

μA733

DIFFERENTIAL VIDEO AMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUIT

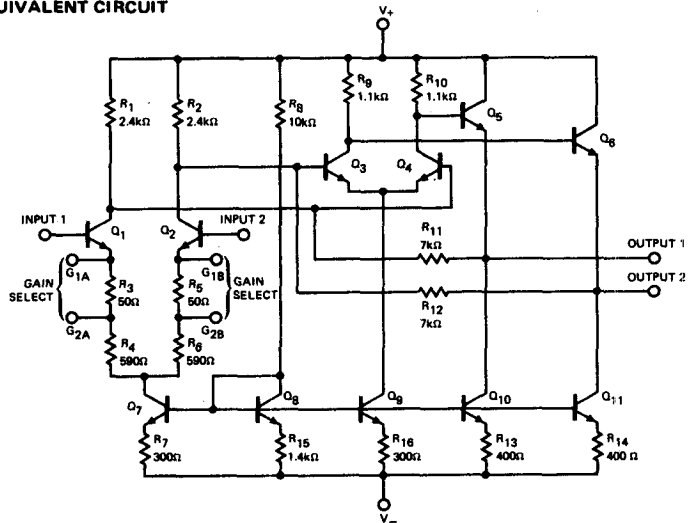
GENERAL DESCRIPTION — The μA733 is a monolithic two-stage Differential Input, Differential Output Video Amplifier constructed using the Fairchild Planar* epitaxial process. Internal series-shunt feedback is used to obtain wide bandwidth, low phase distortion, and excellent gain stability. Emitter follower outputs enable the device to drive capacitive loads and all stages are current-source biased to obtain high power supply and common mode rejection ratios. It offers fixed gains of 10, 100 or 400 without external components, and adjustable gains from 10 to 400 by the use of a single external resistor. No external frequency compensation components are required for any gain option. The device is particularly useful in magnetic tape or disc file systems using phase or NRZ encoding and in high speed thin film or plated wire memories. Other applications include general purpose video and pulse amplifiers where wide bandwidth, low phase shift, and excellent gain stability are required.

- 120 MHz BANDWIDTH
- 250 kΩ INPUT RESISTANCE
- SELECTABLE GAINS OF 10, 100, AND 400
- NO FREQUENCY COMPENSATION REQUIRED

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	± 8 V
Differential Input Voltage	± 5 V
Common Mode Input Voltage	± 6 V
Output Current	10 mA
Internal Power Dissipation (Note 1)	
Metal Can	500 mW
Flatpak	570 mW
DIP	670 mW
Operating Temperature Range	
Military (μA733)	-55° C to +125° C
Commercial (μA733C)	0° C to +70° C
Storage Temperature Range	-85° C to +150° C
Lead Temperature (Soldering, 60 second time limit)	300° C

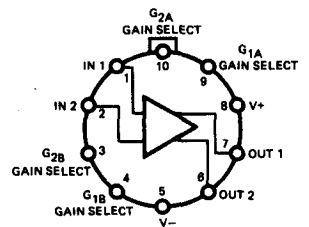
EQUIVALENT CIRCUIT



Notes on following pages.

CONNECTION DIAGRAMS

10-LEAD METAL CAN
(TOP VIEW)
PACKAGE OUTLINE 5N
PACKAGE CODE H

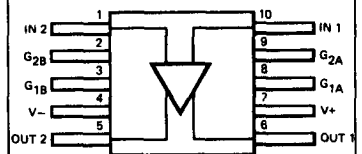


Note: Pin 5 connected to case.

ORDER INFORMATION
TYPE PART NO.
μA733 μA733HM
μA733C μA733HC

10-LEAD FLATPAK
(TOP VIEW)

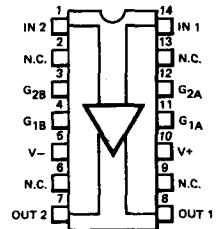
PACKAGE OUTLINE 3F
PACKAGE CODE F



ORDER INFORMATION
TYPE PART NO.
μA733 μA733FM

14-LEAD DIP
(TOP VIEW)

