Ordering number : EN2056C

SANYO Semiconductors
DATA SHEET

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	V_{CC} 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	V_{CC}		3	V
Operating supply voltage range	V_{CC} op		1.8 to 6.0	V

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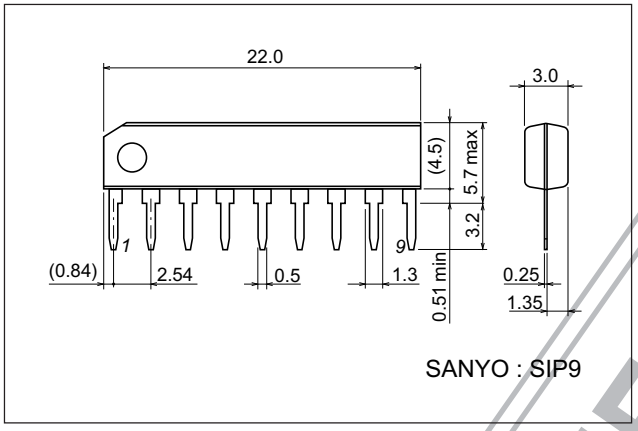
Operating Characteristics at Ta=25°C, V_{CC}=3V, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM Characteristics/f=1MHz]						
Quiescent current	Icco	V_{IN}=No input		3.7	4.6	mA
Detection output	V_O1	V_{IN}=23dBμ, 1kHz-30% mod	−30	−25	−20	dBm
			24	43	78	mV
	V_O2	V_{IN}=80dBμ, 1kHz-30% mod	−18	−14	−10	dBm
			97	155	250	mV
Signal-to-noise ratio	S/N1	V_{IN}=23dBμ	18	21.5		dB
	S/N2	V_{IN}=80dBμ	48	53		dB
Total harmonic distortion	THD1	V_{IN}=80dBμ, 1kHz-30% mod		0.3	1.2	%
	THD2	V_{IN}=100dBμ, 1kHz-30% mod		0.4	1.5	%

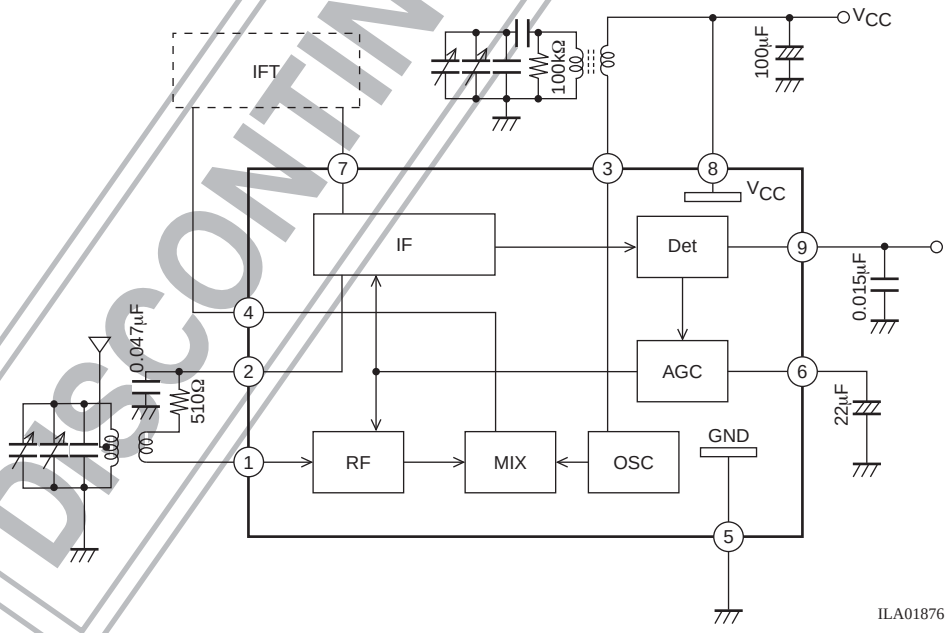
Package Dimensions

unit : mm

3017D

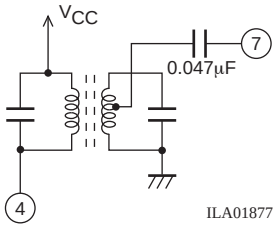


Equivalent Circuit Block Diagram

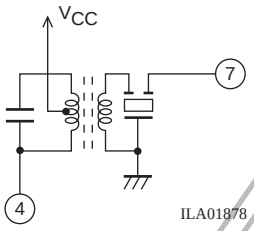


IFT (Intermediate Frequency Transformer)

