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Ordering number : ENN7185

Monolithic linear IC

LA1845N, 1845NM

Single-Chip Home Stereo IC

Overview

The LA1845N/1845NM is designed for use in mini systems and is a single-chip tuner IC that provides electronic tuning functions using SD/IF-count technigue. 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

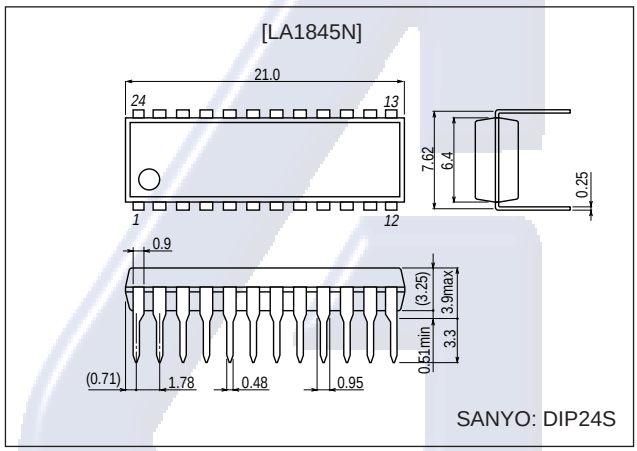
Features

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

Package Dimensions

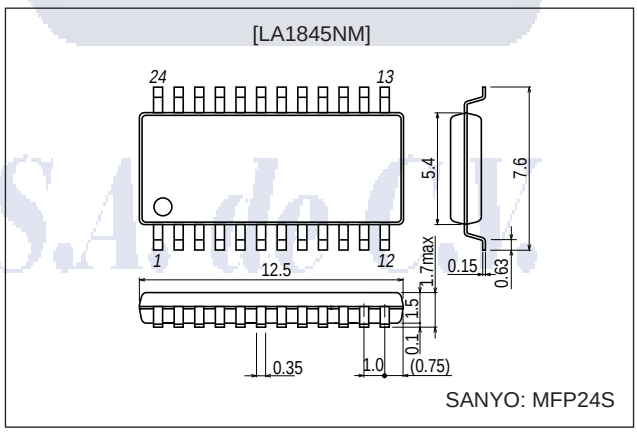
unit: mm

3067A-DIP24S



unit: mm

3112A-MFP24S



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Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		9	V
Allowable power dissipation	Pd max	Ta ≤ 45°C	400	mW
	Pd max	Ta = 80°C (DIP)	400	mW
	Pd max	Ta = 80°C (MFP)	260	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}		8	V
Operating supply voltage range	V_{CC}op	Ta = 80°C	4.3 to 8.5	V

