Ordering number:ENN3342B

Monolithic Linear IC

LA1875M

Single-chip, Electronic Tuner for Car Stereo

Overview

The LA1875M is an electronic tuner IC that incorporates AM, FM IF and MPX circuit sections on a single chip, making it ideal for use in car stereo equipment.

The LA1875M features an antenna-damping AM AGC circuit with rapid charge and discharge characteristics. It also features an S-meter driver, tuning and FM-stereo LED outputs, FM soft-mute and forced mono modes and a no-adjustment MPX VCO.

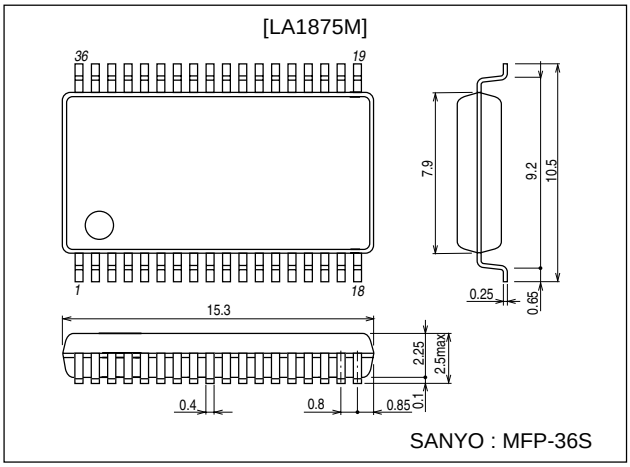
The LA1875M AM circuit comprises a mixer, oscillator, RF AGC, IF amplifier and IF buffer. The FM IF circuit comprises an IF amplifier, eqadrature detector, and AFC and IF buffer outputs. The MPX circuit comprises a VCO and stereo noise control (SNC) and high-cut control (HCC) circuits.

The LA1875M operates from a 7 to 10V supply and is available in 36-pin MFPs.

Package Dimensions

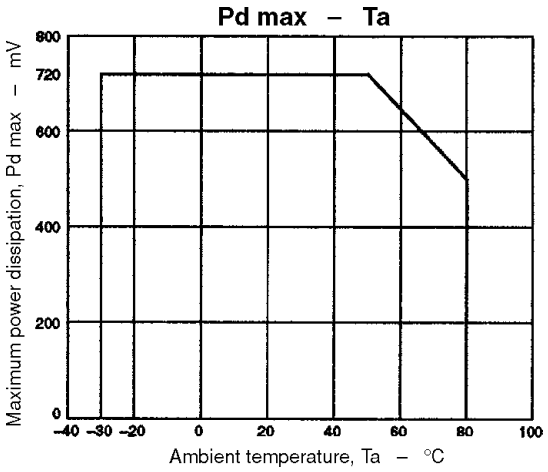
unit:mm

3129-MFP36S



Features

- AM, FM IF and MPX circuits.
- Antenna-damping AM AGC circuit with rapid charge and discharge characteristics.
- S-meter driver.
- Tuning and FM-stereo LED outputs.
- AFC and IF buffer outputs.
- AM mixer, oscillator, AGC, IF amplifier and IF buffer.
- FM IF amplifier, quadrature detector.
- MPX no-adjustment VCO, SNC and HCC.
- FM soft-mute and forced-mono modes.
- 7 to 10V supply.
- 36-pin MFP.



SANYO Electric Co.,Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		11	V
Power dissipation (Ta≤50˚C)	P_D		720	mW
Operating temperature range	Topr		–30 to +80	˚C
Storage temperature range	Tstg		–40 to +150	˚C

Recommended Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		8.5	V
Supply voltage range	V_{CC}		7 to 10	V

