



# LA1800

— Monolithic Linear IC  
**FM / AM Single-Chip Radio**

## Functions

- FM : Front end, low-pass filter, IF amplifier, quadrature detector, muting.
- AM :RF amplifier, detector.
- AM :AF driver (earphone driver).

## Features

- Minimum number of external parts required : One tuning circuit each for FM, AM
- Low current dissipation : 5.6mA/FM, 3.2mA/AM
- Low-voltage operation :  $V_{CC\ min}=2.5V$

## Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$	Pin 3	6.0	V
Allowable power dissipation	$P_d\ max$		200	mW
Operating temperature	$T_{opr}$		-20 to +70	$^\circ C$
Storage temperature	$T_{stg}$		-40 to +125	$^\circ C$

### Operating Conditions at $T_a=25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$		3.0	V
Operating supply voltage range	$V_{CC\ op}$		2.5 to 5.0	V

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM]						
Current drain	$I_{cco}$			3.6	5.5	mA
Pin 2 voltage	$V_2$		1.9	2.4	2.9	V
Pin 14 voltage	$V_{14}$		0.4	0.9	1.6	V
Pin 21 voltage	$V_{21}$		0.6	0.9	1.2	V

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# LA1800

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[FM]						
Current drain	I <sub>cco</sub>			5.6	8.0	mA
Pin 2 voltage	V <sub>2</sub>		1.9	2.6	2.9	V
Pin 4 voltage	V <sub>4</sub>		1.7	2.3	2.9	V
Pin 5 voltage	V <sub>5</sub>		1.7	2.3	2.9	V
Pin 6 voltage	V <sub>6</sub>		1.1	1.7	2.3	V
Pin 7 voltage	V <sub>7</sub>		1.1	1.7	2.3	V
Pin 8 voltage	V <sub>8</sub>		1.1	1.7	2.3	V
Pin 9 voltage	V <sub>9</sub>		1.9	2.6	2.9	V
Pin 10 voltage	V <sub>10</sub>		1.8	2.5	2.9	V
Pin 13 voltage	V <sub>13</sub>			0	0.6	V
Pin 14 voltage	V <sub>14</sub>		0.5	1.0	1.7	V
Pin 16 voltage	V <sub>16</sub>		1.6	2.3	2.9	V
Pin 17 voltage	V <sub>17</sub>		1.6	2.3	2.9	V
Pin 19 voltage	V <sub>19</sub>		0.6	0.86	1.4	V
Pin 20 voltage	V <sub>20</sub>		0.6	0.86	1.4	V
[AF]						
Pin 11 current	I <sub>11</sub>		0.5	1.0	1.5	mA
Pin 12 voltage	V <sub>12</sub>			0	0.5	V

[Reference characteristics]

**Operating Characteristics** at Ta=25°C, VCC=3V, See specified Test Circuit 2.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM: f <sub>C</sub> =1MHz, f <sub>m</sub> =400Hz]						
Current drain	I <sub>cco</sub>	Quiescent		3.6		mA
Detection output	V <sub>O1</sub>	V <sub>IN</sub> =40dBμ, 30% mod		10		mV
	V <sub>O2</sub>	V <sub>IN</sub> =70dBμ, 30% mod		100		mV
Signal-to-noise ratio	S/N	V <sub>IN</sub> =70dBμ, 30% mod		47		dB
[FM: f <sub>C</sub> =90MHz, f <sub>m</sub> =400Hz]						
Current drain	I <sub>cco</sub>	Quiescent		5.6		mA
Input limiting sensitivity	-3dBLS	3dB down, 30% mod		16		dBμ
Demodulation output	V <sub>O</sub>	V <sub>IN</sub> =80dBμ, 30% mod		90		mV
Total harmonic distortion	THD	V <sub>IN</sub> =80dBμ, 30% mod		0.8		%
Signal-to-noise ratio	S/N	V <sub>IN</sub> =80dBμ		59		dB
[AF: f <sub>m</sub> =400Hz]						
Voltage gain	V <sub>G</sub>	V <sub>O</sub> =50mV		24		dB
Total harmonic distortion	THD	V <sub>O</sub> =50mV		0.3		%

