

SANYO	No.3342B	LA1875M
		Single-chip, Electronic Tuner for Car Stereos

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, quadrature 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 10 V supply and is available in 36-pin MFPs.

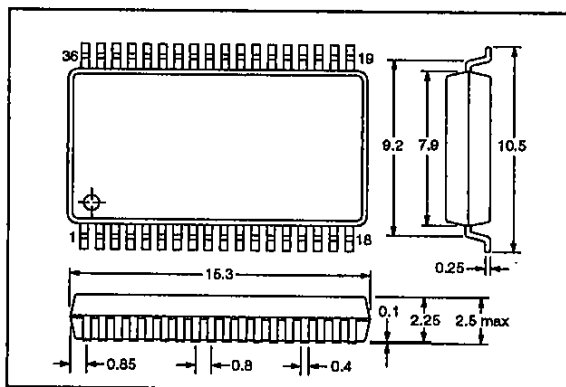
FEATURES

- 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 10 V supply
- 36-pin MFP

PACKAGE DIMENSIONS

Unit: mm

3129-MFP36S



SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	11	V
Power dissipation ($T_a \leq 50\text{ }^\circ\text{C}$)	P_D	720	mW
Operating temperature range	T_{opr}	-30 to 80	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40 to 150	$^\circ\text{C}$

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 to 10	V

Electrical Characteristics

FM characteristics

$V_{CC} = 8.5\text{ V}$, $T_a = 25\text{ }^\circ\text{C}$, $f_c = 10.7\text{ MHz}$, $f_m = 1\text{ kHz}$, 75 kHz deviation unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	21	31	41	mA
-3 dB limiting sensitivity	-3dBLS	Referred to $V_1 = 100\text{ dB}\mu$. Mute is ON.	27	37	47	dB μ
Tuning LED turn-on input voltage	V_{LED}	$V_{26} = 2\text{ V}$	43	58	73	dB μ
Detector output voltage	V_O	$V_1 = 100\text{ dB}\mu$	165	250	345	mV
S-meter output voltage	V_{SM}	No signal	0	0.15	0.7	V
		$V_1 = 100\text{ dB}\mu$	5.0	6.1	7.0	
IF buffer output voltage	V_{IF}	$V_1 = 80\text{ dB}\mu$, $V_{12} = 5\text{ V}$	200	360	540	mV
SNC output voltage	V_{SUB}	$V_1 = 100\text{ dB}\mu$, $V_{34} = 0.1\text{ V}$. See note.	-	0.5	5.0	mV
Tuning LED turn-on bandwidth	BW_{LED}	$V_1 = 100\text{ dB}\mu$, $V_{26} \geq 2\text{ V}$	85	130	180	kHz
Signal-to-noise ratio	SN	$V_1 = 100\text{ dB}\mu$	66	74	-	dB
AM suppression ratio	AMR	$V_1 = 100\text{ dB}\mu$ at 1 kHz with 30% AM modulation	38	60	-	dB
Separation	Sep	$V_1 = 100\text{ dB}\mu$. See note.	30	45	-	dB
Channel balance	CB		-1.5	0	1.5	dB
HCC output attenuation	α	$V_1 = 100\text{ dB}\mu$, $V_{33} = 0.6\text{ V}$, $f_m = 10\text{ kHz}$. See note.	-10.0	-5.0	-0.5	dB
Stereo LED turn-on pilot tone modulation	LED-ON	$V_1 = 100\text{ dB}\mu$	1.8	3.2	5.0	%
Stereo LED turn-off pilot tone modulation	LED-OFF	$V_1 = 100\text{ dB}\mu$	-	2.2	-	%

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Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Total harmonic distortion	THD	$V_I = 100 \text{ dB}\mu$, mono signal	-	0.5	2.5	%
		$V_I = 100 \text{ dB}\mu$, main channel signal	-	0.5	2.5	

Note

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

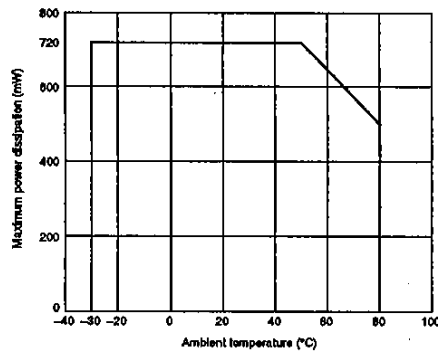
AM characteristics

$V_{CC} = 8.5 \text{ V}$, $T_a = 25 \text{ }^\circ\text{C}$, $f_c = 1 \text{ MHz}$, $f_m = 1 \text{ kHz}$ with 30% modulation

