DIFFERENTIAL VIDEO AMPLIFIER

μA733/733C

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.

FEATURES

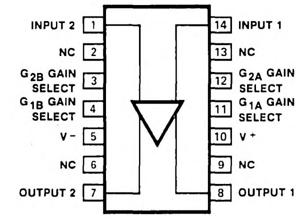
- **120MHz bandwidth**
- **250kΩ input resistance**
- **Selectable gains of 10,100 and 400**
- **No frequency compensation required**
- **Mil std 883A,B,C available**

APPLICATIONS

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

PIN CONFIGURATION

F,N PACKAGE



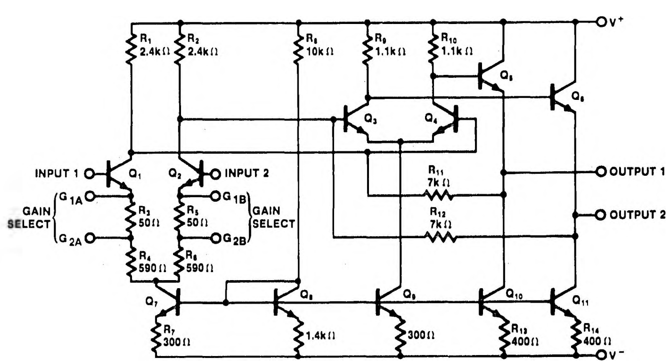
TOP VIEW

ORDER NUMBERS
μA733F μA733CN
μA733N μA733CF

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Differential input Voltage	±5	V
Common mode input Voltage	±6	V
V_{CC}	±8	V
Ouput current	10	mA
Junction temperature	+150	°C
Storage temperature range	-65 to +150	°C
Operation temperature range		
μA733C	0 to +75	°C
μA733	-55 to +125	°C
P_D Power dissipation		
K package	500	mW
N, F package	670	mW

CIRCUIT SCHEMATIC



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DC ELECTRICAL CHARACTERISTICS

$T_A = +25°C$, $V_S = \pm 6V$, VCM = 0 unless otherwise specified.
Recommended operating supply voltages $V_S = \pm 6.0V$

PARAMETER	TEST CONDITIONS	μA733C			μA733			UNITS
		Min	Typ	Max	Min	Typ	Max	
Differential voltage gain								
Gain 1[2]		250	400	600	300	400	500	V/V
Gain 2[2]	$R_I = 2k\Omega$, $V_{OUT} = 3V_{p\text{-}p}$	80	100	120	90	100	110	V/V
Gain 3[3]		8	10	12	9	10	11	V/V
Bandwidth								
Gain 1[1]			40			40		MHz
Gain 2[2]			90			90		MHz
Gain 3[3]			120			120		MHz
Rise time								
Gain 1[1]			10.5			10.5		ns
Gain 2[2]	$V_{OUT} = 1V_{p\text{-}p}$		4.5	12		4.5	10	ns
Gain 3[3]			2.5			2.5		ns
Propagation delay								
Gain 1[1]			7.5			7.5		ns
Gain 2[2]	$V_{OUT} = 1V_{p\text{-}p}$		6.0	10		6.0	10	ns
Gain 3[3]			3.6			3.6		ns
Input resistance								
Gain 1[2]			4.0			4.0		kΩ
Gain 2[2]		10	30		20	30		kΩ
Gain 3[3]			250			250		kΩ
Input capacitance[2]	Gain 2		2.0			2.0		pF
Input offset current			0.4	5.0		0.4	3.0	μA
Input bias current			9.0	30		9.0	20	μA
Input noise voltage	BW = 1kHz to 10MHz		12			12		μVrms
Input voltage range		± 1.0			± 1.0			V
Common mode								
Rejection ratio								
Gain 2	VCM = ± 1V, f ≤ 100kHz	60	86		60	86		dB
Gain 2	VCM = ± 1V, F = 5MHz		60			60		dB
Supply voltage								
Rejection ratio								
Gain 2	$\Delta V_S = \pm 0.5V$	50	70		50	70		dB
Output offset voltage								
Gain 1[1]	$R_L = \infty$		0.6	1.5		0.6	1.5	V
Gain 2 and 3[2,3]			0.35	1.5		0.35	1.0	V
Output common mode voltage	$R_L = \infty$	2.4	2.9	3.4	2.4	2.9	3.4	V
Output voltage swing, differential	$R_L = 2k$	3.0	4.0		3.0	4.0		$V_pK\text{-}_pK$
Output sink current		2.5	3.6		2.5	3.6		mA
Output resistance			20			20		Ω
Power supply current	$R_L \pm \infty$		18	24		18	24	mA
THE FOLLOWING SPECS APPLY OVER TEMPERATURE		**0°C ≤ T_A ≤ 70°C**			**−55°C ≤ T_A ≤ 125°C**			
Differential voltage gain								
Gain 1[1]		250		600	200		600	V/V
Gain 2[2]	$R_I = 2k\Omega$, $V_{OUT} = 3Vp\text{-}p$	80		120	80		120	V/V
Gain[3]		8		12	8		12	V/V

