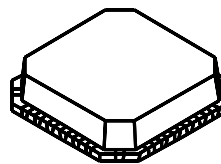


High Power 6 × 4 Antenna Switch MMIC with Integrated Control Logic for PDC Full Packet

Description

The CXG1125ER is a high power antenna switch MMIC for PDC dual 800MHz and 1.5GHz. This IC is suited to connect 2Tx/3Rx to one of 4 antennas equipped with full packet mode. The CXG1125ER has on-chip logic circuit for operation with 6 CMOS inputs. The Sony's GaAs J-FET process is used for low insertion loss and low voltage operation.

24 pin VQFN (Plastic)



Features

- Low insertion loss: 0.5dB @900MHz, 0.7dB @1.5GHz
- High linearity: Harmonic < -65dBc
- CMOS compatible input control
- Small package: 24-pin VQFN (4.0mm × 4.0mm)

Applications

6 × 4 antenna switch for digital cellular such as PDC handsets

Structure

GaAs J-FET MMIC

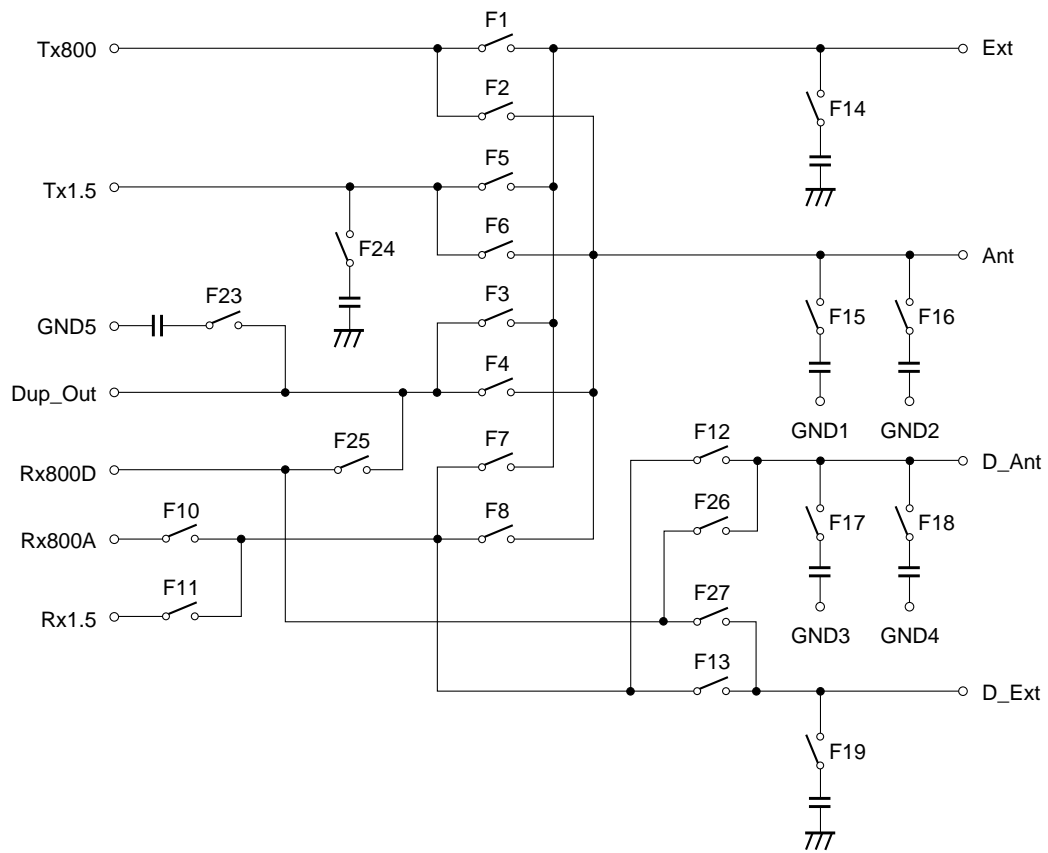
Absolute Maximum Ratings (Ta = 25°C)