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent supply current	I_{CCO}	No signal	15	24	33	mA
Tuning LED turn-on input voltage	V_{LED}	$V_{26} = 2 \text{ V}$	21	30	39	dB μ
RF AGC turn-on input voltage	V_{AGC}	$V_I = 3 \text{ V}$	50	57	64	dB μ
Detector output voltage	V_O	$V_I = 25 \text{ dB}\mu$	18	40	68	mV
		$V_I = 74 \text{ dB}\mu$	70	105	156	
IF buffer output voltage	V_{IF}	$V_I = 50 \text{ dB}\mu$, $V_{12} = 5 \text{ V}$	150	260	390	mV
S-meter output voltage	V_{SM}	No signal	0	0.7	1.3	V
		$V_I = 74 \text{ dB}\mu$	2.6	3.7	5.2	
Pin-diode driver current	I_{antd}	$V_I = 0.7 \text{ V}$	2.0	2.5	3.0	mA
Signal-to-noise ratio	S/N	$V_I = 25 \text{ dB}\mu$	17	21	-	dB
		$V_I = 74 \text{ dB}\mu$	42	49	-	
Total harmonic distortion	THD	$V_I = 74 \text{ dB}\mu$	-	0.35	1.0	%
		$V_I = 130 \text{ dB}\mu$	-	0.4	2.0	

