



# LA1800

## FM/AM Single-Chip Radio

### Functions

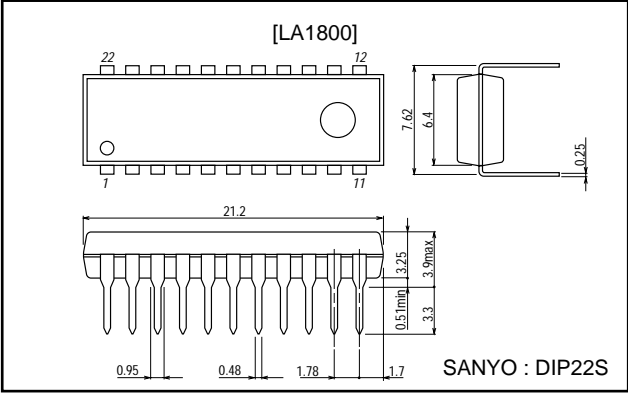
- FM : Front end, low-pass filter, IF amp, quadrature detector, muting.
- AM : RF amp, detector.
- AM : AF driver (earphone driver).

### 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 :  $V_{CC \text{ min}}=2.5V$

### Package Dimensions

unit : mm  
**3059-DIP22S**



### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$	Pin 3	6.0	V
Allowable power dissipation	$P_d \text{ max}$		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 operating voltage	$V_{CC}$		3.0	V
Operating voltage range	$V_{CC \text{ op}}$		2.5 to 5.0	V

### Operating Characteristics

 at  $T_a=25^\circ C$ ,  $V_{CC}=3V$ , See Test Circuit

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
<b>[AM]</b>						
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
<b>[FM]</b>						
Current drain	$I_{cco}$			5.6	8.0	mA
Pin 2 voltage	$V_2$		1.9	2.6	2.9	V
Pin 4 voltage	$V_4$		1.7	2.3	2.9	V
Pin 5 voltage	$V_5$		1.7	2.3	2.9	V

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
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	14	V
Pin 20 voltage	V <sub>20</sub>		0.6	0.86	14	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

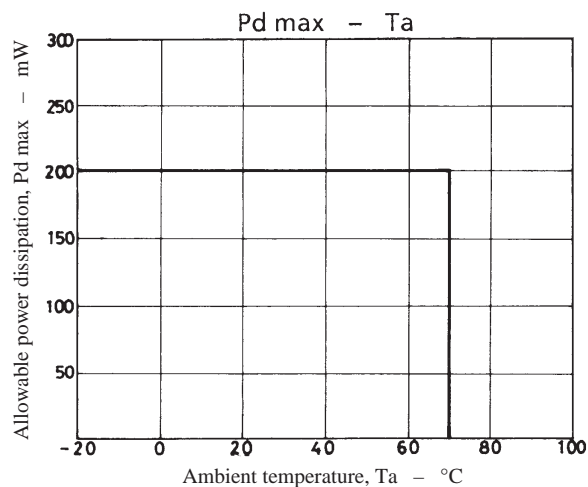
[Reference characteristics]

## Operating Characteristics at Ta=25°C, V<sub>CC</sub>=3V, See 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	VG	V <sub>O</sub> =50mV		24		dB
Total harmonic distortion	THD	V <sub>O</sub> =50mV		0.3		%

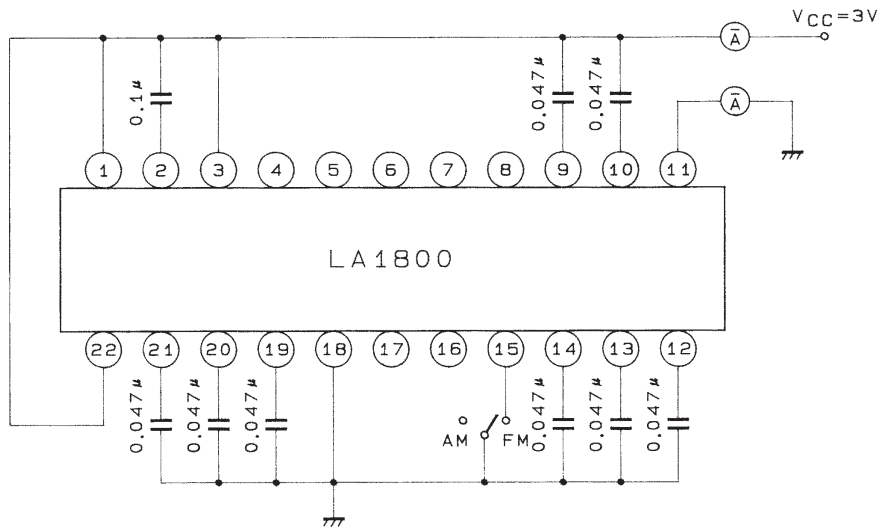
Note : 1. Current drain for FM, AM includes current of AF driver stage.