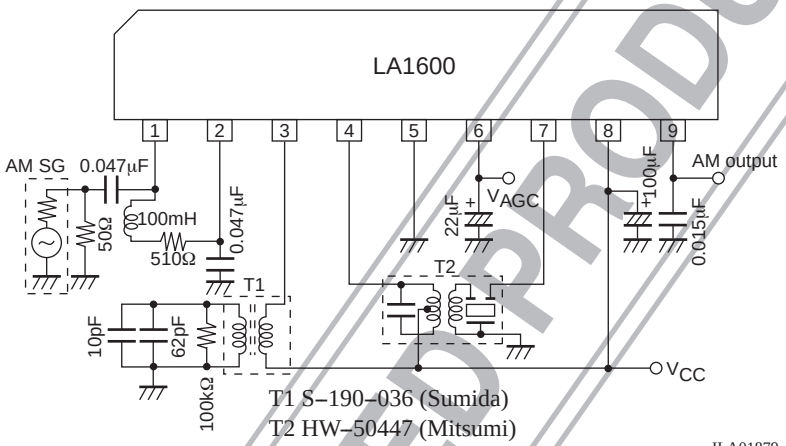
1. Using double tuning coil



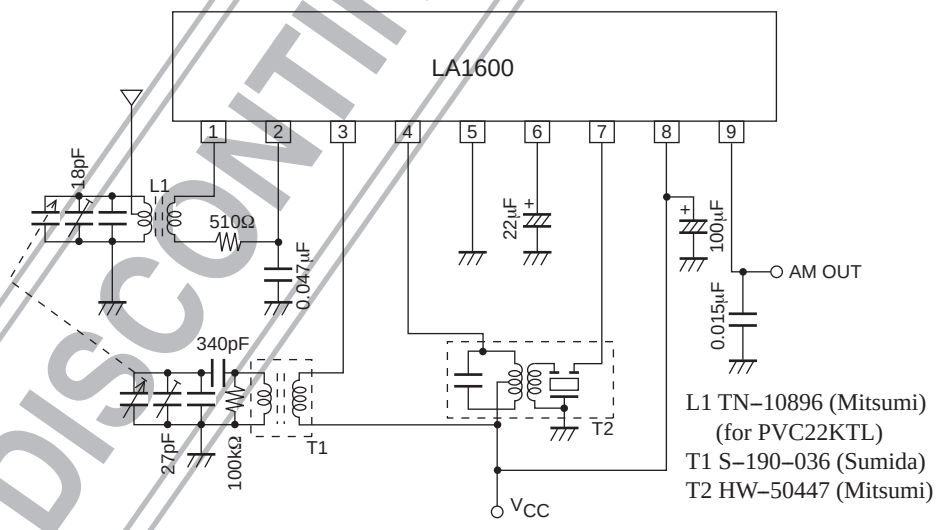
2. Using ceramic filter



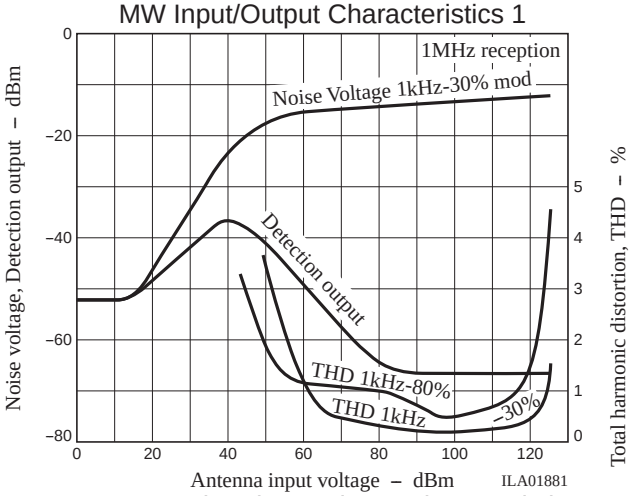
Specified Test Circuit Diagram



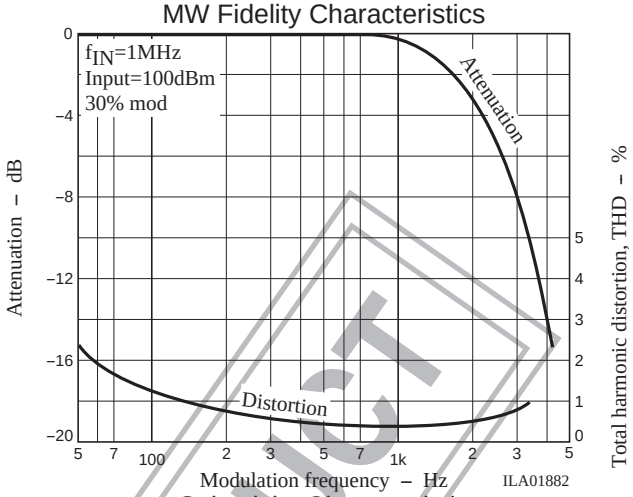