Electrical Characteristics

FM characteristics at Ta = 25˚C, V_{CC}=8.5V, f_c=10.7MHz, f_m=1kHz, 75kHz deviation unless otherwise noted.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	21	31	41	mA
–3dB limiting sensitivity	–3dBLS	Referred to V_I=100dBμ, Mute is ON.	27	37	47	dBμ
Tuning LED turn-on input voltage	V_{LED}	V_{26}=2V	43	58	73	dBμ
Detector output voltage	V_O	V_I=100dBμ	165	250	345	mV
S-meter output voltage	V_{SM}	No signal	0	0.15	0.7	V
		V_I=100dBμ	5.0	6.1	7.0	
IF buffer output voltage	V_{IF}	V_I=80dBμ, V_{12}=5V	200	360	540	mV
SNC output voltage	V_{SUB}	V_I=100dBμ, V_{34}=0.1V. See note.		0.5	5.0	mV
Tuning LED turn-on bandwidth	BW_{LED}	V_I=100dBμ, V_{26}≥2V	85	130	180	kHz
Signal-to-noise ratio	S/N	V_I=100dBμ	66	74		dB
AM suppression ratio	AMR	V_I=100dBμ at 1kHz with 30% AM modulation	38	60		dB
Sepatation	Sep	V_I=100dBμ, See note.	30	45		dB
Channel balance	CB		–1.5	0	+1.5	dB
HCC output attenuation	α	V_I=100dBμ, V_{33}=0.6V, f_m=10kHz, See note.	–10.0	–5.0	–0.5	dB
Stereo LED turn-on pilot tone modulation	LED-ON	V_I=100dBμ	1.8	3.2	5.0	%
Stereo LED turn-off pilot tone modulation	LED-OFF	V_I=100dBμ		2.2		%
Total harmonic distortion	THD	V_I=100dBμ, mono signal		0.5	2.5	%
		V_I=100dBμ, main channel signal		0.5	2.5	

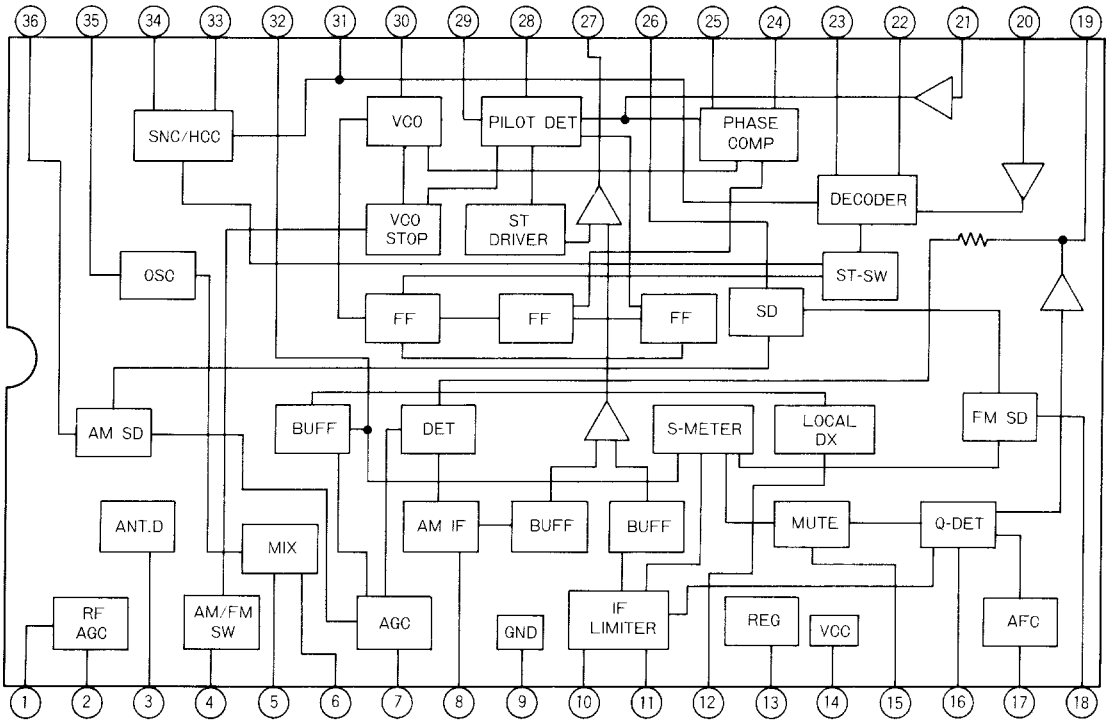
Note

V_I comprises 90% left + right signal and 10% pilot signal.

