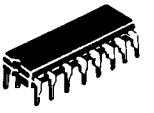
HA12134A, HA12135A, HA12136A

Dolby B-Type Noise Reduction System

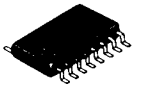
The HA12134A, HA12135A, HA12136A are silicon monolithic bipolar IC series providing dual channel dolby B-type noise reduction system in one chip. The circuit is used primarily to reduce the level of background noise introduced during recording and playback of audio signals on magnetic tape.
This circuit is available only to licensees of dolby laboratories licensing corporation.
Licensing and application information may be obtained from dolby laboratories licensing corporation.
HA12134A series provide the following functions and features.

HA12134A, HA12135A, HA12136A



(DP-16)

HA12134AFP, HA12135AFP, HA12136AFP



(FP-16D)

Functions

- Dual dolby B-type NR processor
- NR ON/OFF control switch.
- Record (encode)/playback (decode) control switch.

Features

- Separate record/playback input and output. Unprocessed signal output available in the encode and decode modes.
- Reduction of external components count.
- Small capacitor value for the reference voltage.
- NR ON/OFF switching and REC/PB switching are provided internally.
- 2-type package (DP-16, FP-16D)
- Wide range of operating supply voltage.

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Ordering Information

Type No	Dolby Level (mVrms)	Package
HA12134A	300	DP-16
HA12134AFP		FP-16D
HA12135A	450	DP-16
HA12135AFP		FP-16D
HA12136A	580	DP-16
HA12136AFP		FP-16D

Block Diagram

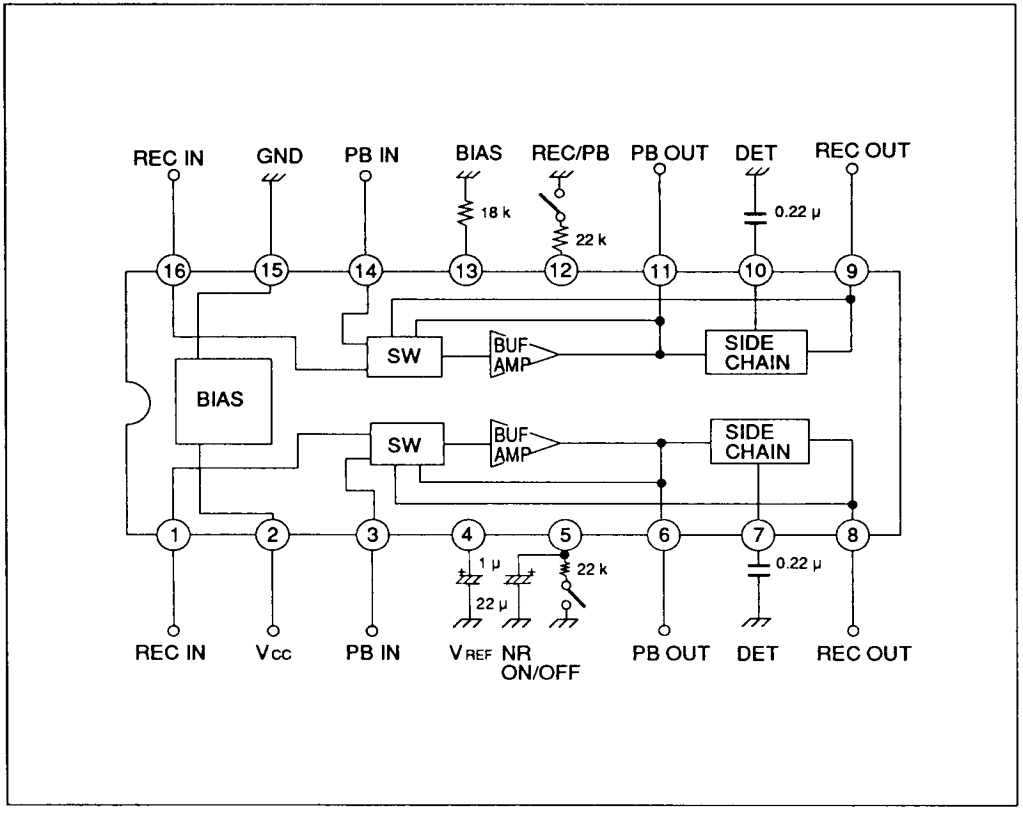


Table 1 Absolute Maximum Ratings (Ta = 25 °C, Unless otherwise specified.)

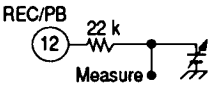
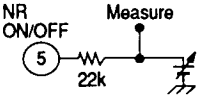
Item	Symbol	Rating	Unit	Note
Supply voltage	Vccmax	16	V	
Power dissipation	Pd	250	mW	Ta ≤ 85 °C
Operating temperature	Topr	–40 to +85	°C	
Storage temperature	Tstg	–55 to +125	°C	
Lead temperature	Tl	260	°C	Note 1

Note: 1. Soldering 10 sec.

Table 2 Electrical Characteristics (Ta = 25 °C, Vcc = 12 V, Unless otherwise specified.)

Item		Symbol	Min	Typ	Max	Unit	Test Condition
Operating voltage	HA12134A		6.5	12.0	16.0	V	Enable functional operations
	HA12135A	Vope	8.0	12.0	16.0		
	HA12136A		9.5	12.0	16.0		
Quiescent current		Iq	—	7	—	mA	No signal, REC NR-ON
Voltage gain of input amp	HA12134A	GvIA	21.0	23.0	25.0	dB	Pin 1→Pin 6 (Pin 16→Pin 11) Vout = 0 dB, f = 1 kHz
	HA12135A		24.5	26.5	28.5		
	HA12136A		26.5	28.5	30.5		
NR encode boost V 8 (9) (NR ON) / V 8 (9) (NR OFF)		ENC-1.4 k (1)	2.9	4.4	5.9	dB	f = 1.4 kHz V 8 (9) (NR OFF) = –20 dB
		ENC-1.4 k (2)	6.0	7.5	9.0	dB	f = 1.4 kHz V 8 (9) (NR OFF) = –30 dB
		ENC-5 k (1)	1.7	3.2	4.7	dB	f = 5 kHz V 8 (9) (NR OFF) = –20 dB
		ENC-5 k (2)	6.7	8.2	9.7	dB	f = 5 kHz V 8 (9) (NR OFF) = –30 dB
		ENC-10 k (1)	–1.1	0.4	1.9	dB	f = 10 kHz V 8 (9) (NR OFF) = 0 dB
		ENC-10 k (2)	9.8	10.4	11.8	dB	f = 10 kHz V 8 (9) (NR OFF) = –40 dB
T. H. D (REC)		T. H. D (REC)	—	0.05	0.3	%	f = 1 kHz V 8 (9) (NR ON) = 0 dB
Signal handling	HA12134A	Vomax (REC)	12.0	13.0	—	dB	f = 1 kHz, T. H. D = 1 % Vcc = 6.5 V
	HA12135A						Vcc = 8.0 V
	HA12136A						Vcc = 9.5 V
Signal/noise ratio (REC)		S/N (REC)	62.0	68.0	—	dB	Rg = 5.1 kΩ weighted CCIR/ARM
Crosstalk (ENC) (Pin 8 – Pin 9)		CT R→L L→R	52.0	60.0	—	dB	f = 1 kHz NR OFF

Electrical Characteristics (Ta = 25 °C, Vcc = 12 V, Unless otherwise specified.) (cont)

Control voltage for REC/PB	REC	2.5	—	Vcc	V	
	PB	0.0	—	0.5		
Control voltage for NR ON/OFF	ON	2.5	—	Vcc	V	
	OFF	0.0	—	0.5		
Channel balance	ΔGVIA	−1.0	0.0	1.0	dB	
Offset voltage V 8 (9) (NR-ON) − V 8(9) (NR-OFF)	ΔVorec	−50	0.0	50	mV	REC mode Vcc = 16.0 V

