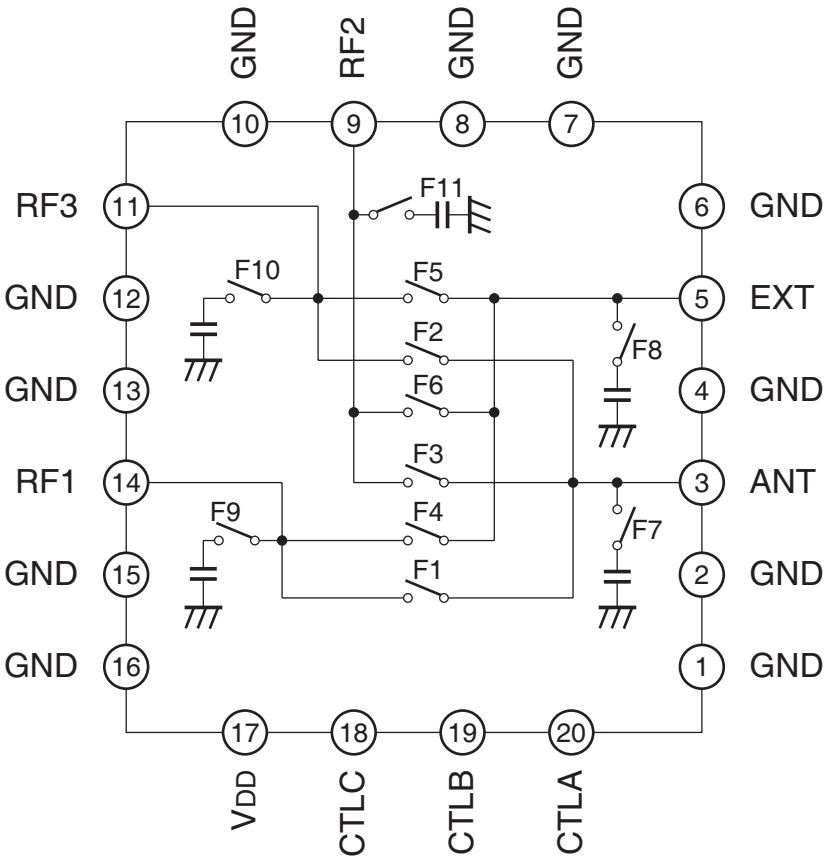
Block Diagram and Pin Configuration



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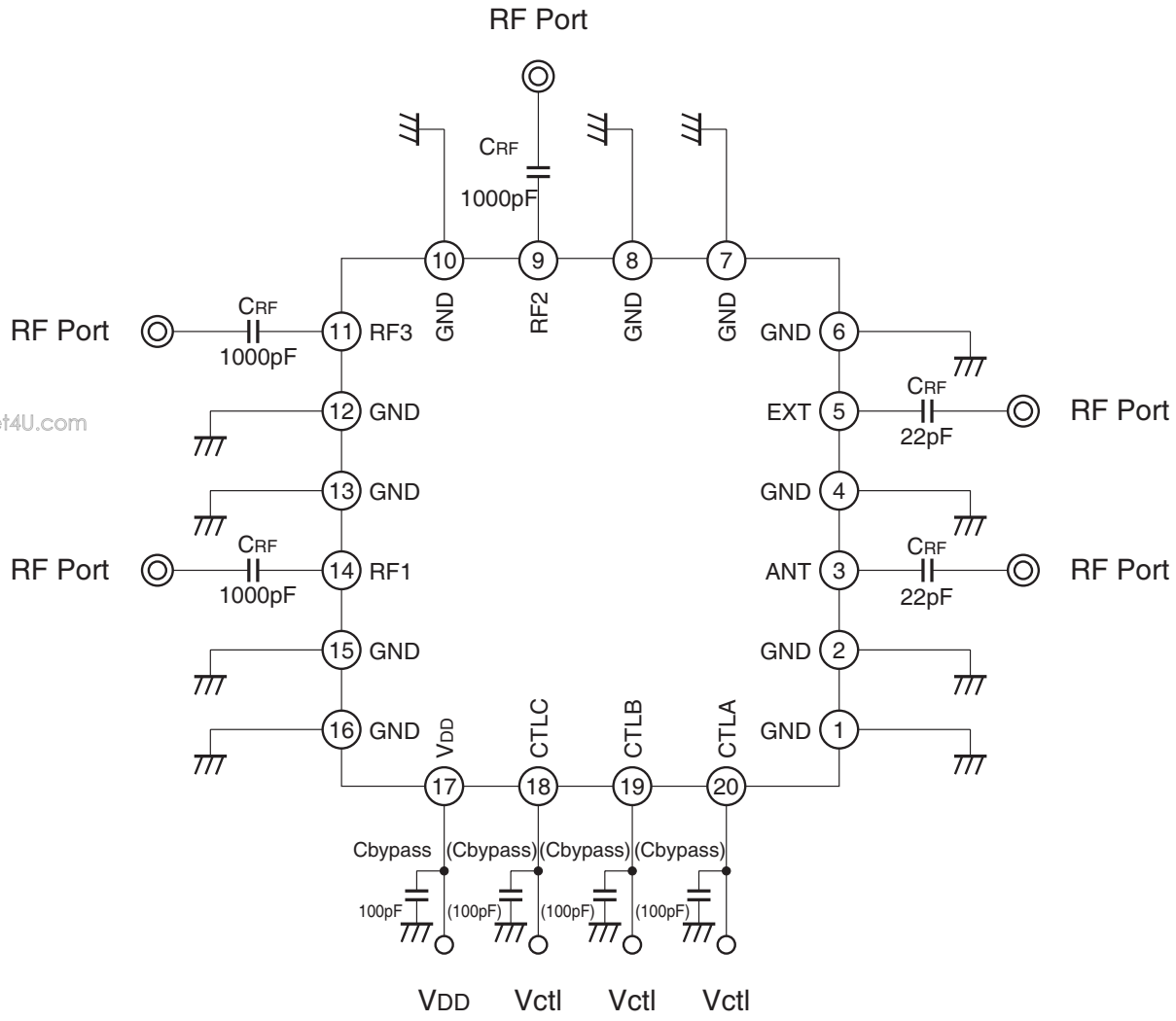
Recommended Circuit



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When using this IC, the following external components should be used:

CRF: This capacitor is used for RF decoupling and must be used for all applications.

Cbypass: This capacitor is used for DC line filtering.

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Truth Table

State	CTL A	CTL B	CTL C	Mode	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
1	H	L	L	ANT-RF3	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
2	L	L	L	EXT-RF3	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON
3	H	L	H	ANT-RF2	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
4	L	L	H	EXT-RF2	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON	OFF
5	H	H	L	ANT-RF1	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
6	L	H	L	EXT-RF1	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	ON

DC Bias Conditions

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(Ta = –35 to +85°C)

Item	Min.	Typ.	Max.	Unit
Vctl (H)	1.44	1.85	V_{DD}	V
Vctl (L)	0	—	0.3	V
V_{DD}	2.7	2.85	3.2	V

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Electrical Characteristic

(Ta = 25℃, V_{DD} = 2.85V)

