



SANYO Semiconductors

DATA SHEET

LA1863M — Monolithic Linear IC Single-Chip Tuner System for Car Radios

Overview

The LA1863M is a high-performance multifunction (FM IF, noise canceller, MPX, and MRC) single-chip car tuner system IC that can easily implement high-quality FM tuners with superlative cost-performance characteristics.

Functions

- FM IF.
- Noise canceller.
- MPX.
- MRC (Multipath noise reduction circuit).

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	Pins 4 and 31	9.2	V
Allowable power dissipation	$P_d \text{ max}$		740	mW
Operating temperature	T_{opr}		-40 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}	Pins 4 and 31	8.0	V
	$V_{CC \text{ ST/SD}}$	Pins 29 and 44	5.0	V
Operating supply voltage range	$V_{CC \text{ op}}$		7.0 to 9.0	V

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Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 8.0\text{V}$, in the specified test circuit, FM IF input.

Note that these tests are made using an IC socket, model IC-51-044-467 (Yamaichi Electronics Co., Ltd).

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
FM Characteristics						
Current drain	I_{CCO-FM}	No input ($I_4 + I_{31}$)	40	55	70	mA
Demodulation output	V_{O-FM}	10.7MHz, 100dB μ , 1kHz, 100% modulation, The pin 7 output	175	260	350	mVrms
Channel balance	CB	10.7MHz, 100dB μ , 1kHz, 100% modulation, The ration of pin 7 to pin 8 referenced to pin 7.	-1.0	0	+1.0	dB
Total harmonic distortion	THD-FM mono	10.7MHz, 100dB μ , 1kHz, 100% modulation, pin 7		0.2	1.0	%
Signal-to-noise ratio - IF	S/N-FM IF	10.7MHz, 100dB μ , 1kHz, 100% modulation, pin 7	73	80		dB
AM rejection ratio - IF	AMR IF	10.7MHz, 100dB μ , 1kHz, fm = 1kHz, 30% AM, pin 7	57	70		dB
Muting attenuation	Att-1	10.7MHz, 100dB μ , 1kHz, when V22 goes from 0 to 1V. The attenuation at pin 7.	20	25	30	dB
	Att-2	10.7MHz, 100dB μ , 1kHz, when V22 goes from 0 to 2V. The attenuation at pin 7.	28	33	38	dB
Separation	Separation	10.7MHz, 100dB μ , L+R = 90%, pilot = 10%, the pin 7 output ratio	30	40		dB
Stereo on level	ST-ON	The pilot modulation such that V44 becomes less than 0.5V	1.5	2.9	5.0	%
Stereo off level	ST-OFF	The pilot modulation such that V44 becomes greater than 3.5V	0.8	1.9		%
Total harmonic distortion - main	THD-main L	10.7MHz, 100dB μ , L+R = 90%, pilot = 10%, pin 7		0.3	1.0	%
Pilot cancellation	P _{CAN}	10.7MHz, 100dB μ , pilot = 10% The pin 7 signal/pilot level leakage DIN audio filter	20	35		dB
SCN output voltage	$V_{O\ SUB}$	10.7MHz, 100dB μ , L-R = 90%, pilot = 10%, $V_{13} = 0.1\text{V}$, pin 7		3.0	10.0	mVrms
SCN output attenuation	Att _{SNC}	10.7MHz, 100dB μ , L-R = 90%, pilot = 10%, $V_{13} = 3\text{V} \rightarrow 0.6\text{V}$, pin 7	2.0	6.0	10.0	dB
HCC output attenuation	Att _{HCC-1}	10.7MHz, 100dB μ , 10kHz, L+R = 90%, pilot = 10%, $V_{14} = 3\text{V} \rightarrow 0.6\text{V}$, pin 7	2.0	6.0	10.0	dB
	Att _{HCC-2}	10.7MHz, 100dB μ , 10kHz, L+R = 90%, pilot = 10%, $V_{14} = 3\text{V} \rightarrow 0.1\text{V}$, pin 7	6.0	10.0	14.0	dB
Input limiting voltage	V_{i-lim}	10.7MHz, 100dB μ , 100% modulation The IF input such that the input referenced output is down by -3dB When the soft muting function is operating	32	41	50	dB μ
Muting attenuation	V_{i-mute}	The IF input level when V23 = 2V, no modulation	29	37	45	dB μ
SD sensitivity	SD-sen	The IF input such that the SD pin voltage (V29) becomes over 3.5V, no modulation	64	74	84	dB μ
IF counter buffer output	$V_{IFBUFF-FM}$	10.7MHz, 100dB μ , no modulation The pin 19 output, no modulation	160	230	320	mVrms
AM output	V_{O-AM}	In AM mode, the pin 7 output ($AC_2 = 300\text{mVrms}$, 1kHz, pin 20 input)	234	330	466	mVrms
S-meter output	$V_{SM\ FM-1}$	No input, the pin 32 DC output, no modulation	0.0	0.1	0.3	V
	$V_{SM\ FM-2}$	50dB μ , the pin 32 DC output, no modulation	1.0	2.1	3.3	V
	$V_{SM\ FM-3}$	70dB μ , the pin 32 DC output, no modulation	2.3	3.5	5.3	V
	$V_{SM\ FM-4}$	100dB μ , the pin 32 DC output, no modulation	4.7	6.0	6.7	V
Muting attenuation	BW-Mute	100dB μ , the bandwidth when V23 = 2V, no modulation	110	190	290	kHz
Mute drive output	VMute-100	100dB μ , the pin 32 DC output, no modulation	0.00	0.03	0.20	V