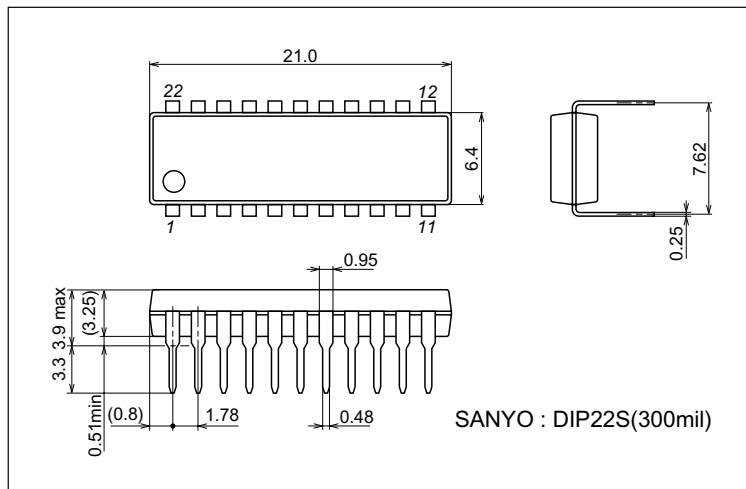
Note : 1. Current drain for FM, AM includes current of AF driver stage.

2. When handling the IC, be careful not to cause dielectric breakdown.

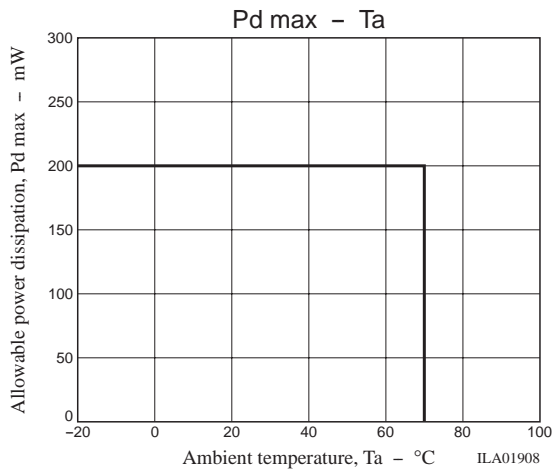
## Package Dimensions

unit : mm

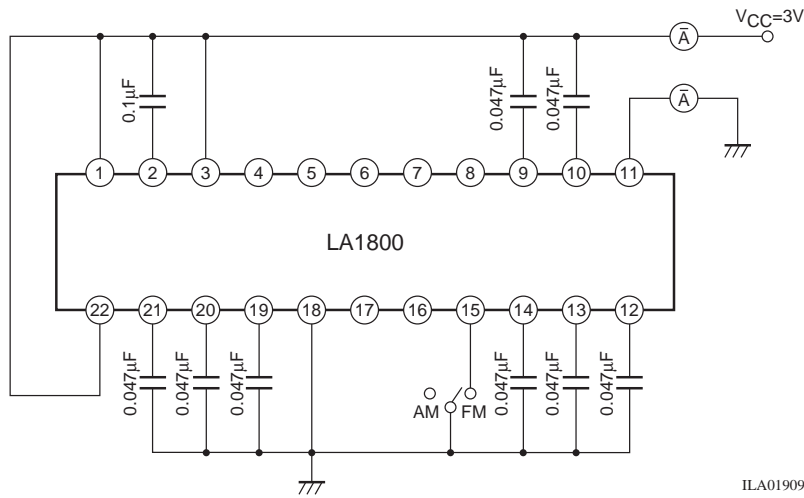
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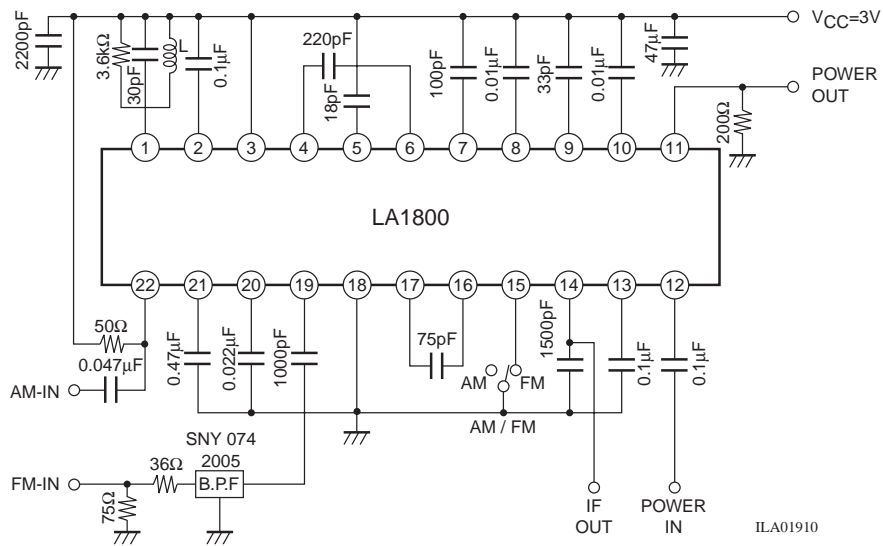
# LA1800