Test Circuit

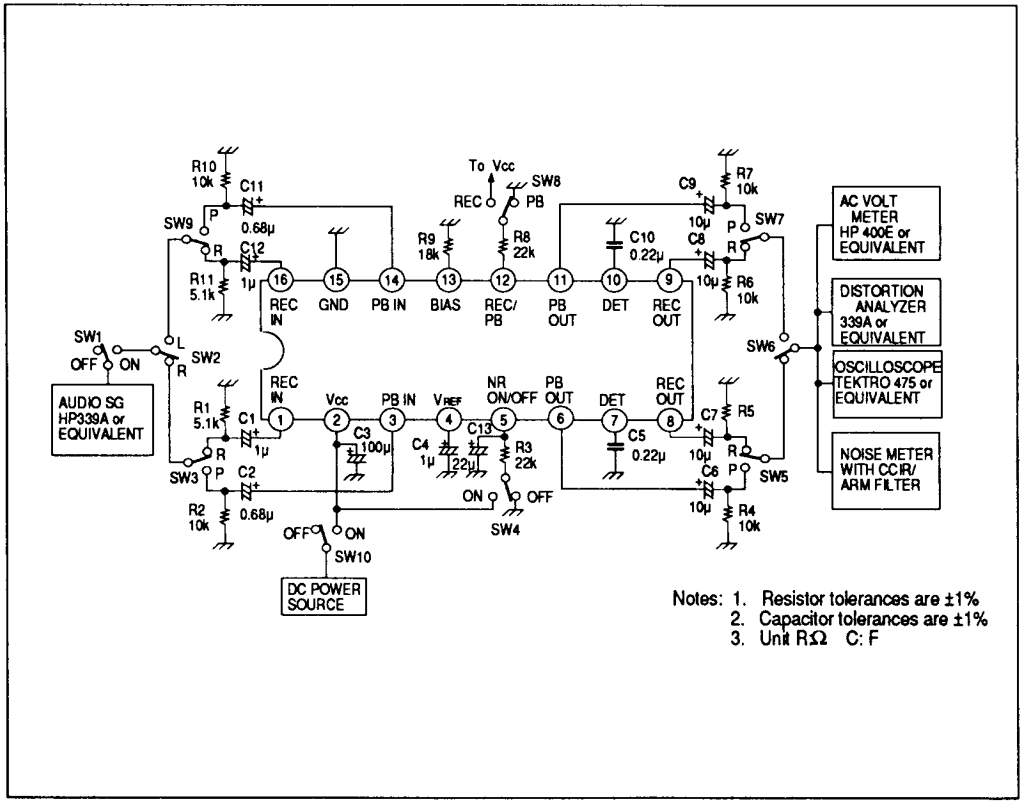
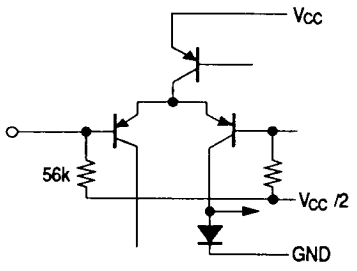
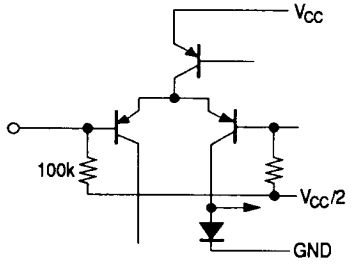
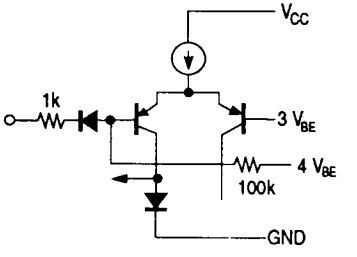
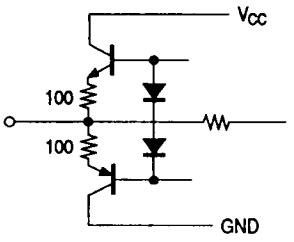
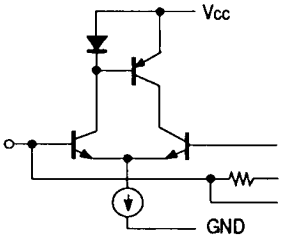
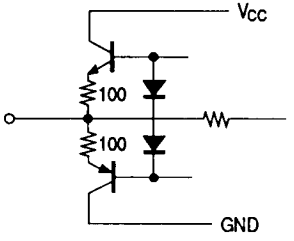


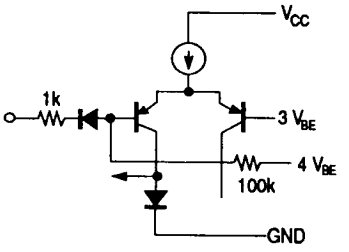
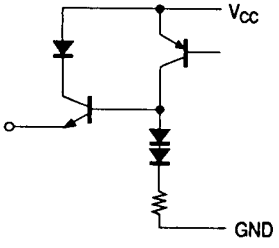
Table 3 Pin Description (Ta = 25 °C, Vcc = 12 V, No signal The value in the table show typical value.)

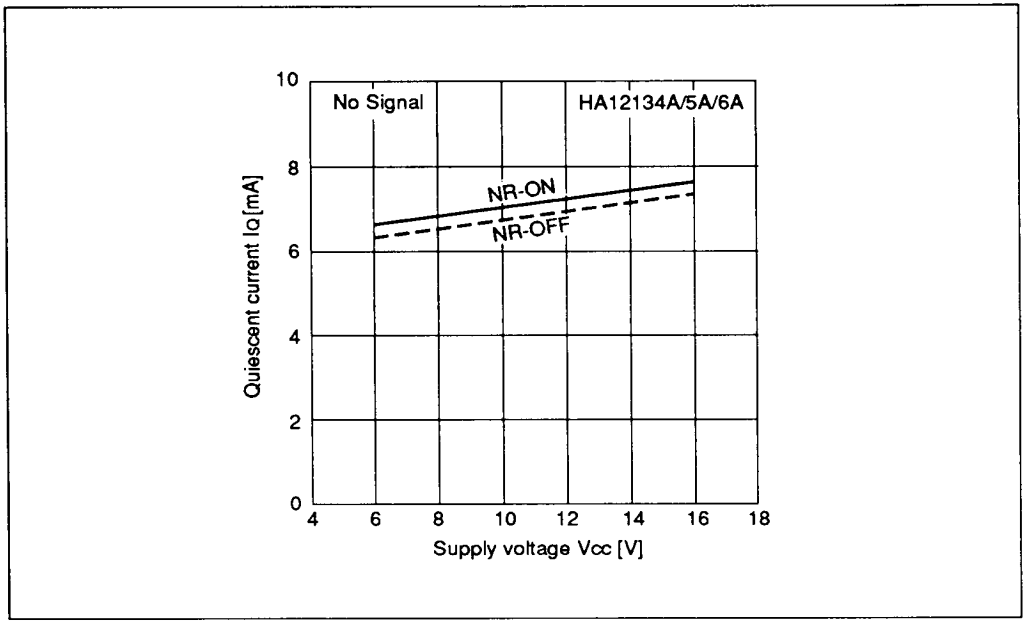
Pin No.	Symbol	R (In)	VDC	Equivalent Circuit	Description
1, 16	REC IN	56 kΩ	6.0 V		Recording (encode) input
2	Vcc	—	12.0 V		Power supply
3, 14	PB IN	100 kΩ	6.0 V		Playback (decode) input
4	VREF	—	6.0 V		Reference voltage
5	NR ON/OFF	—	—		Mode control pin for NR ON/OFF "H"→NR ON "L"→NR OFF

Pin Description (Ta = 25 °C, Vcc = 12 V, No signal The value in the table show typical value.) (cont)

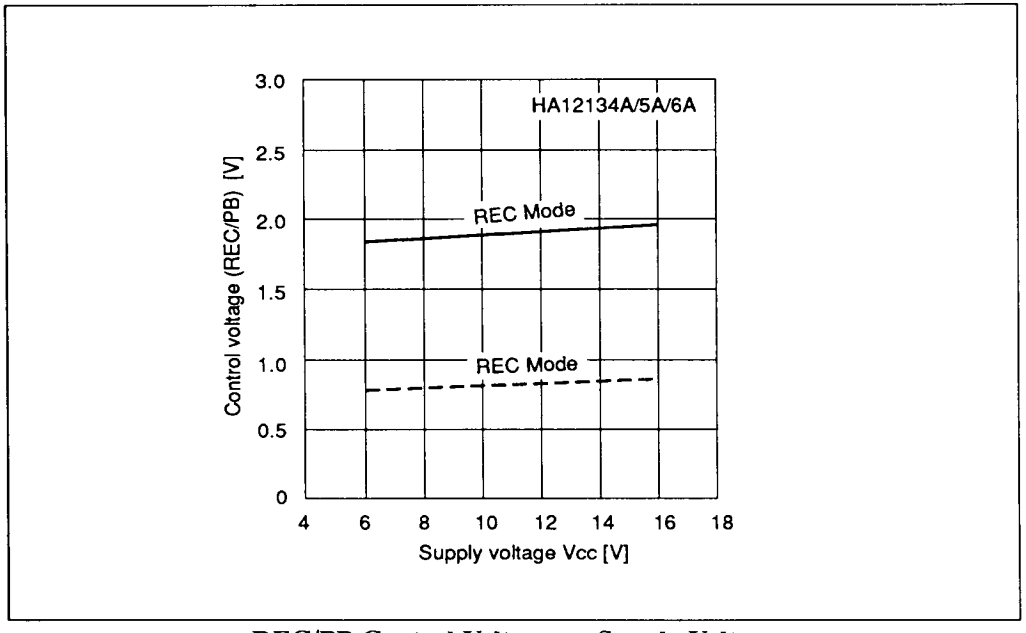
6, 11	PB OUT	—	6.0 V		Playback (decode) output
7, 10	DET	—	1.3 V		Time constant pin for the level detector
8, 9	REC OUT	—	6.0 V		Recording (encode) output

