

## RX Gain Control Amplifier

### Description

CXA3201N is an RX gain control amplifier suitable for CDMA cellular/PCS phone.

### Features

- Wide gain control range
- Linear gain slope
- Wideband operation (50MHz to 300MHz)
- Very small package (16 Pin SSOP)
- Low voltage operation
- Two input ports
- Power save function included

### Absolute Maximum Ratings

- |                                     |           |                        |    |
|-------------------------------------|-----------|------------------------|----|
| • Supply voltage                    | $V_{CC}$  | 6                      | V  |
| • Operating temperature             | $T_{opr}$ | -55 to +125            | °C |
| • Storage temperature               | $T_{stg}$ | -65 to +150            | °C |
| • Allowable Power dissipation       | $P_D$     | 330                    | mW |
| • Supply voltage range              |           | -0.3 to 6              | V  |
| • Logic input voltage               |           | -0.3 to $V_{CC} + 0.3$ | V  |
| • Signal input voltage              |           | -0.3 to $V_{CC} + 0.3$ | V  |
| • Differential signal input voltage |           | 0 to 2.5               | V  |

### Operating Condition

- |                |          |            |   |
|----------------|----------|------------|---|
| Supply voltage | $V_{CC}$ | 2.7 to 3.8 | V |
|----------------|----------|------------|---|

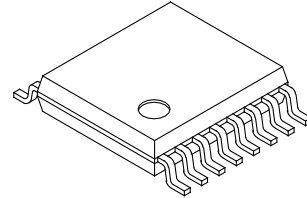
### Applications

CDMA cellular/PCS phone

### Structure

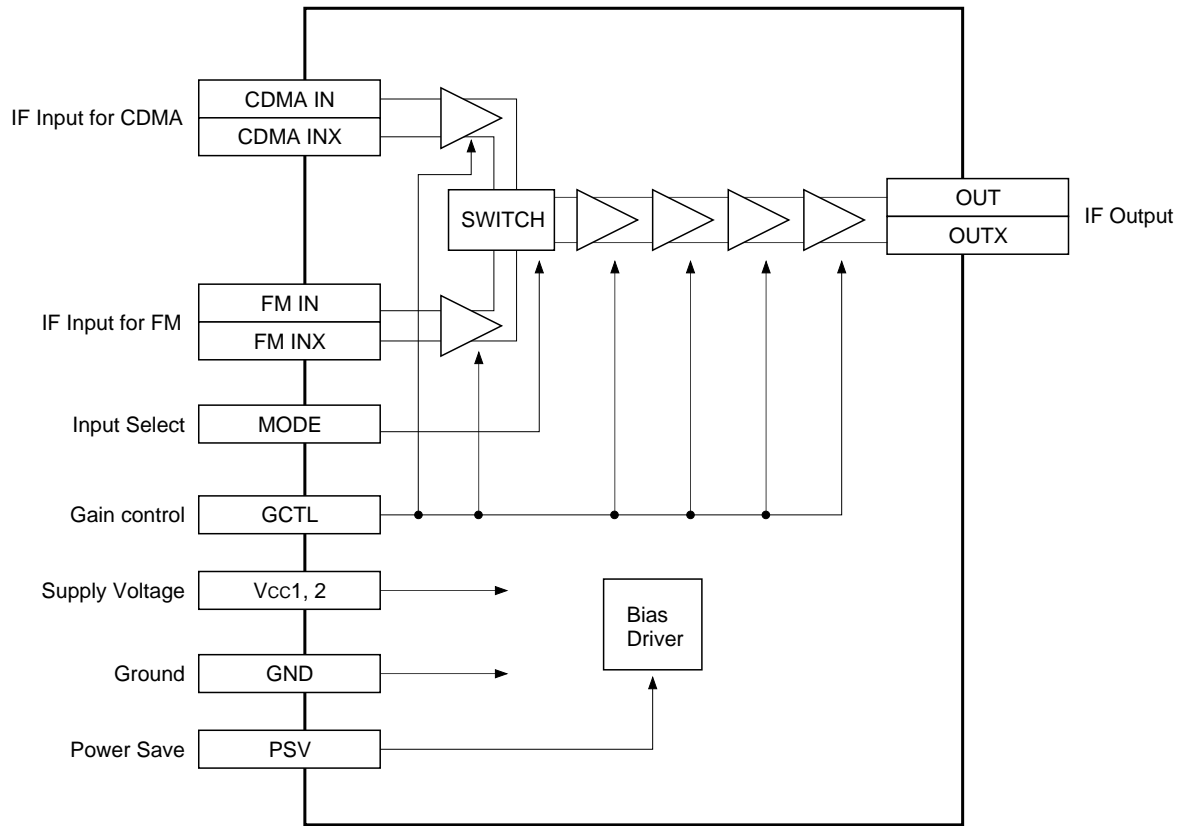
Bipolar silicon monolithic IC

16 pin SSOP (Plastic)

