μPC1287G　FM立体声解码器

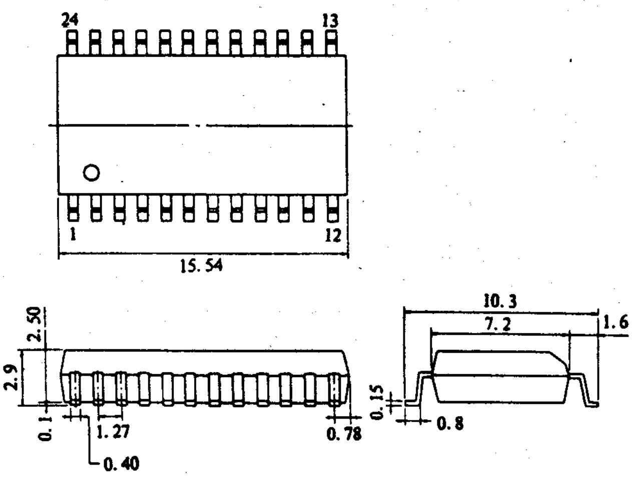
简要说明

μPC1287G为单片调频立体声解码和噪声截止集成电路。该电路具有导频截止(具有自动控制电路)，立体声噪声控制(SNC)，高频截止控制(HCC)，强制单声(控制24端)等功能。

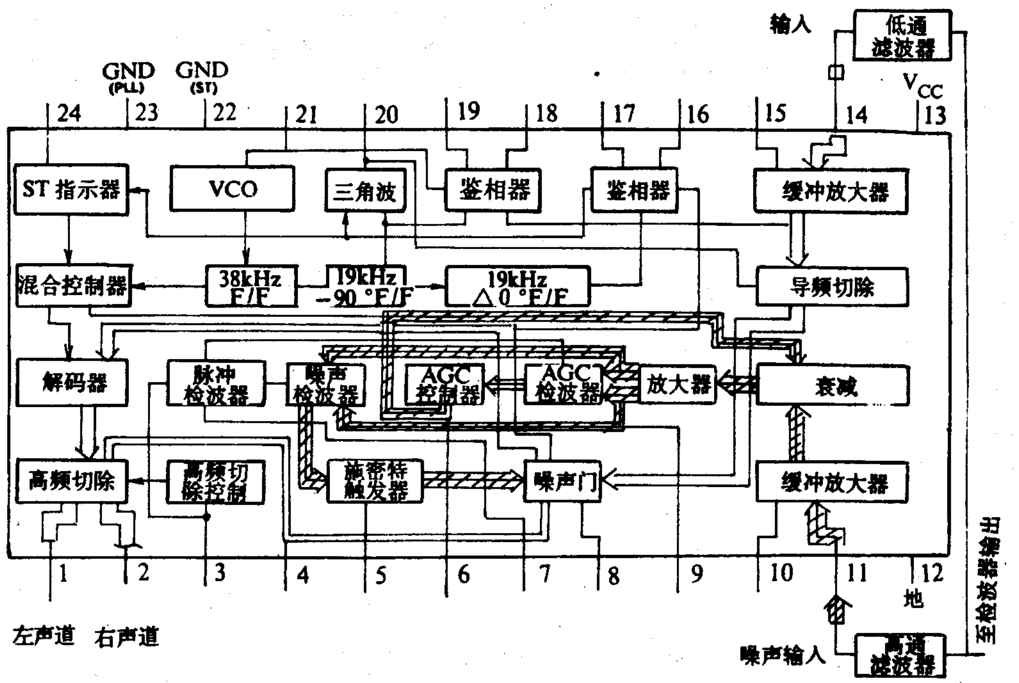
该电路的主要特点是失真低(THD = 0.1%，V_I = 300mV)，纹波抑制比高(SVR = 33dB，f_r = 200Hz)，最大输入电平高($V_{I(max)}$ = 800mV，THD = 1.0%)

该电路适用于汽车收音机。

外形图



电路框图 $V_{CC(max)}$ = 0V，$P_{D(max)}$ = 470mW



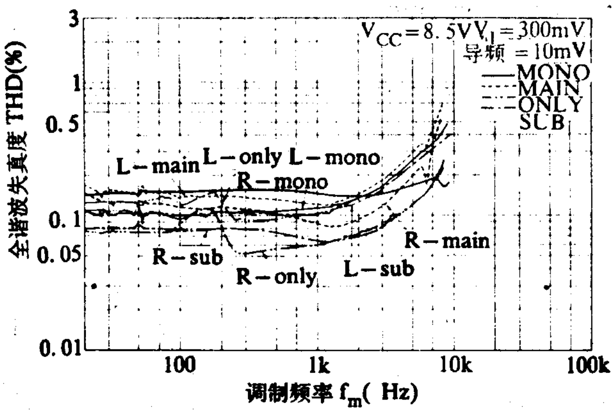
电参数(V_{CC} = 8.5V，V_{L+R} = 270mV，导频 = 30mV，f = 1kHz)