Item	Symbol	State	Condition	Min.	Typ.	Max.	Unit
Insertion Loss	IL	ANT-RF1	830 to 885MHz		0.36	0.56	dB
		EXT-RF1	830 to 885MHz		0.36	0.56	dB
		ANT-RF2	1750 to 1880MHz		0.39	0.64	dB
		EXT-RF2	1750 to 1880MHz		0.40	0.65	dB
		ANT-RF3	1920 to 2170MHz		0.43	0.68	dB
		EXT-RF3	1920 to 2170MHz		0.45	0.70	dB
Isolation	ISO	ANT-RF1	830 to 885MHz	25	30		dB
		EXT-RF1	830 to 885MHz	28	33		dB
		ANT-RF2	1750 to 1880MHz	28	33		dB
		EXT-RF2	1750 to 1880MHz	25	30		dB
		ANT-RF3	1920 to 2170MHz	24	29		dB
		EXT-RF3	1920 to 2170MHz	24	29		dB
VSWR	VSWR	ANT	50Ω		1.1	1.4	—
		EXT	50Ω		1.1	1.4	—
1dB compression input power	P1dB		V_{DD} = 2.85V		32		dBm
Switching speed	TSW				5	10	us
ACLR	ACLR1		±5MHz, 3.84MHz BW, *1, *2, *3		–60	–50	dBc
	ACLR2		±10MHz, 3.84MHz BW, *1, *2, *3		–65	–55	dBc
Harmonics	2fo		*1, *2, *3		–90	–70	dBc
	3fo		*1, *2, *3		–90	–70	dBc
Bias current	Idd		V_{DD} = 2.85V		105	210	μA
Control current	Ictl		Vctl (H) = 2.85V		0.1	5	μA
IMD2	IMD2_1_1	ANT-RF1	fud = fRx – fTx, *4		–107	–97	dBm
		EXT-RF1	fud = fRx – fTx, *4		–105	–95	dBm
	IMD2_1_2	ANT-RF2	fud = fRx – fTx, *5		–105	–95	dBm
		EXT-RF2	fud = fRx – fTx, *5		–105	–95	dBm
	IMD2_1_3	ANT-RF3	fud = fRx – fTx, *6		–110	–100	dBm
		EXT-RF3	fud = fRx – fTx, *6		–107	–97	dBm
	IMD2_2_1	ANT-RF1	fud = fRx + fTx, *4		–115	–105	dBm
		EXT-RF1	fud = fRx + fTx, *4		–115	–105	dBm
	IMD2_2_2	ANT-RF2	fud = fRx + fTx, *5		–115	–105	dBm
		EXT-RF2	fud = fRx + fTx, *5		–110	–100	dBm
	IMD2_2_3	ANT-RF3	fud = fRx + fTx, *6		–115	–105	dBm
		EXT-RF3	fud = fRx + fTx, *6		–110	–100	dBm

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Item	Symbol	State	Condition	Min.	Typ.	Max.	Unit
IMD3	IMD3_1_1	ANT-RF1	fud = 2 × fTx – fRx, *4		–107	–97	dBm
		EXT-RF1	fud = 2 × fTx – fRx, *4		–107	–97	dBm
	IMD3_1_2	ANT-RF2	fud = 2 × fTx – fRx, *5		–107	–97	dBm
		EXT-RF2	fud = 2 × fTx – fRx, *5		–107	–97	dBm
	IMD3_1_3	ANT-RF3	fud = 2 × fTx – fRx, *6		–107	–97	dBm
		EXT-RF3	fud = 2 × fTx – fRx, *6		–107	–97	dBm
	IMD3_2_1	ANT-RF1	fud = 2 × fTx + fRx, *4		–110	–100	dBm
		EXT-RF1	fud = 2 × fTx + fRx, *4		–110	–100	dBm
	IMD3_2_2	ANT-RF2	fud = 2 × fTx + fRx, *5		–110	–100	dBm
		EXT-RF2	fud = 2 × fTx + fRx, *5		–110	–100	dBm
	IMD3_2_3	ANT-RF3	fud = 2 × fTx + fRx, *6		–110	–100	dBm
		EXT-RF3	fud = 2 × fTx + fRx, *6		–110	–100	dBm

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*1 Pin = 25dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, 830 to 840MHz

*2 Pin = 25dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, 1750 to 1785MHz

*3 Pin = 25dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, 1920 to 1980MHz

*4 Pin = 20dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, fTx = 830 to 840MHz, Pin = –15dBm, fRx = 875 to 885MHz

*5 Pin = 20dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, fTx = 1750 to 1785MHz, Pin = –15dBm, fRx = 1845 to 1880MHz

*6 Pin = 20dBm, Vctl = 0/1.85V, V_{DD} = 2.85V, fTx = 1920 to 1980MHz, Pin = –15dBm, fRx = 2110 to 2170MHz

