Differential video amplifier

µA733

FEATURES

- 120MHz bandwidth
- 250kΩ input resistance
- Selectable gains of 10,100 and 400
- No frequency compensation required

APPLICATIONS

- Video amplifier
- Pulse amplifier in communications
- Magnetic memories
- Video recorder systems

DESCRIPTION

The 733 is a monolithic differential input, differential output, wideband video amplifier. It offers fixed gains of 10, 100 or 400 without external components, and adjustable gains from 10 to 400 by the use of an external resistor. No external frequency compensation components are required for any gain option. Gain stability, wide bandwidth and low phase distortion are obtained through use of the classic series-shunt feedback from the emitter-follower outputs to the inputs of the second stage. The emitter-follower outputs provide low output impedance, and enable the device to drive capacitive loads. The 733 is intended for use as a high-performance video and pulse amplifier in communications, magnetic memories, display and video recorder systems.

ORDERING INFORMATION

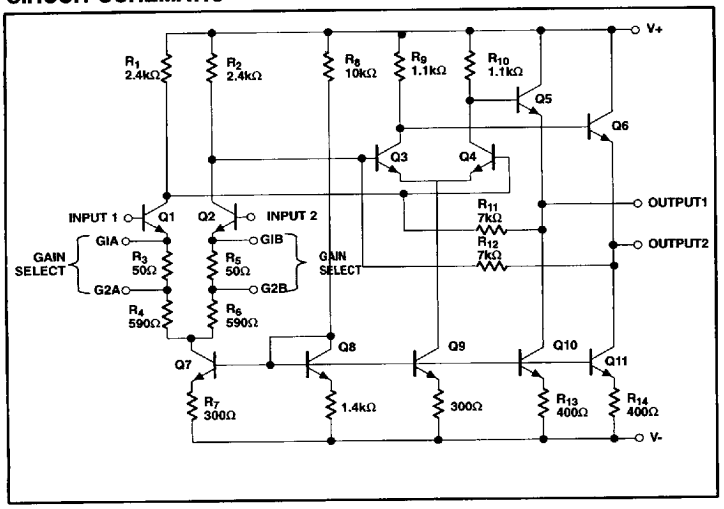
DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
14-Pin Ceramic DIP	µA733/BCA	GDIP1-T14

* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

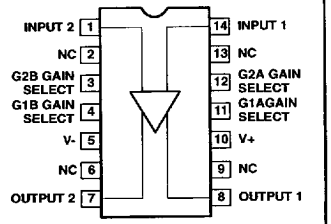
ABSOLUTE MAXIMUM RATINGS[1]

SYMBOL	PARAMETER	RATING[1]	UNIT
V_{IDR}	Differential input voltage	±5	V
V_{ICR}	Common mode input voltage range	±6	V
V_{CC}	Supply voltage	±8	V
I_O	Output current	10	mA
T_J	Junction temperature	+150	°C
T_{STG}	Storage temperature range	-65 to +150	°C
P_D	Power dissipation	670	mW

CIRCUIT SCHEMATIC



PIN CONFIGURATION



ELECTRICAL CHARACTERISTICS

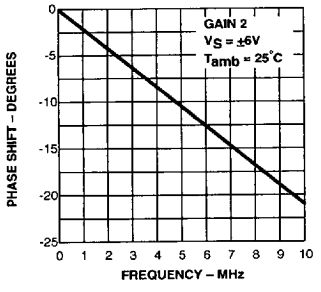
T_{amb} = +25°C, V_S = ±6V, VCM = 0, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	T_{amb} = +25°C			T_{anb} = -55°C, +125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
	Differential voltage gain,								
A_{DIF1}	Gain 1[2]	R_L = 2kΩ, V_O = $3V_{p-p}$	300	400	500	200		600	V/V
A_{DIF2}	Gain 2[3]		90	100	110	80		120	V/V
A_{DIF3}	Gain 3[4]		9	10	11	8		12	V/V
	Bandwidth								
BW1	Gain 1[2]	V_O = $1V_{p-p}$		40					MHz
BW2	Gain 2[3]			90					MHz
BW3	Gain 3[4]			120					MHz
	Rise time								
t_{R1}	Gain 1[2]	V_O = $1V_{p-p}$		10.5					ns
t_{R2}	Gain 2[3]			4.5					ns
t_{R3}	Gain 3[4]			2.5					ns
	Propagation delay								
t_{PD1}	Gain 1[2]	V_O = $1V_{p-p}$		7.5					ns
t_{PD2}	Gain 2[3]			6.0					ns
t_{PD3}	Gain 3[4]			3.6					ns
	Input resistance								
R_{IN1}	Gain 1[3]			4.0					kΩ
R_{IN2}	Gain 2[3]		20	30		8			kΩ
R_{IN3}	Gain 3[4]			250					kΩ
C_{IN}	Input capacitance[3]	Gain 2		2.0					pF
I_{IO}	Input offset current			0.4	3.0			5.0	µA
I_{IB}	Input bias current			9.0	20			40	µA
E_N	Input noise voltage	BW = 1kHz to 10MHz		12					µVrms
V_{ICR}	Input voltage range		-1.0		+1.0	-1.0		+1.0	V
	Common mode rejection ratio								
$CMRR_2$	Gain 2	V_{CM} = ±1V	60	86		50			dB
$CMRR_2$	Gain 2	V_{CM} = ±1V, f = 5MHz		60					dB
	Supply voltage rejection ratio								
PSRR	Gain 2	ΔV_S = ±0.5V	50	70		50			dB
	Output offset voltage								
V_{IO1}	Gain 1	R_S = 50Ω, R_L = ∞		0.6	1.5			1.5	V
$V_{IO2,3}$	Gain 2 and 3[3, 4]			0.35	1.0			1.2	V
V_{OCM}	Output common mode voltage	R_S = 50Ω, R_L = ∞	2.4	2.9	3.4				V
V_{ODIF}	Output voltage swing differential	R_L = 2kΩ	3.0	4.0		2.5			V_{p-p}
I_O	Output sink current	R_L = 1kΩ	2.5	3.6		2.2			mA
R_O	Output resistance			20					Ω
I_S	Power supply current	R_L = ∞		18	24			27	mA