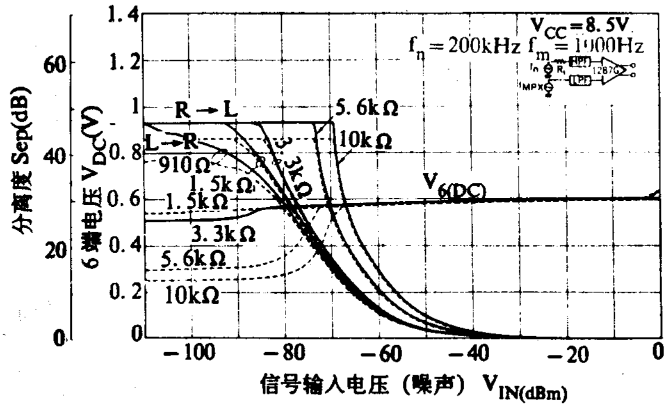
静态电源电流	I_{CCO}	静态	≤50mA
电源电压抑制比	SVR	f_r = 200Hz，V_r = 0.5V (无线性滤波器)	33dB
分离度	Sep	f = 1kHz	≥35dB
单声全谐波失真度	THD_1	V_I = 300mV(单声)	≤0.5%
立体声全谐波失真度	THD_2	L + R = 270mV，导频 = 30mV	≤0.7%
电压增益(单声)	G_V	单声	−1dB

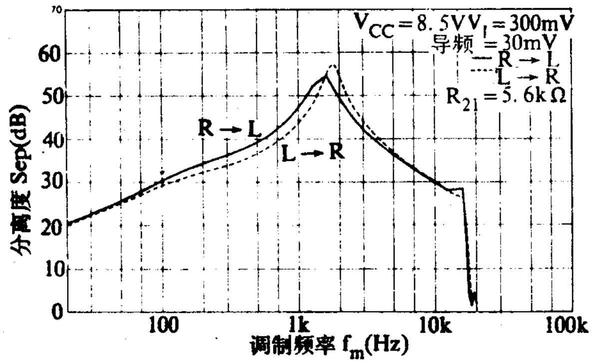
续表

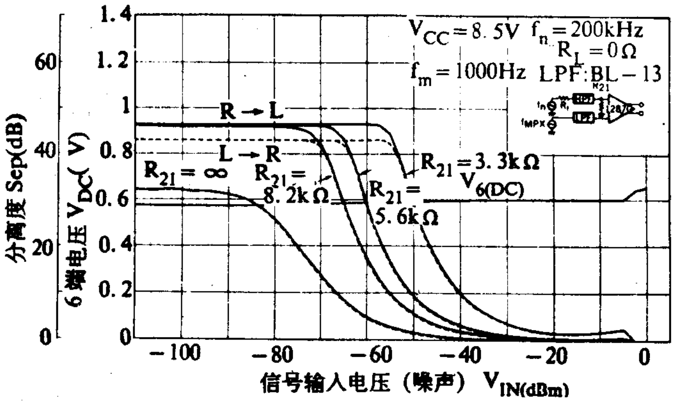
声道平衡度	CB		0dB
亮灯电平	LAMP-ON	仅导频	10mV
灯滞后	HY		5dB
俘获范围	CR		≥ ±2.3%
超声抑制	Rej(19)	三角波切除	≥15dB
SCA 抑制	Rej(SCA)	L + R = 240mV, 导频 = 30mV, SCA = 30mV	67dB
信噪比	S/N	$R_g = 4.7k\Omega$	≥71dB
最大输入电平	$V_{I(max)}$	THD = 1%	≥700mV