Test Circuit 1 : AM-MW



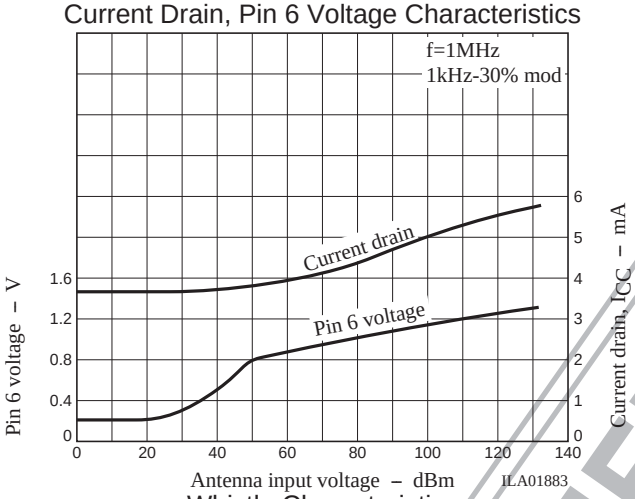
MW Input/Output Characteristics 1



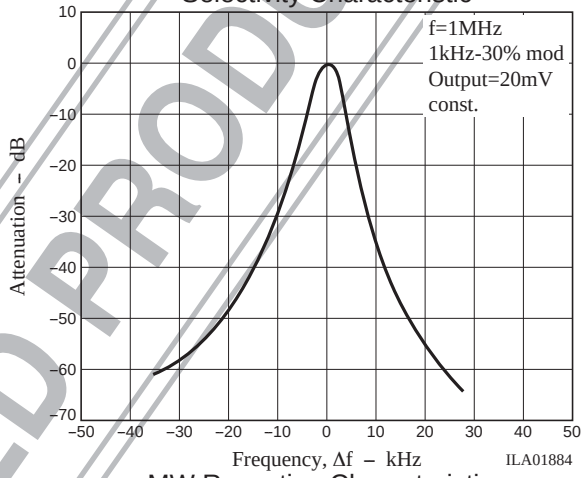
MW Fidelity Characteristics



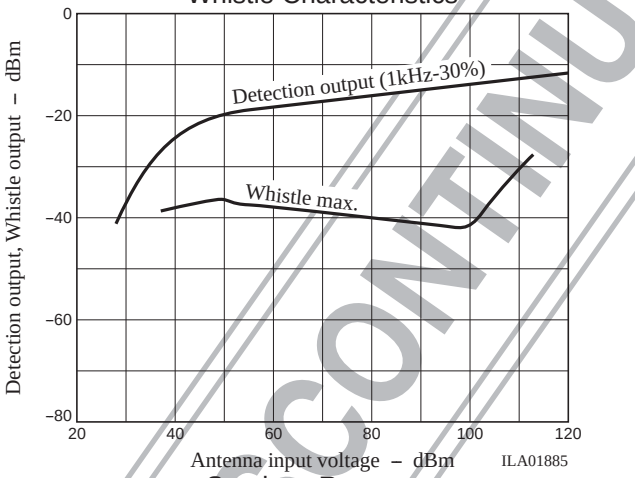
Current Drain, Pin 6 Voltage Characteristics



