Ordering number : ENN*7931

Preliminary

SANYO Semiconductors
DATA SHEET

LA1845NV — Monolithic Linear IC
Single-Chip Home Stereo IC

The LA1845NV is designed for use in mini systems and is a single-chip tuner IC that provides electronic tuning functions using SD/IF-count technique. It incorporates a pilot canceler and an adjustment-free MUX VCO circuit, thus allows additional parts to be reduced.

Functions

- AM : RF amplifier, mixer, oscillator, IF amplifier, detector, AGC, SD, oscillator buffer, IF buffer, stereo IF output, AGC time constant switch
- FM IF : IF amplifier, quadrature detector, S-meter, SD (signal detection), S-curve detection, IF buffer output
- MPX : PLL stereo decoder, stereo display, forced monaural, VCO stop, audio muting, adjacent channel interference rejection function, pilot canceler

Features

- Integrated MPX VCO (ceramic resonators are no longer required.)
- Built-in adjacent channel interference rejection function (114kHz, 190kHz)
- Supports both SD and IF-count techniques
- Both FM SD sensitivity and bandwidth can be set
- Pilot canceler built in.

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Power Supply Voltage	V_{CC} max		6	V
Allowable Power Consumption	Pd max	Ta = 80°C with board 114.3mm×76.1mm×1.6mm material : Glass epoxy resin	360	mW
Operating Temperature	Topr		-20 to +80	°C
Storage Temperature	Tstg		-40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}		5	V
Operating Supply Voltage Range	V_{CC} op	Ta = 80°C	4.3 to 5.5	V

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

92706 / 91004 JO IM No.7931-1/10

Electrical Characteristics • Operating Characteristics at V_{CC} = 8V, in the specified test circuit.

FM Mono Characteristics at fc = 10.7MHz, Vi = 100dBμ, fm = 1kHz, Modulation = 75kHz

Parameter	Conditions	Ratings			Unit
		min	typ	max	
Current Drain	With no input signal	20	30	40	mA
Demodulator Output	100dBμ, 100% modulation, fm = 1kHz	230	360	460	mVrms
Total Harmonic Distortion	100dBμ, 100% modulation, fm = 1kHz		0.35	1.5	%
Signal-to-Noise Ratio	100dBμ, 100% modulation, fm = 1kHz	73	80		dB
AM Rejection Ratio	100dBμ, AM = 30% modulation, fm = 1kHz	47	65		dB
3dB Sensitivity	100dBμ, 100% modulation, fm = 1kHz Output reference, -3dB input		32	40	dBμ
SD Sensitivity	0% modulation	38	47	56	dBμ
IF Counter Buffer Output	100dBμ	200	275	400	mVrms
Mute Attenuation	100dBμ, 100% modulation, fm = 1kHz		76		dB

FM Stereo Characteristics at fc = 10.7MHz, Vi = 100dBμ, L+R = 90%, Pilot = 10%, fm = 1kHz

Parameter	Conditions	Ratings			Unit
		min	typ	max	
Separation	L+R = 90%, Pilot = 10%, fm = 1kHz	30	42		dB
Stereo On Level	Pilot input	1.5	3.5	5.5	%
Total Harmonic Distortion	Pilot input		0.45	1.5	%
Adjacent Channel Rejection Ratio 1	fs = 113kHz, VS = 90%, Pilot = 10% ; The left-right modulation, demodulated output		36		dB
Adjacent Channel Rejection Ratio 2	fs = 189kHz, VS = 90%, Pilot = 10% ; The left-right modulation, demodulated output		41		dB
Carrier Leak	L+R = 90%, Pilot = 10% reference, Pilot = 10% output	38	44		dB

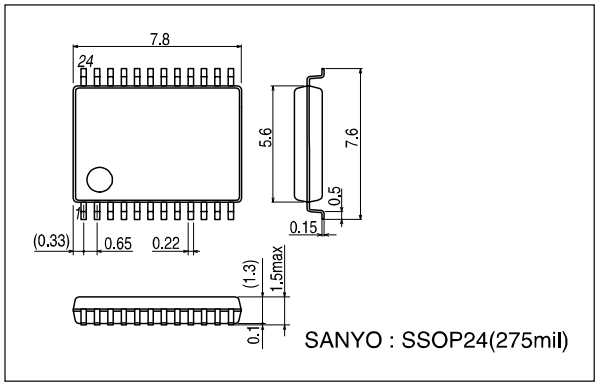
AM Characteristics at fc = 1000kHz, Vi = 80dBμ, fm = 1kHz, Modulation = 30%