Pin Description (Ta = 25 °C, Vcc = 12 V, No signal The value in the table show typical value.) (cont)

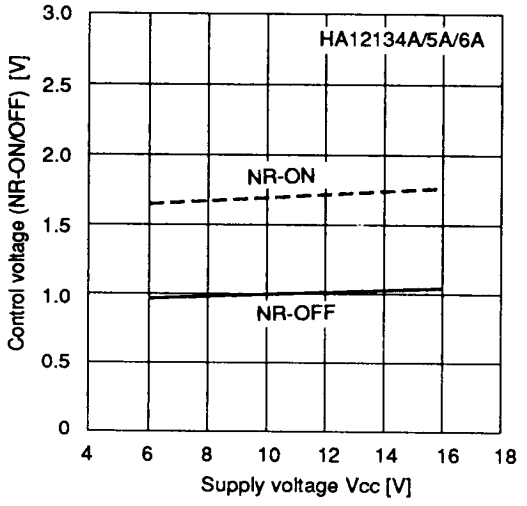
12	REC/PB	—	—		Mode control pin for REC/PB (encode/ decode) "H" → REC (encode) "L" → PB (decode)
13	BIAS	—	1.0 V		Reference current input pin for the active filters
15	GND	—	0 V	—	Ground



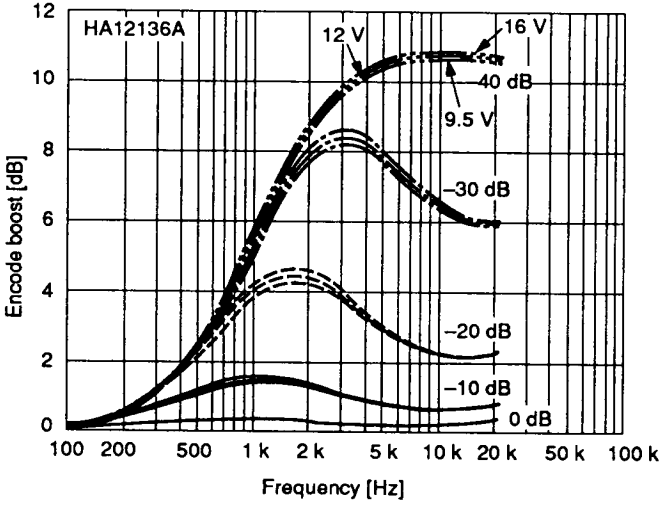
Quiescent Current vs. Supply Voltage



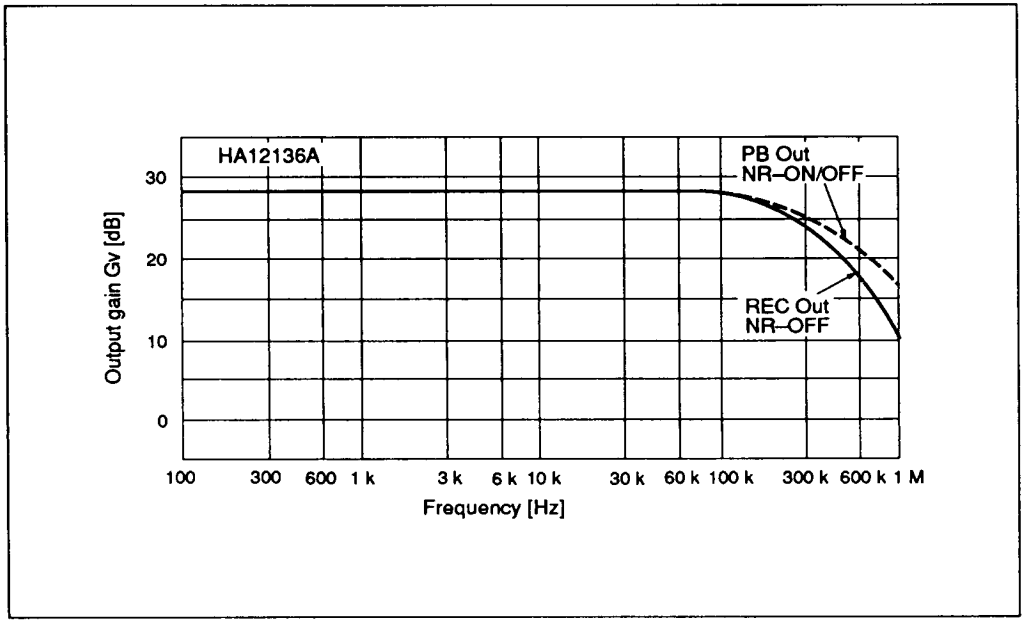
REC/PB Control Voltage vs. Supply Voltage



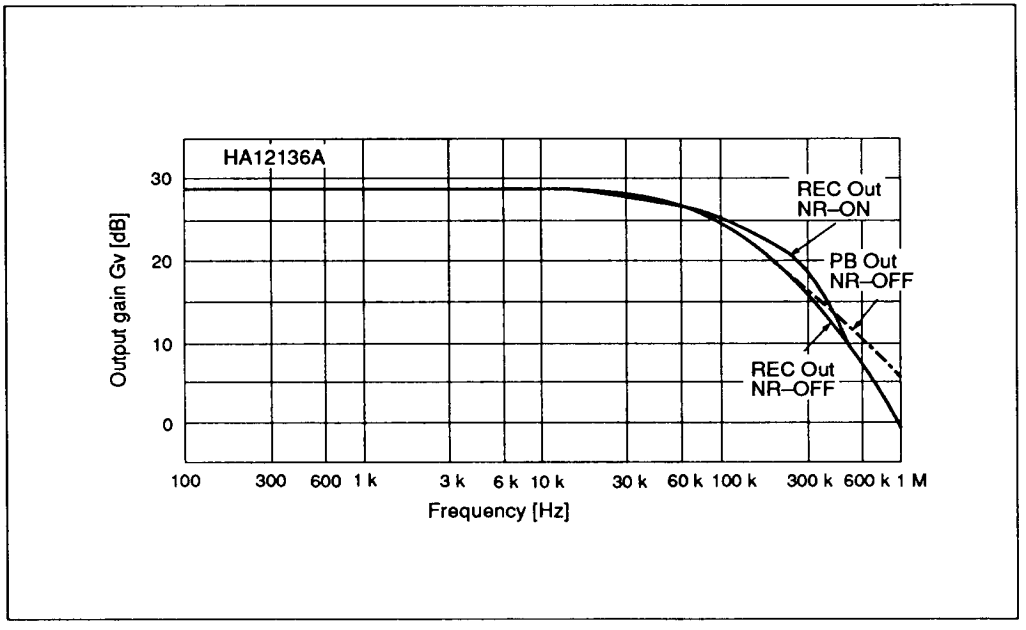
NR-ON/OFF Control Voltage vs. Supply Voltage



