



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

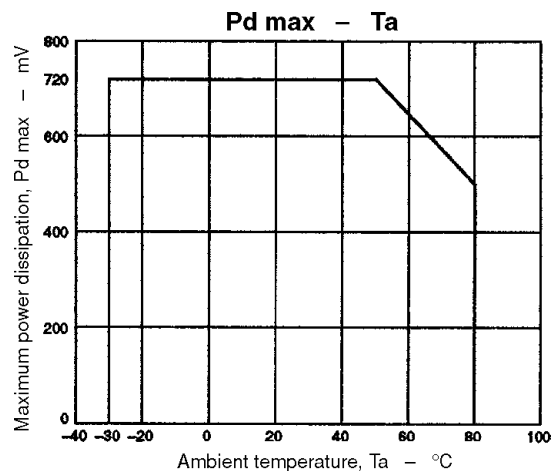
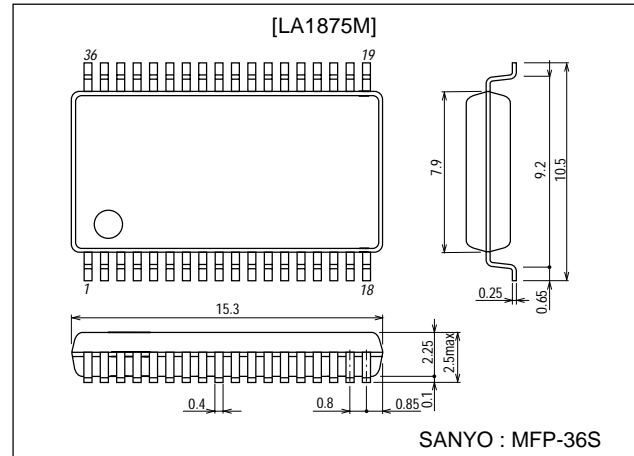
### Features

- 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 10V supply.
- 36-pin MFP.

### Package Dimensions

unit:mm

3129-MFP36S



■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

**SANYO Electric Co., Ltd. Semiconductor Company**

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

# LA1875M

## Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		11	V
Power dissipation ( $T_a \leq 50^\circ\text{C}$ )	$P_D$		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 at $T_a = 25^\circ\text{C}$

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 $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$ , $f_c=10.7\text{MHz}$ , $f_m=1\text{kHz}$ , 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 $V_I=100\text{dB}\mu$ , Mute is ON.	27	37	47	dB $\mu$
Tuning LED turn-on input voltage	$V_{LED}$	$V_{26}=2\text{V}$	43	58	73	dB $\mu$
Detector output voltage	$V_O$	$V_I=100\text{dB}\mu$	165	250	345	mV
S-meter output voltage	$V_{SM}$	No signal	0	0.15	0.7	V
		$V_I=100\text{dB}\mu$	5.0	6.1	7.0	
IF buffer output voltage	$V_{IF}$	$V_I=80\text{dB}\mu$ , $V_{12}=5\text{V}$	200	360	540	mV
SNC output voltage	$V_{SUB}$	$V_I=100\text{dB}\mu$ , $V_{34}=0.1\text{V}$ . See note.		0.5	5.0	mV
Tuning LED turn-on bandwidth	$BW_{LED}$	$V_I=100\text{dB}\mu$ , $V_{26} \geq 2\text{V}$	85	130	180	kHz
Signal-to-noise ratio	S/N	$V_I=100\text{dB}\mu$	66	74		dB
AM suppression ratio	AMR	$V_I=100\text{dB}\mu$ at 1kHz with 30% AM modulation	38	60		dB
Separation	Sep	$V_I=100\text{dB}\mu$ , See note.	30	45		dB
Channel balance	CB		-1.5	0	+1.5	dB
HCC output attenuation	$\alpha$	$V_I=100\text{dB}\mu$ , $V_{33}=0.6\text{V}$ , $f_m=10\text{kHz}$ , See note.	-10.0	-5.0	-0.5	dB
Stereo LED turn-on pilot tone modulation	LED-ON	$V_I=100\text{dB}\mu$	1.8	3.2	5.0	%
Stereo LED turn-off pilot tone modulation	LED-OFF	$V_I=100\text{dB}\mu$		2.2		%
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

