June 1992
Edition 1.1A

FUJITSU

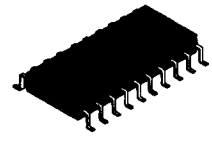
DATA SHEET

MB3115

Dual Equalizer Amplifier with Automatic Melody-Pause-Search Function

The Fujitsu MB3115 is a dual equalizer amplifier with an automatic melody-pause-search function. It provides forward-to-reverse head changeovers and equalizer characteristics changeovers to match any recorded magnetic medium. The MB3115 has a pause detection function and an open collector output for an automatic melody-pause-search tape select function. It is suitable for use in tape players with an equalizer amplifier feature.

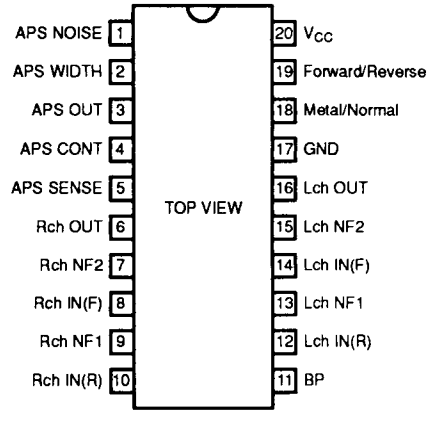
The MB3115 is packaged in 20 pin plastic flat package; for high density mounting.



Plastic SOP
(FPT-20P-M01))

- Equalizer section
  - Equalizer voltage gain (OPEN) :100 dB typ.
  - Low distortion :0.05% typ.
  - Low noise :0.8 μVrms typ.
  - Maximum output voltage :2.0 Vrms typ.
- Automatic melody-pause-search tape select section
  - Input sensitivity :0.2 mVrms typ.
  - On-chip stereo mix amplifier
  - On-chip power-on reset function
  - On-chip misoperation protection filter amplifier by pause noise
- Package and ordering information:
  - 20-pin plastic SOP, order as MB3115PF

Pin Assignment



ABSOLUTE MAXIMUM RATINGS

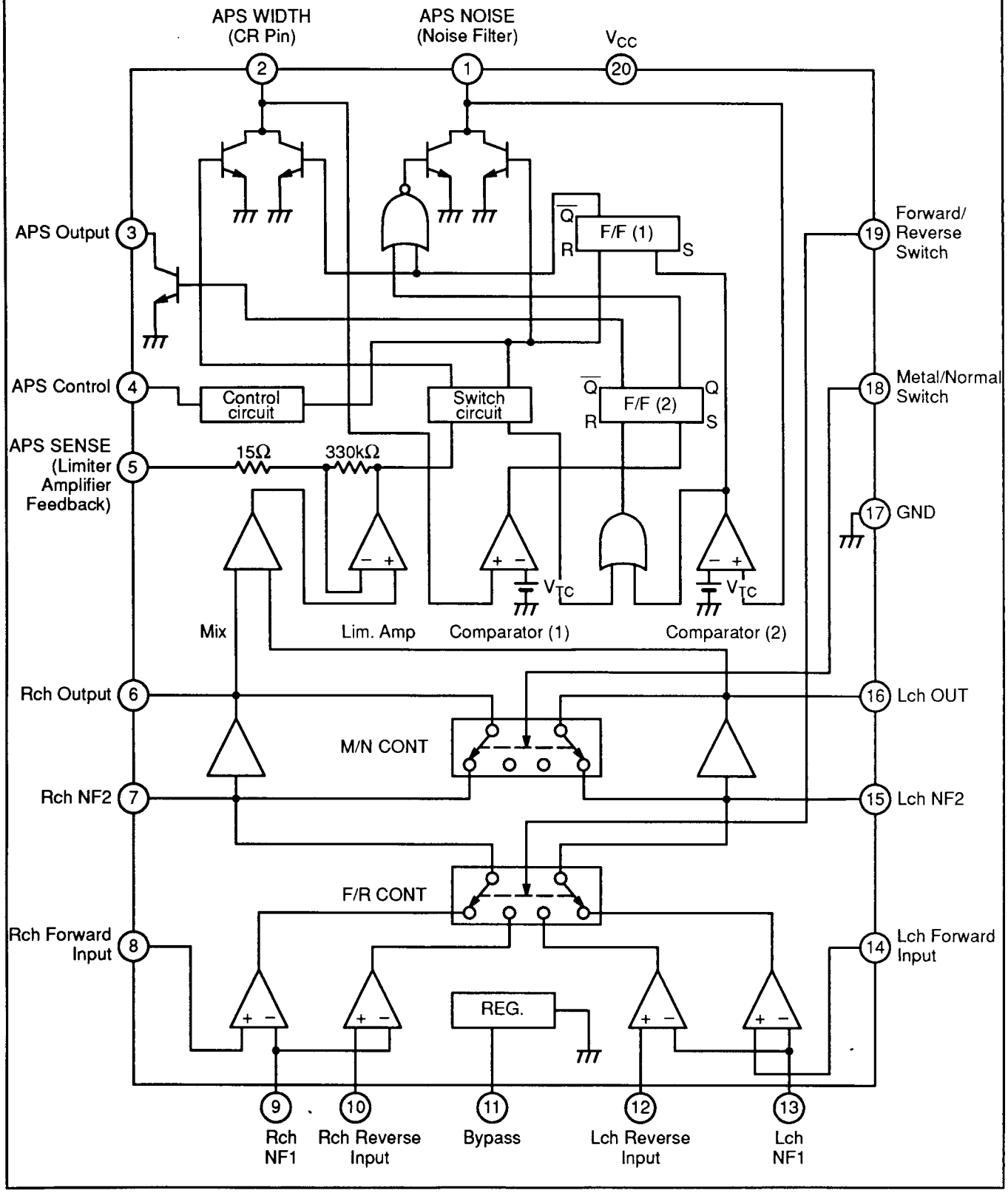
Ratings	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	18	V
Power Dissipation	P_D	625 ($T_A \leq 75°C$)	mW
Operating Temperature	T_A	−20 to 75	°C
Storage Temperature	T_{STG}	−55 to +125	°C

