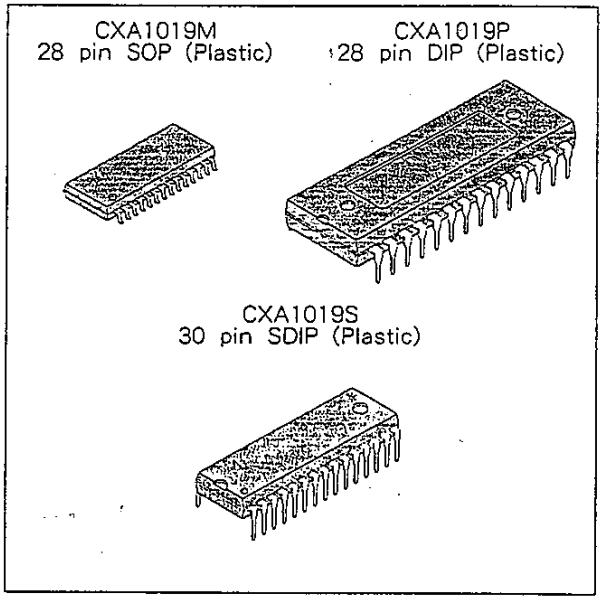
SONY®

CXA1019M/P/S

FM/AM Radio

Description

CXA1019M/P/S is a one-chip FM/AM radio IC designed for radio-cassette tape recorders and headphone tape recorders, and has the following functions.



Features

- Small number of peripheral components.
- Low current consumption (Vcc=3V)
  For FM: Io=5.3 mA (Typ.)
  For AM: Io=3.4 mA (Typ.)
- Built-in FM/AM select switch.
- Large output of AF amplifier.
  Vcc=6V, EIAJ output=500 mW (Typ.) when Vcc=6V. load impedance 8Ω

Functions

FM section

- RF amplifier, Mixer and OSC (incorporating AFC variable capacitor).
- IF amplifier
- Quadrature detection
- Tuning LED driver

AM section

- RF amplifier, Mixer and OSC (with RF AGC).
- IF amplifier (with IF AGC)
- Detector
- Tuning LED driver

AF section

- Electronic volume control

Structure

Bipolar silicon monolithic IC

SONY reserves the right to change products and specifications without notice.
This information does not convey any license under patent rights of SONY corporation or others.

E88Z20C22

Downloaded from Elcodis.com electronic components distributor

Recommended Operating Conditions

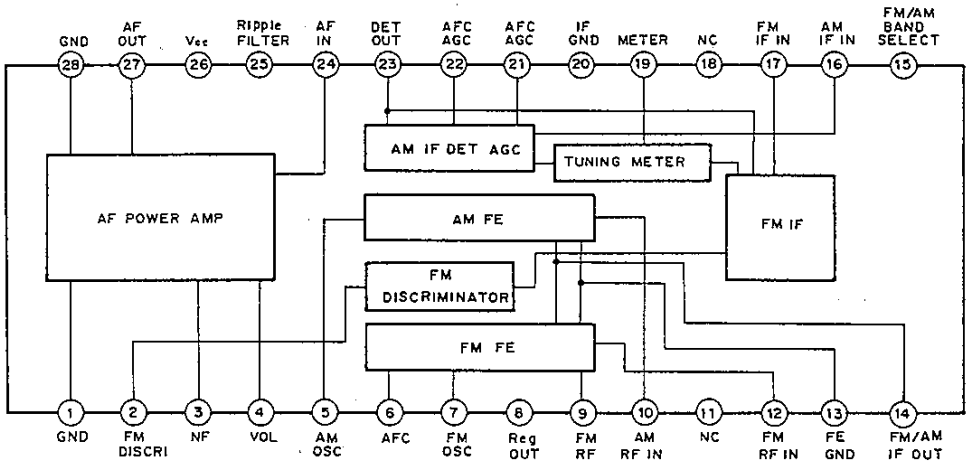
• Supply voltage	Vcc	2 to 7.5	V (CXA1019M)
	Vcc	2 to 8.5	V (CXA1019P/S)

Absolute Maximum Ratings (Ta=25 °C)

