SONY

CXA1852N

Quadrature Modulator for 900 MHz-Band Mobile Communications

Description

The CXA1852N is an IC package that combines a π/2 phase shifter with a quadrature modulator.
This is suitable for 900 MHz digital cordless telephone (CT2) and digital cellular.

Features

- Quadrature modulator IC has a built-in π/2 phase shifter.
- Local frequency = 300.1 MHz (max.); I&Q = 36 kHz (max.)
- Small phase error
- Operating voltage range: 2.7 to 5 V
- Power saving function
- 20-pin SSOP package used for set size reduction

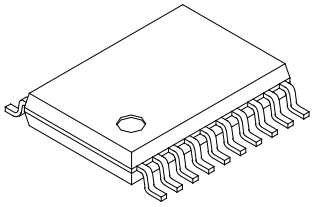
Applications

- CT2 digital cordless telephone
- Digital cellular

Structure

Bipolar silicon monolithic IC

20 pin SSOP (Plastic)



Absolute Maximum Ratings (Ta=25 °C)

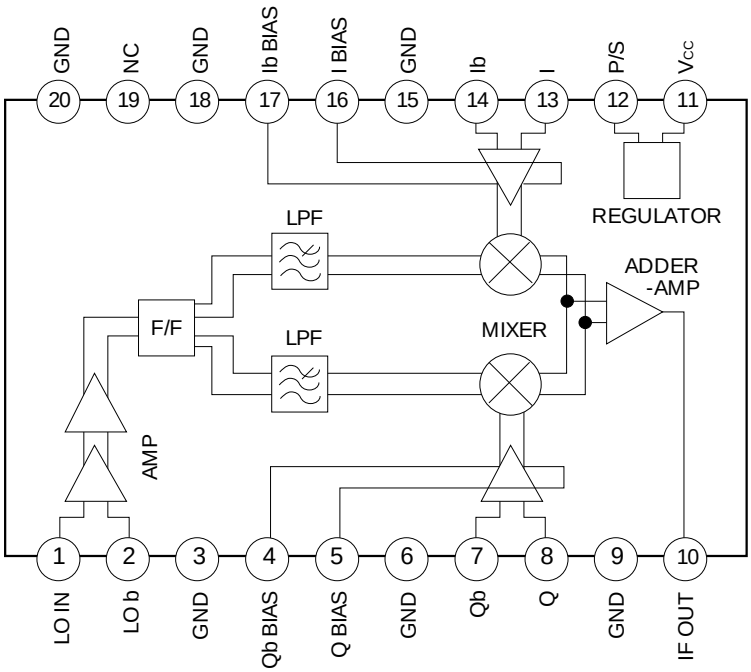
• Supply voltage	V_{CC}	6	V
• Operating temperature	Topr	–20 to +70	°C
• Storage temperature	Tstg	–65 to +150	°C
• Allowable power dissipation	P_D	530*	mW

*When mounted on a 50 × 50 × 1.6 mm copper-foiled glass epoxy board

Recommended Operating Conditions

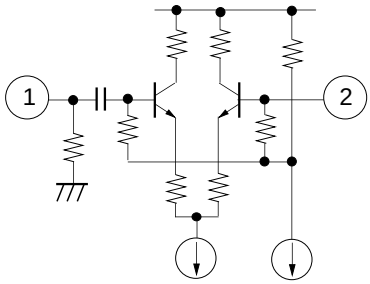
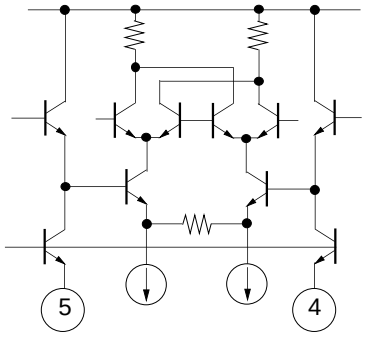
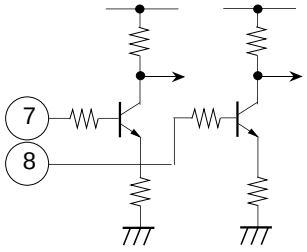
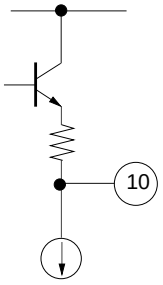
• Supply voltage	V_{CC}	2.7±5.0	V

