## INTEGRATED CIRCUITS

# DATA SHEET

## 74LV4051

8-channel analog multiplexer/demultiplexer

Product specification
Supersedes data of 1997 Jul 15
IC24 Data Handbook







## 8-channel analog multiplexer/demultiplexer

74LV4051

#### **FEATURES**

- Optimized for low voltage applications: 1.0 to 6.0 V
- ullet Accepts TTL input levels between  $V_{CC}$  = 2.7 V and  $V_{CC}$  = 3.6 V
- Low typ "ON" resistance: 60  $\Omega$  at V<sub>cc</sub> – V<sub>EE</sub> = 4.5 V 90  $\Omega$  at V<sub>cc</sub> – V<sub>EE</sub> = 3.0 V 145  $\Omega$  at V<sub>cc</sub> – V<sub>EE</sub> = 2.0 V
- $\bullet$  Logic level translation: to enable 3 V logic to communicate with  $\pm$  3 V analog signals
- Typical "break before make" built in
- Output capability: non-standard
- I<sub>CC</sub> category: MSI

#### **DESCRIPTION**

The 74LV4051 is a low-voltage CMOS device and is pin and function compatible with the 74HC/HCT4051.

The 74LV4051 is an 8-channel analog multiplexer/demultiplexer with three digital select inputs ( $S_0$  to  $S_2$ ) an active LOW enable input (E), eight independent inputs/outputs ( $Y_0$  to  $Y_7$ ) and a common input/output (Z).

With  $\overline{E}$  LOW, one of the eight switches is selected (low impedance ON-state) by  $S_0$  to  $S_2$ . With  $\overline{E}$  HIGH, all switches are in the high impedance OFF-state, independent of  $S_0$  to  $S_2$ .

 $\rm V_{CC}$  and GND are the supply voltage pins for the digital control inputs (S $_0$  to S $_2$ , and  $\overline{E}$ ). The V $_{CC}$  to GND ranges are 1.0 to 6.0 V. The analog inputs/outputs (Y $_0$  to Y $_7$  and Z) can swing between V $_{CC}$  as a positive limit and V $_{EE}$  as a negative limit. V $_{CC}$ - V $_{EE}$  may not exceed 6.0 V. For operation as a digital multiplexer/demultiplexer, V $_{EE}$  is connected to GND (typically ground).

#### **QUICK REFERENCE DATA**

GND = 0 V;  $T_{amb} = 25^{\circ}C$ ;  $t_r = t_f \le 2.5 \text{ ns}$ 

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
t <sub>PZH</sub> /t <sub>PZL</sub>	Turn "ON" time E to V <sub>OS</sub> S <sub>n</sub> to V <sub>OS</sub>	$\begin{array}{l} C_L = 15 \text{ pF} \\ R_L = 1 \text{K}\Omega \\ V_{CC} = 3.3 \text{ V} \end{array}$	23 22	ns
t <sub>PHZ</sub> /t <sub>PLZ</sub>	Turn "OFF" time E to V <sub>OS</sub> S <sub>n</sub> to V <sub>OS</sub>		25 20	113
C <sub>I</sub>	Input capacitance		3.5	
C <sub>PD</sub>	Power dissipation capacitance per switch	See Notes 1 and 2	25	pF
C <sub>S</sub>	Maximum switch capacitance independent (Y) common (Z)		5 25	Γ.

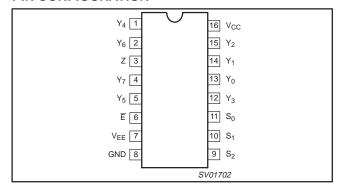
#### NOTES:

- 1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ )
  - $P_D = C_{PD} \times V_{CC}^2 \times f_i + \frac{1}{2} ((C_{L} + C_S) \times V_{CC}^2 \times f_o) \text{ where:}$
  - $f_i$  = input frequency in MHz;  $C_L$  = output load capacity in pF;
  - $f_0$  = output frequency in MHz;  $C_S$  = maximum switch capacitance in pF;
  - V<sub>CC</sub> = supply voltage in V;
- $\sum ((C_L + C_S) \times V_{CC}^2 \times f_0) = \text{sum of the outputs.}$
- The condition is V<sub>I</sub> = GND to V<sub>CC</sub>.

#### ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	OUTSIDE NORTH AMERICA	NORTH AMERICA	Code
16-Pin Plastic DIL	-40°C to +125°C	74LV4051 N	74LV4051 N	SOT38-4
16-Pin Plastic SO	-40°C to +125°C	74LV4051 D	74LV4051 D	SOT109-1
16-Pin Plastic SSOP Type II	-40°C to +125°C	74LV4051 DB	74LV4051 DB	SOT338-1
16-Pin Plastic TSSOP Type I	-40°C to +125°C	74LV4051 PW	74LV4051PW DH	SOT403-1

#### **PIN CONFIGURATION**



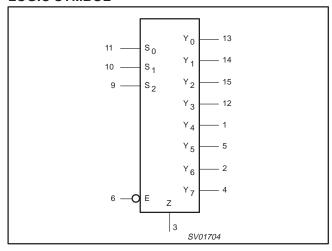
#### PIN DESCRIPTION

PIN NUMBER	SYMBOL	FUNCTION				
3 Z		Common input/output				
6	Ē	Enable input (active LOW)				
7	V <sub>EE</sub>	Negative supply voltage				
8	GND	Ground (0 V)				
11, 10, 9	S <sub>0</sub> to S <sub>2</sub>	Select inputs				
13, 14, 15, 12, 1, 5, 2, 4	Y <sub>0</sub> to Y <sub>7</sub>	Independent inputs/outputs				
16	V <sub>CC</sub>	Positive supply voltage				

## 8-channel analog multiplexer/demultiplexer

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## **LOGIC SYMBOL**



## **FUNCTION TABLE**

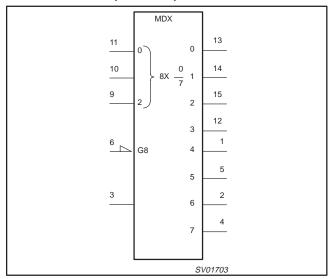
	INPUTS		INPUTS	CHANNEL
Ē	S <sub>2</sub>	S <sub>1</sub>	S <sub>0</sub>	ON
L	L	L	L	$Y_0 - Z$
L	L	L	Н	$Y_0 - Z$ $Y_1 - Z$
L	L	Н	L	$Y_2 - Z$ $Y_3 - Z$
L	L	Н	Н	$Y_3 - Z$
L	Н	L	L	$Y_4 - Z$
L	Н	L	Н	Y <sub>5</sub> – Z
L	Н	Н	L	$Y_6 - Z$
L	Н	Н	Н	$Y_4 - Z$ $Y_5 - Z$ $Y_6 - Z$ $Y_7 - Z$
Н	Х	Х	Х	None

## NOTES:

H = HIGH voltage level
L = LOW voltage level

X = don't care

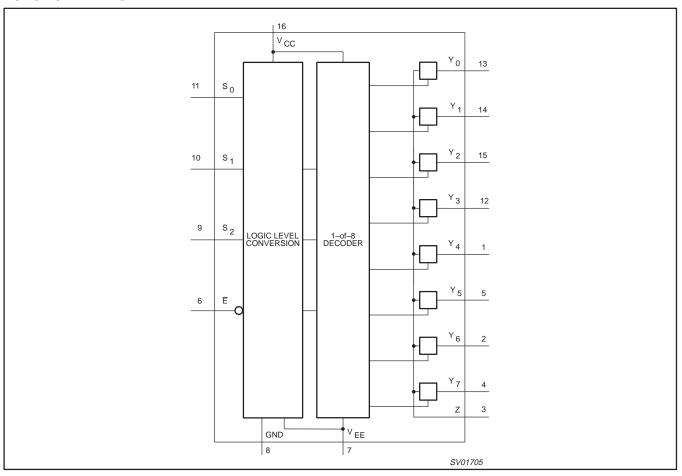
## LOGIC SYMBOL (IEEE/IEC)