— Note —

Permanent device damage may occur if absolute maximum ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

Figure 1. MB3115 Block Diagram



RECOMMENDED OPERATING CONDITIONS

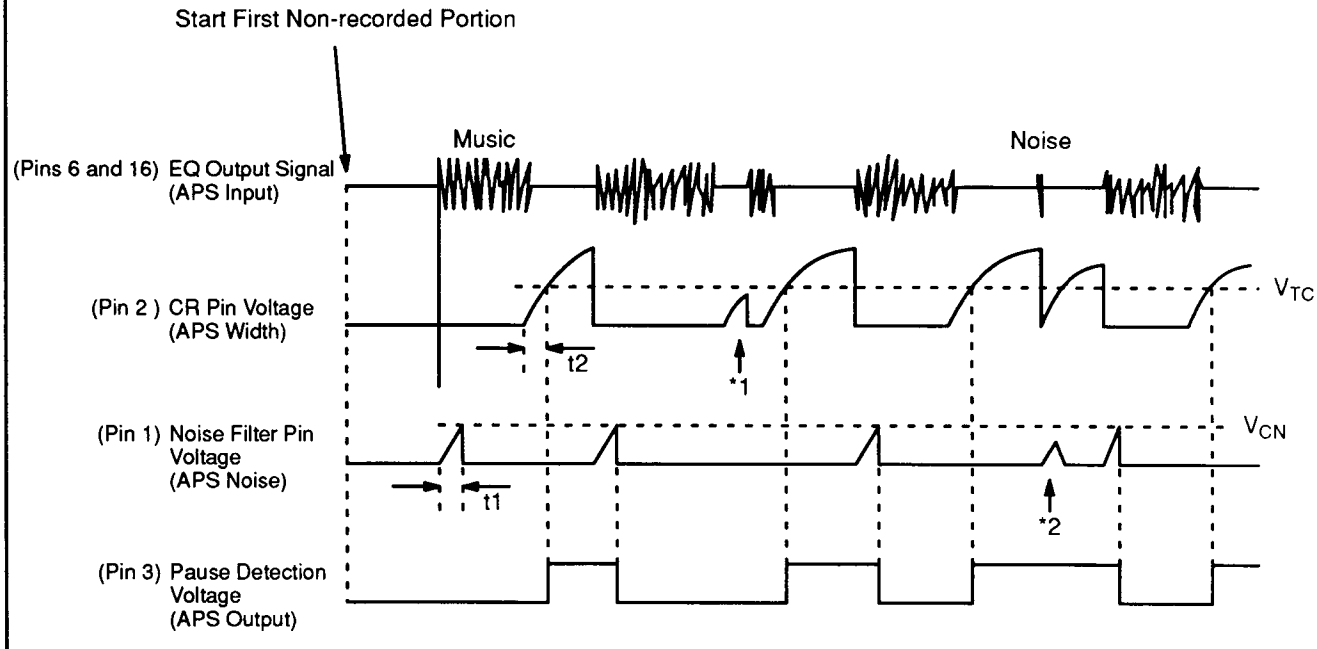
Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	6 to 16	V