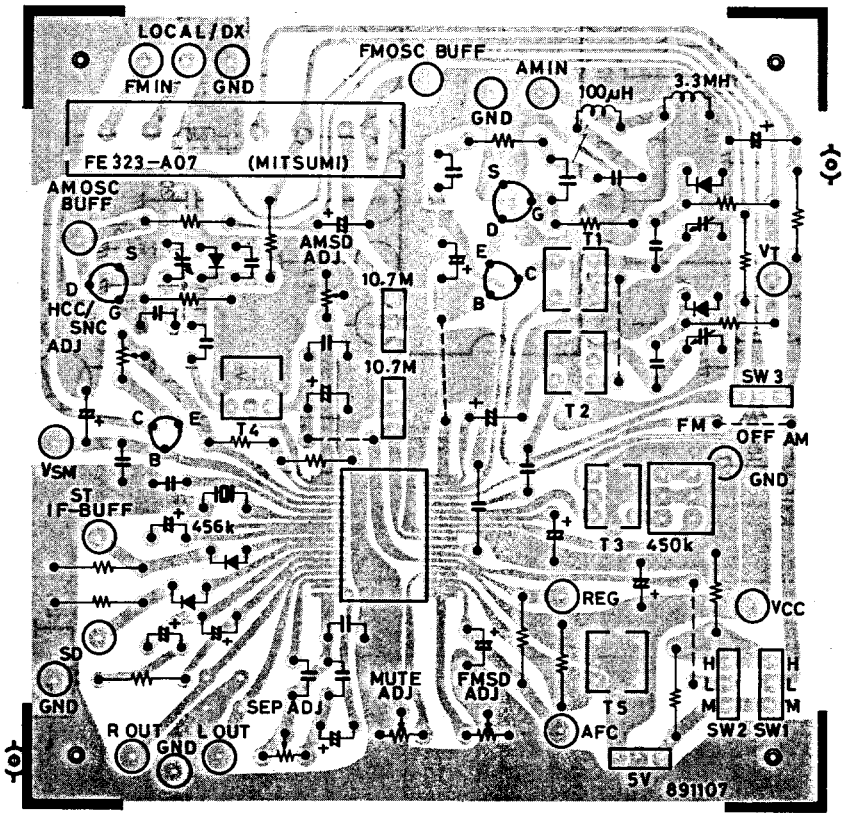
AM characteristics at Ta = 25˚C, V_{CC}=8.5V, f_c=1MHz with 30% modulation.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	16	24	33	mA
Tuning LED turn-on input voltage	V_{LED}	V_{26}=2V	21	30	39	dBμ
RF AGC turn-on input voltage	V_{AGC}	V_I=3V	50	57	64	dBμ
Detector output voltage	V_O	V_I=25dBμ	18	40	68	mV
		V_I=74dBμ	70	105	156	
IF buffer output voltage	V_{IF}	V_I=50dBμ, V_{12}=5V	150	260	390	mV
S-meter output voltage	V_{SM}	No signal	0	0.7	1.3	V
		V_I=74dBμ	2.6	3.7	5.2	
Pin-diode driver current	I_{antd}	V_I=0.7V	2.0	2.5	3.0	mA
Signal-to-noise ratio	S/N	V_I=25dBμ	17	21		dB
		V_I=74dBμ	42	49		
Total harmonic distortion	THD	V_I=74dBμ		0.35	1.0	%
		V_I=130dBμ		0.4	2.0	

