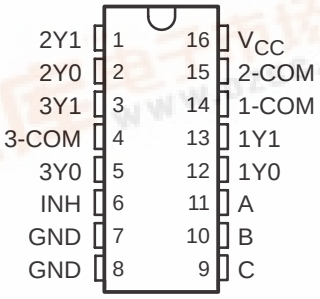
TRIPLE 2-CHANNEL ANALOG MULTIPLEXERS/DEMULTIPLEXERS

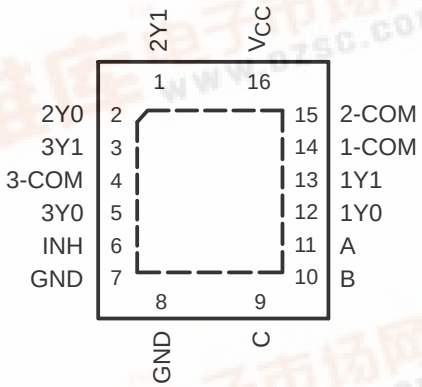
SCLS430K – MAY 1999 – REVISED APRIL 2005

- 2-V to 5.5-V V_{CC} Operation
- Support Mixed-Mode Voltage Operation on All Ports
- High On-Off Output-Voltage Ratio
- Low Crosstalk Between Switches
- Individual Switch Controls
- Extremely Low Input Current
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

SN54LV4053A . . . J OR W PACKAGE
SN74LV4053A . . . D, DB, DGV, N, NS, OR PW PACKAGE
(TOP VIEW)



SN74LV4053A . . . RGY PACKAGE
(TOP VIEW)



description/ordering information

These triple 2-channel CMOS analog multiplexers/demultiplexers are designed for 2-V to 5.5-V V_{CC} operation.

The ’LV4053A devices handle both analog and digital signals. Each channel permits signals with amplitudes up to 5.5 V (peak) to be transmitted in either direction.

Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

ORDERING INFORMATION

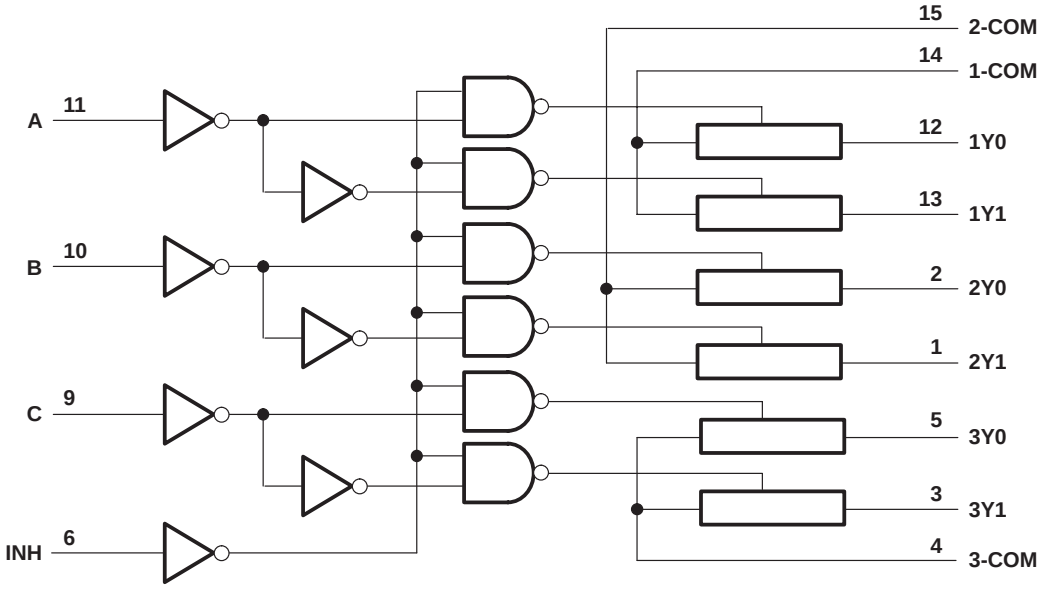
T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
−40°C to 85°C	PDIP – N	Tube of 25	SN74LV4053AN	SN74LV4053AN
	QFN – RGY	Reel of 1000	SN74LV4053ARGYR	LW053A
	SOIC – D	Tube of 40	SN74LV4053AD	LV4053A
		Reel of 2500	SN74LV4053ADR	
	SOP – NS	Reel of 2000	SN74LV4053ANSR	74LV4053A
	SSOP – DB	Reel of 2000	SN74LV4053ADBR	LW053A
	TSSOP – PW	Tube of 90	SN74LV4053APW	LW053A
		Reel of 2000	SN74LV4053APWR	
		Reel of 250	SN74LV4053APWT	
	TVSOP – DGV	Reel of 2000	SN74LV4053ADGVR	LW053A
−55°C to 125°C	CDIP – J	Tube of 25	SNJ54LV4053AJ	SNJ54LV4053AJ
	CFP – W	Tube of 150	SNJ54LV4053AW	SNJ54LV4053AW

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE

INPUTS				ON CHANNELS
INH	C	B	A	
L	L	L	L	1Y0, 2Y0, 3Y0
L	L	L	H	1Y1, 2Y0, 3Y0
L	L	H	L	1Y0, 2Y1, 3Y0
L	L	H	H	1Y1, 2Y1, 3Y0
L	H	L	L	1Y0, 2Y0, 3Y1
L	H	L	H	1Y1, 2Y0, 3Y1
L	H	H	L	1Y0, 2Y1, 3Y1
L	H	H	H	1Y1, 2Y1, 3Y1
H	X	X	X	None

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC} . . . . . −0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . . −0.5 V to 7 V
Switch I/O voltage range, V_{IO} (see Notes 1 and 2) . . . . . −0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0) . . . . . −20 mA
I/O diode current, I_{IOK} (V_{IO} < 0) . . . . . −50 mA
Switch through current, I_T (V_{IO} = 0 to V_{CC}) . . . . . ±25 mA
Continuous current through V_{CC} or GND . . . . . ±50 mA
Package thermal impedance, θ_{JA} (see Note 3): D package . . . . . 73°C/W
(see Note 3): DB package . . . . . 82°C/W
(see Note 3): DGV package . . . . . 120°C/W
(see Note 3): NS package . . . . . 64°C/W
(see Note 3): PW package . . . . . 108°C/W
(see Note 4): RGY package . . . . . 39°C/W
Storage temperature range, T_{stg} . . . . . −65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. This value is limited to 5.5 V maximum.
3. The package thermal impedance is calculated in accordance with JESD 51-7.
4. The package thermal impedance is calculated in accordance with JESD 51-5.

