



LA1600

— Monolithic Linear IC

Single-Band AM Radio

Overview

The LA1600, being an AM tuner IC placed in a 9-pin SIP, provides the functions of an AM tuner. It is usable in the band range up to SW band and is especially suited for use in low-cost AM radios and radio-controlled receivers.

Functions

- AM : RF amplifier, MIX, OSC, IF amplifier, detector, AGC.

Features

- Minimum number of external parts required.
- Low current drain (3.7mA).
- Low supply voltage (1.8V min).
- Adoption of double-balanced mixer.
- Usable in the band range up to SW band.

Specifications

Maximum Ratings at Ta=25°C, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	VCC max	Pin 3	9	V
		Pin 4	9	V
		Pin 8	7	V
Allowable power dissipation	Pd max	Ta≤70°C	100	mW
Operating temperature	Topr		-20 to +70	°C
Storage temperature	Tstg		-40 to +125	°C

Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	VCC		3	V
Operating supply voltage range	VCC op		1.8 to 6.0	V

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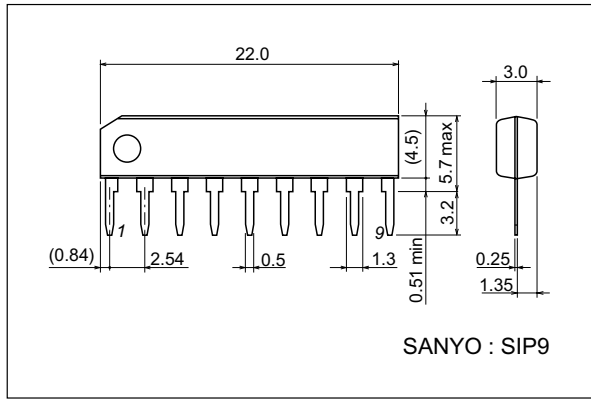
Operating Characteristics at $T_a=25^\circ\text{C}$, $V_{CC}=3\text{V}$, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM Characteristics/f=1MHz]						
Quiescent current	I _{cco}	V _{IIN} =No input		3.7	4.6	mA
Detection output	V _{O1}	V _{IIN} =23dBμ, 1kHz-30% mod	-30	-25	-20	dBm
			24	43	78	mV
	V _{O2}	V _{IIN} =80dBμ, 1kHz-30% mod	-18	-14	-10	dBm
			97	155	250	mV
Signal-to-noise ratio	S/N1	V _{IIN} =23dBμ	18	21.5		dB
	S/N2	V _{IIN} =80dBμ	48	53		dB
Total harmonic distortion	THD1	V _{IIN} =80dBμ, 1kHz-30% mod		0.3	1.2	%
	THD2	V _{IIN} =100dBμ, 1kHz-30% mod		0.4	1.5	%