• Bias voltage	V _{DD}	7	V
• Control voltage	V _{ctl}	5	V
• Operating temperature	T _{opr}	-35 to +85	°C
• Storage temperature	T _{stg}	-65 to +150	°C

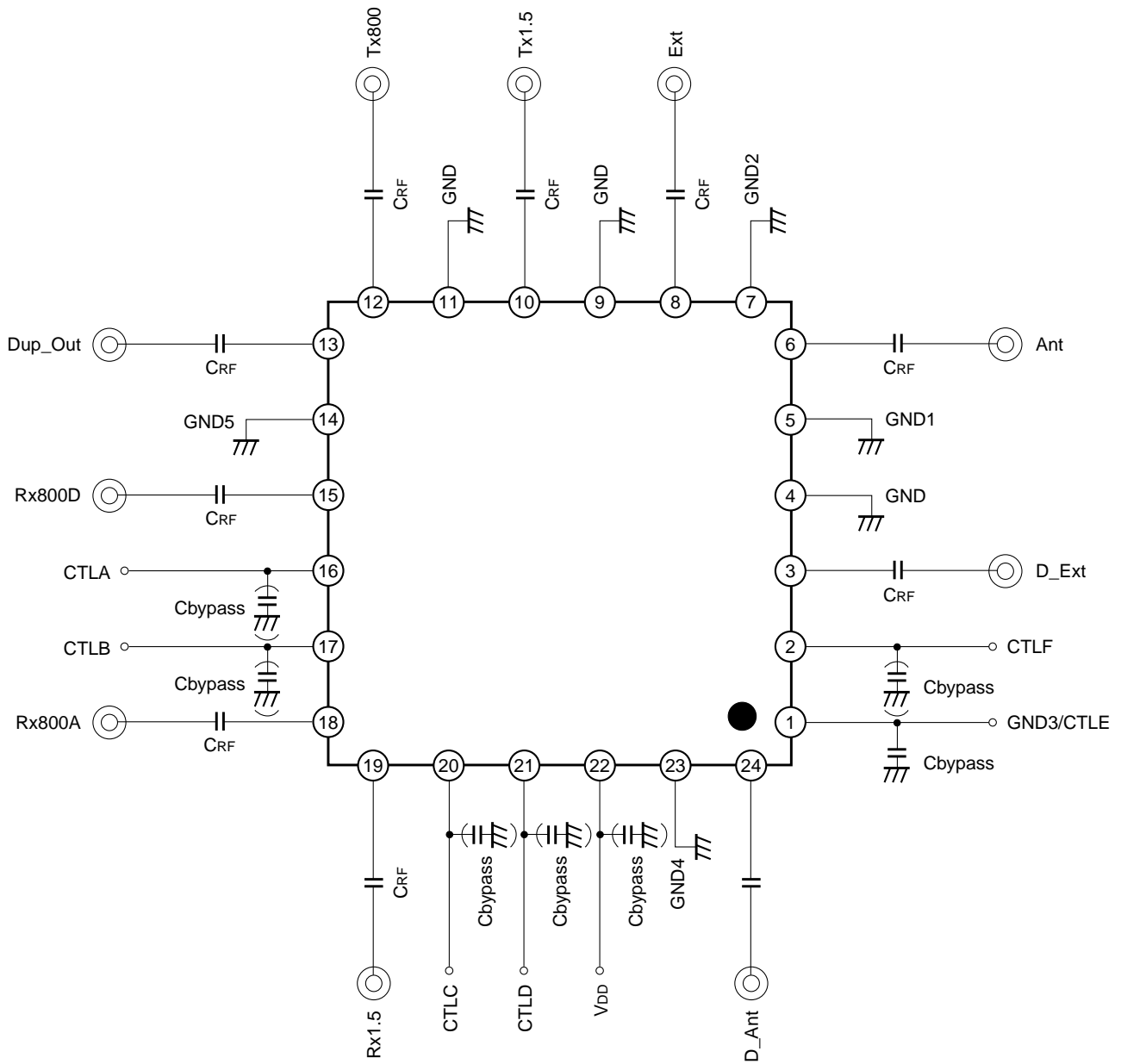
GaAs MMICs are ESD sensitive devices. Special handling precautions are required.