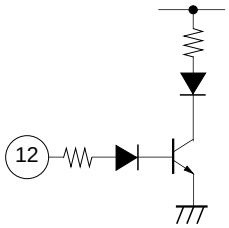
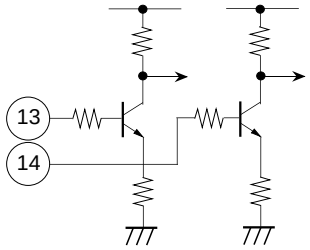
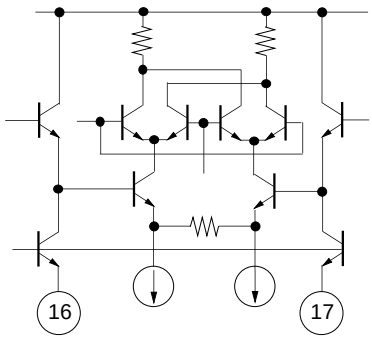
Block Diagram and Pin Configuration



E93517A5Y-TE

Pin Description

Pin No.	Symbol	Typical pin voltage (V)	Equivalent circuit	Description
1	LOCAL IN	0		Local input pin. The internal resistor provides 50 Ω matching.
2	$\overline{\text{LOCAL}}$ IN	*2.0		Bias pin for the local input amplifier. Ground this pin via a capacitor.
3	GND	0		
4	$\overline{Q}$-BIAS	*0.175		Local leak level adjustment pins. Normally ground these pins via 1 kΩ resistors.
5	Q-BIAS	*0.175		
6	GND	0		
7	$\overline{Q}$-INPU	*1.85 V to 0.85 V		Q signal input pin. The input impedance is 500 kΩ or more. (Only DC signals can be normally input at the Vcc/2 DC Bias.)
8	Q-INPUT	*1.85 V to 0.85 V		Q signal input pin. The input impedance is 500kΩ or more. (Signals of up to 1 Vp-p can be input at the Vcc/2 DC Bias.)
9	GND	0		
10	IF OUTPUT	*1.4		IF output pin. (An output impedance of 50 Ω is provided by the emitter follower.)

Pin No.	Symbol	Typical pin voltage (V)	Equivalent circuit	Description
11	V_{CC}	5.5 to 2.7		Power supply pin.
12	POWER SAVE	0 to 5.5		Power saving control pin. OFF when $V_{P/S} \leq 1.0$ V; ON when $V_{P/S} \geq 1.8$ V
13	I-INPUT	*0.85 to 1.85		I signal input pin. The input impedance is 500 kΩ or more. (Signals of up to 1 Vp-p can be input at the V_{CC}/2 DC Bias.)
14	$\overline{\text{I}}$-INPUT	*0.85 to 1.85		I signal input pin. The input impedance is 500 kΩ or more (Only DC signals can be normally input at the V_{CC}/2 DC Bias.)
15	GND	0		
16	I-BIAS	*0.175		Local leak level adjustment pin. Normally ground this pin via a 1 kΩ resistor.
17	$\overline{\text{I}}$-BIAS	*0.175		
18	GND	0		
19	N.C	—		
20	GND	0		

