

SANYO

No. 3979

LA1883M**Single-chip FM/AM Tuner
for Car Radio and Home Stereo Equipment****OVERVIEW**

The LA1883M is a single-chip stereo FM/AM tuner system IC for use in car radio and home stereo equipment. It features higher performance and 30% fewer external components than current devices.

The LA1883M is a basic FM/AM tuner block on a single chip. It comprises FM front end, FM IF, MPX, noise canceller, AM and AM/FM switch.

The LA1883M operates from a 7.5 to 9.2 V supply and is available in 64-pin QIPs.

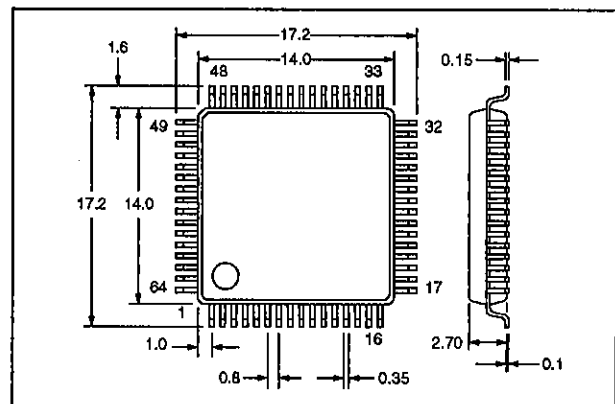
FEATURES

- Single-chip stereo FM/AM tuner
- FM front end, FM IF, MPX, noise canceller, AM and FM/AM switch
- Higher performance and 30% fewer external components than current devices.
- High FM front end to FM IF stage isolation
- 7.5 to 9.2 V supply
- 64-pin QIP

