

**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.

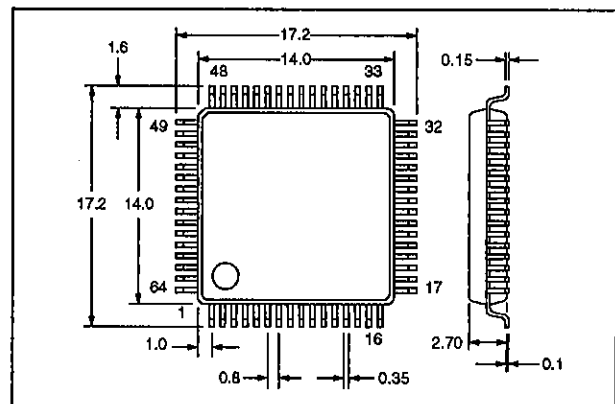
**FEATURES**

- 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

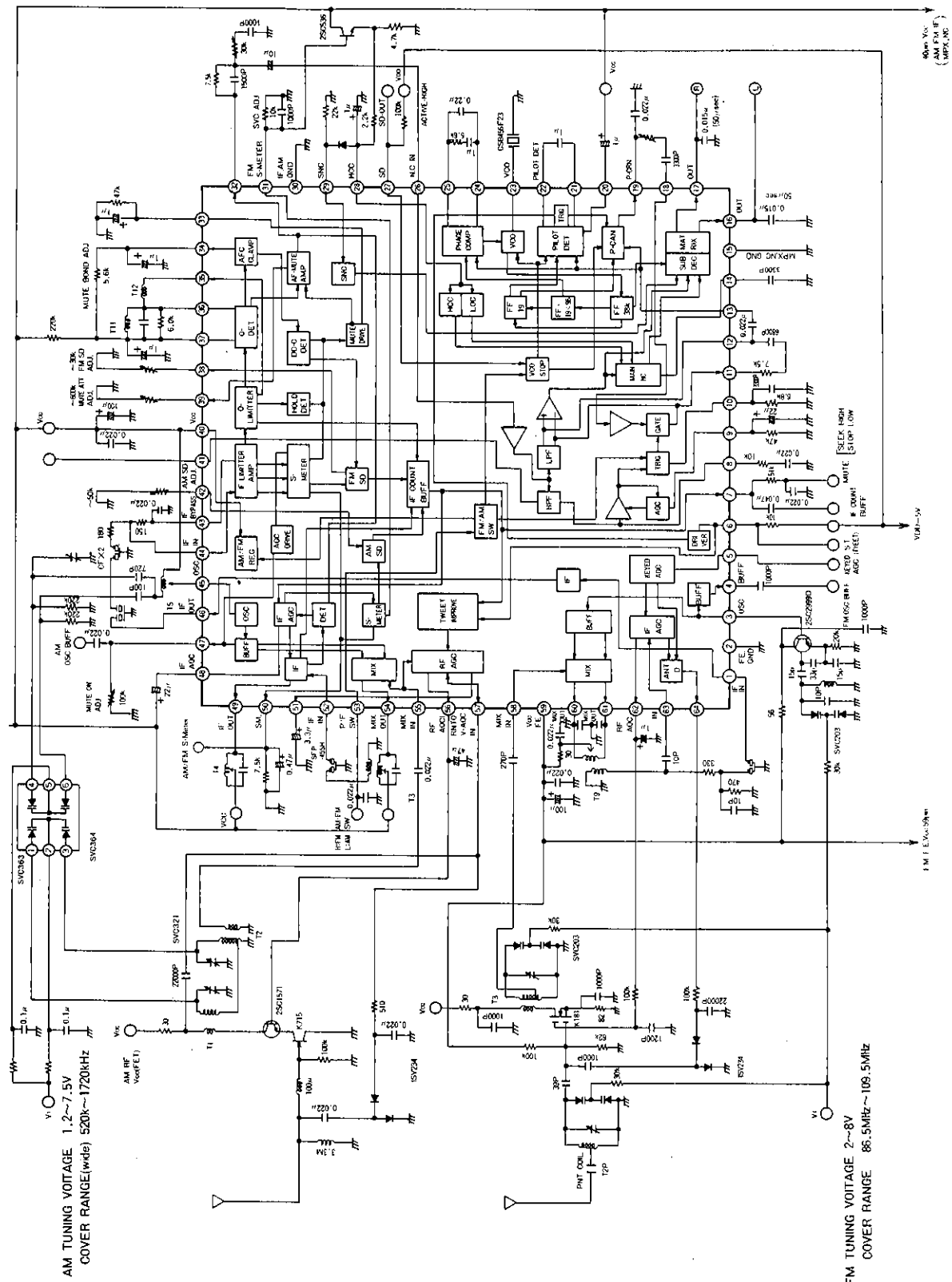
**PACKAGE DIMENSIONS**

Unit: mm

3159-QIP64E



## BLOCK DIAGRAM



## 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

$T_a = 25\text{ }^{\circ}\text{C}$

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

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

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Demodulator output voltage	$V_{OFM}$	$f_m = 1\text{ kHz}$ , 100% modulation, $V_i = 80\text{ dB}\mu$	180	280	380	mV
Channel balance	CB	$f_m = 1\text{ kHz}$ , 100% modulation, $V_i = 80\text{ dB}\mu$	-1	0	1	dB
FM total harmonic distortion	$THD_{FM}$	$f = 1\text{ kHz}$ , 100% modulation, $V_i = 80\text{ dB}\mu$	-	0.5	1.2	%
Signal-to-noise ratio	$S/N_{FM\text{ IF}}$	$f = 1\text{ kHz}$ , 100% modulation, $V_i = 80\text{ dB}\mu$	68	75	-	dB
AM suppression ratio	AMR	$f = 1\text{ kHz}$ , $f_m = 1\text{ kHz}$ , 30% AM modulation, $V_i = 80\text{ dB}\mu$	56	69	-	dB
Muting attenuation	$\alpha_{MUTE}$	$f = 1\text{ kHz}$ , $V_i = 80\text{ dB}\mu$ , $V_{33}$ changed from 0 to 2 V.	5	10	15	dB
		$f = 1\text{ kHz}$ , $V_i = 80\text{ dB}\mu$ , $V_{33}$ 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	ST <sub>OFF</sub>	$V_6 < 3.5 \text{ V}$	1.5	2.7	–	%
Main channel total harmonic distortion	THD <sub>main</sub>	See note 2.	–	0.4	1.5	%
Pilot signal cancellation level	P <sub>CAN</sub>	10% pilot signal, $V_1 = 80 \text{ dB}\mu$ , Pilot-level leakage DIN-AUDIO measurement	15	22	–	dB