Block Diagram

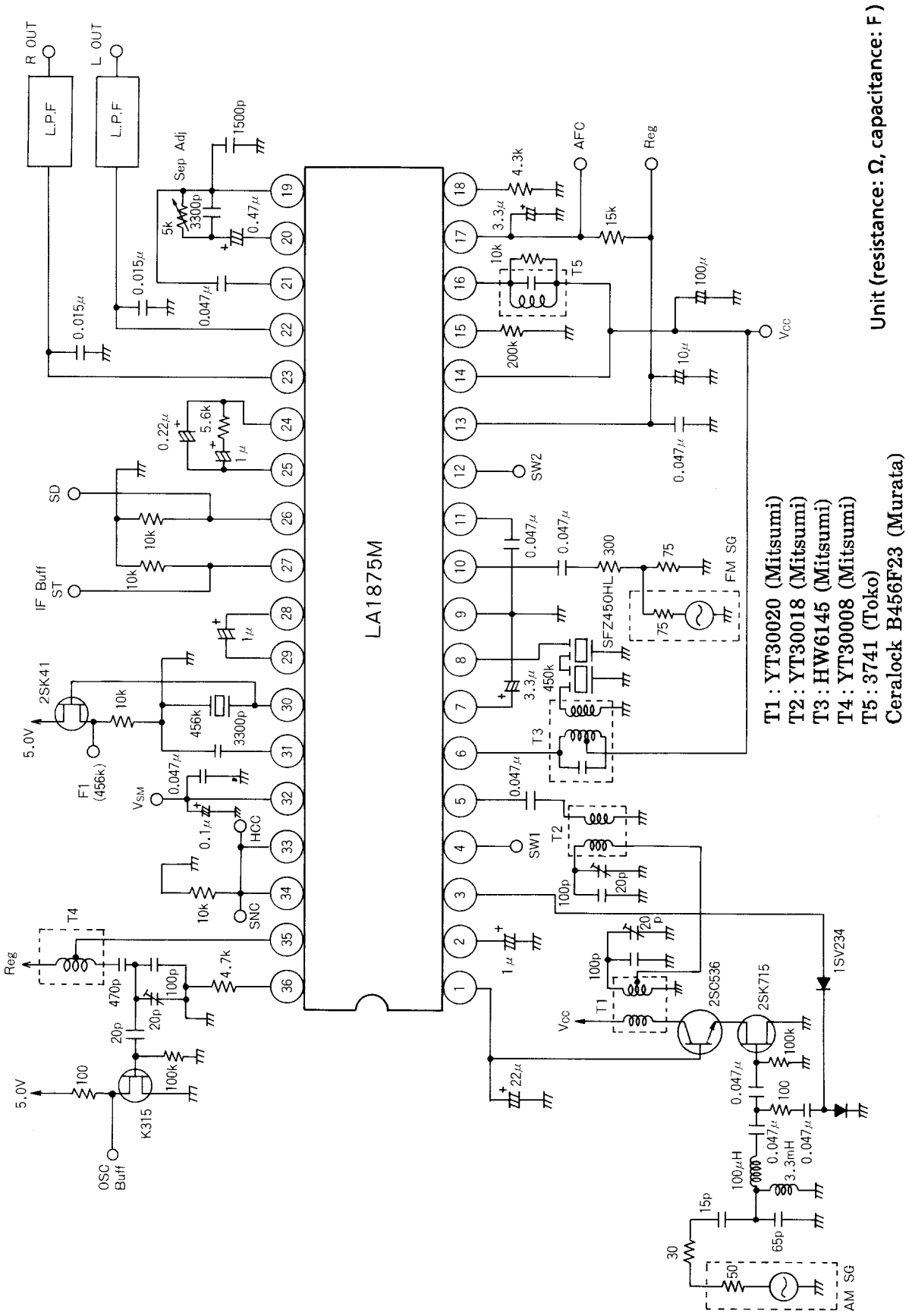


Sample Printed Circuit Pattern

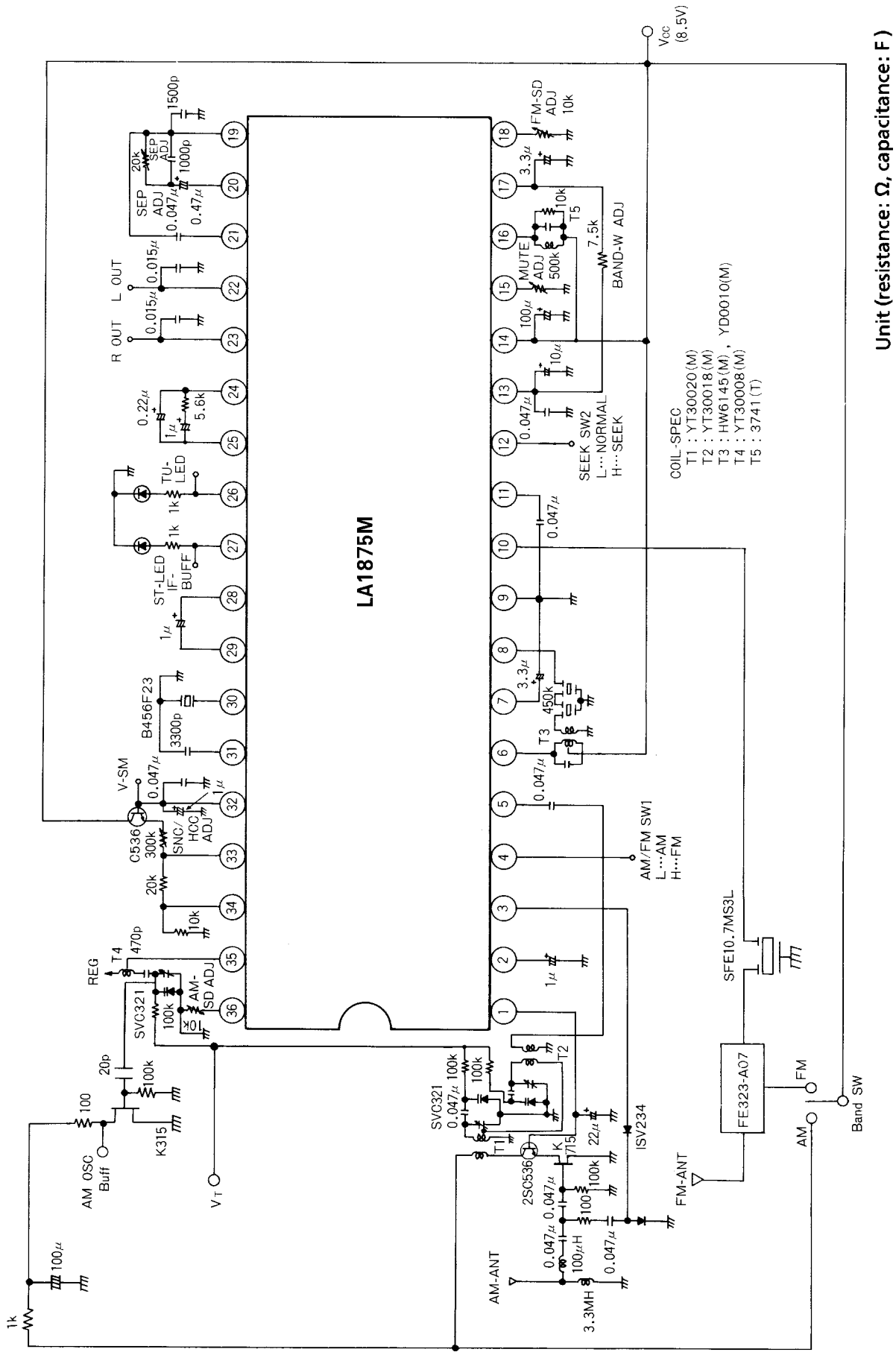


Cu-foiled area 90×90mm²

Specified Test Ciruit

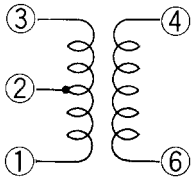


Sample Application Circuit



LA1875M Coil Specifications

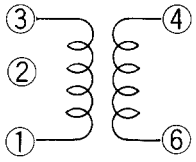
T1 RF double tuning coil (Primary)



L1 – 3 = 224 μH

YT-30020 (Mitsumi)
① – ② 2T
⑥ – ④ 37T
② – ③ 82T

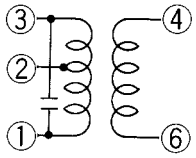
T2 RF double tuning coil (Secondary)



L1 – 3 = 224 μH

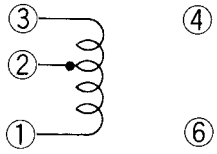
YT-30018 (Mitsumi)
① – ② 2T
⑥ – ④ 15T
② – ③ 82T

T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



HW-6145 (Mitsumi)
③ – ② 67T $Q_O = 70 \pm 20\%$
② – ① 85T f = 450kHz
⑥ – ④ 10T internal 180pF