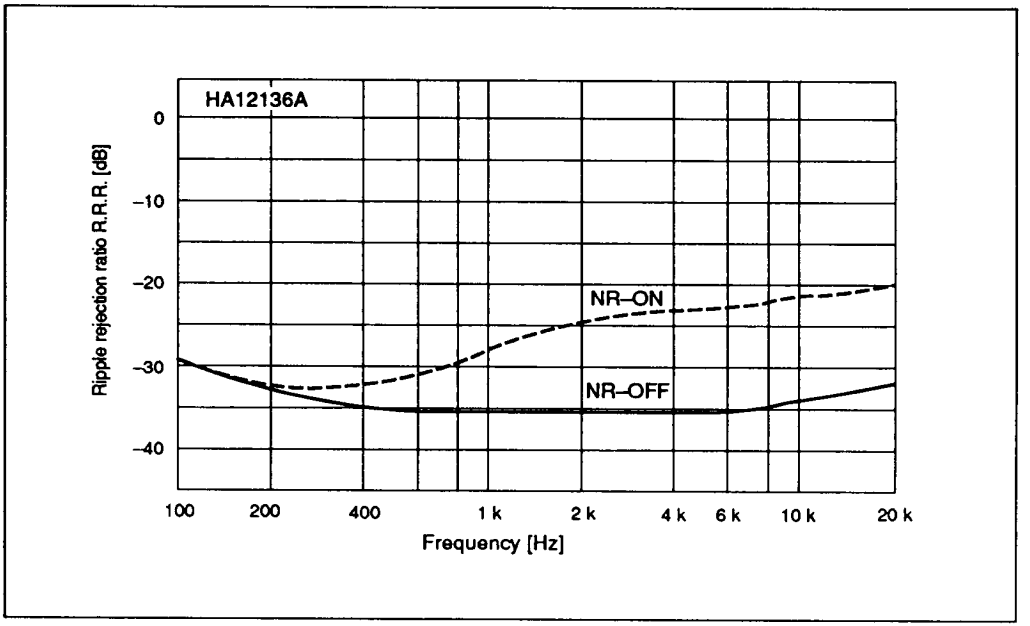
Encode Boost vs. Frequency



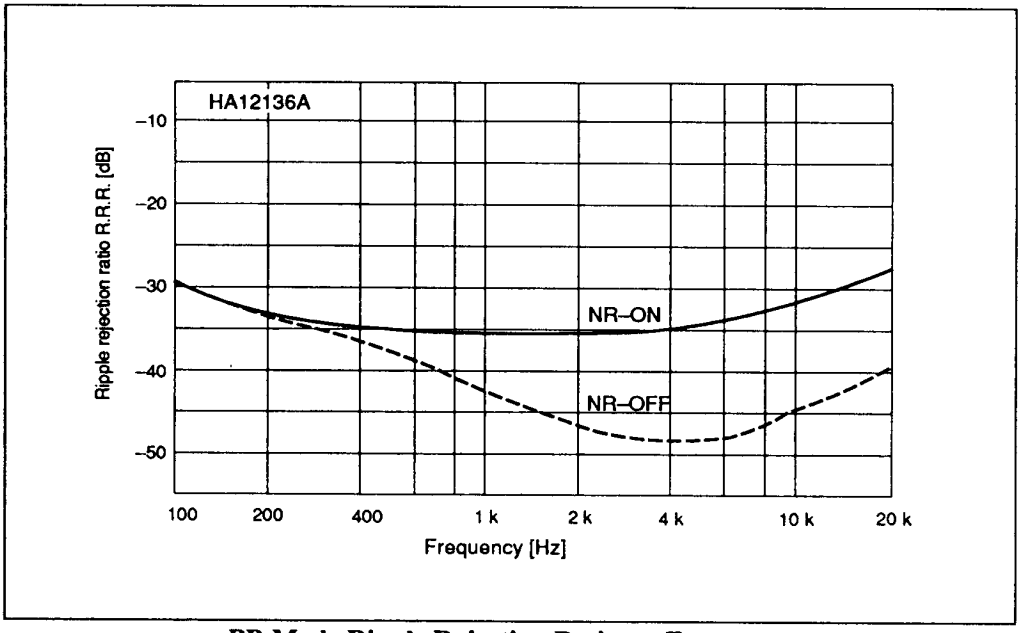
REC Mode Output Gain vs. Frequency



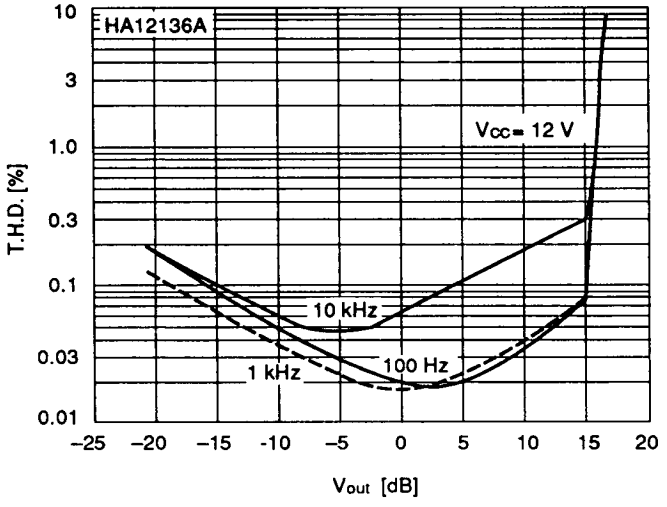
PB Mode Output Gain vs. Frequency



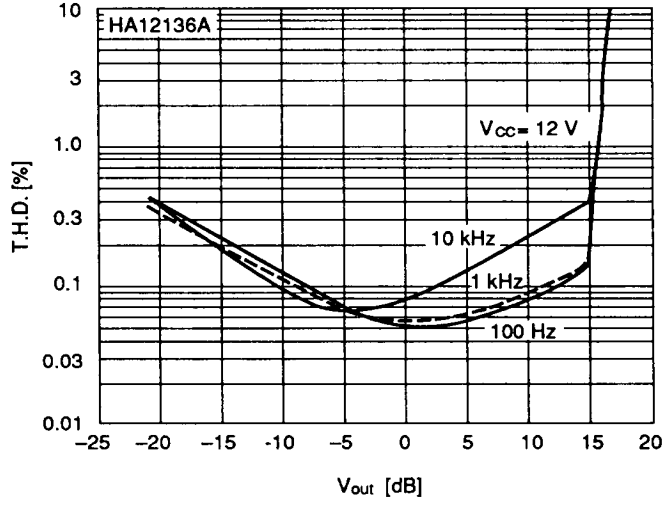
REC Mode Ripple Rejection Ratio vs. Frequency



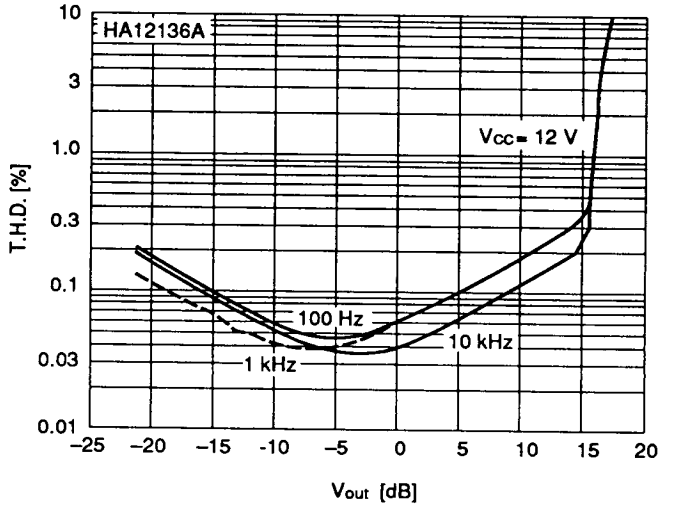
PB Mode Ripple Rejection Ratio vs. Frequency



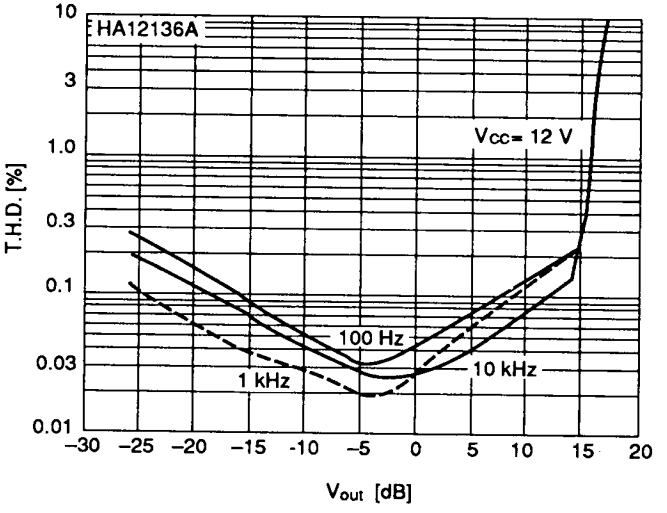
REC NR-OFF Total Harmonic Distortion vs. Output Level



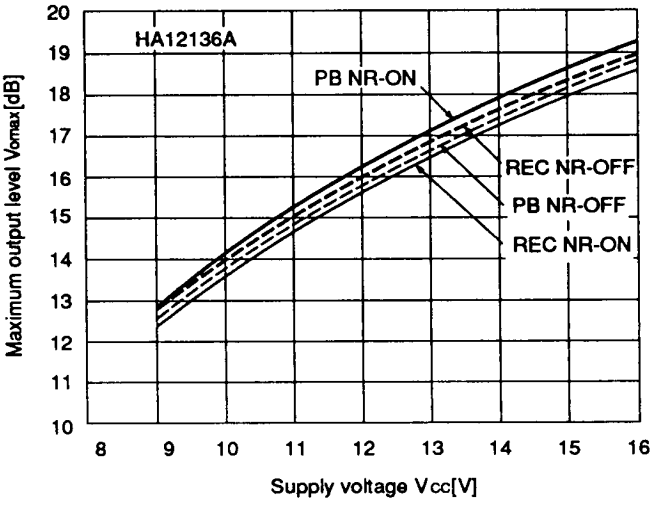
REC NR-ON Total Harmonic Distortion vs. Output Level