recommended operating conditions (see Note 5)

			SN54LV4053A		SN74LV4053A		UNIT
			MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage		2‡	5.5	2‡	5.5	V
V_{IH}	High-level input voltage, control inputs	V_{CC} = 2 V	1.5		1.5		V
		V_{CC} = 2.3 V to 2.7 V	V_{CC} × 0.7		V_{CC} × 0.7		
		V_{CC} = 3 V to 3.6 V	V_{CC} × 0.7		V_{CC} × 0.7		
		V_{CC} = 4.5 V to 5.5 V	V_{CC} × 0.7		V_{CC} × 0.7		
V_{IL}	Low-level input voltage, control inputs	V_{CC} = 2 V		0.5		0.5	V
		V_{CC} = 2.3 V to 2.7 V		V_{CC} × 0.3		V_{CC} × 0.3	
		V_{CC} = 3 V to 3.6 V		V_{CC} × 0.3		V_{CC} × 0.3	
		V_{CC} = 4.5 V to 5.5 V		V_{CC} × 0.3		V_{CC} × 0.3	
V_I	Control input voltage		0	5.5	0	5.5	V
V_{IO}	Input/output voltage		0	V_{CC}	0	V_{CC}	V
$\Delta t/\Delta v$	Input transition rise or fall rate	V_{CC} = 2.3 V to 2.7 V		200		200	ns/V
		V_{CC} = 3 V to 3.6 V		100		100	
		V_{CC} = 4.5 V to 5.5 V		20		20	
T_A	Operating free-air temperature		−55	125	−40	85	°C

‡ With supply voltages at or near 2 V, the analog switch on-state resistance becomes very nonlinear. It is recommended that only digital signals be transmitted at these low supply voltages.

NOTE 5: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	V_{CC}	T_A = 25°C			SN54LV4053A		SN74LV4053A		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
r_{on}	On-state switch resistance	I_T = 2 mA, V_I = V_{CC} or GND, V_{INH} = V_{IL} (see Figure 1)	2.3 V		41	180		225		225	Ω
			3 V		30	150		190		190	
			4.5 V		23	75		100		100	
$r_{on(p)}$	Peak on-state resistance	I_T = 2 mA, V_I = V_{CC} to GND, V_{INH} = V_{IL}	2.3 V		139	500		600		600	Ω
			3 V		63	180		225		225	
			4.5 V		35	100		125		125	
Δr_{on}	Difference in on-state resistance between switches	I_T = 2 mA, V_I = V_{CC} to GND, V_{INH} = V_{IL}	2.3 V		2	30		40		40	Ω
			3 V		1.6	20		30		30	
			4.5 V		1.3	15		20		20	
I_I	Control input current	V_I = 5.5 V or GND	0 to 5.5 V			±0.1		±1		±1	µA
$I_{S(off)}$	Off-state switch leakage current	V_I = V_{CC} and V_O = GND, or V_I = GND and V_O = V_{CC}, V_{INH} = V_{IH} (see Figure 2)	5.5 V			±0.1		±1		±1	µA
$I_{S(on)}$	On-state switch leakage current	V_I = V_{CC} or GND, V_{INH} = V_{IH} (see Figure 3)	5.5 V			±0.1		±1		±1	µA
I_{CC}	Supply current	V_I = V_{CC} or GND	5.5 V					20		20	µA
C_{IC}	Control input capacitance				2						pF
C_{IS}	Common terminal capacitance				8.2						pF
C_{OS}	Switch terminal capacitance				5.6						pF
C_F	Feedthrough capacitance				0.5						pF

switching characteristics over recommended operating free-air temperature range, V_{CC} = 2.5 V ± 0.2 V (unless otherwise noted)

PARAMETER		FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T_A = 25°C			SN54LV4053A		SN74LV4053A		UNIT
					MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 15 pF (see Figure 4)		2.5	10		16		16	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		7.6	18		23		23	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		7.7	18		23		23	ns
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 50 pF (see Figure 4)		4.4	12		18		18	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		8.8	28		35		35	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		11.7	28		35		35	ns

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted)

PARAMETER		FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T_A = 25°C			SN54LV4053A		SN74LV4053A		UNIT
					MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 15 pF (see Figure 4)		1.6	6		10		10	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		5.3	12		15		15	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		6.1	12		15		15	ns
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 50 pF (see Figure 4)		2.9	9		12		12	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		6.1	20		25		25	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		8.9	20		25		25	ns

switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted)

PARAMETER		FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T_A = 25°C			SN54LV4053A		SN74LV4053A		UNIT
					MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 15 pF (see Figure 4)		0.9	4		7		7	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		3.8	8		10		10	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 15 pF (see Figure 5)		4.6	8		10		10	ns
t_{PLH} t_{PHL}	Propagation delay time	COM or Yn	Yn or COM	C_L = 50 pF (see Figure 4)		1.8	6		8		8	ns
t_{PZH} t_{PZL}	Enable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		4.3	14		18		18	ns
t_{PHZ} t_{PLZ}	Disable delay time	INH	COM or Yn	C_L = 50 pF (see Figure 5)		6.3	14		18		18	ns