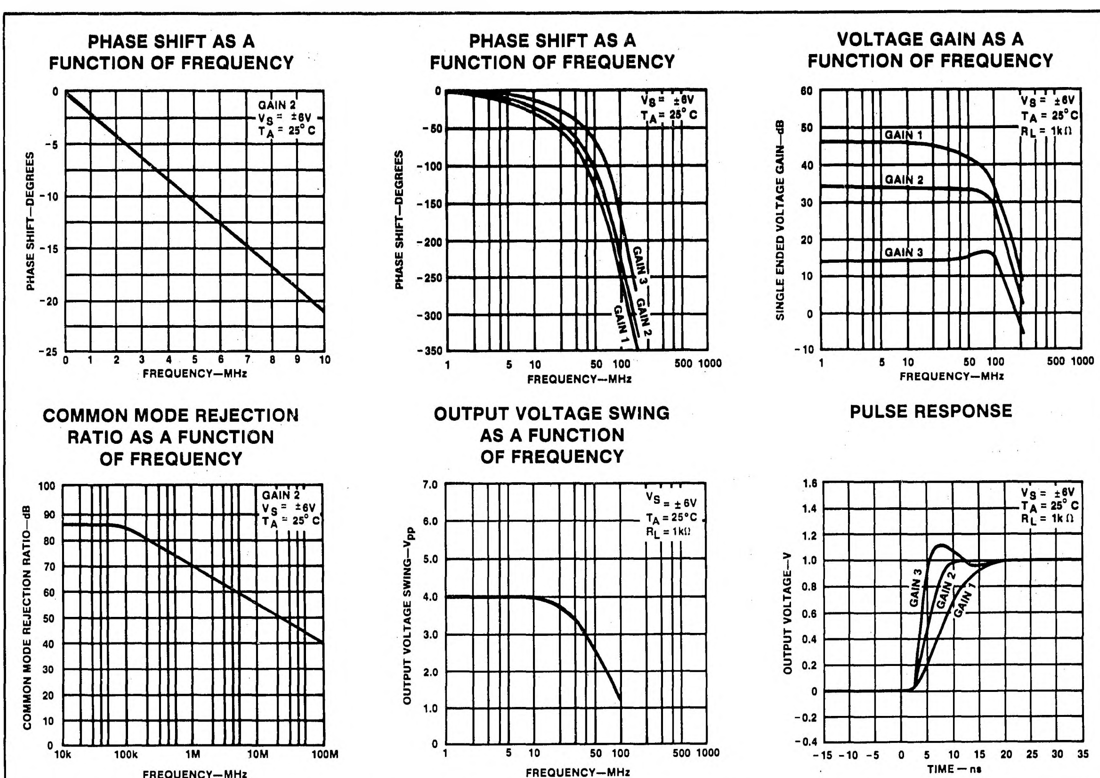
DIFFERENTIAL VIDEO AMPLIFIER μA733/733C

DC ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	TEST CONDITIONS	μA733C			μA733			UNITS
		Min	Typ	Max	Min	Typ	Max	
Input resistance								
Gain 2[2]		8			8			kΩ
Input offset current				6			5	μA
Input bias current				40			40	μA
Input voltage range		± 1.0			± 1.0			V
Common mode Rejection ratio								
Gain 2	VCM = ± V, F ≤ 100kHz	50			50			dB
Supply voltage Rejection ratio								
Gain 2	$\Delta V_S = \pm 0.5V$	50			50			dB
Output offset voltage								
Gain 1[1]	$R_L = \infty$			1.5			1.5	V
Gain 2 and 3[2, 3]				1.5			1.2	V
Output voltage swing, differential	$R_L = 2k$	2.8			2.5			Vpk-pk
Output sink current		2.5			2.2			mA
Power supply current	$R_L \pm \infty$			27			27	mA