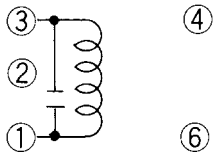
T4 AM OSC Coil



L1 – 3 = 118 μH

YT-30008 (Mitsumi)
① – ② 29T
② – ③ 29T

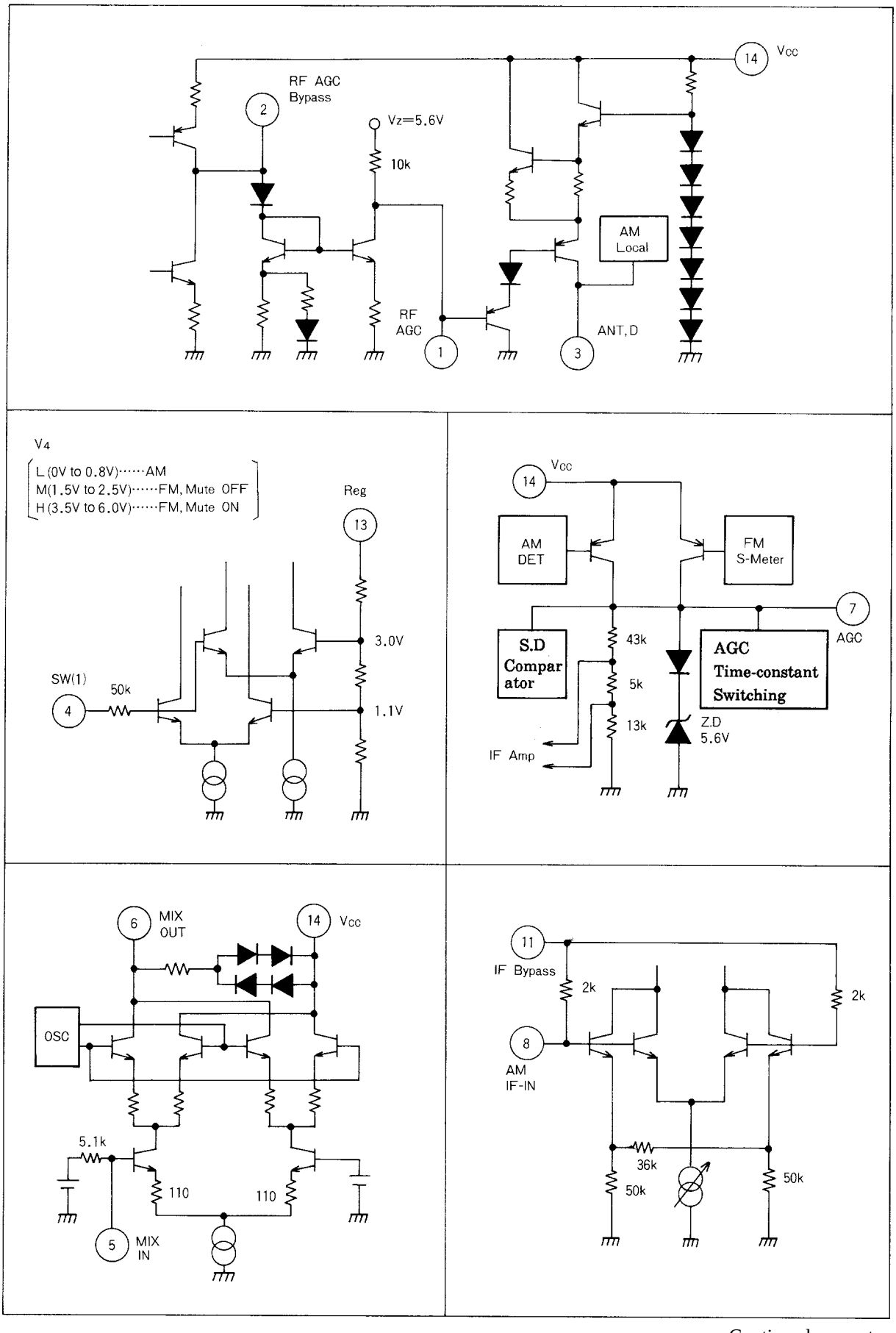
T5 FM DET Coil



292TEAS-3741Z (Toko)
① – ③ 21T
f = 10.7MHz
internal 82pF
$Q_O = 38 \pm 20\%$

IC Internal Equivalent Circuit Diagrams

Unit (resistance: Ω)



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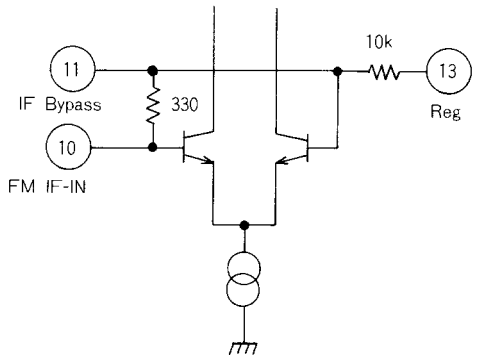
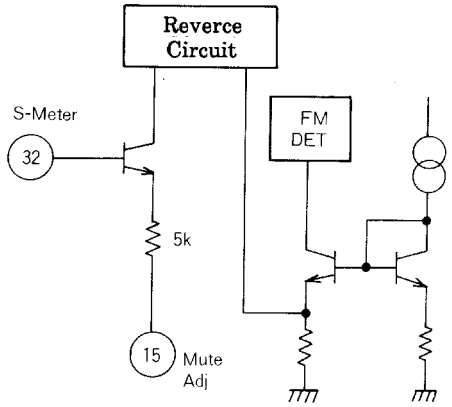
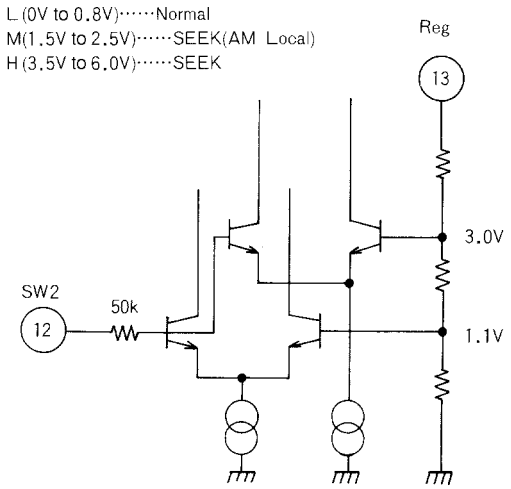
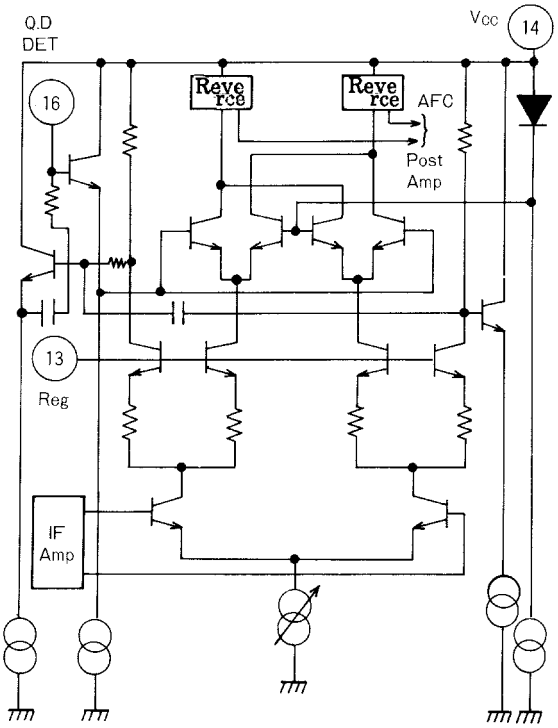
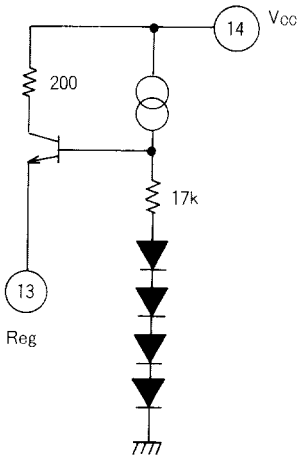
Unit (resistance: Ω)