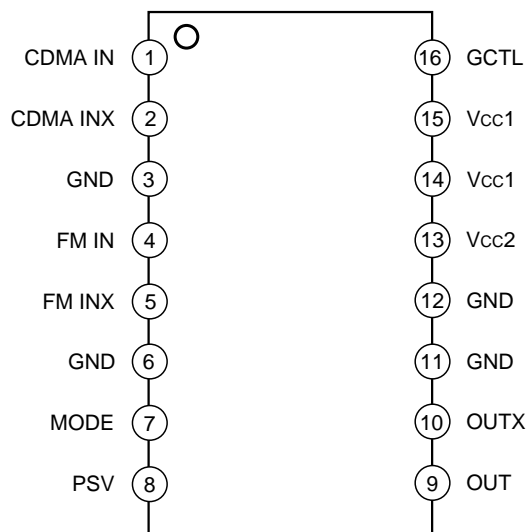


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Block Diagram



Pin Configuration



Pin Description

Pin No.	Symbol	Pin voltage TYP (V)	Equivalent circuit	Description
1	CDMA IN	1.15		Differential input pins for received CDMA IF signal.
2	CDMA INX	1.15		
3 6 11 12	GND	0		Ground.
4	FM IN	1.15		Differential input pins for received FM IF signal.
5	FM INX	1.15		
7	MODE	—		Input select pin. CDMA IN for High FM IN for Low.
8	PSV	—		Power save function pin. High: Active Low: Power save

Pin No.	Symbol	Pin voltage TYP (V)	Equivalent circuit	Description
9	OUT	—		Differential output pins for received CDMA IF signal. Open collector output.
10	OUTX	—		
13	Vcc2	3.0		Positive power supply for output stage.
14 15	Vcc1	3.0		Positive power supply.
16	GCTL	—		Gain control pin.

Electrical Characteristics

DC Characteristics

(V<sub>CC</sub> = 3.0V, T<sub>a</sub> = 27°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption 1	I <sub>cc1</sub>	V <sub>psv</sub> = 3.0V, V <sub>gctl</sub> = 1.5V, Pin 13, 14	7	10.2	15	mA
Current consumption 2	I <sub>cc2</sub>	V <sub>psv</sub> = 0 V, V <sub>gctl</sub> = 1.5V, Pin 13, 14	10	27	50	μA
Input current pin 7H	I <sub>modeH</sub>	V <sub>mode</sub> = 3.0V			1	
Input current pin 7L	I <sub>modeL</sub>	V <sub>mode</sub> = 0.5V	-1			
Input current pin 8H	I <sub>psvH</sub>	V <sub>psv</sub> = 3.0V			1	
Input current pin 8L	I <sub>psvL</sub>	V <sub>psv</sub> = 0 V	-15			
Input current pin 16H	I <sub>gctlH</sub>	V <sub>gctl</sub> = 3.0V			1	
Input current pin 16L	I <sub>gctlL</sub>	V <sub>gctl</sub> = 0.5V	-1			
MODE high voltage	V <sub>mH</sub>	Pin 7	2.5			V
MODE low voltage	V <sub>mL</sub>	Pin 7			0.5	
PSV high voltage	V <sub>psH</sub>	Pin 8	2.5			
PSV low voltage	V <sub>psL</sub>	Pin 8			0.5	