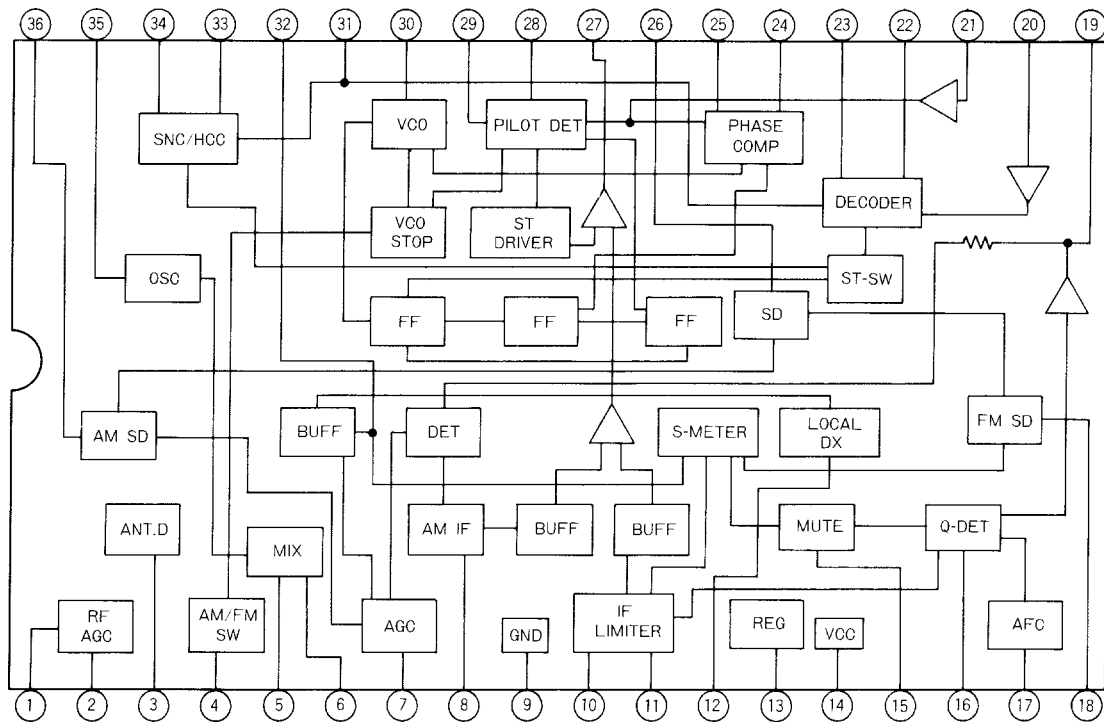
$V_I$  comprises 90% left + right signal and 10% pilot signal.

### AM characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC}=8.5\text{V}$ , $f_c=1\text{MHz}$ with 30% modulation.

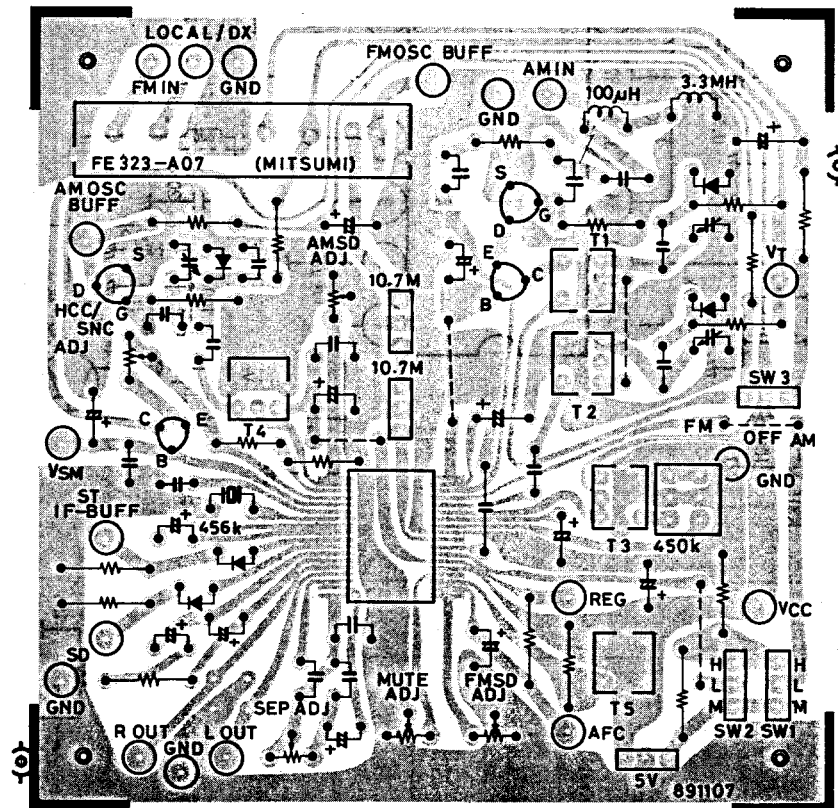
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent supply current	$I_{CCO}$	No signal	16	24	33	mA
Tuning LED turn-on input voltage	$V_{LED}$	$V_{26}=2\text{V}$	21	30	39	dB $\mu$
RF AGC turn-on input voltage	$V_{AGC}$	$V_I=3\text{V}$	50	57	64	dB $\mu$
Detector output voltage	$V_O$	$V_I=25\text{dB}\mu$	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	

