

DATA SHEET

μA733/733C

Differential video amplifier

Product specification

April 15, 1992

IC11

Philips Semiconductors



PHILIPS

Differential video amplifier

μA733/733C

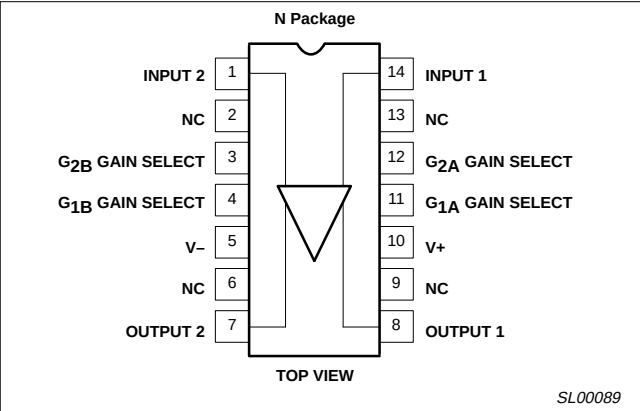
DESCRIPTION

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



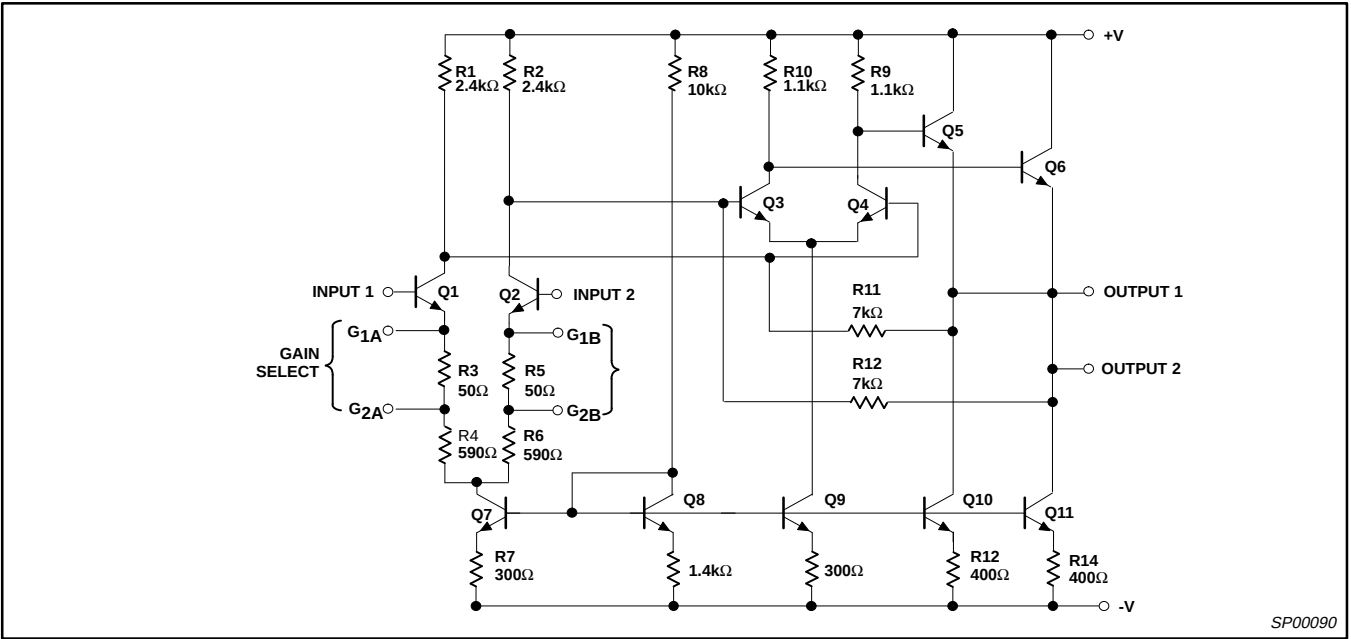
APPLICATIONS

- 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



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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	$^{\circ}\text{C}$
T_{STG}	Storage temperature range	-65 to +150	$^{\circ}\text{C}$
T_A	Operating ambient temperature range μ A733C μ A733	0 to +70	$^{\circ}\text{C}$
		-55 to +125	$^{\circ}\text{C}$
$P_{D\text{ MAX}}$	Maximum power dissipation, 25 $^{\circ}\text{C}$ ambient temperature (still-air) ¹	1420	mW

NOTE:

1. The following derating factors should be applied above 25 $^{\circ}\text{C}$:
N package at 11.4mW/ $^{\circ}\text{C}$

DC ELECTRICAL CHARACTERISTICS

$T_A = +25^{\circ}\text{C}$, $V_S = \pm 6\text{V}$, $V_{CM} = 0$, unless otherwise specified. Recommended operating supply voltages $V_S = \pm 6.0\text{V}$.