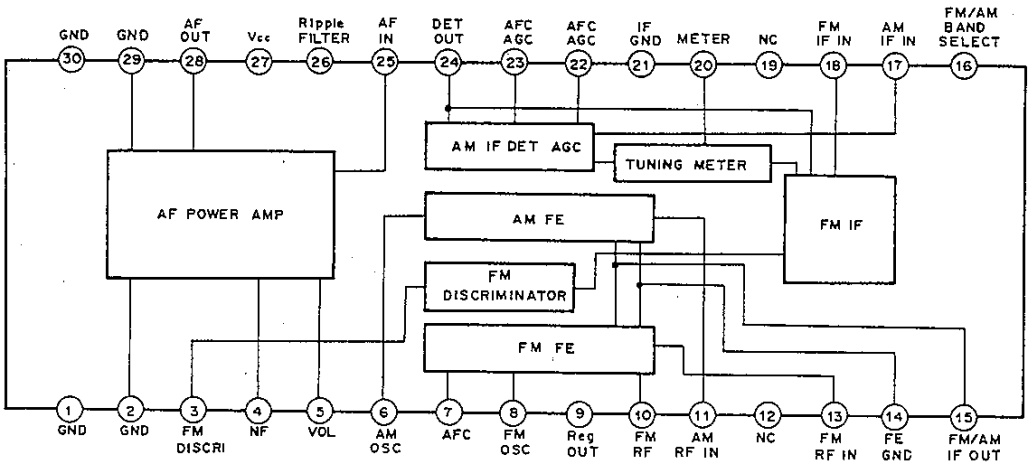
• Supply voltage	Vcc	9	V
• Operating temperature	Topr	−10 to +60	°C
• Storage temperature	Tstg	−50 to +125	°C
• Allowable power dissipation	PD CXA1019M	700	mW
	CXA1019P/S	1000	mW

Block Diagram

CXA1019M/P



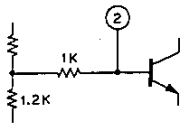
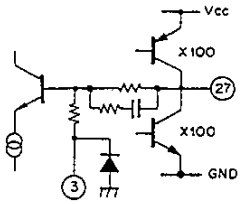
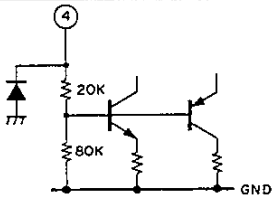
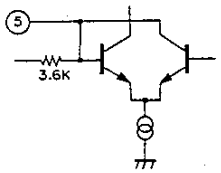
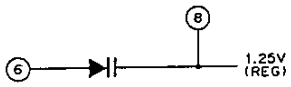
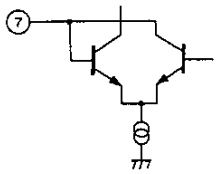
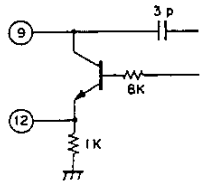
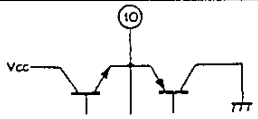
CXA1019S



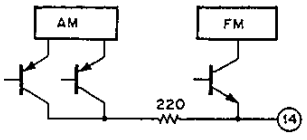
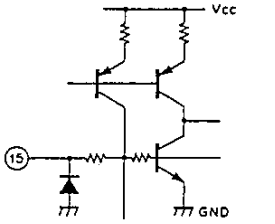
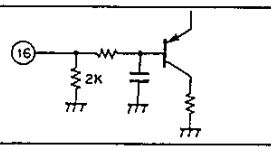
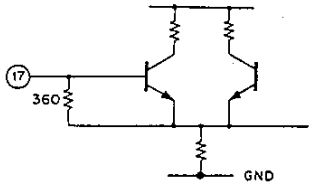
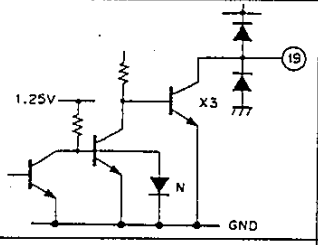
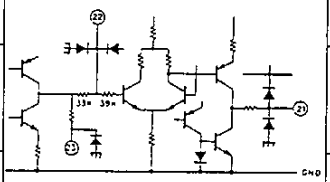
Downloaded from Elcodis.com electronic components distributor

Standard Circuit Design Data

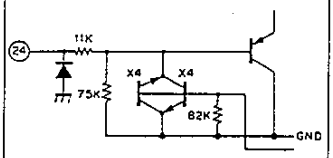
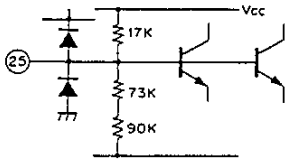
(The pin numbers in the parenthesis are for CXA1019S.)