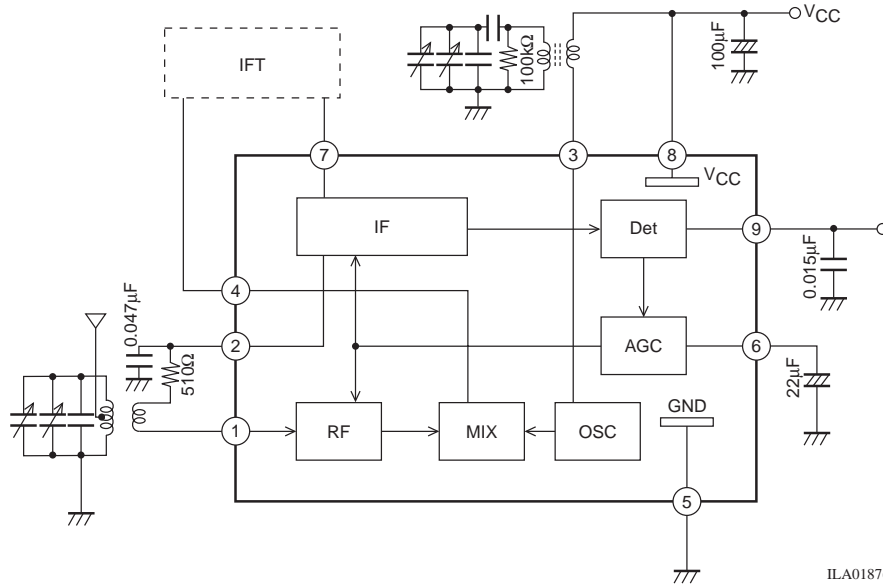
Package Dimensions

unit : mm

3017D



Equivalent Circuit Block Diagram

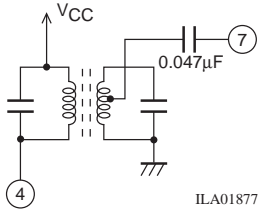


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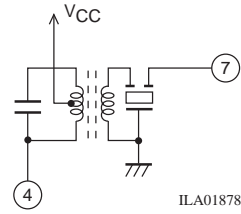
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IFT (Intermediate Frequency Transformer)