# LA1875M

## Block Diagram



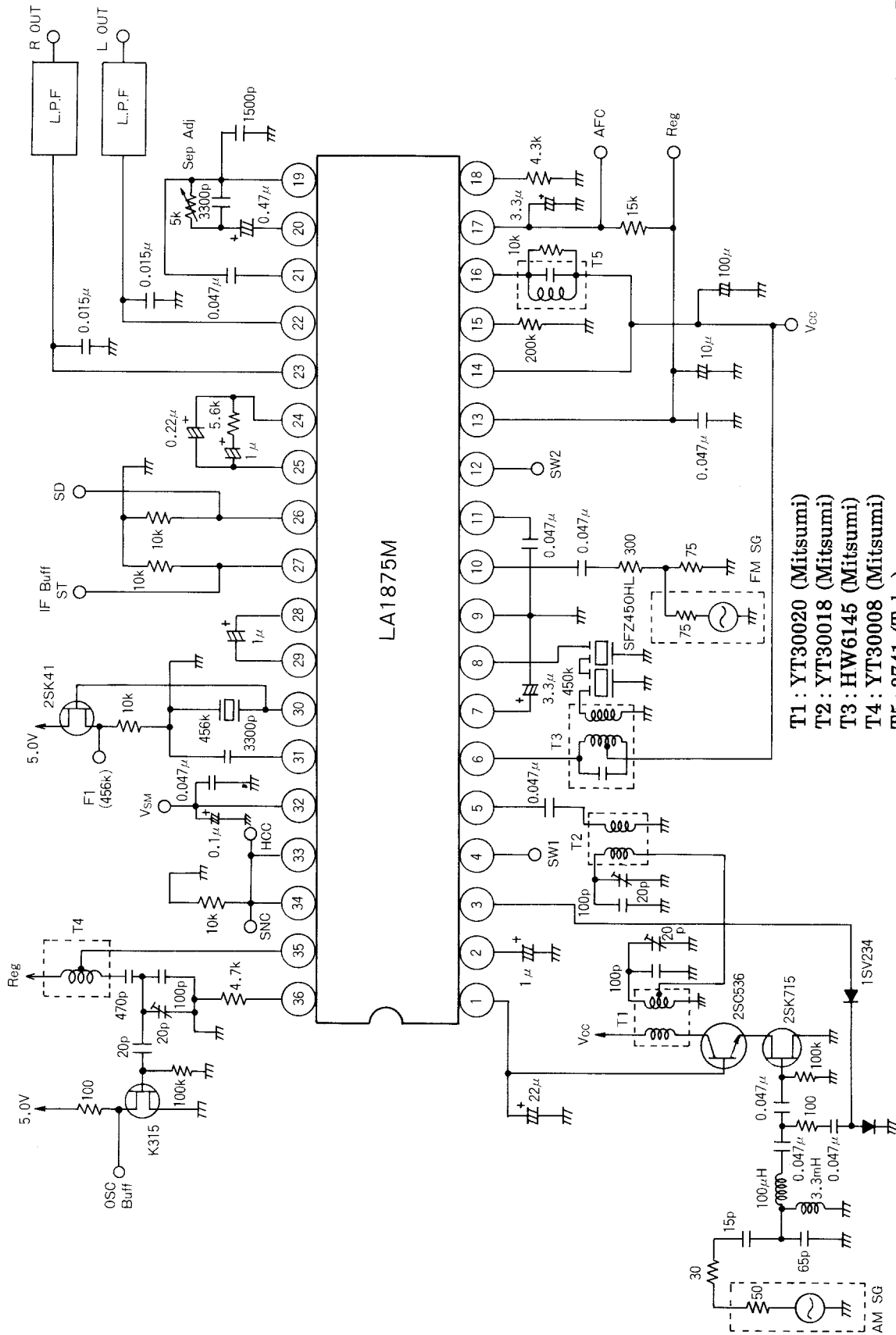
## Sample Printed Circuit Pattern



Cu-foiled area 90×90mm<sup>2</sup>

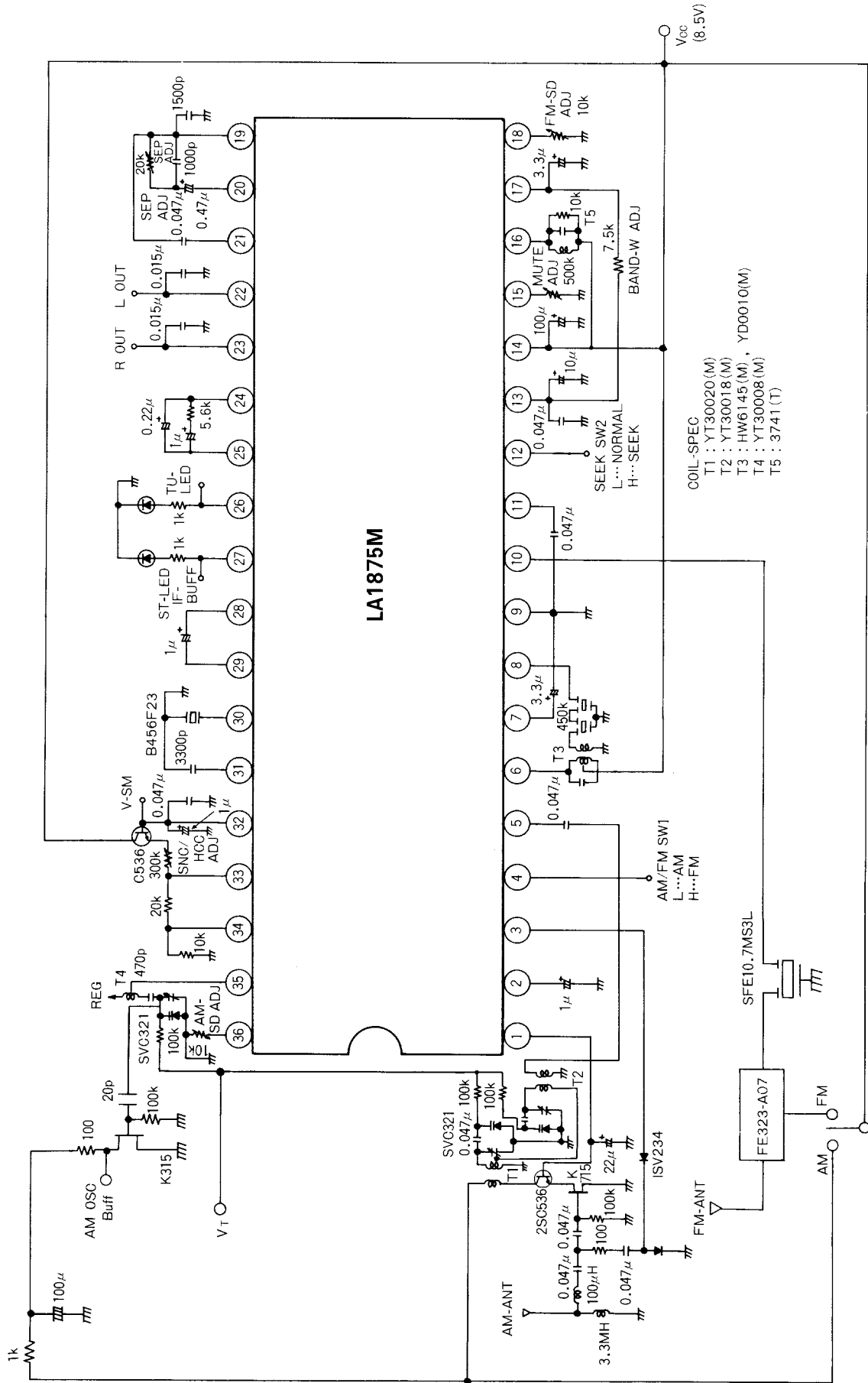
# LA1875M

## Specified Test Circuit



# LA1875M

## Sample Application Circuit

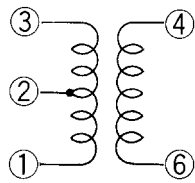


Unit (resistance: Ω, capacitance: F)

# LA1875M

## LA1875M Coil Specifications

T1 RF double tuning coil (Primary)

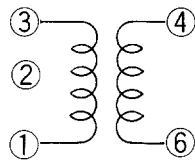


$$L1 - 3 = 224\mu\text{H}$$

YT-30020 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 37T
- ② - ③ 82T

T2 RF double tuning coil (Secondary)

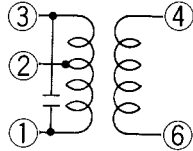


$$L1 - 3 = 224\mu\text{H}$$

YT-30018 (Mitsumi)

- ① - ② 2T
- ⑥ - ④ 15T
- ② - ③ 82T

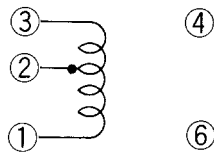
T3 AM IFT Coil (Matching Coil for SFZ 450 HL3)



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

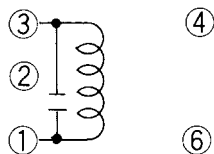


$$L1 - 3 = 118\mu\text{H}$$

YT-30008 (Mitsumi)

