



CXA1191

LINEAR INTEGRATED CIRCUIT

FM/AM Radio

DESCRIPTION

The UTC **CXA1191** is a one-chip FM/AM radio IC designed for radio-cassette tape recorders and headphone tape recorders.

FEATURES

- *Small number of peripheral components
- *Low current consumption ($V_{CC}=3V$)
 - FM: $I_D=5.3mA$ (Typ.)
 - AM: $I_D=3.4mA$ (Typ.)
- *Built-in FM/AM select switch
- *Large current of AF amplifier

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
- FM muting

Structure

- Bipolar silicon monolithic IC

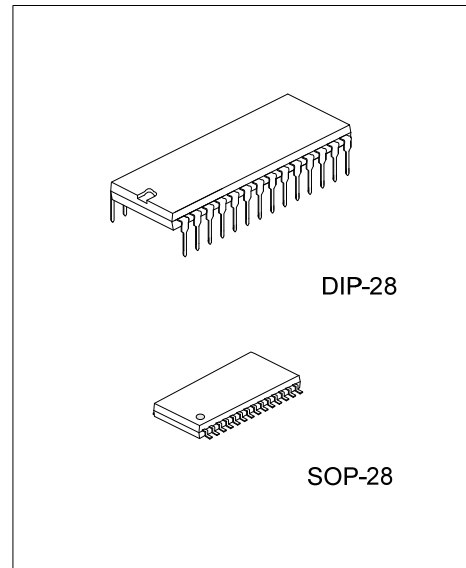
ORDERING INFORMATION

Ordering Number			Package	Packing
Normal	Lead Free Plating	Halogen Free		
CXA1191-D28-T	CXA1191L-D28-T	CXA1191G-D28-T	DIP-28	Tube
CXA1191-S28-R	CXA1191L-S28-R	CXA1191G-S28-R	SOP-28	Tape Reel
CXA1191-S28-T	CXA1191L-S28-T	CXA1191G-S28-T	SOP-28	Tube

CXA1191L-D28-R

- (1) Packing Type
- (2) Package Type
- (3) Lead Plating

- (1) R: Tape Reel, T: Tube
- (2) D28: DIP-28, S28: SOP-28
- (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn



Lead-free: CXA1191L

Halogen-free: CXA1191G

■ PIN CONFIGURATIONS

PIN	DESCRIPTION	SYMBOL	VOLTAGE(V)				EQUIVALENT CIRCUIT
			V _{CC} =3V		V _{CC} =6V		
			FM	AM	FM	AM	
1		MUTE	0	0	0	0	
2	Phase-shift circuit, Connect ceramic discriminator.	FM DISCRI	2.18	2.7	4.88	5.43	
3	Negative feedback pin	NF	1.5	1.5	3.0	3.0	
27	Power amplifier output pin	AF OUT	1.5	1.5	3.0	3.0	
4	Connect variable resistor for electronic volume control.	VOL CONT	1.25	1.25	1.25	1.25	
5	AM local oscillation circuit	AM OSC	1.25	1.25	1.25	1.25	
6	AFC variable capacitor pin	AFC	1.25	Note	1.25	Note	
8	Regulator pin 1.25V (Typ.)	REG OUT	1.25	1.25	1.25	1.25	
7	FM local oscillation circuit	FM OSC	1.25	1.25	1.25	1.25	
9	Connect FM RF tuning coil.	FM RF	1.25	1.25	1.25	1.25	
12	FM RF input pin	FM RF IN	0.3	0	0.3	0	
10	AM RF input	AM RF IN	1.25	1.25	1.25	1.25	
11		NC	0	0	0	0	
13		GND (FE GND)	0	0	0	0	

■ PIN CONFIGURATIONS(Cont.)