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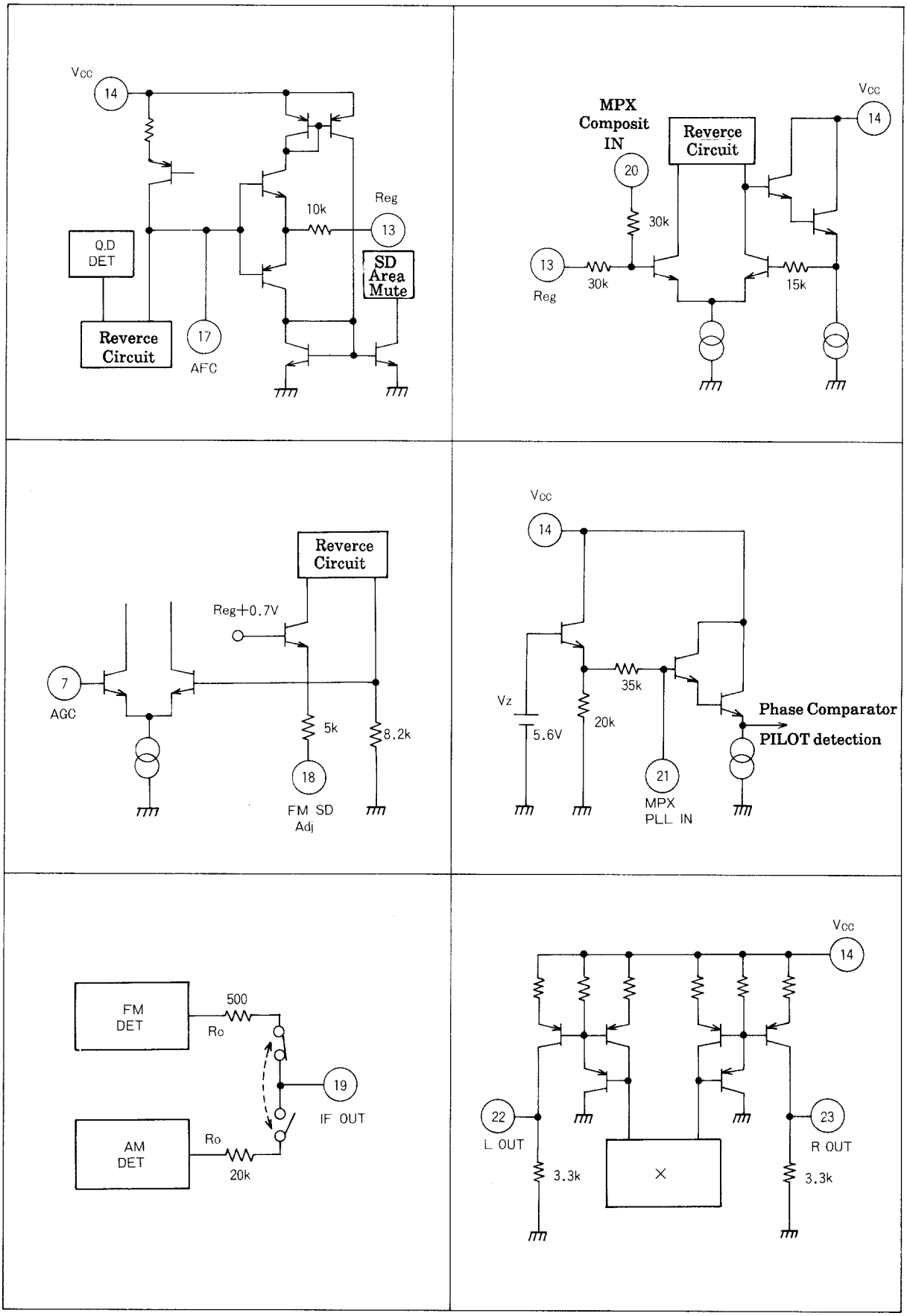
Unit (resistance: Ω)