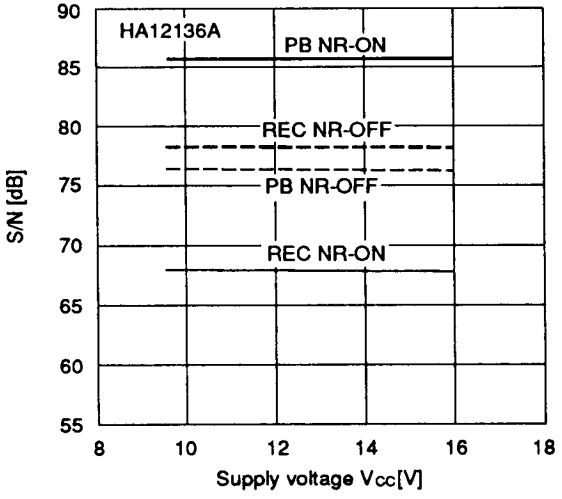
PB NR-OFF Total Harmonic Distortion vs. Output Level



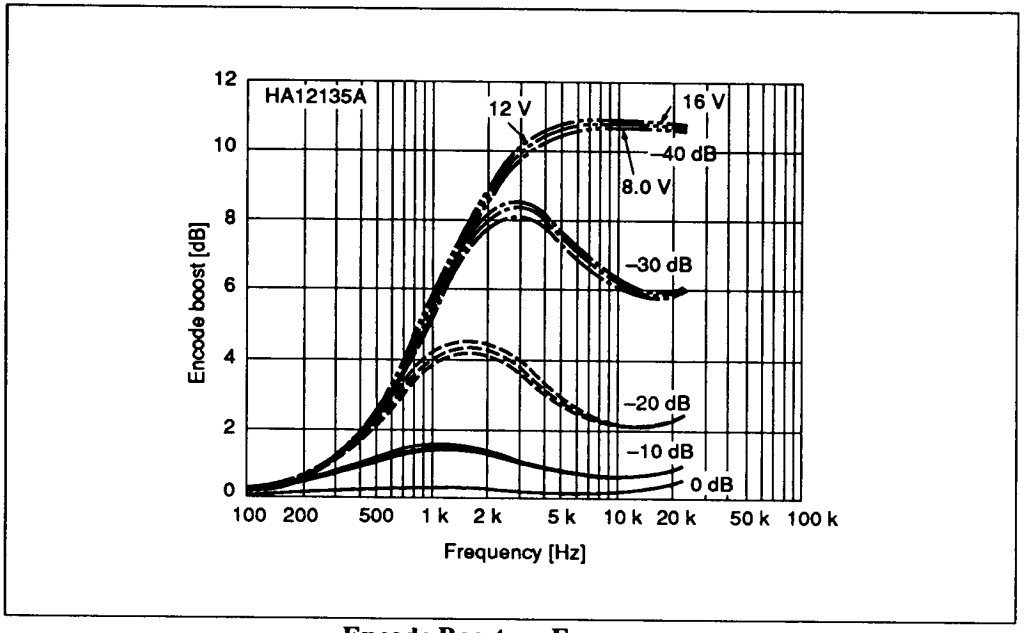
PB NR-ON Total Harmonic Distortion vs. Output Level



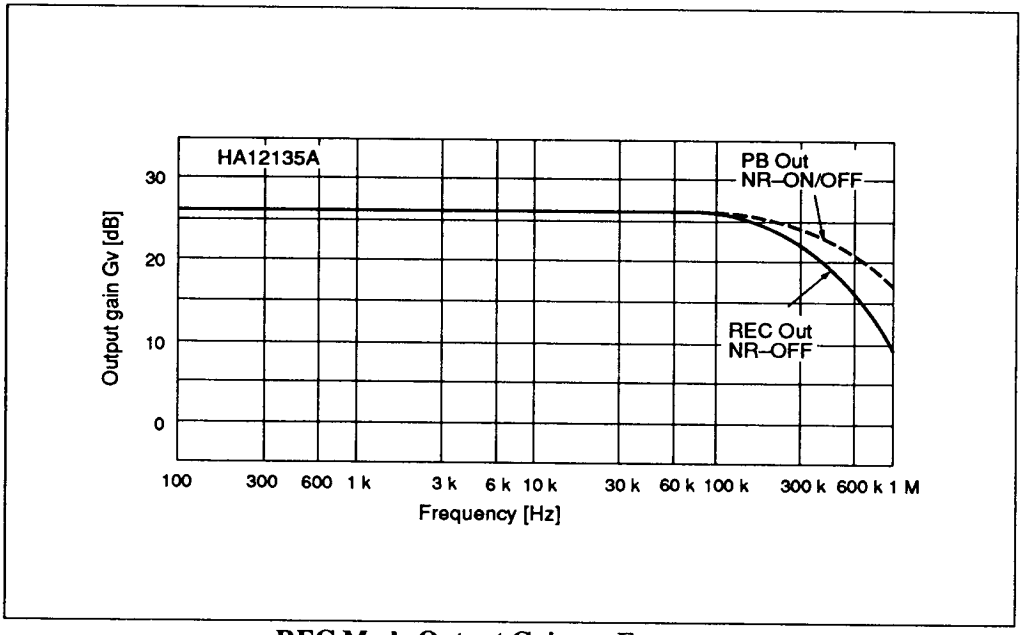
Maximum Output Level vs. Supply Voltage



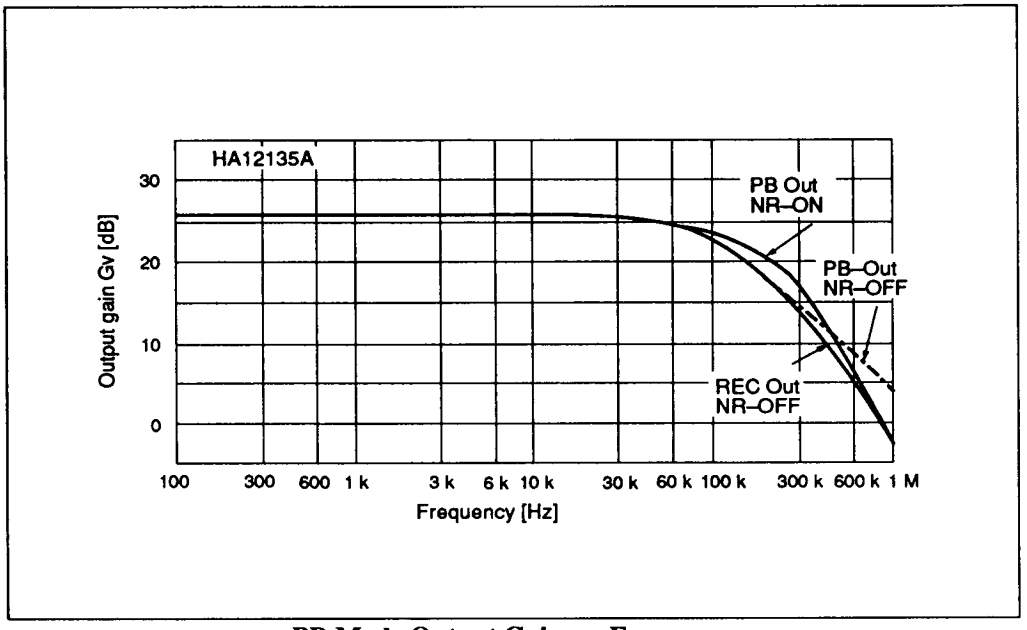
REC/PB Signal To Noise Ratio vs. Supply Voltage