analog switch characteristics

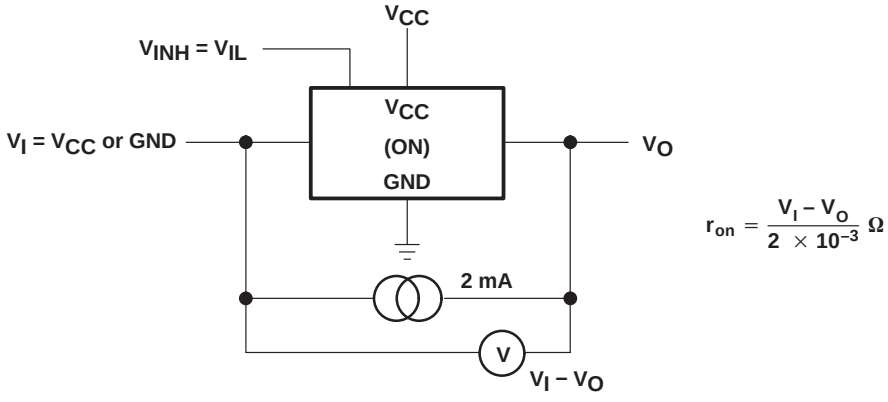
PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		V_{CC}	T_A = 25°C TYP	UNIT
Frequency response (switch on)	COM or Yn	Yn or COM	C_L = 50 pF, R_L = 600 Ω, f_{in} = 1 MHz (sine wave) (see Note 6 and Figure 6)		2.3 V	30	MHz
					3 V	35	
					4.5 V	50	
Crosstalk (between any switches)	COM or Yn	Yn or COM	C_L = 50 pF, R_L = 600 Ω, f_{in} = 1 MHz (sine wave) (see Note 7 and Figure 7)		2.3 V	−45	dB
					3 V	−45	
					4.5 V	−45	
Crosstalk (control input to signal output)	INH	COM or Yn	C_L = 50 pF, R_L = 600 Ω, f_{in} = 1 MHz (square wave) (see Figure 8)		2.3 V	20	mV
					3 V	35	
					4.5 V	65	
Feedthrough attenuation (switch off)	COM or Yn	Yn or COM	C_L = 50 pF, R_L = 600 Ω, f_{in} = 1 MHz (see Note 7 and Figure 9)		2.3 V	−45	dB
					3 V	−45	
					4.5 V	−45	
Sine-wave distortion	COM or Yn	Yn or COM	C_L = 50 pF, R_L = 10 kΩ, f_{in} = 1 kHz (sine wave) (see Figure 10)	V_I = 2 V_{p-p}	2.3 V	0.1	%
				V_I = 2.5 V_{p-p}	3 V	0.1	
				V_I = 4 V_{p-p}	4.5 V	0.1	

NOTES: 6. Adjust f_{in} voltage to obtain 0-dBm output. Increase f_{in} frequency until dB meter reads −3 dB.
7. Adjust f_{in} voltage to obtain 0-dBm input.

operating characteristics, V_{CC} = 3.3 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	C_L = 50 pF,	f = 10 MHz	5.3	pF

PARAMETER MEASUREMENT INFORMATION



$$r_{on} = \frac{V_I - V_O}{2 \times 10^{-3}}\ \Omega$$

Figure 1. On-State Resistance Test Circuit

PARAMETER MEASUREMENT INFORMATION

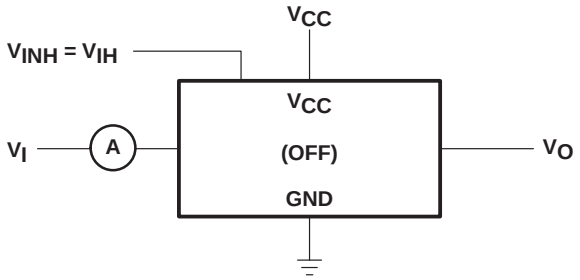


Figure 2. Off-State Switch Leakage-Current Test Circuit

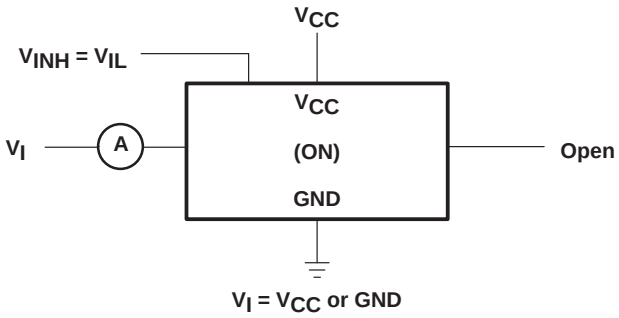


Figure 3. On-State Switch Leakage-Current Test Circuit

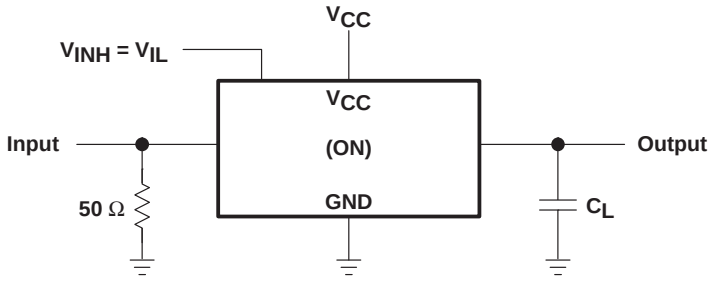
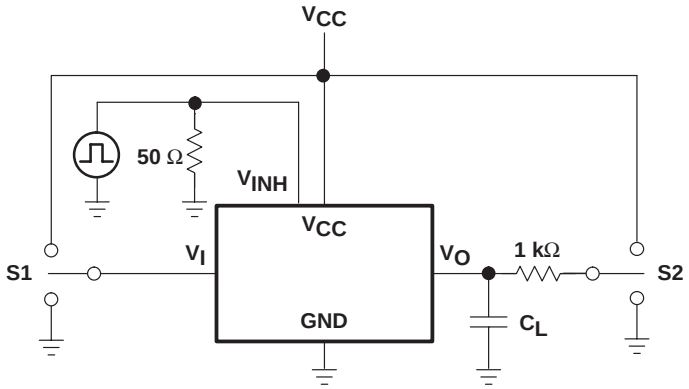


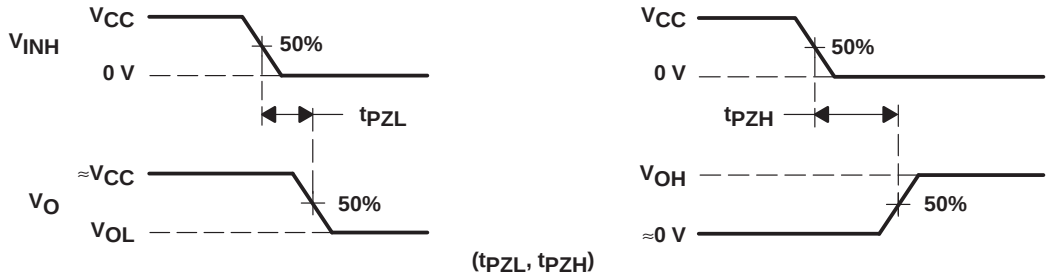
Figure 4. Propagation Delay Time, Signal Input to Signal Output

