DATA SHEET

µA733/733C
Differential video amplifier

Product specification

IC11

April 15, 1992

PHILIPS

Differential video amplifier μA733/733C

DESCRIPTION

The 733 is a monolithic differential input, differential output, wide-band 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

PIN CONFIGURATION

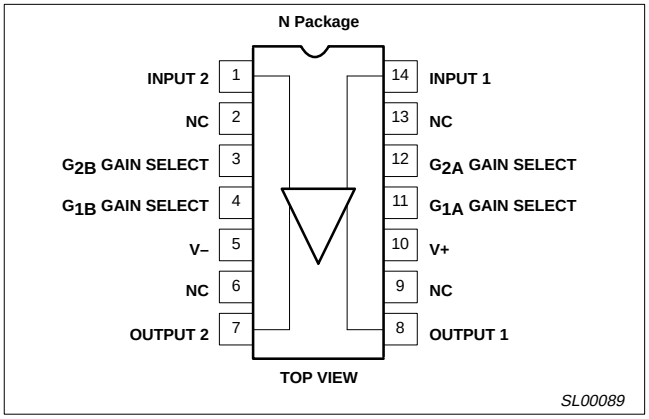


Figure 1. Pin Configuration

APPLICATIONS

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

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE	ORDER CODE	DWG #
14-Pin Plastic Dual In–Line Package (DIP)	-55°C to +125°C	μA733N	SOT27-1
14-Pin Plastic Dual In–Line Package (DIP)	0 to +70°C	μA733CN	SOT27-1