- ① - ② 29T
- ② - ③ 29T

T5 FM DET Coil



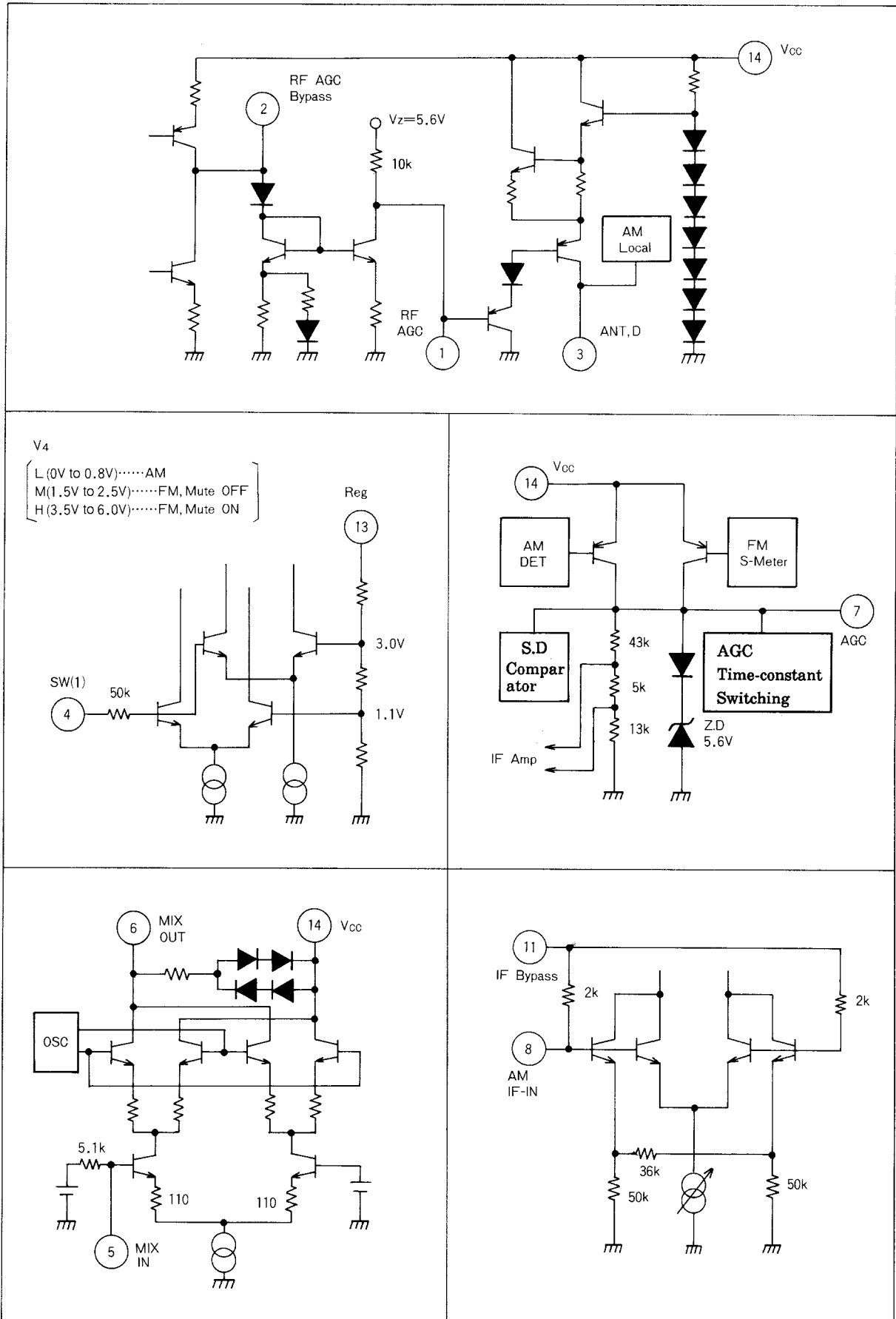
292TEAS-3741Z (Toko)

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

# LA1875M

## IC Internal Equivalent Circuit Diagrams

Unit (resistance:  $\Omega$ )