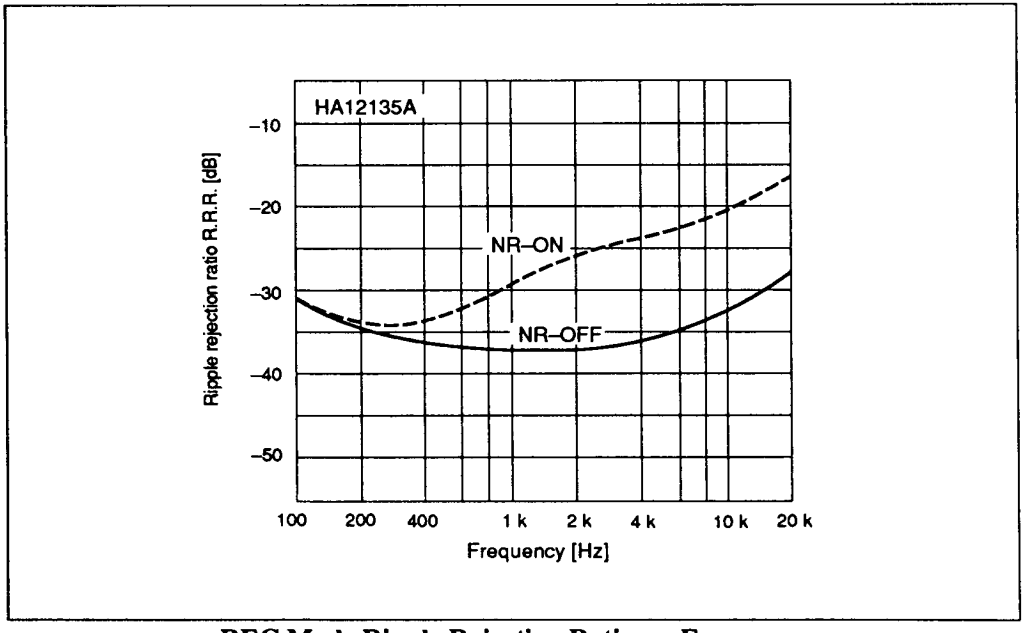
Encode Boost vs. Frequency



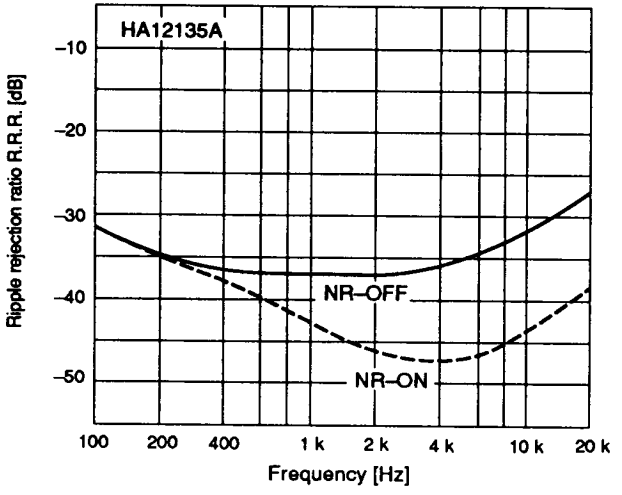
REC Mode Output Gain vs. Frequency



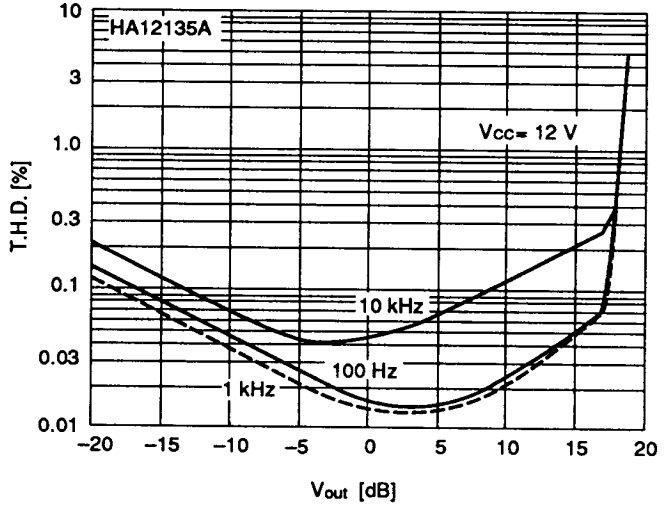
PB Mode Output Gain vs. Frequency



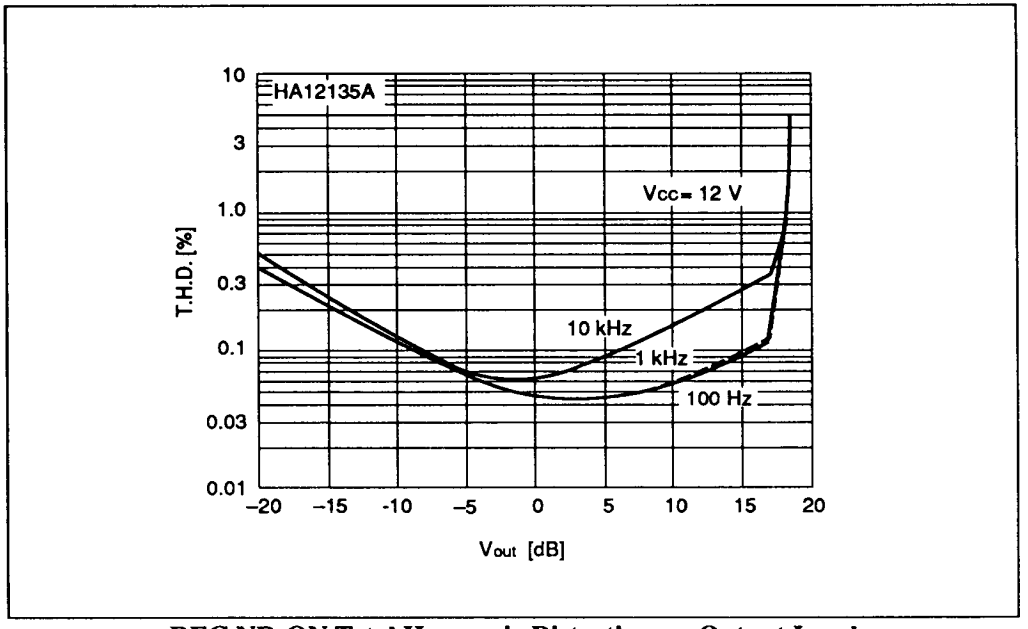
REC Mode Ripple Rejection Ratio vs. Frequency



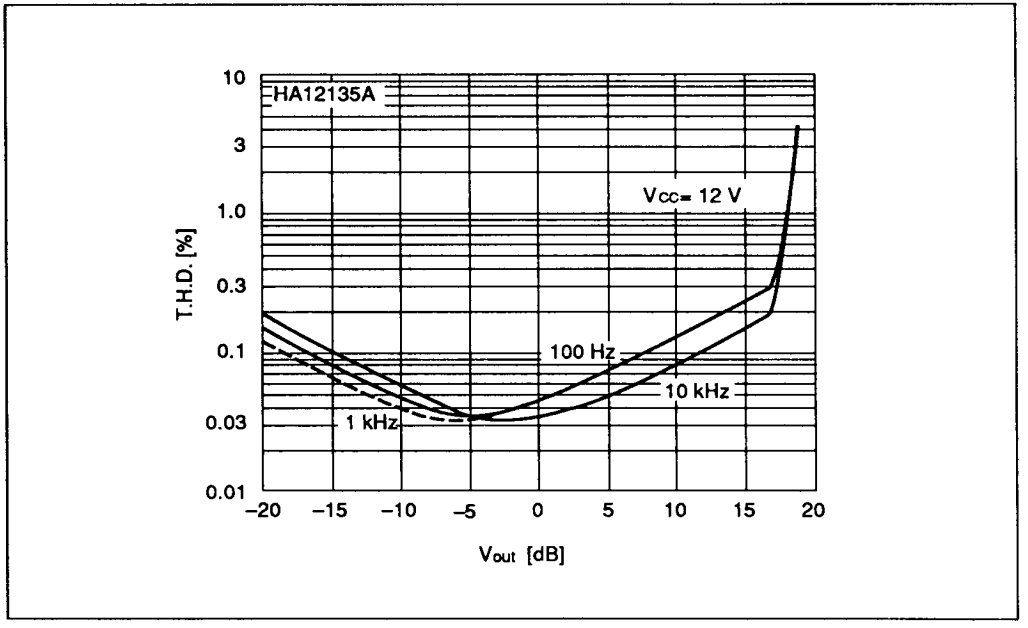
PB Mode Ripple Rejection Ratio vs. Frequency



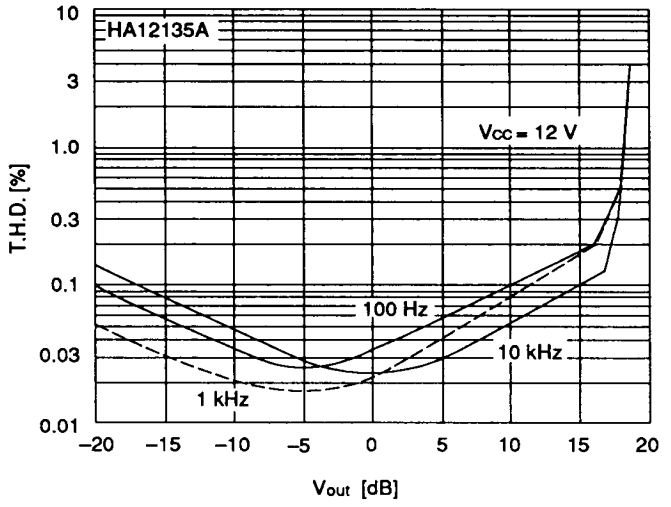
REC NR-OFF Total Harmonic Distortion vs. Output Level