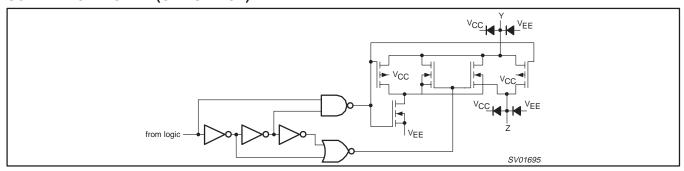
## 8-channel analog multiplexer/demultiplexer

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## **FUNCTIONAL DIAGRAM**



## **SCHEMATIC DIAGRAM (ONE SWITCH)**



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## 8-channel analog multiplexer/demultiplexer

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## ABSOLUTE MAXIMUM RATINGS<sup>1, 2</sup>

In accordance with the Absolute Maximum Rating System (IEC 134). Voltages are referenced to GND (ground = 0 V).

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V <sub>CC</sub>	DC supply voltage		-0.5 to +7.0	V
± I <sub>IK</sub>	DC input diode current	$V_{I} < -0.5 \text{ or } V_{I} > V_{CC} + 0.5 \text{ V}$	20	mA
± I <sub>SK</sub>	DC switch diode current	$V_S < -0.5 \text{ or } V_S > V_{CC} + 0.5 \text{ V}$	20	mA
±IS	DC switch current	$-0.5 \text{ V} < \text{V}_{\text{S}} < \text{V}_{\text{CC}} + 0.5 \text{ V}$	25	mA
T <sub>stg</sub>	Storage temperature range		-65 to +150	°C
Р <sub>ТОТ</sub>	Power dissipation per package  – plastic DIL  – plastic mini-pack (SO)  – plastic shrink mini-pack (SSOP and TSSOP)	for temperature range: -40 to +125°C above +70°C derate linearly with 12 mW/K above +70°C derate linearly with 8 mW/K above +60°C derate linearly with 5.5 mW/K	750 500 400	mW

## NOTES:

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>CC</sub>	DC supply voltage	See Note 1 and Figure 5	1.0	3.3	6.0	V
V <sub>I</sub>	Input voltage		0	_	V <sub>CC</sub>	V
Vo	Output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	Operating ambient temperature range in free air	See DC and AC characteristics	-40 -40		+85 +125	°C
t <sub>r</sub> , t <sub>f</sub>	Input rise and fall times	$V_{CC} = 1.0 \text{ V to } 2.0 \text{ V}$ $V_{CC} = 2.0 \text{ V to } 2.7 \text{ V}$ $V_{CC} = 2.7 \text{ V to } 6.0 \text{ V}$	- - -	- - -	500 200 100	ns/V

#### NOTE:

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<sup>1.</sup> Stresses beyond those listed 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.

<sup>2.</sup> The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

<sup>1.</sup> The LV is guaranteed to function down to  $V_{CC} = 1.0 \text{V}$  (input levels GND or  $V_{CC}$ ); DC characteristics are guaranteed from  $V_{CC} = 1.2 \text{V}$  to  $V_{CC} = 6.0 \text{V}$ .

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## DC ELECTRICAL CHARACTERISTICS

Over recommended operating conditions, voltages are referenced to GND (ground = 0 V)