No.	Symbol	Voltage (V)				Equivalent circuit	Description
		Vcc=3V		Vcc=6V			
		FM	AM	FM	AM		
1 (1, 2)	GND	0	0	0	0		
2 (3)	FM DISCRI	2.18	2.70	4.88	5.43		Phase-shift circuit Connect ceramic discriminator
3 (4)	NF	1.5	1.5	3.0	3.0		Negative feedback pin
27 (28)	AF OUT	1.5	1.5	3.0	3.0		Power amplifier output pin
4 (5)	VOL CONT	1.25	1.25	1.25	1.25		Connect variable resistor for electronic volume control.
5 (6)	AM OSC	1.25	1.25	1.25	1.25		AM local oscillation circuit
6 (7)	AFC	1.25	*	1.25	*		AFC variable capacitor pin
8 (9)	REG OUT	1.25	1.25	1.25	1.25		Regulator pin 1.25V (Typ.)
7 (8)	FM OSC	1.25	1.25	1.25	1.25		FM local oscillation circuit
9 (10)	FM RF	1.25	1.25	1.25	1.25		Connect FM RF tuning coil.
12 (13)	FM RF IN	0.3	0	0.3	0		FM RF input pin
10 (11)	AM RF IN	1.25	1.25	1.25	1.25		AM RF input pin

Downloaded from Elcodis.com electronic components distributor

No.	Symbol	Voltage (V)				Equivalent circuit	Description
		Vcc=3V		Vcc=6V			
		FM	AM	FM	AM		
11 (12)	NC	0	0	0	0		
13 (14)	GND (FE GND)	0	0	0	0		
14 (15)	FM/AM FE OUT	0.36	0.2	0.36	0.2		IF output pin of FM and AM. Connect IF filter.
15 (16)	BAND SELECT	1.30	0	1.30	0		FM and AM bands selection switch pin. During GND it becomes AM and during open it becomes FM.
16 (17)	AM IF IN	0	0	0	0		Input pin of AM IF.
17 (18)	FM IF IN	0.34	0	0.88	0		Input pin of FM IF.
18 (19)	NC	0	0	0	0		
19 (20)	METER	3.0	3.0	6.0	6.0		Meter drive circuit (For tuning indicator)
20 (21)	GND	0	0	0	0		
21 (22)	AFC/AGC	1.25	1.49	1.25	1.49		AFC pin of W band. During AM, it determines time constant of AGC.
22 (23)	AFC/AGC	1.25	1.12	1.25	1.15		AFC pin of J band. During AM, it determines time constant of AGC.
23 (24)	DET OUT	1.25	1.0	1.25	1.0		Detection output pin

Downloaded from Elcodis.com electronic components distributor

No.	Symbol	Voltage (V)				Equivalent circuit	Description
		Vcc=3V		Vcc=6V			
		FM	AM	FM	AM		
24 (25)	AF IN	0	0	0	0		Power amplifier input pin
25 (26)	RIPPLE FILTER	2.71	2.71	5.4	5.4		Ripple filter
26 (27)	Vcc	3.0	3.0	6.0	6.0		Power supply pin
28 (29, 30)	GND	0	0	0	0		Power GND

*Note) The pin voltage of pin 6 during AM, it is the same pin voltage of pin 22 (23) during J BAND and is the same pin voltage of pin 21 (22) during W BAND.

Downloaded from Elcodis.com electronic components distributor

Electrical Characteristics

See the Electrical Characteristics Test Circuit
Ta=25°C, Vcc=6V

No.	Item	Symbol	SW conditions 1	2	3	4	5	6	Test Point	Conditions	Min.	Typ.	Max.	Unit
1	AM circuit current	ID1	A	B	A	A	A	A	IA	No signal, AM	—	3.5	10.0	mA
2	FM circuit current	ID2	A	B	A	A	B	A	IA	No signal, FM	—	7.0	14.0	mA
3	FM front end voltage gain	GV1	A	B	A	A	B	A	VA	V_{IN1}=40dBμV, 100MHz	32	39	46	dB
4	FM detection output level	VD1	A	—	—	A	B	A	VD	V_{IN3}=90dBμV, 10.7MHz (1kHz, 22.5kHz DEV)	39	77.5	155	Vrms
5	FM IF knee level	VD2	A	—	—	A	B	A	VD	V_{IN3} level at a point 3dB down from V_{IN3}=90dBμV, 10.7MHz (1kHz, 22.5kHz DEV)	—	24	32	dBμV
6	FM detection output distortion factor	THD1	A	—	—	A	B	A	VD	V_{IN3}=90dBμV, 10.7MHz (1kHz 75kHz DEV)	—	0.3	2.0	%
7	FM meter current	IB1	A	—	—	A	B	A	IM	V_{IN3}=60dBμV, 10.7MHz	1.8	3.5	7.0	mA
8	AM front end voltage gain	GV2	A	A	A	A	A	A	VB	V_{IN2}=60dBμV, 1660kHz	15	22	29	dB
9	AM IF voltage gain	GV3	A	A	—	A	A	A	VD	V_{IN4} when 455kHz (1kHz 30% MOD) output is −34dBm	14	20	27	dBμV
10	AM detection output level	VD3	A	A	—	A	A	A	VD	V_{IN4}=85dBμV, 455kHz (1kHz, 30% MOD)	39	77.5	155	Vrms
11	AM meter current	IB2	A	A	—	A	A	A	IM	V_{IN4}=85dBμV, 455kHz	1.3	3.0	7.0	mA
12	AM detection output distortion factor	THD2	A	A	B	B	A	A	VD	V_{IN2}=95dBμV, 1660kHz (1kHz, 30% MOD) Vcc=7.8V	—	0.6	2.0	%
13	Audio voltage gain	GV4	A	—	—	—	—	B	VE	V_{IN4}=−30dBm, 1kHz	27	31.5	36	dB
14	Audio distortion factor	THD3	A	—	—	—	—	B	VE	Distortion factor for output of 50mW V_{IN4}=−20dBm, 1kHz	—	0.3	2.5	%