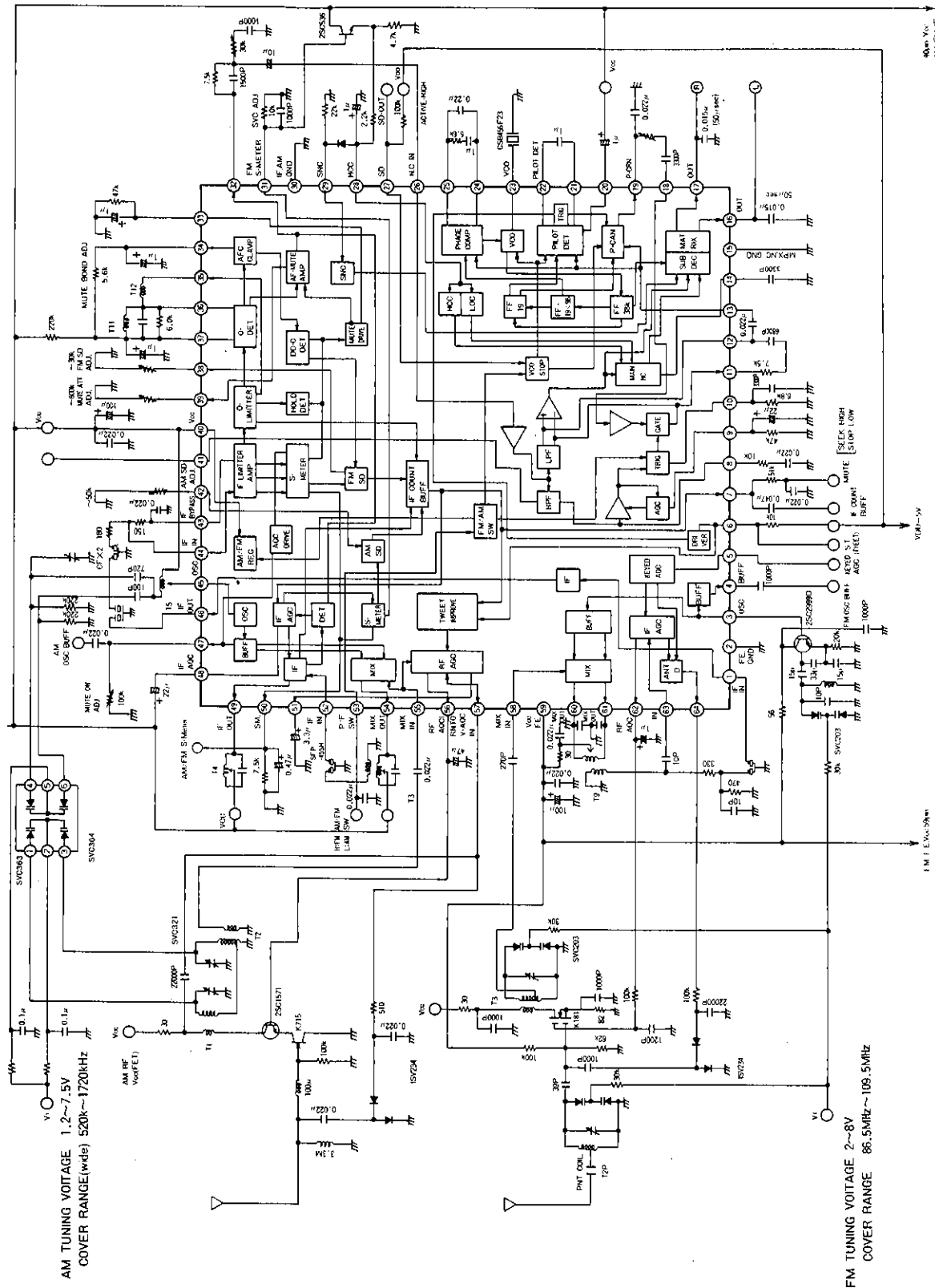
PACKAGE DIMENSIONS

Unit: mm

3159-QIP64E



BLOCK DIAGRAM



AM TUNING VOLTAGE 1.2~7.5V
COVER RANGE(wide) 520K~1720KHz

FM TUNING VOLTAGE 2~8V
COVER RANGE 85.5MHz~109.5MHz

Unit (resistance: Ω, capacitance: F)

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	9.5	V
Power dissipation	P_D	950	mW
Operating temperature range	T_{opr}	-30 to 85	°C
Storage temperature range	T_{stg}	-40 to 150	°C

Recommended Operating Conditions

$T_a = 25\text{ °C}$

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	8.5	V
Supply voltage range	V_{CC}	7.5 to 9.2	V
STEREO INJ supply voltage	$V_{CC\text{ STEREO INJ}}$	5	V

Electrical Characteristics

FM IF

$V_{CC} = 8.5\text{ V}$, $T_a = 25\text{ °C}$, $f_c = 10.7\text{ MHz}$

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Demodulator output voltage	V_{OFM}	$f_m = 1\text{ kHz}$, 100% modulation, $V_1 = 80\text{ dB}\mu$	180	280	380	mV
Channel balance	CB	$f_m = 1\text{ kHz}$, 100% modulation, $V_1 = 80\text{ dB}\mu$	-1	0	1	dB
FM total harmonic distortion	THD_{FM}	$f = 1\text{ kHz}$, 100% modulation, $V_1 = 80\text{ dB}\mu$	-	0.5	1.2	%
Signal-to-noise ratio	$S/N_{FM\text{ IF}}$	$f = 1\text{ kHz}$, 100% modulation, $V_1 = 80\text{ dB}\mu$	68	75	-	dB
AM suppression ratio	AMR	$f = 1\text{ kHz}$, $f_m = 1\text{ kHz}$, 30% AM modulation, $V_1 = 80\text{ dB}\mu$	56	69	-	dB
Muting attenuation	α_{MUTE}	$f = 1\text{ kHz}$, $V_1 = 80\text{ dB}\mu$. V_{33} changed from 0 to 2 V.	5	10	15	dB
		$f = 1\text{ kHz}$, $V_1 = 80\text{ dB}\mu$. V_{33} changed from 0 to 4 V.	19	24	29	
Separation	SEP	See note 2.	35	45	-	dB
Stereo LED turn-ON pilot tone modulation	ST_{ON}	$V_6 < 1.5\text{ V}$	2.5	3.7	6.6	%