Parameter	Conditions	Ratings			Unit
		min	typ	max	
Current Drain	With no input signal	13	27	39	mA
Detector Output 1	23dBμ, 30% modulation, fm = 1kHz	40	80	160	mVrms
Detector Output 2	80dBμ, 30% modulation, fm = 1kHz	90	160	230	mVrms
Signal-to-Noise Ratio 1	23dBμ, 30% modulation, fm = 1kHz	17	23		dB
Signal-to-Noise Ratio 2	80dBμ, 30% modulation, fm = 1kHz	46	52		dB
Total Harmonic Distortion 1	80dBμ, 30% modulation, fm = 1kHz		0.4	1.1	%
Total Harmonic Distortion 2	107dBμ, 30% modulation, fm = 1kHz		0.5	1.3	%
SD Sensitivity	0% modulation	11	20	29	dBμ
Local Oscillator Buffer Output	With no input signal	100	140	200	mVrms
IF Counter Buffer Output	23dBμ	140	285	400	mVrms

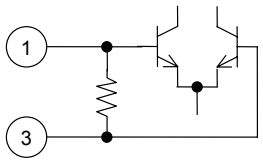
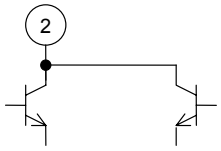
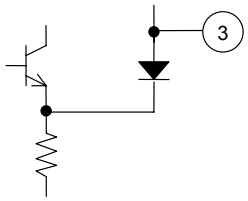
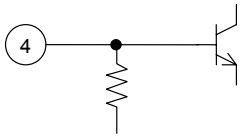
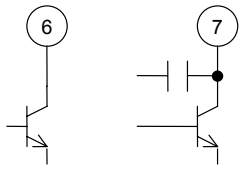
Package Dimensions

unit : mm

3175B



Pin Description

Pin No.	Pin function	Pin voltage	Equivalent circuit	Notes
1	FM IF input	Vreg		Input impedance r_i = 330Ω
2	AM mixer output	V_{CC}		Connect the mixer coil between this pin and V_{CC}
3	REG	2.1		Vreg = 2.1V
4	AM IF input	Vreg		Input impedance r_i = 2kΩ
5	GND	0V		
6 7	Tu-LED ST-LED/AF-IF output	V_{CC}		Active low Open collector
8	FM detector	V_{CC}		The 600BEAS-10471 (Toko Mfg. Co., Ltd.) is recommended for detector coil.
9	V_{CC}			

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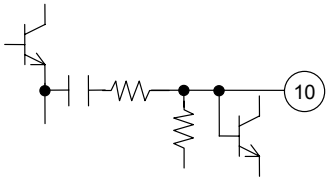
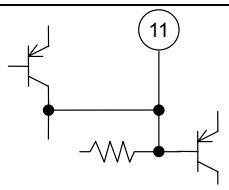
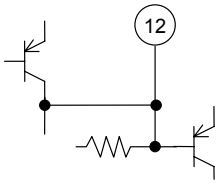
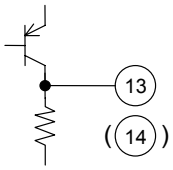
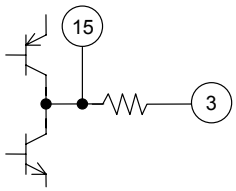
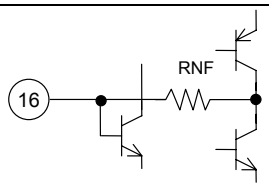
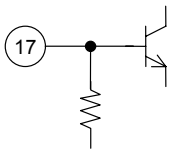
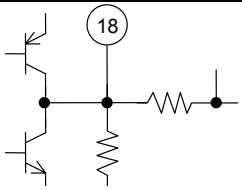
Pin No.	Pin function	Pin voltage	Equivalent circuit	Notes
10	AM/FM IF counter output, output control switch, mute switch	0V		V_{10}≤0.5V : Reception state 1.4V≤V_{10}≤2.2V : Muting on V_{10}≥3.5V : IF counter output and muting on
11	Phase comparator low-pass filter (AM/FM switching)	V_{CC}-1.0		The device operates in AM mode when a current of over 200μA flows from pin. 12.
12	Pilot detector low-pass filter (Forced mono) (VCO stop)	V_{CC}-1.0		The device is forced to monaural when a current of over 50μA flows from this pin. The VCO is stopped when a current of over 200μA flows from this pin. The limit values for the resistor are the same as those for pin 11.
13 14	L outputs R outputs	3.2V		Output impedance r_o = 3.3kΩ
15	Pilot canceler output	Vreg		
16	Decoder input	Vreg		Inverting input pin RNF = 20kΩ
17	PLL input	Vreg		Input impedance r_i = 20kΩ
18	FM demodulator output	Vreg+0.7		Output impedance r_o = 2.3kΩ The channel separation can be adjusted with an external capacitor connected between this pin and ground.