## DC Test Circuit

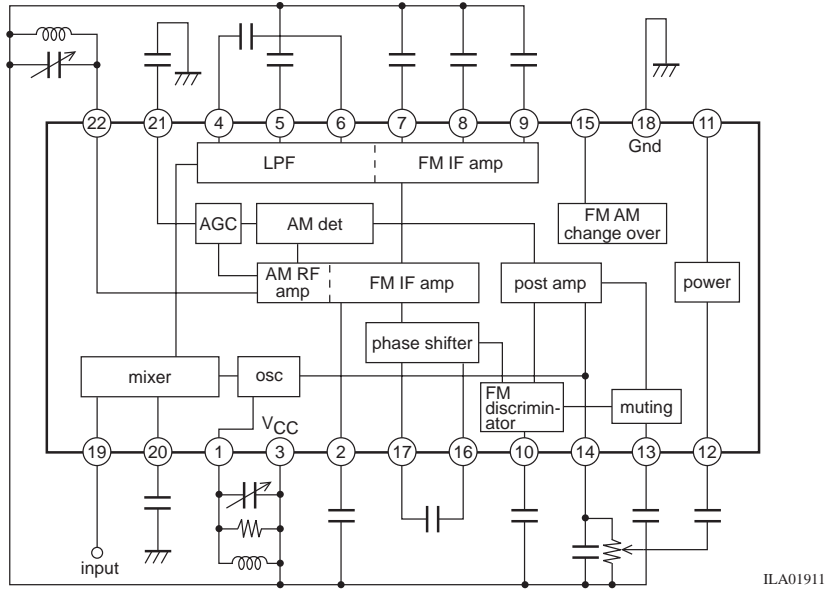


## AC Test Circuit

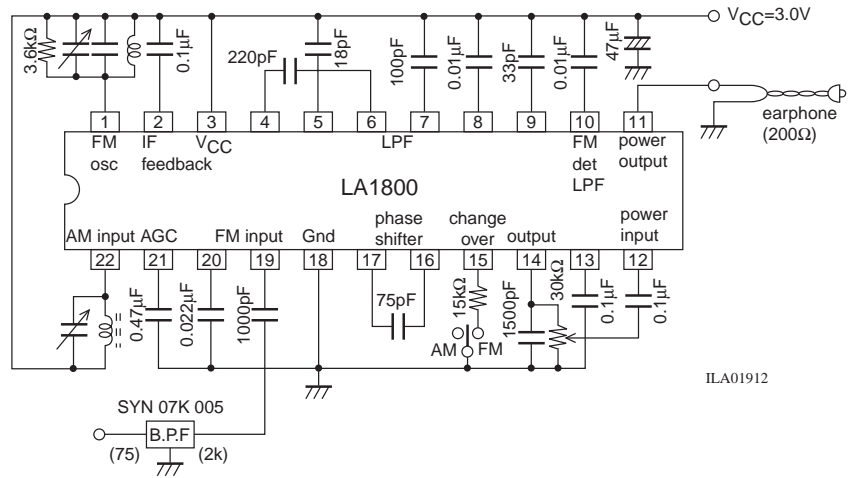


# LA1800

## Equivalent Circuit Block Diagram

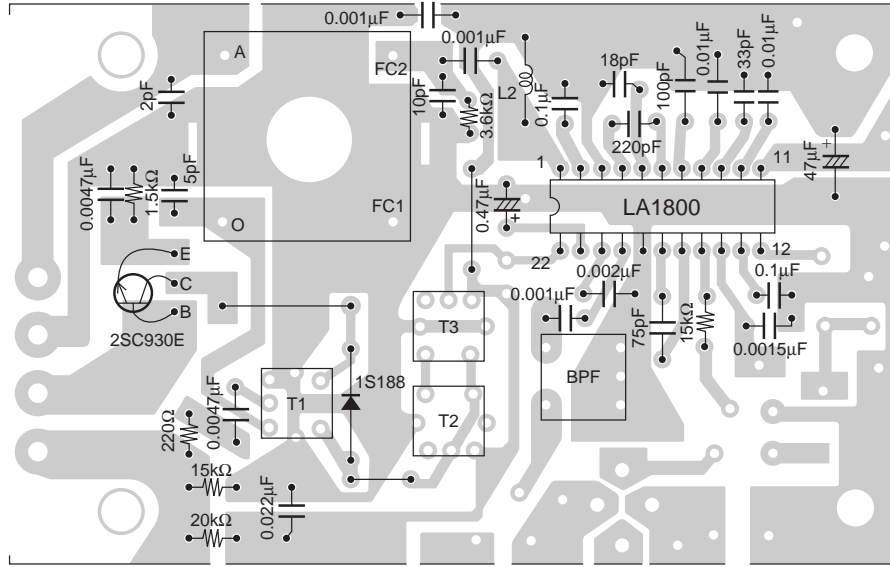


## Sample Application Circuit



# LA1800

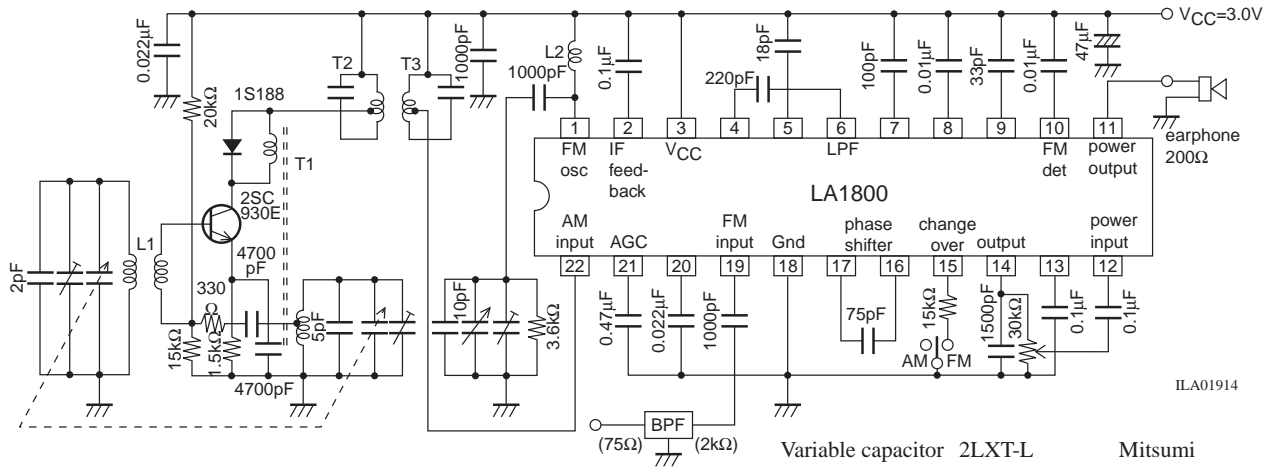
## Sample Printed Circuit Pattern (Cu-foiled side)