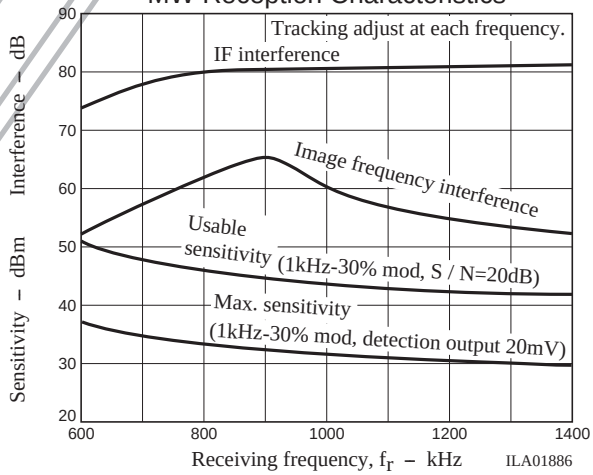
Selectivity Characteristic



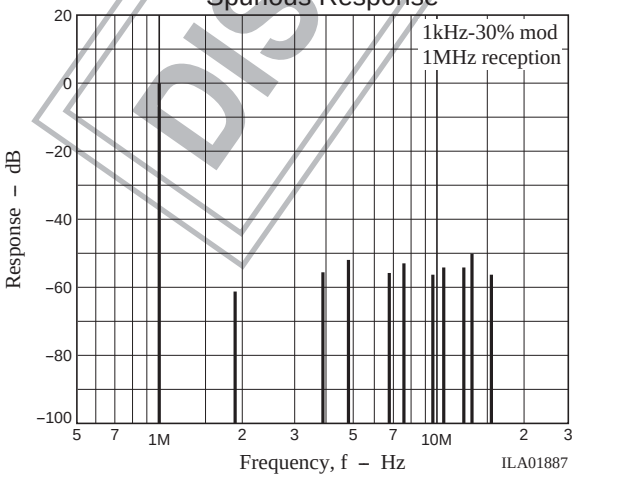
Whistle Characteristics



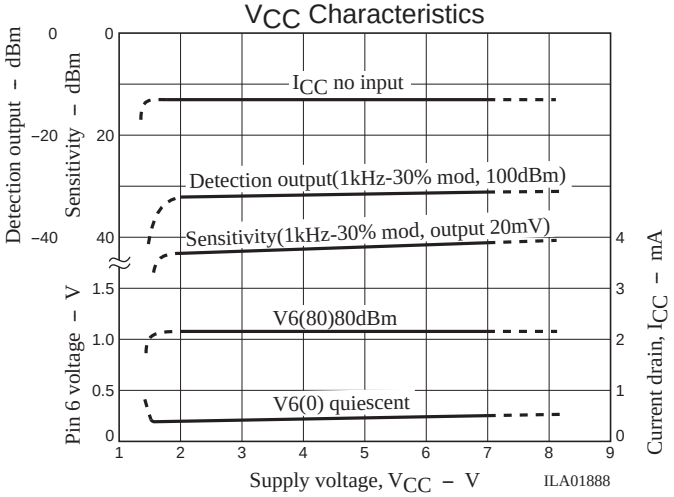
MW Reception Characteristics

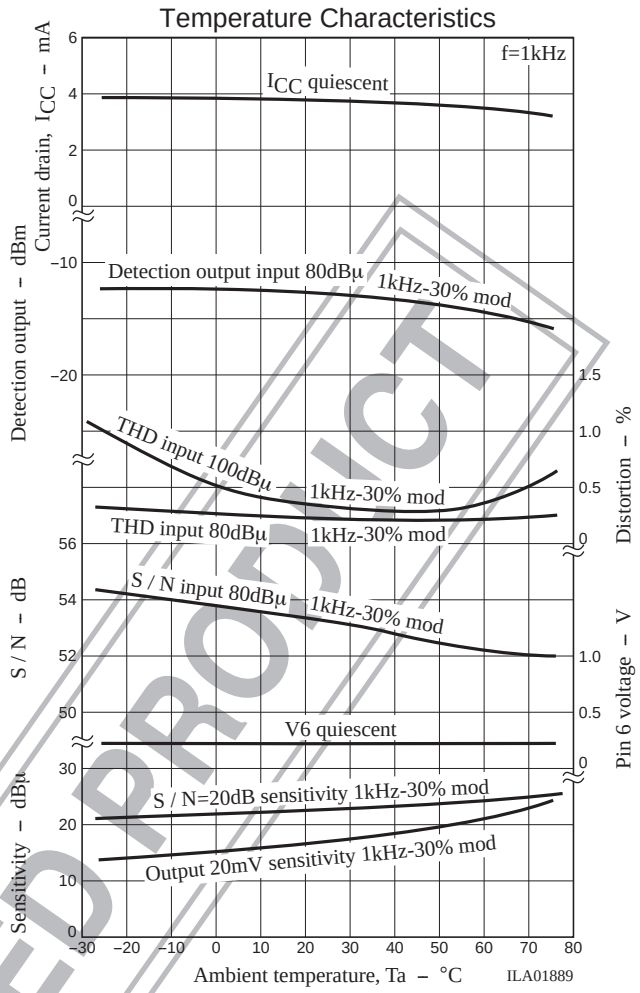


Spurious Response