						LIMITS			
SYMBOL	PARAMETER	TEST CO	NDITIONS	-4	0°C to +8	5°C	-40°C to	o +125°C	דואט 🏲
				MIN	TYP <sup>1</sup>	MAX	MIN	MAX	1
		V <sub>CC</sub> = 1.2 V	0.9	1		0.9			
		V <sub>CC</sub> = 2.0 V		1.4			1.4		1
$V_{IH}$	HIGH level Input voltage	$V_{CC} = 2.7 \text{ to } 3.6 \text{ V}$	2.0			2.0		<b>7</b> ∨	
	Vollago	V <sub>CC</sub> = 4.5 V	3.15			3.15		7	
		$V_{CC} = 6.0 \text{ V}$		4.20			4.20		
		V <sub>CC</sub> = 1.2 V				0.3		0.3	
	LOW lovel langet	V <sub>CC</sub> = 2.0 V				0.6		0.6	
$V_{IL}$	LOW level Input voltage	$V_{CC} = 2.7 \text{ to } 3.6 \text{ V}$				0.8		0.8	V
		V <sub>CC</sub> = 4.5 V				1.35		1.35	
		$V_{CC} = 6.0 \text{ V}$				1.80		1.80	
±lı	Input leakage	$V_{CC} = 3.6$	$V_I = V_{CC}$ or GND			1.0		1.0	μΑ
1	current	$V_{CC} = 6.0$				2.0		2.0	μ, τ
	Analog switch	$V_{CC} = 3.6$	$V_I = V_{IH}$ or $V_{IL}$			1.0		1.0	١,
±ls	OFF-state current per channel	V <sub>CC</sub> = 6.0	IV <sub>S</sub> I = V <sub>CC</sub> - GND (See Figure 2)			2.0		2.0	μΑ
±I <sub>S</sub>	Analog switch	V <sub>CC</sub> = 3.6	$V_I = V_{IH} \text{ or } V_{IL}$			1.0		1.0	μА
±iS	ON-state current	V <sub>CC</sub> = 6.0	IV <sub>S</sub> I = V <sub>CC</sub> - GND (See Figure 3)			2.0		2.0	
Icc	Quiescent supply	V <sub>CC</sub> = 3.6 V	$V_I = V_{CC}$ or GND			20.0		40	μА
	current	V <sub>CC</sub> = 6.0 V	$V_{IS} = GND \text{ or } V_{CC};$ $V_{OS} = V_{CC} \text{ or } GND$			40.0		80	ļ par t
$\Delta I_{CC}$	Additional quiescent supply current per input	$V_{CC} = 2.7 \text{ to } 3.6 \text{ V}$	$V_{I} = V_{CC} - 0.6 \text{ V}$			500		850	μΑ
		V <sub>CC</sub> = 1.2 V	$V_I = V_{IH} \text{ or } V_{IL};$ $I_S = 100 _{\mu}A;$ $V_{IS} = V_{CC} \text{ to GND}$						
	ON-resistance	V <sub>CC</sub> = 2.0 V			145	325		375	7
$R_{ON}$	(peak)	V <sub>CC</sub> = 2.7 V	$V_{I} = V_{IH} \text{ or } V_{II};$		90	200		235	Ω
		$V_{CC} = 3.0 \text{ to } 3.6 \text{ V}$	$I_{S} = 1000  \mu A;$		80	180		210	7
		V <sub>CC</sub> = 4.5 V	$V_{IS} = V_{CC}$ to GND		60	135		160	7
		V <sub>CC</sub> = 6.0 V	1 i		55	125		145	7
		V <sub>CC</sub> = 1.2 V	$V_I = V_{IH} \text{ or } V_{IL};$ $I_S = 100 _{\text{ll}}A;$ $V_{IS} = \text{GND}$		225				
	ON-resistance	V <sub>CC</sub> = 2.0 V			110	235		270	
$R_{ON}$	(rail)	V <sub>CC</sub> = 2.7 V	$V_{I} = V_{IH} \text{ or } V_{IL};$		70	145		165	Ω
		$V_{CC} = 3.0 \text{ to } 3.6 \text{ V}$	$I_S = 1000  \mu A;$		60	130		150	
		V <sub>CC</sub> = 4.5 V	$V_{IS} = GND^{\alpha}$		45	100		115	
		V <sub>CC</sub> = 6.0 V	7 1		40	85		100	7

## NOTES:

6

All typical values are measured at T<sub>amb</sub> = 25°C.
 At supply voltages approaching 1.2 V, the analog switch ON-resistance becomes extremely non-linear. Therefore, it is recommended that these devices be used to transmit digital signals only, when using these supply voltages.

<sup>3.</sup> R<sub>ON</sub> (MAX) data is preliminary.