78X49mm<sup>2</sup>

ILA01913

## MW Superheterodyne Use

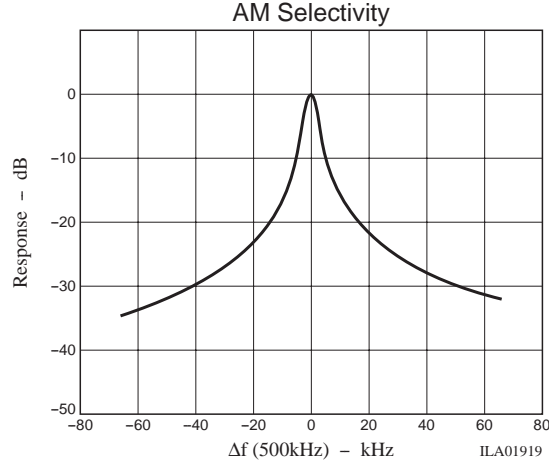
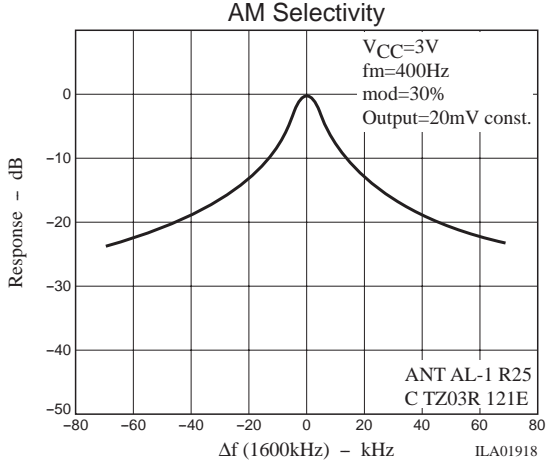