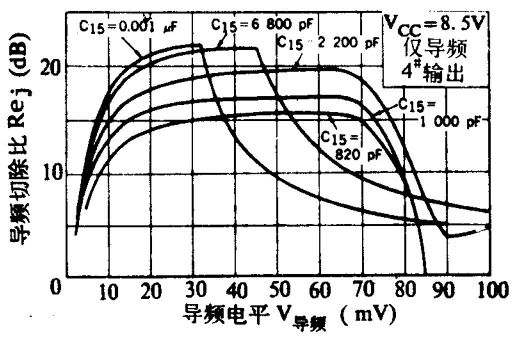
特点与性能

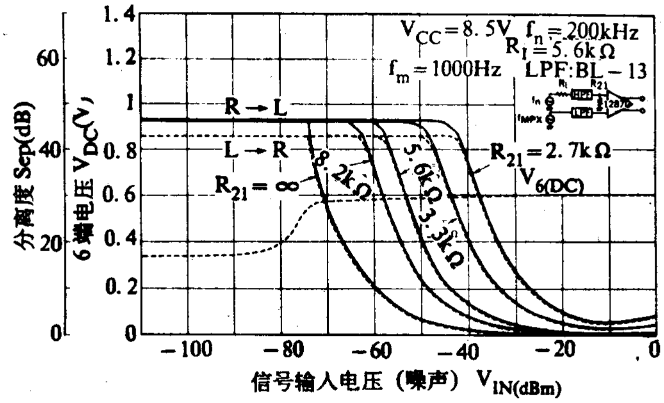


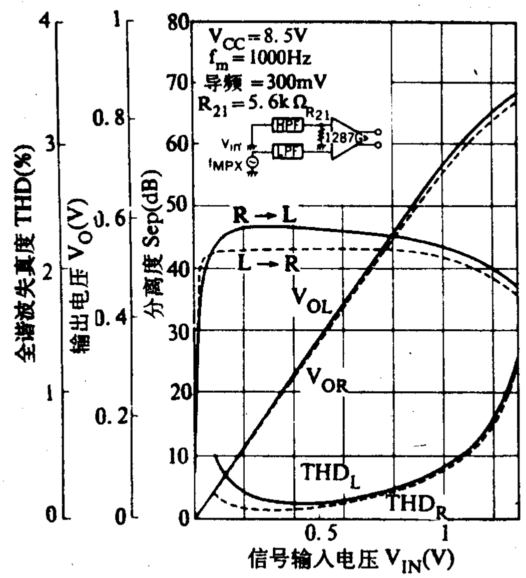


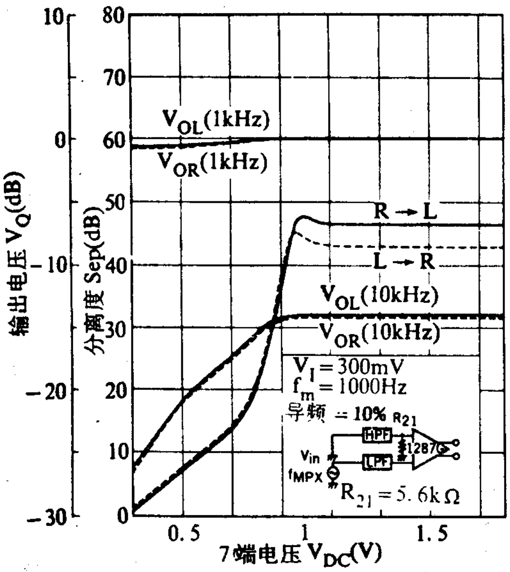






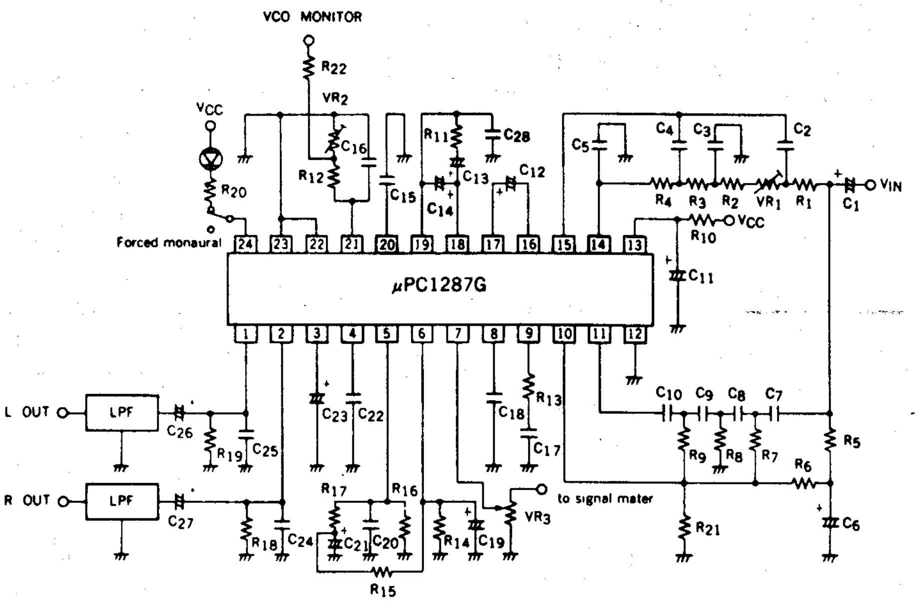






典型应用

汽车收音机用调频立体声解码器



VR_1:分离度调节

VR_2:VCO 调整(76kHz)

VR_3:HCC 调整(HCC 断开、$V_7 > 1.2V$)

C_{22}:高切频率 $f = 2.84 \times 10^{-5}/C_{22}$

R_{21}:混移调整(移动应用 SNC)

C_{15}:亮灯电平调整

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC1287G

T-77-05-05

FM MULTIPLEX STEREO DEMODULATOR WITH NOISE CANCELLER

DESCRIPTION

The μPC1287G is a sillicon monolithic integrated circuit which includes FM stereo demodulator and noise canceller on the single chip, for use in automotive radio receivers.

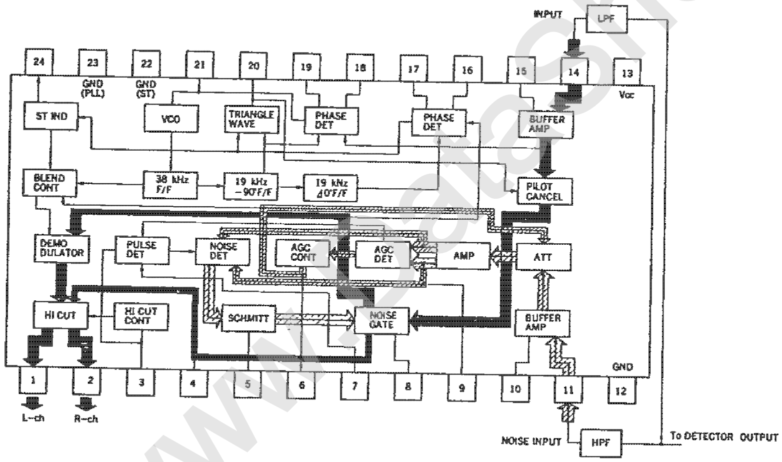
FUNCTIONS

- Pilot canceller (with automatic control circuit)
- Stereo-noise control (SNC)
- High-cut control (HCC)
- Forced monaural (control pin No.24)

FEATURES

- Low distortion. THD = 0.1 % (TYP.), @ V_i = 300 $mV_{r.m.s.}$
- High ripple rejection ratio. SVR = 33 dB (TYP.), @ f_r = 200 Hz
- High maximum input level. V_i (MAX.) = 800 $mV_{r.m.s.}$ (TYP.), @ THD = 1.0 %
- A small number of external parts.

