



## LA3335M

### PLL FM Multiplex Demodulator for 3 V Headphone Stereos and Radio-cassette Recorders

## Overview

The LA3335M is PLL FM stereo multiplex demodulator IC designed for use in headphone stereos, etc. which operate from a low supply voltage.

## Applications

- FM Multiplex IC for 3 V headphones, radio-cassette recorders

## Functions

- PLL FM stereo decoder, VCO stop, stereo indicator

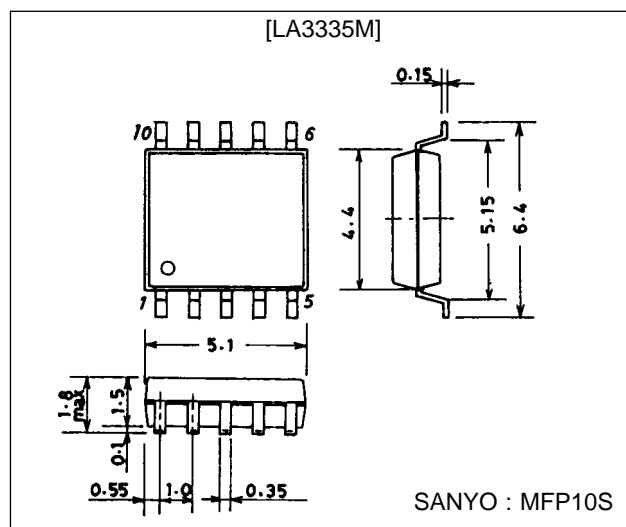
## Features

- Wide operating voltage range : 1.8 to 6 V
- Low current dissipation : 1.6 mA
- Minimum number of external parts required

## Package Dimensions

unit : mm

### 3086A-MFP10S



## Specifications

### Maximum Ratings at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		8	V
Lamp drive current	$I_L \text{ max}$		10	mA
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 70^\circ\text{C}$	50	mW
Operating temperature	$T_{opr}$		-20 to +70	°C
Storage temperature	$T_{stg}$		-40 to +125	°C

### Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$		3	V
Operating voltage range	$V_{CC \text{ op}}$		1.8 to 6	V
Input signal voltage	$V_{IN}$		150	mV

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## External Parts

Part Name	Symbol	Kind	Value	Remarks
Resistor	R1	Carbon resistor	27 k $\Omega$	VCO time constant
	R2	Carbon resistor	560 $\Omega$	Limiting resistor
Semifixed resistor	VR1	Carbon resistor	10 k $\Omega$	VCO OSC frequency adjust
Capacitor	C1	Electrolytic capacitor	2.2 $\mu$ F	DC blocking
	C2	Electrolytic capacitor	0.1 $\mu$ F	Loop filter
	C3	Polystyrol capacitor	1000 pF	VCO time constant
	C4	Electrolytic capacitor	1 $\mu$ F	Pilot detection
	C5	Ceramic capacitor	6800 pF	De-emphasis
	C6	Ceramic capacitor	6800 pF	De-emphasis
	C7	Electrolytic capacitor		Power supply ripple filter

## Typical Voltage and Name of Each Pin

Pin No.	Voltage	Name	Remarks
1	1.2 V	Input	
2	$V_{CC}-0.7$ V	PLL loop filter	
3	$V_{CC}$	Power supply	
4	—	VCO	 $V_{CC}-0.2$ V $0.65 V_{CC}$
5	—	NC	
6	0 V	GND	
7	—	Stereo indicator	Open collector
8	$V_{CC}-0.7$ V	Pilot sync detection filter	
9	1.3 V	Decoder output (low)	
10	1.3 V	Decoder output (high)	

## Proper cares in using IC

- VCO stop method  
Short pin 7 and pin 3 ( $V_{CC}$  pin) to stop the VCO.  
(Note) The maximum voltage to be applied to pin 7 must not exceed the voltage on pin 3.
- Free-running frequency check method : Use either of the following two methods.
  - Connect pin 4 to a frequency counter through the high input impedance amplifier.