Electrical Characteristics

(Ta=25 °C, V_{CC}=2.7 V, Z_L=Z_S=50 Ω)*

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption		I_{CC}	For no signal input	10	15.0	22	mA
Standby current consumption		I_{CC} (PS)	PS		330	480	µA
IF output power		Pout	50 Ω load, f=f_{LO}/2+$f_{I/Q}$	–15	–11	–7.0	dBm
Lo carrier leak		ISO (Lo)	$f_{I/Q}$=36 kHz, 1 Vp-p, fout=f_{LO}/2	26	35.0		dBc
Lo leak level		P_{LO}	I/Q=V_{CC}/2, fout=f_{LO}/2		–49.0	–37	dBm
Image rejection (side-band leak)		ImR	fout=f_{LO}/2-$f_{I/Q}$	28.5	37.5		dBc
I/Q input impedance		$Z_{I/Q}$		500			kΩ
Power saving response time	Rise	$T_{P/S}$ (RISE)			1.0	5.0	µs
	Fall	$T_{P/S}$ (DOWN)			1.0	3.0	µs
Power saving control voltage		$V_{P/S}$ (ON)		1.8		5.5	V
		$V_{P/S}$ (OFF)				1.0	V
Lo input level		Loin		–17		–7	dBm

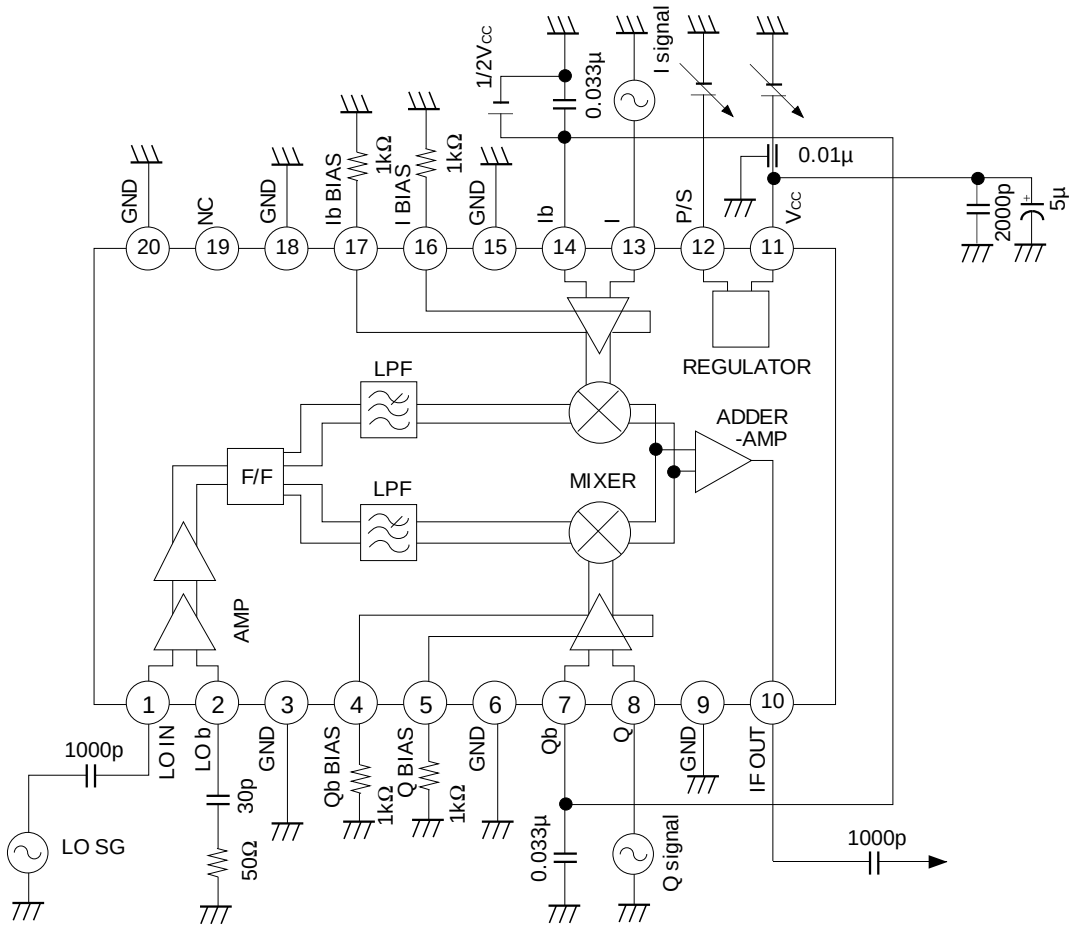
Design Reference Values

(Ta=25 °C, V_{CC}=2.7 V, Z_L=Z_S=50 Ω)*

Item	Symbol	Conditions	Typ.	Unit
I/Q third-order intermodulation distortion	$IM3_{I/Q}$	fout=$f_{LO/2}$-3fI/Qf	37.3	dBc
Lo input VSWR			1.1	X:1
IF output VSWR			1.2	X:1