BLOCK DIAGRAM



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μPC1287G

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ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage	V_{CC}	16	V
Circuit Current	I_{CC}	67	mA
Package Dissipation	P_D	470*	mW
Operational Temperature	T_{opt}	–30 to +75	°C
Storage Temperature	T_{stg}	–40 to +125	°C

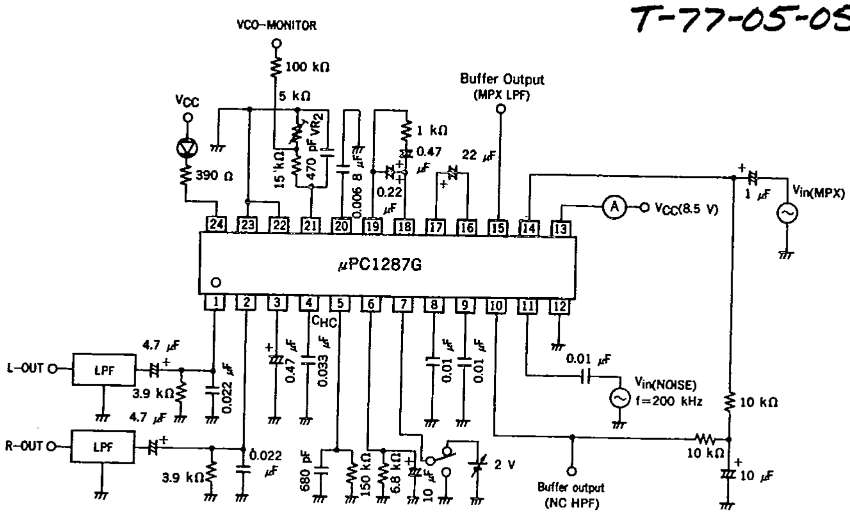
*T_a = 75 °C

RECOMMENDED OPERATING CONDITION (T_a = 25 °C)

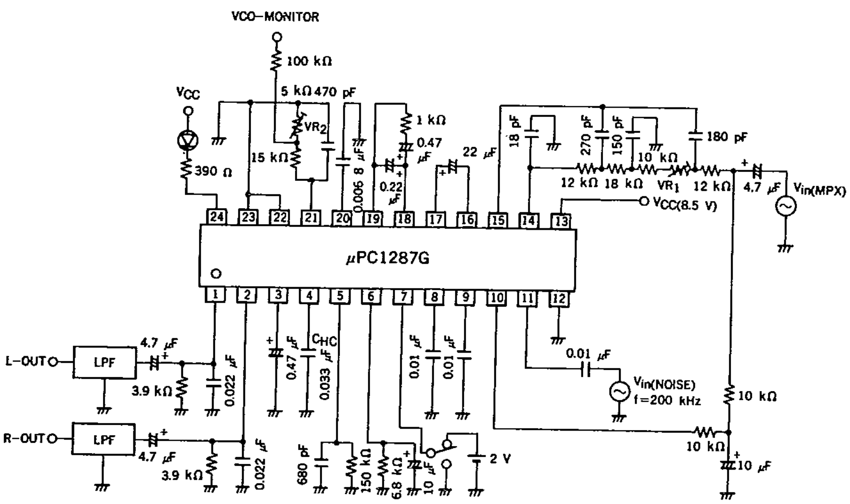
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	7.5	8.5	9.5	V

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)
(V_{CC} = 8.5 V, V_{L+R} = 270 $mV_{r.m.s.}$, Pilot = 30 $mV_{r.m.s.}$, f = 1 kHz)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Circuit Current	I_{CC}		39	50	mA	Quiescent
Supply Voltage Rejection Ratio	SVR		33		dB	f_r = 200 Hz, V_r = 0.5 $V_{r.m.s.}$ (without Line-filter)
Separation	Sep	35	40		dB	f = 1 kHz
Monaural Total Harmonic Distortion	THD1		0.1	0.5	%	V_{in} = 300 $mV_{r.m.s.}$ (Monaural)
Stereo Total Harmonic Distortion	THD2		0.1	0.7	%	L + R = 270 $mV_{r.m.s.}$ Pilot = 30 $mV_{r.m.s.}$
Voltage Gain (Mono)	G_v	–4	–1	+2	dB	Monaural
Channel Balance	CB	–1.5	0	+1.5	dB	
Lamp-on Level	LAMP-ON	6.5	10	13.5	$mV_{r.m.s.}$	Pilot Only
Lamp Hysteresis	Hy	3	5	7	dB	
Capture Range	CR	±2.3			%	
Ultrasonic Frequency Rejection	Rej(19)	15	17		dB	Triangular Wave Cancel
SCA Rejection	Rej(SCA)		67		dB	L + R = 240 $mV_{r.m.s.}$ Pilot = 30 $mV_{r.m.s.}$ SCA = 30 $mV_{r.m.s.}$
Signal to Noise Ratio	S/N	71	77		dB	Rg = 4.7 kΩ
Maximum Input Level	$V_{i(MAX.)}$	700	800		$mV_{r.m.s.}$	THD = 1 %
Control Current (Stereo → Mono)	$I_{(mono)}$		0.25	0.5	mA	L + R = 270 $mV_{r.m.s.}$ Pilot = 30 $mV_{r.m.s.}$
Separation (Blend)	SepB		10		dB	Noise Level at V_{iAGC} + 12 dB
High-cut Operating Voltage	$V_{HC(1)}$	0.5	0.65	0.9	V	C_{HC} = 10 μF, –6 dB point (V_o)
Voltage Gain (L.P.F.)	G_{VLPF}	0	0.8	1.6	dB	
Voltage Gain (H.P.F.)	G_{VHPF}	2	3.0	4	dB	
High-cut Control Noise	NHC		–50	–45	dBm	Din Noise Peak
Input Signal Voltage (AGC DET.)	V_{AGC}	–75	–71.5	–68	dBm	f = 200 kHz AGC Terminal Voltage (V_6) = 0.55 V



