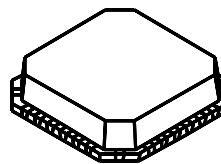


High Power 6 × 4 Antenna Switch MMIC with Integrated Control Logic for PDC Full Packet

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

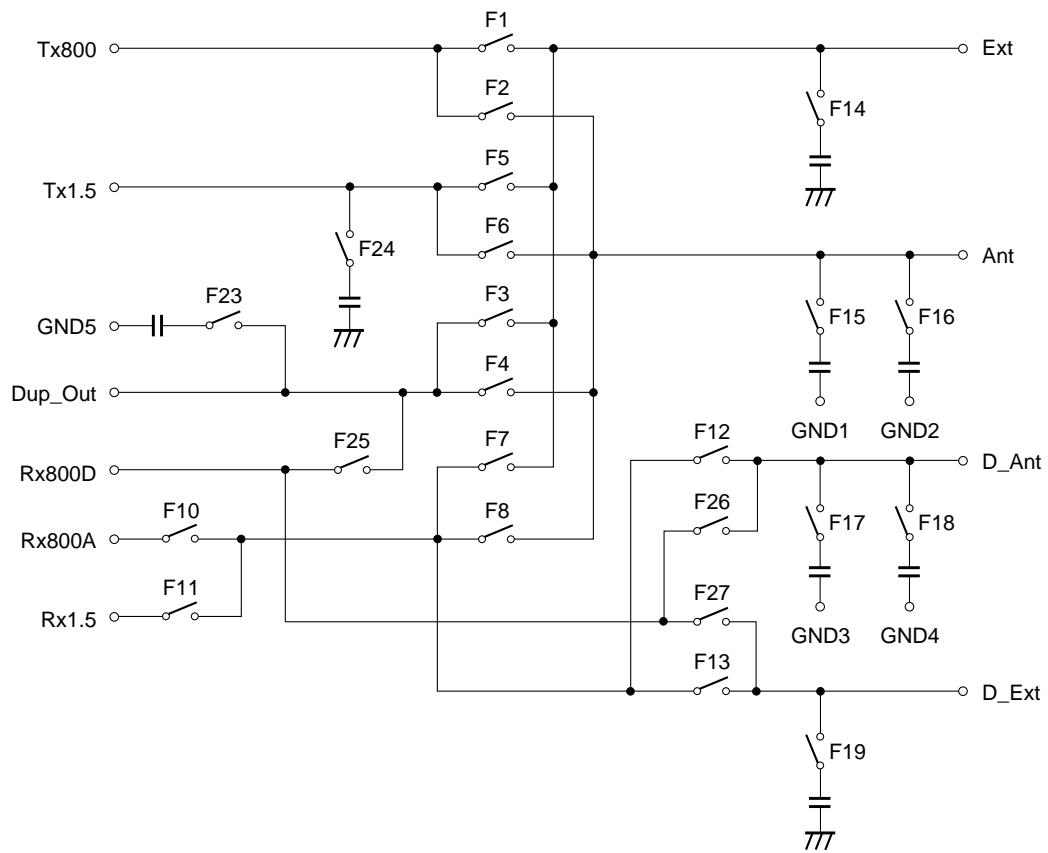
Absolute Maximum Ratings (Ta = 25°C)

• 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

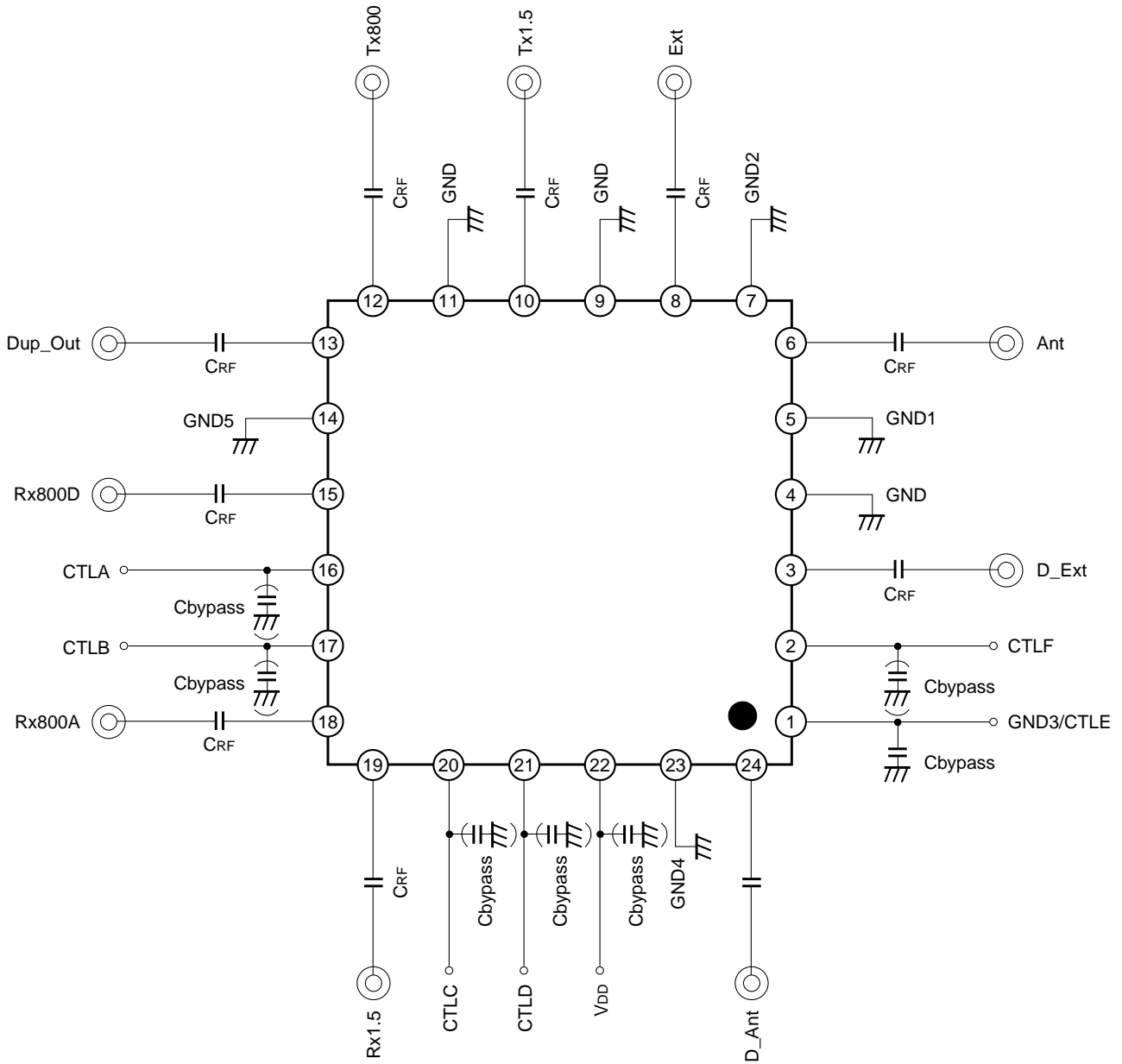
GaAs MMICs are ESD sensitive devices. Special handling precautions are required.