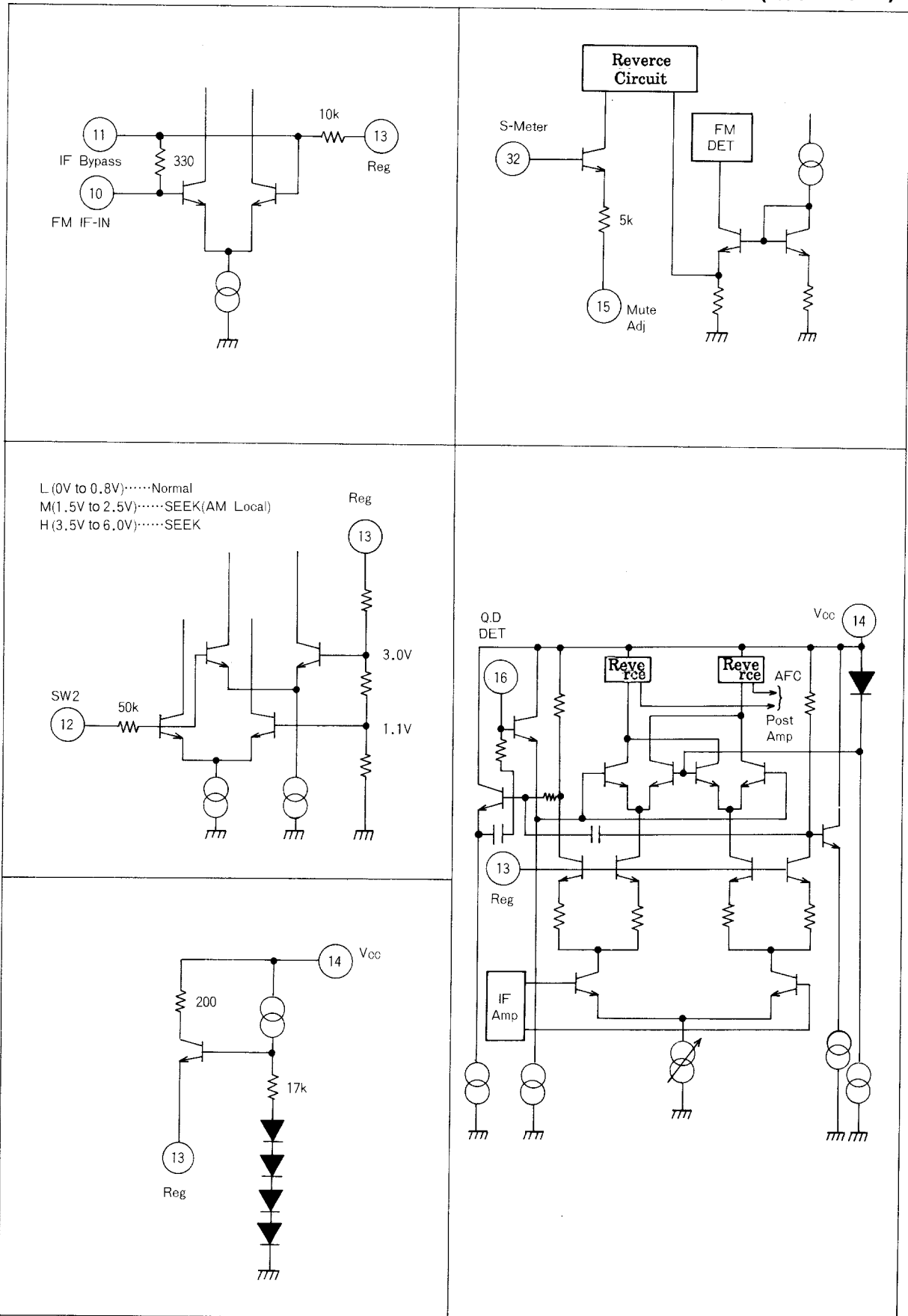


Continued on next page.

# LA1875M

Continued from preceding page.

Unit (resistance:  $\Omega$ )



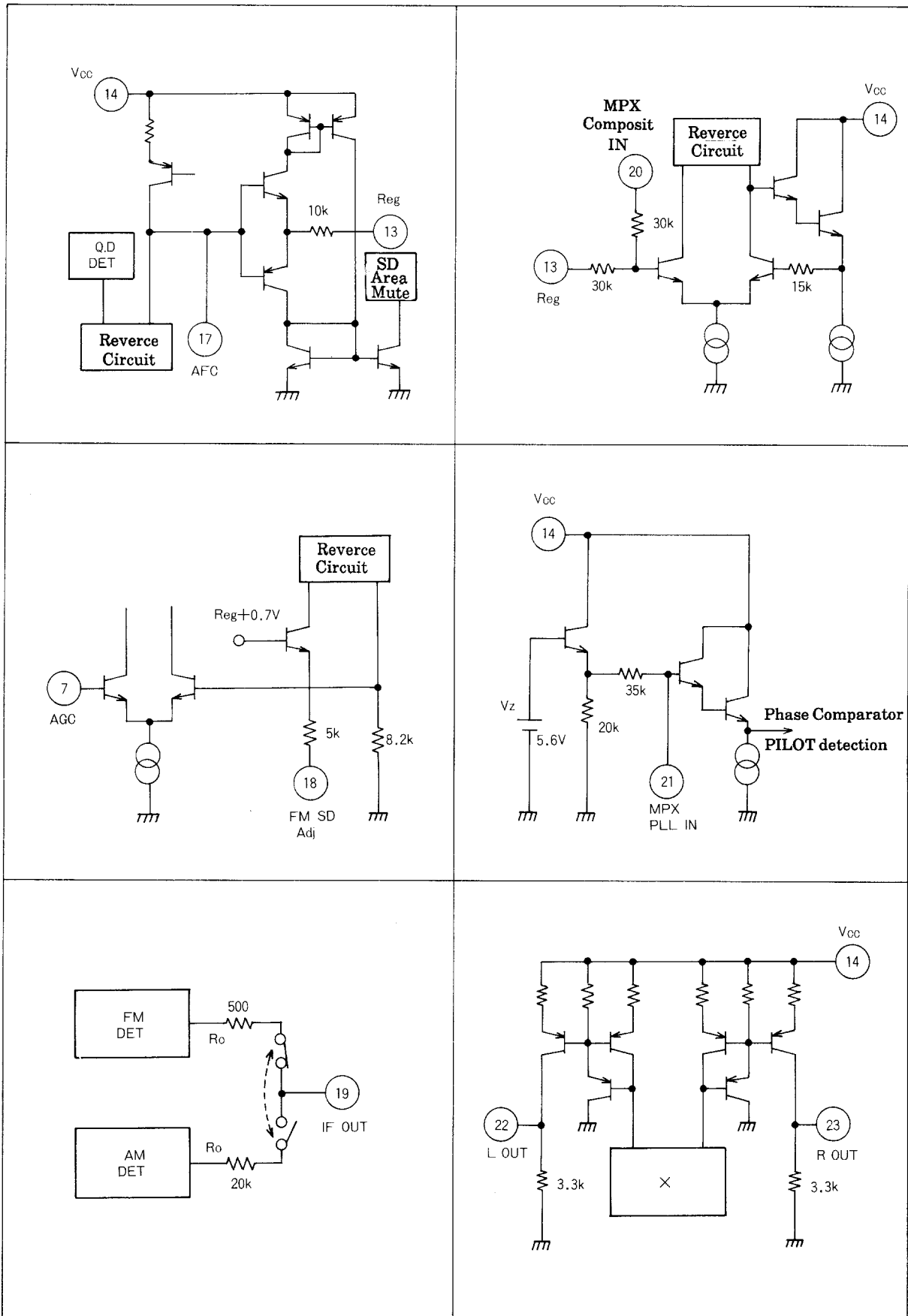
Continued on next page.