TEST CIRCUIT 2 (SEPARATION, THD (ST))



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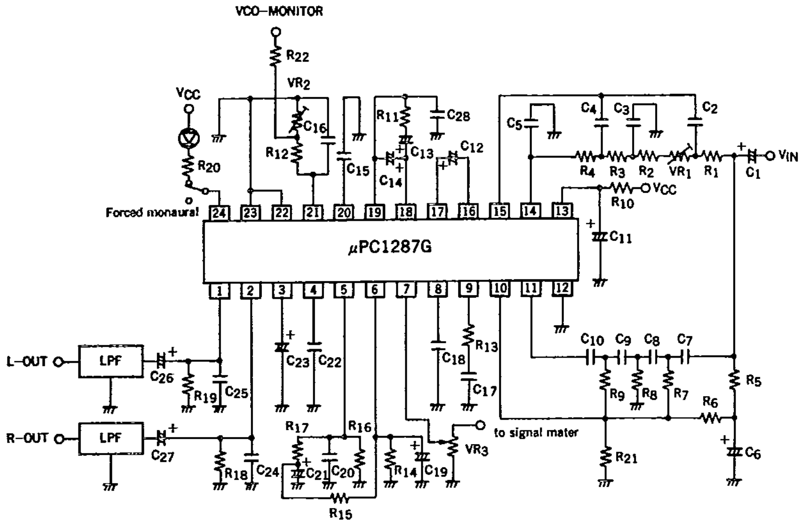
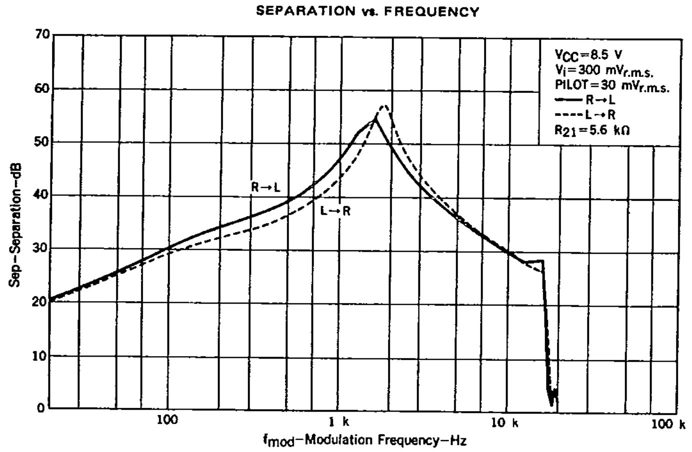
TYPICAL APPLICATION

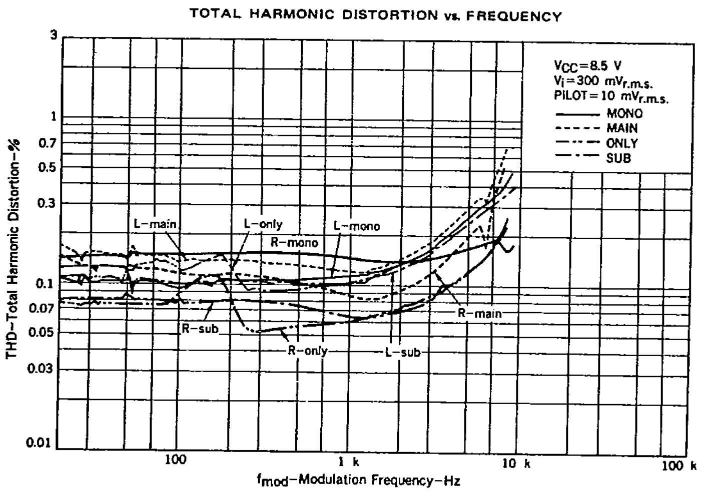


VR1 : SEPARATION ADJUSTMENT
VR2 : VCO ADJUSTMENT (76 kHz)
VR3 : HCC ADJUSTMENT (HCC off $V_7 > 1.2$ V)
C22 : HIGH-CUT FREQUENCY $f = 2.84 \times 10^{-5}/C_{22}$
R21 : BLEND SHIFT ADJUSTMENT (shift operating SNC)
C15 : LAMP ON LEVEL ADJUSTMENT

NOTE 1 : Value of VR_3 is recommended less than 33 kΩ.
2 : In case of sensing pulsive noise through the output for signal meter, don't use capacitor with large capacity at the output terminal for signal meter.
3 : Coefficient of VCO circuit (C_{16}, VR_2, R_{12}) is recommended −330 PPM/°C
4 : C_{21} and R_{17} reduce AGC effect in the case that there is continual pulsive noise. Adjust AGC characteristic for successive pulsive noise by R_{14} and R_{15}.
5 : C_{19} is recommended solid tantalum capacitor.