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



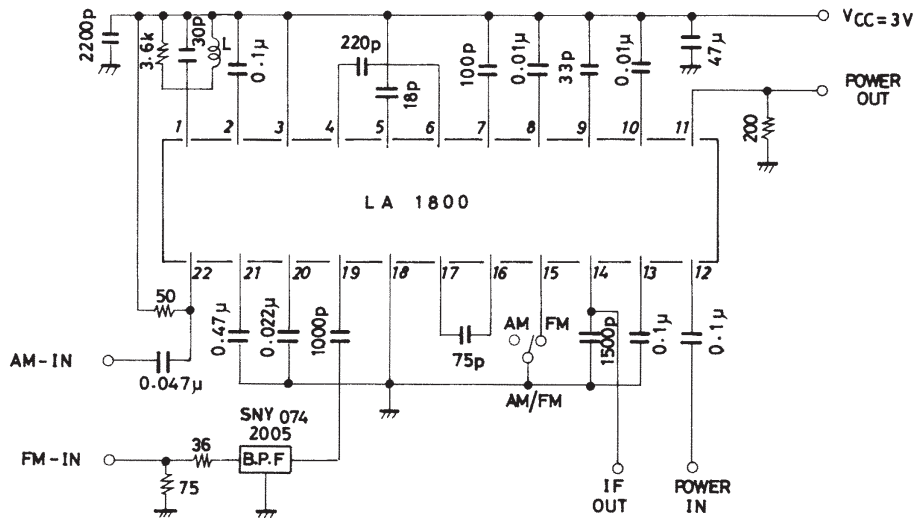
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## DC Test Circuit



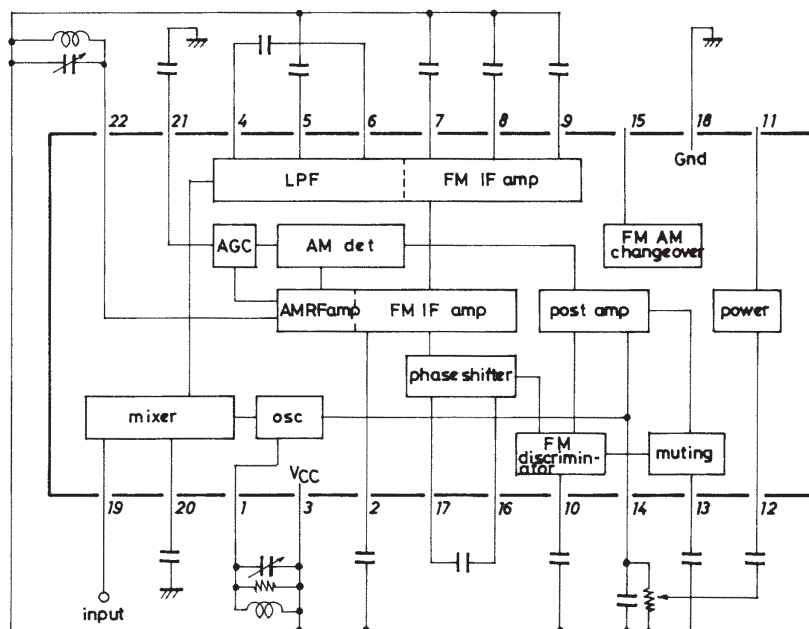
Unit (resistance : Ω, capacitance : F)