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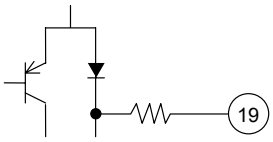
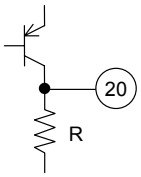
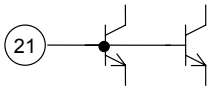
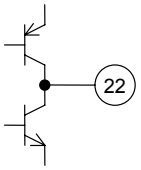
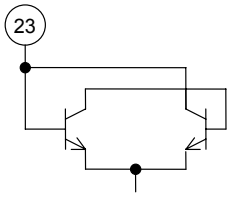
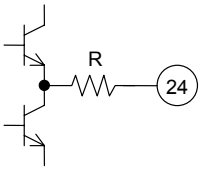
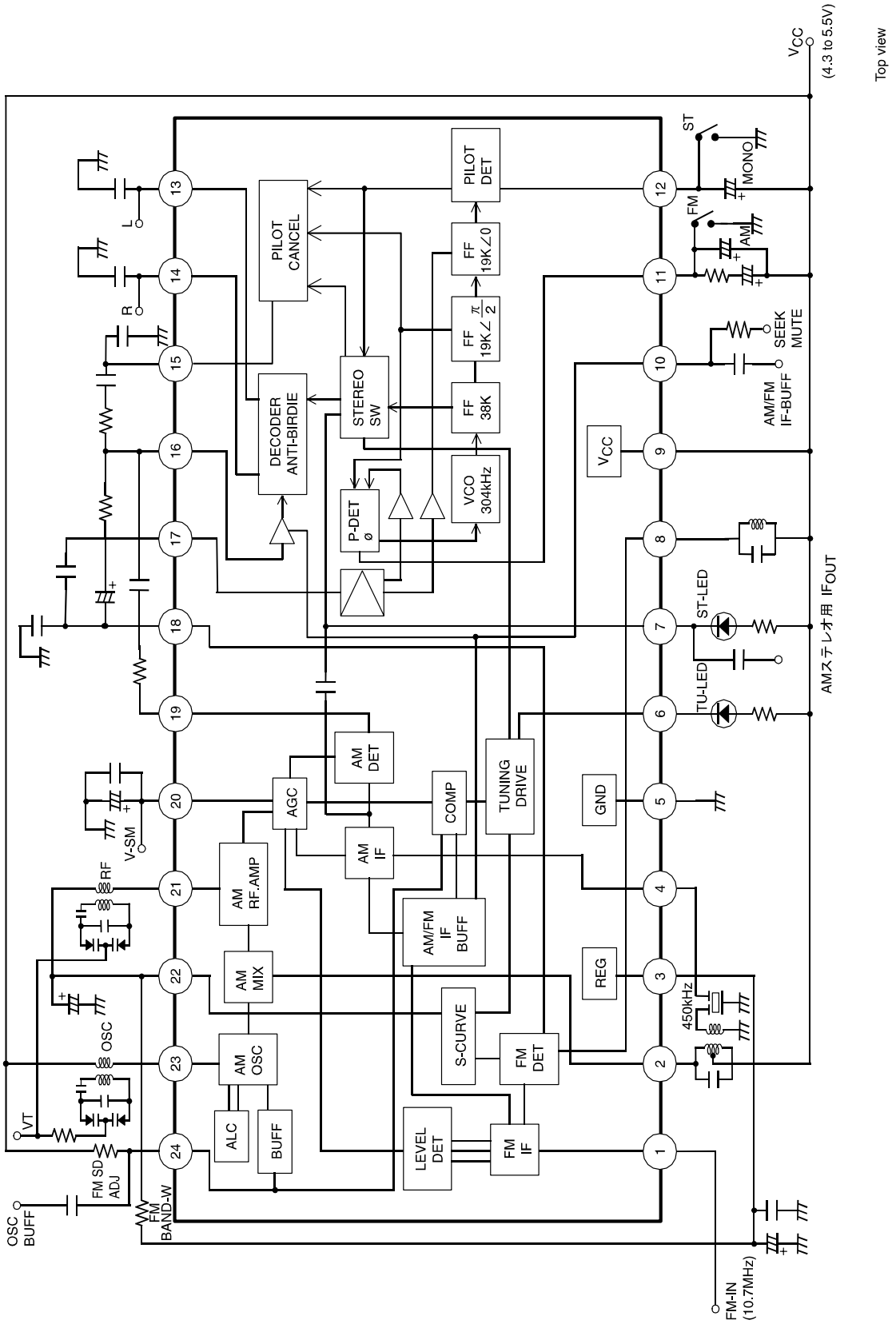
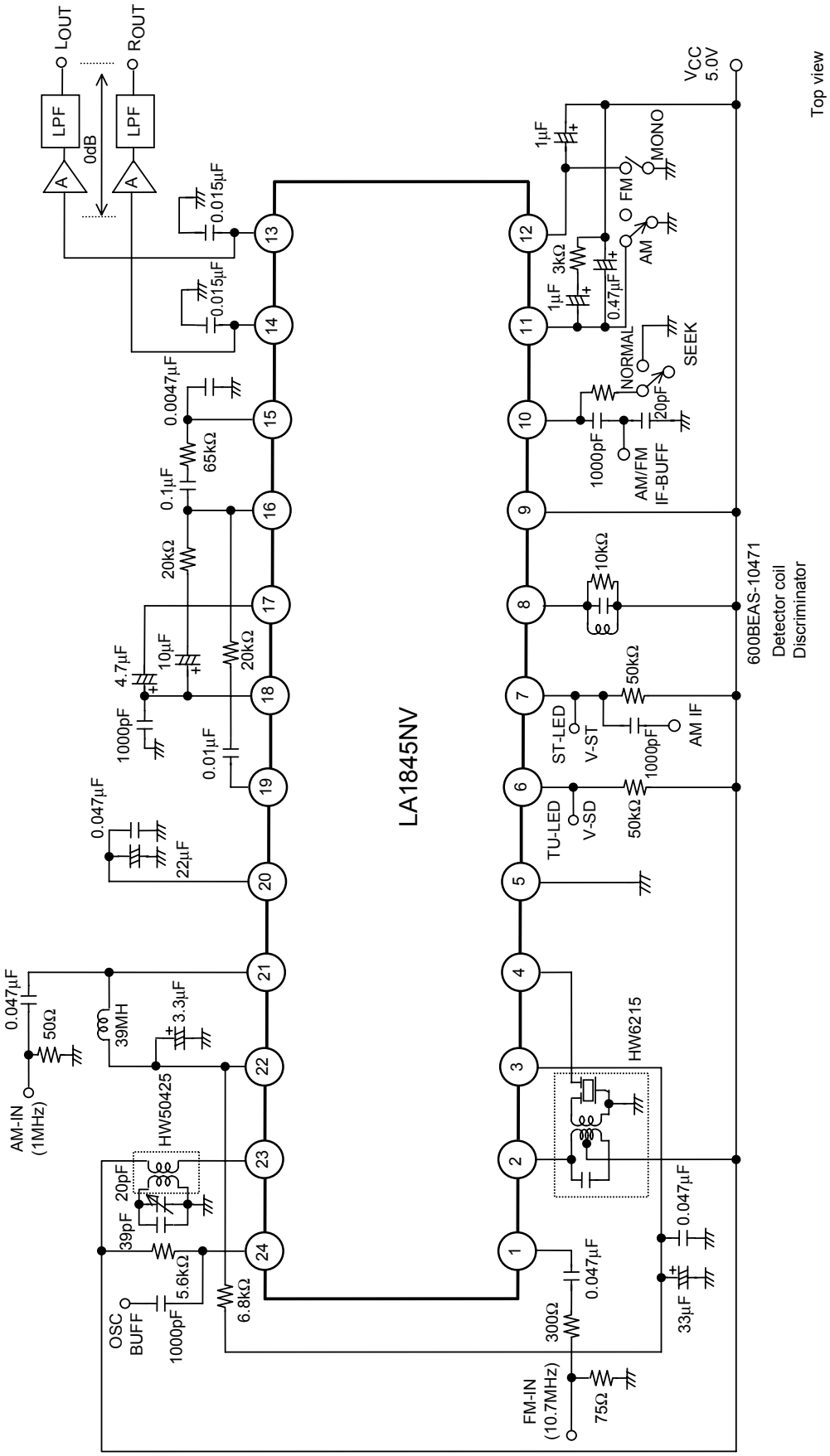
Pin No.	Pin function	Pin voltage	Equivalent circuit	Notes
19	AM detector output	0V (FM) 1.5V (AM)		Output impedance r_o = 3.3kΩ
20	S meter, AM AGC	0.2V (FM) 0.9V (AM)		The resistance of the built-in resistor R is 13.9kΩ. The SD response during seek operation is determined with the external capacitor connected to this pin.
21	AM RF input	Vreg		Must be used at the same potential as pin 22.
22	AFC	Vreg		The FM SD bandwidth can be adjusted with the external resistor connected between this pin and pin 3 (Vreg).
23	OSC	V_{CC}		Connect the oscillator coil between this pin and pin 9 (V_{CC}). Note : Impedance of the secondary oscillator coil must be 5kΩ or higher.
24	Oscillator buffer output, FM SD sensitivity adjustment	V_{CC}-1.4		The FM SD sensitivity can be adjusted with an external resistor connected to this pin. Output impedance R = 200Ω Note : Resistance of the external resistor connected to the pin 24 must be 3.3kΩ or higher.

