Am733/733C

Differential Video Amplifier

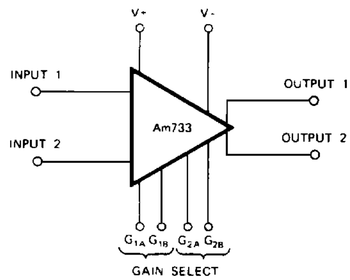
Distinctive Characteristics

- The Am733 and Am733C differential video amplifiers are functionally, electrically and pin-for-pin equivalent to the Fairchild μA733 and 733C.
- Bandwidths: 40 to 120 MHz
- Rise Times: 2.5 to 10 ns
- Propagation Delay: 3.6 to 10 ns
- **100% reliability assurance testing in compliance with MIL STD 883.**
- **Electrically tested and optically inspected dice for hybrid manufacturers.**
- Available in metal can, hermetic dual-in-line or hermetic flat packages.

FUNCTIONAL DESCRIPTION

The Am733 is a monolithic two-stage differential input, emitter follower differential output video amplifier. Internal series-shunt feedback is used to obtain fixed gains of 10, 100 or 400, and adjustable gains from 10 to 400 by the use of an external resistor.

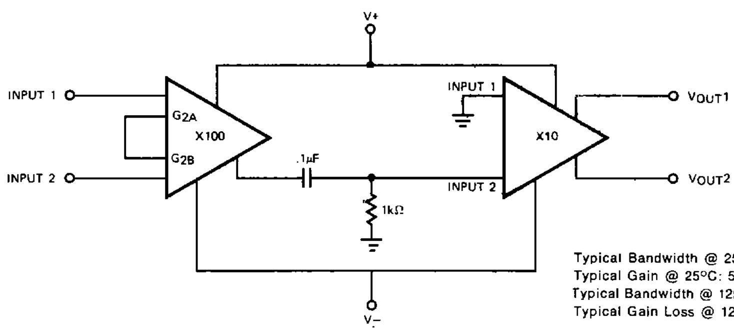
FUNCTIONAL DIAGRAM



LIC-826

TYPICAL APPLICATION

HIGH-GAIN WIDEBAND AMPLIFIER



Typical Bandwidth @ 25°C: 65 MHz
Typical Gain @ 25°C: 54 dB
Typical Bandwidth @ 125°C: 57 MHz
Typical Gain Loss @ 125°C: 1 dB

LIC-827

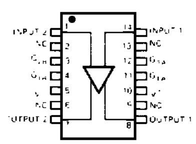
ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am733C	TO-99	0°C to +70°C	733HC
	DIP	0°C to +70°C	733DC
	Dice	0°C to +70°C	733XC
Am733	TO-99	−55°C to +125°C	733HM
	DIP	−55°C to +125°C	733DM
	Flat Pak	−55°C to +125°C	733FM
	Dice	−55°C to +125°C	733XM

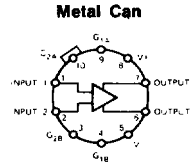
CONNECTION DIAGRAMS

Top Views

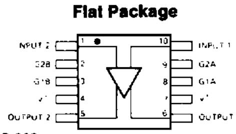
Dual-In-Line



Metal Can



Flat Package



NOTES:
(1) On Metal Can, pin 5 is connected to case.
(2) On DIP, pin 5 is connected to bottom of package.
(3) On Flat Package, pin 4 is connected to bottom of package

LIC-828

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)	500 mW
Operating Temperature Range	
Am733C	0°C to +70°C
Am733	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 60 sec.)	300°C

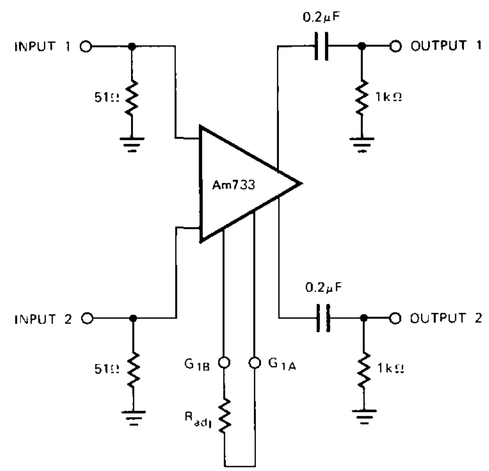
ELECTRICAL CHARACTERISTICS ($T_A = 25°C$, $V_S = ±6.0$ V unless otherwise specified)

