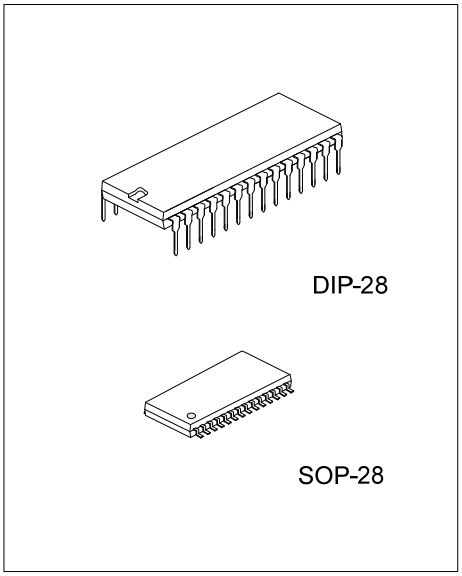
CXA1191

LINEAR INTEGRATED CIRCUIT

FM/AM Radio



Lead-free: CXA1191L
Halogen-free: CXA1191G

■ 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 (Vcc=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

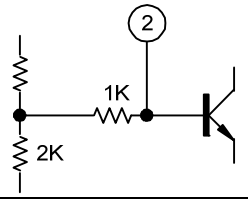
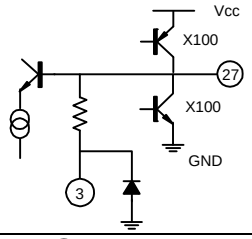
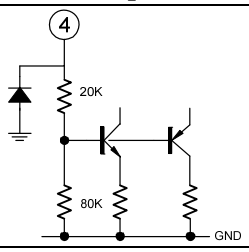
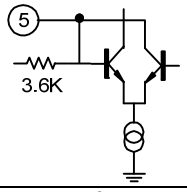
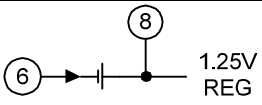
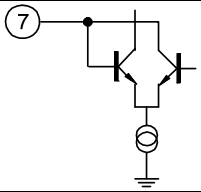
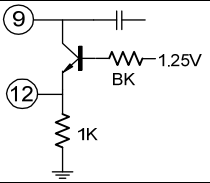
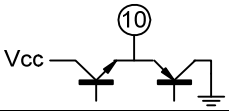
■ ORDERING INFORMATION

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

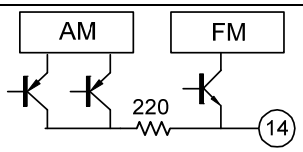
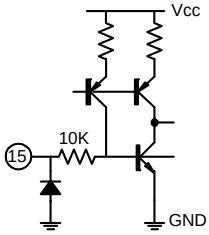
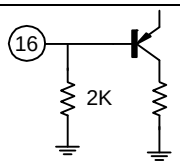
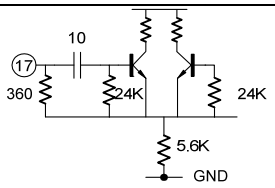
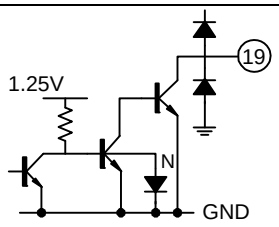
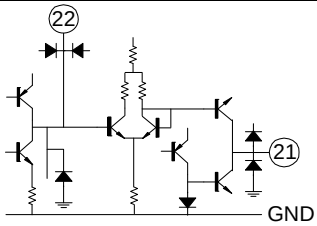
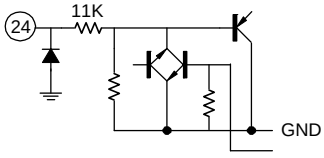
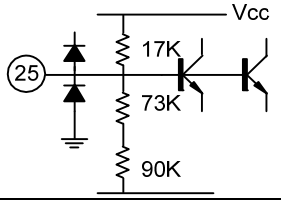
CXA1191L-D28-R
(1)Packing Type
(2)Package Type
(3)Lead Plating

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

■ 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.)