# LA1875M

Continued from preceding page.

Unit (resistance:  $\Omega$ )

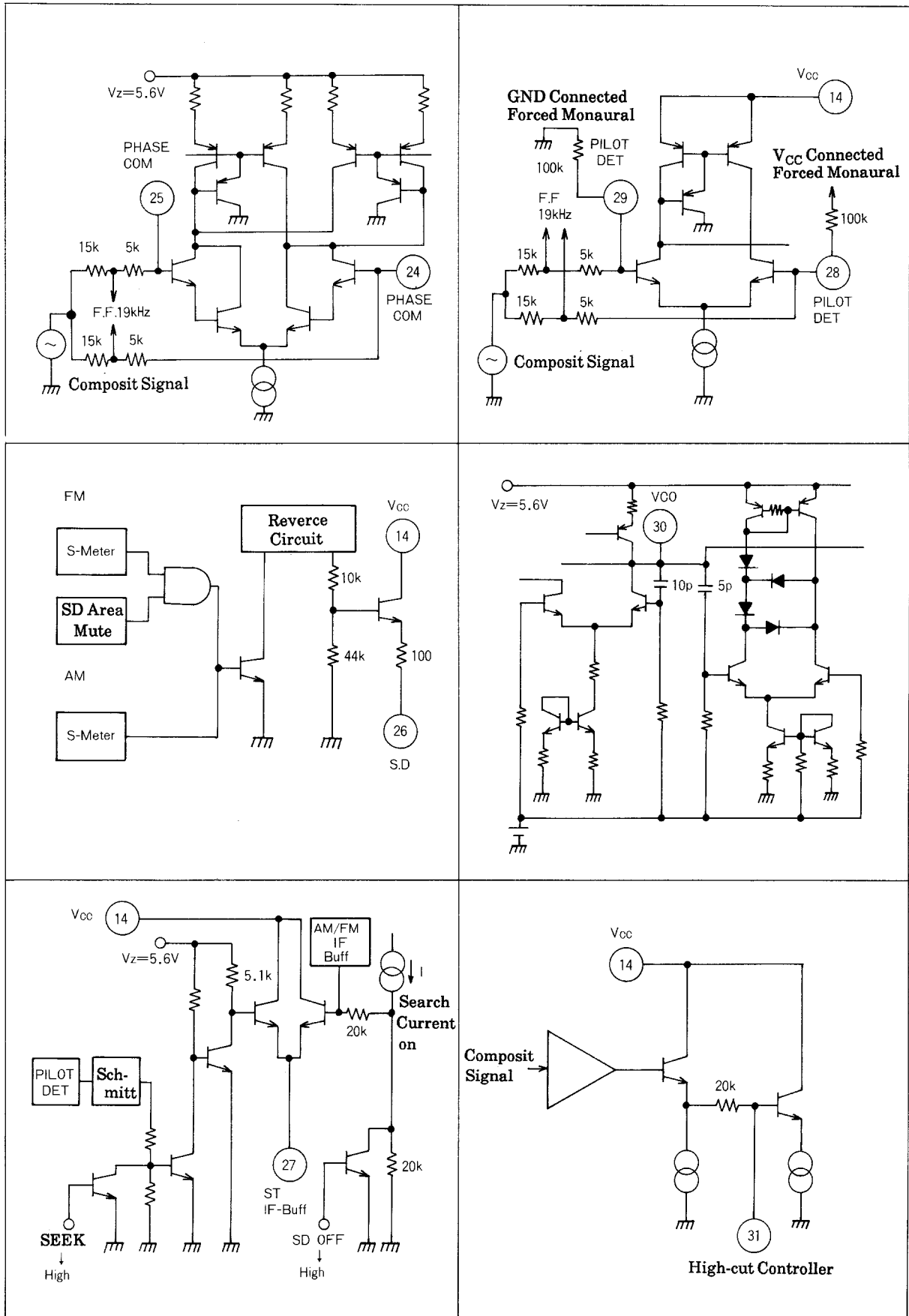


Continued on next page.