TYPICAL CHARACTERISTICS (T_a = 25 °C)





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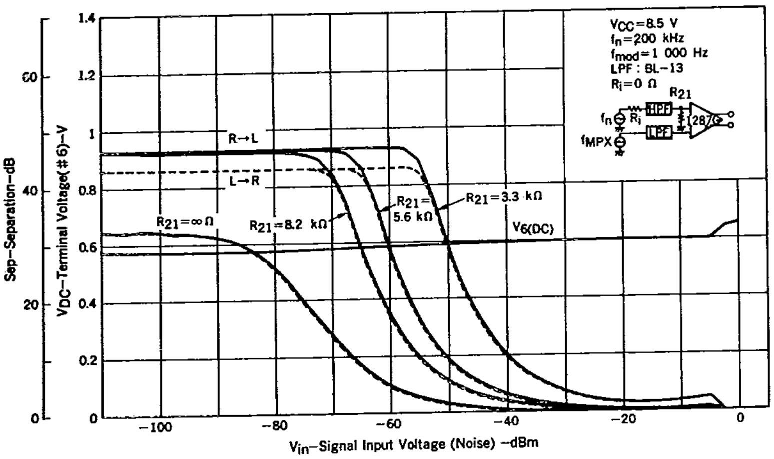
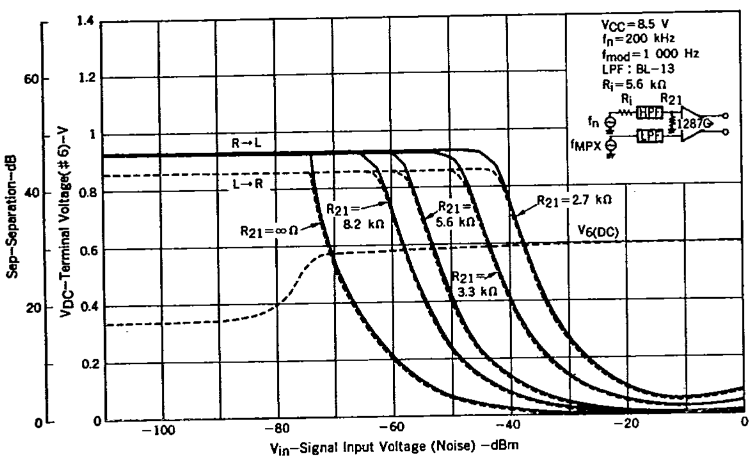
TERMINAL VOLTAGE (V_6), SEPARATION vs. NOISE INPUT VOLTAGE



TERMINAL VOLTAGE (V_6), SEPARATION vs. NOISE INPUT VOLTAGE



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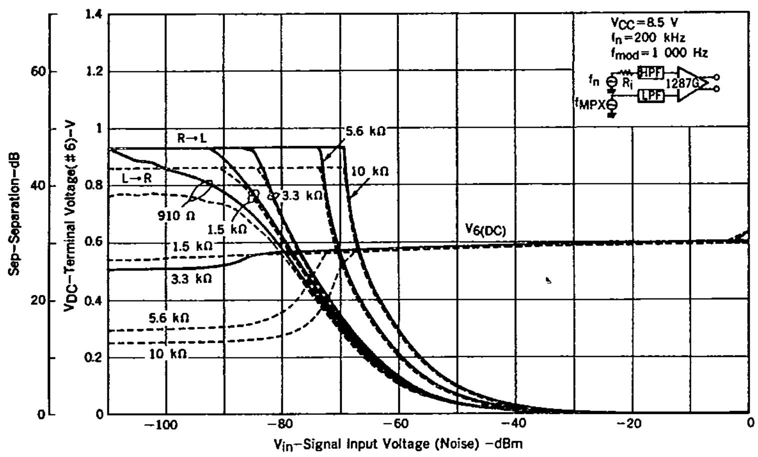
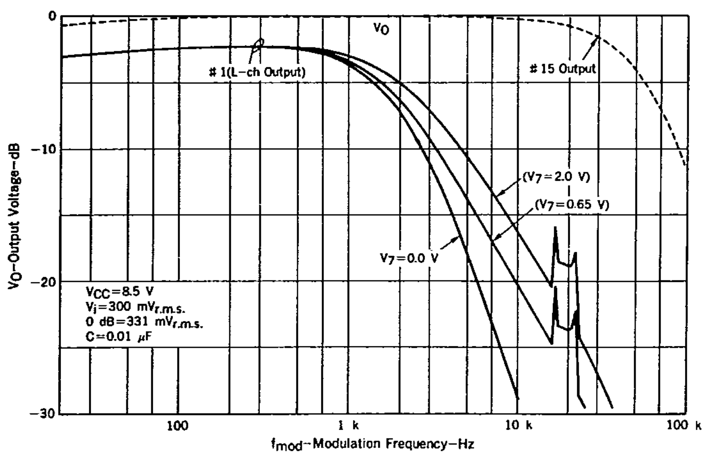
TERMINAL VOLTAGE (V_6), SEPARATION vs. NOISE INPUT VOLTAGE