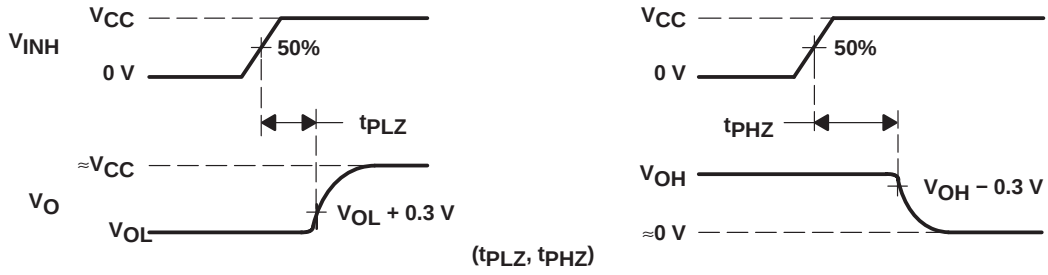
PARAMETER MEASUREMENT INFORMATION



TEST	S1	S2
t_{PLZ}/t_{PZL} t_{PHZ}/t_{PZH}	GND V_{CC}	V_{CC} GND

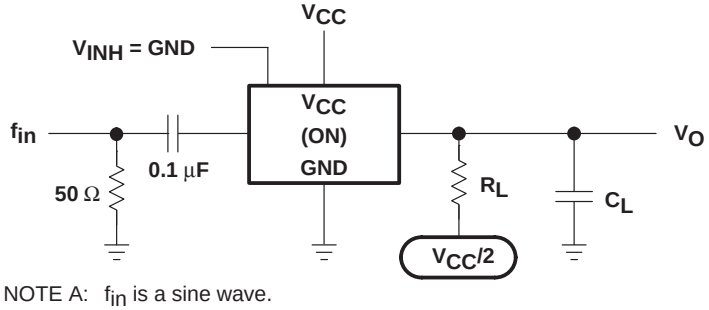
TEST CIRCUIT





VOLTAGE WAVEFORMS

Figure 5. Switching Time (t_{PZL}, t_{PLZ}, t_{PZH}, t_{PHZ}), Control to Signal Output



NOTE A: f_{in} is a sine wave.

Figure 6. Frequency Response (Switch On)

PARAMETER MEASUREMENT INFORMATION

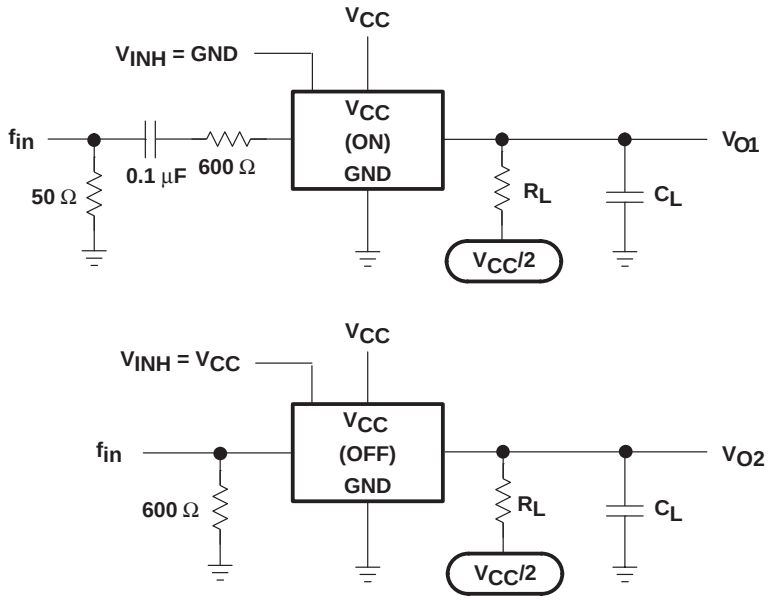


Figure 7. Crosstalk Between Any Two Switches

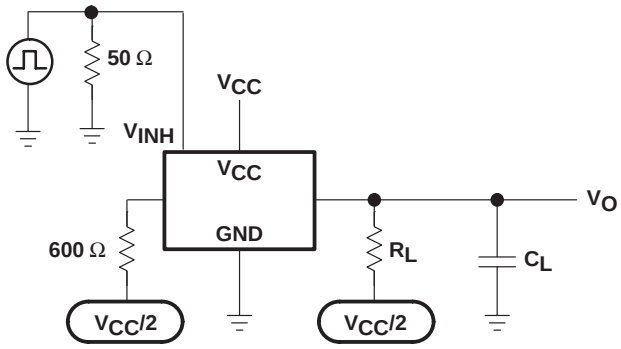


Figure 8. Crosstalk Between Control Input and Switch Output

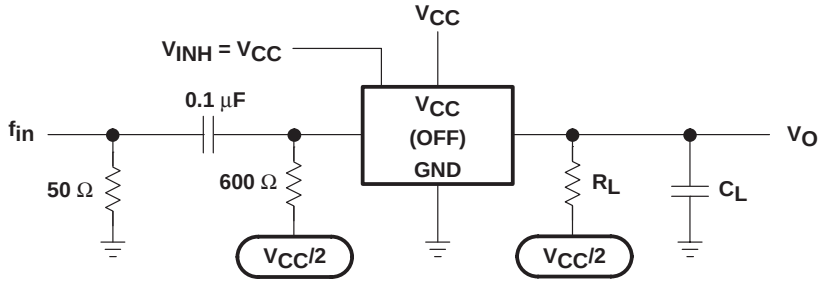


Figure 9. Feedthrough Attenuation (Switch Off)

PARAMETER MEASUREMENT INFORMATION

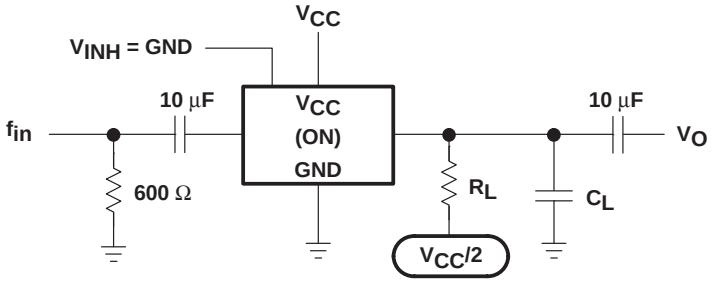


Figure 10. Sine-Wave Distortion

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
SN74LV4053AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADBR	ACTIVE	SSOP	DB	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADBRE4	ACTIVE	SSOP	DB	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADGVR	ACTIVE	TVSOP	DGV	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADGVRE4	ACTIVE	TVSOP	DGV	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LV4053ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LV4053ANSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ANSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APW	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWE4	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWG4	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWR	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWRE4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWRG4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWT	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWTE4	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053APWTG4	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV4053ARGYR	ACTIVE	QFN	RGY	16	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
SN74LV4053ARGYRG4	ACTIVE	QFN	RGY	16	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