ELECTRICAL CHARACTERISTICS

(V_{CC}=8.5 V, Rg=620 Ω, f=1kHz, R_L=10k Ω, T_A=25°C)

Parameter	Symbol	Condition	Value			Unit
			Min	Typ	Max	
Equalizer Section						
Power Supply Current	I_{CCN}	No signal, normal mode	7.7	10.6	14.8	mA
Power Supply Current	I_{CCM}	No signal, metal mode	7.8	11.0	15.2	mA
Open-loop Voltage Gain	A_{VO}		85	100		dB
Total Harmonic Distortion	THD	V_O=0.3Vrms, A_V=40dB		0.05	0.2	%
Maximum Output Voltage	V_{OH}	THD=1.0%	1.4	2.0		Vrms
Equivalent Noise Input Voltage	V_{NO}	NAB, BW=20 to 20kHz		0.8	1.5	μVrms
Channel Balance	CB			0		dB
Channel Separation	CS			60		dB
Forward/Reverse Cross Talk	CT			60		dB
Automatic Melody-Pause-Search Section						
Limiter Amplifier Voltage Gain	A_{VL}	R_F=36Ω		76		dB
Minimum Signal Input Voltage	V_{SM}	R_F=36Ω		0.2		mVrms
CR Pin Input Current	I_{TC}	V_2 (APS WIDTH terminal) =1V, No signal input after F/F (1) is set		0.01		μA
Time Setting Voltage	V_{TC}	APS WIDTH terminal		4.2		V
Control Input Current	I_{CI}	APS CONT terminal=GND		−7		μA
Control Input Voltage	V_{CI}	APS CONT terminal=GND		1.3		V
Noise Filter Current	I_{CN}			60		μA
Noise Filter Detection Voltage	V_{CN}			1.4		V
Output Saturation Voltage	V_{OL}	I_O=5mA			0.4	V
Output Brake Down Voltage	BV_O	I_F=1μA	18			V
Control Input Voltage	V_{IH}	$\overline{M/N}$ terminal	2.0			V
	V_{IL}	$\overline{M/N}$ terminal			0.2	V
	V_{IH}	$\overline{F/R}$ terminal	2.0			V
	V_{IL}	$\overline{F/R}$ terminal			0.5	V
Control Input Current	I_{IH}	$\overline{M/N}$ terminal V_I=GND		−3.5		μA
	I_{IL}	$\overline{F/R}$ terminal V_I=GND		−0.7		μA

Figure 2. Automatic Program Selector (Aps) Timing Chart



Note: *1 Automatic program selector function does not work because the non-recorded period is short.
*2 The noise filter output voltage is charged up by the noise, but it does not reach the V_{CN} level, so the pause detection voltage does not change to low level.

The pause detection time and the noise filter operation time are defined by CR time constant as shown in the following examples: *a* and *b*.

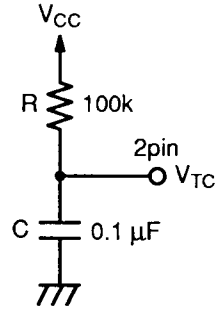
a) Pause detection time (t_2)

Threshold voltage of internal comparator is set 1/2 x V_{CC}, charge time is defined:

$$V = V_{CC}\left\{1 - \frac{1}{\left(e^{\frac{t2}{CR}}\right)}\right\}$$

$$V = \frac{1}{2} V_{CC}$$

$$t2 = CR \ln 2 \text{ (second)}$$
$$\simeq 0.69 \times CR$$



b) Noise filter operation time (t_1)

Charge current $I_C \simeq 30\ \mu A$

Noise filter detection voltage (V_{CN}) $\simeq 1.4$ V

When external capacitance is C, noise filter response time is defined:

$$C \times V_{CN} = I_C \times t_1$$
$$t_1 \simeq 0.047 \times C \text{ (second)}$$