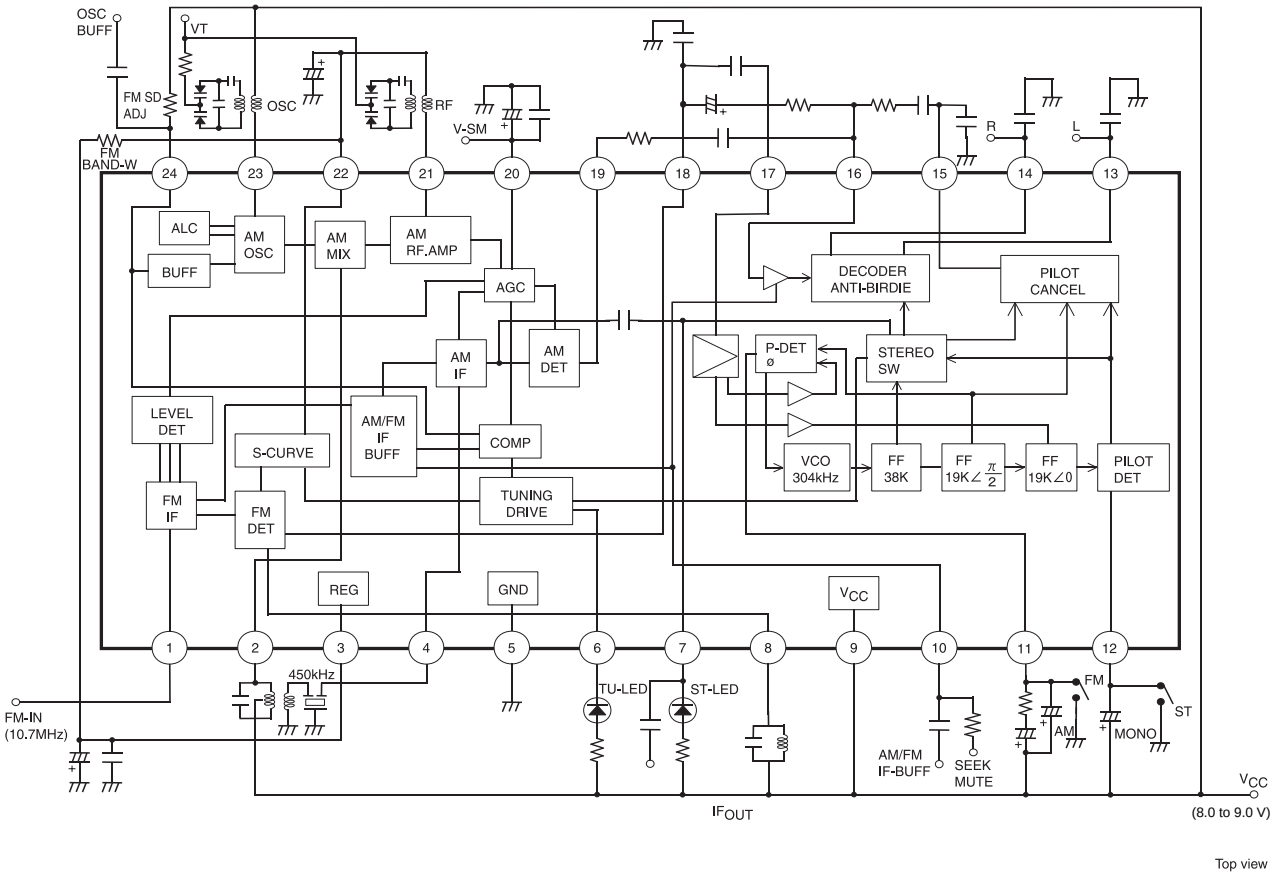
Operating Characteristics at Ta = 25°C, V_{CC} = 8 V, in the specified test circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[FM Mono Characteristics] fc = 10.7 MHz, Vi = 100 dBμ, fm = 1 kHz, Mod = 75 kHz						
Current drain	I_{CCO-FM}	With no input signal	20	30	40	mA
Demodulator output	V_{OFM}	100 dBμ, 100% modulation, fm = 1 kHz	230	360	460	mVrms
Total harmonic distortion	THD_{FM}	100 dBμ, 100% modulation, fm = 1 kHz		0.35	1.5	%
Signal-to-noise ratio	S/N_{FM}	100 dBμ, 100% modulation, fm = 1 kHz	73	80		dB
AM rejection ratio	AMR	100 dBμ, AM 30% modulation, fm = 1 kHz	47	65		dB
3 dB sensitivity		100 dBμ, 100% modulation, fm = 1 kHz, -3 dB input		32	40	dBμ
SD sensitivity		0% modulation	38	47	56	dBμ
IF counter buffer output	$V_{IFBuff-FM}$	100 dBμ, the pin 13 output	80	120	160	mVrms
Mute attenuation	Mute-Att	100 dBμ, 100% modulation, fm = 1 kHz	75	85		dB
[FM Stereo Characteristics] fc = 10.7 MHz, Vi = 100 dBμ, fm = 1 kHz, L + R = 90%, Pilot = 10%						
Separation	Sep_L	Left channel modulated. The pin 16 output/the pin 17 output	30	42		dB
Stereo on level	ST_{ON}	The pilot modulation such that V7 falls under 0.7 V	1.5	3.5	5.5	%
Total harmonic distortion	THD-main	Left + right modulation. The pin 16 output.		0.45	1.5	%
Adjacent channel rejection ratio 1	Brej-3rd	fs = 113 kHz, Vs = 90%, pilot = 10% The left - right modulation, demodulated output		36		dB
Adjacent channel rejection ratio 2	Brej-5th	fs = 189 kHz, 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] fc = 1000 kHz, Vi = 80 dBμ, fm = 1 kHz, Mod = 30%						
Current drain	I_{CCO-AM}	With no input signal	13	27	39	mA
Detector output 1	V_{OAM1}	23 dBμ, 30% modulation, fm = 1 kHz	40	80	160	mVrms
Detector output 2	V_{OAM2}	80 dBμ, 30% modulation, fm = 1 kHz	90	160	230	mVrms
Signal-to-noise ratio 1	S/N_{AM1}	23 dBμ, 30% modulation, fm = 1 kHz	17	23		dB
Signal-to-noise ratio 2	S/N_{AM2}	80 dBμ, 30% modulation, fm = 1 kHz	46	52		dB
Total harmonic distortion 1	THD_{AM1}	80 dBμ, 30% modulation, fm = 1 kHz		0.4	1.1	%
Total harmonic distortion 2	THD_{AM2}	107 dBμ, 30% modulation, fm = 1 kHz		0.5	1.3	%
SD sensitivity		0% modulation	11	20	29	dBμ
Local oscillator buffer output	V_{OSC-AM}	With no input signal	100	140	200	mVrms
IF counter buffer output	$V_{IFBuff-AM}$	23 dBμ	140	285	400	mVrms