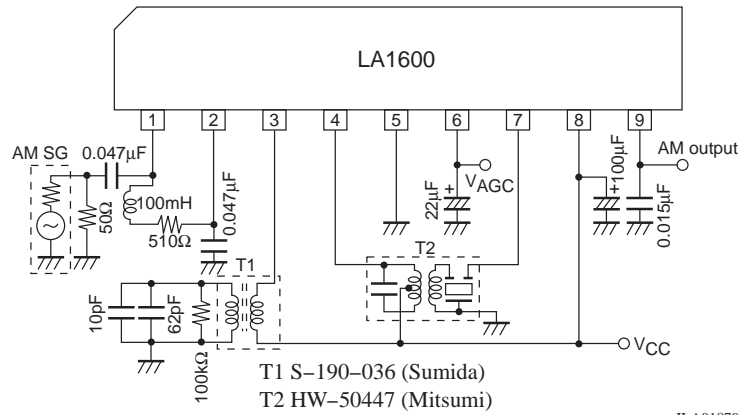
1. Using double tuning coil



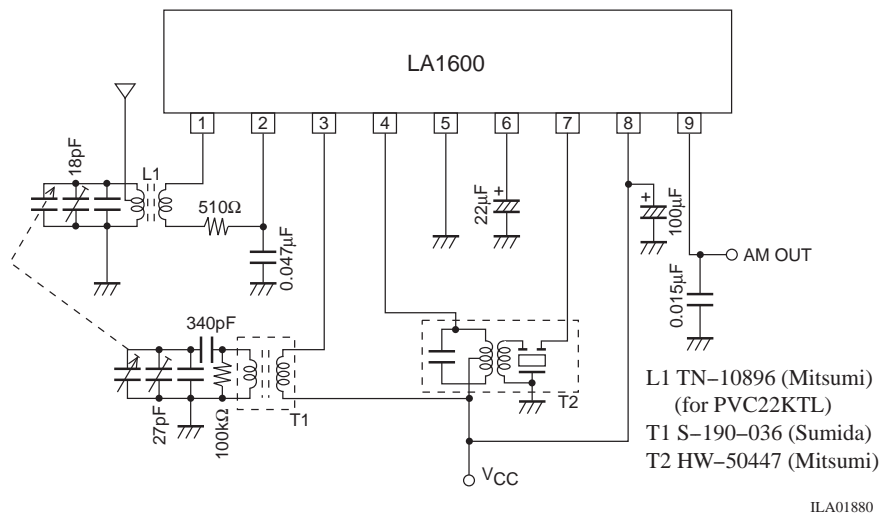
2. Using ceramic filter

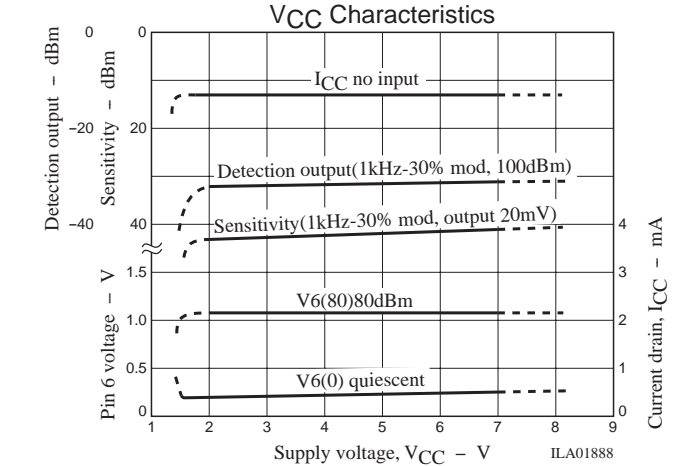
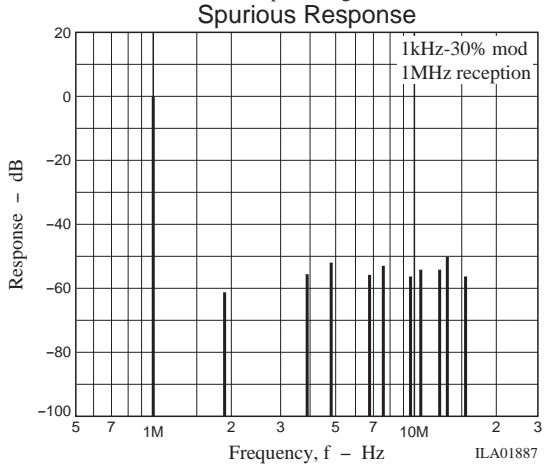