SYMBOL	PARAMETER	TEST CONDITIONS	μ A733C			μ A733			UNIT
			Min	Typ	Max	Min	Typ	Max	
	Differential voltage gain	$R_I = 2\text{k}\Omega$, $V_{OUT} = 3V_{P-P}$							
	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
BW	Gain 1 ¹			40			40		MHz
	Gain 2 ²			90			90		
	Gain 3 ³			120			120		
t_R	Gain 1 ¹	$V_{OUT} = 1V_{P-P}$		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}	Gain 1 ¹	$V_{OUT} = 1V_{P-P}$		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		k Ω
	Gain 2 ²		10	30		20	30		k Ω
	Gain 3 ³			250			250		k Ω
	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	$V_{CM} = \pm 1\text{V}$, $f \leq 100\text{kHz}$	60	86		60	86		dB
	Gain 2	$V_{CM} = \pm 1\text{V}$, $f = 5\text{MHz}$		60			60		dB

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DC ELECTRICAL CHARACTERISTICS (Continued)

SYMBOL	PARAMETER	TEST CONDITIONS	μ A733C			μ A733			UNIT
			Min	Typ	Max	Min	Typ	Max	
SVRR	Supply voltage rejection ratio Gain 2	$\Delta V_S = \pm 0.5V$	50	70		50	70		dB
	Output offset voltage	$R_L = \infty$							
	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	$R_L = \infty$	2.4	2.9	3.4	2.4	2.9	3.4	V
	Output voltage swing, differential	$R_L = 2k\Omega$	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	$R_L = \infty$		18	24		18	24	mA
THE FOLLOWING SPECIFICATIONS APPLY OVER TEMPERATURE			$0^\circ C \leq T_A \leq 70^\circ C$			$-55^\circ C \leq T_A \leq 125^\circ C$			
			Min	Typ	Max	Min	Typ	Max	UNIT
	Differential voltage gain	$R_I = 2k\Omega, V_{OUT} = 3V_{P-P}$							
	Gain 1 ¹		250		600	200		600	V/V
	Gain 2 ²		80		120	80		120	V/V
	Gain 3 ³		8		12	8		12	V/V
R_{IN}	Input resistance								
	Gain 2 ²		8			8			k Ω
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	$V_{CM} = \pm V, F \leq 100kHz$	50			50			dB
SVRR	Supply voltage rejection ratio								
	Gain 2	$\Delta V_S = \pm 0.5V$	50			50			dB
V_{OS}	Output offset voltage	$R_L = \infty$							
	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	$R_L = 2k\Omega$	2.8			2.5			V_{P-P}
I_{SINK}	Output sink current		2.5			2.2			mA
I_{CC}	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.

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TYPICAL PERFORMANCE CHARACTERISTICS