PACKAGE OUTLINE 6A
PACKAGE CODE D



ORDER INFORMATION
TYPE PART NO.
μA733 μA733DM
μA733C μA733DC

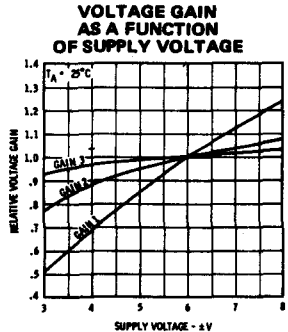
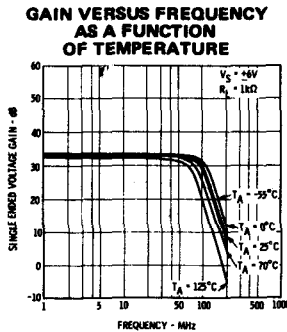
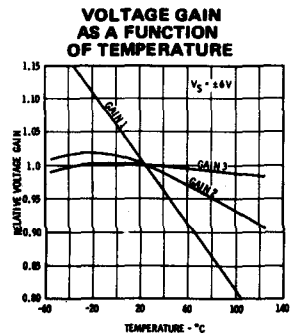
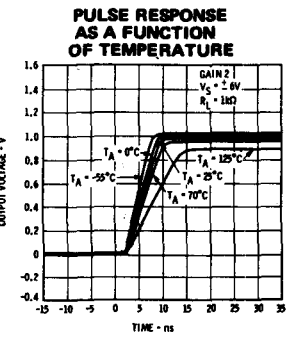
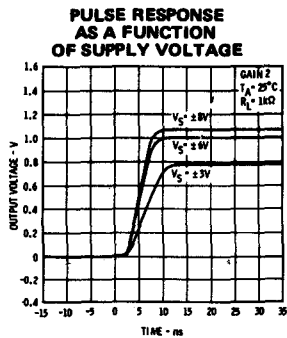
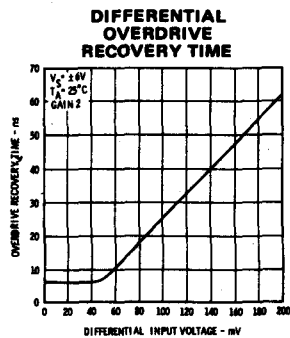
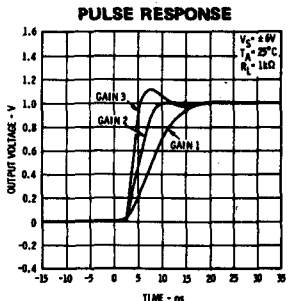
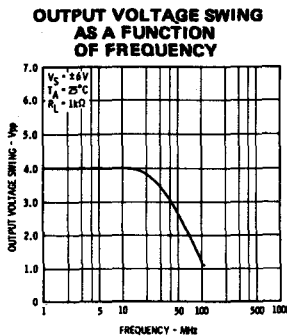
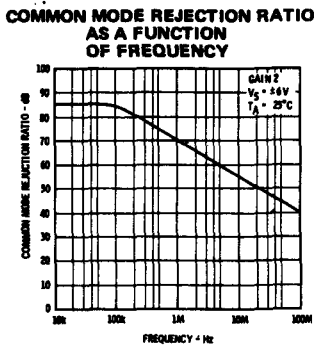
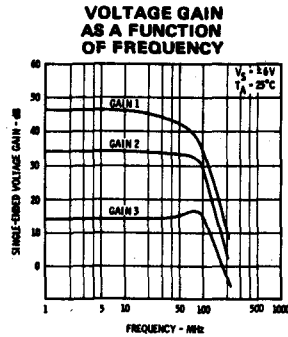
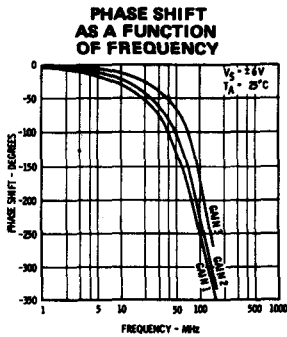
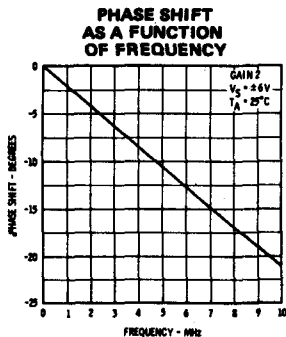
*Planar is a patented Fairchild process.