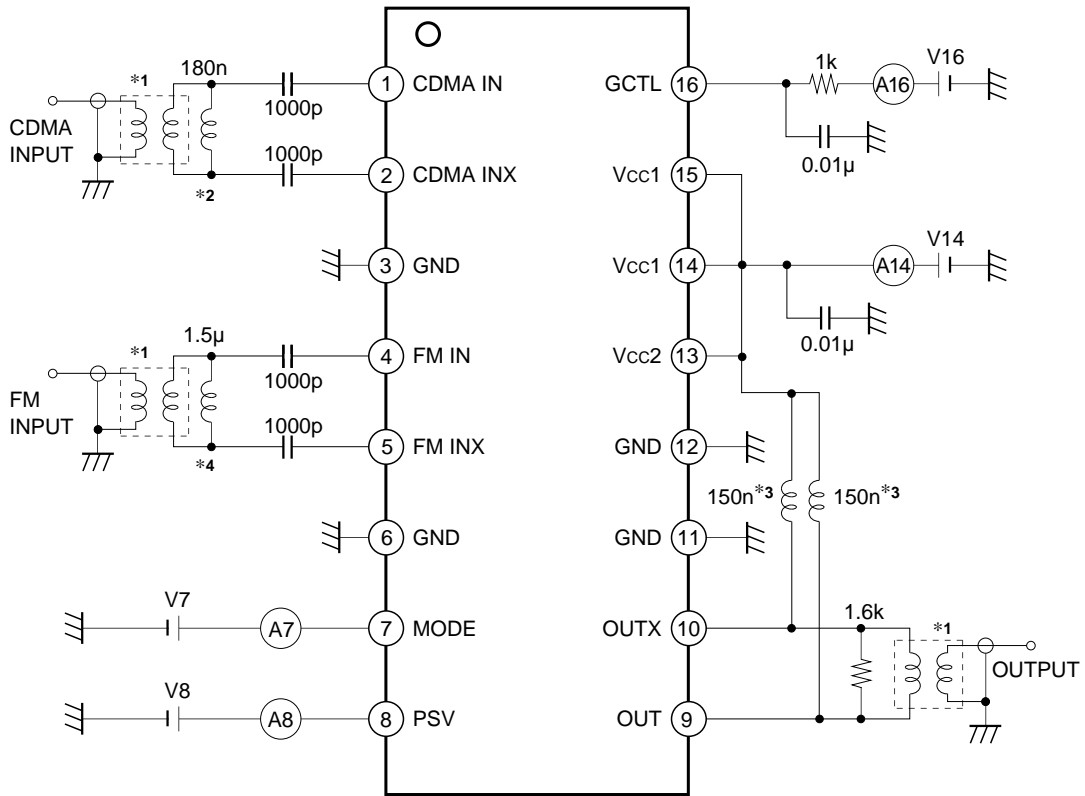
AC Characteristics

(V<sub>CC</sub> = 3.0V, T<sub>a</sub> = 27°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating frequency range	F <sub>r</sub>		50		300	MHz
Gain CDMA2.4	G <sub>CDMA2.4</sub>	V <sub>mode</sub> = "H", f = 210.38MHz, V <sub>gctl</sub> = 2.4V	42	46	50	dB
Gain CDMA1.5	G <sub>CDMA1.5</sub>	V <sub>mode</sub> = "H", V <sub>gctl</sub> = 1.5V	-7	-3	1	
Gain CDMA0.6	G <sub>CDMA0.6</sub>	V <sub>mode</sub> = "H", V <sub>gctl</sub> = 0.6V	-59	-55	-51	
CDMA Gain slope	G <sub>CLIN</sub>	V <sub>mode</sub> = "H", Gain CDMA at V <sub>gctl</sub> = 2.0V - Gain CDMA at V <sub>gctl</sub> = 1.0V	58	61	64	dB/V
Gain FM2.4	G <sub>FM2.4</sub>	V <sub>mode</sub> = "L", f = 85.38MHz, V <sub>gctl</sub> = 2.4V	42	46	50	dB
Gain FM1.5	G <sub>FM1.5</sub>	V <sub>mode</sub> = "L", V <sub>gctl</sub> = 1.5V	-7	-3	1	
Gain FM0.6	G <sub>FM0.6</sub>	V <sub>mode</sub> = "L", V <sub>gctl</sub> = 0.6V	-59	-55	-51	
FM Gain slope	G <sub>FMLIN</sub>	V <sub>mode</sub> = "L", Gain FM at V <sub>gctl</sub> = 2.0V - Gain FM at V <sub>gctl</sub> = 1.0V	58	61	64	dB/V
Input level 3rd order intercept point	IIP3	V <sub>mode</sub> = "H", G <sub>CDMA</sub> = 40dB* <sup>1</sup> f <sub>1</sub> = 209.38MHz, f <sub>2</sub> = 211.38MHz Measure of 210.38MHz	-42	-38		dBm
Noise Figure	NF	V <sub>mode</sub> = "H", G <sub>CDMA</sub> = 40dB* <sup>1</sup> Measure of 210.38MHz		5	8	dB