0dBμV=1μV

Downloaded from Elcodis.com electronic components distributor

Electrical Characteristic Test Circuit

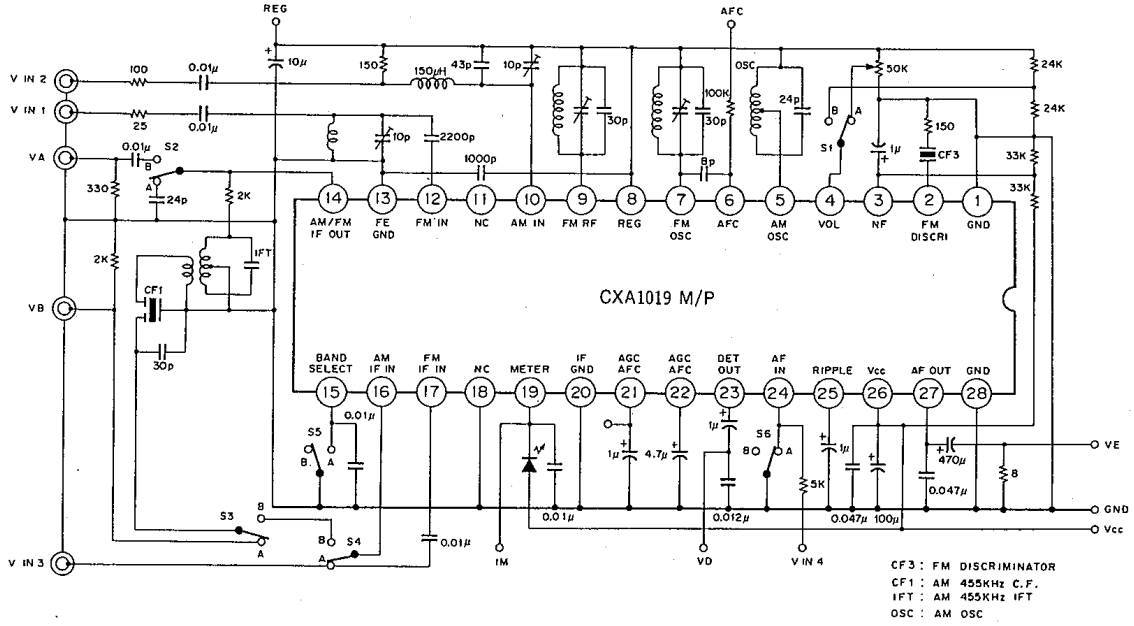
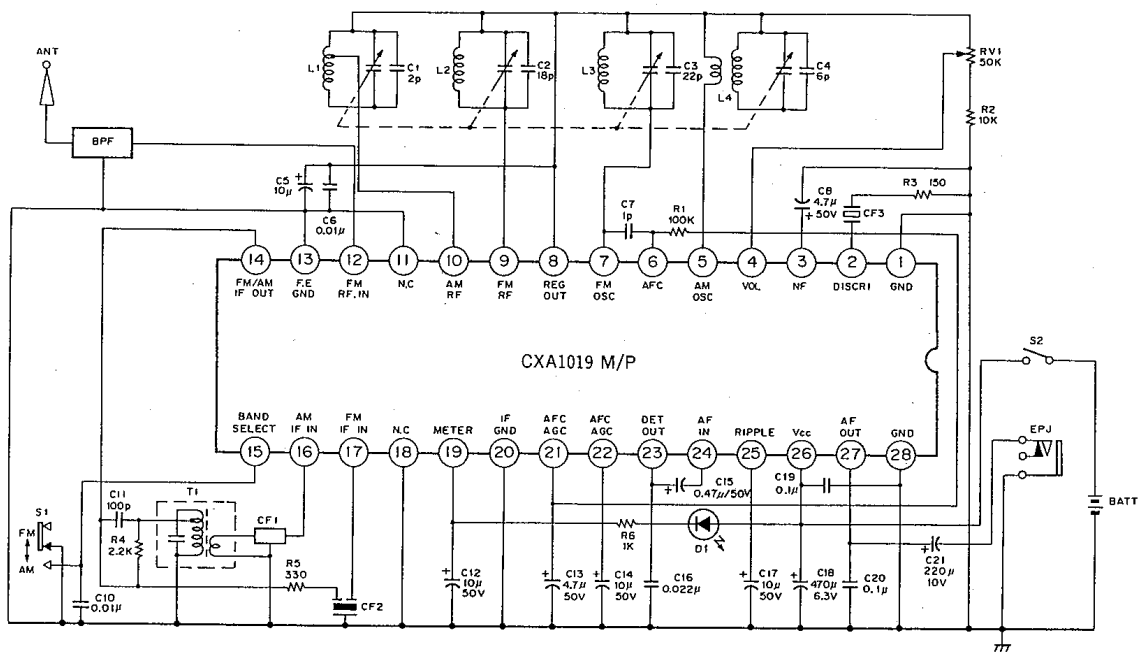