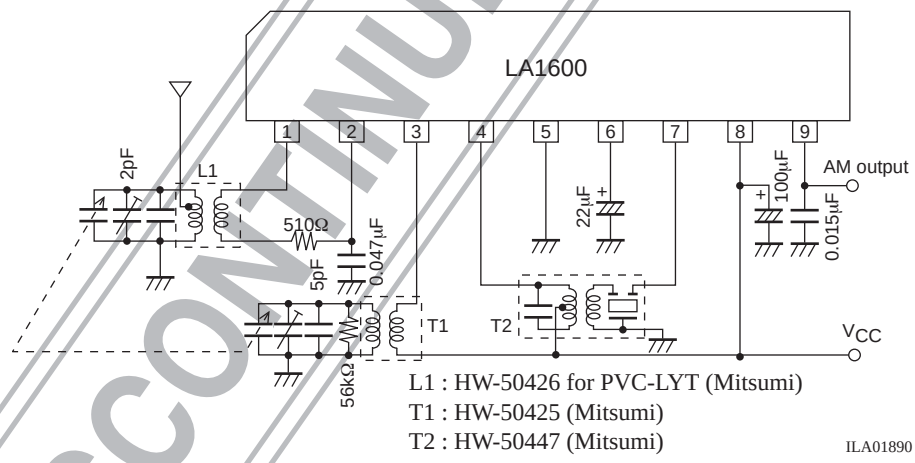


VCC Characteristics



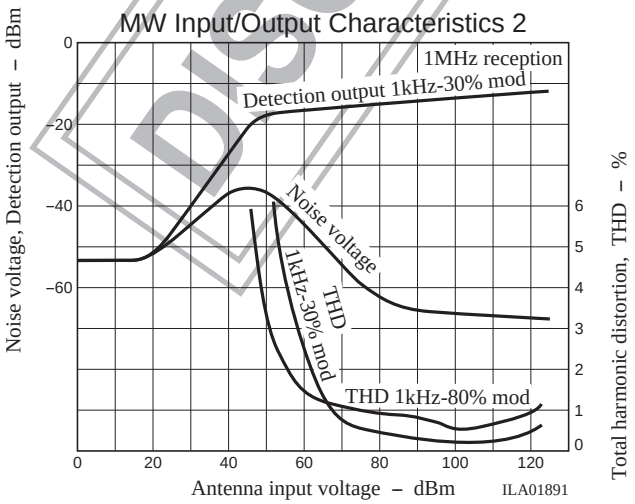


Test Circuit 2 : AM-MW

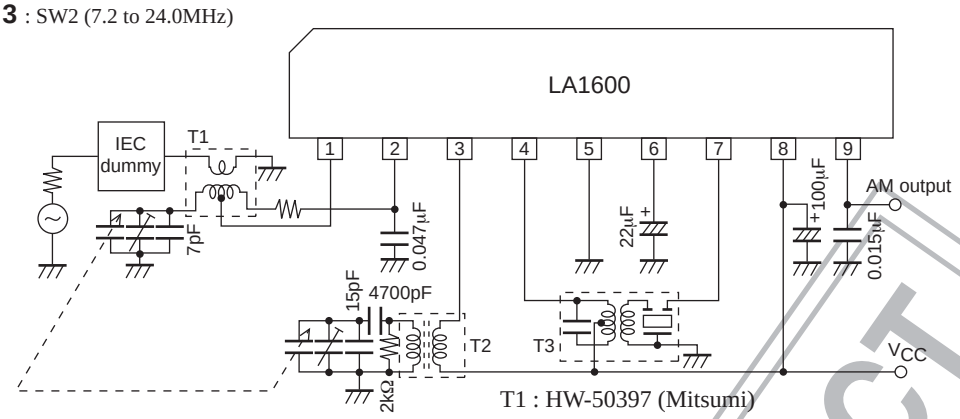


L1 : HW-50426 for PVC-LYT (Mitsumi)
T1 : HW-50425 (Mitsumi)
T2 : HW-50447 (Mitsumi)