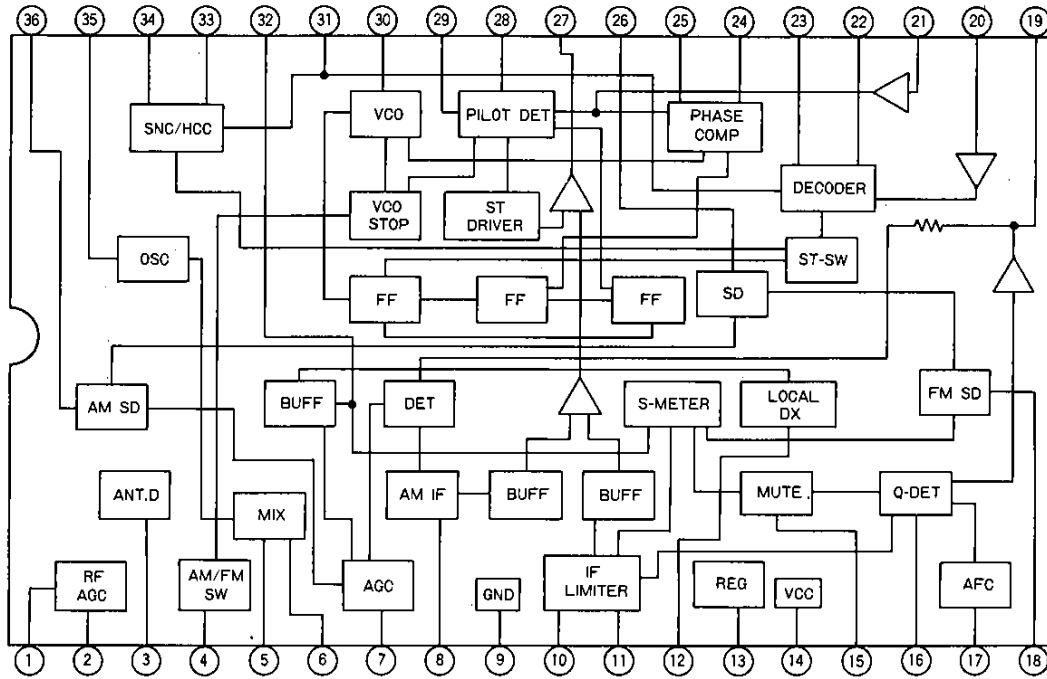
Typical Performance Characteristics

Maximum power dissipation vs. ambient temperature

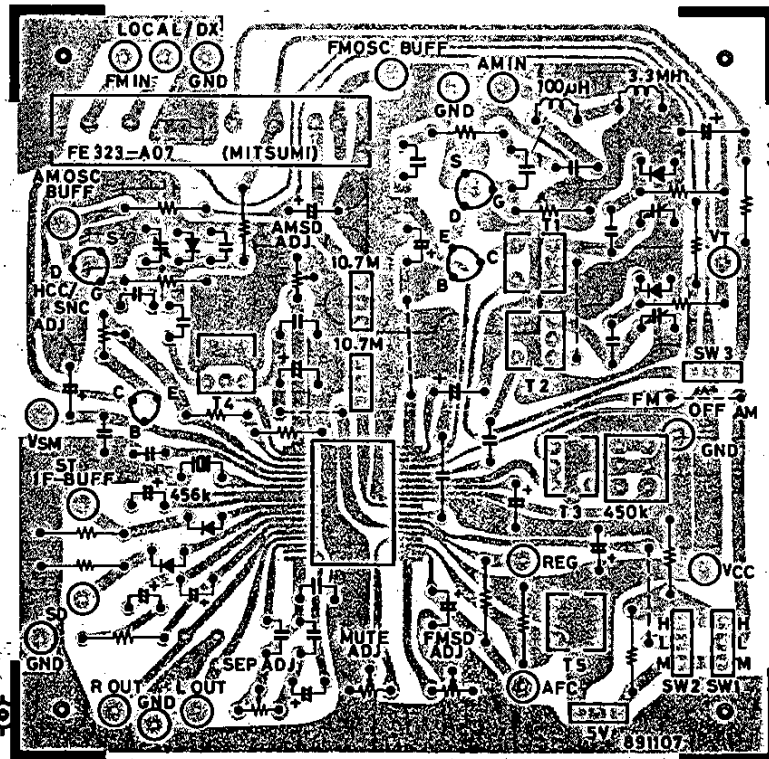


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Block Diagram

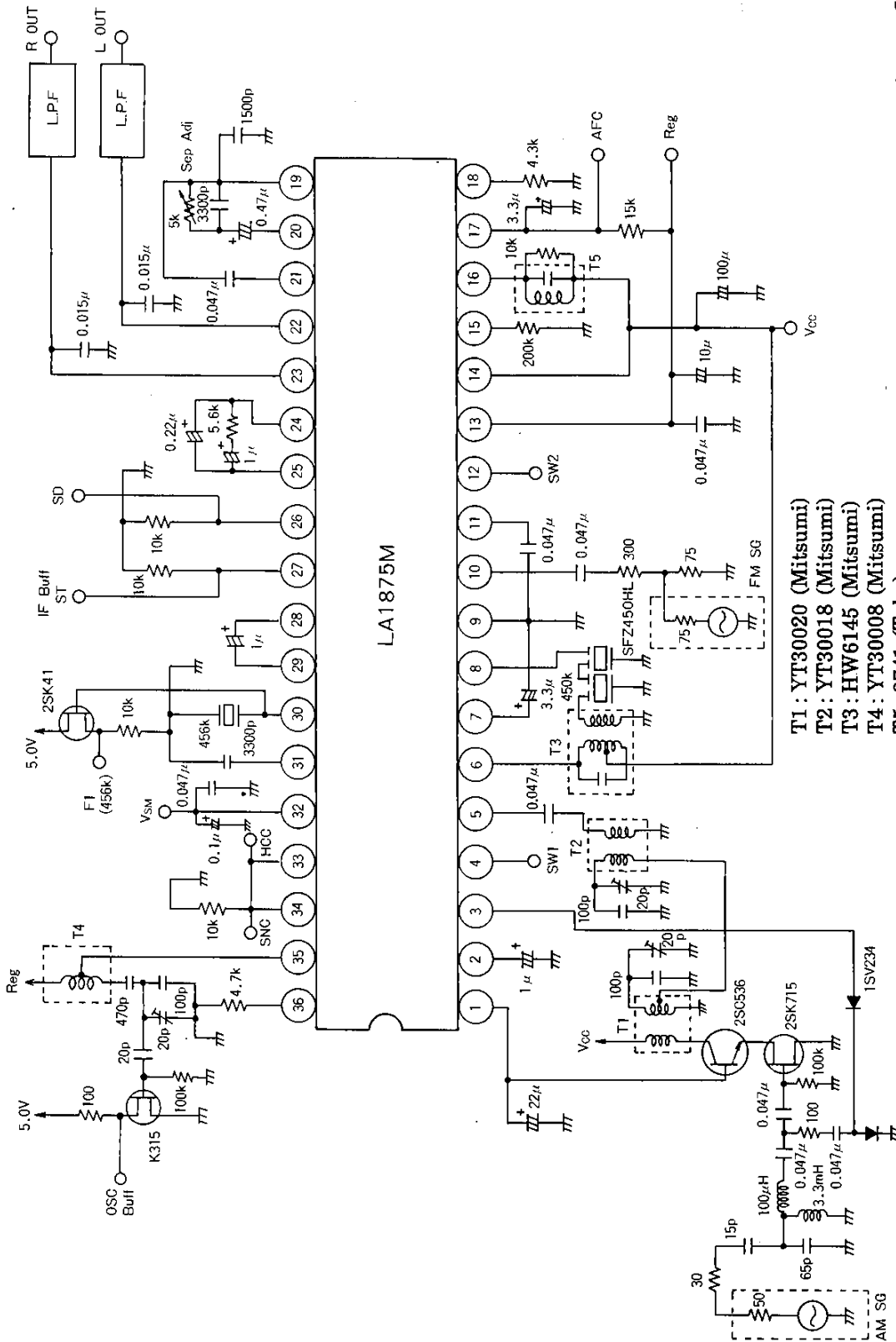


Sample Printed Circuit Pattern



Cu-foiled area 90×90mm²

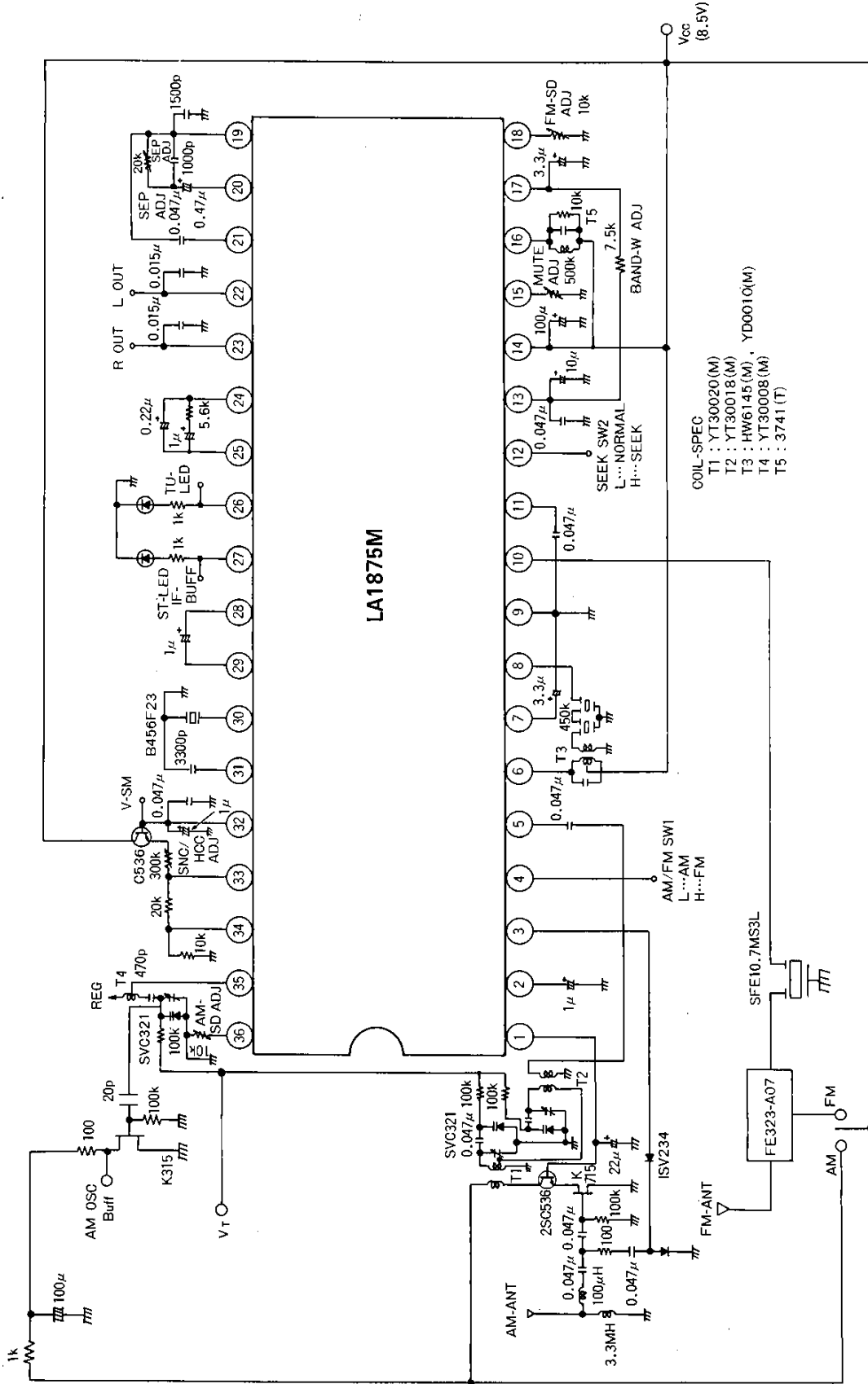
Specified Test Circuit



- T1 : YT30020 (Mitsumi)
- T2 : YT30018 (Mitsumi)
- T3 : HW6145 (Mitsumi)
- T4 : YT30008 (Mitsumi)
- T5 : 3741 (Toko)
- Ceralock B456F23 (Murata)

Unit (resistance: Ω, capacitance: F)

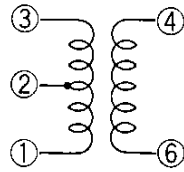
Sample Application Circuit



Unit (resistance: Ω , capacitance: F)

LA1875M Coil Specifications

T1 RF double tuning coil (Primary)

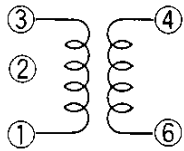


L1 - 3 = 224 μ H

YT-30020 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 37T
- ② - ③ 82T

T2 RF double tuning coil (Secondary)

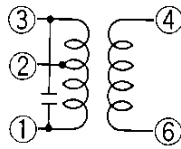


L1 - 3 = 224 μ H

YT-30018 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 15T
- ② - ③ 82T

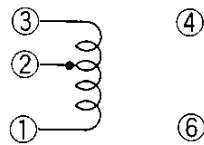
T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



HW-6145 (Mitsumi)

- ③ - ② 67T $Q_0 = 70 \pm 20\%$
- ② - ① 85T $f = 450\text{kHz}$
- ⑥ - ④ 10T internal 180pF

T4 AM OSC Coil

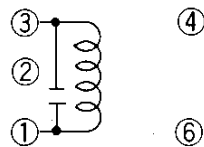


L1 - 3 = 118 μ H

YT-30008 (Mitsumi)