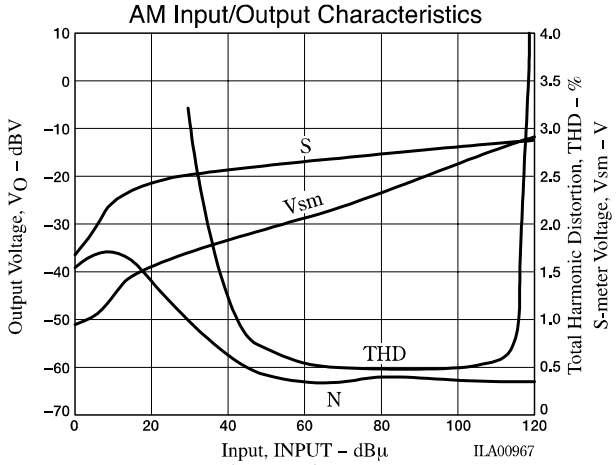
Equivalent Circuit Block Diagram



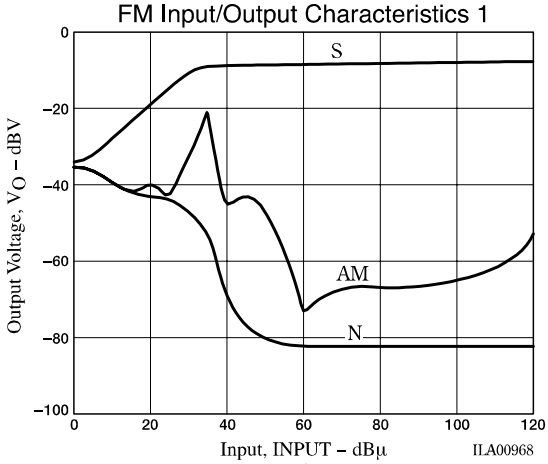
Test Circuit



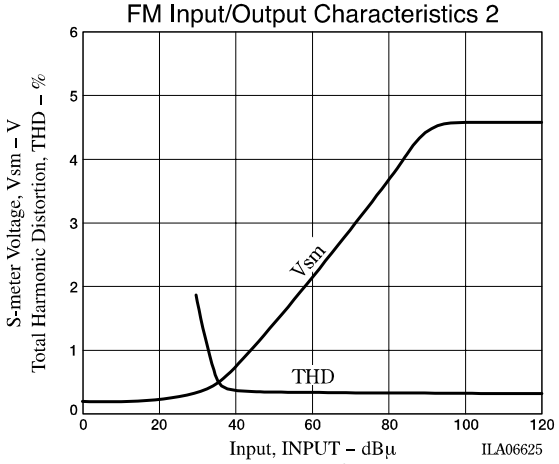
AM Input/Output Characteristics



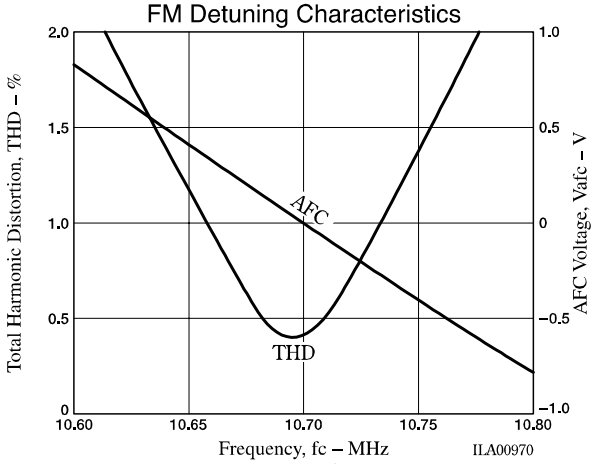
FM Input/Output Characteristics 1



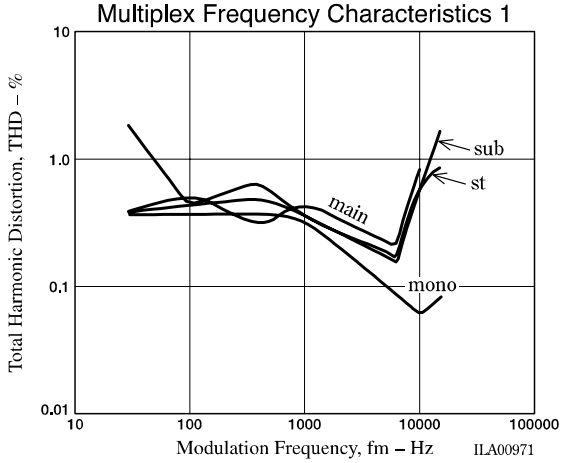