μA733

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_S = ±6.0 V unless otherwise specified)

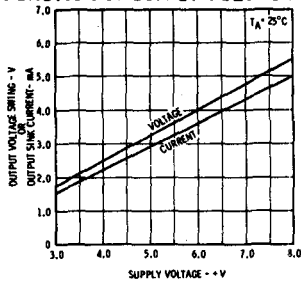
PARAMETER (see definitions)	CONDITIONS	MIN	TYP	MAX	UNITS
Differential Voltage Gain					
Gain 1 (Note 2)		300	400	500	
Gain 2 (Note 3)		90	100	110	
Gain 3 (Note 4)		9.0	10	11	
Bandwidth	R _S = 50Ω				
Gain 1			40		MHz
Gain 2			90		MHz
Gain 3			120		MHz
Risetime	R _S = 50Ω, V _{OUT} = 1 V _{p-p}				
Gain 1			10.5		ns
Gain 2			4.5	10	ns
Gain 3			2.5		ns
Propagation Delay	R _S = 50Ω, V _{OUT} = 1 V _{p-p}				
Gain 1			7.5		ns
Gain 2			6.0	10	ns
Gain 3			3.6		ns
Input Resistance					
Gain 1			4.0		kΩ
Gain 2		20	30		kΩ
Gain 3			250		kΩ
Input Capacitance	Gain 2		2.0		pF
Input Offset Current			0.4	3.0	μA
Input Bias Current			9.0	20	μA
Input Noise Voltage	R _S = 50Ω, BW = 1 kHz to 10 MHz		12		μVrms
Input Voltage Range		±1.0			V
Common Mode Rejection Ratio					
Gain 2	V _{CM} = ±1 V, f ≤ 100 kHz	60	86		dB
Gain 2	V _{CM} = ±1 V, f = 5 MHz		60		dB
Supply Voltage Rejection Ratio					
Gain 2	ΔV _S = ±0.5 V	50	70		dB
Output Offset Voltage					
Gain 1			0.6	1.5	V
Gain 2 and Gain 3			0.35	1.0	V
Output Common Mode Voltage		2.4	2.9	3.4	V
Output Voltage Swing		3.0	4.0		V _{p-p}
Output Sink Current		2.5	3.6		mA
Output Resistance			20		Ω
Power Supply Current			18	24	mA
The following specifications apply for -55°C ≤ T _A ≤ +125°C					
Differential Voltage Gain					
Gain 1 (Note 2)		200		600	
Gain 2 (Note 3)		80		120	
Gain 3 (Note 4)		8.0		12	
Input Resistance					
Gain 2		8.0			kΩ
Input Offset Current				5.0	μA
Input Bias Current				40	μA
Input Voltage Range		±1.0			V
Common Mode Rejection Ratio		50			dB
Supply Voltage Rejection Ratio		50			dB
Output Offset Voltage					
Gain 1				1.5	V
Gain 2 and Gain 3				1.2	V
Output Swing		2.5			V _{p-p}
Output Sink Current		2.2			mA
Positive Supply Current				27	mA

TYPICAL PERFORMANCE CURVES FOR μ A733 AND μ A733C

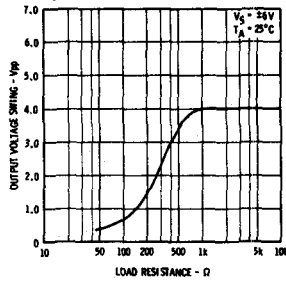


TYPICAL PERFORMANCE CURVES FOR $\mu A733$ AND $\mu A733C$

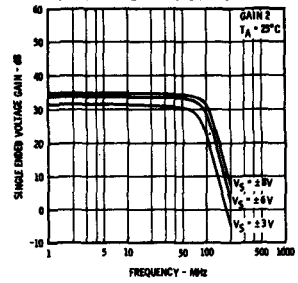
OUTPUT VOLTAGE AND CURRENT SWING AS A FUNCTION OF SUPPLY VOLTAGE



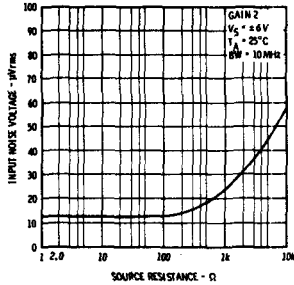
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