## AC Test Circuit



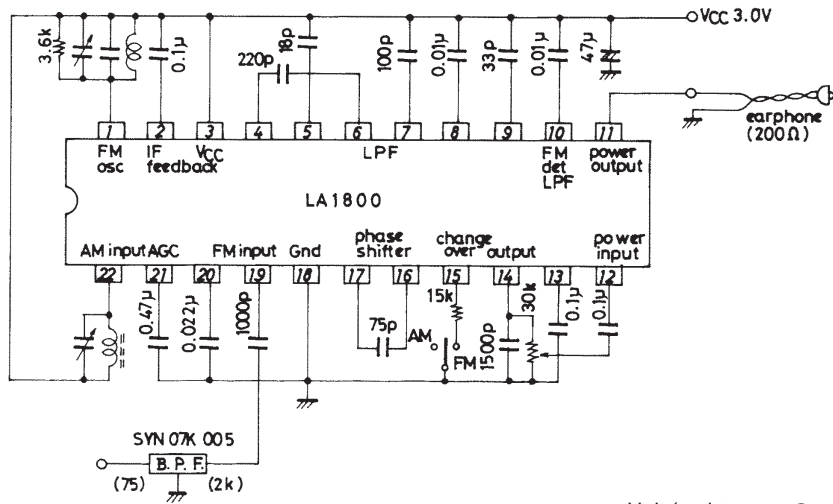
Unit (resistance : Ω, capacitance : F)

## Equivalent Circuit Block Diagram



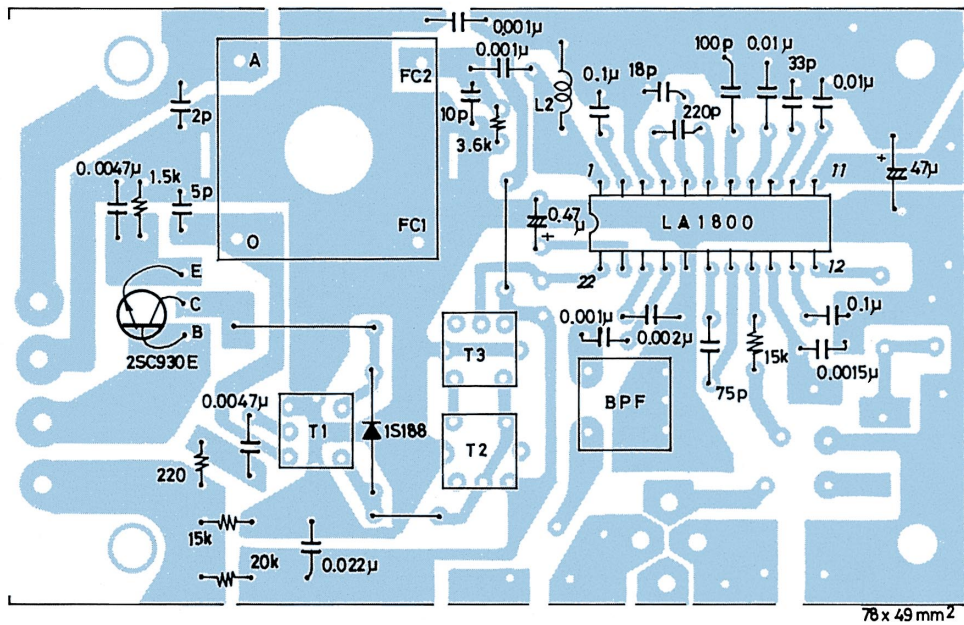
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## Sample Application Circuit



Unit (resistance : Ω, capacitance : F)