Fig. 2

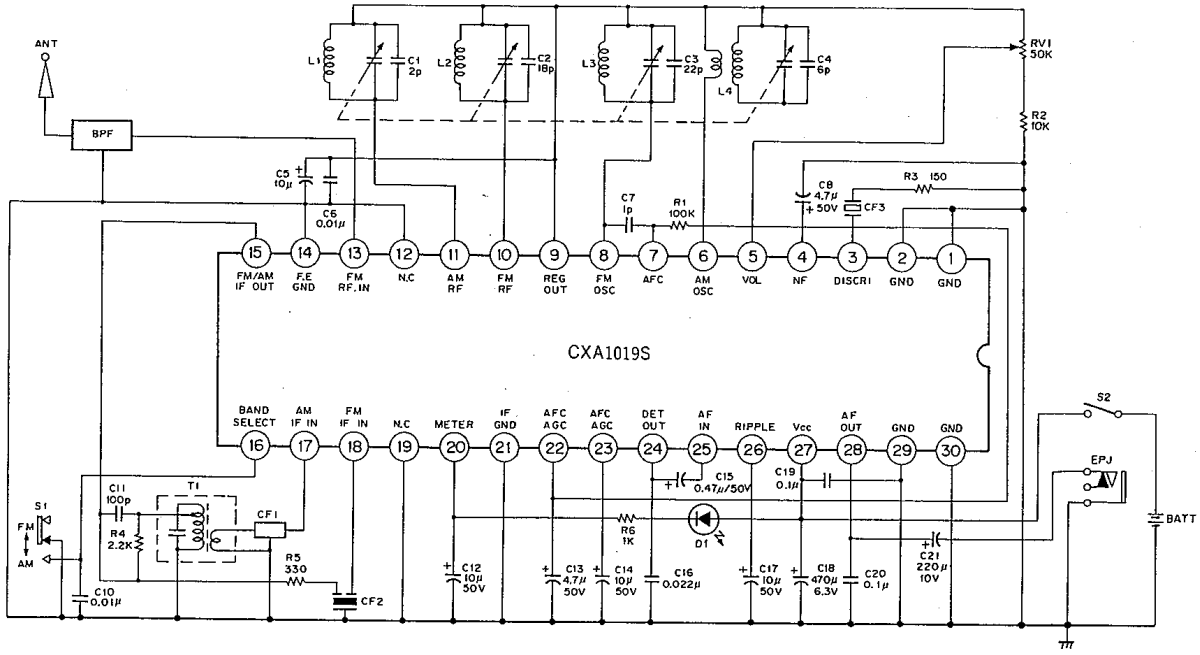
Downloaded from Elcodis.com electronic components distributor

Application Circuit 1



Downloaded from Elcodis.com electronic components distributor

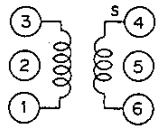
Application Circuit 2



Downloaded from Elcodis.com electronic components distributor

Coil data

AM OSC

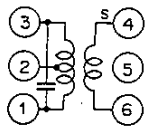


Core diameter ϕ0.06 mm 2UEW

f(kHz)	L(μH) 1 to 3	Qo 1 to 3	Number of windings t	
			1 to 3	4 to 6
796	270	125	107	29

Equivalent to L-5K7-H5 R12-1684X. Mitsumi Electric Co., Ltd.
or 7TRS-8441X TOKO Co., Ltd.