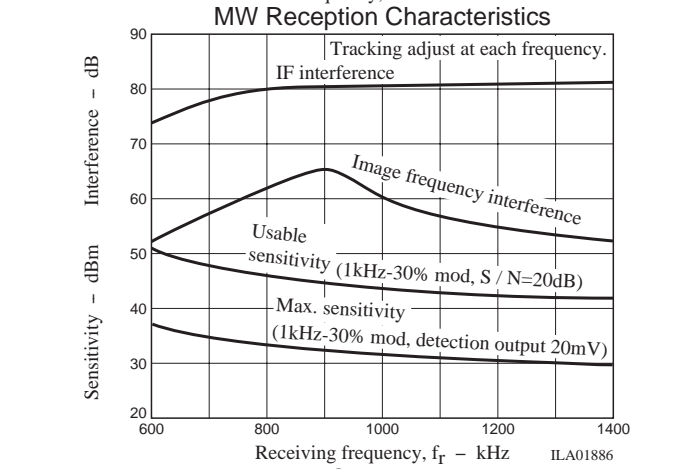
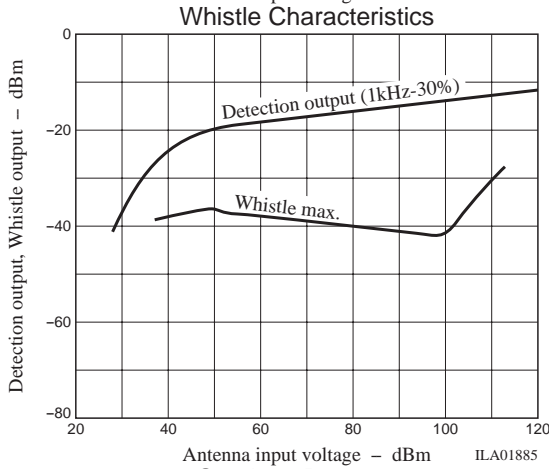
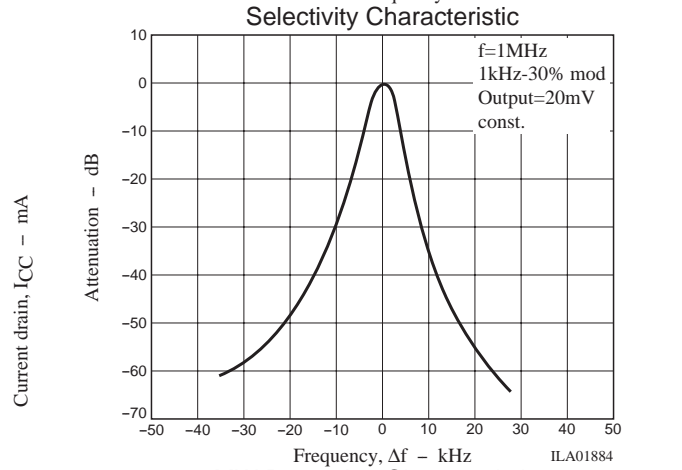
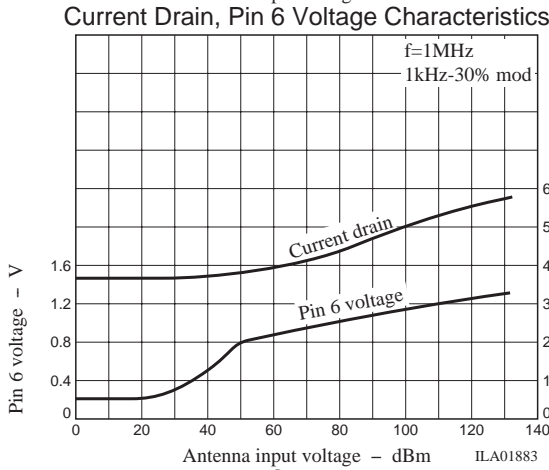
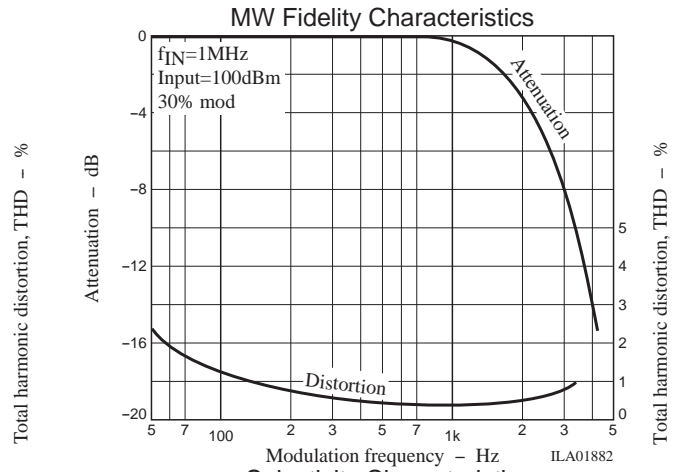
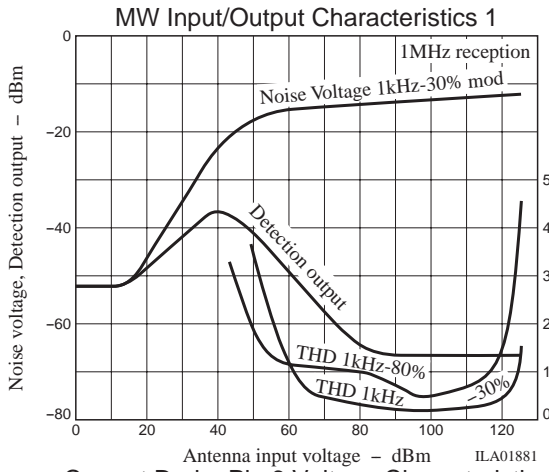