Parameter (see definitions)	Conditions	Am733C Min.	Am733C Typ.	Am733C Max.	Am733 Min.	Am733 Typ.	Am733 Max.	Units
Differential Voltage Gain								
Gain 1 (Note 2)		250	400	600	300	400	500	
Gain 2 (Note 3)		80	100	120	90	100	110	
Gain 3 (Note 4)		8.0	10	12	9.0	10	11	
Bandwidth	$R_S = 50\ \Omega$							
Gain 1			40			40		MHz
Gain 2			90			90		MHz
Gain 3			120			120		MHz
Risetime	$R_S = 50\ \Omega$, $V_{out} = 1$ Vpp							
Gain 1			10.5			10.5		ns
Gain 2			4.5	12		4.5	10	ns
Gain 3			2.5			2.5		ns
Propagation Delay	$R_S = 50\ \Omega$, $V_{out} = 1$ Vpp							
Gain 1			7.5			7.5		ns
Gain 2			6.0	10		6.0	10	ns
Gain 3			3.6			3.6		ns
Input Resistance								
Gain 1			4.0			4.0		kΩ
Gain 2		10	30		20	30		kΩ
Gain 3			250			250		kΩ
Input Capacitance	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	$R_S = 50\ \Omega$, BW = 1 kHz to 10 MHz		12			12		μVrms
Input Voltage Range		±1.0			±1.0			V
Common Mode Rejection Ratio								
Gain 2	$V_{cm} = ±1$ V, $f \leq 100$ kHz	60	86		60	86		dB
Gain 2	$V_{cm} = ±1$ V, $f = 5$ MHz		60			60		dB
Supply Voltage Rejection Ratio								
Gain 2	$\Delta V_S = ±0.5$ V	50	70		50	70		dB
Output Offset Voltage								
Gain 1			0.6	1.5		0.6	1.5	V
Gain 2 and Gain 3			0.35	1.5		0.35	1.0	V
Output Common Mode Voltage		2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing	Single Ended	3.0	4.0		3.0	4.0		Vpp
Output Sink Current		2.5	3.6		2.5	3.6		mA
Output Resistance			20			20		Ω
Power Supply Current			18	24		18	24	mA
The Following Specifications Apply Over The Operating Temperature Ranges								
Differential Voltage Gain								
Gain 1 (Note 2)		250	400	600	200	400	600	
Gain 2 (Note 3)		80	100	120	80	100	120	
Gain 3 (Note 4)		8.0	10	12	8.0	10	12	
Input Resistance								
Gain 1			4.0			4.0		kΩ
Gain 2		8.0	30		8.0	30		kΩ
Gain 3			250			250		kΩ
Input Offset Current			0.4	6.0		0.4	5.0	μA
Input Bias Current			9.0	40		9.0	40	μA
Input Voltage Range		±1.0			±1.0			V

Parameter (see definitions)	Conditions	Am733C Min.	Am733C Typ.	Am733C Max.	Am733 Min.	Am733 Typ.	Am733 Max.	Units
The Following Specifications Apply Over The Operating Temperature Ranges								
Common Mode Rejection Ratio Gain 2	$V_{cm} = \pm 1$ V, f ≤ 100 kHz	50	86		50	86		dB
Supply Voltage Rejection Ratio Gain 2	$\Delta V_S = \pm 0.5$ V	50	70		50	70		dB
Output Offset Voltage								
Gain 1			0.6	1.5		0.6	1.5	V
Gain 2 and Gain 3			0.35	1.5		0.35	1.2	V
Output Voltage Swing	Single Ended	2.8	4.0		2.5	4.0		Vpp
Output Sink Current		2.5	3.6		2.2	3.6		mA
Power Supply Current				27			27	mA

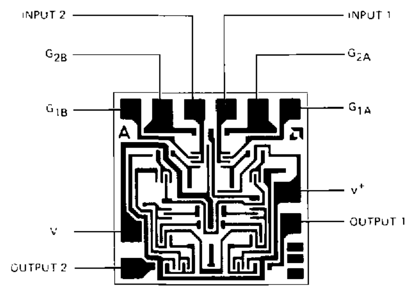
Notes: 1. Derate metal can package at 6.8 mW/°C for operation at ambient temperatures above 85°C and Dual In-Line package at 9 mW/°C for operation at ambient temperatures above 100°C.
2. Gain Select pins G_{1A} and G_{1B} connected together.
3. Gain Select pins G_{2A} and G_{2B} connected together.
4. All Gain Select pins open.