SNC output voltage	V <sub>SUS</sub>	$V_1 = 80 \text{ dB}\mu$ , $V_{31} = 0.1 \text{ V}$ . See note 2.	–	–	5	mV
SNC output attenuation	$\alpha_{\text{SNC}}$	$V_1 = 80 \text{ dB}\mu$ , $V_{31}$ changed from 3.0 to 0.6 V. See note 2.	0	4	8	dB
HCC output attenuation	$\alpha_{\text{HCC}}$	$V_1 = 80 \text{ dB}\mu$ , $f = 10 \text{ kHz}$ . $V_{28}$ 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 <sub>ILIM</sub>	Referred to $V_1 = 80 \text{ dB}\mu$ .	33	40	47	dB $\mu$
Muting sensitivity	V <sub>MUTE</sub>	Unmodulated signal, $V_{33} = 2 \text{ V}$	27	35	43	dB $\mu$
SD sensitivity	SD <sub>SEN MPX</sub>	Unmodulated signal. IF count buffer is ON ( $V > 100 \text{ mV}$ ).	60	72	84	dB $\mu$
		Unmodulated signal. SD is ON.	60	72	84	
IF count buffer output voltage	V <sub>IF BUFF FM</sub>	Unmodulated input and output, $V_{\text{FM IF}} = 100 \text{ dB}\mu$	170	260	400	mV
S-meter output voltage	V <sub>SM FM</sub>	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 <sub>MUTE</sub>	$V_1 = 100 \text{ dB}\mu$ , $V_{33} = 2 \text{ V}$ 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 $\mu$
Conversion voltage gain	$A_v$	$V_{MX IN} = 70 \text{ dB}\mu$ at 98 MHz with no modulation	74	118	187	mV
OSC BUFF output voltage	$V_{OSC BUFF FM}$	No signal, $I_{OSC} = 108.7 \text{ MHz}$ , $V_t = 4.6 \text{ V}$	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	$\tau_{GATE}$	$V_{NC IN} = 100 \text{ mV peak}$ at $f = 1 \text{ kHz}$ , $1 \mu\text{s}$ pulse	15	25	35	$\mu\text{s}$
Noise sensitivity	$N_{SEN}$	1 kHz, $1 \mu\text{s}$ pulse input level when noise canceller is ON	—	—	30	mV $_p$