- ① - ② 29T
- ② - ③ 29T

T5 FM DET Coil

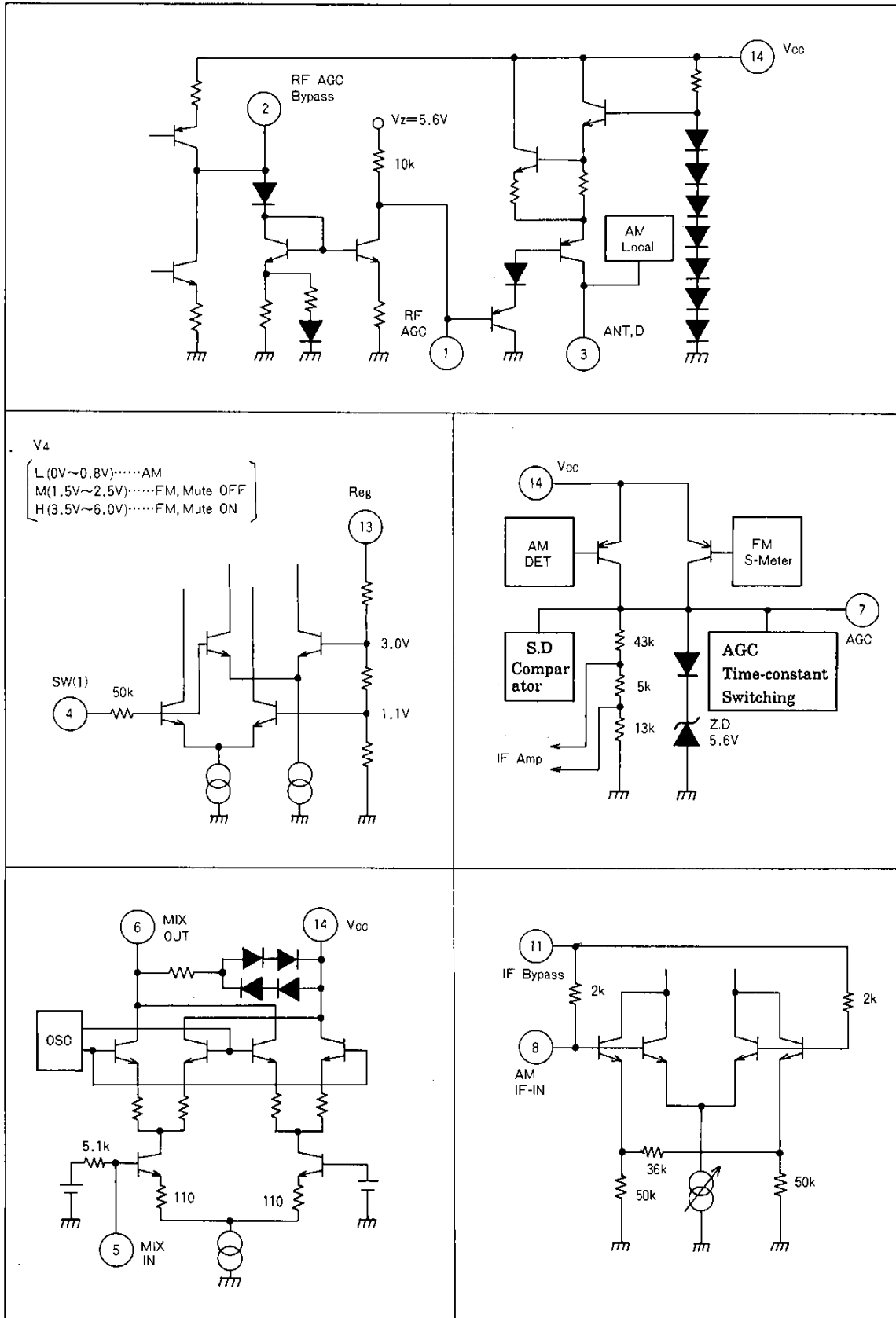


292TEAS-3741Z (Tokko)