AM IFT

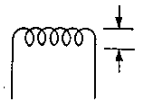


Core diameter ϕ0.07 mm UEW

Co(pF) 1 to 3	Qo 1 to 3	Number of windings t		
		1 to 2	2 to 3	4 to 6
180	90	111	35	7

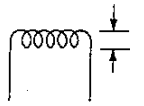
Equivalent to 21K7-H5 R12-8558A. Mitsumi Electric Co., Ltd.
or 7MC-7789N TOKO Co., Ltd.

FM RF



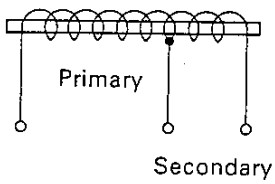
ϕ4 mm
ϕ0.6 mm 4.5t

FM OSC



ϕ4 mm
ϕ0.6 mm 3.5t

AM bar antenna



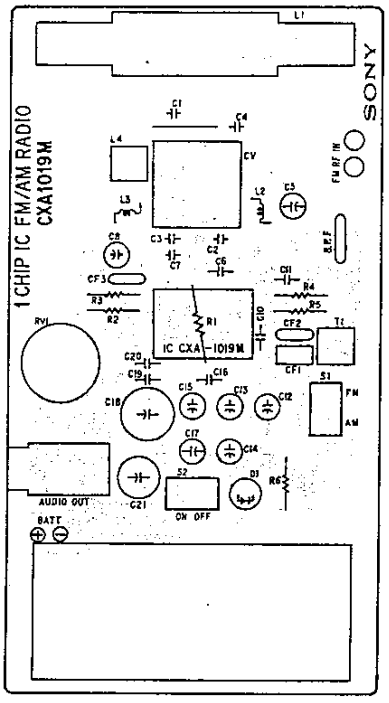
f(kHz)	L(μH)	Primary	Secondary
796	650	91t	20t

BPF PFWE8
(88 to 108 MHz) Soshin Electric Co., Ltd.

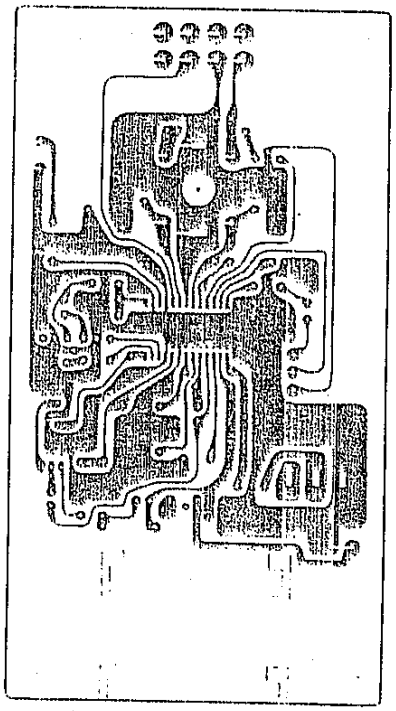
CF1	SFU-455B	Murata Mfg. Co., Ltd. Or BFCFL-455 TOKO Co., Ltd.
CF2	SFE10.7MA5	Murata Mfg. Co., Ltd.
CF3	CDA10.7MC1	Murata Mfg. Co., Ltd.