NOTES
1. Gain select pins G_{1A} and G_{1B} connected together
2. Gain select pins G_{2A} and G_{2B} connected together.
3. All gain select pins open.

TYPICAL PERFORMANCE CHARACTERISTICS



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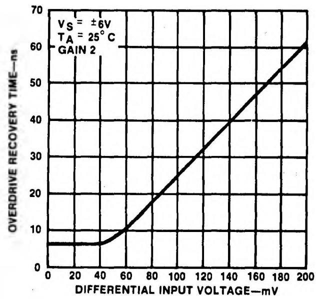
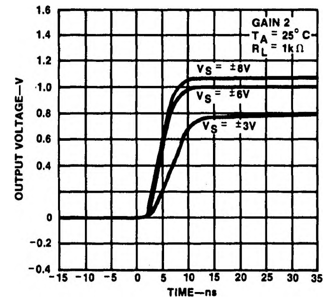
TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

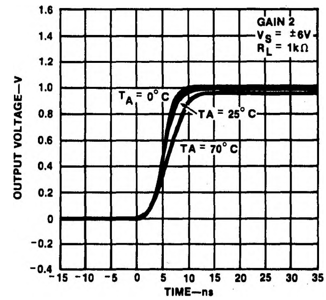
DIFFERENTIAL OVERDRIVE RECOVERY TIME



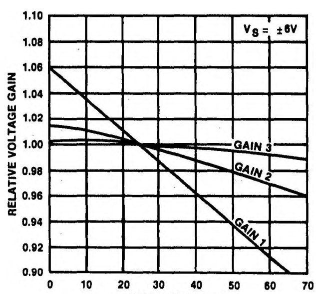
PULSE RESPONSE AS A FUNCTION OF SUPPLY VOLTAGE



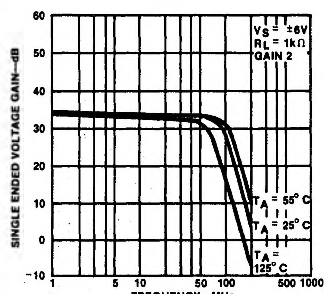
PULSE RESPONSE AS A FUNCTION OF TEMPERATURE



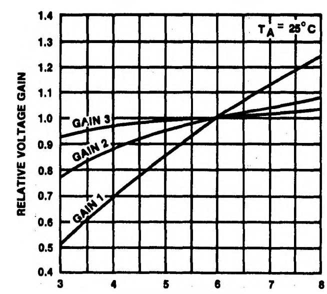
VOLTAGE GAIN AS A FUNCTION OF TEMPERATURE