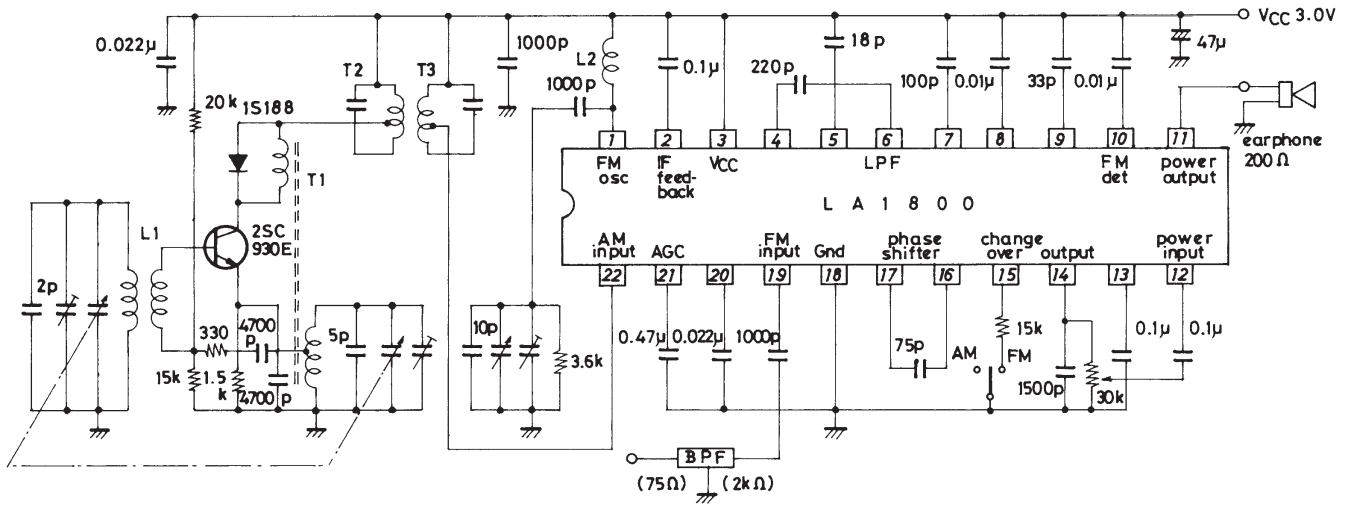
## Sample Printed Circuit Pattern (Cu-foiled side)



Unit (resistance : Ω, capacitance : F)