- ① - ③ 21T
- $f = 10.7\text{MHz}$
- internal 82pF
- $Q_0 = 38 \pm 20\%$

IC Internal Equivalent Circuit Diagrams

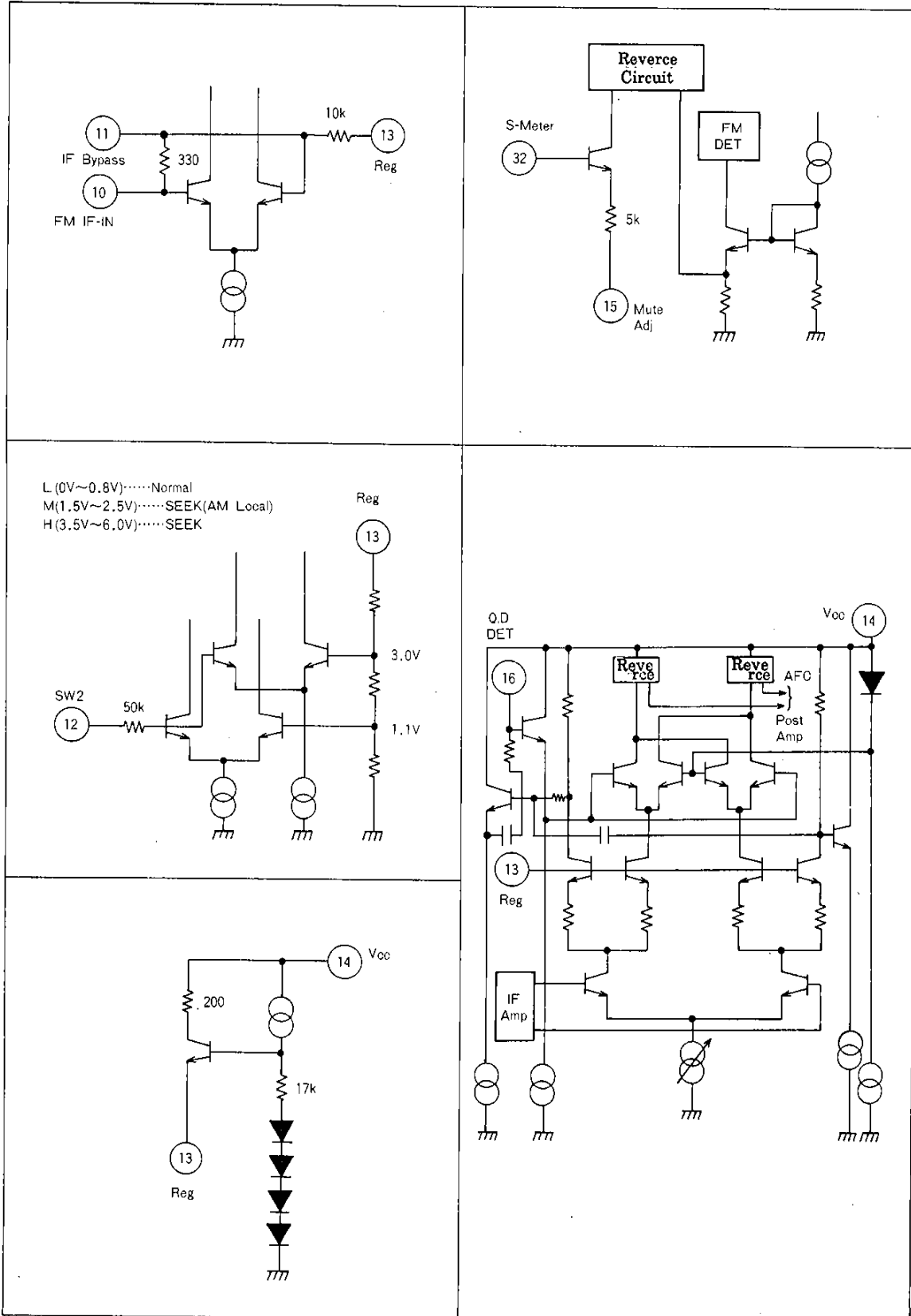
Unit (resistance: Ω)