ILA01890

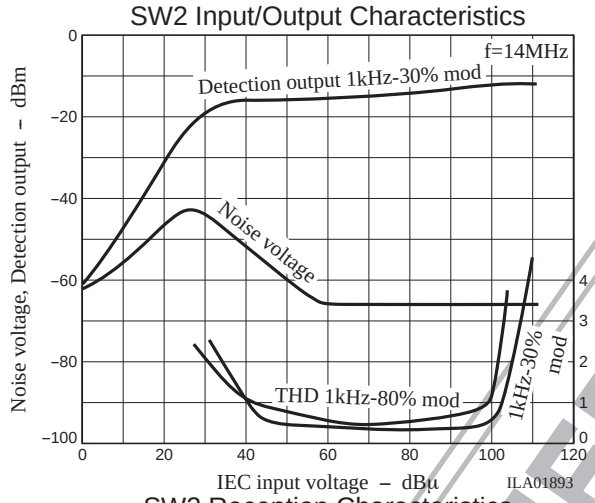


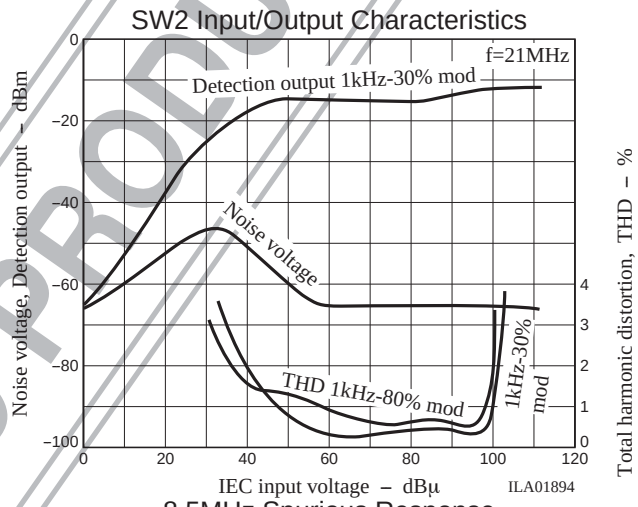
Test Circuit 3 : SW2 (7.2 to 24.0MHz)

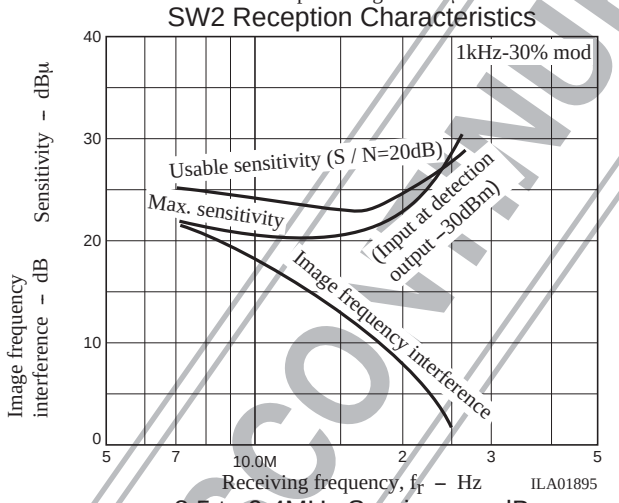


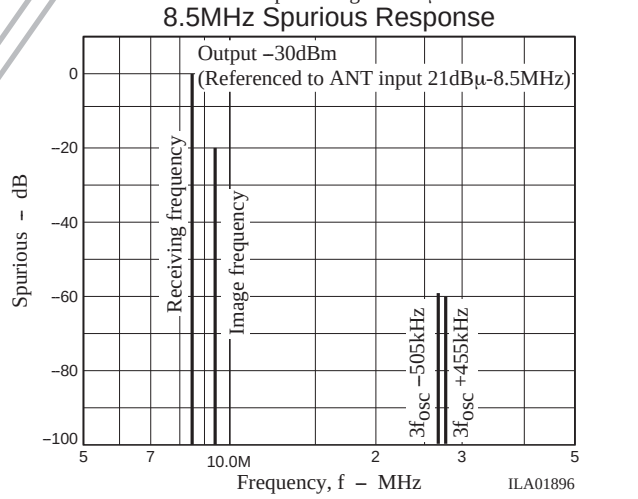
T1 : HW-50397 (Mitsumi)
T2 : HW-50422 (Mitsumi)
T3 : HW-50447 (Mitsumi)