Figure 3. Typical Connection Circuit

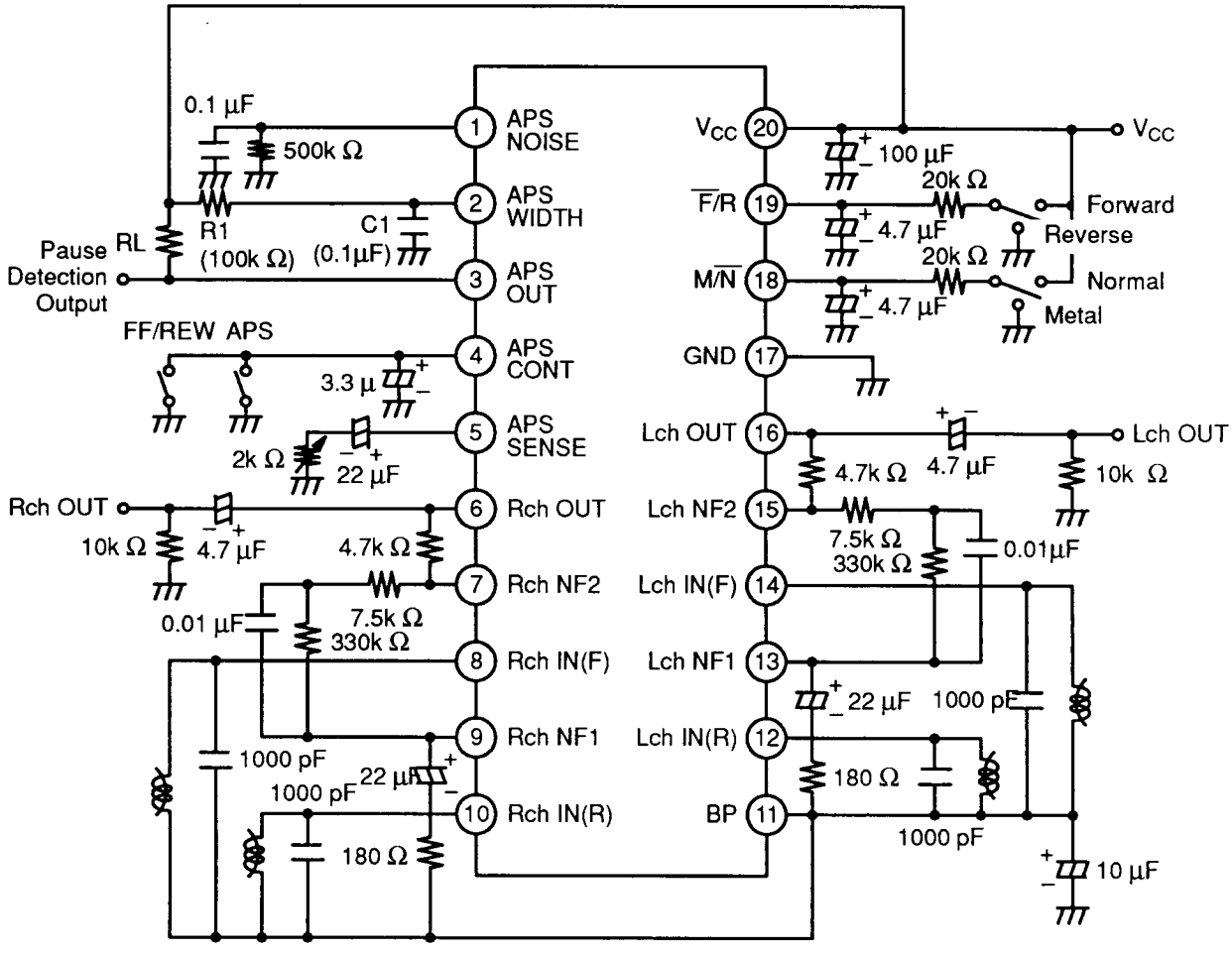


Figure 4. Voltage Gain vs. Frequency

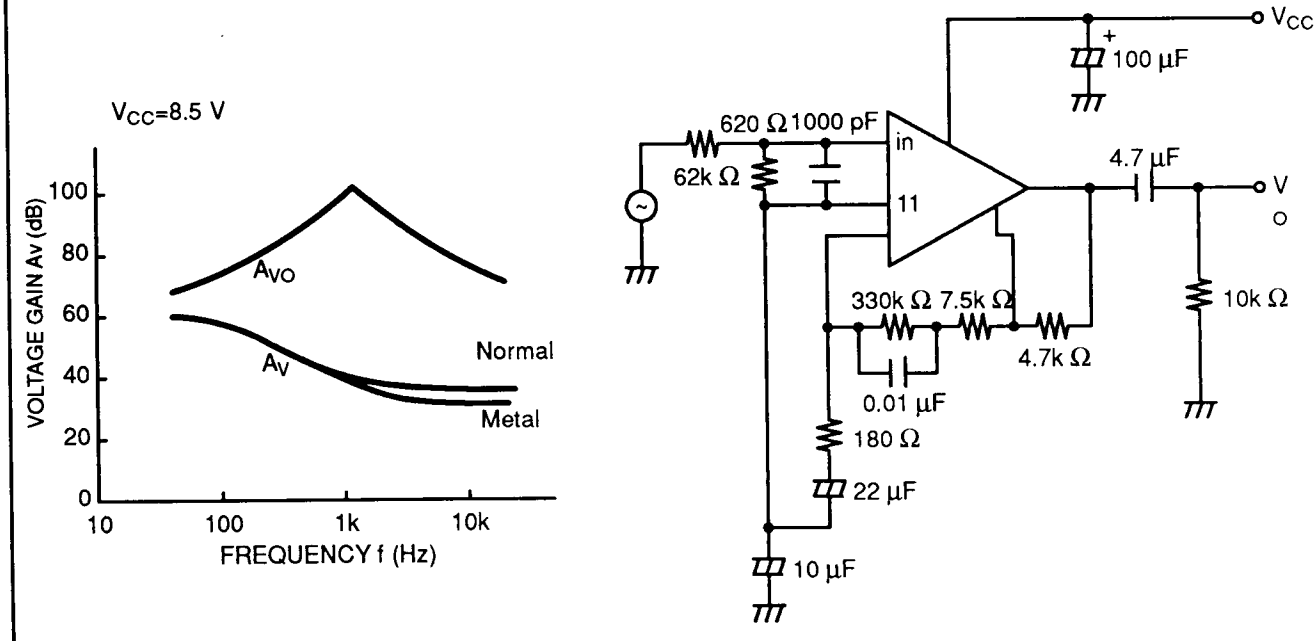