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Block Diagram



Pin Configuration and Recommended Circuit



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

CRF: This capacitor is used for RF de-coupling and must be used for all applications. 100pF is recommended.

Cbypass: This capacitor is used for DC line filtering. 100pF is recommended.

Truth Table

A: Rx/Tx

B: Main/diversity

C: External/antenna

D: 800MHz digital/800MHz analog

E: 800MHz/1.5GHz

F: TDMA/duplex

State	On Pass	A	B	C	D	E	F	F1	F2	F3	F4	F5	F6	F7	F8	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F23	F24	F25	F26	F27	
1	Tx800 – Ext	H	–	L	–	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	H	L	H	H	H	L	L	L
2	Tx800 – Ant	H	–	H	–	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	H	L	L	H	L	H	H	H	L	L	L
3	Tx1.5 – Ext	H	–	L	–	H	–	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	H	L	H	H	H	L	L	L	L
4	Tx1.5 – Ant	H	–	H	–	H	–	L	L	L	L	L	H	L	L	L	L	L	L	L	H	L	L	L	H	H	H	L	L	L	L
5	Rx800D – Ext	L	L	L	L	L	–	L	L	H	L	L	L	L	L	L	L	L	L	L	L	H	L	H	L	H	L	H	H	L	L
6	Rx800A – Ext	L	L	L	H	L	–	L	L	L	L	L	L	H	L	H	L	L	L	L	L	H	L	H	L	H	H	H	L	L	L
7	Rx1.5 – Ext	L	L	L	–	H	–	L	L	L	L	L	L	H	L	L	H	L	L	L	L	L	H	L	H	H	H	H	L	L	L
8	Rx800D – Ant	L	L	H	L	L	–	L	L	L	H	L	L	L	L	L	L	L	L	L	H	L	L	H	L	H	L	H	H	L	L
9	Rx800A – Ant	L	L	H	H	L	–	L	L	L	L	L	L	L	H	H	L	L	L	L	H	L	L	H	L	H	H	H	L	L	L
10	Rx1.5 – Ant	L	L	H	–	H	–	L	L	L	L	L	L	L	H	L	H	L	L	L	H	L	L	L	H	H	H	H	L	L	L
11	Rx800D – D_Ext	L	H	L	L	L	–	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	L	H	L	L	H	H	L	L	H
12	Rx800A – D_Ext	L	H	L	H	L	–	L	L	L	L	L	L	L	L	L	H	L	L	H	H	H	L	H	L	L	H	H	L	L	L
13	Rx1.5 – D_Ext	L	H	L	–	H	–	L	L	L	L	L	L	L	L	L	H	L	H	H	L	H	L	H	L	H	H	L	L	L	L
14	Rx800D – D_Ant	L	H	H	L	L	–	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	H	H	H	L	H	L
15	Rx800A – D_Ant	L	H	H	H	L	–	L	L	L	L	L	L	L	L	H	L	H	L	H	H	L	L	L	L	H	H	H	L	L	L
16	Rx1.5 – D_Ant	L	H	H	–	H	–	L	L	L	L	L	L	L	L	L	H	H	L	H	L	H	L	L	H	H	H	L	L	L	L
17	Dup_Out – Ext Rx800D – Ext	H	L	L	L	L	H	L	L	H	L	L	L	L	L	L	L	L	L	L	L	H	L	H	L	H	L	H	H	L	L
18	Dup_Out – Ant Rx800D – Ant	H	L	H	L	L	H	L	L	L	H	L	L	L	L	L	L	L	L	L	H	L	L	H	L	H	L	H	H	L	L
19	Dup_Out – Ext Rx800D – D_Ext	H	H	L	L	L	H	L	L	H	L	L	L	L	L	L	L	L	L	L	L	H	L	H	L	L	L	H	L	L	H
20	Dup_Out – Ant Rx800D – D_Ant	H	H	H	L	L	H	L	L	L	H	L	L	L	L	L	L	L	L	L	H	L	L	L	L	H	L	H	L	H	L