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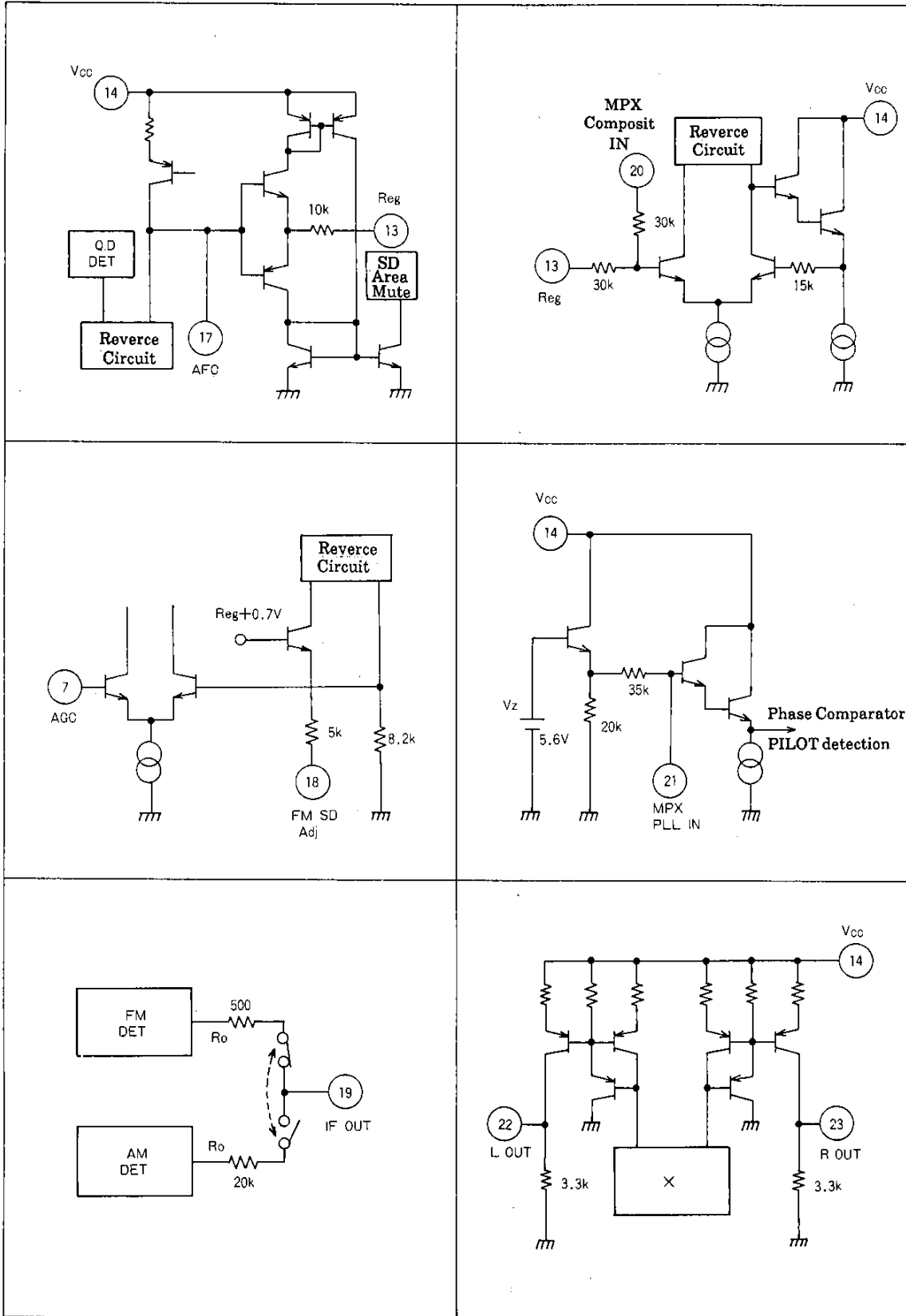
Unit (resistance: Ω)



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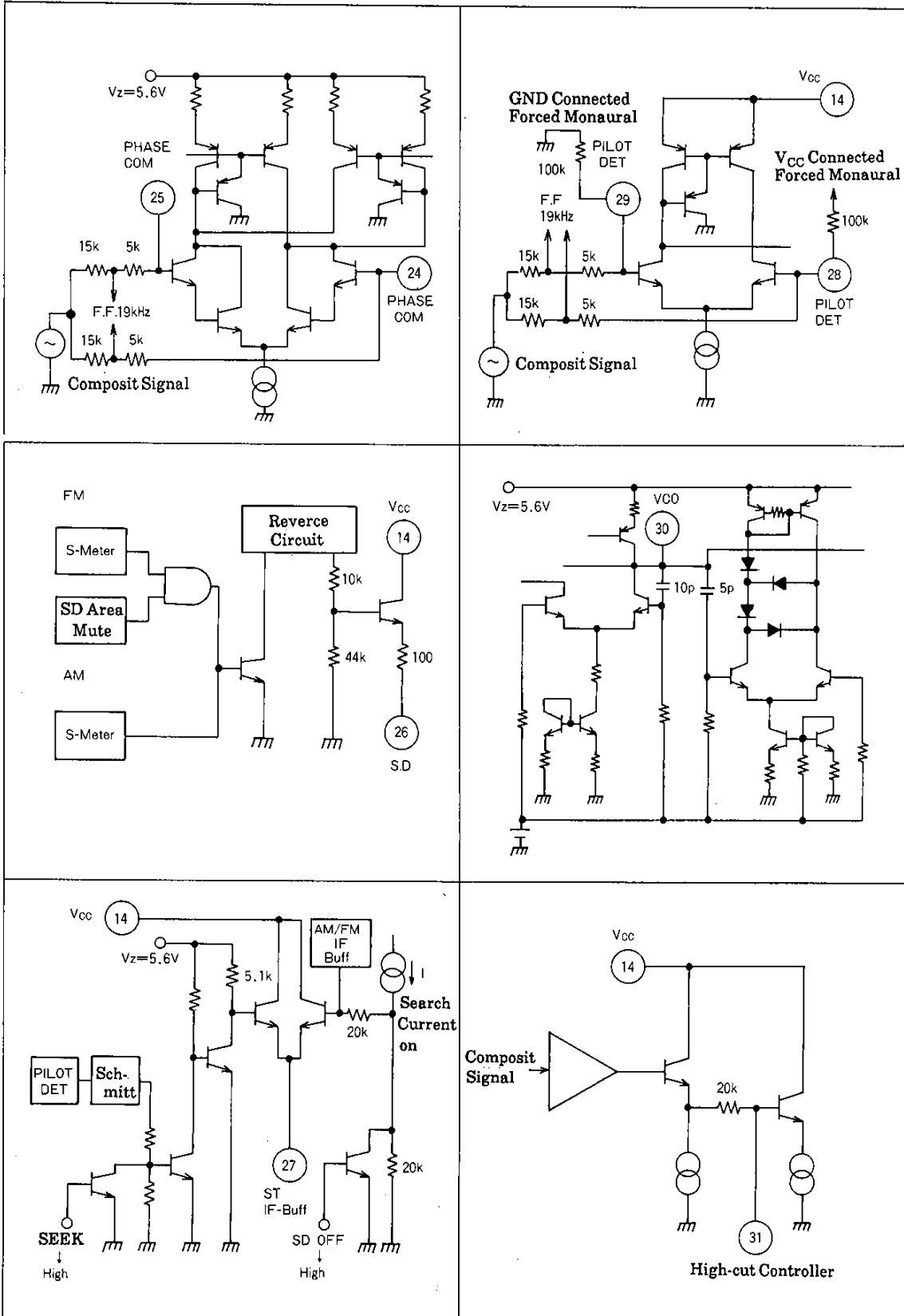
Unit (resistance: Ω)