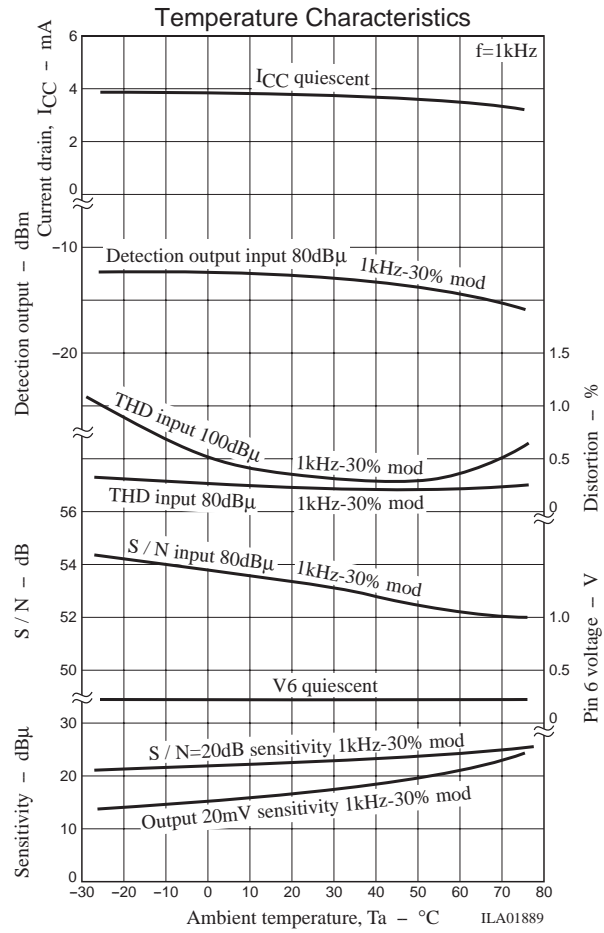
Specified Test Circuit Diagram



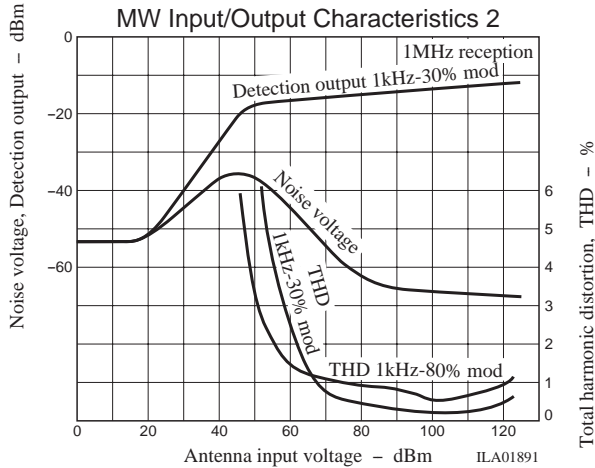
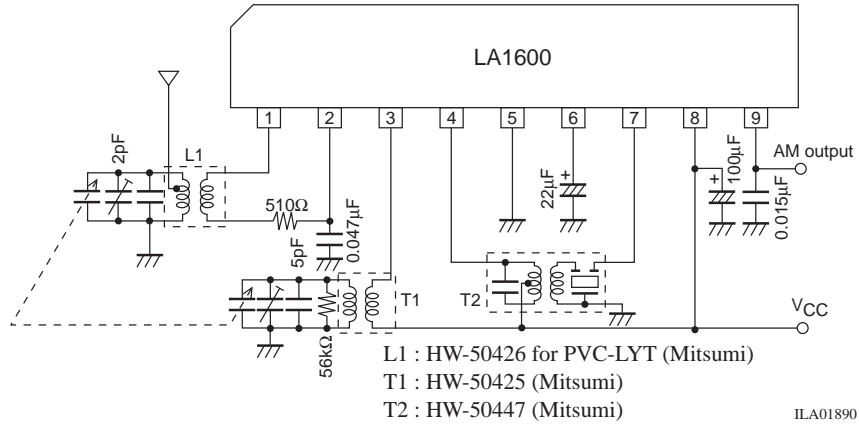
Test Circuit 1 : AM-MW