# LA1875M

Continued from preceding page.

Unit (resistance:  $\Omega$ )

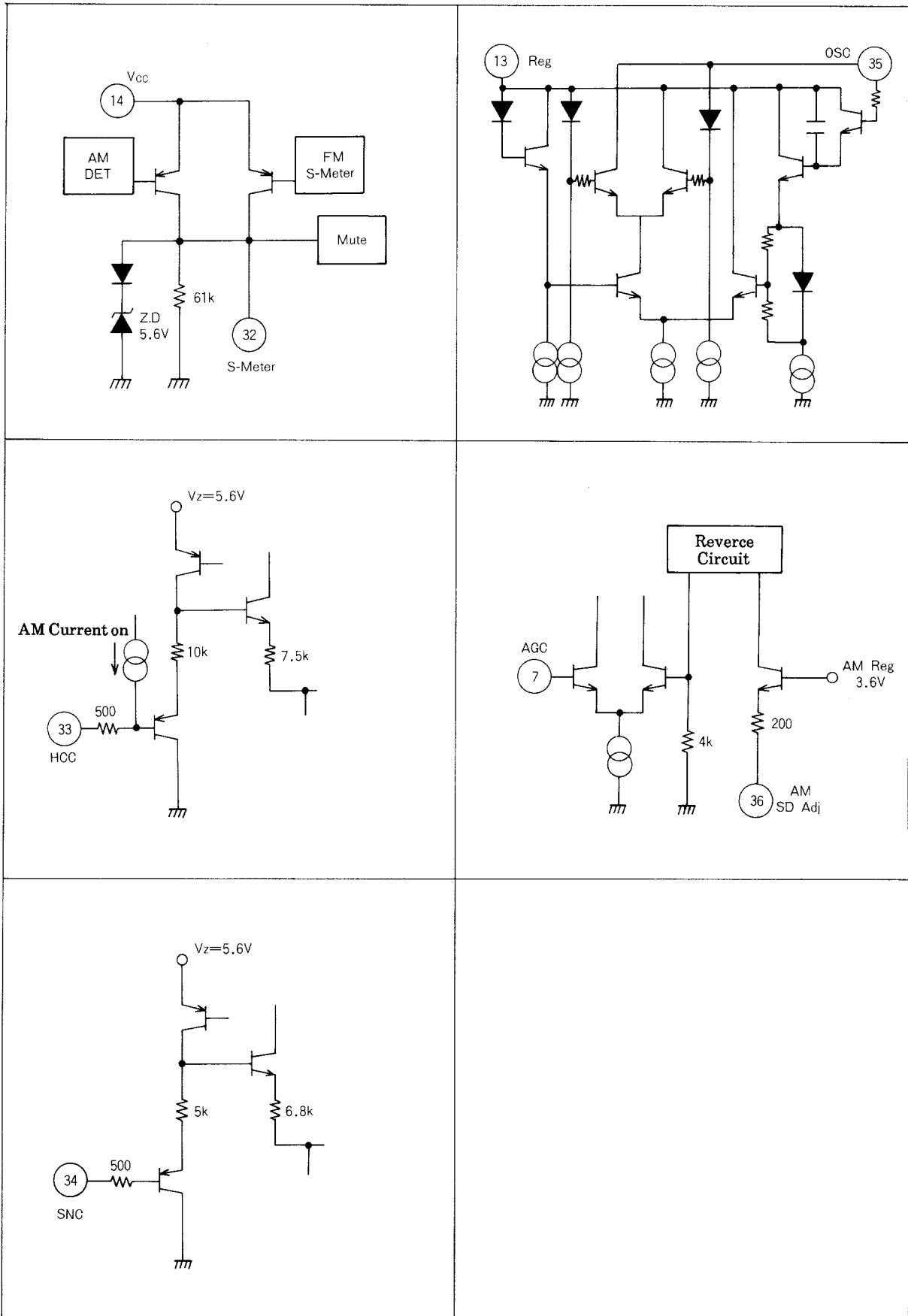


Continued on next page.

# LA1875M

Continued from preceding page.

Unit (resistance:  $\Omega$ )



- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of January, 2000. Specifications and information herein are subject to change without notice.