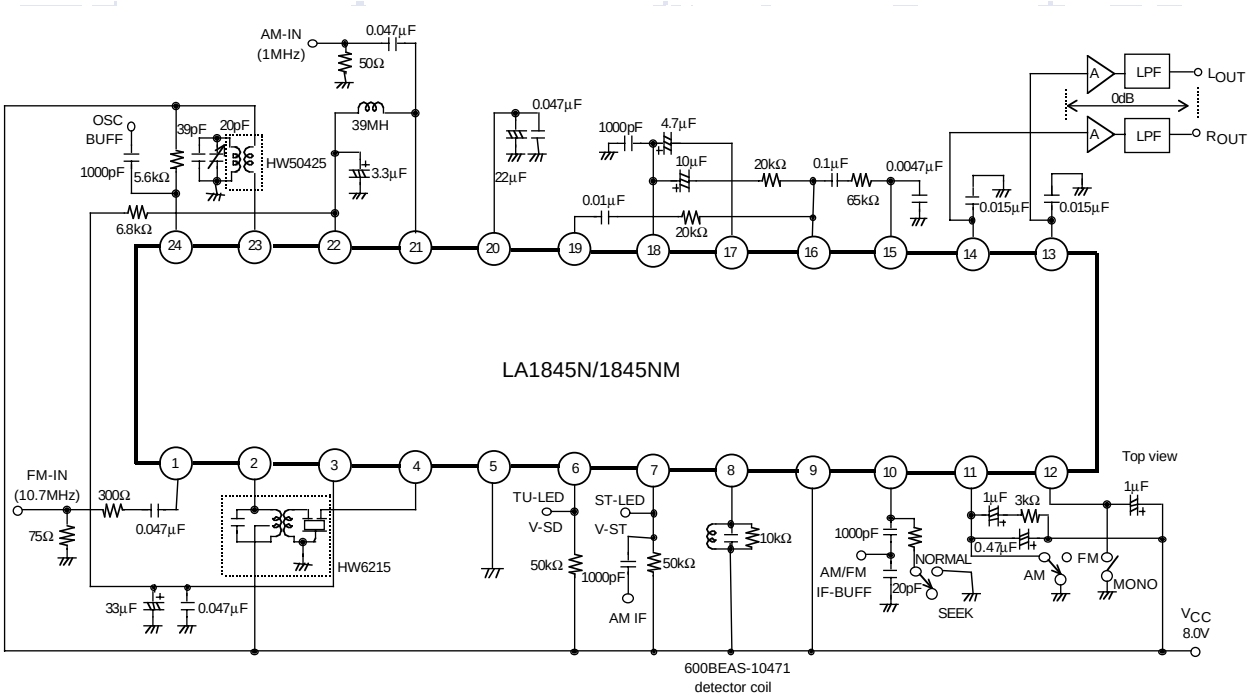
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Block Diagram



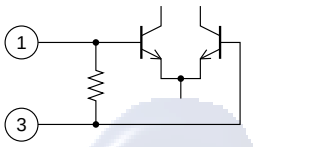
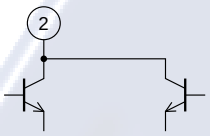
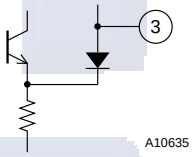
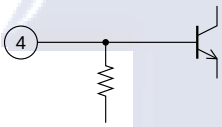
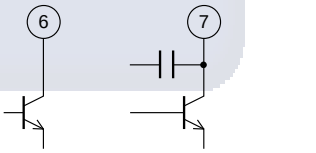
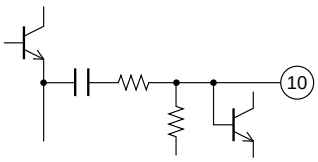
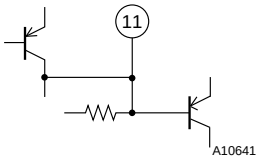
AC Test Circuit