CIRCUIT SCHEMATIC

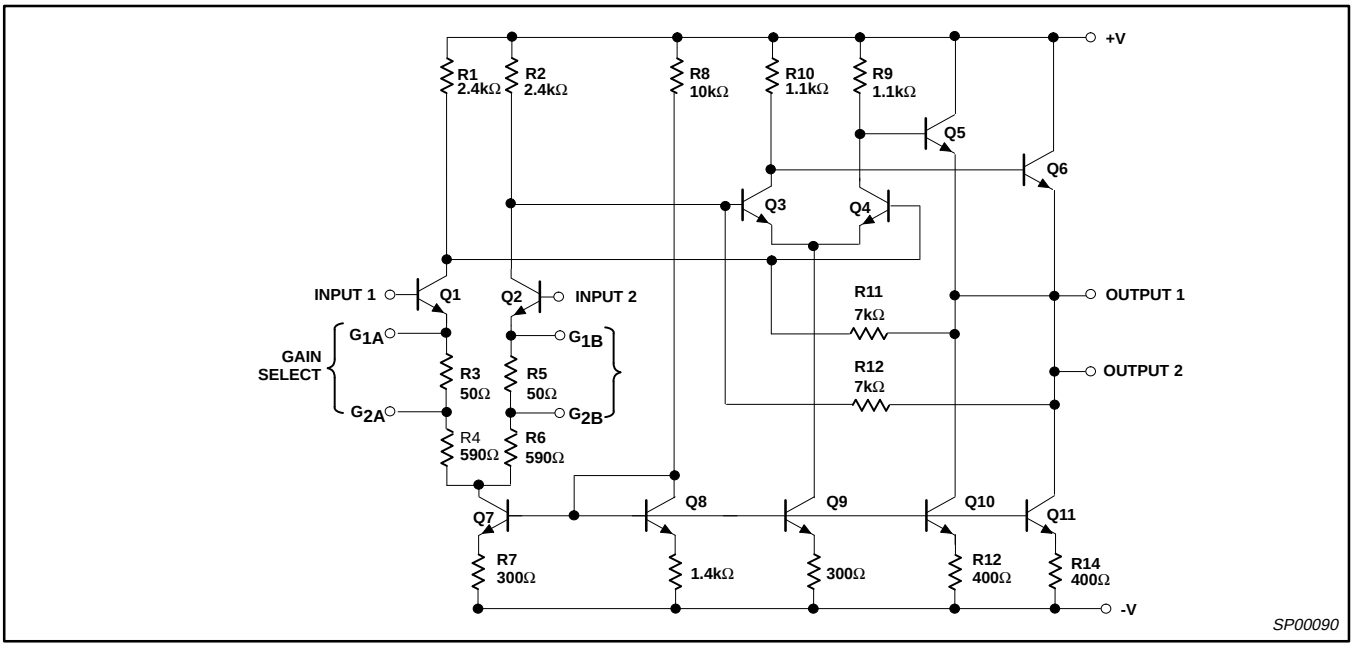


Figure 2. Circuit Schematic

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{DIFF}	Differential input voltage	±5	V
V_{CM}	Common-mode input voltage	±6	V
V_{CC}	Supply voltage	±8	V
I_{OUT}	Output current	10	mA
T_J	Junction temperature	+150	°C
T_{STG}	Storage temperature range	-65 to +150	°C
T_A	Operating ambient temperature range		
	μA733C	0 to +70	°C
	μA733	-55 to +125	°C
$P_{D\ MAX}$	Maximum power dissipation, 25°C ambient temperature (still-air)[1]	1420	mW

NOTE:
1. The following derating factors should be applied above 25°C:
   N package at 11.4mW/°C

DC ELECTRICAL CHARACTERISTICS

T_A=+25°C, V_S=±6V, V_{CM}=0, unless otherwise specified. Recommended operating supply voltages V_S=±6.0V.

SYMBOL	PARAMETER	TEST CONDITIONS	μA733C			μA733			UNIT
			Min	Typ	Max	Min	Typ	Max	
	Differential voltage gain	R_l = 2kΩ, V_{OUT} = 3V_{P-P}							
	Gain 1[2]		250	400	600	300	400	500	V/V
	Gain 2[2]		80	100	120	90	100	110	V/V
	Gain 3[3]		8	10	12	9	10	11	V/V
	Gain 1[1]			40			40		
BW	Gain 2[2]			90			90		MHz
	Gain 3[3]			120			120		
t_R		V_{OUT} = 1V_{P-P}							
	Gain 1[1]			10.5			10.5		ns
	Gain 2[2]			4.5	12		4.5	10	ns
	Gain 3[3]			2.5			2.5		ns
t_{PD}		V_{OUT} = 1V_{P-P}							
	Gain 1[1]			7.5			7.5		ns
	Gain 2[2]			6.0	10		6.0	10	ns
	Gain 3[3]			3.6			3.6		ns
R_{IN}									
	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
I_{OS}	Input offset current			0.4	5.0		0.4	3.0	μA
I_{BIAS}	Input bias current			9.0	30		9.0	20	μA
V_{NOISE}	Input noise voltage	BW=1kHz to 10MHz		12			12		μV_{RMS}
V_{IN}	Input voltage range		±1.0			±1.0			V
CMRR									