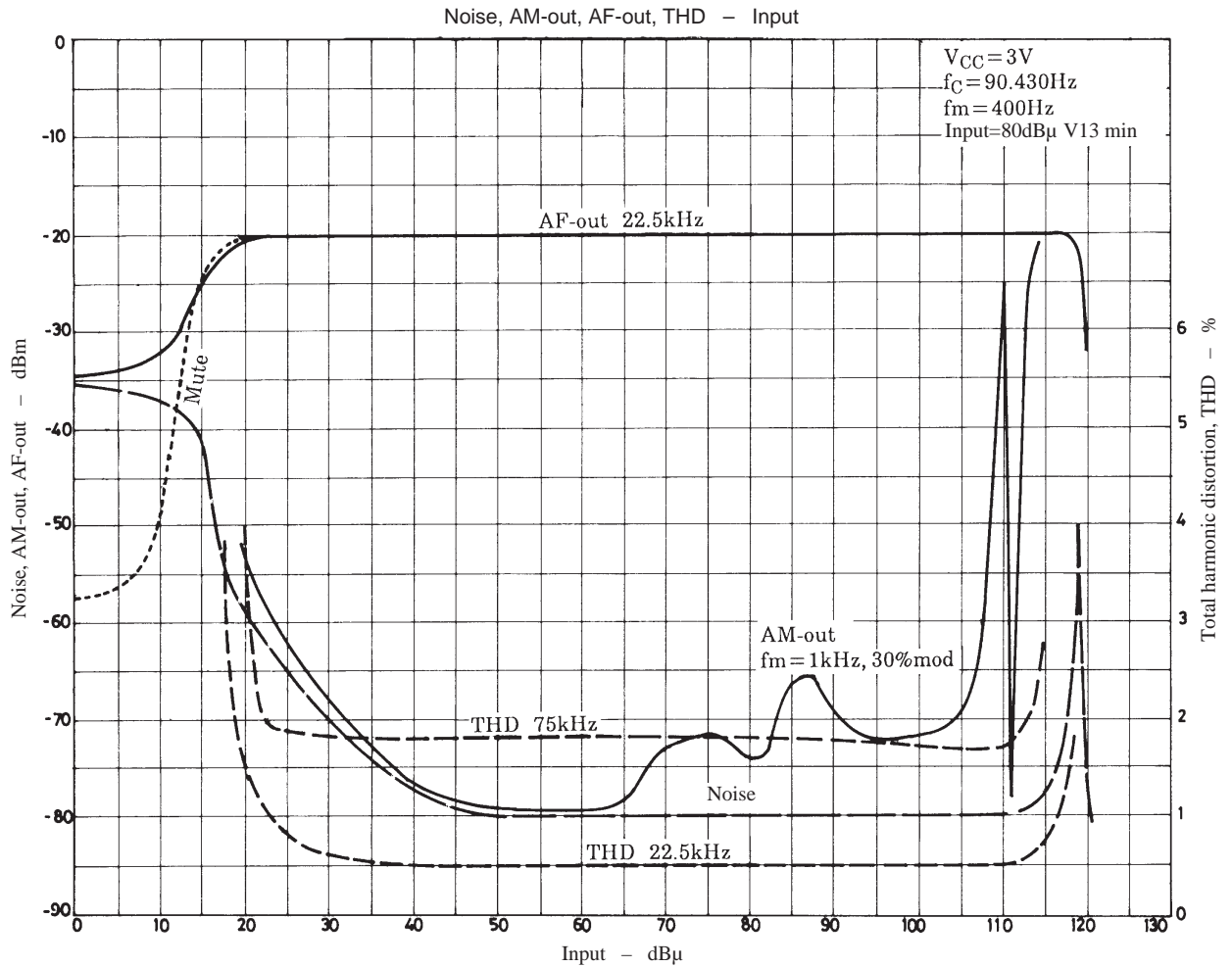
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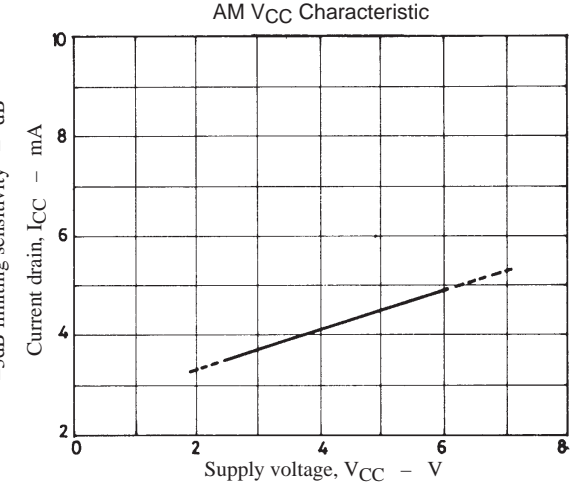
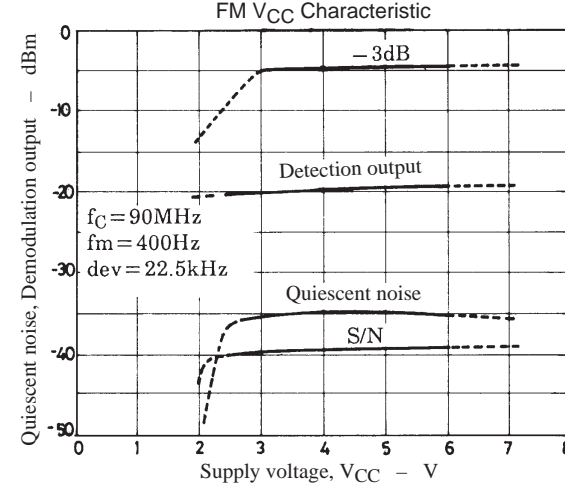
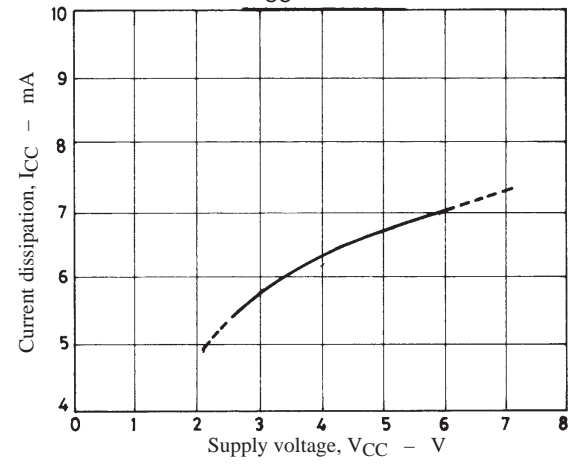