* f_{LO}=300.1 MHz Pin=–10 dBm
$f_{I/Q}$=36 kHz 1 Vp-p DC=V_{CC}/2

Electrical Characteristics Test Circuit

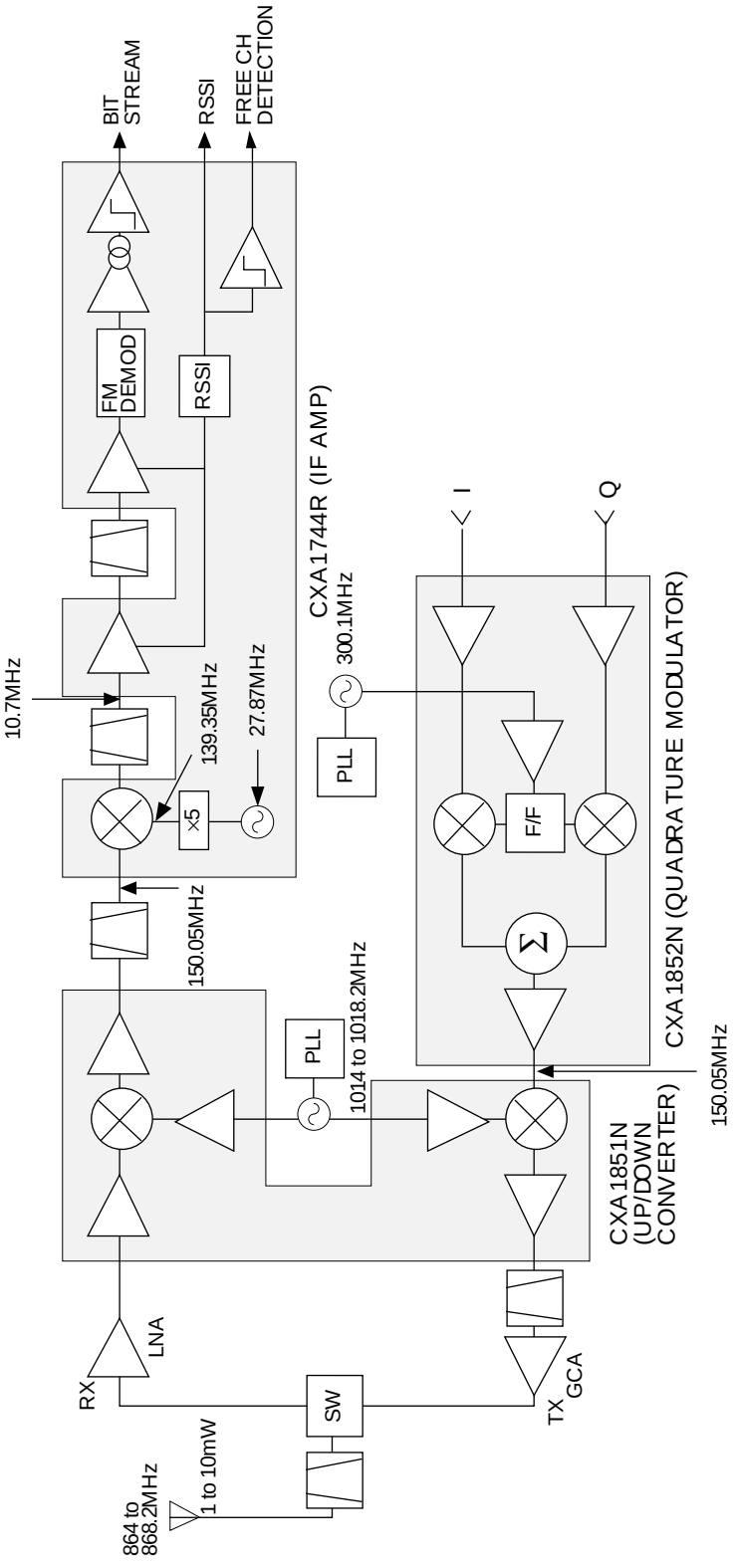


Signal	Frequency	Input level	Remarks
Lo	300.1 MHz	–10 dBm	
I signal	36 kHz	1 Vp-p	I/O phase difference = 90 °C
Q signal	35 kHz	1 Vp-p	DC for measuring the local leak

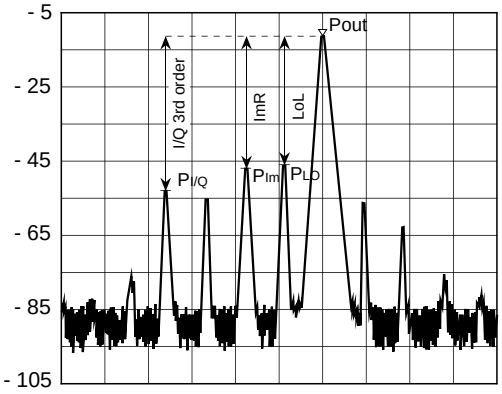
