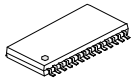
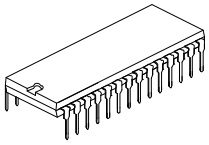
UTC CXA1191 LINEAR INTEGRATED CIRCUIT

FM/AM Radio



SOP-28



DIP-28

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

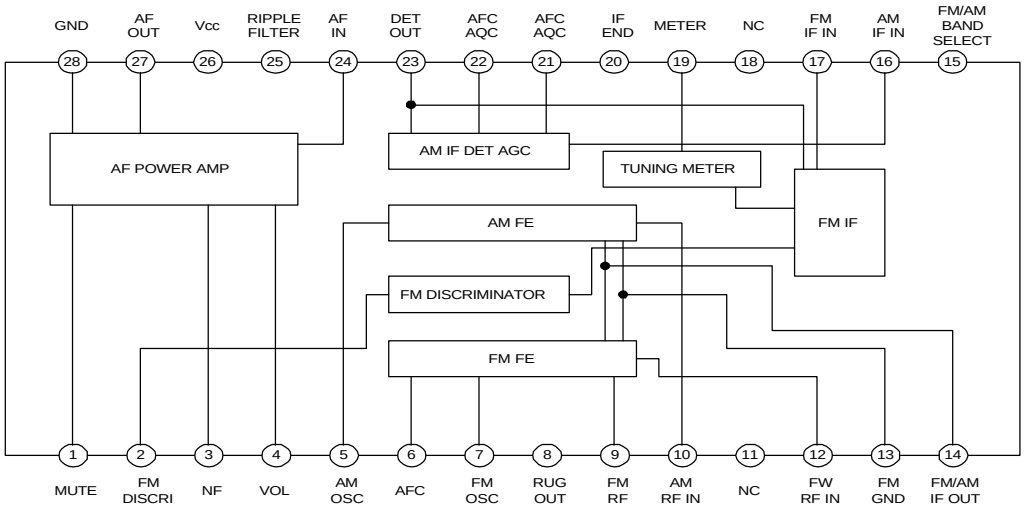
ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

PARAMETER	SYMBOL	VALUE	UNIT
Supply voltage	Vcc	9	V
Operating temperature	Topr	-10 ~ +60	°C
Storage temperature	Tstg	-50 ~ +125	°C
Allowable power dissipation	P_D	700 (SOP-28) 1000 (DIP-28)	mW

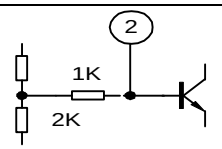
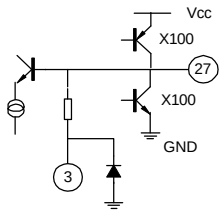
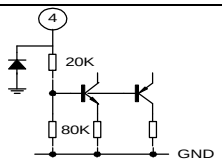
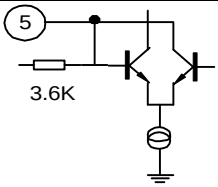
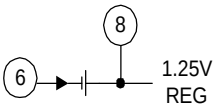
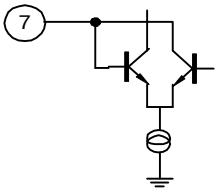
RECOMMENDED OPERATING CONDITIONS

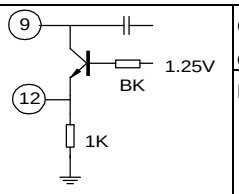
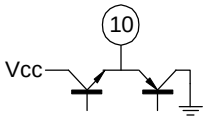
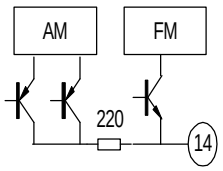
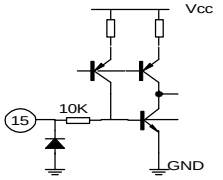
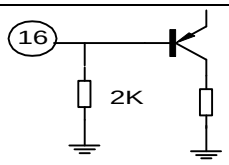
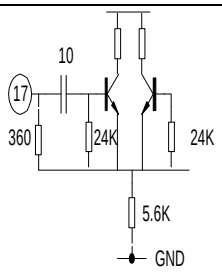
PARAMETER	SYMBOL	VALUE	UNIT
Supply voltage	Vcc	2 ~ 7.5 (SOP-28)	V
	Vcc	2 ~ 8.5 (DIP-28)	V

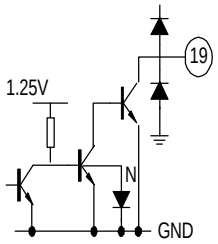
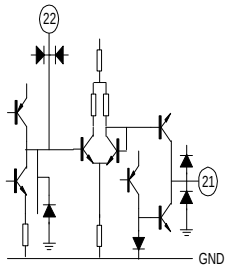
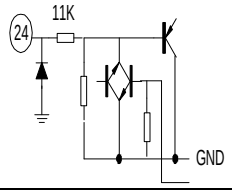
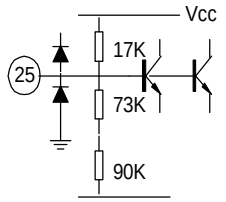
BLOCK DIAGRAM