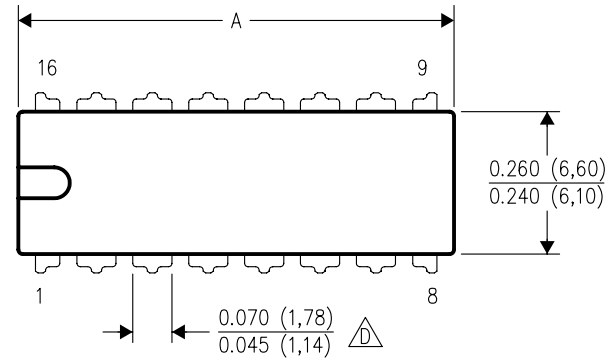
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

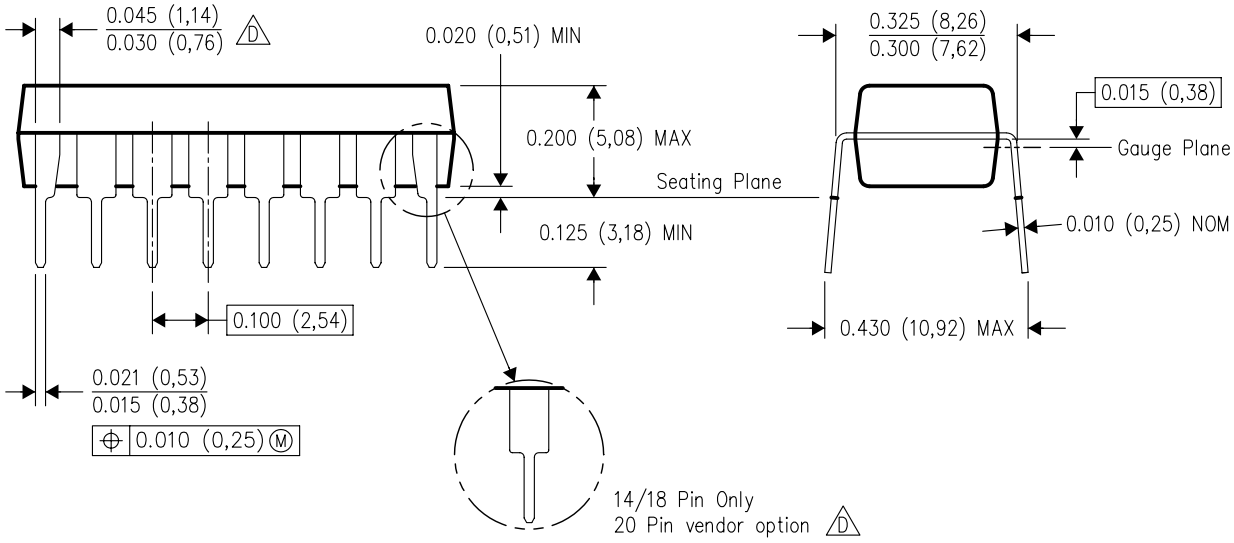
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