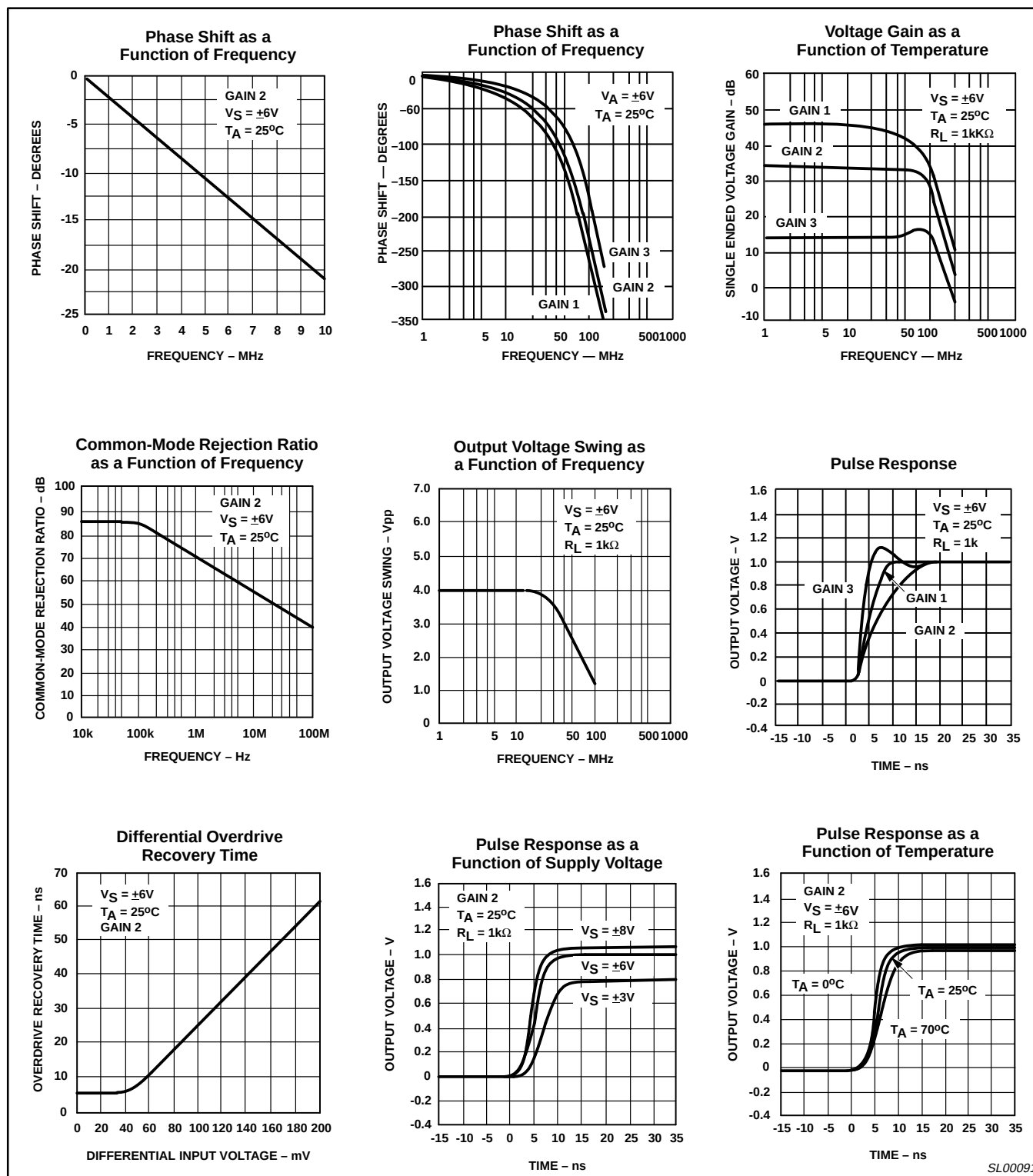


Figure 3. Typical Performance Characteristics

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

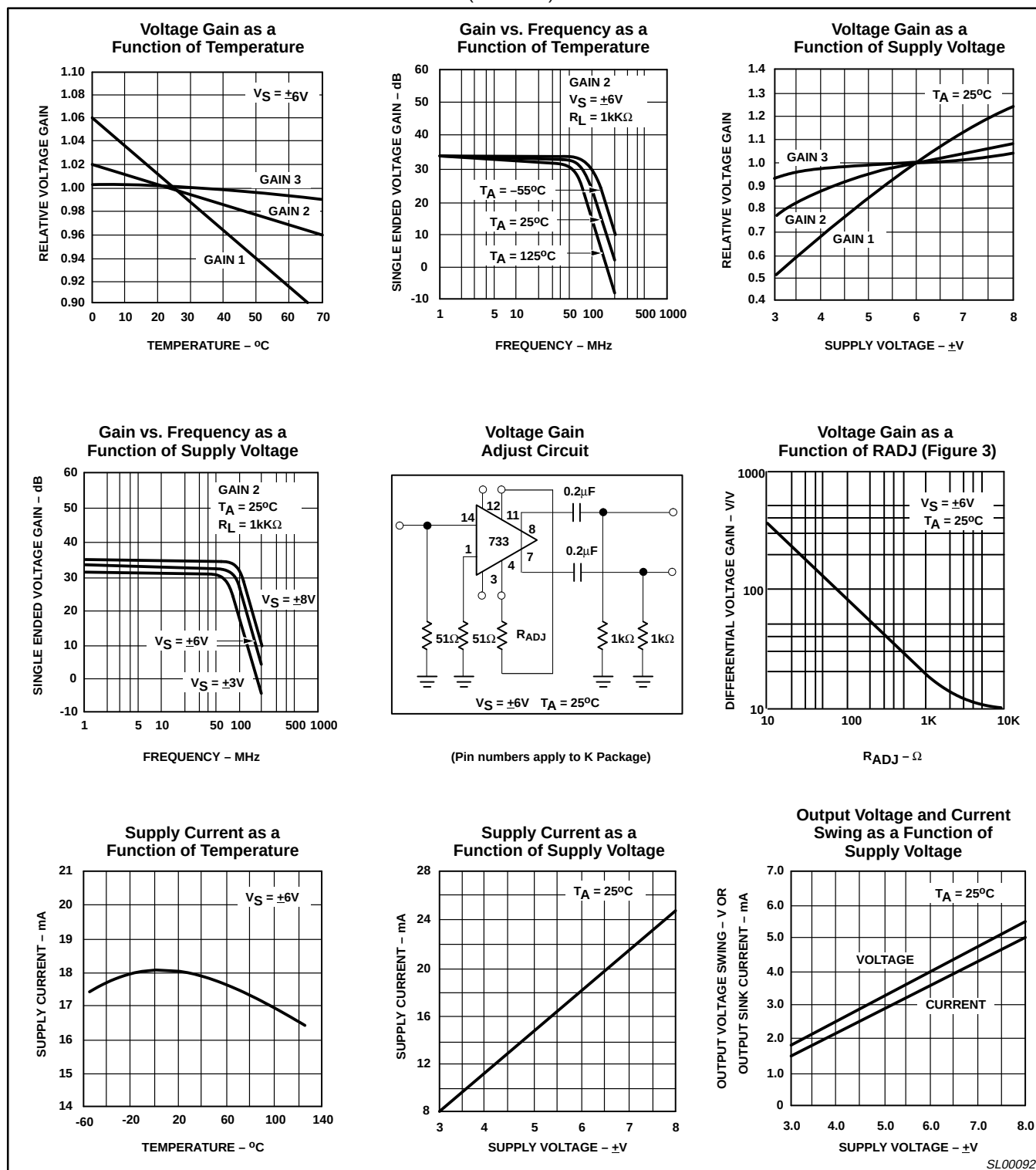