PIN CONFIGURATIONS

PIN	SYMBOL	VOLTAGE(V)				EQUIVALENT CIRCUIT	DESCRIPTION
		Vcc=3V		Vcc=6V			
		FM	AM	FM	AM		
1	MUTE	0	0	0	0		
2	FM DISCRI	2.18	2.7	4.88	5.43		Phase-shift circuit, Connect ceramic discriminator.
3	NF	1.5	1.5	3.0	3.0		Negative feedback pin
27	AF OUT	1.5	1.5	3.0	3.0		Power amplifier output pin
4	VOL CONT	1.25	1.25	1.25	1.25		Connect variable resistor for electronic volume control.
5	AM OSC	1.25	1.25	1.25	1.25		AM local oscillation circuit
6	AFC	1.25	*	1.25	*		AFC variable capacitor pin
8	REG OUT	1.25	1.25	1.25	1.25		Regulator pin 1.25V (Typ.)
7	FM OSC	1.25	1.25	1.25	1.25		FM local oscillation circuit

9	FM RF	1.25	1.25	1.25	1.25		Connect FM RF tuning coil.
12	FM RF IN	0.3	0	0.3	0		FM RF input pin
10	AM RF IN	1.25	1.25	1.25	1.25		AM RF input
11	NC	0	0	0	0		
13	GND (FE GND)	0	0	0	0		
14	FM/AM FE OUT	0.36	0.2	0.36	0.2		IF output pin of FM and AM, Connect IF filter
15	BAND SELECT	0.84	0	0.88	0		FM and AM bands selection switch pin. During GND it becomes AM and during open it becomes FM.
16	AM IF IN	0	0	0	0		Input pin of AM IF
17	FM IF IN	0.34	0	0.88	0		Input pin of FM IF
18	NC	0	0	0	0		

19	METER	1.6	1.6	4.5	4.5		Meter drive circuit (For tuning indicator)
20	GND	0	0	0	0		
21	AFC/AGC	1.25	1.49	1.25	1.49		AFC pin of W band. During AM, it determines time constant of AGC.
22	AFC/AGC	1.25	1.25	1.25	1.25		AFC pin of J band. During AM, it determines time constant of AGC.
23	DET OUT	1.25	1.0	1.25	1.0		Detection output pin
24	AF IN	0	0	0	0		Power amplifier input pin
25	RIPPLE FILTER	2.71	2.71	5.4	5.4		Ripple filter
26	Vcc	3.0	3.0	6.0	6.0		Power supply pin
28	GND	0	0	0	0		Power GND

*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.

ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc=6V)

NO	ITEM	SYMBOL	SW CONDITIONS						TEST POINT	CONDITIONS	MIN	TYP	MAX	UNIT
			1	2	3	4	5	6						
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,100MH_Z	32	39	46	dB
4	FM detection output level	VD1	A	-	-	A	B	A	VD	V_{IN3}=90dBμV,10.7 MH_Z (1 kHz,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 3 dB down from V_{IN3}=90dBμV,10.7 MH_Z (1 kHz,22.5kHz DEV)	-	24	32	dBμV
6	FM detection output distortion factor	THD1	A	-	-	A	B	A	VD	V_{IN3}=90dBμV,10.7 MH_Z (1 kHz,75kHz DEV)	-	0.3	2.0	%
7	FM meter current	IB1	A	-	-	A	B	A	IM	V_{IN3}=60dBμV,10.7 MH_Z	1.8	3.5	7.0	mA
8	AM front end voltage gain	GV2	A	A	A	A	A	A	VB	V_{IN3}=60dBμV,1660 kH_Z	15	22	29	dB
9	AM IF voltage gain	GV3	A	A	-	A	A	A	VD	V_{IN3} 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_{IN3}=85dBμV,455kH_Z (1kHz, 30% MOD)	39	77.5	155	Vrms
11	AM meter current	IB2	A	A	-	A	A	A	IM	V_{IN3}=85dBμV,455kH_Z (1kHz, 30% MOD)	1.3	3.0	7.0	mA
12	AM detection output distortion factor	THD2	A	A	B	B	A	A	VD	V_{IN2}=60dBμV,1660kH_Z (1kHz, 30% MOD),Vcc=7,8V	-	0.6	2.0	%
13	Audio voltage gain	GV4	A	-	-	-	-	B	VE	V_{IN3}=60dBμV,10.7MH_Z V_{IN4}=-30dBμV,1kH_Z	27	31.5	36	dB
14	Audio distortion factor	THD3	A	-	-	-	-	B	VE	Distortion factor for output of 50mVV V_{IN3}=60dBμV,10.7MH_Z V_{IN4}=-20dBμ m,1kH_Z	-	0.3	2.5	%
15	Muting level	VD4	A	-	-	-	-	B	VE	Muting level for 50 mW output V_{IN4}=-20dBm,1kH_Z V_{IN3} OFF	8	15	22	dB

0dBμV=1μV

APPLICATION CIRCUIT