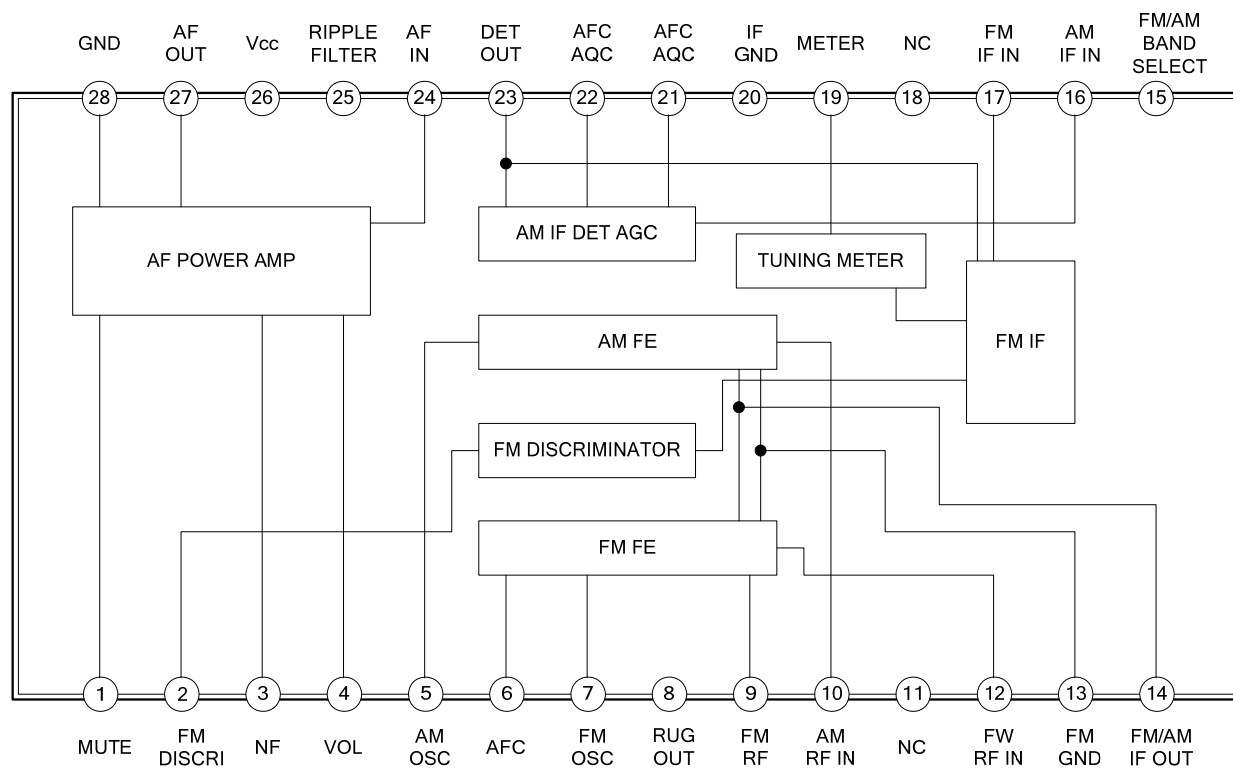
PIN	DESCRIPTION	SYMBOL	VOLTAGE(V)				EQUIVALENT CIRCUIT
			V _{CC} =3V		V _{CC} =6V		
			FM	AM	FM	AM	
14	IF output pin of FM and AM, Connect IF filter	FM/AM FE OUT	0.36	0.2	0.36	0.2	
15	FM and AM bands selection switch pin. During GND it becomes AM and during open it becomes FM.	BAND SELECT	0.84	0	0.88	0	
16	Input pin of AM IF	AM IF IN	0	0	0	0	
17	Input pin of FM IF	FM IF IN	0.34	0	0.88	0	
18		NC	0	0	0	0	
19	Meter drive circuit (For tuning indicator)	METER	1.6	1.6	4.5	4.5	
20		GND	0	0	0	0	
21	AFC pin of W band. During AM, it determines time constant of AGC.	AFC/AGC	1.25	1.49	1.25	1.49	
22	AFC pin of J band. During AM, it determines time constant of AGC.	AFC/AGC	1.25	1.25	1.25	1.25	
23	Detection output pin	DET OUT	1.25	1.0	1.25	1.0	
24	Power amplifier input pin	AF IN	0	0	0	0	
25	Ripple filter	RIPPLE FILTER	2.71	2.71	5.4	5.4	

■ PIN CONFIGURATIONS(Cont.)

PIN	DESCRIPTION	SYMBOL	VOLTAGE(V)				EQUIVALENT CIRCUIT
			V _{CC} =3V		V _{CC} =6V		
			FM	AM	FM	AM	
6	Power supply pin	V _{CC}	3.0	3.0	6.0	6.0	
28	Power GND	GND	0	0	0	0	

Note: The pin voltage of pin 6 during AM, it is the same pin voltage of pin22 (23) during J BAND and is the same pin voltage of pin 21 (22) during W BAND.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	9	V
Power Dissipation	P _D	1000	mW
		700	mW
Junction Temperature	T _J	+150	°C
Operating Temperature	T _{OPR}	-20 ~ +85	°C
Storage Temperature	T _{STG}	-40 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