Figure 5. MB3115 Total Harmonic Distortion vs. Output Voltage L-channel (Normal)

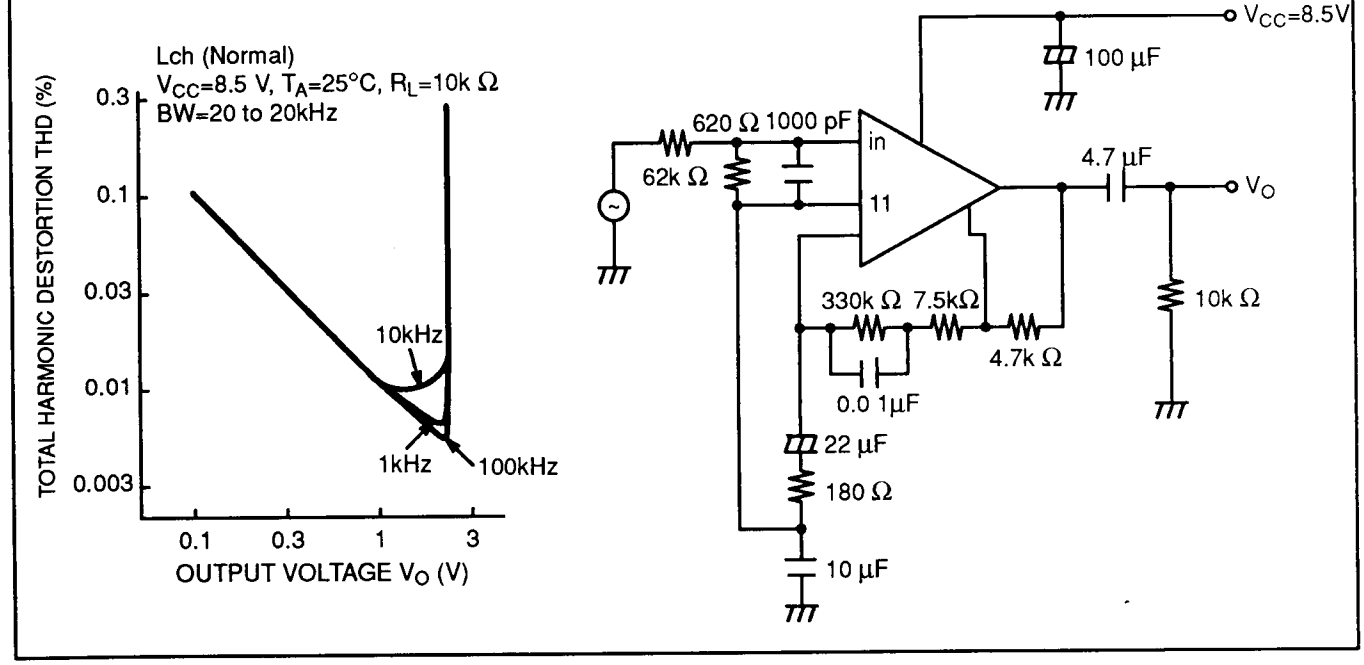


Figure 6. MB3115 Total Harmonic Distortion vs. Output Voltage L-channel (Metal)