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Pin Functions

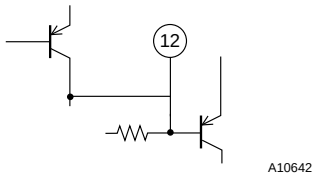
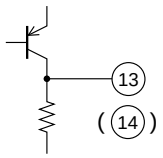
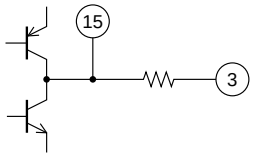
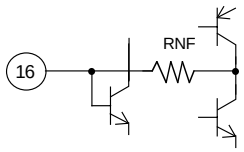
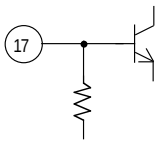
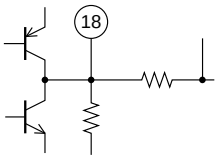
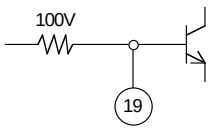
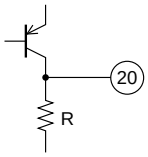
Pin No.	Pin function	Pin voltage	Notes	Equivalent circuit
1	FM IF input	Vreg	Input impedance r_i = 330 Ω	 A10635
2	AM mixer output	V_{CC}	Connect the mixer coil between this pin and V_{CC}	 A10636
3	REG	2.3	Vreg = 2.3 V	 A10635
4	AM IF input	Vreg	Input impedance r_i = 2 kΩ	 A10637
5	GND	0 V		
6 7	TU-LED ST-LED / AF-IF output	V_{CC} V_{CC}	Active low Open collector	 A10638
8	FM detector	V_{CC}	The 600BEAS-10471 (Toko Mfg. Co., Ltd.) is recommended for detector coil.	
9	V_{CC}			
10	AM / FM IF counter output, output control switch, mute switch	0 V	V10 ≤ 0.5 V: Reception state 1.4 V ≤ V10 ≤ 2.2 V: Muting on V10 ≥ 3.5 V: IF counter output and muting on	 A10643
11	Phase comparator low-pass filter (AM/FM switching)	V_{CC} – 1.0	The device operates in AM mode when a current of over 200 µA flows from pin.12. Limit values for the resistor: 2.7 kΩ (When V_{CC} = 7 V) 3.9 kΩ (8 V)	 A10641

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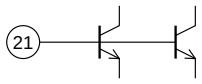
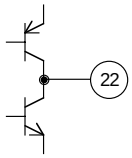
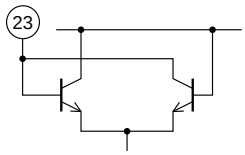
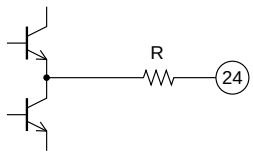
Pin No.	Pin function	Pin voltage	Notes	Equivalent circuit
12	Pilot detector low-pass filter (Forced mono) (VCO stop)	V_{CC} – 1.0	The device is forced to monaural when a current of over 50 µA flows from this pin. The VCO is stopped when a current of over 200 µA flows from this pin. The limit values for the resistor are the same as those for pin 11.	 A10642
13 14	L outputs R outputs	3.2 V 3.2 V	Output impedance r_o = 3.3 kΩ	 A10647
15	Pilot canceler output	Vreg		 A10645
16	Decoder input	Vreg	Inverting input pin RNF = 20 kΩ	
17	PLL input	Vreg	Input impedance ri = 20 kΩ	
18	FM demodulator output	Vreg + 0.7 (FM) Vreg + 0.7 (AM)	Output impedance r_o = 2.3 kΩ The channel separation can be adjusted with an external capacitor connected between this pin and ground.	 A10649
19	AM detector output	0 V (FM) 1.5 V (AM)	Output impedance r_o = 10 kΩ	
20	S meter, AM AGC	0.2 V (FM) 0.9 V (AM)	The resistance of the built-in resistor R is 13.9 kΩ The SD responce during seek operation is determined with the external capacitor connected to this pin.	 A10651

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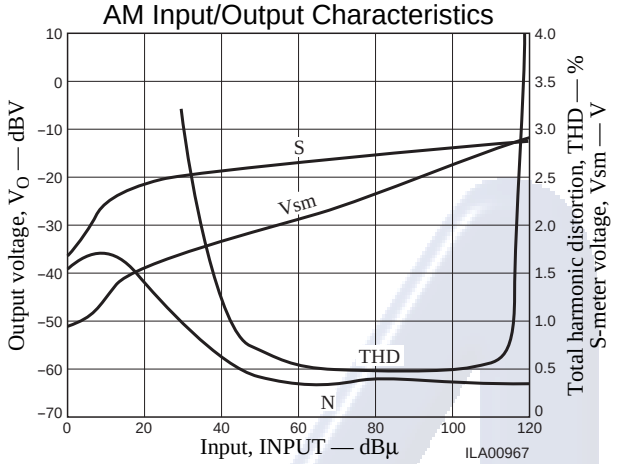
Pin No.	Pin function	Pin voltage	Notes	Equivalent circuit
21	AM RF input	Vreg	Must be used at the same potential as pin 22	 A10653
22	AFC	Vreg	The FM SD bandwidth can be adjusted with the external resistor connected between this pin and pin 3 (Vreg)	
23	OSC	Vcc	Connect the oscillator coil between this pin and pin 9 (Vcc) Note: Impedance of the secondary oscillator coil must be 5 kΩ or higher.	 A10655
24	Oscillator buffer output, FM SD sensitivity adjustment	Vcc - 1.4	The FM SD sensitivity can be adjusted with an external resistor connected to this pin. Output impedance r_o = 200 Ω Note: Resistance of the external resistor connected to the pin 24 must be 3.3 kΩ or higher.	 A10656