	Gain 2	V_{CM}=±1V, f≤100kHz	60	86		60	86		dB
	Gain 2	V_{CM}=±1V, f=5MHz		60			60		dB

DC ELECTRICAL CHARACTERISTICS (Continued)

SYMBOL	PARAMETER	TEST CONDITIONS	μA733C			μA733			UNIT
			Min	Typ	Max	Min	Typ	Max	
SVRR	Supply voltage rejection ratio Gain 2	ΔV_S = ±0.5V	50	70		50	70		dB
	Output offset voltage	R_L = ∞							
	Gain 1[1]			0.6	1.5		0.6	1.5	V
	Gain 2 and 3[2, 3]			0.35	1.5		0.35	1.0	V
V_{CM}	Output common-mode voltage	R_L = ∞	2.4	2.9	3.4	2.4	2.9	3.4	V
	Output voltage swing, differential	R_L=2kΩ	3.0	4.0		3.0	4.0		V_{P-P}
I_{SINK}	Output sink current		2.5	3.6		2.5	3.6		mA
R_{OUT}	Output resistance			20			20		Ω
I_{CC}	Power supply current	R_L = ∞		18	24		18	24	mA
THE FOLLOWING SPECIFICATIONS APPLY OVER TEMPERATURE			**0°C ≤ T_A ≤ 70°C**			**-55°C ≤ T_A ≤ 125°C**			
			Min	**Typ**	**Max**	**Min**	**Typ**	**Max**	**UNIT**
	Differential voltage gain	R_l = 2kΩ, V_{OUT} = $3V_{P-P}$							
	Gain 1[1]		250		600	200		600	V/V
	Gain 2[2]		80		120	80		120	V/V
	Gain[3]		8		12	8		12	V/V
R_{IN}	Input resistance								
	Gain 2[2]		8			8			kΩ
I_{OS}	Input offset current				6			5	μA
I_{BIAS}	Input bias current				40			40	μA
V_{IN}	Input voltage range		±1.0			±1.0			V
CMRR	Common-mode rejection ratio								
	Gain 2	V_{CM}=±V, F≤100kHz	50			50			dB
SVRR	Supply voltage rejection ratio								
	Gain 2	ΔV_S=±0.5V	50			50			dB
V_{OS}	Output offset voltage	R_L = ∞							
	Gain 1[1]				1.5			1.5	V
	Gain 2 and 3[2, 3]				1.5			1.2	V
V_{DIFF}	Output voltage swing, differential	R_L = 2kΩ	2.8			2.5			V_{P-P}
I_{SINK}	Output sink current		2.5			2.2			mA
I_{CC}	Power supply current	R_L ± ∞			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