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Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Stereo LED turn-OFF pilot tone modulation	STOFF	$V_6 < 3.5 \text{ V}$	1.5	2.7	-	%
Main channel total harmonic distortion	THD _{main}	See note 2.	-	0.4	1.5	%
Pilot signal cancellation level	PCAN	10% pilot signal, $V_1 = 80 \text{ dB}\mu$, Pilot-level leakage DIN-AUDIO measurement	15	22	-	dB
SNC output voltage	V _{OSUB}	$V_1 = 80 \text{ dB}\mu$, $V_{31} = 0.1 \text{ V}$. See note 2.	-	-	5	mV
SNC output attenuation	α_{SNC}	$V_1 = 80 \text{ dB}\mu$, V_{31} changed from 3.0 to 0.6 V. See note 2.	0	4	8	dB
HCC output attenuation	α_{HCC}	$V_1 = 80 \text{ dB}\mu$, $f = 10 \text{ kHz}$. V_{28} changed from 3.0 to 0.6 V. See note 2.	0.5	4.5	8.5	dB
		$V_1 = 80 \text{ dB}\mu$, $f = 10 \text{ kHz}$. V_{28} changed from 3.0 to 0.1 V. See note 2.	20	24	28	
Input -3 dB limiting voltage	V _{ILIM}	Referred to $V_1 = 80 \text{ dB}\mu$.	33	40	47	dB μ
Muting sensitivity	V _{MUTE}	Unmodulated signal, $V_{33} = 2 \text{ V}$	27	35	43	dB μ
SD sensitivity	SD _{SEN MPX}	Unmodulated signal. IF count buffer is ON ($V > 100 \text{ mV}$).	60	72	84	dB μ
		Unmodulated signal. SD is ON.	60	72	84	
IF count buffer output voltage	V _{IF BUFF FM}	Unmodulated input and output, $V_{\text{FM IF}} = 100 \text{ dB}\mu$	170	260	400	mV
S-meter output voltage	V _{SM FM}	No signal	0	0.4	1.0	V
		$V_1 = 50 \text{ dB}\mu$	1.0	1.9	3.0	
		$V_1 = 70 \text{ dB}\mu$	1.9	3.4	5.5	
		$V_1 = 100 \text{ dB}\mu$	3.3	5.2	6.9	
Muting bandwidth	BW _{MUTE}	$V_1 = 100 \text{ dB}\mu$, $V_{33} = 2 \text{ V}$ unmodulated wideband signal	150	230	330	kHz

Notes

1. Mounted in Yamaichi Electrical Industries' IC-51-0644-824 or KS8277 IC socket
2. f_1 comprises 90% left and right signals, and 10% pilot signal.

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FM front end

$V_{CC} = 8.5 \text{ V}$, $T_a = 25 \text{ }^\circ\text{C}$

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
RF AGC turn-ON input voltage	V_{IAGC}	$V_{64} = 0.7 \text{ V}$	65	72	79	dB μ
Conversion voltage gain	A_v	$V_{MIX IN} = 70 \text{ dB}\mu$ at 98 MHz with no modulation	74	118	187	mV
OSC BUFF output voltage	$V_{OSC BUFF FM}$	No signal, $f_{osc} = 108.7 \text{ MHz}$, $V_t = 4.6 \text{ V}$	130	200	270	mV
FM section quiescent supply current	I_{CCOFM}	No signal. $I_{40} + I_{49} + I_{54} + I_{60} + I_{61}$	54	77	95	mA

Noise canceller

$V_{CC} = 8.5 \text{ V}$, $T_a = 25 \text{ }^\circ\text{C}$

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Gate time	τ_{GATE}	$V_{NC IN} = 100 \text{ mV}$ peak at $f = 1 \text{ kHz}$, $1 \mu\text{s}$ pulse	15	25	35	μs
Noise sensitivity	N_{SEN}	1 kHz, $1 \mu\text{s}$ pulse input level when noise canceller is ON	-	-	30	mV $_p$