## AM

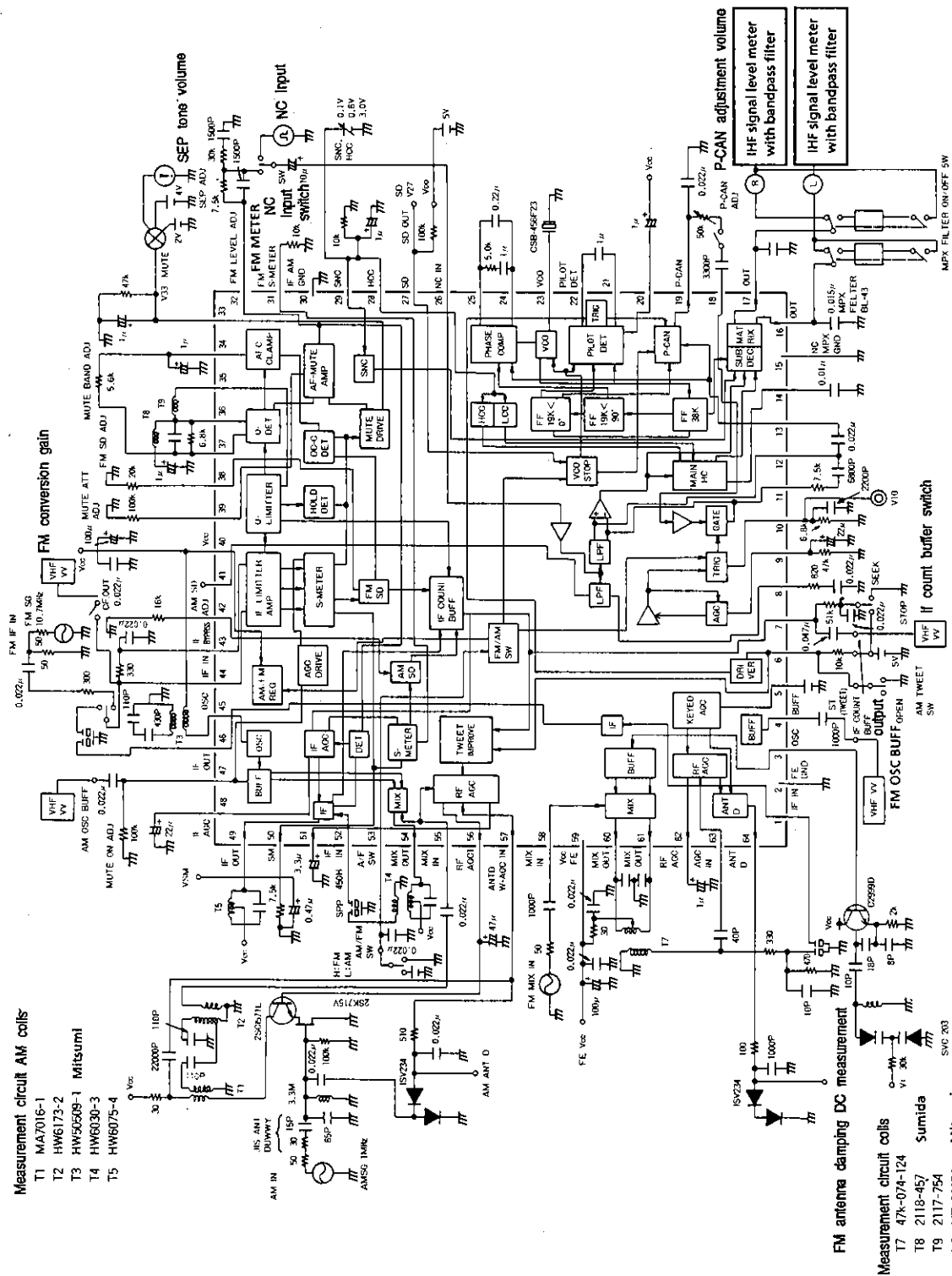
$V_{CC} = 8.5 \text{ V}$ ,  $T_a = 25 \text{ }^\circ\text{C}$ ,  $f_{AM ANT} = 1 \text{ MHz}$  unless otherwise noted

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 <sub>SEN</sub>	f <sub>AM ANT</sub> = 1.4 MHz, V <sub>57</sub> = 0.7 V	93	99	105	dBμ
SD antenna input level sensitivity	SD <sub>SEN AM</sub>	IF count output is ON.	23	30	37	dBμ
		SD is ON.	23	30	37	
Tweet reduction circuit antenna input level sensitivity	Tweet <sub>SEN</sub>	N <sub>6</sub> = 0 V, AGC ON input	50	56	62	dBμ
IF BUFF output voltage	V <sub>IF BUFF AM</sub>	V <sub>AM ANT</sub> = 74 dBμ, unmodulated	200	260	–	mV

### Measurement Circuit

Unit (resistance:  $\Omega$ , capacitance: F)

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