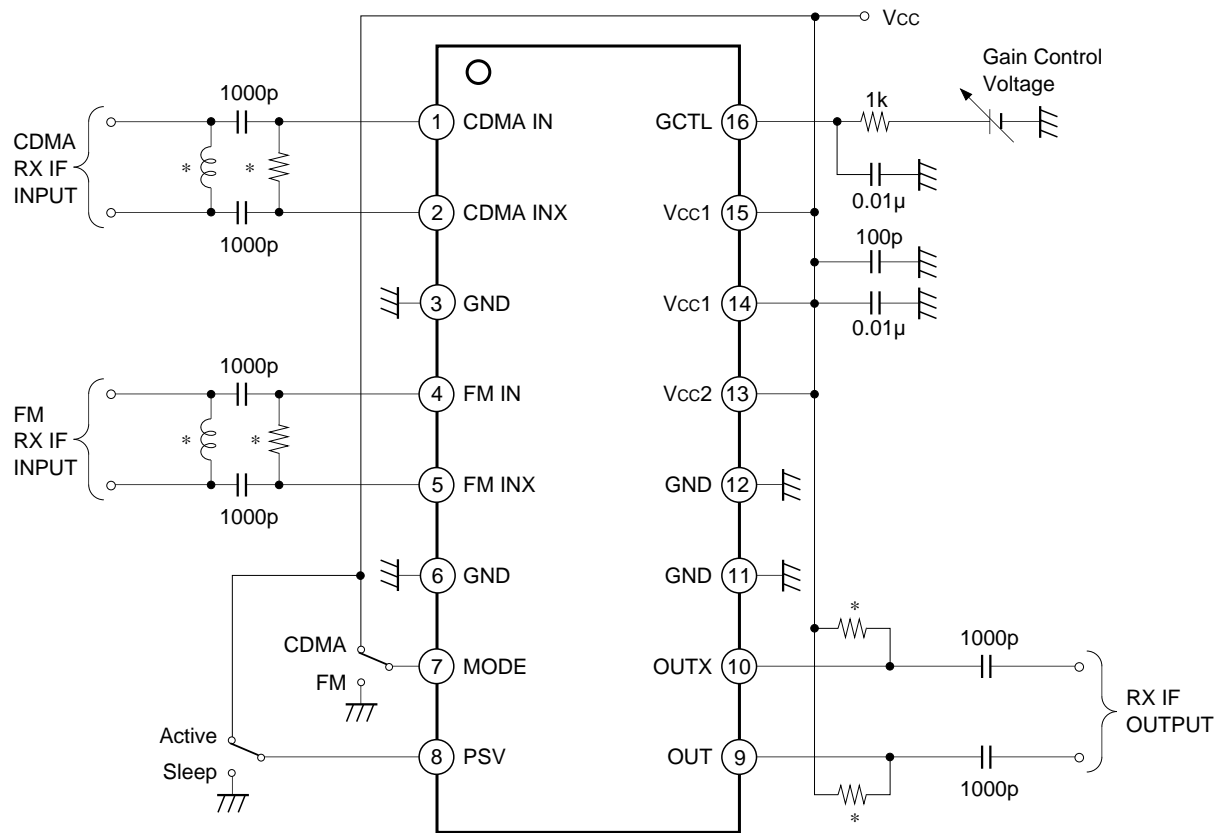
\*1 Adjust GCTL voltage, and set the overall gain to 40dB.

Measurement Circuit



- \*1 TOKO, Inc. B5FL 616DS-1135
- \*2 Coilcraft, Inc. 0805HS-181TKBC
- \*3 Coilcraft, Inc. 0805HS-151TKBC
- \*4 Coilcraft, Inc. 1008CS-152XKBC

Application Circuit



\* Must be adjusting values to result a best impedance matching between BPF filter and this IC.