AM

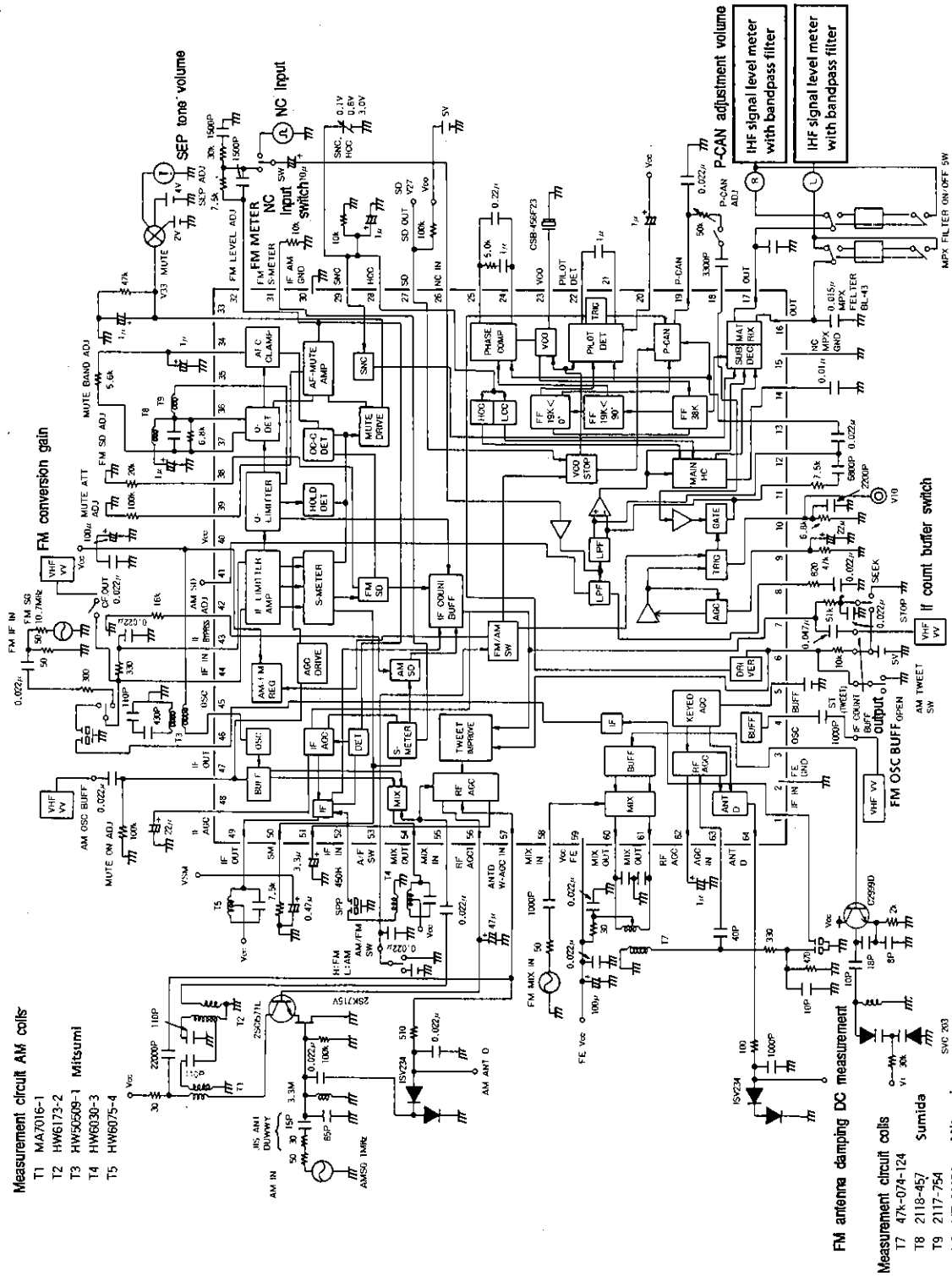
$V_{CC} = 8.5 \text{ V}$, $T_a = 25 \text{ }^\circ\text{C}$, $f_{AM ANT} = 1 \text{ MHz}$ unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Usable sensitivity	S	$V_{AM ANT} = 27 \text{ dB}\mu$, $f_m = 1 \text{ kHz}$, 30% modulation	16	20	-	dB
Detector output voltage	V_{OAM}	$V_{AM ANT} = 74 \text{ dB}\mu$, $f_m = 1 \text{ kHz}$, 30% modulation	85	120	170	mV
AGC figure-of-merit	V_{AGCFOM}	Referred to $V_{AM ANT} = 74 \text{ dB}\mu$, change in input required for output to fall 10 dB	52	57	62	dB
Signal-to-noise ratio	S/N_{AM}	$V_{AM ANT} = 74 \text{ dB}\mu$, $f_m = 1 \text{ kHz}$, 30% modulation	45	50	-	dB
Total harmonic distortion	THD_{AM}	$V_{AM ANT} = 74 \text{ dB}\mu$, $f_m = 1 \text{ kHz}$, 80% modulation	-	0.4	1.0	%
S-meter output voltage	$V_{SM AM}$	No signal	-	0	0.3	V
		$V_{AM ANT} = 100 \text{ dB}\mu$, unmodulated	3.3	4.7	7.0	
OSC BUFF output voltage	$V_{OSC BUFF AM}$	No signal	310	370	-	mV

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Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Wideband-AGC sensitivity	W-AGC _{SEN}	f _{AM ANT} = 1.4 MHz, V ₅₇ = 0.7 V	93	99	105	dBμ
SD antenna input level sensitivity	SD _{SEN AM}	IF count output is ON.	23	30	37	dBμ
		SD is ON.	23	30	37	
Tweet reduction circuit antenna input level sensitivity	Tweet _{SEN}	N ₆ = 0 V, AGC ON input	50	56	62	dBμ
IF BUFF output voltage	V _{IF BUFF AM}	V _{AM ANT} = 74 dBμ, unmodulated	200	260	-	mV

Measurement Circuit



Measurement circuit AM coils
 T1 MAY016-1
 T2 HW6173-2
 T3 HW50509-1 Mitsumi
 T4 HW6030-3
 T5 HW6075-4

Measurement circuit coils
 T7 4X-074-124
 T8 2118-457 Sumida
 T9 2117-754
 L3 Y1-30074 Mitsumi

Unit (resistance: Ω , capacitance: F)

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