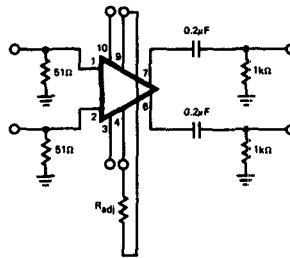
GAIN VERSUS FREQUENCY AS A FUNCTION OF SUPPLY VOLTAGE



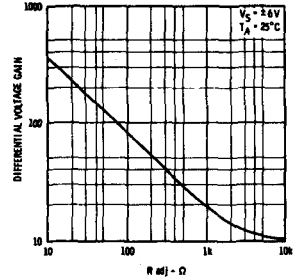
INPUT NOISE VOLTAGE AS A FUNCTION OF SOURCE RESISTANCE



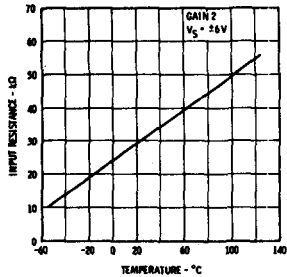
VOLTAGE GAIN ADJUST CIRCUIT



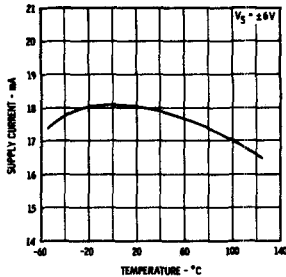
VOLTAGE GAIN AS A FUNCTION OF R_{ADJ}



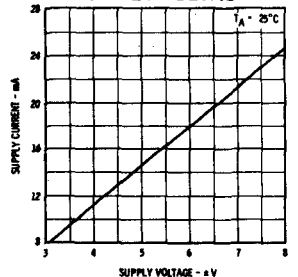
INPUT RESISTANCE AS A FUNCTION OF TEMPERATURE



SUPPLY CURRENT AS A FUNCTION OF TEMPERATURE



SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE

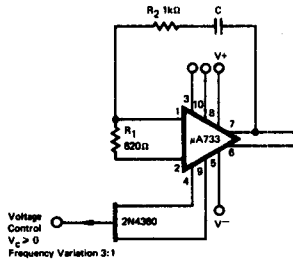


NOTES

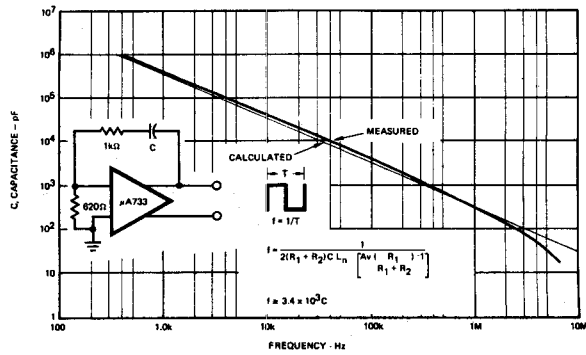
1. Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3 mW/°C for the Metal Can, 8.3 mW/°C for the DIP and 7.1 mW/°C for the Flatpak.
2. Gain Select pins G_{1A} and G_{1B} connected together.
3. Gain Select pins G_{2A} and G_{2B} connected together.
4. All Gain Select pins open.

TYPICAL APPLICATIONS

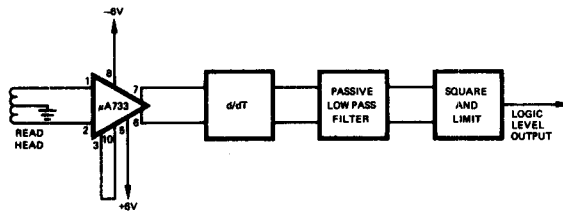
VOLTAGE CONTROLLED OSCILLATOR



OSCILLATOR FREQUENCY FOR VARIOUS CAPACITOR VALUES



PHASE ENCODING PLAYBACK SYSTEM



Phase Linearity: $\pm 4^\circ$ from 2 to 5 MHz
 Input Resistance: 30 k Ω
 Input Capacity: 2 pF
 Fixed Gain: 100