FM Input/Output Characteristics 2



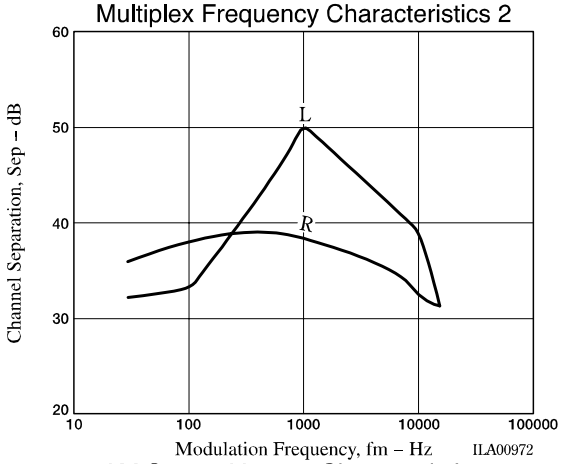
FM Detuning Characteristics



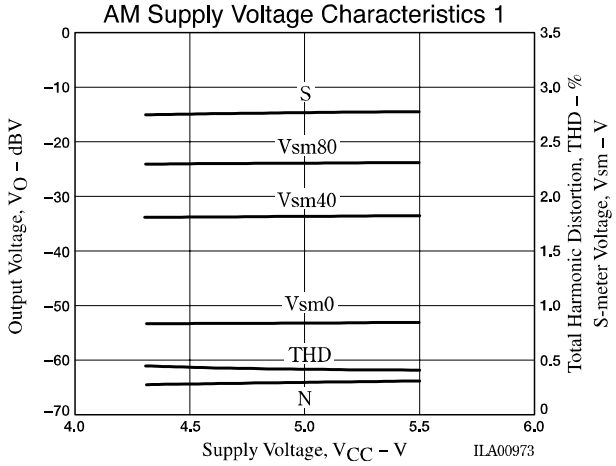
Multiplex Frequency Characteristics 1



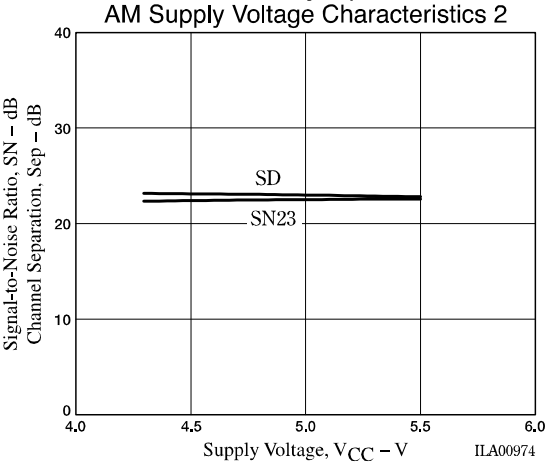
Multiplex Frequency Characteristics 2



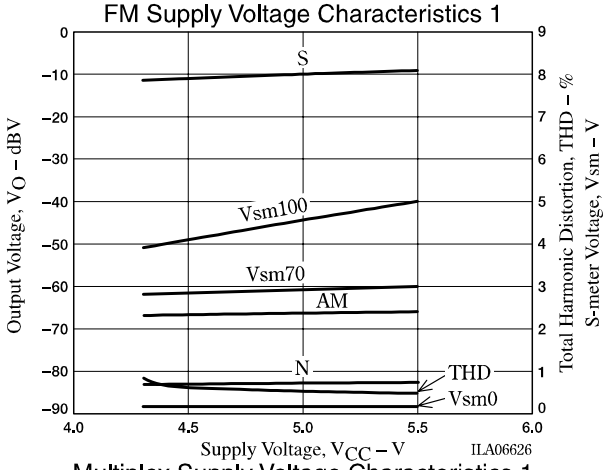
AM Supply Voltage Characteristics 1