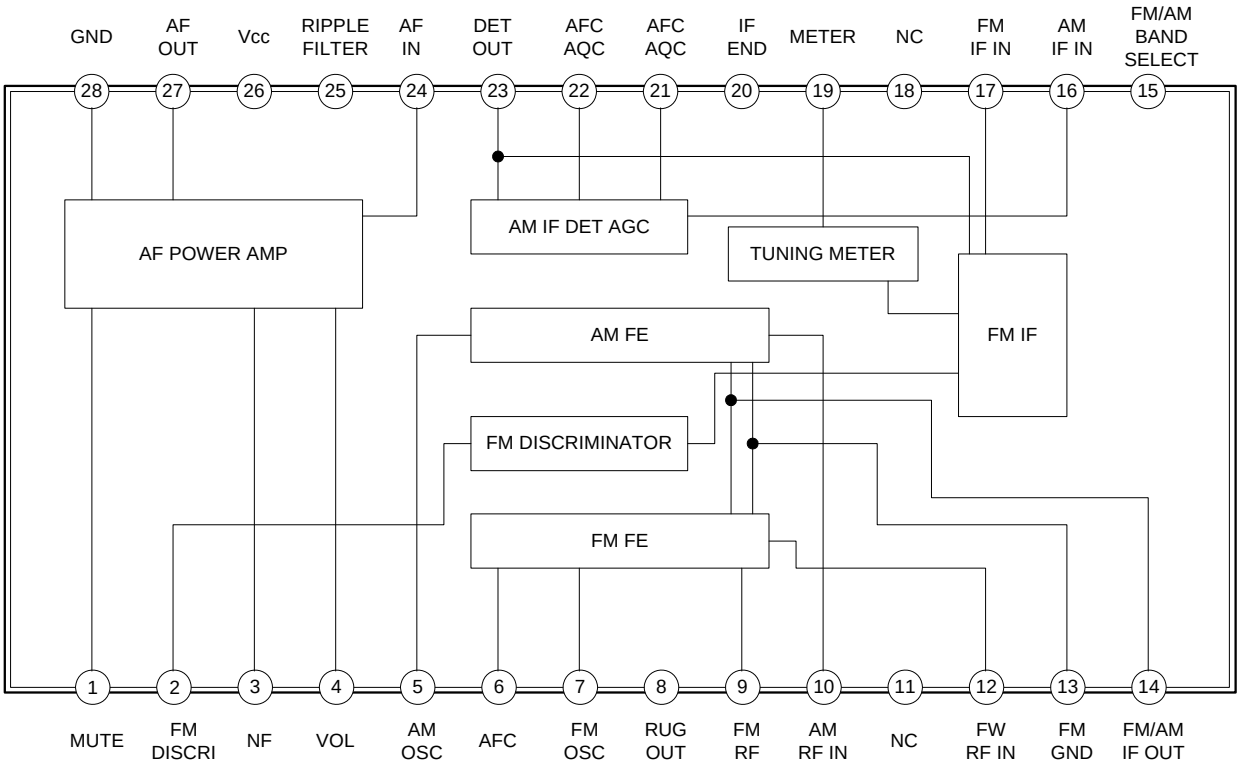
PIN	DESCRIPTION	SYMBOL	VOLTAGE(V)				EQUIVALENT CIRCUIT
			V_{CC}=3V		V_{CC}=6V		
			FM	AM	FM	AM	
14	IF output pin of FM and AM, Connect IF filter	FM/AM FE OUT	0.36	0.2	0.36	0.2	
15	FM and AM bands selection switch pin. During GND it becomes AM and during open it becomes FM.	BAND SELECT	0.84	0	0.88	0	
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	DIP-28	P_D	1000	mW
	SOP-28		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	V_{CC}	2 ~ 8.5	V
	SOP-28		2 ~ 7.5	V

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, Vcc=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	VA	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),Vcc=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 50mVV V_{IN3}=60dBμV,10.7MHz V_{IN4}=-20dBμ m,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