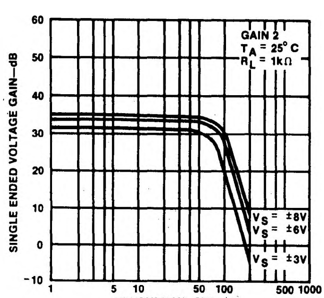
GAIN vs FREQUENCY AS A FUNCTION OF TEMPERATURE



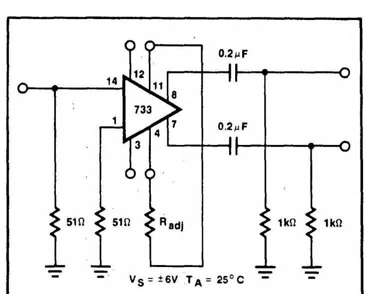
VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



GAIN vs FREQUENCY AS A FUNCTION OF SUPPLY VOLTAGE

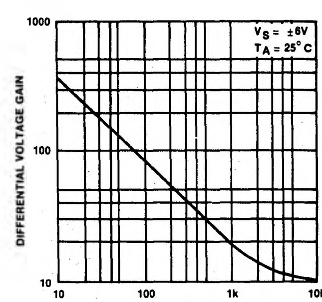


VOLTAGE GAIN ADJUST CIRCUIT



(Pin numbers apply to K Package)

VOLTAGE GAIN AS A FUNCTION OF RADJ (FIGURE 3)



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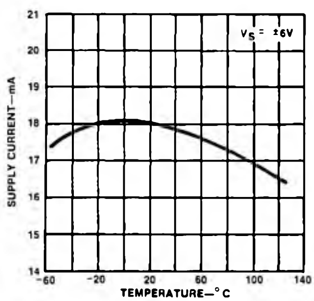
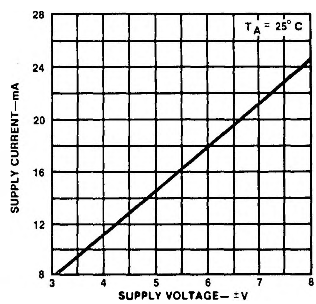
TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

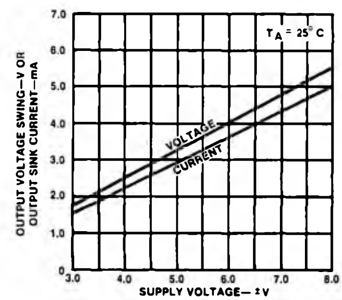
SUPPLY CURRENT AS A FUNCTION OF TEMPERATURE



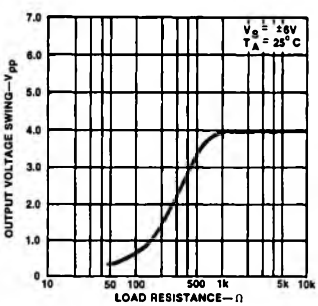
SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



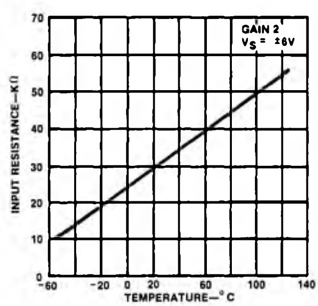
OUTPUT VOLTAGE AND CURRENT SWING AS A FUNCTION OF SUPPLY VOLTAGE



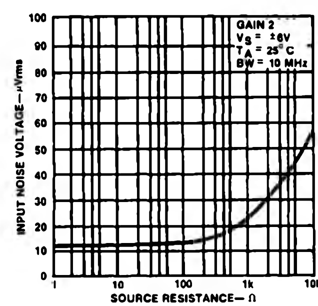
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



INPUT RESISTANCE AS A FUNCTION OF TEMPERATURE



INPUT NOISE VOLTAGE AS A FUNCTION OF SOURCE RESISTANCE



TEST CIRCUITS $T_A = 25°C$ unless otherwise specified.