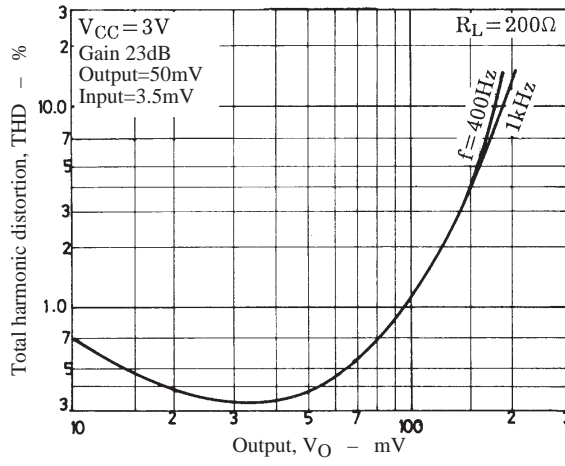
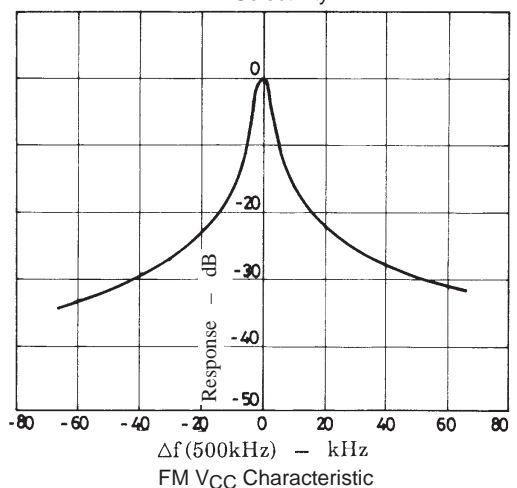
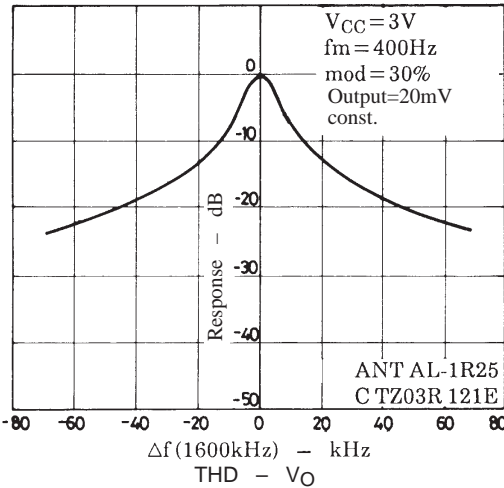
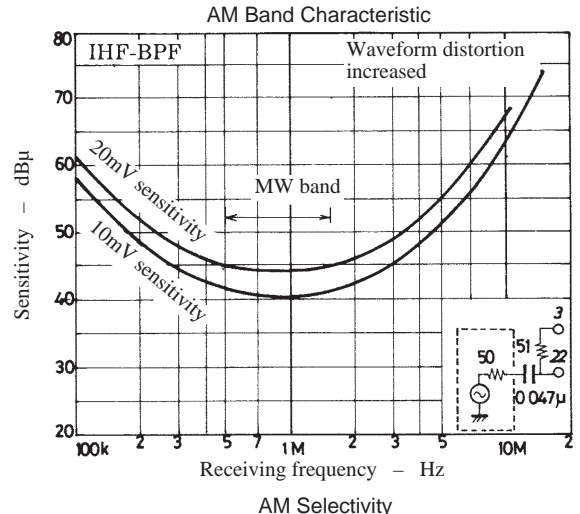
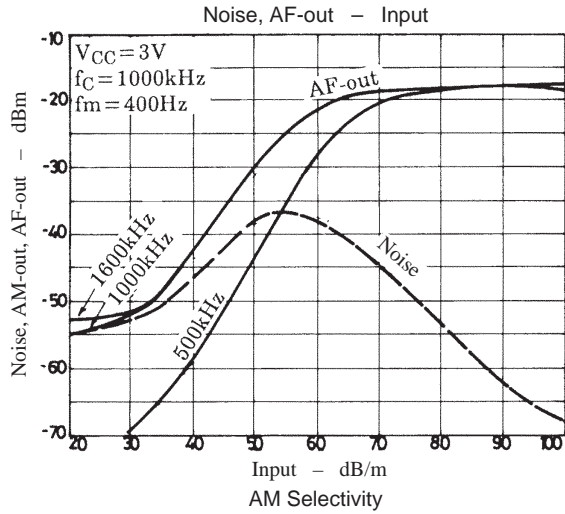
## MW Superheterodyne Use