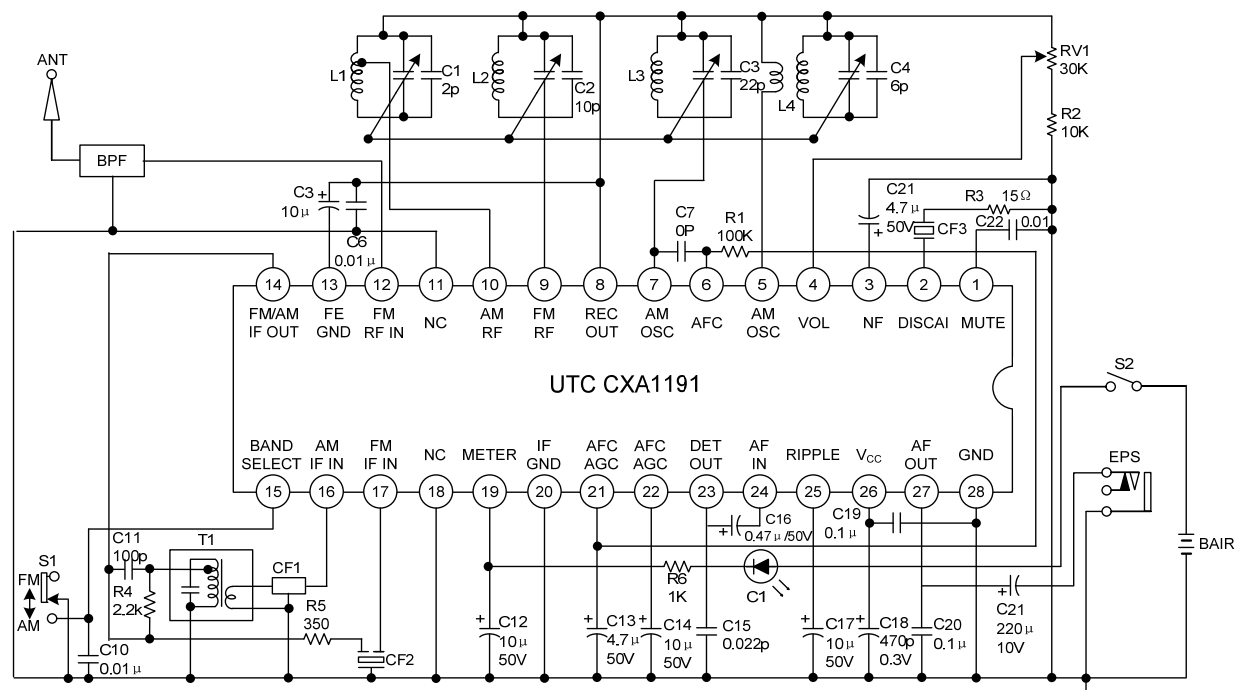
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	DIP-28	2 ~ 8.5	V
	SOP-28	2 ~ 7.5	V

■ ELECTRICAL CHARACTERISTICS (T_a=25°C, V_{CC}=6V)

PARAMETER	SYMBOL	SW CONDITIONS						TEST POINT	CONDITIONS	MIN	TYP	MAX	UNIT
		1	2	3	4	5	6						
AM Circuit Current	I _{D1}	A	B	A	A	A	A	I _A	No signal, AM	-	3.5	10.0	mA
FM Circuit Current	I _{D2}	A	B	A	A	B	A	I _A	No signal, FM	-	7.0	14.0	mA
FM Front End Voltage Gain	G _{V1}	A	B	A	A	B	A	V _A	V _{IN1} =40dBμV, 100MHz	32	39	46	dB
FM Detection Output Level	V _{D1}	A	-	-	A	B	A	V _D	V _{IN3} =90dBμV, 10.7 MHz (1 kHz, 22.5kHz DEV)	39	77.5	155	Vrms
FM IF Knee Level	V _{D2}	A	-	-	A	B	A	V _D	V _{IN3} level at a point 3 dB down from V _{IN3} =90dBμV, 10.7 MHz (1 kHz, 22.5kHz DEV)	-	24	32	dBμV
FM Detection Output Distortion Factor	THD1	A	-	-	A	B	A	V _D	V _{IN3} =90dBμV, 10.7 MHz (1 kHz, 75kHz DEV)	-	0.3	2.0	%
FM Meter Current	I _{B1}	A	-	-	A	B	A	I _M	V _{IN3} =60dBμV, 10.7 MHz	1.8	3.5	7.0	mA
AM Front End Voltage Gain	G _{V2}	A	A	A	A	A	A	V _B	V _{IN3} =60dBμV, 1660 kHz	15	22	29	dB
AM IF Voltage Gain	G _{V3}	A	A	-	A	A	A	V _D	V _{IN3} when 455kHz (1kHz, 30% MOD) output is -34dBm	14	20	27	dBμV
AM Detection Output Level	V _{D3}	A	A	-	A	A	A	V _D	V _{IN3} =85dBμV, 455kHz (1kHz, 30% MOD)	39	77.5	155	Vrms
AM Meter Current	I _{B2}	A	A	-	A	A	A	I _M	V _{IN3} =85dBμV, 455kHz (1kHz, 30% MOD)	1.3	3.0	7.0	mA
AM Detection Output Distortion Factor	THD2	A	A	B	B	A	A	V _D	V _{IN2} =60dBμV, 1660kHz (1kHz, 30% MOD), V _{CC} =7.8V	-	0.6	2.0	%
Audio Voltage Gain	G _{V4}	A	-	-	-	-	B	V _E	V _{IN3} =60dBμV, 10.7MHz V _{IN4} =-30dBμV, 1kHz	27	31.5	36	dB
Audio Distortion Factor	THD3	A	-	-	-	-	B	V _E	Distortion factor for output of 50mV _V V _{IN3} =60dBμV, 10.7MHz V _{IN4} =-20dBμV, 1kHz	-	0.3	2.5	%
Muting Level	V _{D4}	A	-	-	-	-	B	V _E	Muting level for 50 mW output V _{IN4} =-20dBm, 1kHz V _{IN3} OFF	8	15	22	dB

0dBμV=1μV

■ APPLICATION CIRCUIT



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