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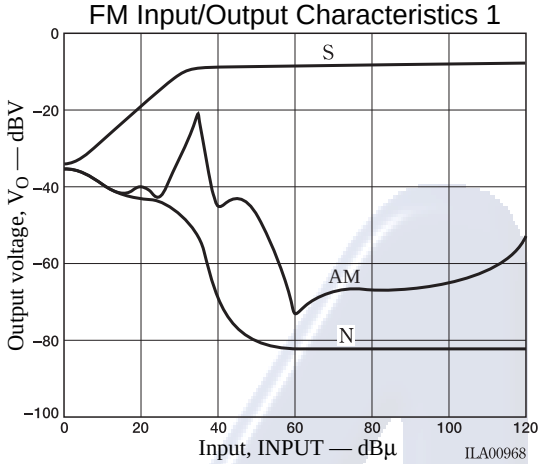
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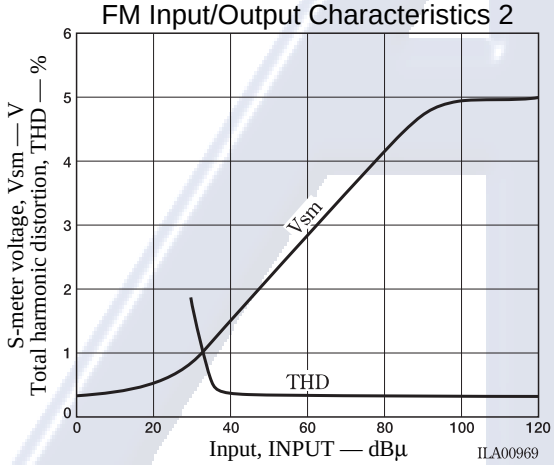
AM Input/Output Characteristics