$V_{CC}=V_{P/S}$	2.7 to 5.5 V
$V_I=V_{Ib}=V_Q=V_{Qb}$	0.5 × V_{CC}

Block Diagram

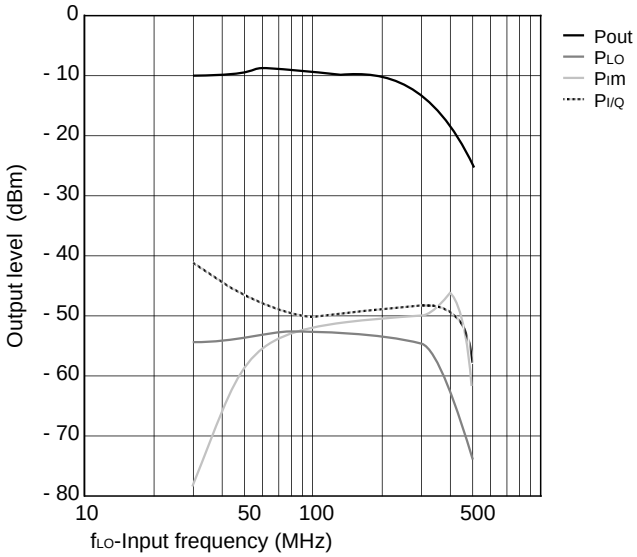
Digital cordless telephone chip set (CXA1744R/CXA1851N/CXA1852N)



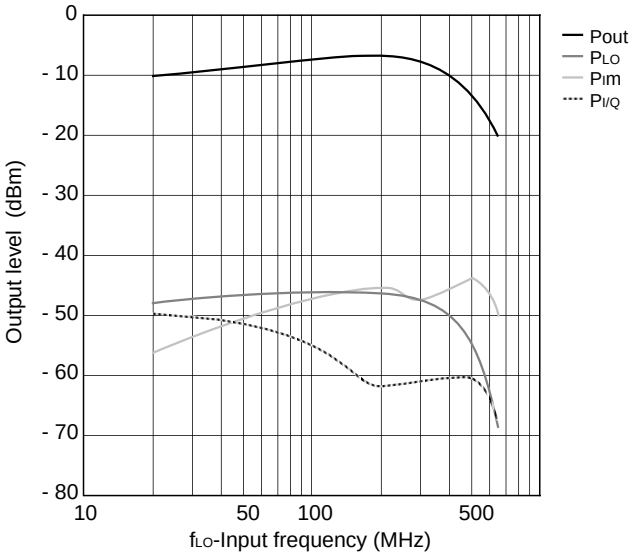
Modulation spectrum (V_{CC}=2.7V, S.P.A. measurement)



f_{LO} vs. Pout, P_{LO}, PIm, $P_{I/Q}$ characteristics (V_{CC}=2.7V)