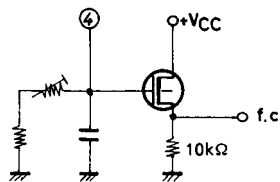
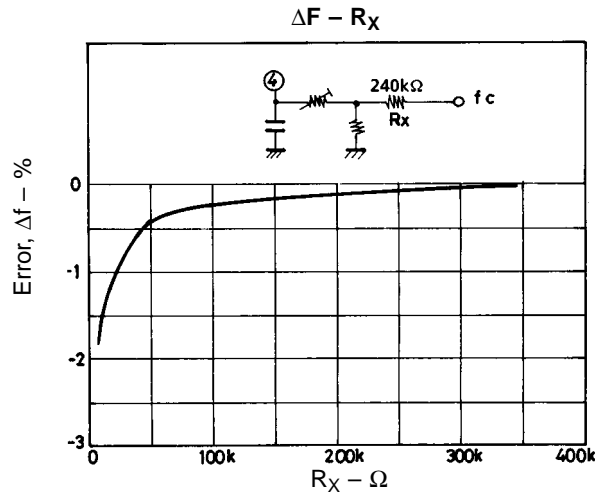


Figure 1

- b) Connect the connection point of the semifixed resistor connected to pin 4 and the fixed resistor to a frequency counter through the  $R_X$  of 240 k $\Omega$ . Fig. 2 shows how the error changes as the  $R_X$  value is decreased.



### 3. Separation setting method

The LA3335M is so designed that the sub-signal gain is approximately 1.25 times as high as the main signal gain. The separation can be set by attenuating the sub-signal of the FM detection output. (See Figure 3)