OUTPUT VOLTAGE vs. FREQUENCY



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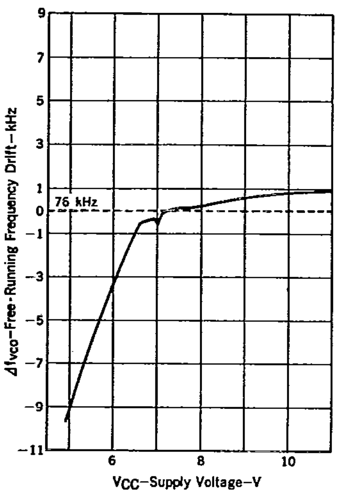
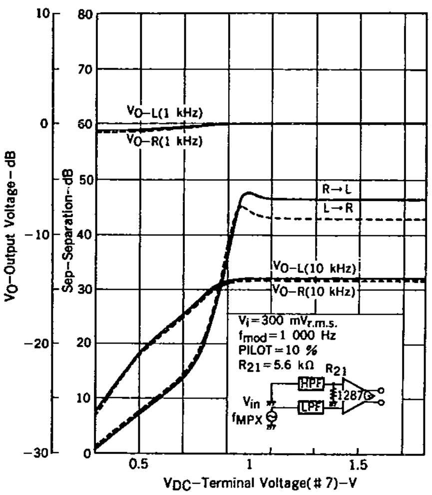
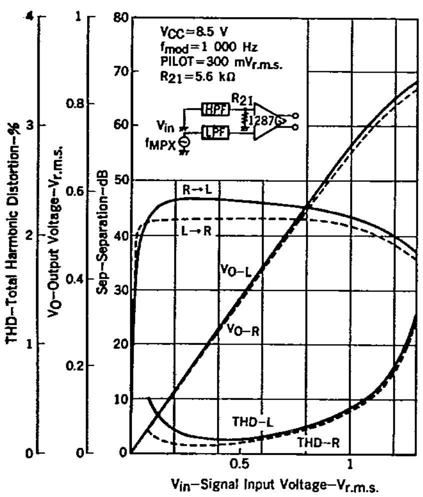
FREE RUNNING FREQUENCY vs. SUPPLY VOLTAGE



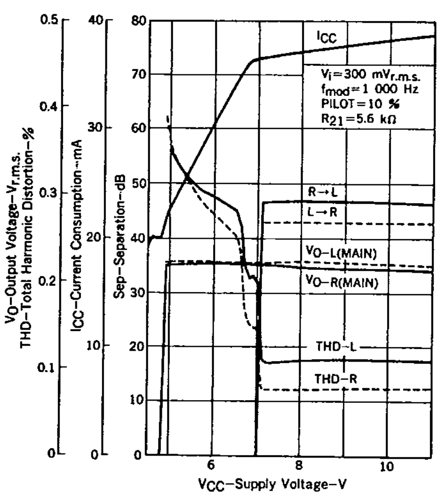
OUTPUT VOLTAGE, SEPARATION vs. TERMINAL VOLTAGE (V_7)