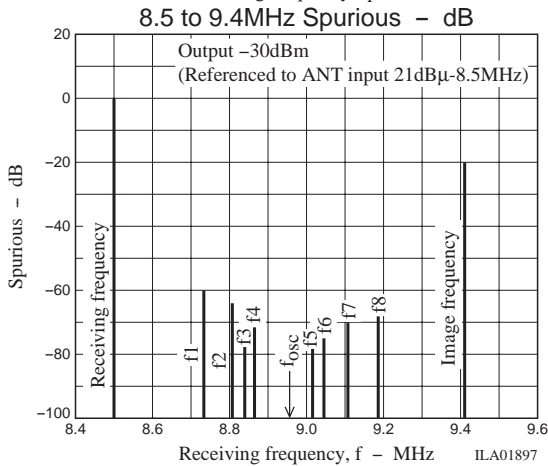
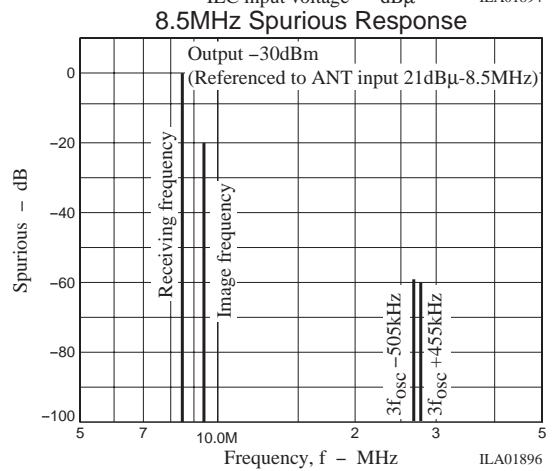
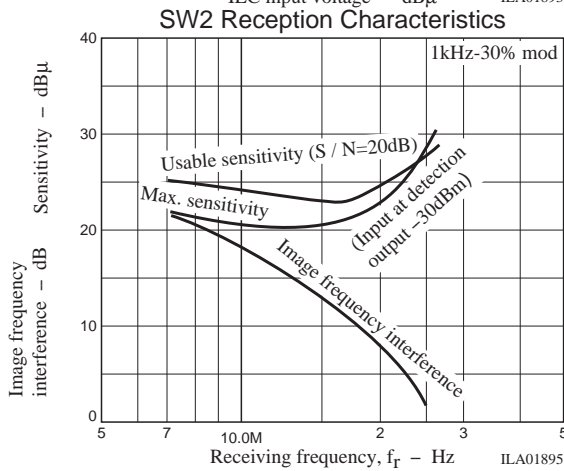
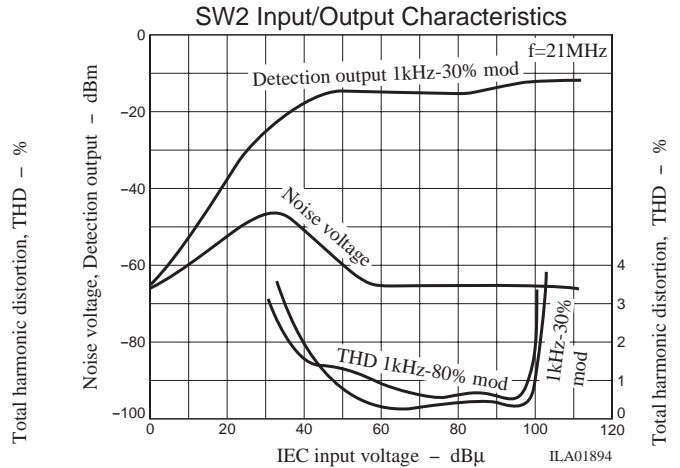
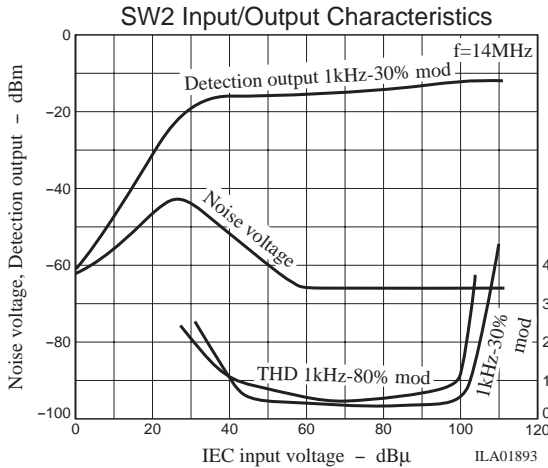
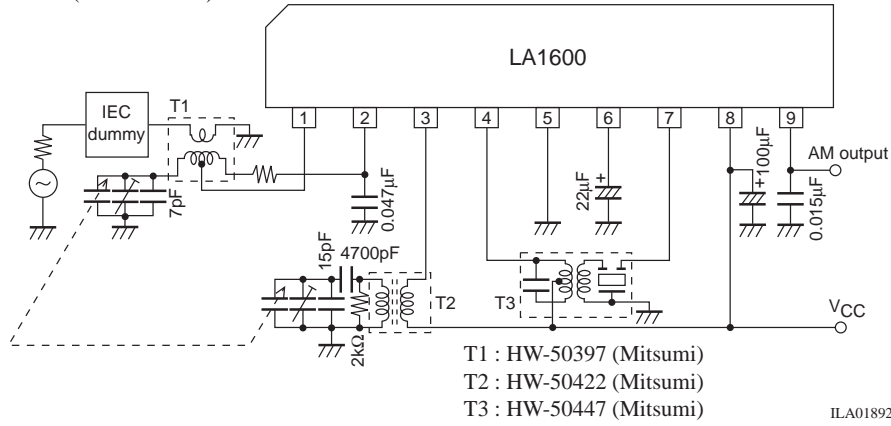