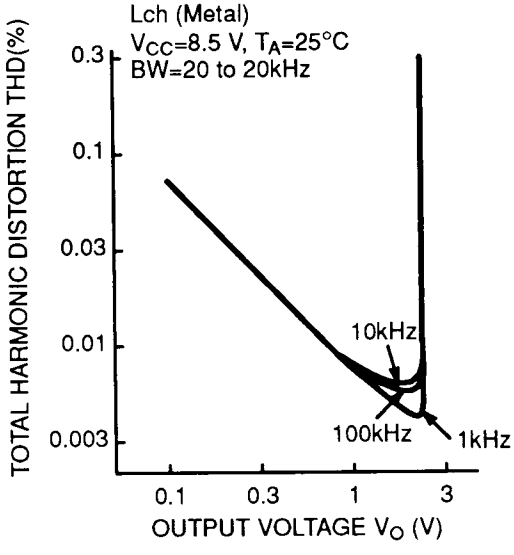
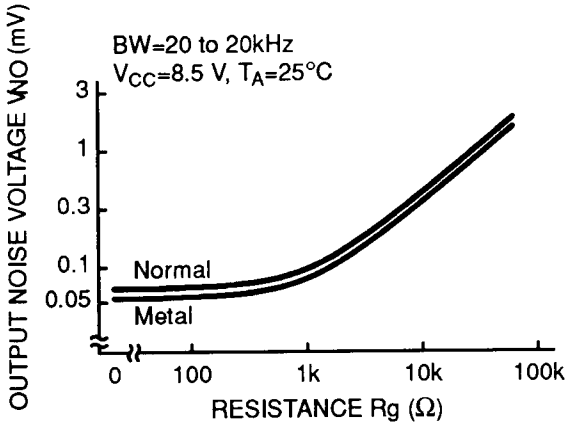


Figure 7. Output Noise Voltage vs. Resistance



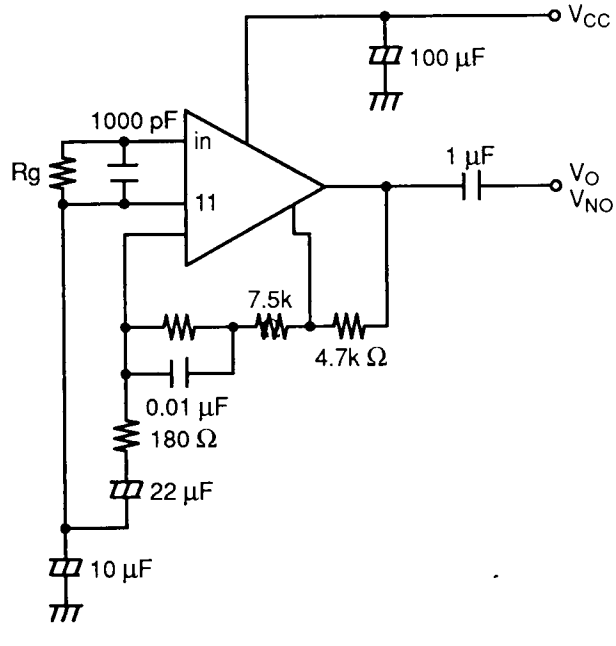


Figure 8. MB3115 Crosstalk (Metal)