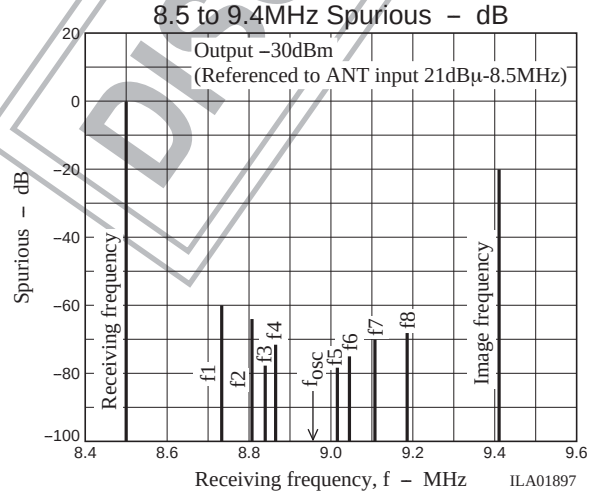
ILA01892











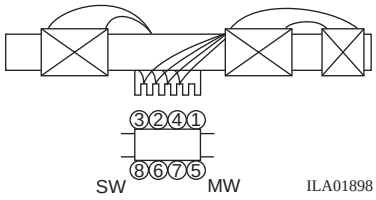
f1 : 8.7336MHz → $2f_{osc}$-2f1=455kHz
f2 : 8.8097MHz → $3f_{osc}$-3f2=455kHz
f3 : 8.8478MHz → $4f_{osc}$-4f3=455kHz
f4 : 8.8702MHz → $5f_{osc}$-5f4=455kHz
f5 : 9.0263MHz → 5f5-$5f_{osc}$=455kHz
f6 : 9.0525MHz → 4f6-$4f_{osc}$=455kHz
f7 : 9.1130MHz → 3f7-$3f_{osc}$=455kHz
f8 : 9.1888MHz → 2f8-$2f_{osc}$=455kHz

Coil Specifications

MW antenna

Bar antenna (for PVC22KTL)

· TN-10896 (Mitsumi)

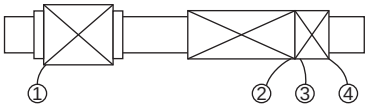


ILA01898

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)

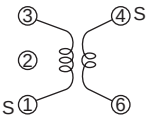


ILA01899

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

MW OSC

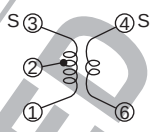
· S-190-036 (Sumida)
For PVC22KTL



ILA01900

①-③ 75T, ④-⑥ 8T
Q_O≥80, L=140μH

· HW-50426 (Mitsumi)
For PVC-LYT

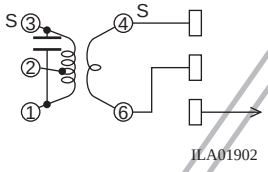


ILA01901

③-② 2T, ④-⑥9T
②-① 86T
Q_O≥80, L=270μH

AM-IFT

· HW-50447 (Mitsumi)

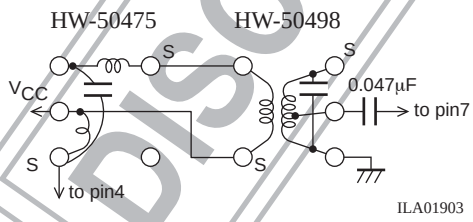


ILA01902

①-② 82T, ③-②70T
④-⑥ 7T
Q_O=110±20%, f=450kHz
Internal 180pF
C.F : SFU450B

AM-IFT

Application where a double tuning coil is used

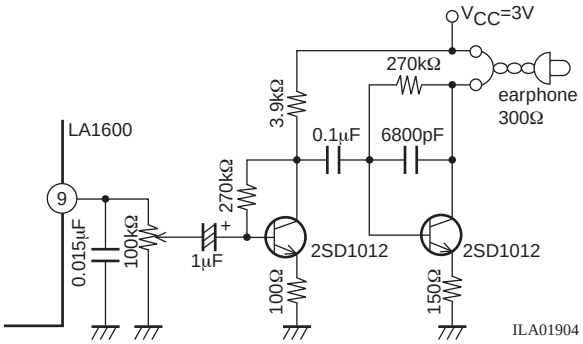


ILA01903

HW-50475 (Mitsumi)	HW-50498 (Mitsumi)
①-② 80T	①-② 134T
④-③ 70 1/2T	④-⑥ 3T
Internal 180pF	②-③ 18T
Q_O=120±20%	Internal 180pF
	Q_O=70±20%