Downloaded from Elcodis.com electronic components distributor

CXA1019M Evaluation Board

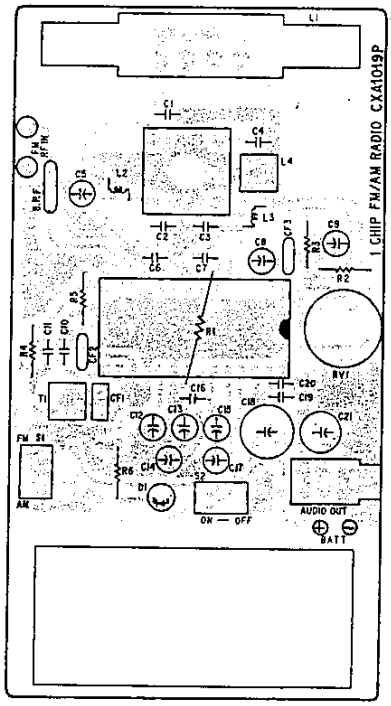


Parts arrangement diagram

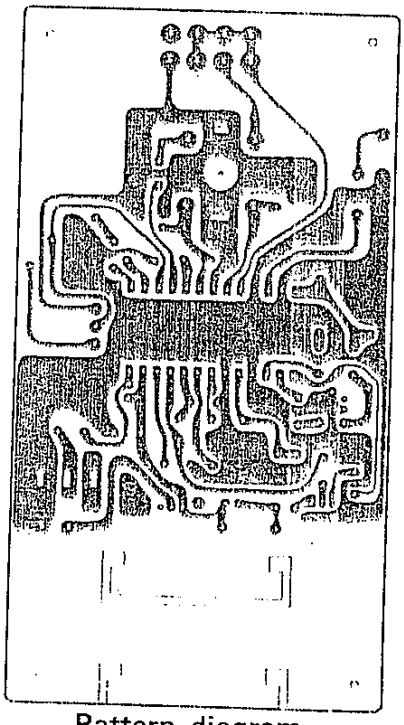


Pattern diagram

CXA1019P Evaluation Board



Parts arrangement diagram

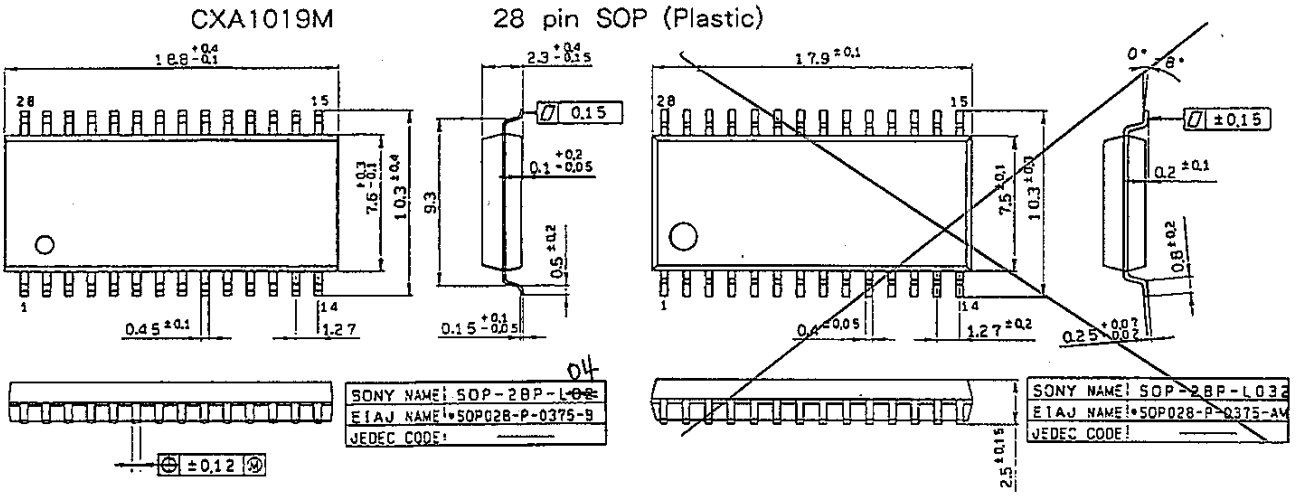


Pattern diagram

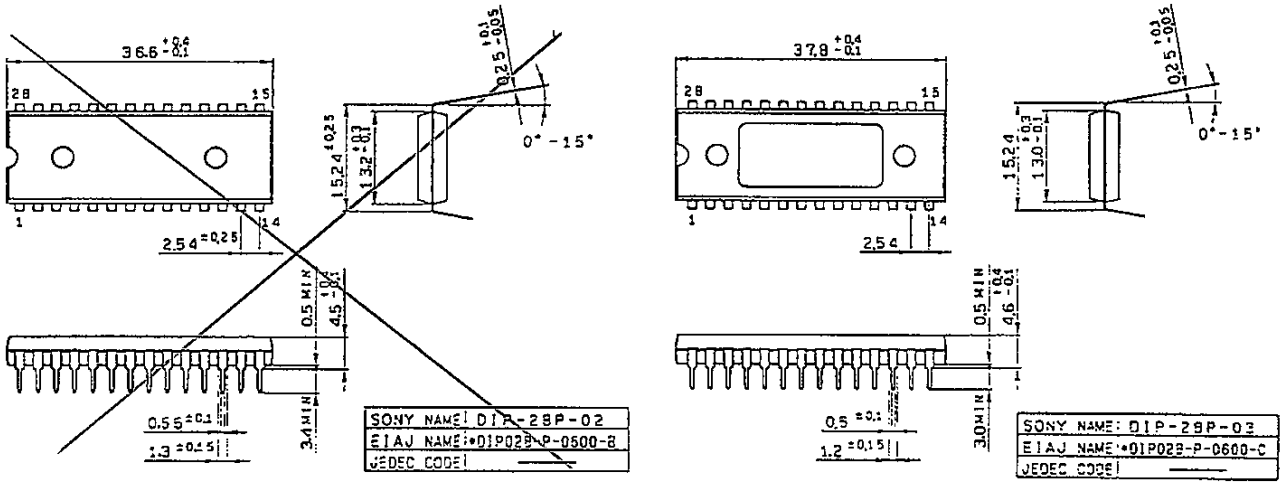
Downloaded from Elcodis.com electronic components distributor