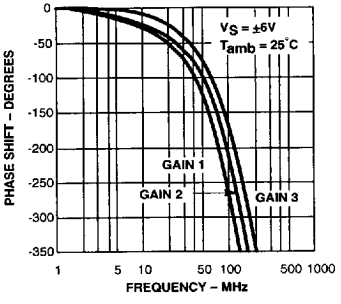
NOTES:
1. Operation beyond the limits of this table may impair the useful life of the device.
2. Gain select Pins G_{1A} and G_{1B} connected together.
3. Gain select Pins G_{2A} and G_{2B} connected together.
4. All gain pins open.

TYPICAL PERFORMANCE CHARACTERISTICS

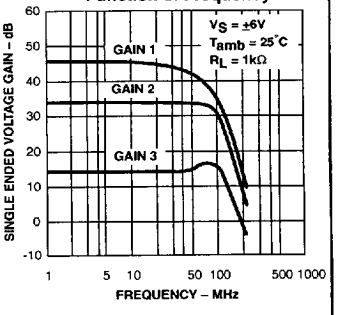
Phase Shift as a Function of Frequency



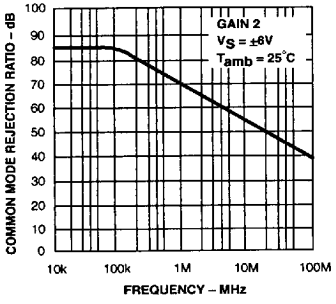
Phase Shift as a Function of Frequency



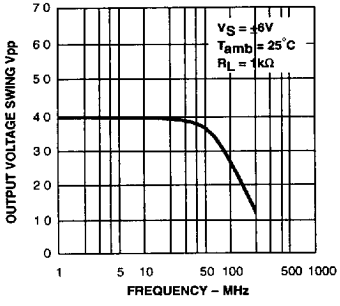
Voltage Gain as a Function of Frequency



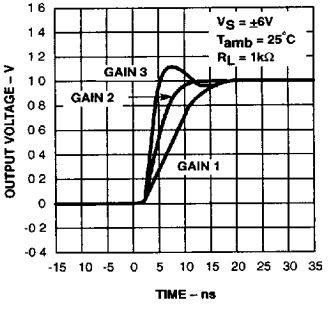
Common Mode Rejection as a Function of Frequency



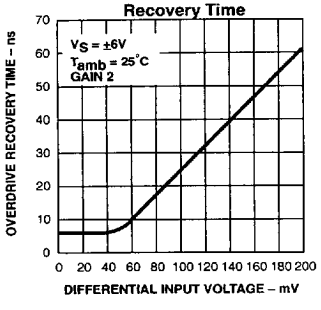
Output Voltage Swing as a Function of Frequency