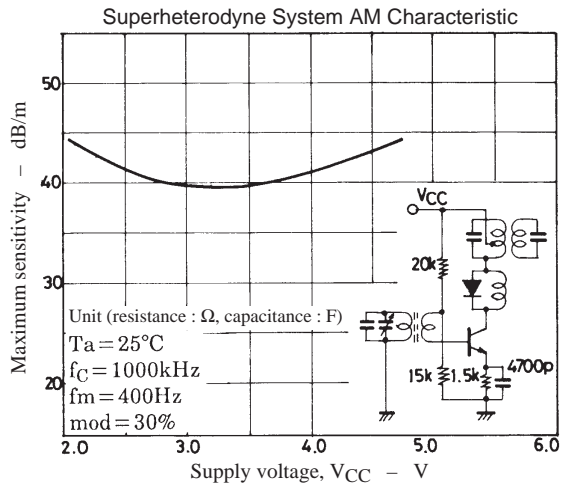
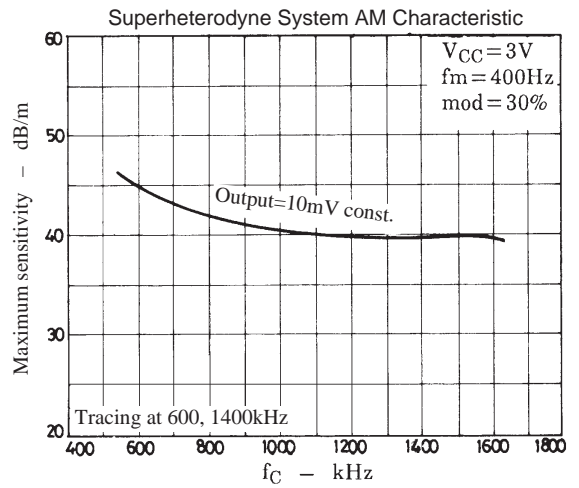
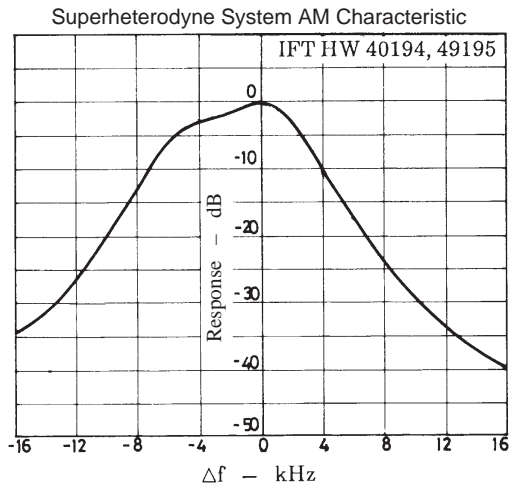
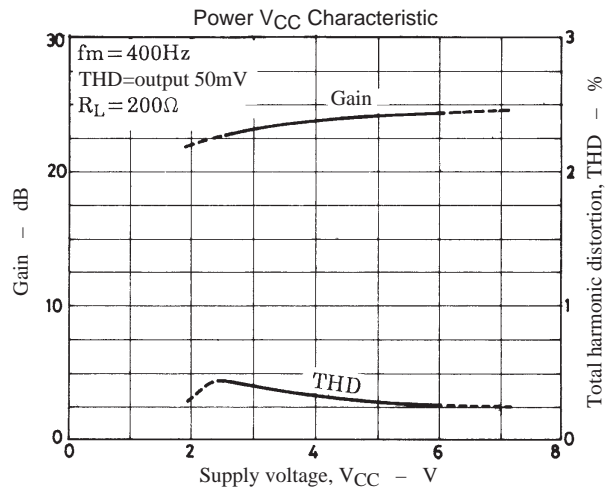
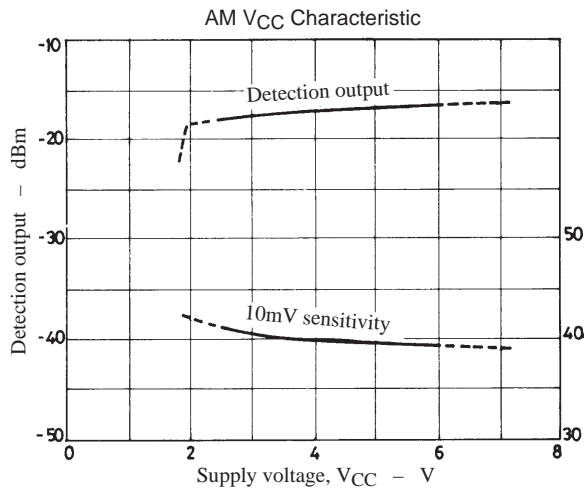
Variable capacitor	2LXT-L	Mitsumi
L1	HH-40947	Mitsumi
T1	HW-40217	Mitsumi
T2	HW-40194	Mitsumi
T3	HW-50005	Mitsumi
B.P.F.	SNY-074-2005	Sumida