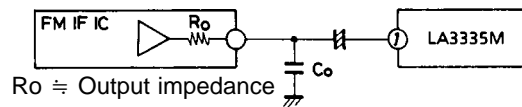
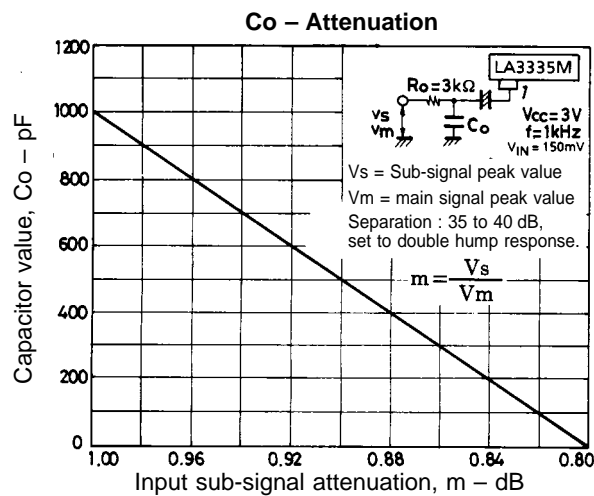
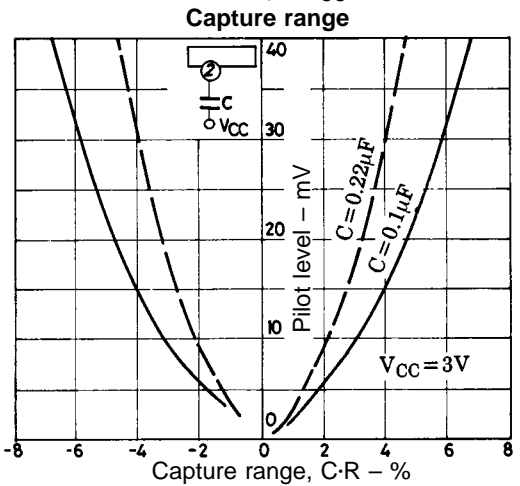
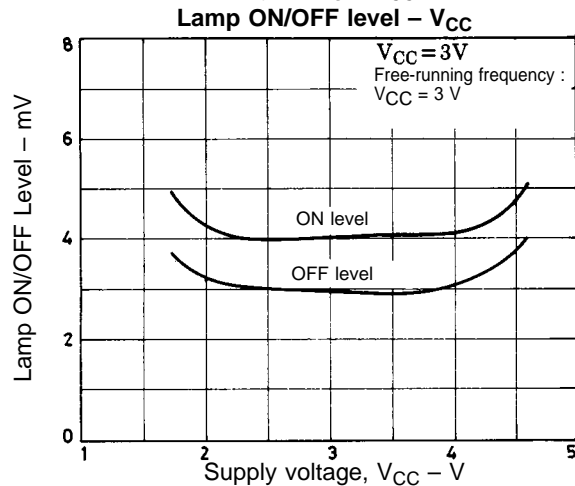
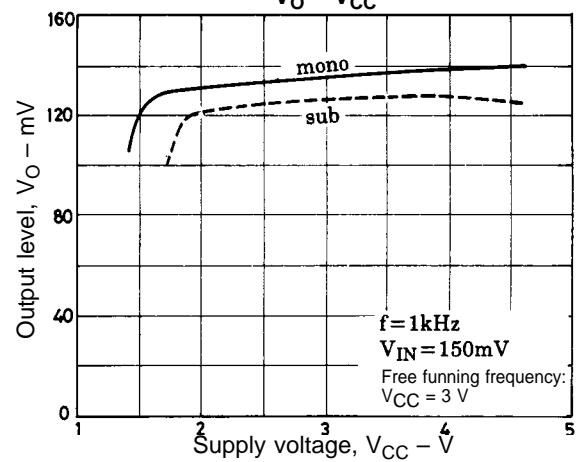
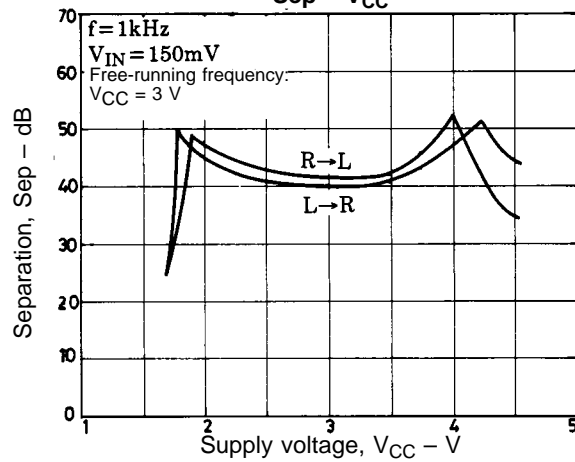
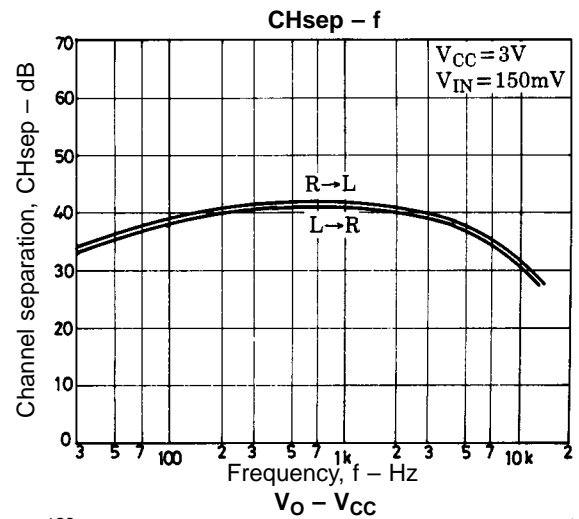
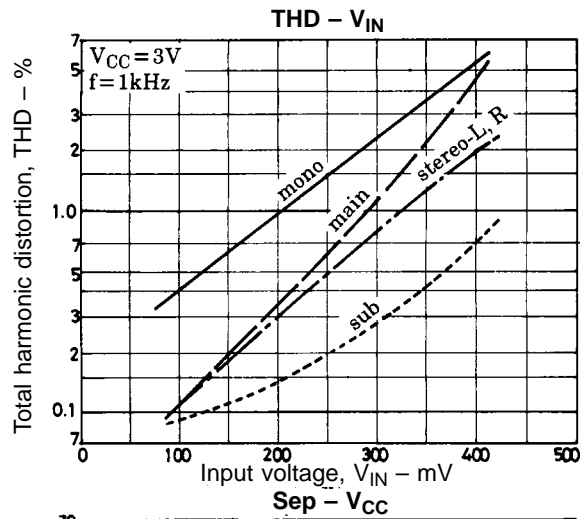
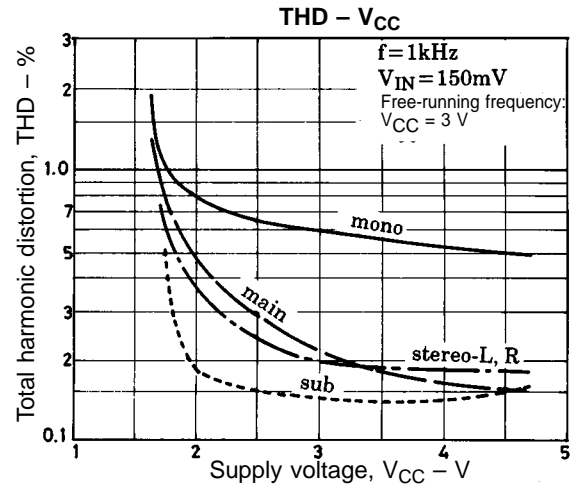
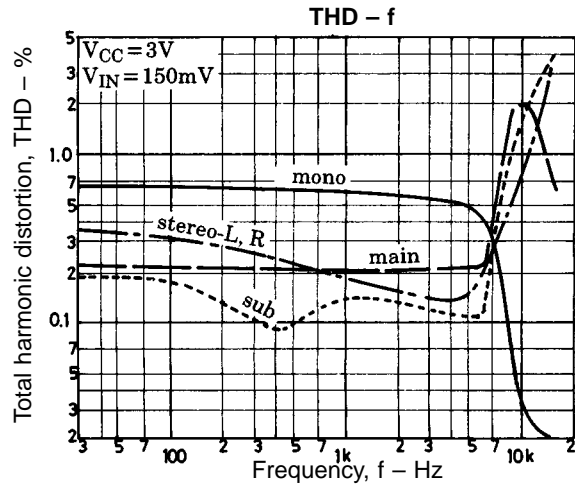