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## Design Reference Values

### Single ended measurement

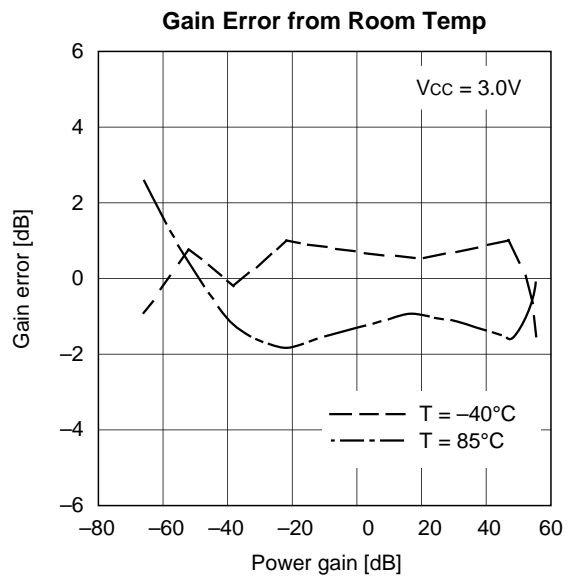
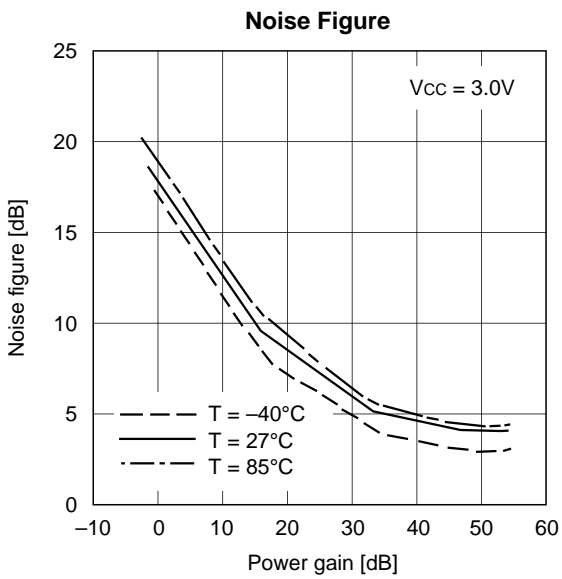
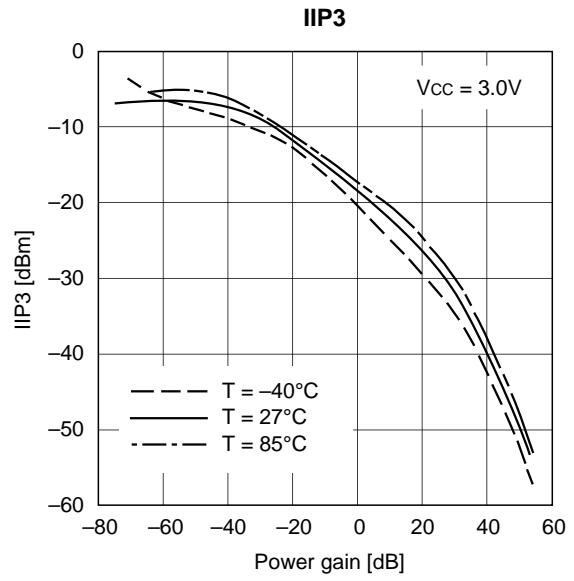
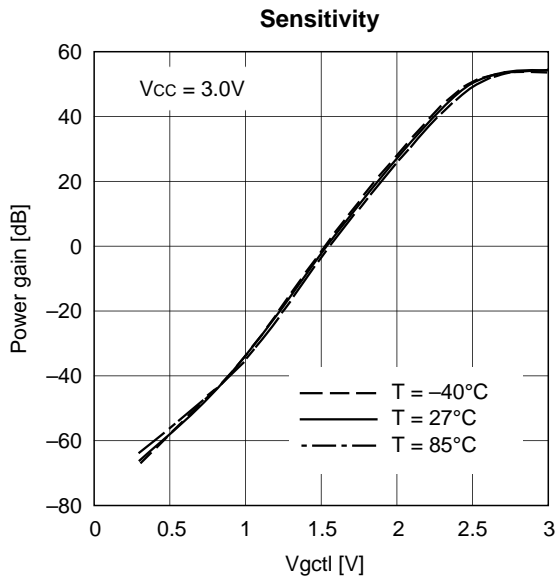
(V<sub>CC</sub> = 3.0V, T<sub>a</sub> = 27°C)