Unit (resistance : Ω, capacitance : F)

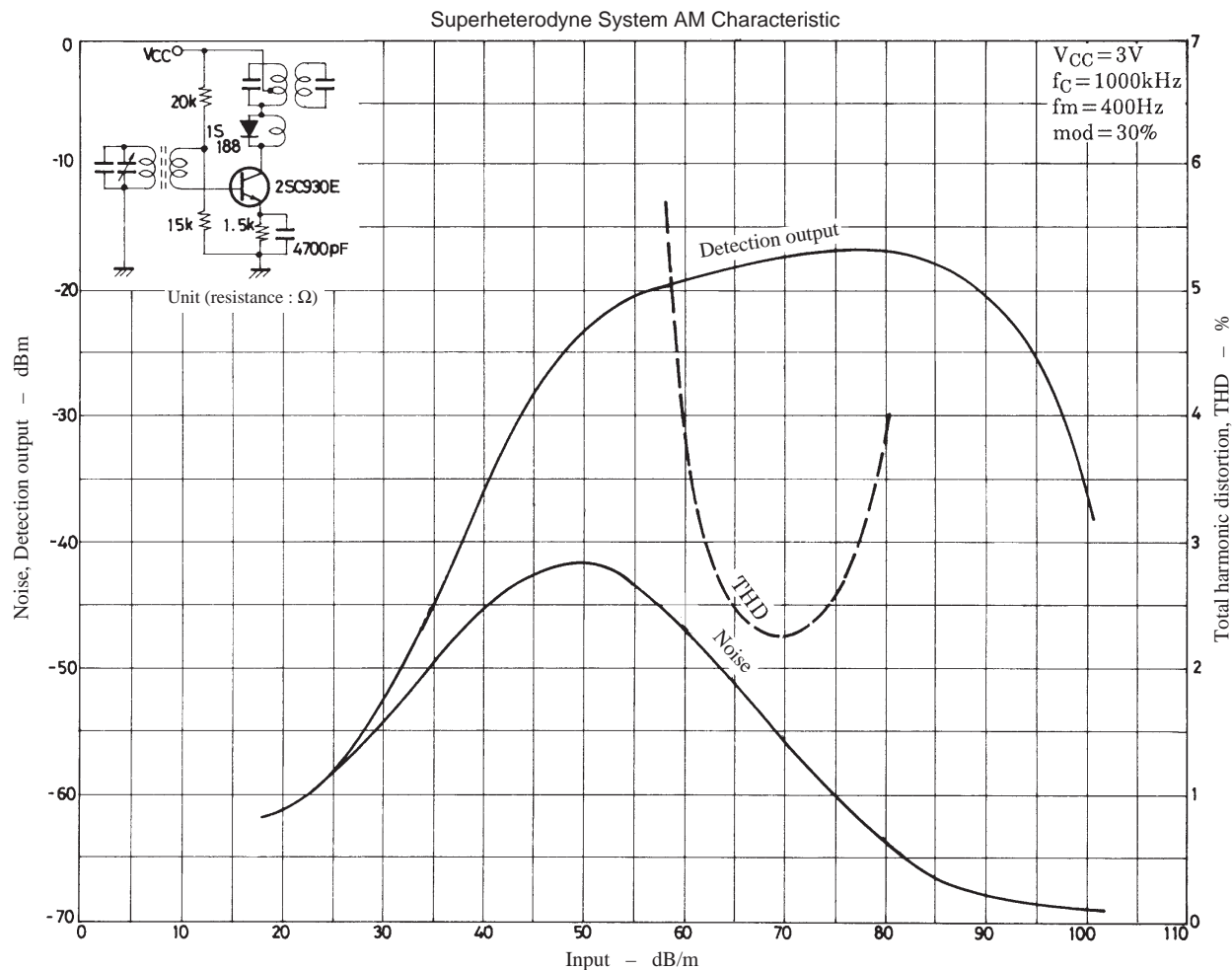




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