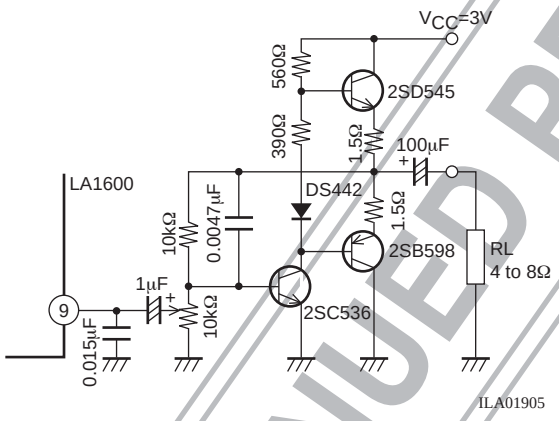
Sample Application Circuit 1

Earphone
Transistor rank=G280 to 560



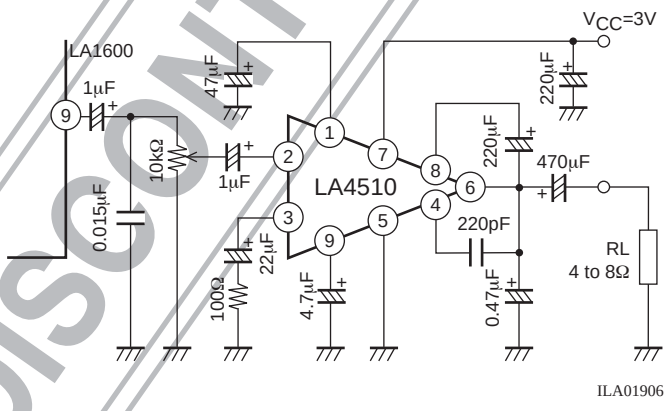
Sample Application Circuit 2

Power amp using 3 discrete devices
Transistor rank=E100 to 200

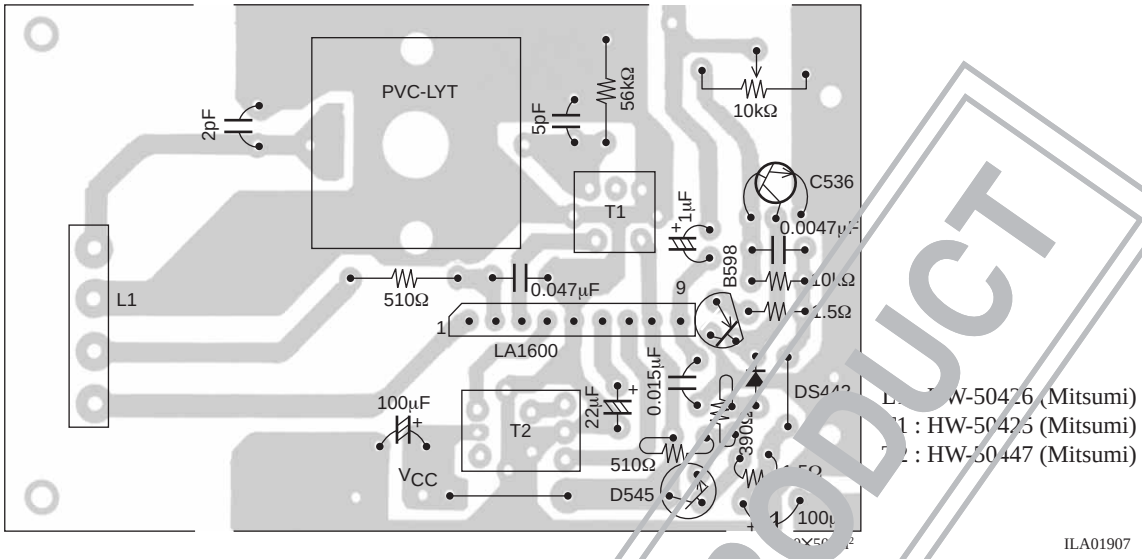


Sample Application Circuit 3

Using the LA4510



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.)



L : HW-50426 (Mitsumi)
T1 : HW-50425 (Mitsumi)
T2 : HW-50447 (Mitsumi)