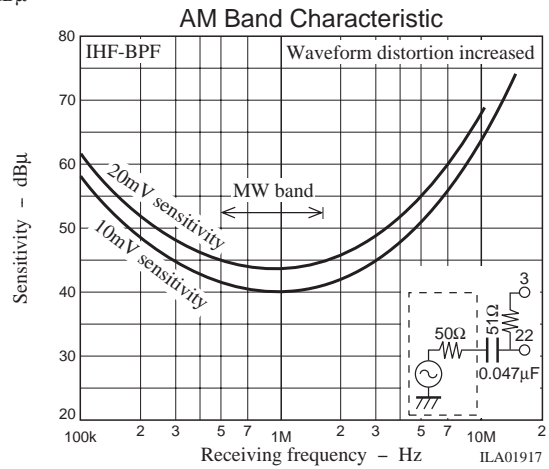
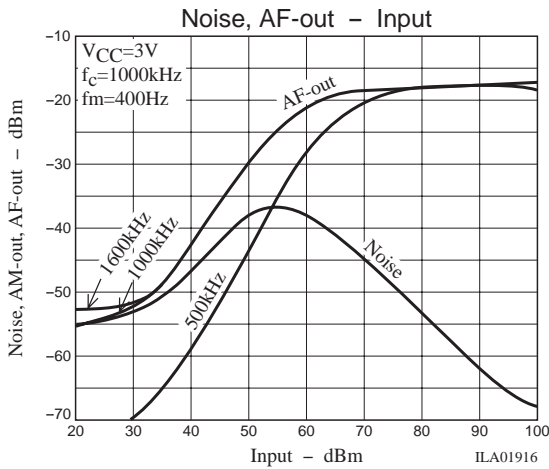
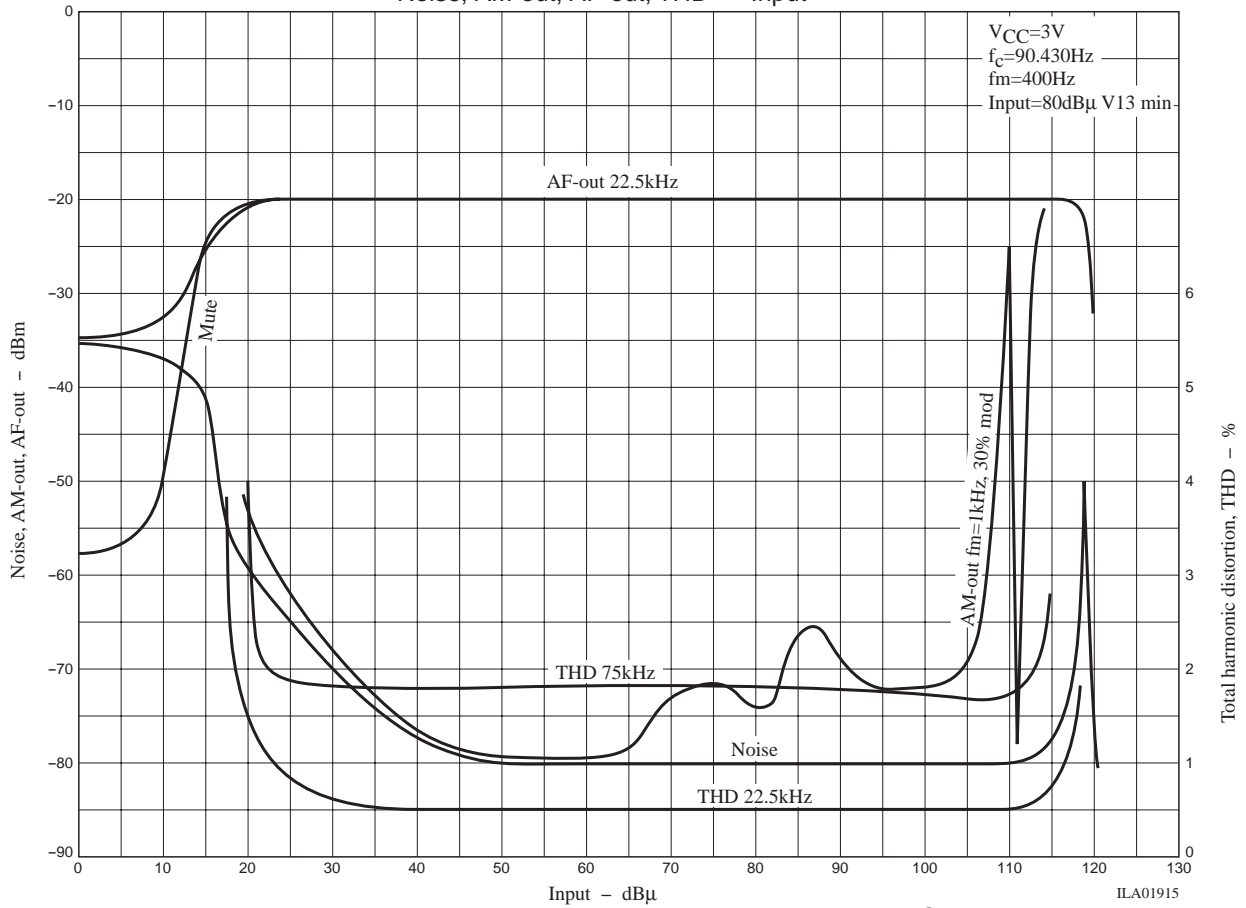