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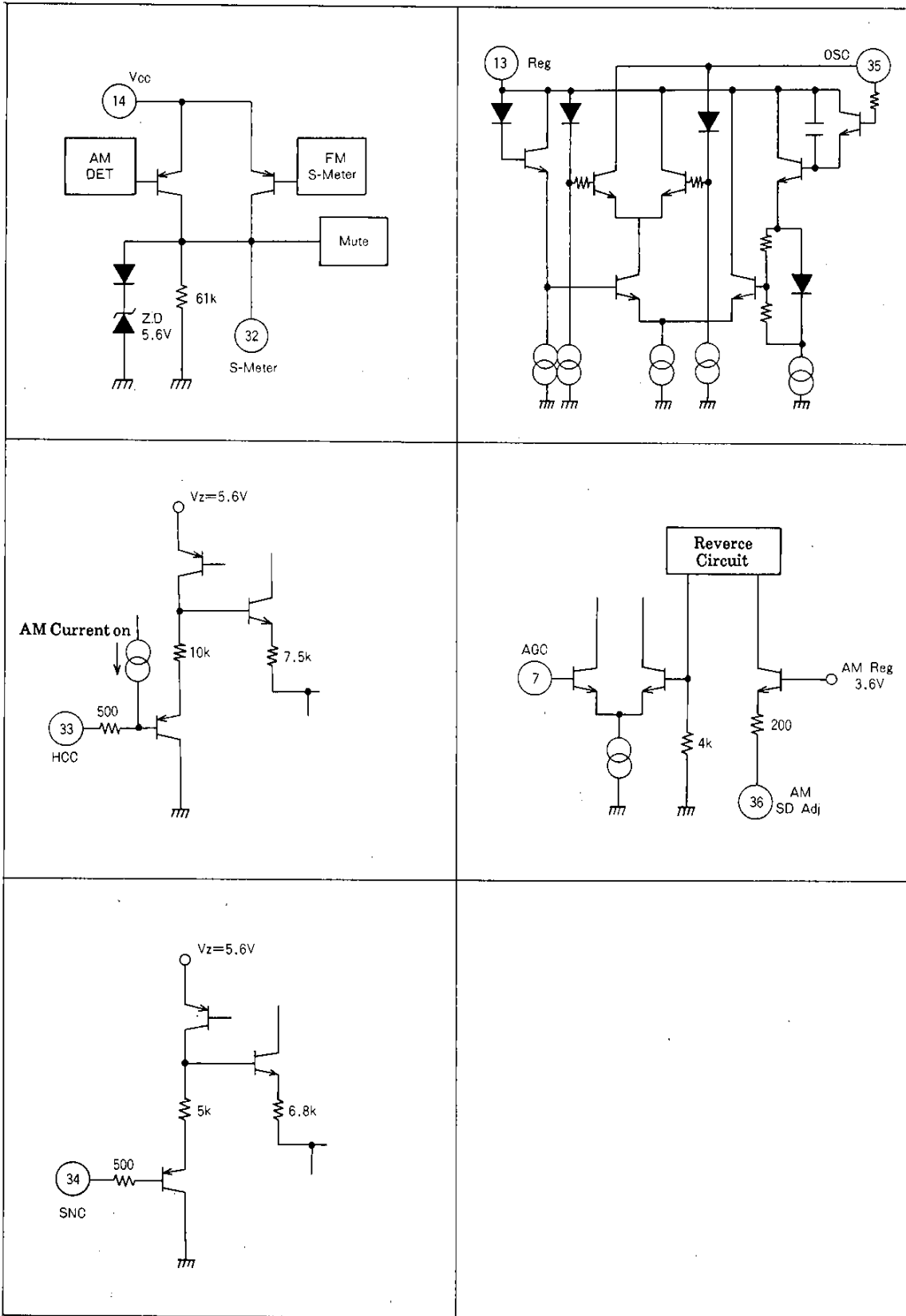
Unit (resistance: Ω)



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Unit (resistance: Ω)



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