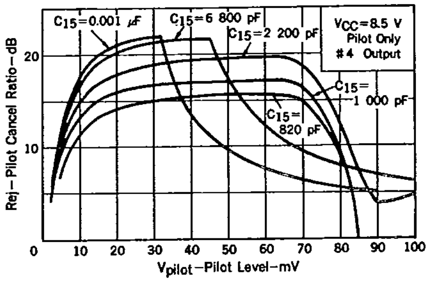
SEPARATION, OUTPUT VOLTAGE, TOTAL HARMONIC DISTORTION vs. INPUT VOLTAGE



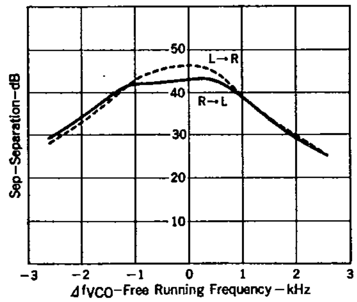
SEPARATION, CIRCUIT CURRENT, OUTPUT VOLTAGE vs. SUPPLY VOLTAGE



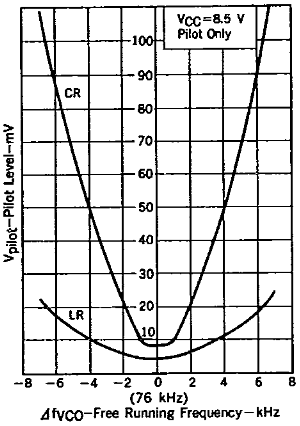
PILOT CANCEL RATIO vs. PILOT LEVEL



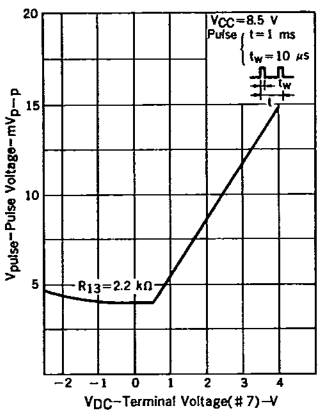
SEPARATION vs. FREE RUNNING FREQUENCY



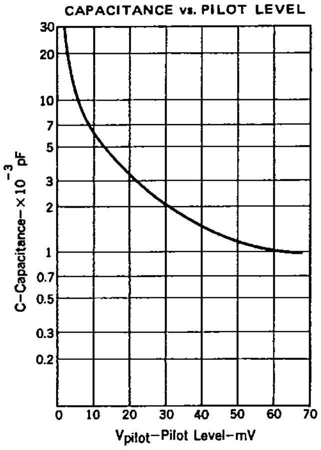
PILOT LEVEL vs. FREE RUNNING FREQUENCY



PULSE VOLTAGE vs. TERMINAL VOLTAGE



CAPACITANCE vs. PILOT LEVEL



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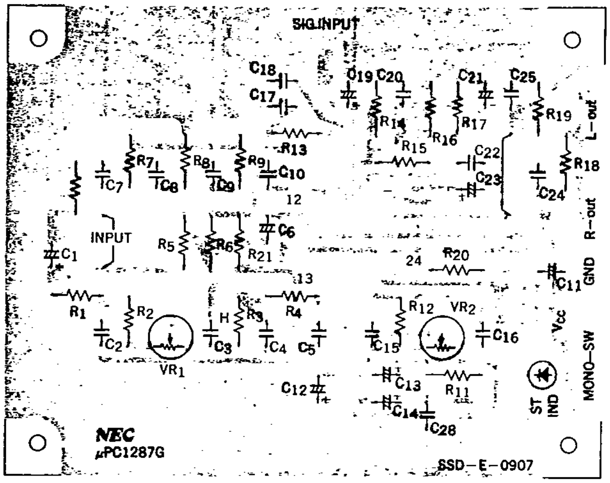
OUTBOARD COMPONENTS MOUNTED ON A PRINTED-CIRCUIT BOARD



R_1 = 12 kΩ	R_{11} = 1 kΩ	R_{21} = 5.6 kΩ	C_1 = 2.2 μF	C_{11} = 100 μF	C_{21} = 1 μF
R_2 = 10 kΩ	R_{12} = 15 kΩ	VR_1 = 22 kΩ	C_2 = 180 pF	C_{12} = 1 μF	C_{22} = 0.01 μF
R_3 = 18 kΩ	R_{13} = 2.2 kΩ	VR_2 = 5 kΩ	C_3 = 150 pF	C_{13} = 0.47 μF	C_{23} = 0.47 μF
R_4 = 12 kΩ	R_{14} = 22 kΩ		C_4 = 270 pF	C_{14} = 0.22 μF	C_{24} = 0.022 μF
R_5 = 10 kΩ	R_{15} = 12 kΩ		C_5 = 18 pF	C_{15} = 0.006 8 μF	C_{25} = 0.022 μF
R_6 = 10 kΩ	R_{16} = 82 kΩ		C_6 = 1 μF	C_{16} = 470 pF	C_{26} = 4.7 μF
R_7 = 5.6 kΩ	R_{17} = 22 kΩ		C_7 = 120 pF	C_{17} = 390 pF	C_{27} = 4.7 μF
R_8 = 5.6 kΩ	R_{18} = 3.9 kΩ		C_8 = 120 pF	C_{18} = 0.01 μF	C_{28} = 1 500 pF
R_9 = 5.6 kΩ	R_{19} = 3.9 kΩ		C_9 = 150 pF	C_{19} = 10 μF	
R_{10} = 33 Ω	R_{20} = 470 Ω		C_{10} = 82 pF	C_{20} = 680 pF	

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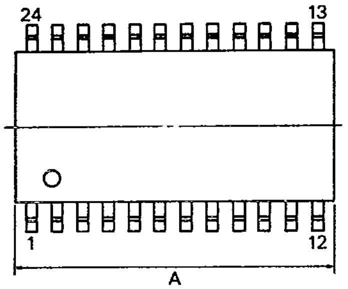
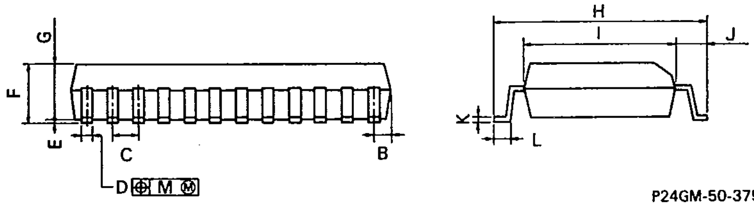
24PIN PLASTIC SOP (375 mil)





P24GM-50-375B

NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS	INCHES
A	15.54 MAX.	0.612 MAX.
B	0.78 MAX.	0.031 MAX.
C	1.27 (T.P.)	0.050 (T.P.)
D	$0.40^{+0.10}_{-0.05}$	$0.016^{+0.004}_{-0.003}$
E	0.1 ± 0.1	0.004 ± 0.004
F	2.9 MAX.	0.115 MAX.
G	2.50	0.098
H	10.3 ± 0.3	$0.406^{+0.012}_{-0.013}$
I	7.2	0.283
J	1.6	0.063
K	$0.15^{+0.10}_{-0.05}$	$0.006^{+0.004}_{-0.002}$
L	0.8 ± 0.2	$0.031^{+0.009}_{-0.008}$
M	0.12	0.005

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