DC Bias Condition

(Ta = 25°C)

Item	Min.	Typ.	Max.	Unit
V _{DD}	2.7	3.0	3.3	V
V _{ctl} (H)	2.0	3.0	3.3	V
V _{ctl} (L)	0.0		0.4	V

Electrical Characteristics

(Ta = 25°C)

Item	Symbol	State	Port	Condition	Min.	Typ.	Max.	Unit
Insertion loss	IL	1	Tx800 – Ext	*1		0.50	0.80	dB
		2	Tx800 – Ant	*1		0.55	0.85	dB
		3	Tx1.5 – Ext	*2		0.70	1.00	dB
		4	Tx1.5 – Ant	*2		0.70	1.00	dB
		5	Rx800D – Ext	*3, *7		1.20	1.45	dB
		6	Rx800A – Ext	*3		1.25	1.55	dB
		7	Rx1.5 – Ext	*4		1.40	1.60	dB
		8	Rx800D – Ant	*3, *7		1.20	1.45	dB
		9	Rx800A – Ant	*3		1.15	1.45	dB
		10	Rx1.5 – Ant	*4		1.35	1.55	dB
		11	Rx800D – D_Ext	*3		0.55	0.85	dB
		12	Rx800A – D_Ext	*3		1.00	1.30	dB
		13	Rx1.5 – D_Ext	*4		1.15	1.35	dB
		14	Rx800D – D_Ant	*3		0.65	0.95	dB
		15	Rx800A – D_Ant	*3		1.20	1.50	dB
		16	Rx1.5 – D_Ant	*4		1.35	1.55	dB
		17	Dup_Out – Ext Rx800D – Ext	*1, *8		0.90	1.20	dB
				*3, *7		1.20	1.50	dB
		18	Dup_Out – Ant Rx800D – Ant	*1, *8		0.95	1.25	dB
				*3, *7		1.25	1.55	dB
19	Dup_Out – Ext Rx800D – D_Ext	*1		0.75	1.00	dB		
		*3		0.55	0.85	dB		
20	Dup_Out – Ant Rx800D – D_Ant	*1		0.80	1.10	dB		
		*3		0.70	1.00	dB		

Item	Symbol	State	Port	Condition	Min.	Typ.	Max.	Unit
Isolation	ISO.	2	Tx800 – Ext	*1	25	37		dB
		1	Tx800 – Ant	*1	25	39		dB
		4	Tx1.5 – Ext	*2	25	35		dB
		3	Tx1.5 – Ant	*2	25	30		dB
		8	Rx800D – Ext	*3, *7	25	37		dB
		9	Rx800A – Ext	*3	25	41		dB
		10	Rx1.5 – Ext	*4	25	51		dB
		5	Rx800D – Ant	*3, *7	25	39		dB
		6	Rx800A – Ant	*3	25	38		dB
		7	Rx1.5 – Ant	*4	20	26		dB
		14	Rx800D – D_Ext	*3	25	37		dB
		15	Rx800A – D_Ext	*3	25	38		dB
		16	Rx1.5 – D_Ext	*4	25	33		dB
		11	Rx800D – D_Ant	*3	25	33		dB
		12	Rx800A – D_Ant	*3	25	33		dB
		13	Rx1.5 – D_Ant	*4	25	37		dB
		18	Dup_Out – Ext Rx800D – Ext	*1, *8	25	37		dB
				*3, *7	25	37		dB
		17	Dup_Out – Ant Rx800D – Ant	*1, *8	25	38		dB
				*3, *7	25	38		dB
20	Dup_Out – Ext Rx800D – D_Ext	*1	25	37		dB		
		*3	25	37		dB		
19	Dup_Out – Ant Rx800D – D_Ant	*1	25	41		dB		
		*3	25	33		dB		