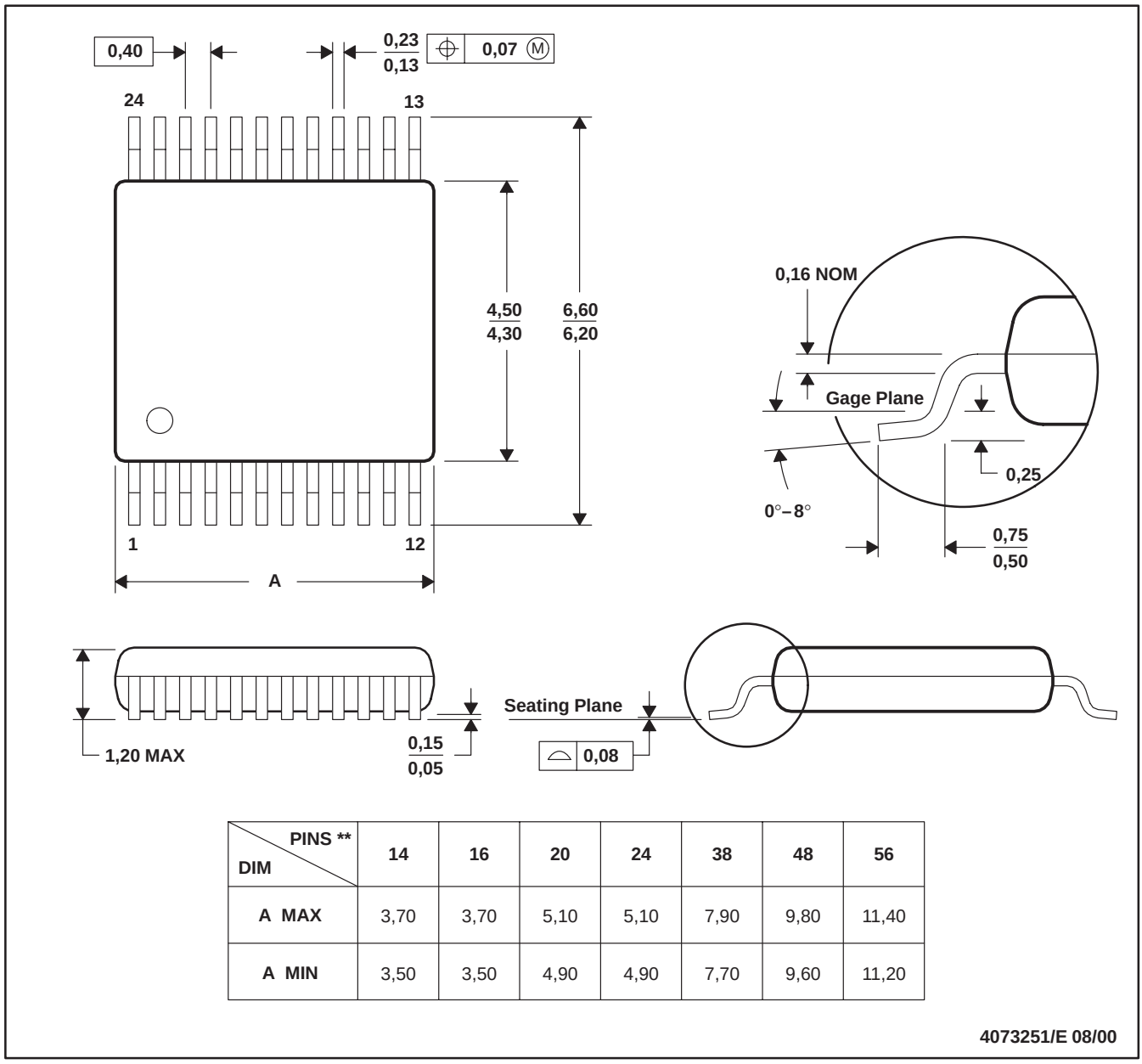
4040049/E 12/2002

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

MPDS006C – FEBRUARY 1996 – REVISED AUGUST 2000

DGV (R-PDSO-G)** **PLASTIC SMALL-OUTLINE**

24 PINS SHOWN

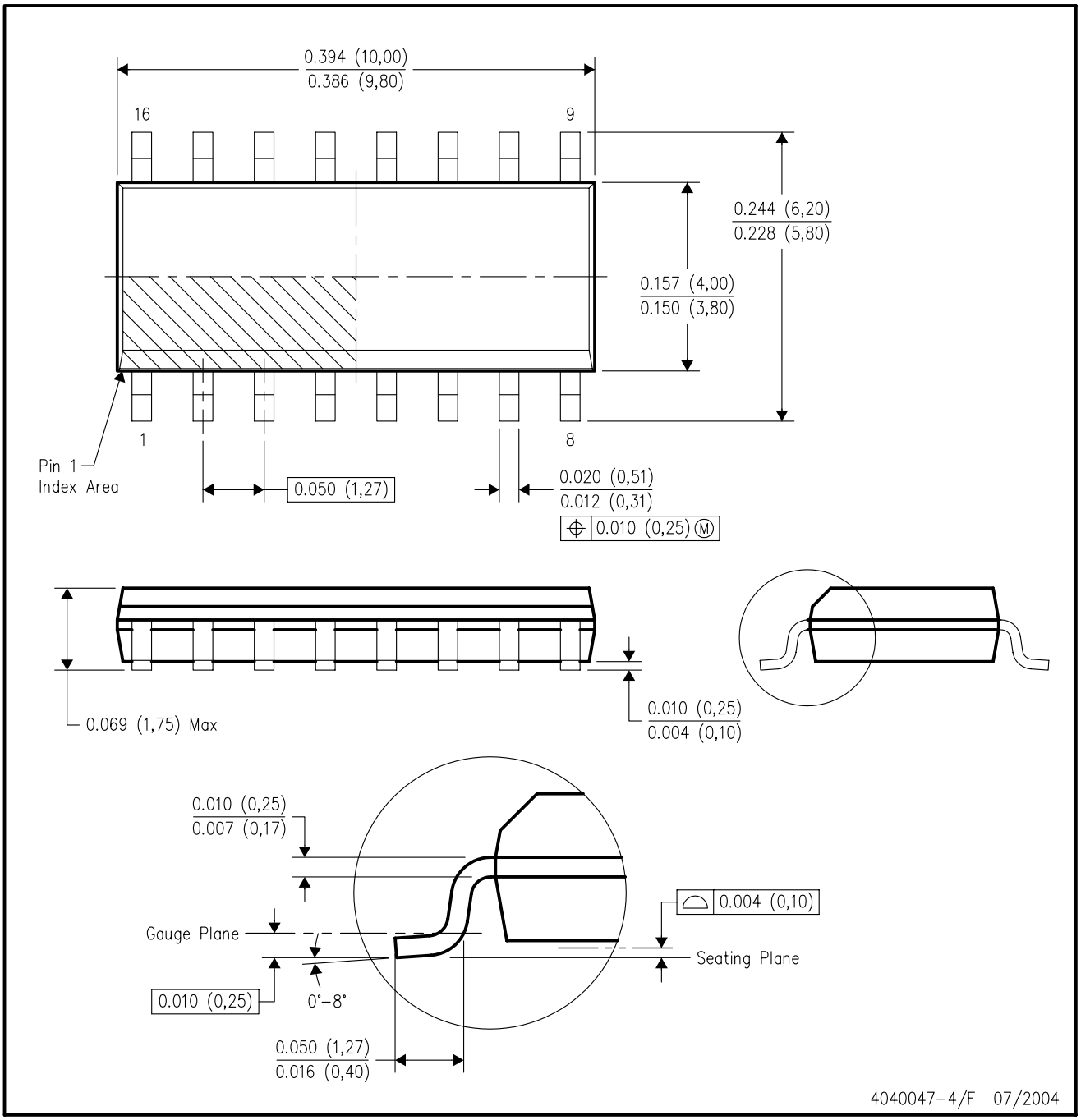


DIM \ PINS **	14	16	20	24	38	48	56
A MAX	3,70	3,70	5,10	5,10	7,90	9,80	11,40
A MIN	3,50	3,50	4,90	4,90	7,70	9,60	11,20

4073251/E 08/00

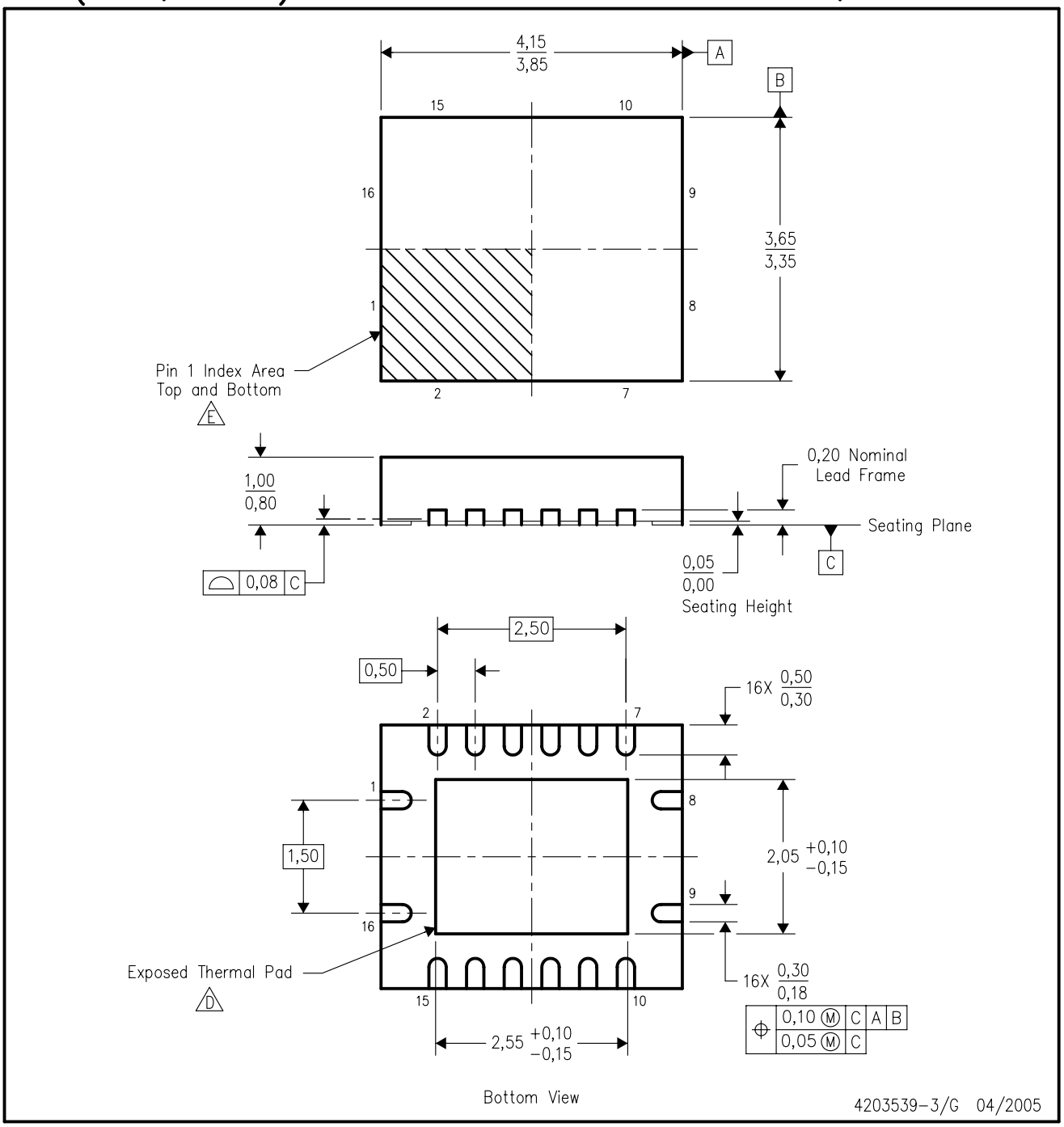
NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
D. Falls within JEDEC: 24/48 Pins – MO-153
14/16/20/56 Pins – MO-194