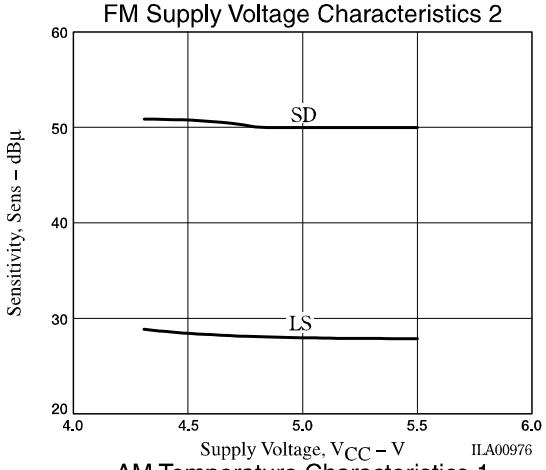
AM Supply Voltage Characteristics 2



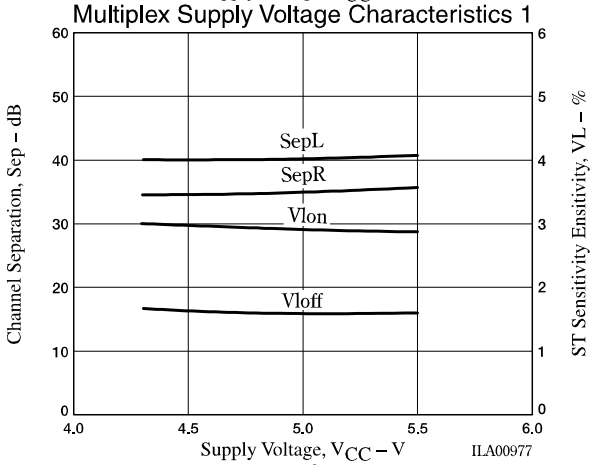
FM Supply Voltage Characteristics 1



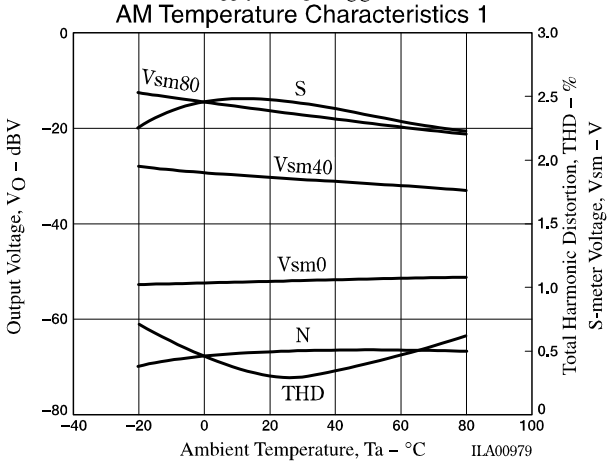
FM Supply Voltage Characteristics 2



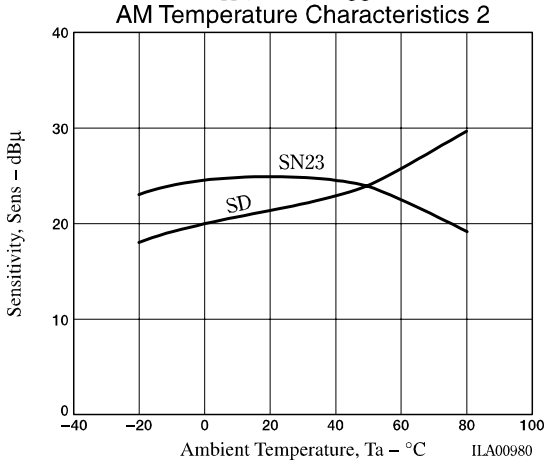
Multiplex Supply Voltage Characteristics 1