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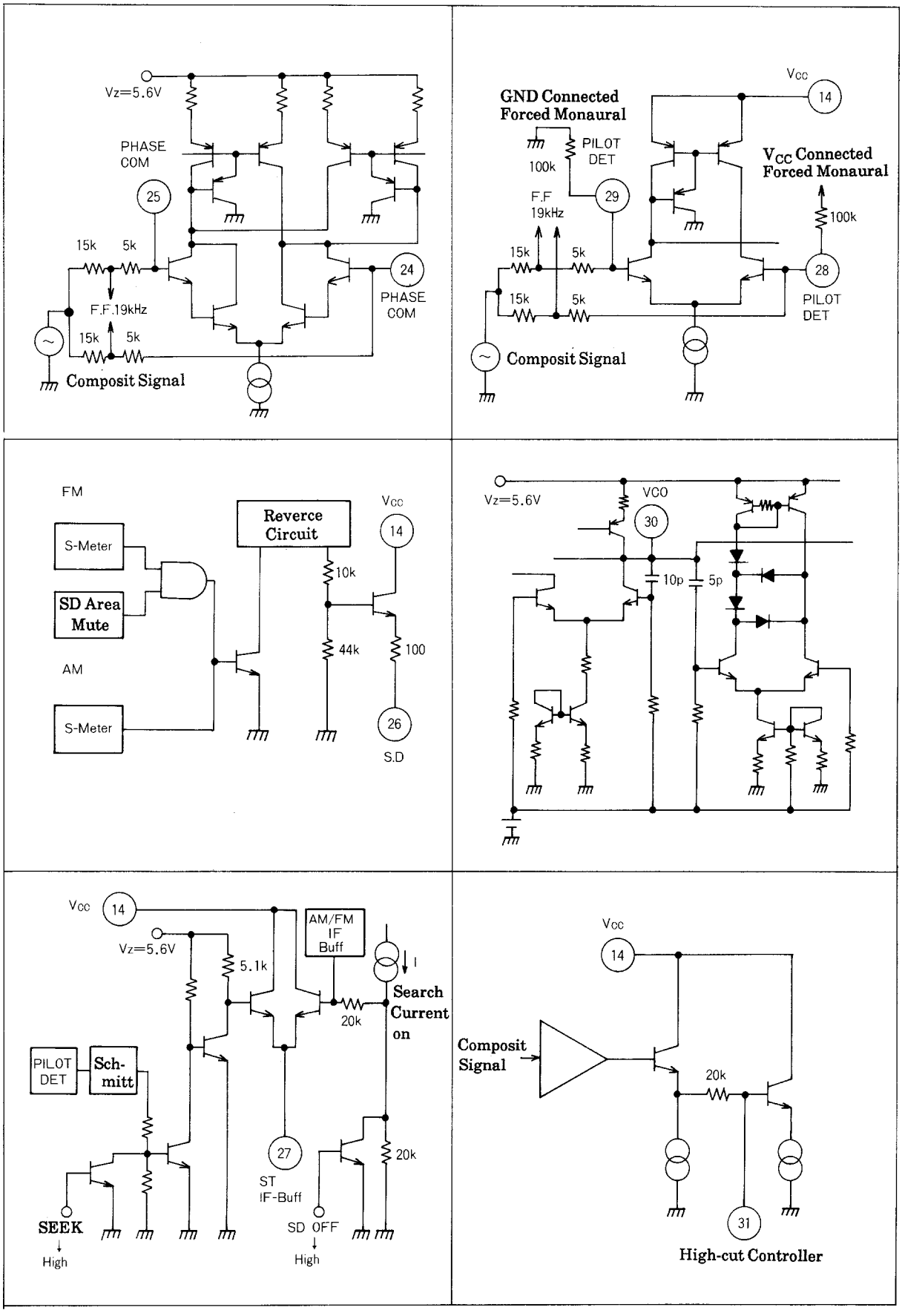
Unit (resistance: Ω)



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Unit (resistance: Ω)