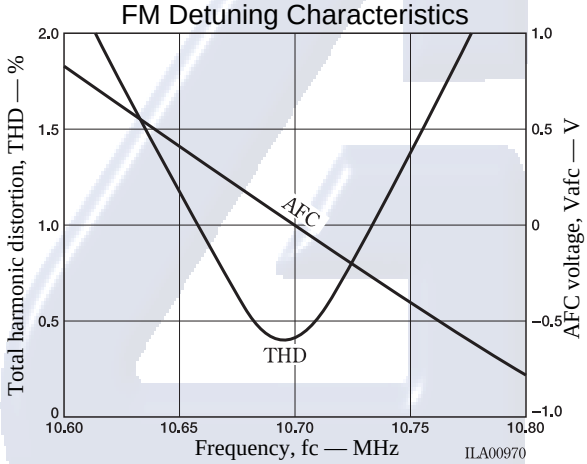
FM Input/Output Characteristics 1



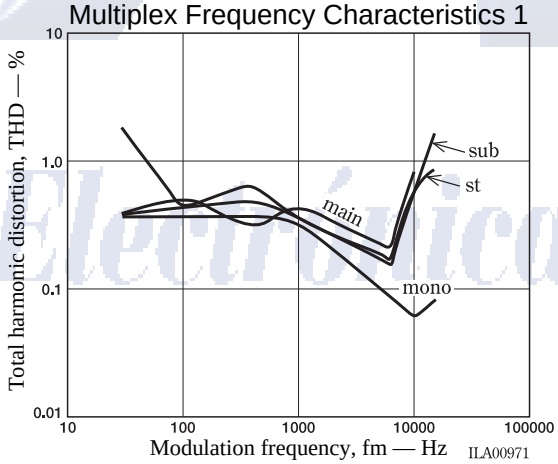
FM Input/Output Characteristics 2



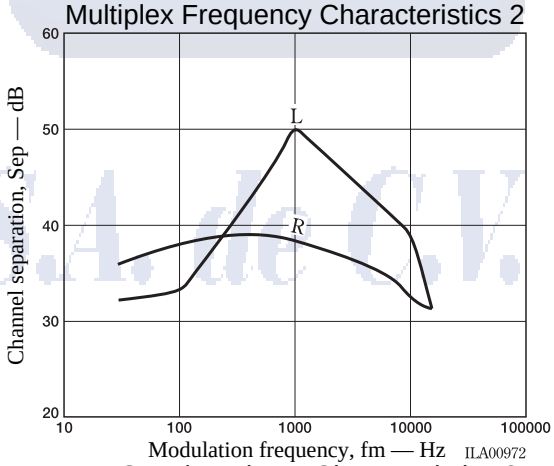
FM Detuning Characteristics



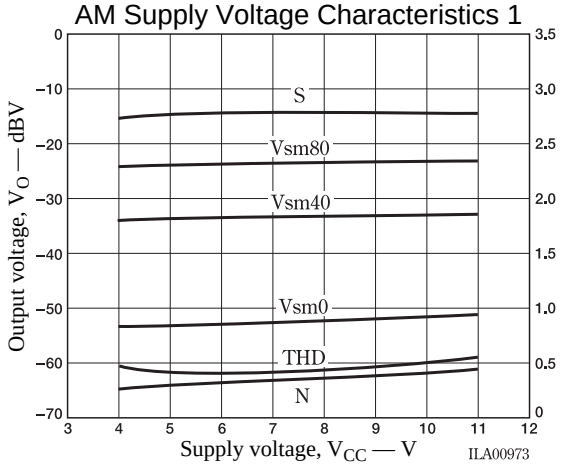
Multiplex Frequency Characteristics 1



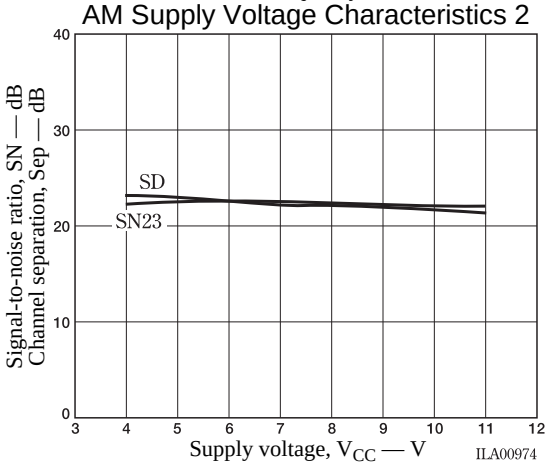
Multiplex Frequency Characteristics 2



AM Supply Voltage Characteristics 1



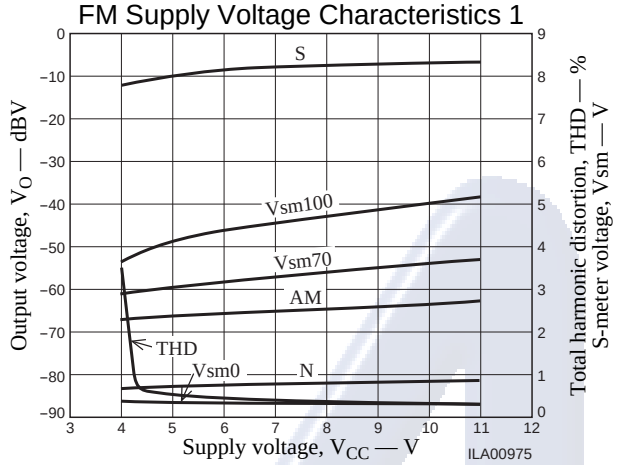
AM Supply Voltage Characteristics 2



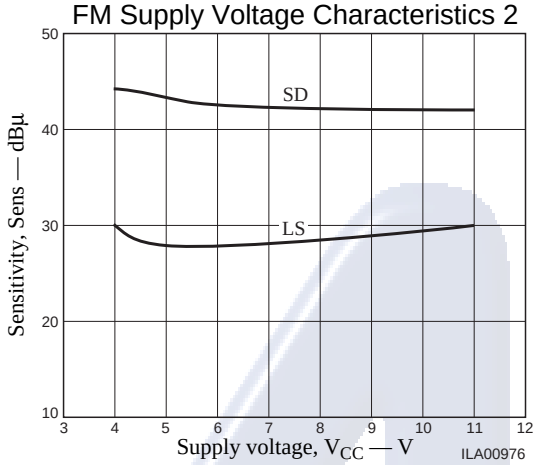
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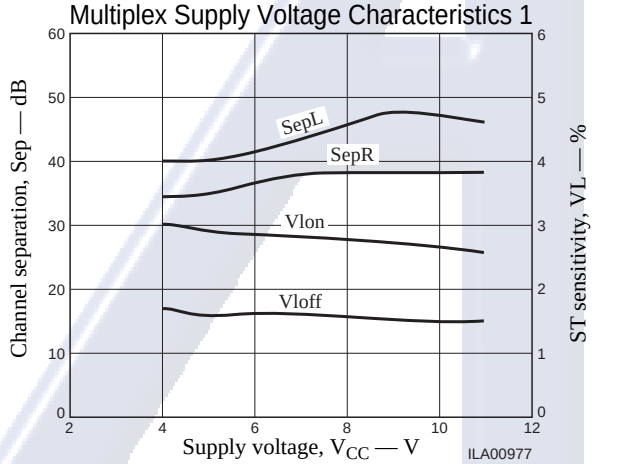
FM Supply Voltage Characteristics 1