Item	Symbol	Conditions	Typ.	Unit
Input resistance	R <sub>in</sub>	f = 210.38MHz, V <sub>gctl</sub> = 1.5V	2.7	kΩ
Input capacitance	C <sub>in</sub>		1.4	pF
Output resistance	R <sub>out</sub>		5.9	kΩ
Output capacitance	C <sub>out</sub>		0.85	pF

### Notes on Operation

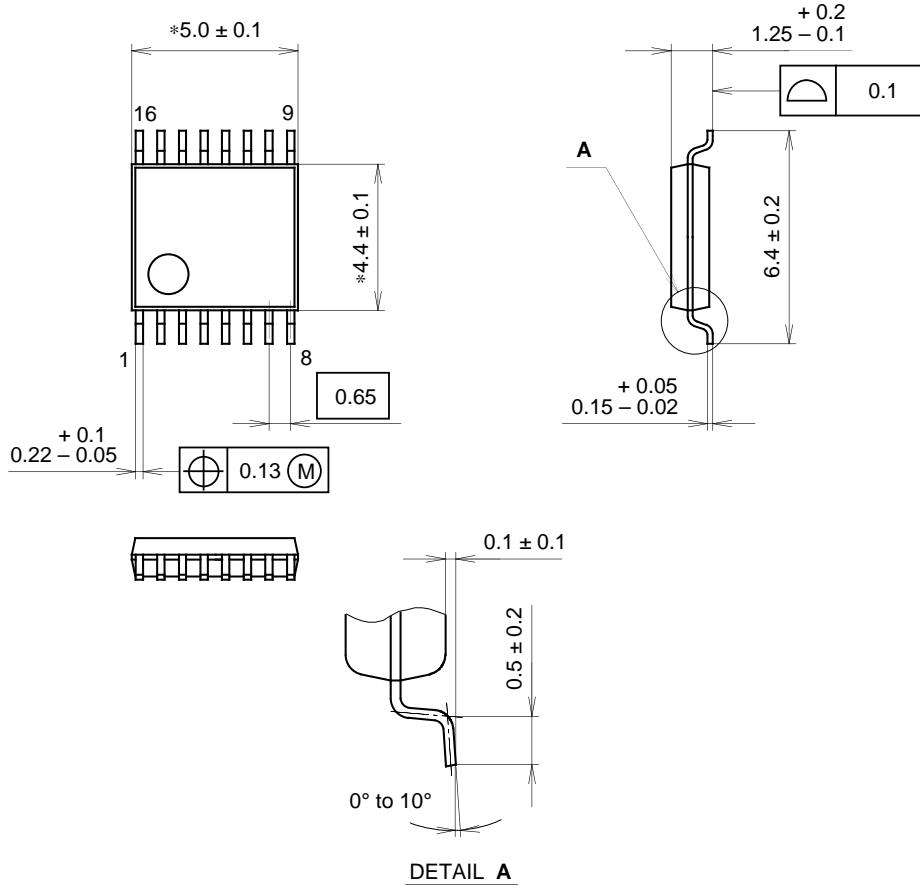
- 1) This IC is a wideband amplifier with wide gain control range. The decoupling capacitors between GND Pin and V<sub>CC</sub> Pin should be as close to the IC as possible.
- 2) The resistors connected to Pins 9 and 10 should be as close to the IC as possible.
- 3) This IC assumes the excellent characteristics when the differential input impedance between Pins 1 and 2, Pins 4 and 5 is 500Ω. Refer to the Measurement Circuit for the external element settings, etc.
- 4) Pay attention to handling this IC because its electrostatic discharge strength is weak.





Package Outline Unit: mm

16PIN SSOP (PLASTIC)



NOTE: Dimension "\*" does not include mold protrusion.

PACKAGE STRUCTURE

SONY CODE	SSOP-16P-L01
EIAJ CODE	SSOP016-P-0044
JEDEC CODE	_____

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER / PALLADIUM PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	0.1g

NOTE : PALLADIUM PLATING  
This product uses S-PdPPF (Sony Spec.-Palladium Pre-Plated Lead Frame).