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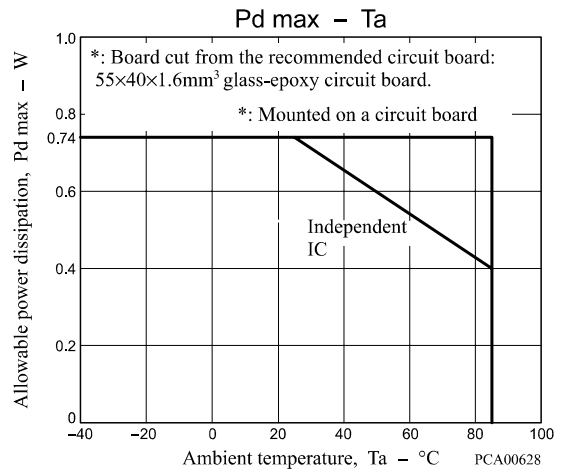
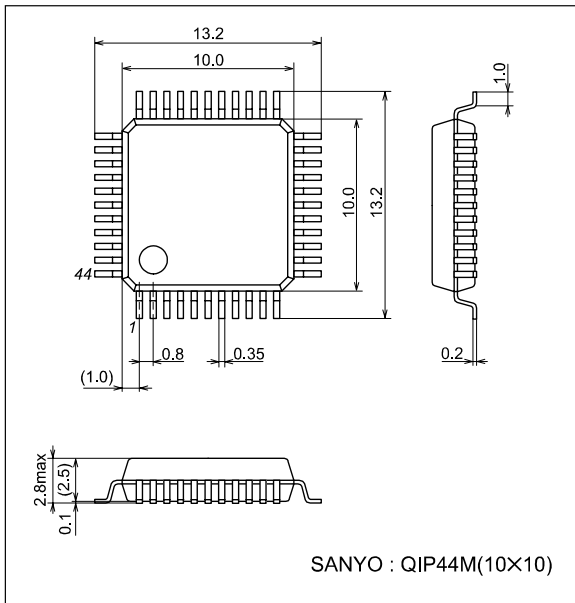
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
NC Block - Noise Canceller input (pin 20), PG1						
Gate time	τ_{GATE^1}	$f = 1\text{kHz}$, $1\mu\text{s}$, 100mVp-o With a pulse input, the time until V_{40} reaches 1V .	35	55	75	μs
	τ_{GATE^2}	$f = 1\text{kHz}$, $1\mu\text{s}$, 100mVp-o With a pulse input, MRC input (pin 15) = 1kHz , 30mVrms	10	25	40	μs
Noise sensitivity	S_N	The $1\mu\text{s}$ pulse input level for which the operates for a 1kHz input. Measure at pin 20.		50	75	mVp-o
Multipath Reduction Circuit						
MRC output	V_{MRC}	The pin 12 voltage when $V_{18} = 2\text{V}$, and a 1kHz , 5mVrms signal is input to pin 15.	1.75	1.85	1.95	V
MRC operating level	MRC-ON	The pin 15 input level such that V_{12} becomes 1.75V when $V_{18} = 2\text{V}$.		15	30	mVrms