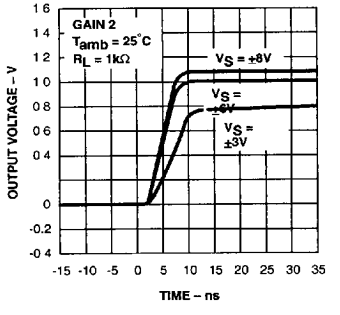
Pulse Response



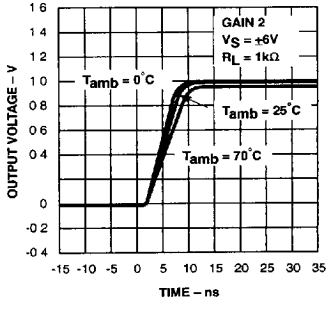
Differential Over-drive Recovery Time



Pulse Response as a Function of Supply Voltage

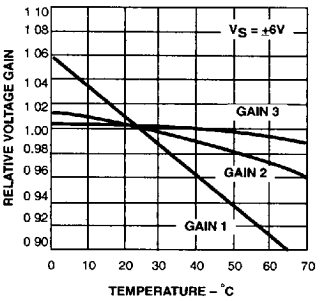


Pulse Response as a Function of Temperature

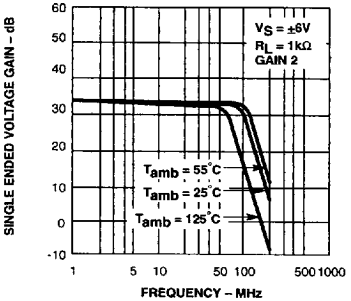


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

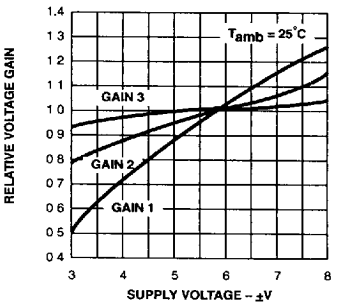
Voltage Gain as a Function of Temperature



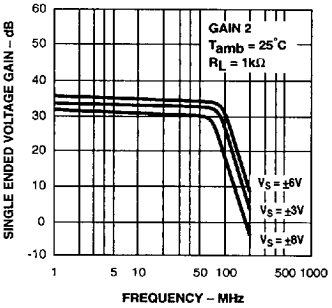
Gain vs. Frequency as a Function of Temperature



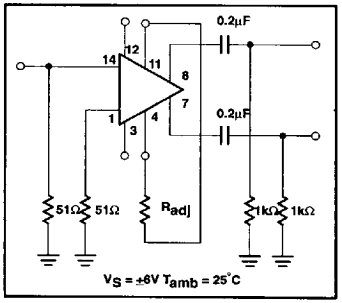
Voltage Gain as a Function of Supply Voltage



Gain vs. Frequency as a Function of Supply Voltage

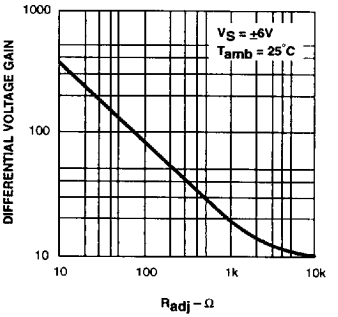


Voltage Gain Adjust Circuit

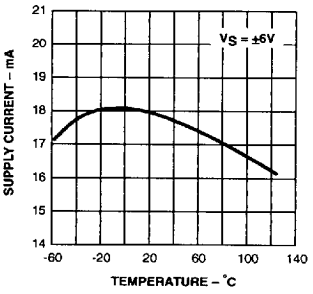


(Pin numbers apply to K Package)

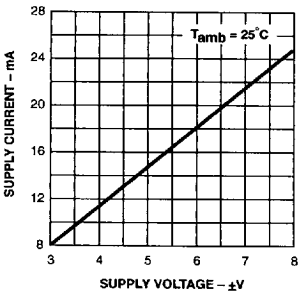
Voltage Gain as a Function of RADJ (Figure 3)



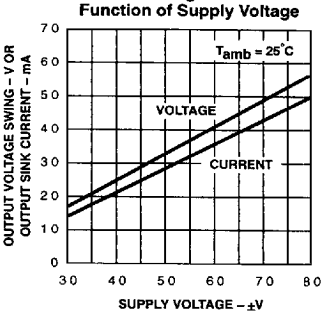
Supply Current as a Function of Temperature



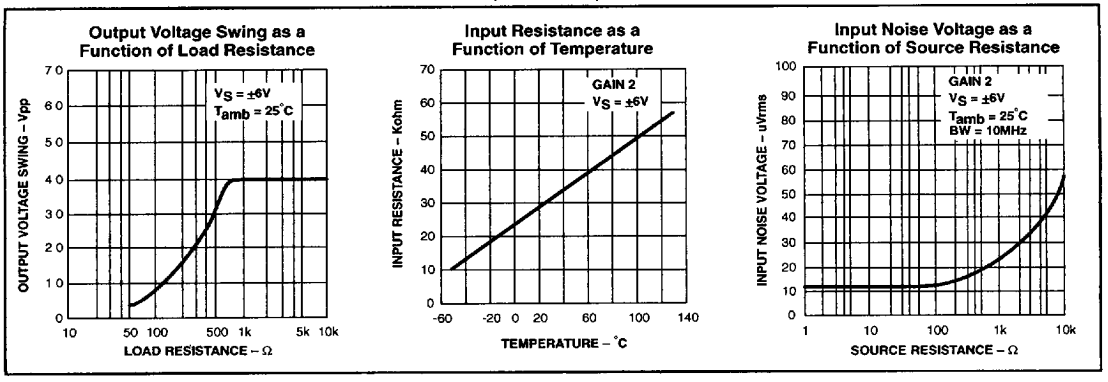
Supply Current as a Function of Supply Voltage



Output Voltage and Current Swing as a Function of Supply Voltage



TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



TYPICAL TEST CIRCUITS