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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	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	
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	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	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	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	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	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	
14	Rx800D – D_Ant	L	H	H	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	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	
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,

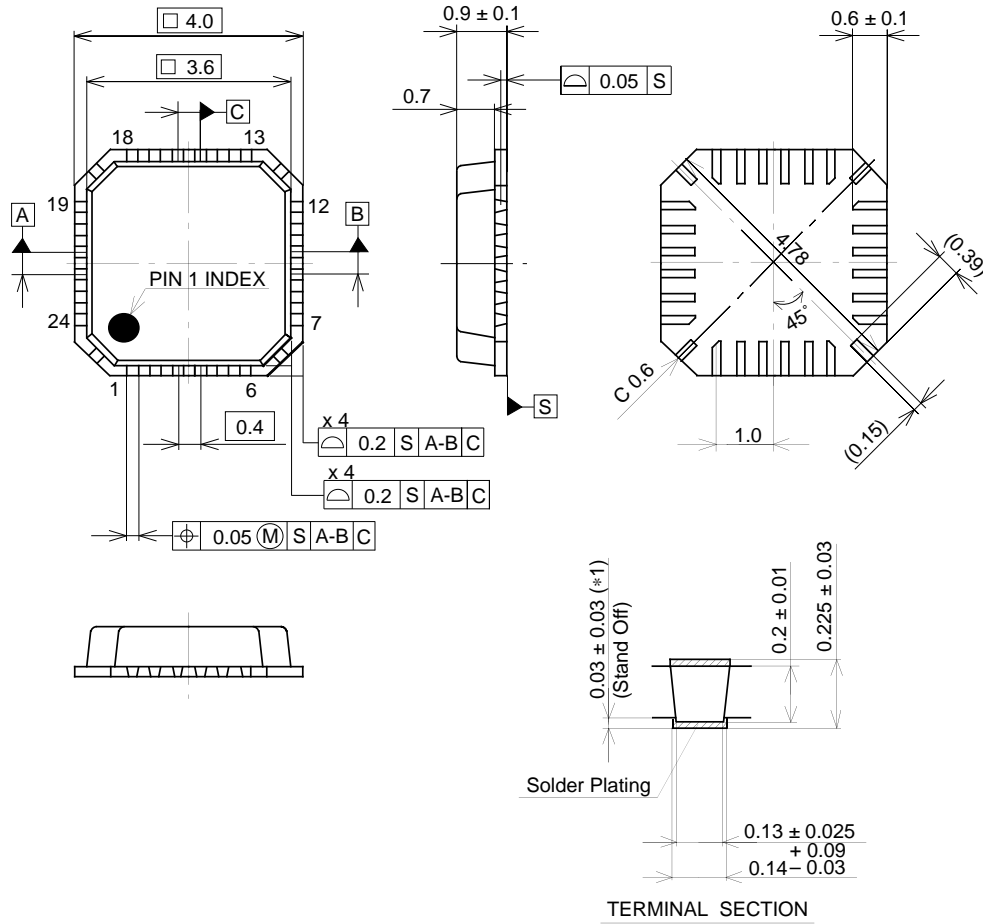
ACP (± 50 kHz) < -65dBc, ACP (± 100 kHz) < -75dBc, 2nd harmonics < -65dBc, 3rd harmonics < -65dBc

*7 Dup_Out port open

*8 Rx800D port open

Package Outline Unit: mm

24PIN VQFN(PLASTIC)



TERMINAL SECTION

PACKAGE STRUCTURE

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

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

LEAD PLATING SPECIFICATIONS

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