Figure 4. Typical Performance Characteristics (cont.)

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

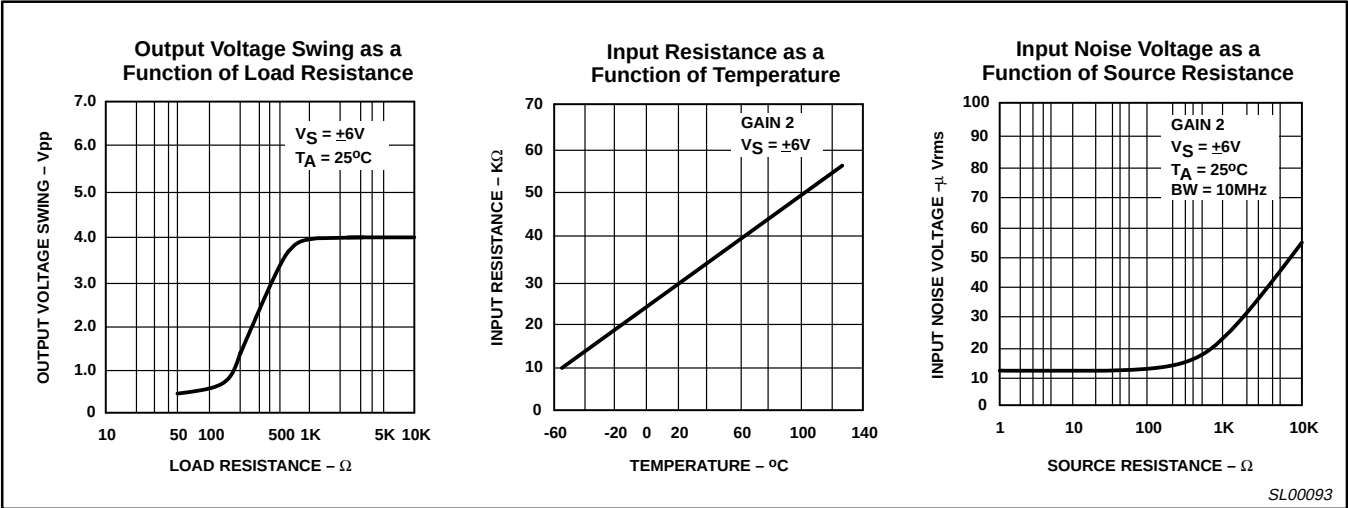


Figure 5. Typical Performance Characteristics (cont.)