Test Circuit 2 : AM-MW



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Test Circuit 3 : SW2 (7.2 to 24.0MHz)



- $f_1 : 8.7336\text{MHz} \rightarrow 2f_{osc} - 2f_1 = 455\text{kHz}$
- $f_2 : 8.8097\text{MHz} \rightarrow 3f_{osc} - 3f_2 = 455\text{kHz}$
- $f_3 : 8.8478\text{MHz} \rightarrow 4f_{osc} - 4f_3 = 455\text{kHz}$
- $f_4 : 8.8702\text{MHz} \rightarrow 5f_{osc} - 5f_4 = 455\text{kHz}$
- $f_5 : 9.0263\text{MHz} \rightarrow 5f_5 - 5f_{osc} = 455\text{kHz}$
- $f_6 : 9.0525\text{MHz} \rightarrow 4f_6 - 4f_{osc} = 455\text{kHz}$
- $f_7 : 9.1130\text{MHz} \rightarrow 3f_7 - 3f_{osc} = 455\text{kHz}$
- $f_8 : 9.1888\text{MHz} \rightarrow 2f_8 - 2f_{osc} = 455\text{kHz}$

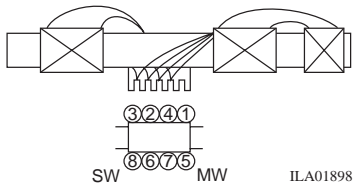
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Coil Specifications

MW antenna

Bar antenna (for PVC22KTL)

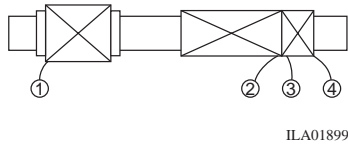
• TN-10896 (Mitsumi)



- ①-② 22T+49T, ③-④ 10T
- Tight solenoid direct winding
- ⑤-⑥ 17T 0.5φ space winding
- ⑦-⑧ 4T tight solenoid winding
- ①-② L=260μH, Q_O=330(≥200)
- ⑤-⑥ L=15μH, Q_O=250(≥150)

Bar antenna (for PVC-LYT)

• HW-50426 (Mitsumi)

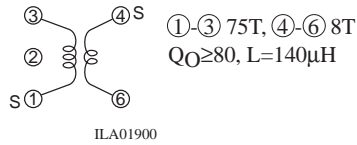


- ①-② 21T+100T
- ③-④ 30T
- ①-② L=604μH, Q_O≥120

MW OSC

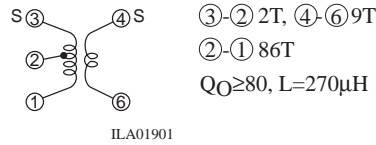
• S-190-036 (Sumida)

For PVC22KTL



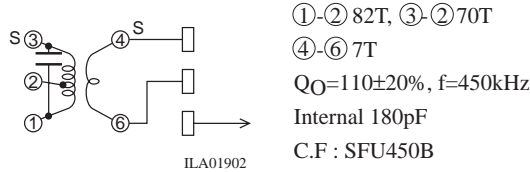
• HW-50426 (Mitsumi)

For PVC-LYT



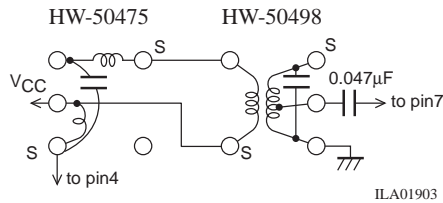
AM-IFT

• HW-50447 (Mitsumi)



AM-IFT

Application where a double tuning coil is used



- HW-50475 (Mitsumi)
- ①-② 80T
 - ④-③ 70 1/2T
 - Internal 180pF
 - Q_O=120±20%

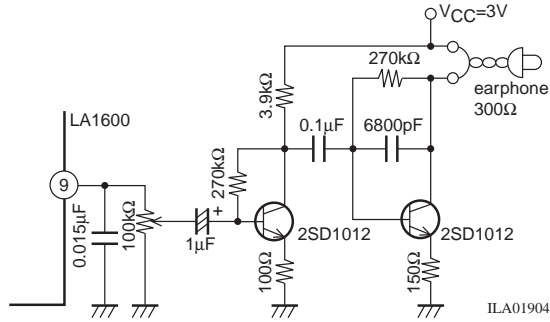
- HW-50498 (Mitsumi)
- ①-② 134T
 - ④-⑥ 3T
 - ②-③ 18T
 - Internal 180pF
 - Q_O=70±20%