Package Outline : Unit : mm

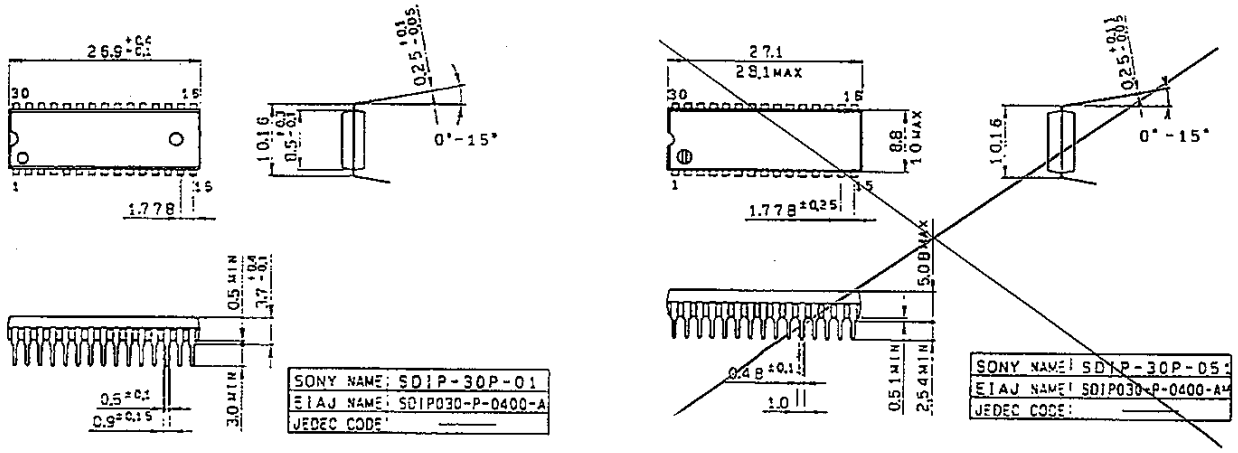
CXA1019M 28 pin SOP (Plastic)



CXA1019P 28 pin DIP (Plastic)



CXA1019S 30 pin SDIP (Plastic)

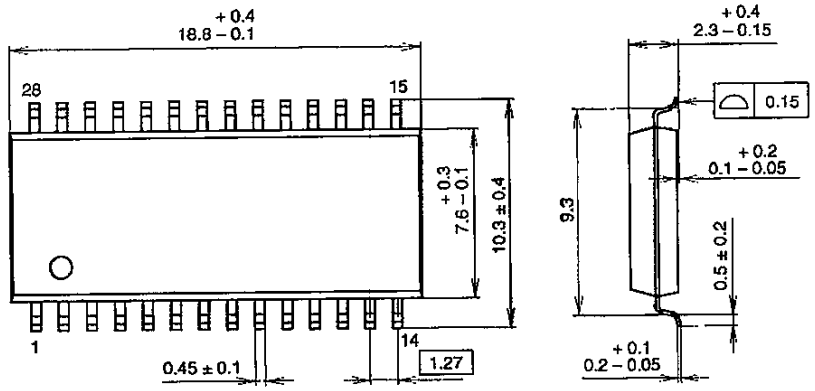


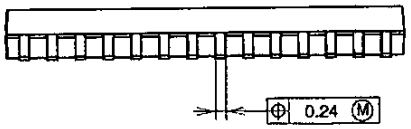
NOTE : PALLADIUM PLATING
This product uses S-PdPPF (Sony Spec.-Palladium Pre-Plated Lead Frame).

Downloaded from Elcodis.com electronic components distributor

Package Outline Unit: mm

28PIN SOP (PLASTIC)





PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	0.7g

SONY CODE	SOP-28P-L04
EIAJ CODE	SOP028-P-0375
JEDEC CODE	————————

LEAD PLATING SPECIFICATIONS

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

Downloaded from Elcodis.com electronic components distributor