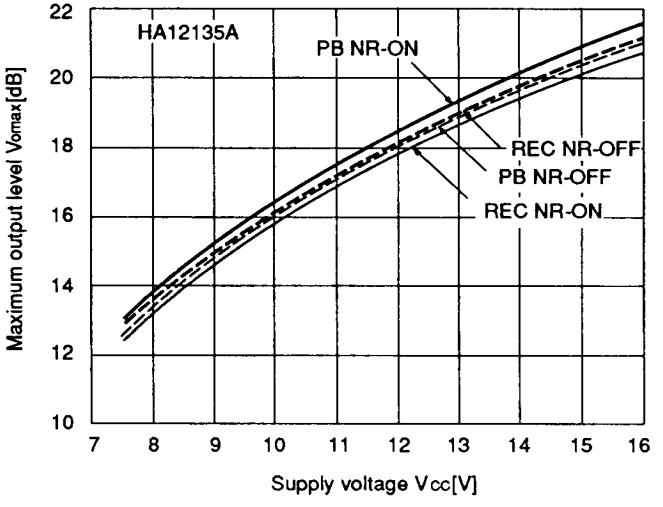
REC NR-ON Total Harmonic Distortion vs. Output Level



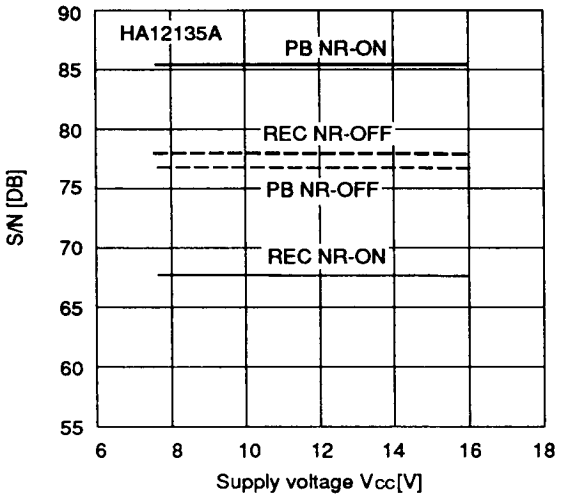
PB NR-OFF Total Harmonic Distortion vs. Output Level



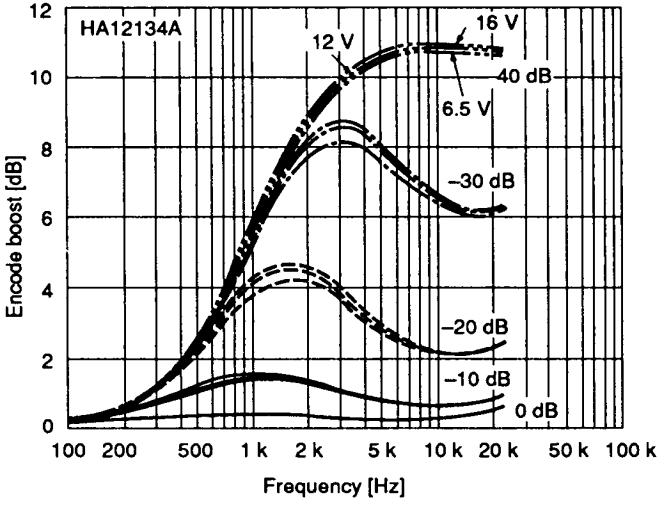
PB NR-ON Total Harmonic Distortion vs. Output Level



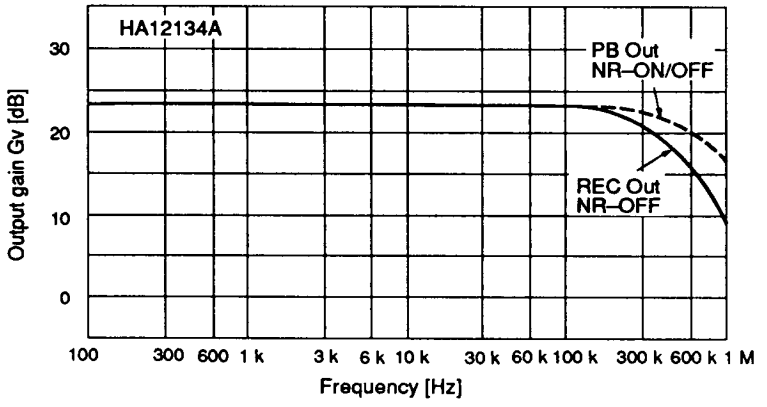
Maximum Output Level vs. Supply Voltage



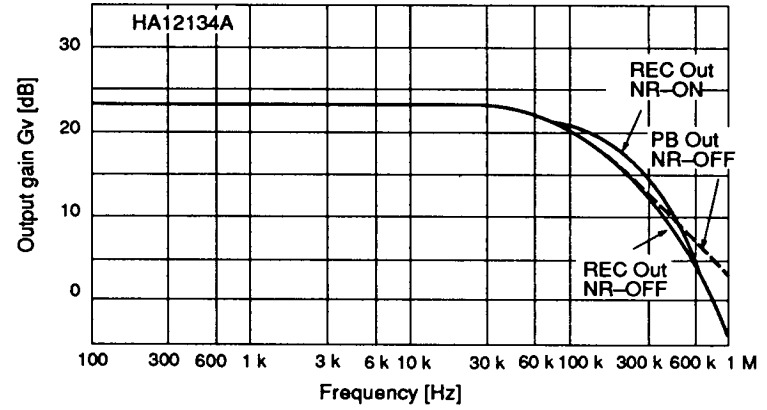
REC/PB Signal to Noise Ratio vs. Supply Voltage