TEST CIRCUITS $T_A=25^\circ C$, unless otherwise specified.

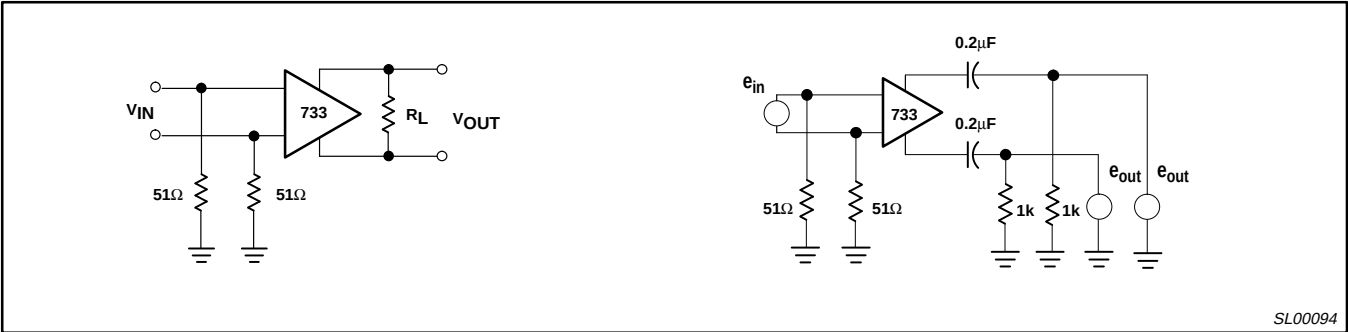


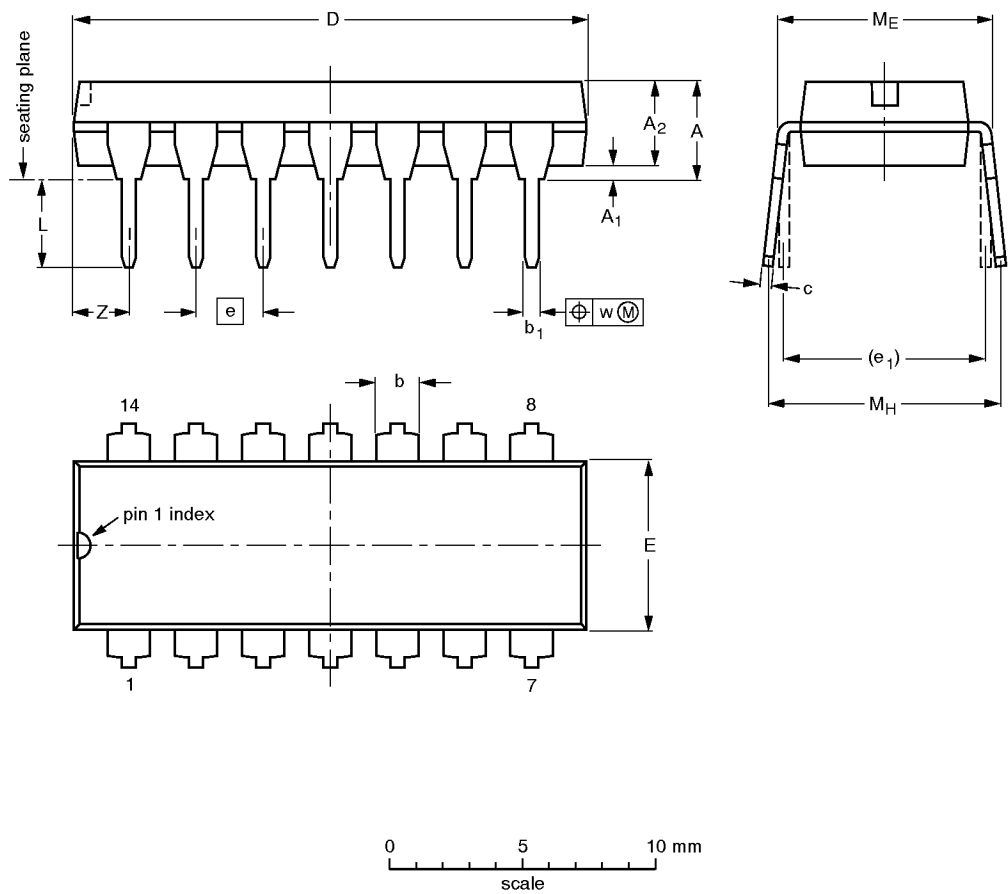
Figure 6. Test Circuits

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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

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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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