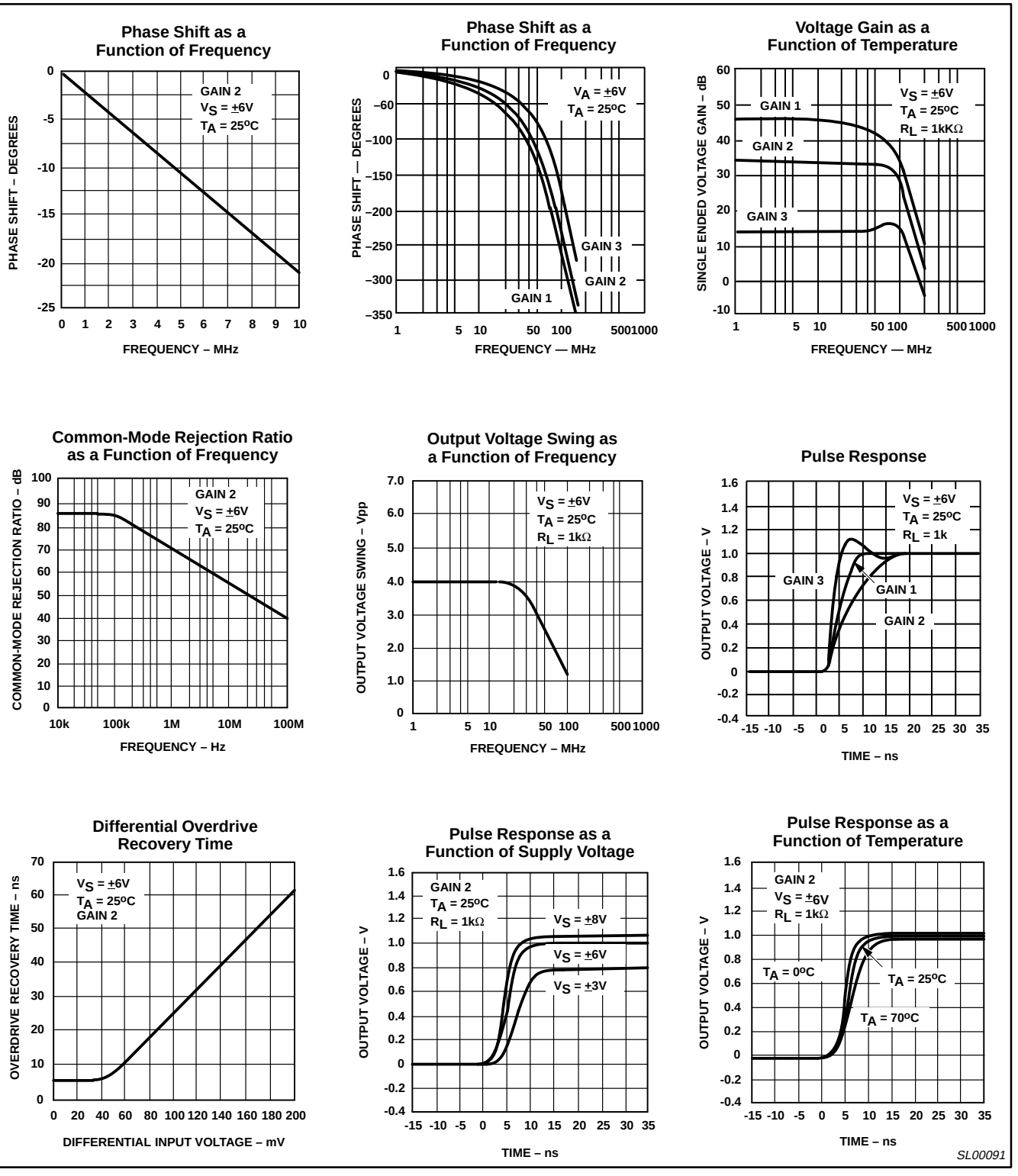


Figure 3. Typical Performance Characteristics

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

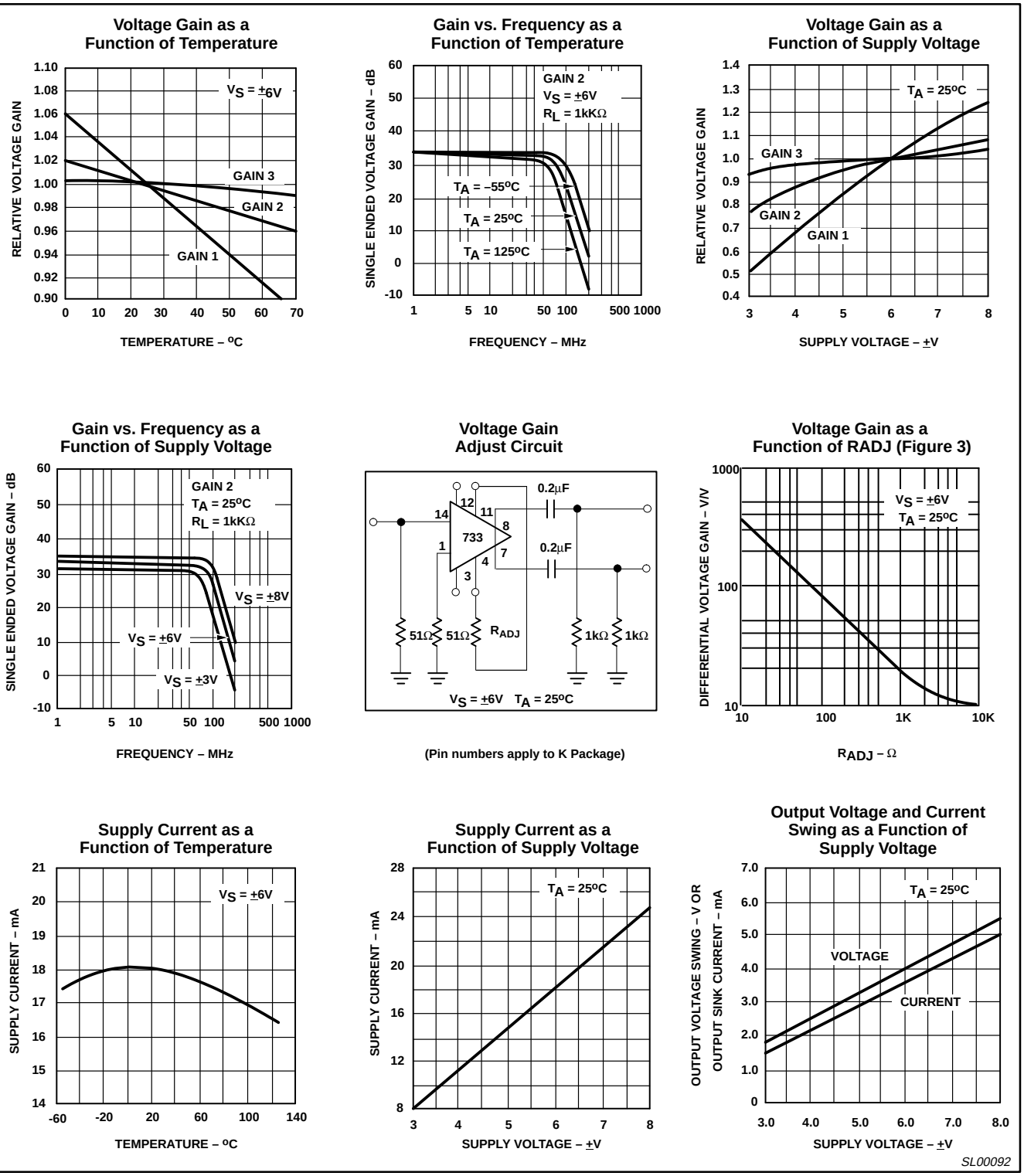