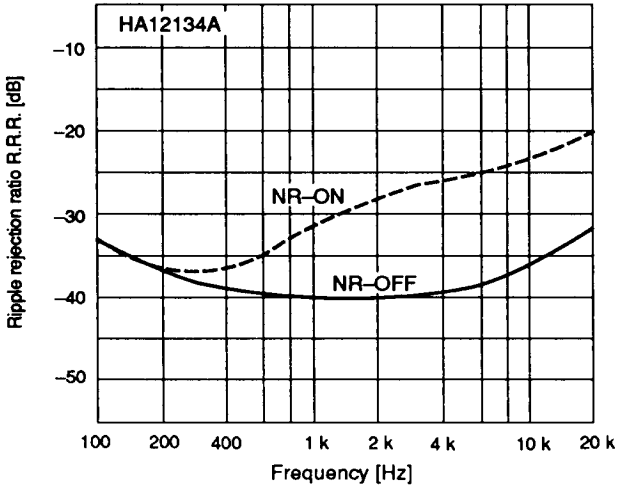
Encode Boost vs. Frequency



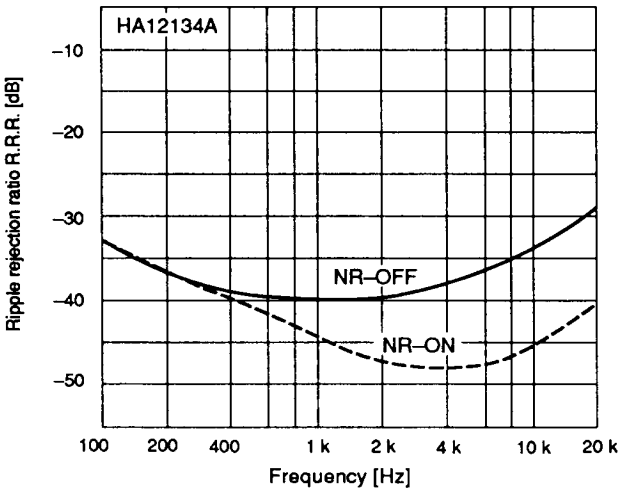
REC Mode Output Gain vs. Frequency



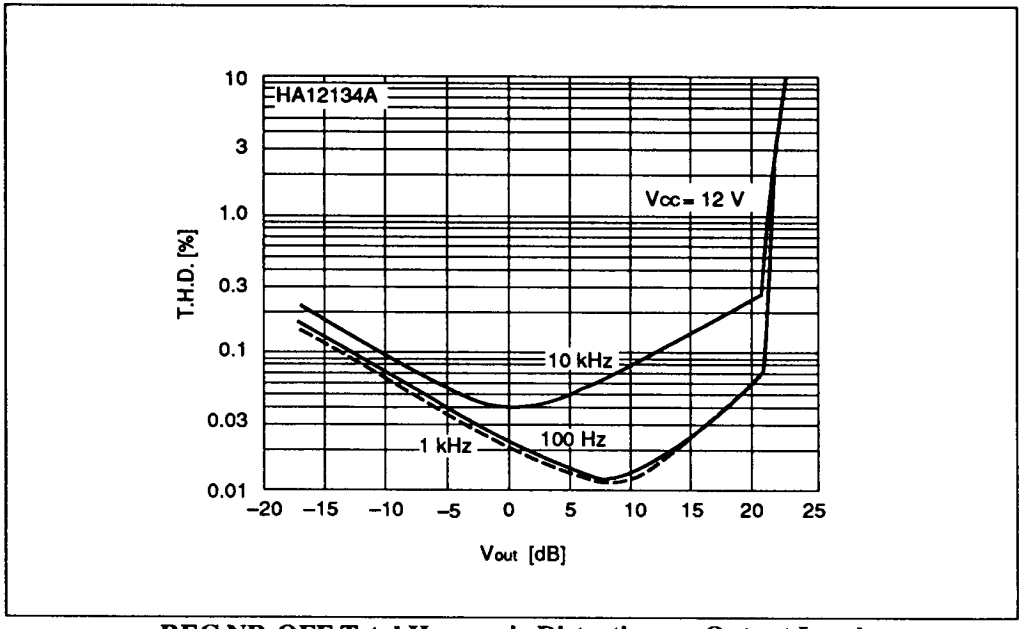
PB Mode Output Gain vs. Frequency



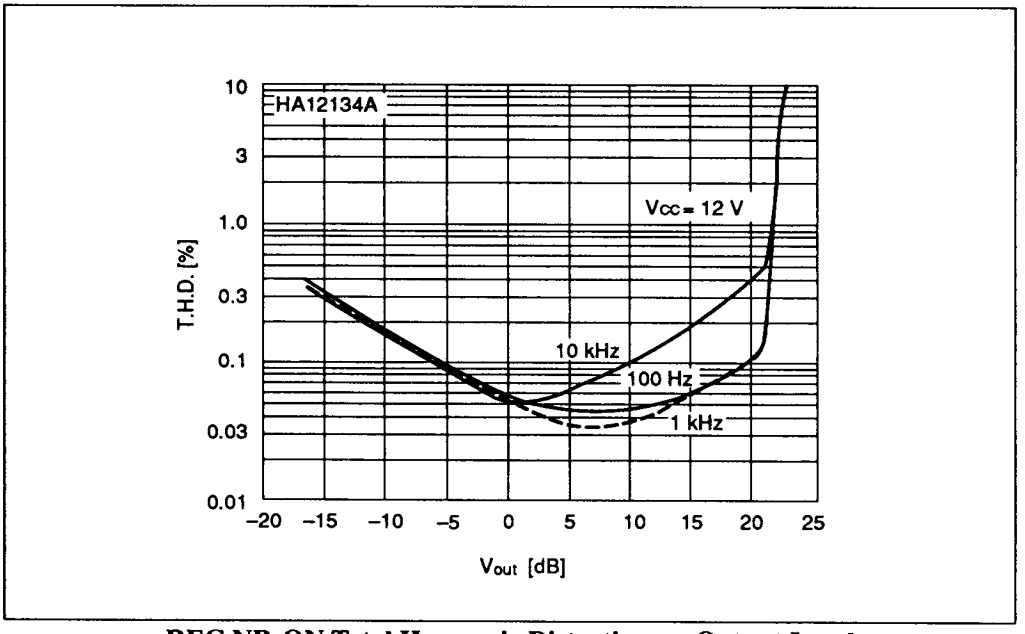
REC Mode Ripple Rejection Ratio vs. Frequency



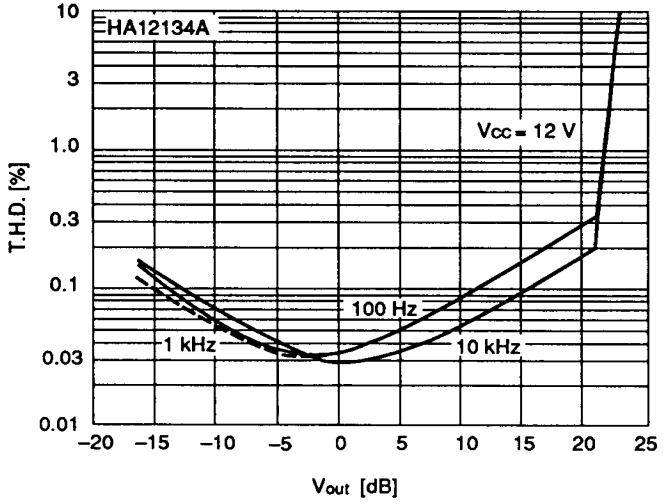
PB Mode Ripple Rejection Ratio vs. Frequency



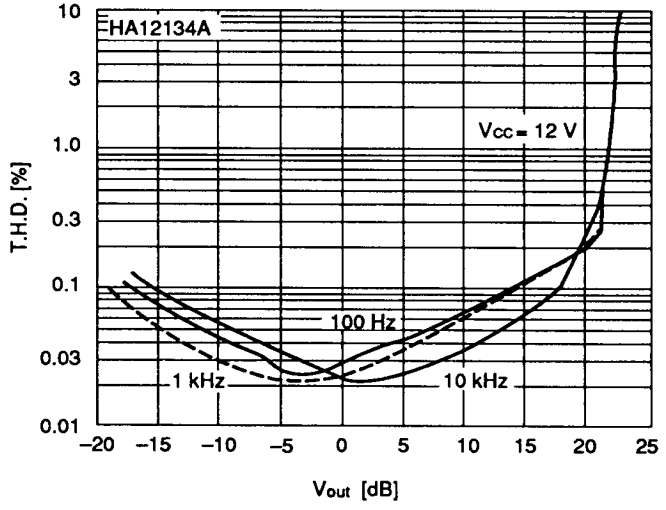
REC NR-OFF Total Harmonic Distortion vs. Output Level



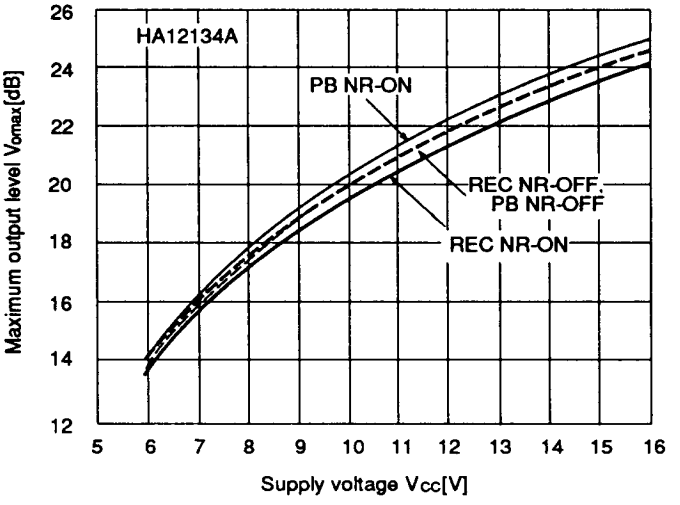
REC NR-ON Total Harmonic Distortion vs. Output Level



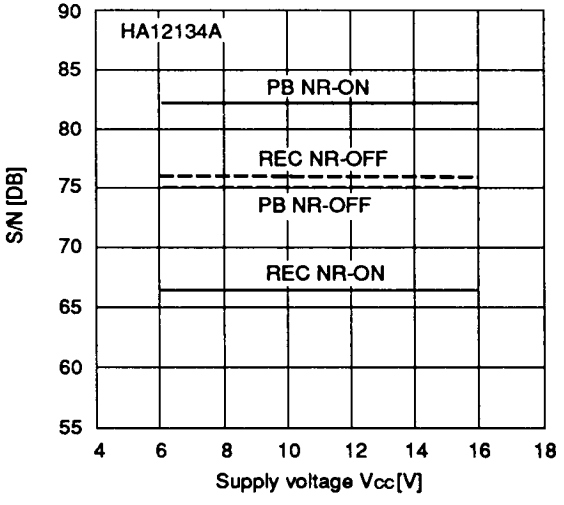
PB NR-OFF Total Harmonic Distortion vs. Output Level



PB NR-ON Total Harmonic Distortion vs. Output Level



Maximum Output Level vs. Supply Voltage



REC/PB Signal To Noise Ratio vs. Supply Voltage