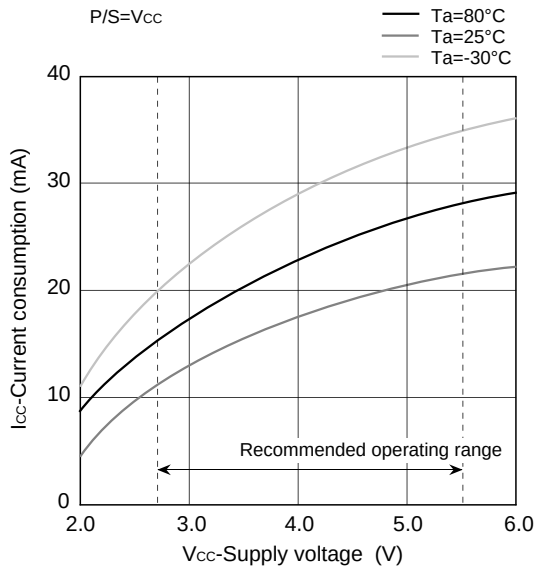


f_{LO} vs. Pout , P_{LO} ,PIm , $P_{I/Q}$ characteristics (V_{CC}=5.5V)



V_{CC} vs. I_{CC} characteristics

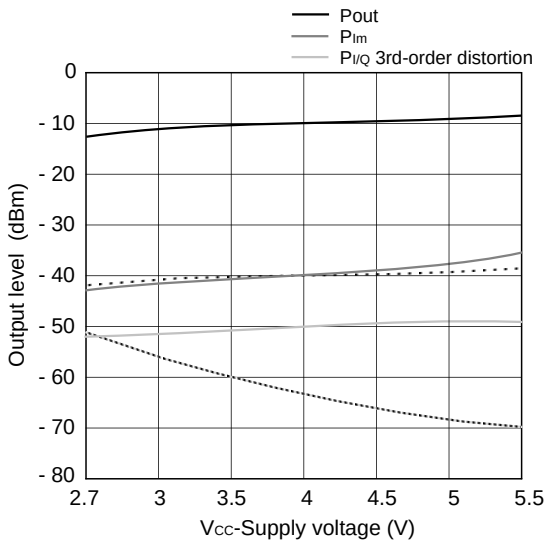
No signal input



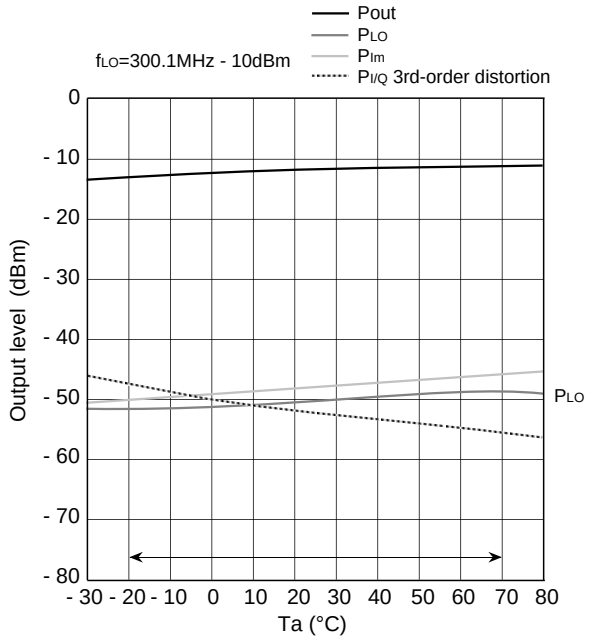
V_{CC} vs. Pout, PIm, PI/Q characteristics