Figure 4. Typical Performance Characteristics (cont.)

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

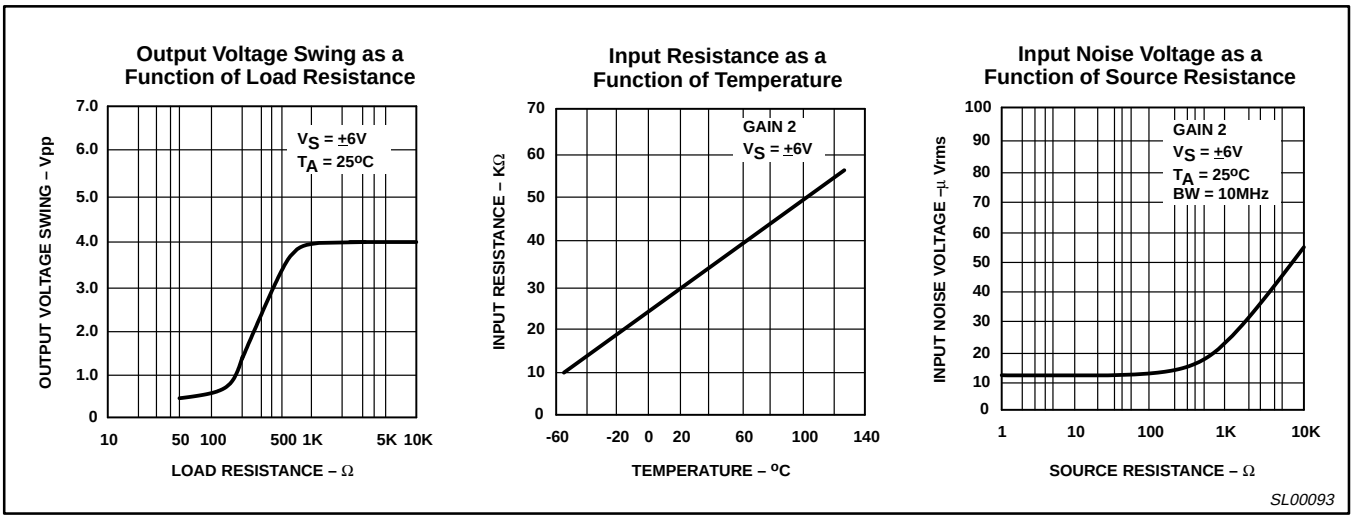


Figure 5. Typical Performance Characteristics (cont.)