VOLTAGE GAIN ADJUST CIRCUIT



LIC-829

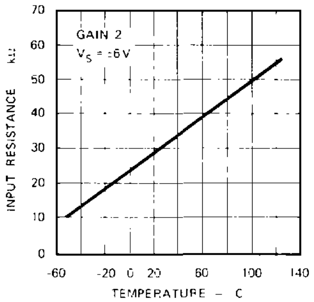
Metallization and Pad Layout



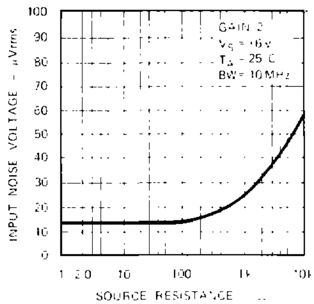
41 X 41 Mils

PERFORMANCE CURVES

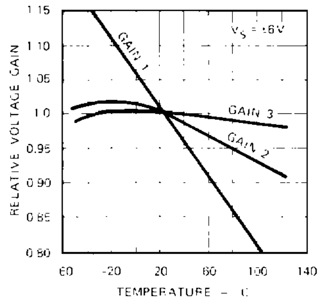
Input Resistance Vs. Temperature



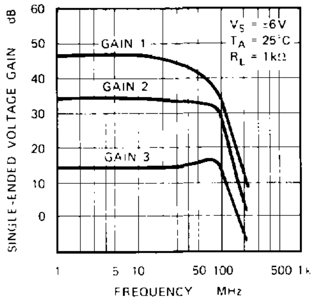
Input Noise Voltage



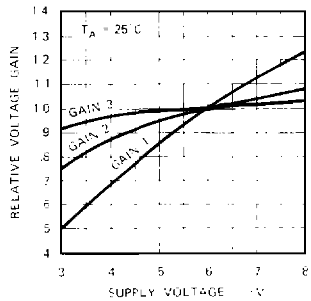
Gain Vs. Temperature



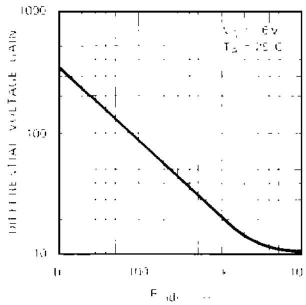
Gain Vs. Frequency



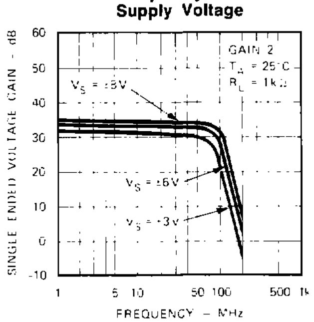
Gain Vs. Supply Voltage



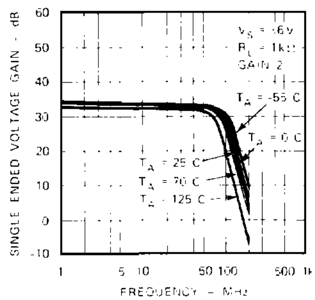
Gain Vs. R_{Adjust}



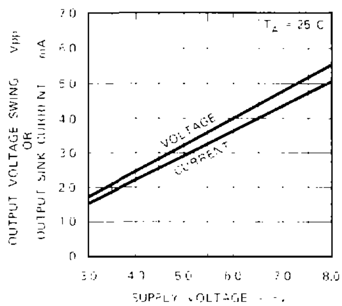
Gain Vs. Frequency and Supply Voltage



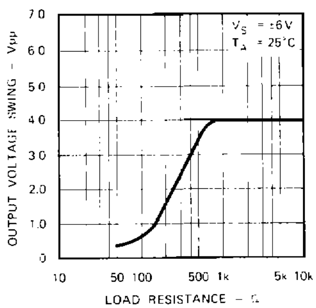
Gain Vs. Frequency and Temperature



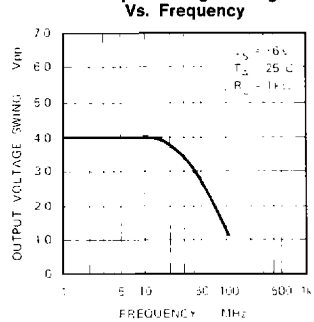
Output Voltage Swing And Sink Current Vs. Supply Voltage