Item	Symbol	State	Port	Condition	Min.	Typ.	Max.	Unit		
Harmonics	2fo	1	Tx800 – Ext	*5		-75	-60	dBc		
		2	Tx800 – Ant	*5		-78	-60	dBc		
		3	Tx1.5 – Ext	*6		-70	-60	dBc		
		4	Tx1.5 – Ant	*6		-75	-60	dBc		
		17	Dup_Out – Ext	*5, *8		-72	-60	dBc		
		18	Dup_Out – Ant	*5, *8		-74	-60	dBc		
		19	Dup_Out – Ext	*5		-73	-60	dBc		
		20	Dup_Out – Ant	*5		-76	-60	dBc		
	3fo		1	Tx800 – Ext	*5		-72	-60	dBc	
			2	Tx800 – Ant	*5		-71	-60	dBc	
			3	Tx1.5 – Ext	*6		-70	-60	dBc	
			4	Tx1.5 – Ant	*6		-70	-60	dBc	
			17	Dup_Out – Ext	*5, *8		-75	-60	dBc	
			18	Dup_Out – Ant	*5, *8		-74	-60	dBc	
			19	Dup_Out – Ext	*5		-73	-60	dBc	
			20	Dup_Out – Ant	*5		-72	-60	dBc	
ACP	±50kHz		1	Tx800 – Ext	*5		-67	-57	dBc	
			2	Tx800 – Ant	*5		-66	-57	dBc	
			3	Tx1.5 – Ext	*6		-67	-57	dBc	
			4	Tx1.5 – Ant	*6		-65	-57	dBc	
			17	Dup_Out – Ext	*5, *8		-66	-57	dBc	
			18	Dup_Out – Ant	*5, *8		-67	-57	dBc	
			19	Dup_Out – Ext	*5		-67	-57	dBc	
			20	Dup_Out – Ant	*5		-67	-57	dBc	
	±100kHz			1	Tx800 – Ext	*5		-74	-65	dBc
				2	Tx800 – Ant	*5		-74	-65	dBc
				3	Tx1.5 – Ext	*6		-73	-65	dBc
				4	Tx1.5 – Ant	*6		-72	-65	dBc
				17	Dup_Out – Ext	*5, *8		-74	-65	dBc
				18	Dup_Out – Ant	*5, *8		-73	-65	dBc
				19	Dup_Out – Ext	*5		-74	-65	dBc
				20	Dup_Out – Ant	*5		-73	-65	dBc

Item	Symbol	State	Port	Condition	Min.	Typ.	Max.	Unit
P1dB	P1dB	1	Tx800 – Ext	V _{DD} = 3.0V	32	34		dBm
		2	Tx800 – Ant	V _{DD} = 3.0V	32	34		dBm
		3	Tx1.5 – Ext	V _{DD} = 3.0V	32	34		dBm
		4	Tx1.5 – Ant	V _{DD} = 3.0V	32	34		dBm
		17	Dup_Out – Ext	V _{DD} = 3.0V, *8	32	34		dBm
		18	Dup_Out – Ant	V _{DD} = 3.0V, *8	32	34		dBm
		19	Dup_Out – Ext	V _{DD} = 3.0V	32	34		dBm
		20	Dup_Out – Ant	V _{DD} = 3.0V	32	34		dBm
Switching speed	TSW					2	5	μs
Bias current	I _{DD}			V _{DD} = 3.0V		1.3	1.8	mA
Control current	I _{ctl}			V _{ctl} (H) = 3V		40	70	μA

*1 Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 940MHz to 958MHz

*2 Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 1,429MHz to 1,453MHz

*3 Pin = 7dBm, 0/3V control, V_{DD} = 3.0V, 810MHz to 885MHz

*4 Pin = 7dBm, 0/3V control, V_{DD} = 3.0V, 1,477MHz to 1,501MHz

*5 $\pi/4$ -shifted DQPSK, Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 940MHz to 958MHz,