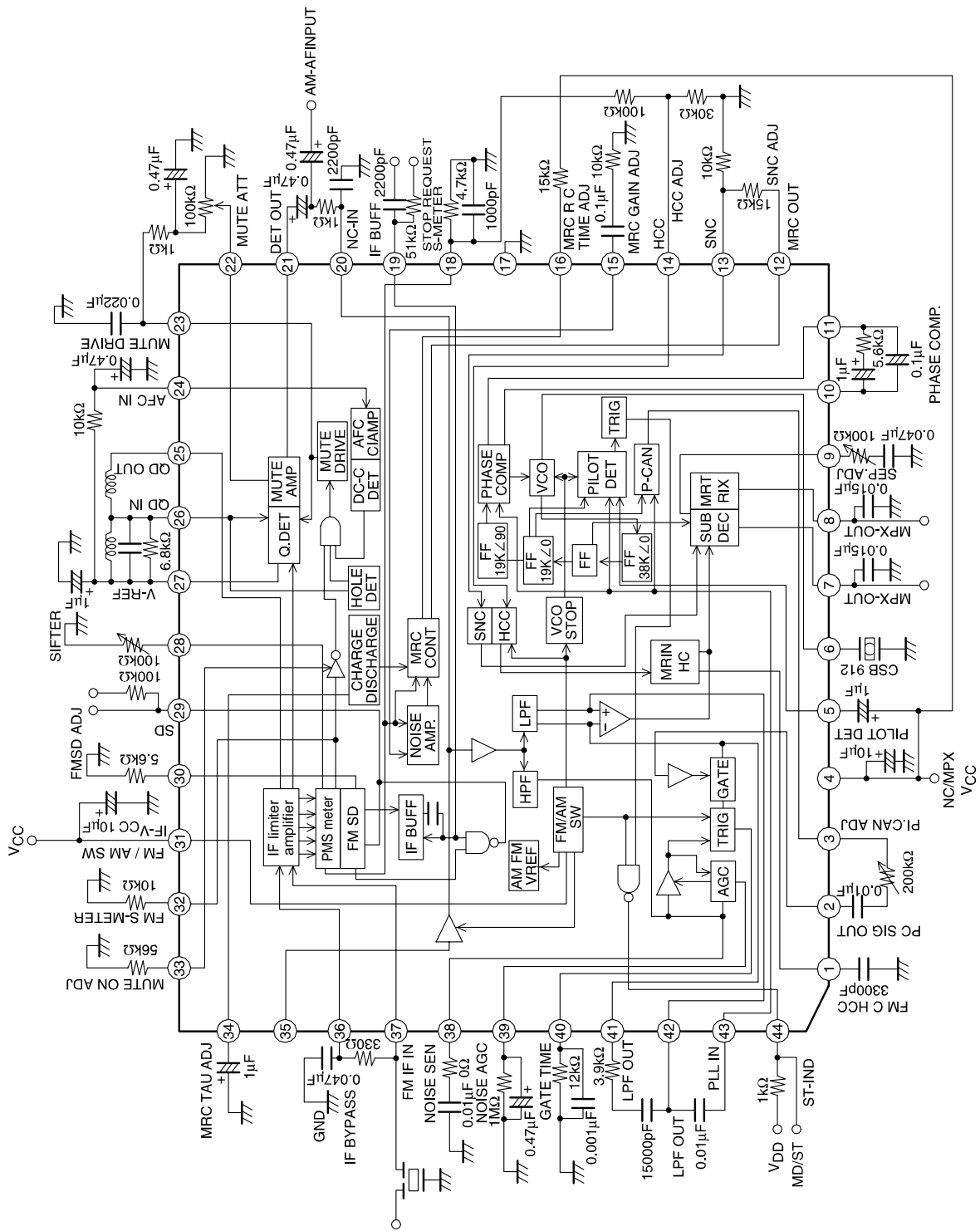
Package Dimensions

unit : mm

3148



Application Circuit Example



PCA00630

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