D (R–PDSO–G16) PLASTIC SMALL–OUTLINE PACKAGE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
D. Falls within JEDEC MS–012 variation AC.

RGY (R–PQFP–N16) PLASTIC QUAD FLATPACK

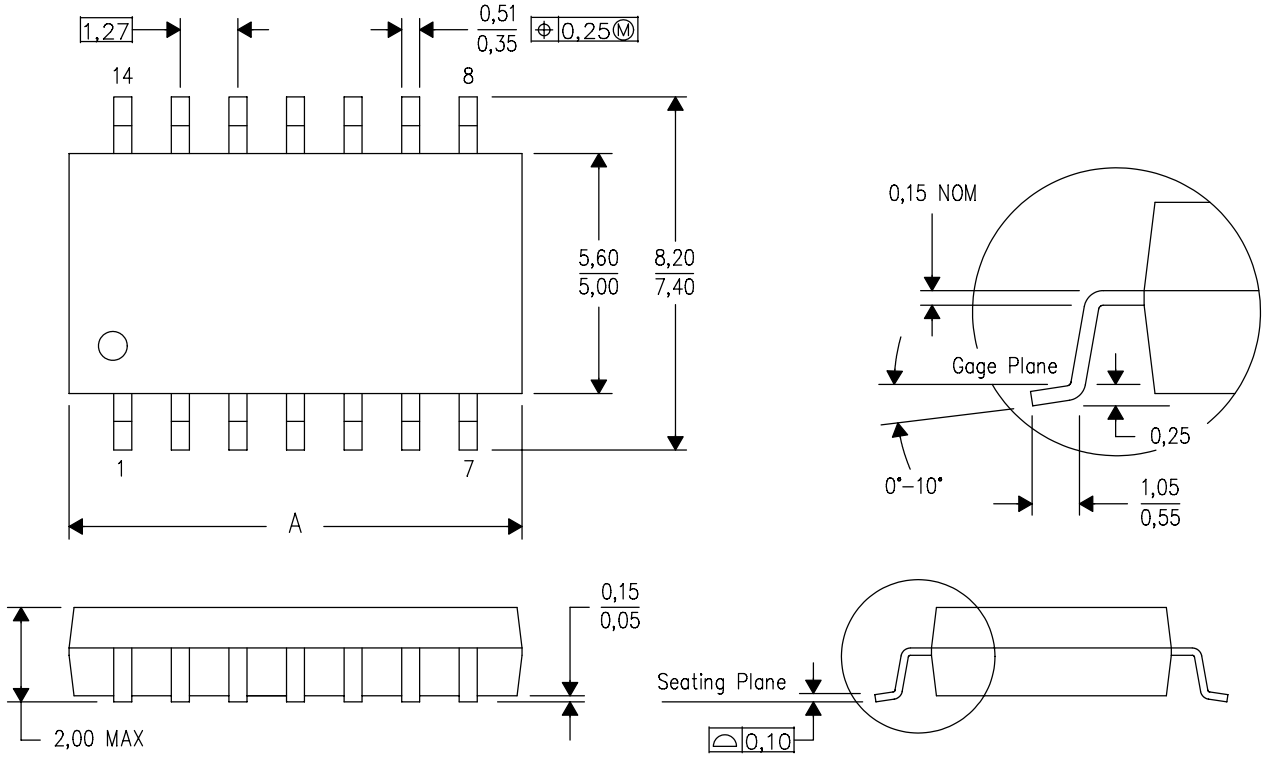


NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. QFN (Quad Flatpack No–Lead) package configuration.
D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
E. Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated. The Pin 1 identifiers are either a molded, marked, or metal feature.
F. Package complies to JEDEC MO–241 variation BB.