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Sample Application Circuit 1

Earphone

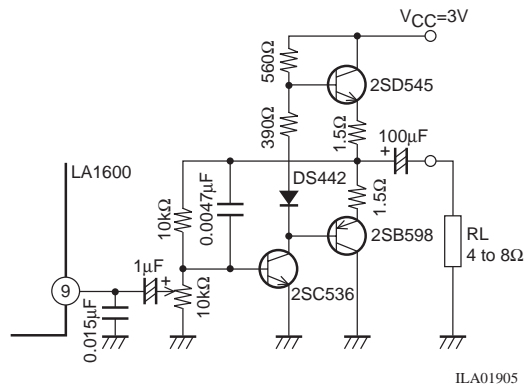
Transistor rank=G280 to 560



Sample Application Circuit 2

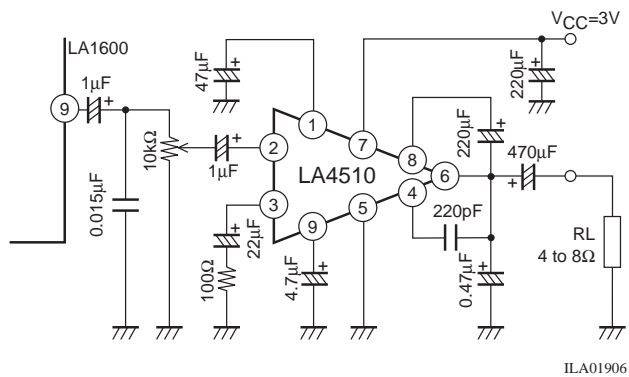
Power amp using 3 discrete devices

Transistor rank=E100 to 200



Sample Application Circuit 3

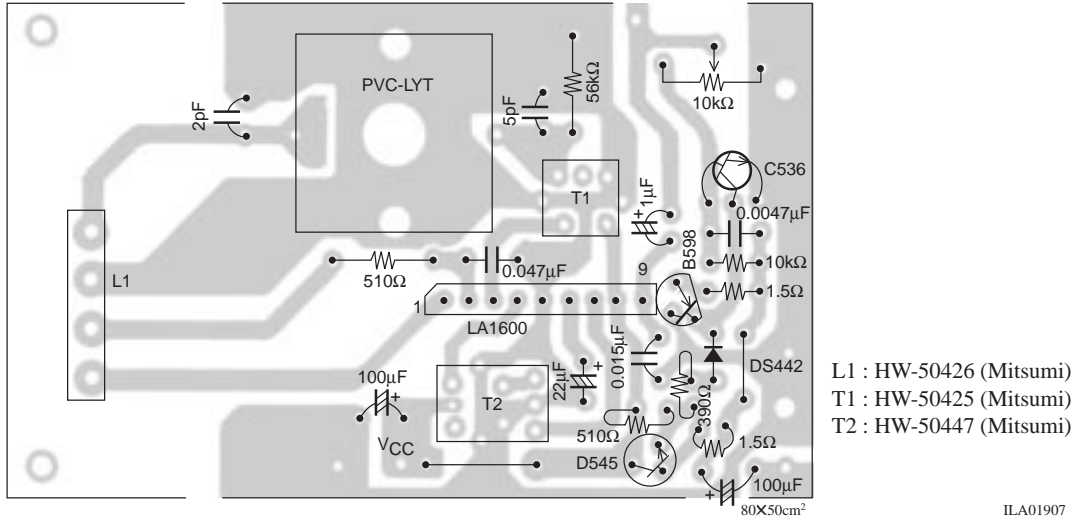
Using the LA4510



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Sample Printed Circuit Pattern : LA1600 + Power amp using 3 discrete devices

(For the circuit diagram, refer to Test Circuit 2 and Sample Application Circuit 2.)



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