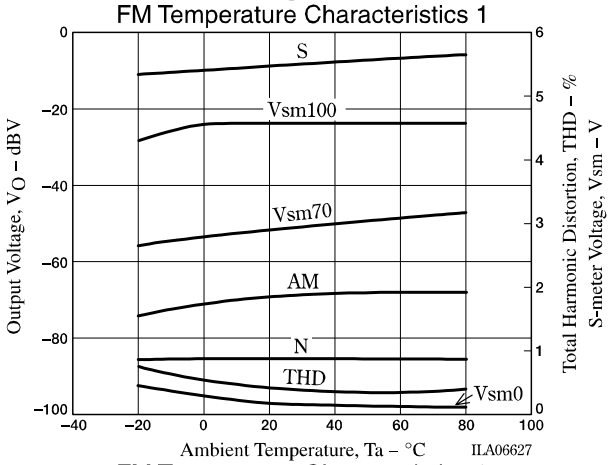
AM Temperature Characteristics 1



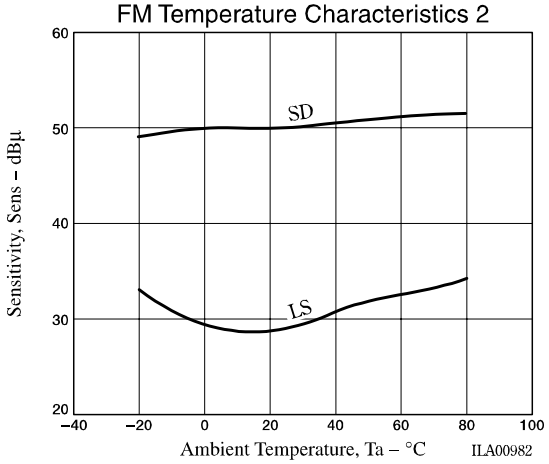
AM Temperature Characteristics 2



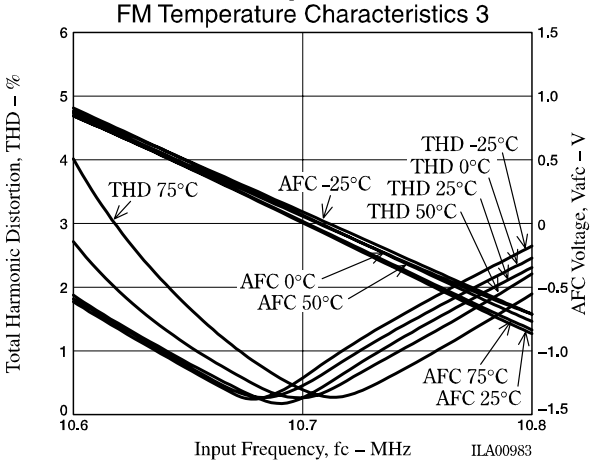
FM Temperature Characteristics 1



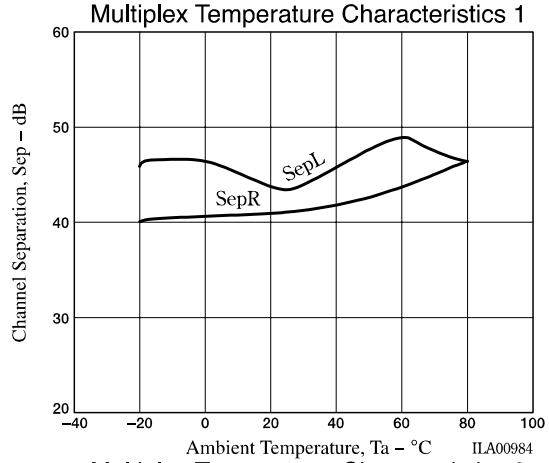
FM Temperature Characteristics 2



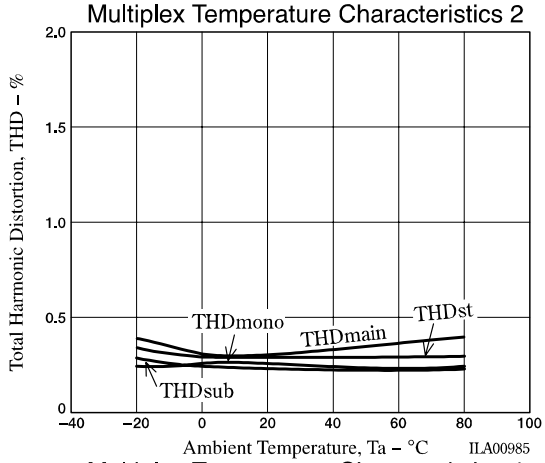
FM Temperature Characteristics 3



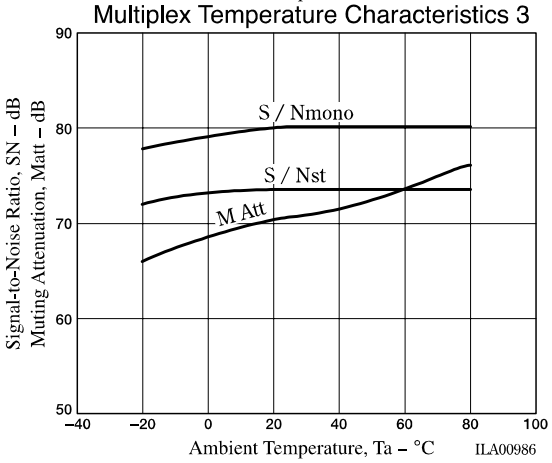
Multiplex Temperature Characteristics 1



Multiplex Temperature Characteristics 2



Multiplex Temperature Characteristics 3



Multiplex Temperature Characteristics 4