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN



DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

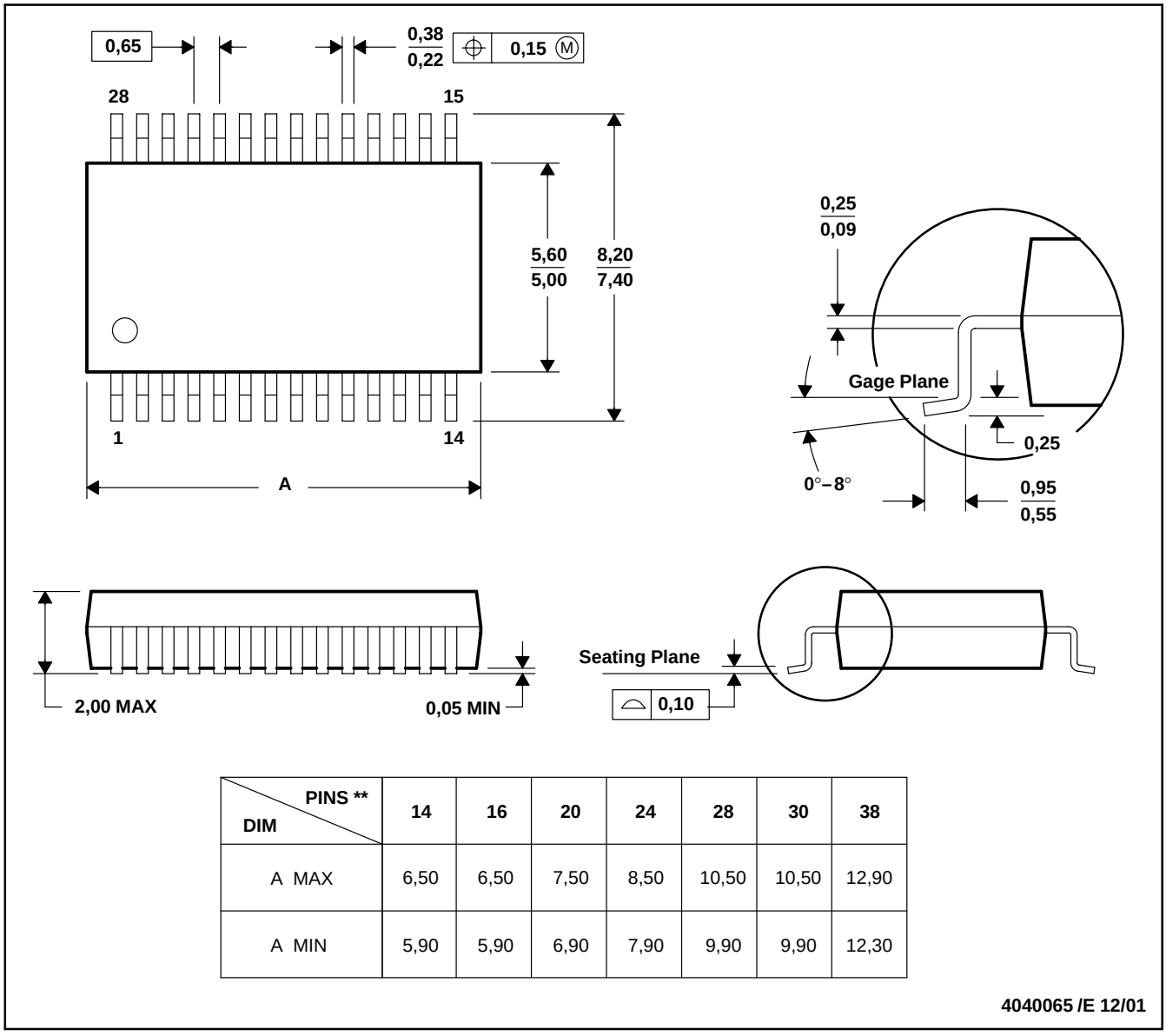
4040062/C 03/03

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

MSSO002E – JANUARY 1995 – REVISED DECEMBER 2001

DB (R-PDSO-G)** **PLASTIC SMALL-OUTLINE**

28 PINS SHOWN



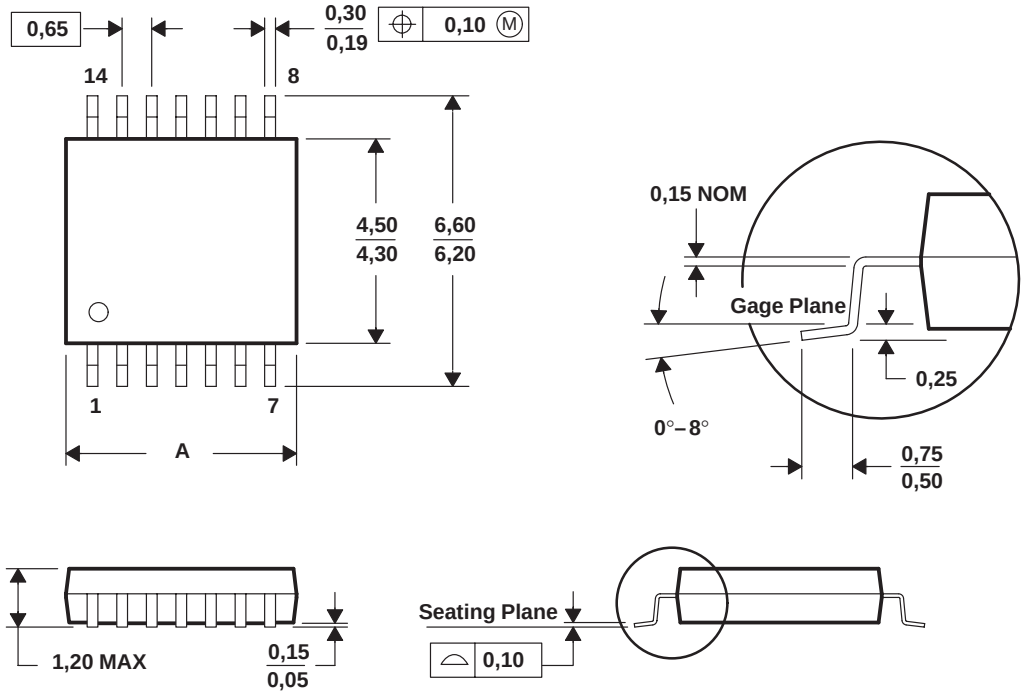
DIM \ PINS **	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

4040065 /E 12/01

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
D. Falls within JEDEC MO-150

PW (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14 PINS SHOWN



DIM \ PINS **	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60

4040064/F 01/97

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
D. Falls within JEDEC MO-153

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