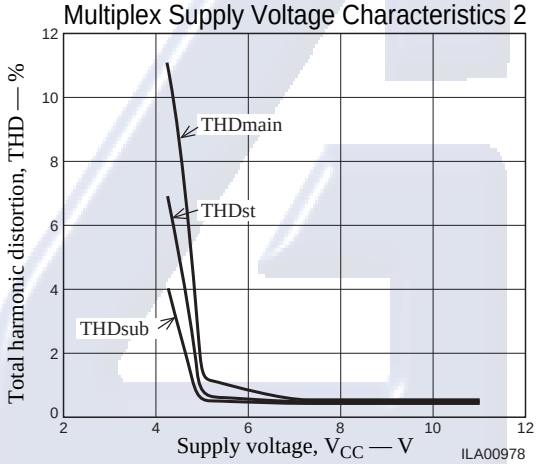
FM Supply Voltage Characteristics 2



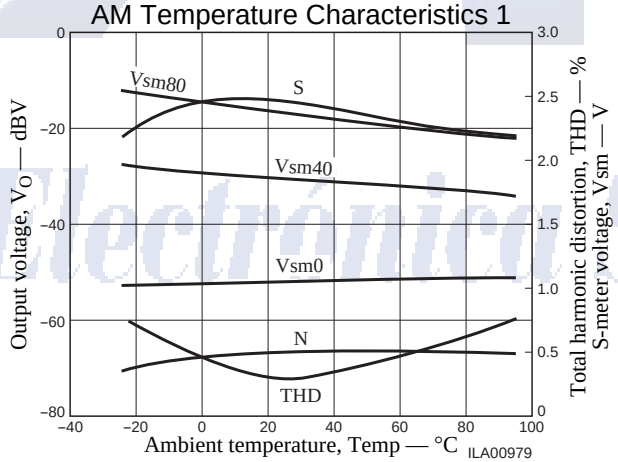
Multiplex Supply Voltage Characteristics 1



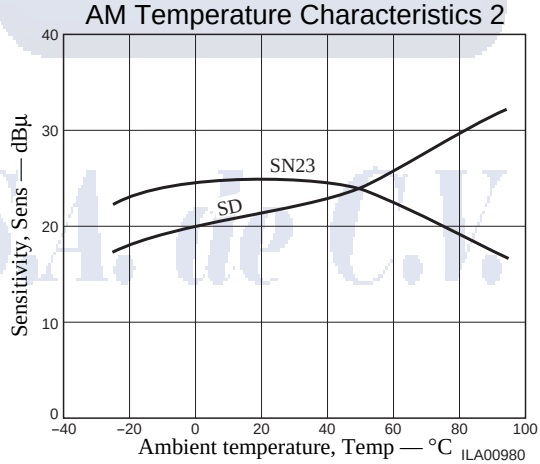
Multiplex Supply Voltage Characteristics 2