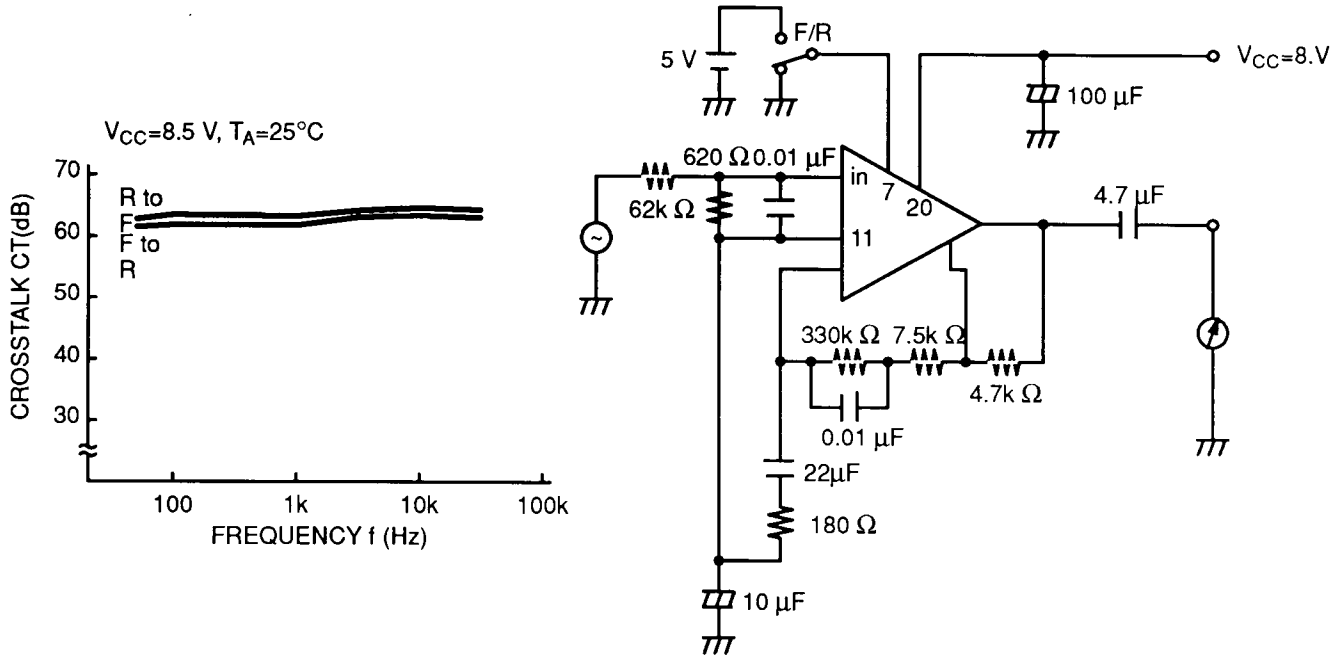
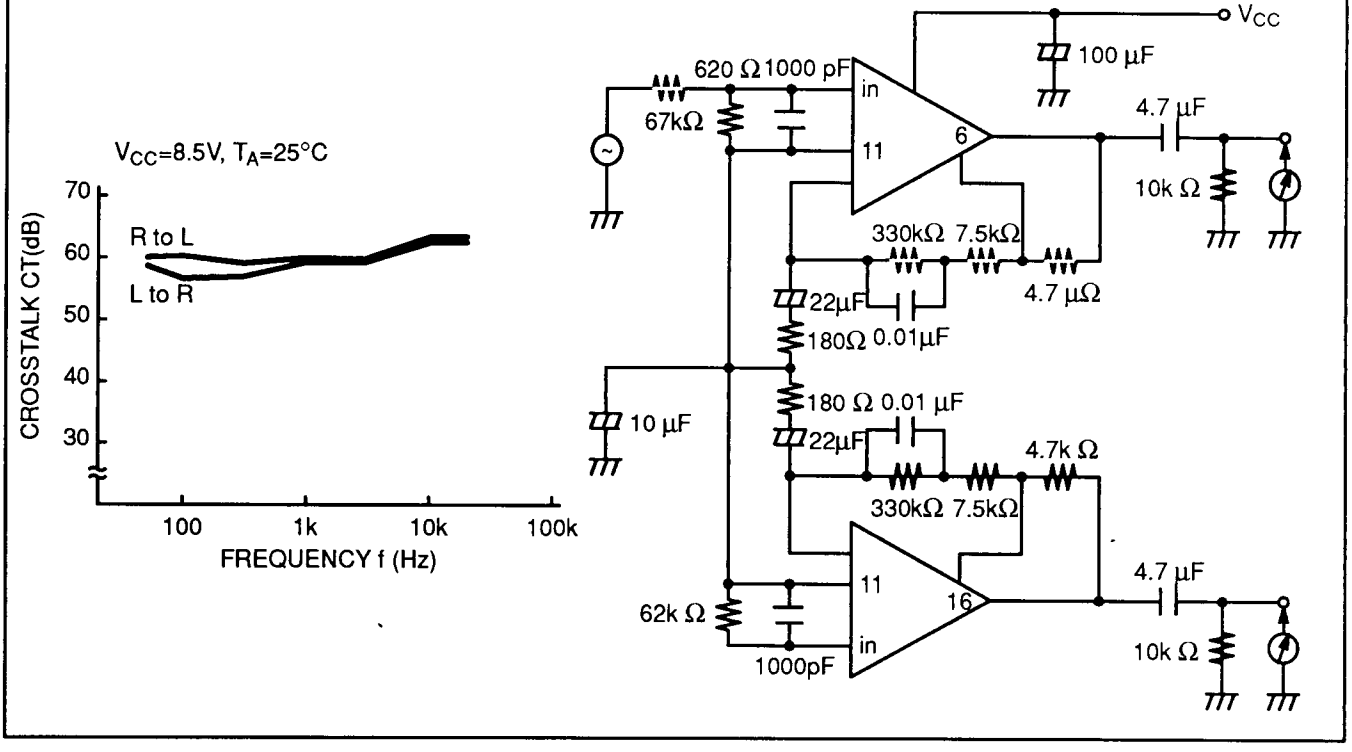
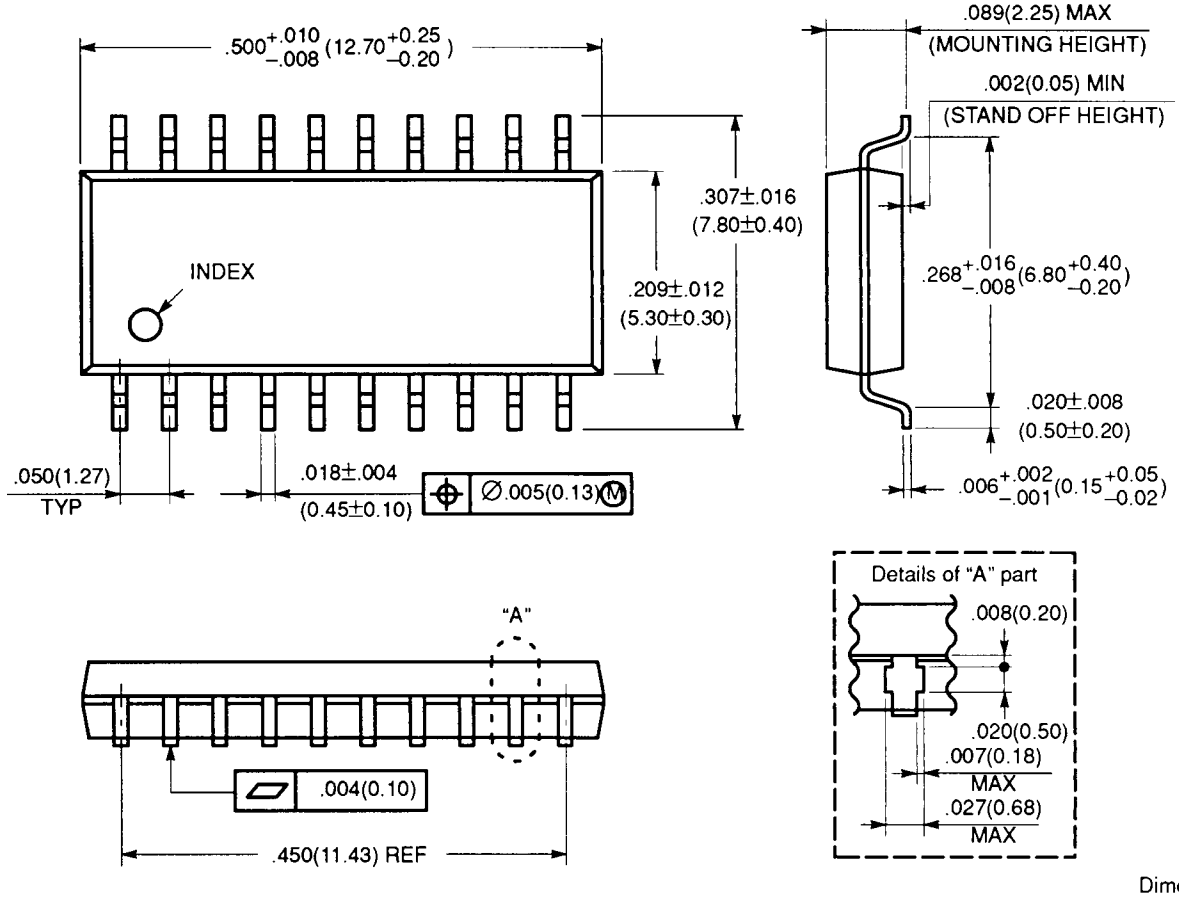


Figure 9. MB3115 Crosstalk (Metal)



PACKAGE DIMENSIONS

20-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-20P-M01)



Dimensions in
inches (millimeters)