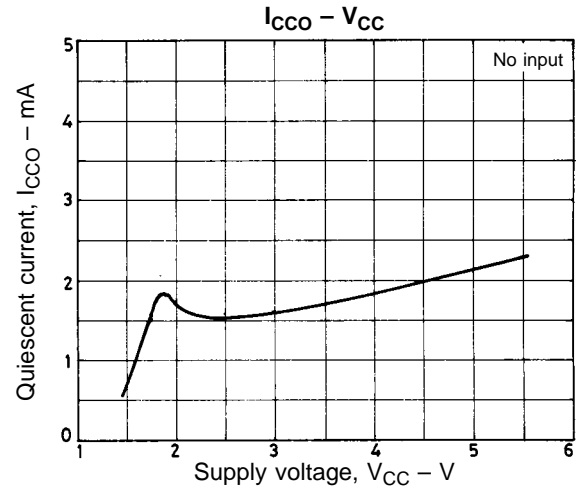
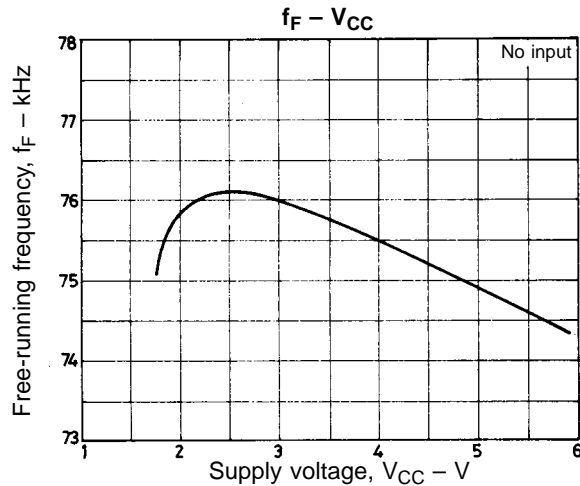
Figure 3

The value of capacitor  $C_o$  depends on the attenuation of the sub-signal of the FM detection output and the IF IC output impedance  $R_o$ . Fig. 4 shows the value of separation setting capacitor  $C_o$  when  $R_o$  is set to 3 k $\Omega$ .

For example, when the attenuation of sub-signal of the IF IC output is 0.9 time that of the main signal, it is seen from Figure 4 that the value of  $C_o$  is approximately 500 pF.







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