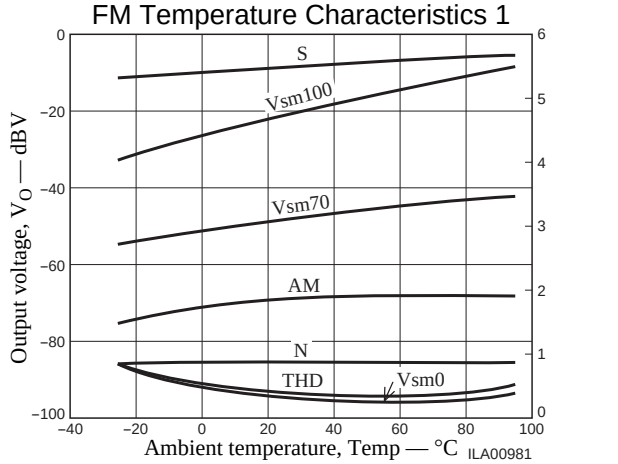
AM Temperature Characteristics 1



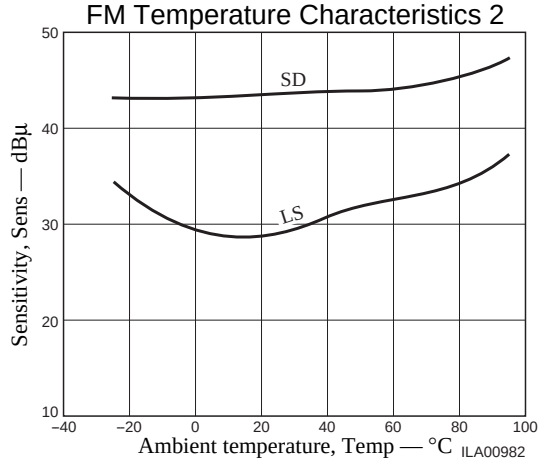
AM Temperature Characteristics 2



FM Temperature Characteristics 1



FM Temperature Characteristics 2

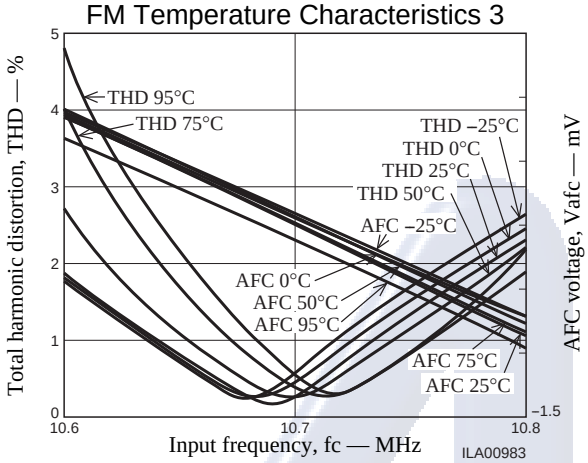


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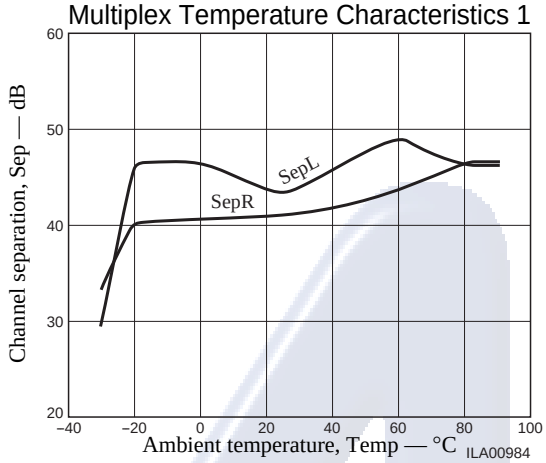
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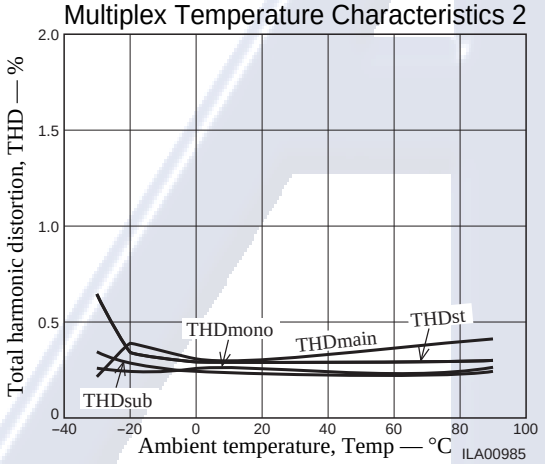
FM Temperature Characteristics 3



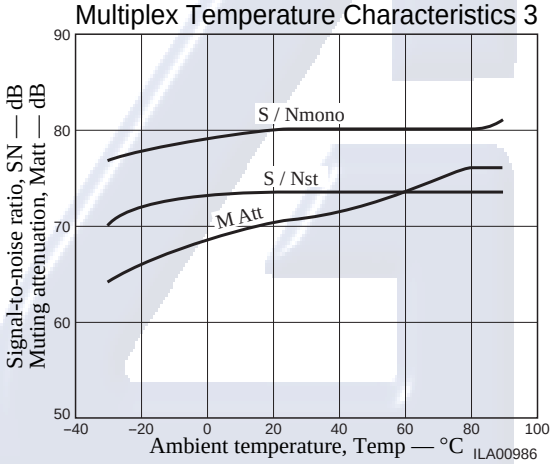
Multiplex Temperature Characteristics 1



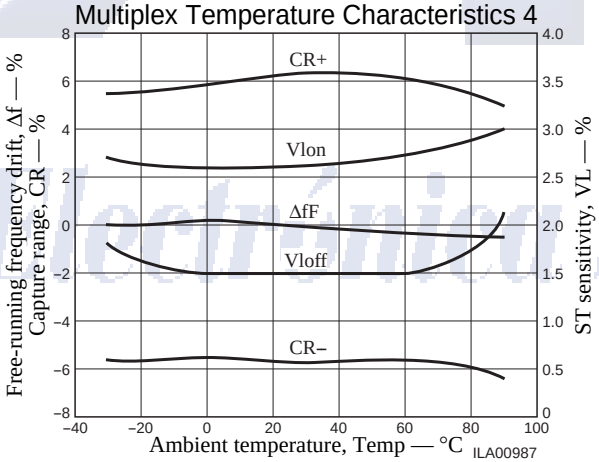
Multiplex Temperature Characteristics 2



Multiplex Temperature Characteristics 3



Multiplex Temperature Characteristics 4



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