ACP (± 50 kHz) < -65dBc, ACP (± 100 kHz) < -75dBc, 2nd harmonics < -65dBc, 3rd harmonics < -65dBc

*6 $\pi/4$ -shifted DQPSK, Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 1,429MHz to 1,453MHz,

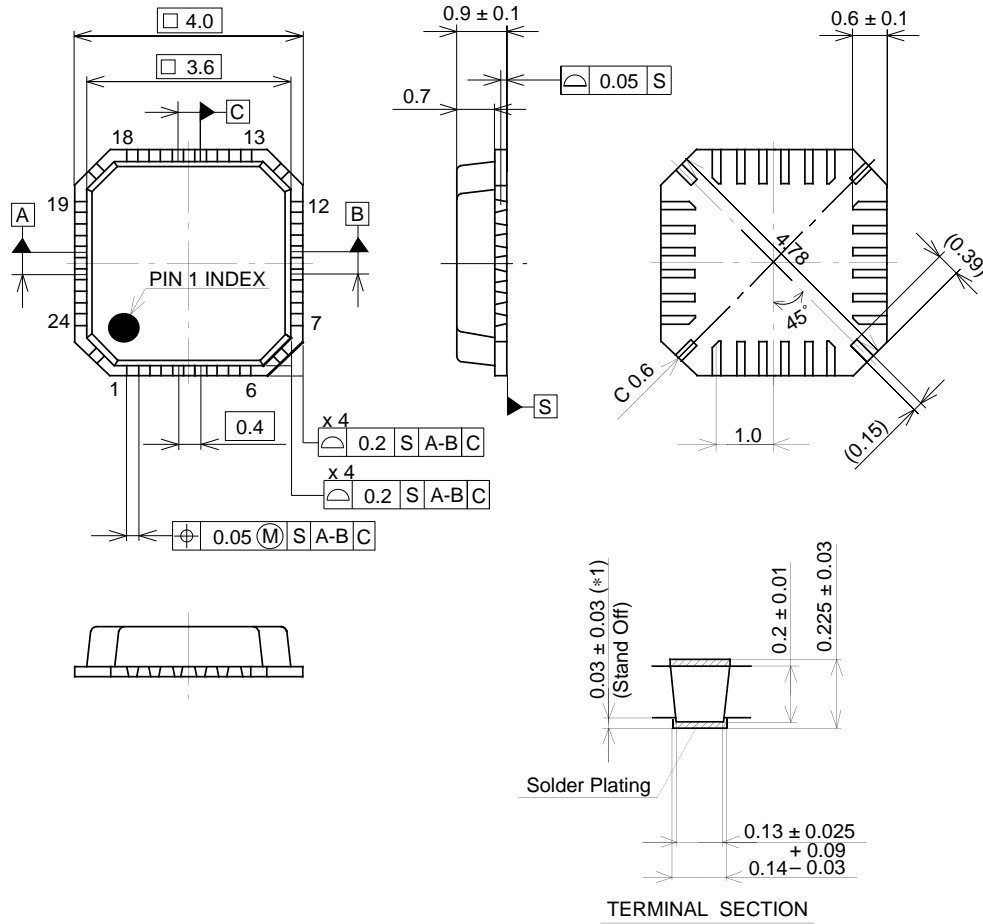
ACP (± 50 kHz) < -65dBc, ACP (± 100 kHz) < -75dBc, 2nd harmonics < -65dBc, 3rd harmonics < -65dBc

*7 Dup_Out port open

*8 Rx800D port open

Package Outline Unit: mm

24PIN VQFN(PLASTIC)



PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.04g

LEAD PLATING SPECIFICATIONS

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

SONY CODE	VQFN-24P-03
EIAJ CODE	_____
JEDEC CODE	_____