LO: f_{LO}=300.1MHz

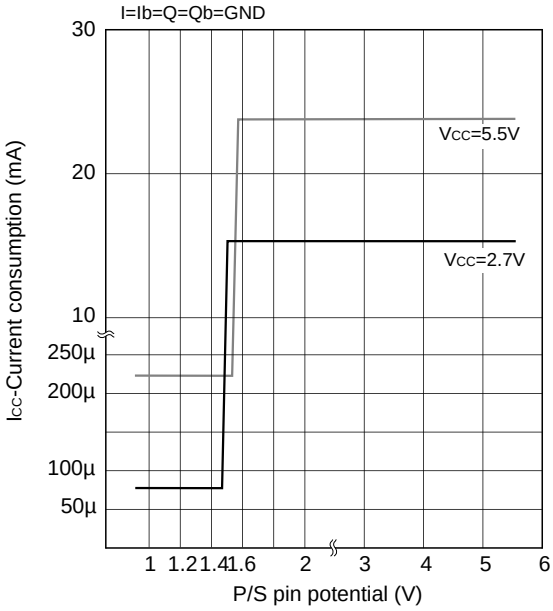
Pin=-10dBm



Ta vs. Pout, P_{LO}, PIm, $P_{I/Q}$ characteristics (V_{CC}=2.7V)



$V_{P/S}$ vs. I_{CC} characteristics

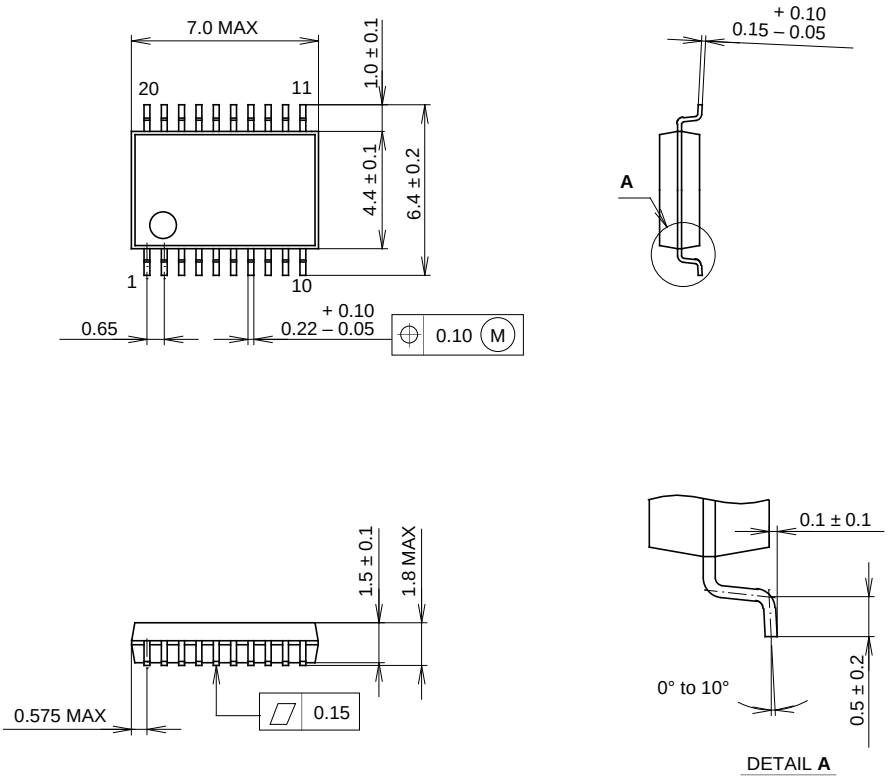


Notes on Operation

(1) Electrostatic sensitive diveces because of the high-frequency process .
(2) Earth pattern should be as wide as possible, and do not increase ground impedance to prevent from the parasitic oscillation.
(3) Wire the GND pin as short as possible.
(4) Connect a by-pass capacitor to the V_{CC} pin.

Package Outline Unit : mm

20PIN SSOP (PLASTIC)



SONY CODE	SSOP-20P-L072
EIAJ CODE	SSOP020-P-0225-BN
JEDEC CODE	

PACKAGE STRUCTURE

MOLDING COMPOUND	EPOXY / PHENOL RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE WEIGHT	0.1g