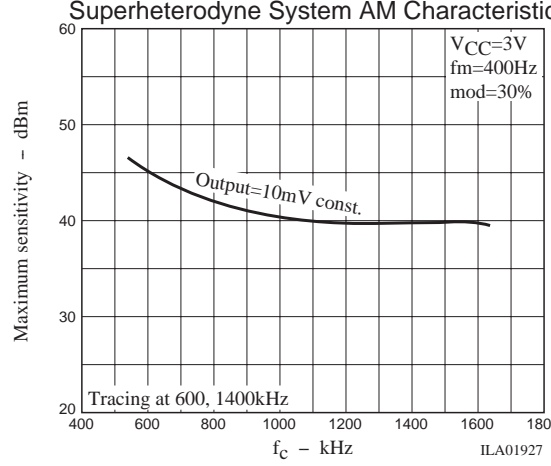
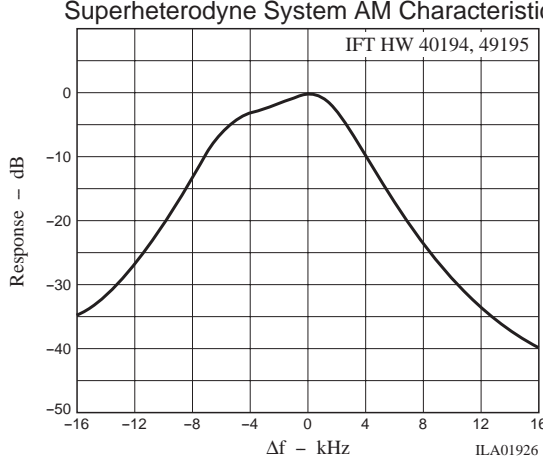
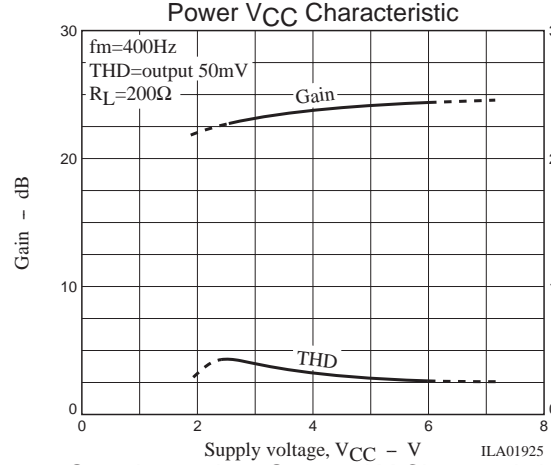
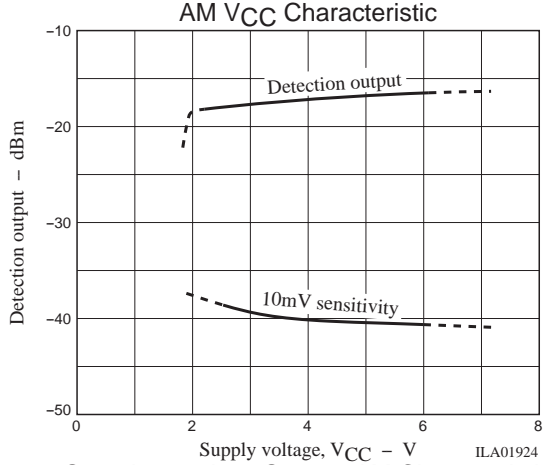
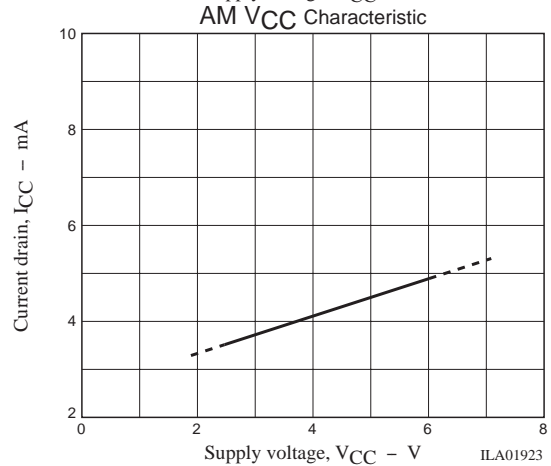
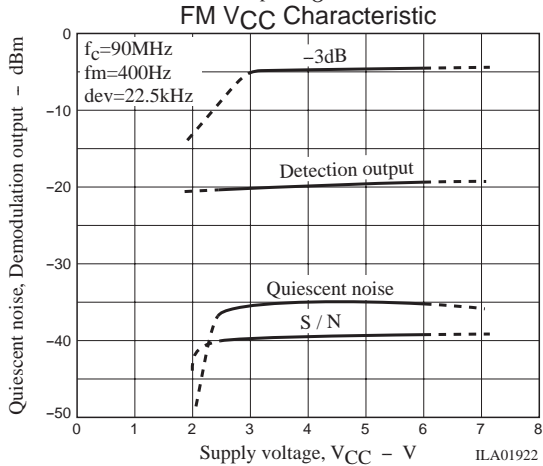
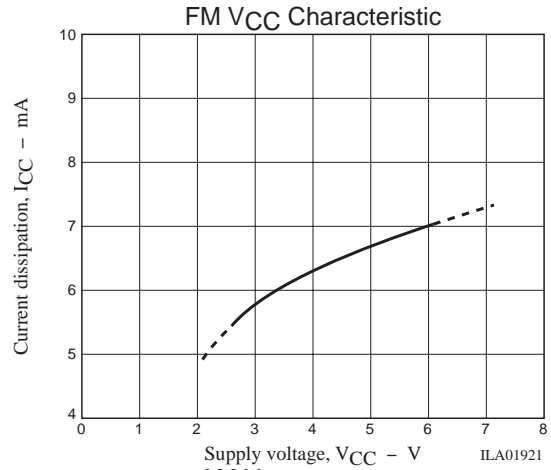
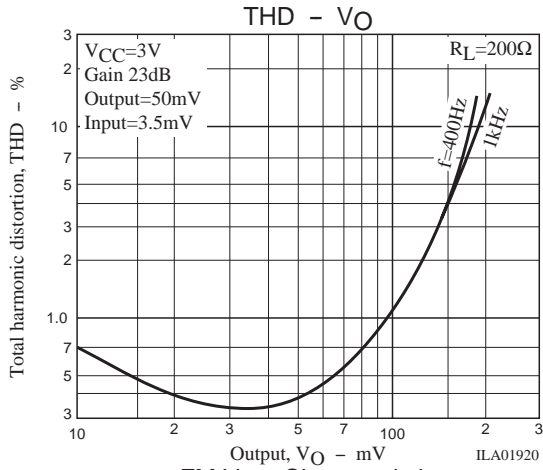
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Component	Part Number	Manufacturer
Variable capacitor	2LXT-L	Mitsumi
L1	HH-40947	Mitsumi
T1	HW-40217	Mitsumi
T2	HW-40194	Mitsumi
T3	HW-50005	Mitsumi
B.P.F	SNY-074-2005	Sumida