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

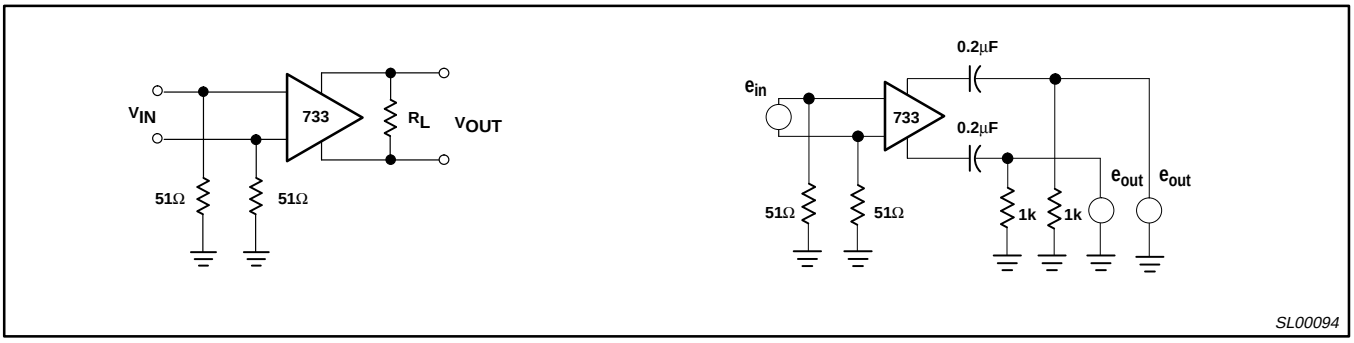
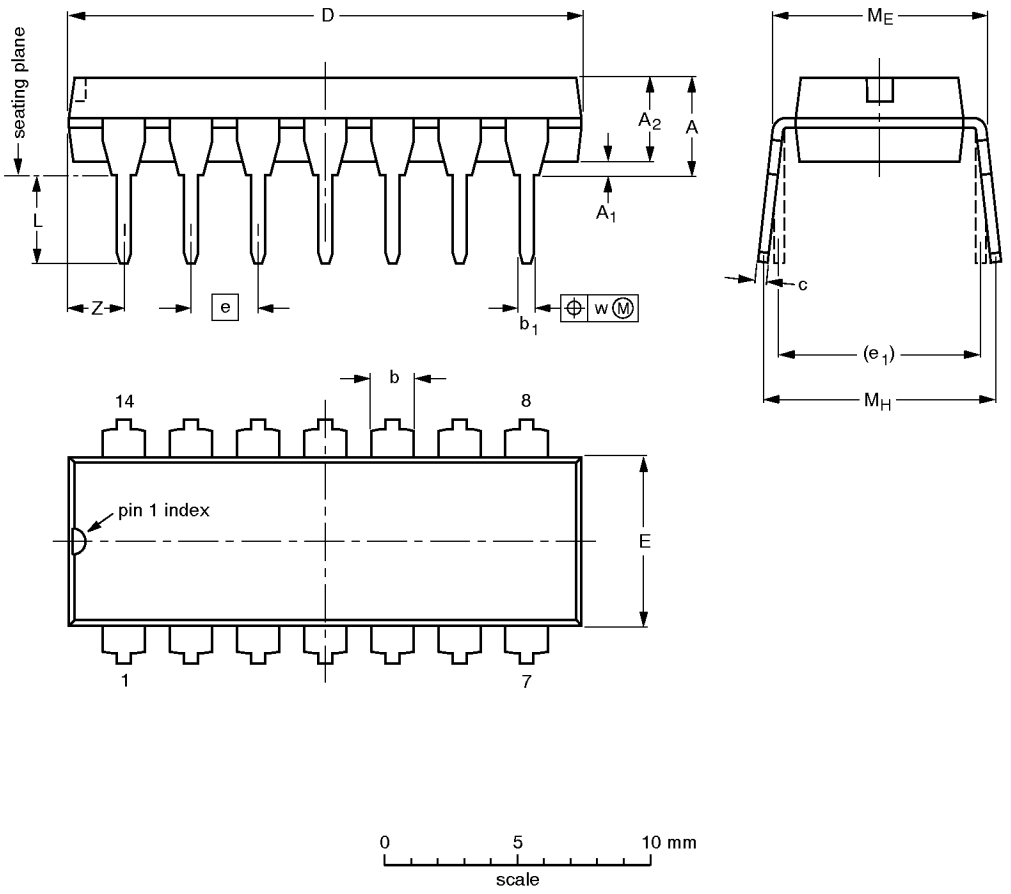


Figure 6. Test Circuits

DIP14: plastic dual in-line package; 14 leads (300 mil) **SOT27-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1 min.	A_2 max.	b	b_1	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001AA				~~92-11-17~~ 95-03-11

DEFINITIONS

Data Sheet Identification	Product Status	Definition
Objective Specification	Formative or in Design	This data sheet contains the design target or goal specifications for product development. Specifications may change in any manner without notice.
Preliminary Specification	Preproduction Product	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product Specification	Full Production	This data sheet contains Final Specifications. Philips Semiconductors reserves the right to make changes at any time without notice, in order to improve design and supply the best possible product.

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