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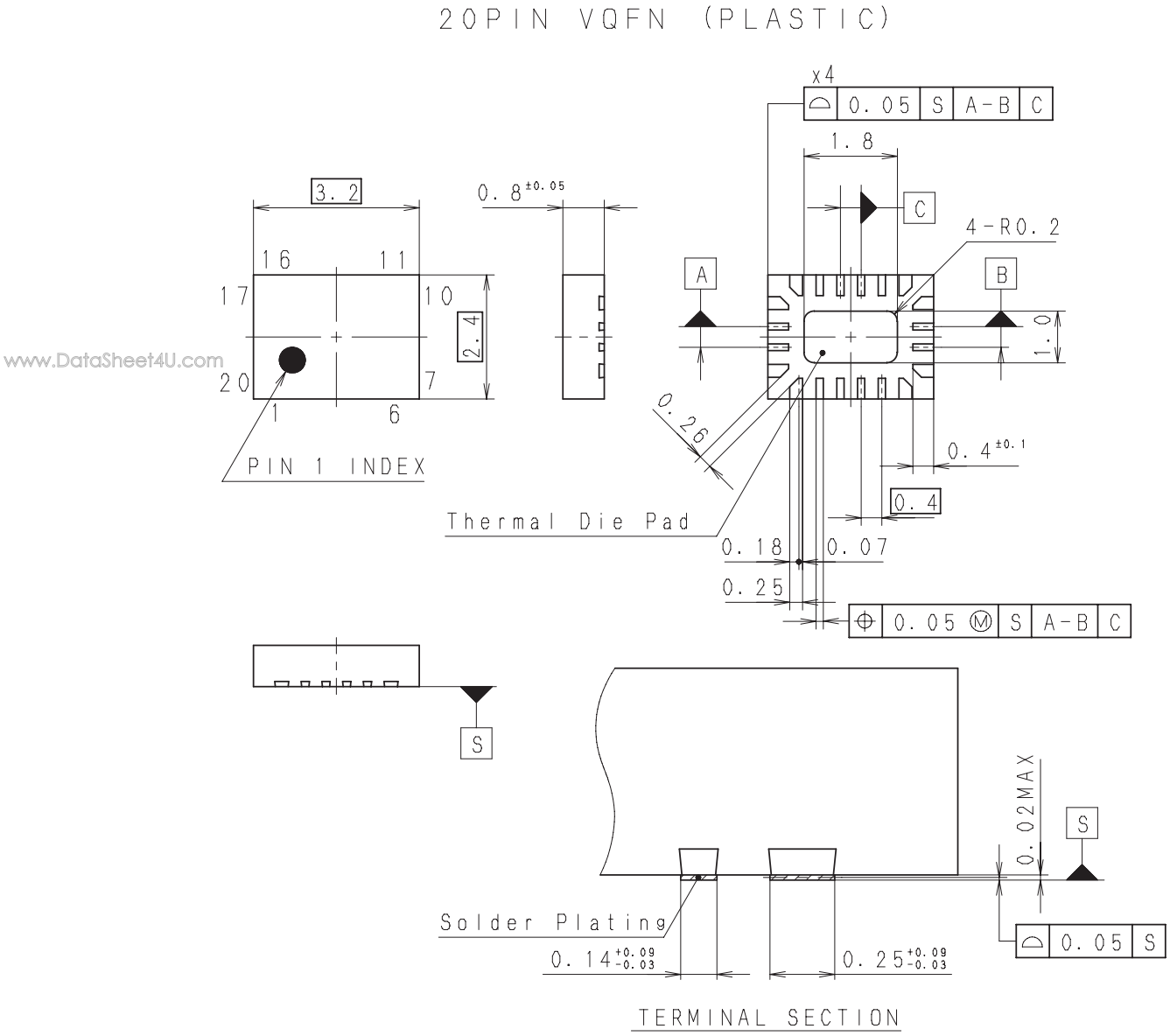
Package Outline

(Unit: mm)



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Note:Cutting burr of lead are 0.05mm MAX.

SONY CODE	VQFN-20P-03
JEITA CODE	————
JEDEC CODE	————

AP-4000-20020S Rev. 0

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.02g

LEAD PLATING SPECIFICATIONS

ITEM	SPEC.
LEAD MATERIAL	COPPER ALLOY
SOLDER COMPOSITION	Sn-Bi Bi:1-4wt%
PLATING THICKNESS	5-18µm

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