# LA1800

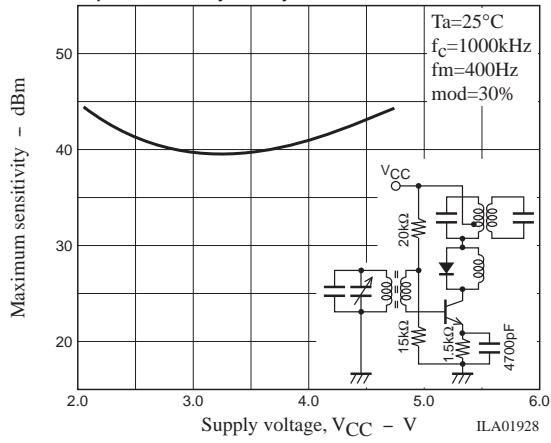
## Noise, AM-out, AF-out, THD - Input



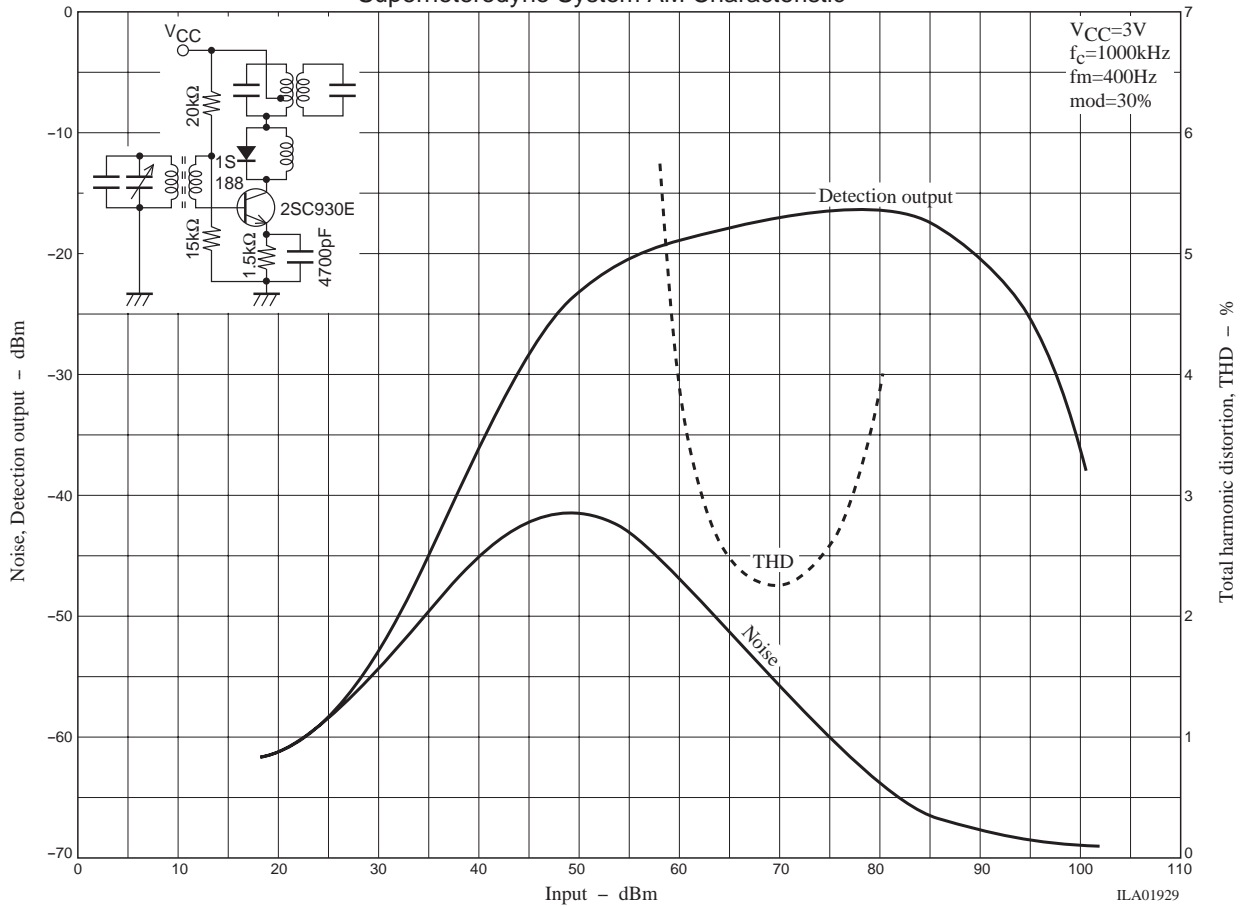


# LA1800

Superheterodyne System AM Characteristic



Superheterodyne System AM Characteristic





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