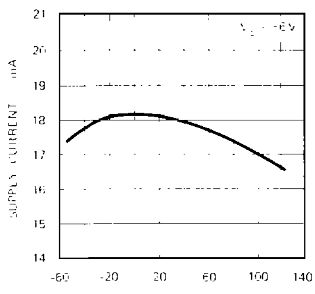
Output Voltage Swing Vs. Load Resistance



Output Voltage Swing Vs. Frequency



Supply Current Vs. Temperature

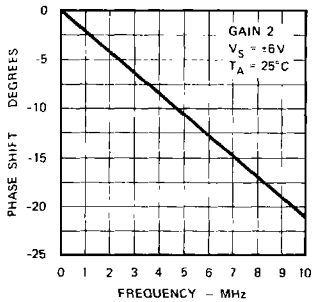


LIC-830

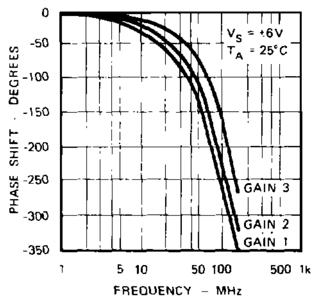
7

PERFORMANCE CURVES

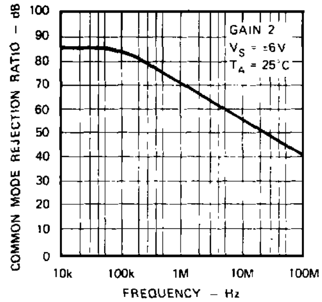
Phase Shift Vs. Frequency



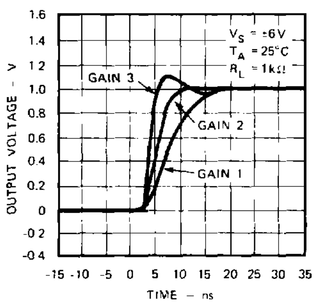
Phase Shift Vs. Frequency



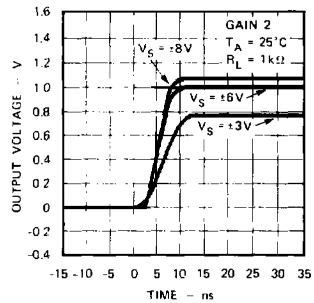
Common Mode Rejection Ratio



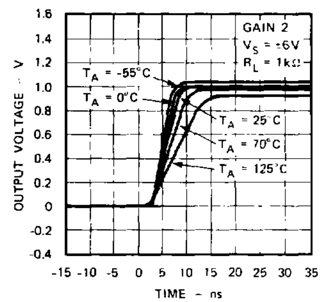
Pulse Response Vs. Gain



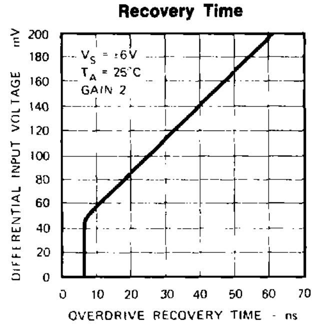
Pulse Response Vs. Supply Voltage



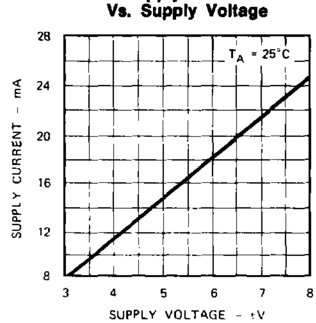
Pulse Response Vs. Temperature



Differential Overdrive Recovery Time



Supply Current Vs. Supply Voltage



LIC-831