## 8-channel analog multiplexer/demultiplexer

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## DC ELECTRICAL CHARACTERISTICS (Continued)

						LIMITS			$\Box$
SYMBOL	PARAMETER	TEST COM	-40°C to +85°C			-40°C to	o +125°C	UNIT	
			MIN	TYP <sup>1</sup>	MAX	MIN	MAX	1 '	
		V <sub>CC</sub> = 1.2 V	$\begin{aligned} V_I &= V_{IH} \text{ or } V_{IL}; \\ I_S &= 100 _{\mu}A; \\ V_{IS} &= V_{CC} \end{aligned}$		250				Ω
R <sub>ON</sub> ON-resista (rail)	ON-resistance	$V_{CC} = 2.0 \text{ V}$			120	320		370	
		$V_{CC} = 2.7 \text{ V}$	$V_I = V_{IH}$ or $V_{IL}$ ;		75	195		225	Ω
		$V_{CC} = 3.0 \text{ to } 3.6 \text{ V}$	$I_S = 1000  \mu A;$		70	175		205	
		V <sub>CC</sub> = 4.5 V	$V_{IS} = V_{CC}$		50	130		150	
		V <sub>CC</sub> = 6.0 V	1		45	120		135	1 '
		V <sub>CC</sub> = 1.2 V							
	Maximum variation	V <sub>CC</sub> = 2.0 V	1		5				1 '
$\Delta R_{ON}$	of ON-resistance	$V_{CC} = 2.7 \text{ V}$	$V_I = V_{IH}$ or $V_{IL}$ ;		4				$ledge _{\Omega }$
ON	between any two	$V_{CC} = 3.0 \text{ to } 3.6 \text{ V}$	$V_{IS} = V_{CC}$ to GND		4				52
	channels	V <sub>CC</sub> = 4.5 V	1		3				
		$V_{CC} = 6.0 \text{ V}$	1		2				

NOTES:

1. All typical values are measured at T<sub>amb</sub> = 25°C.

2. At supply voltages approaching 1.2 V, the analog switch ON-resistance becomes extremely non-linear. Therefore, it is recommended that these devices be used to transmit digital signals only, when using these supply voltages.

3. R<sub>ON</sub> (MAX) data is preliminary.

## 8-channel analog multiplexer/demultiplexer

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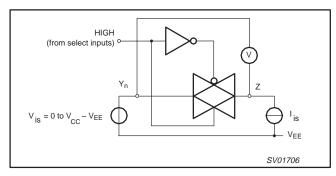


Figure 1. Test circuit for measuring ON-resistance ( $R_{ON}$ ).

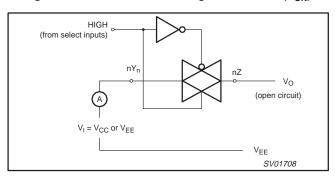


Figure 3. Test circuit for measuring ON-state current.

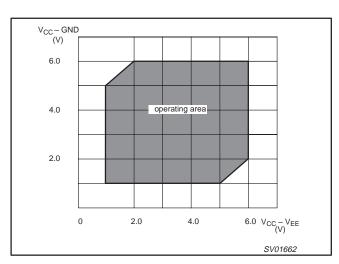


Figure 5. Guaranteed operating area as a function of the supply voltages.

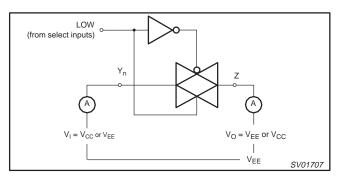


Figure 2. Test circuit for measuring OFF-state current.

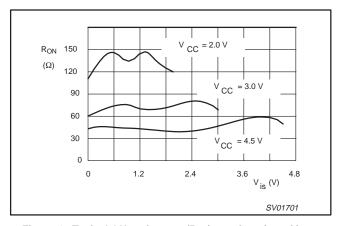


Figure 4. Typical ON-resistance (R $_{on}$ ) as a function of input voltage (V $_{is}$ ) for V $_{is}$  = 0 to V $_{CC}$  – V $_{EE}$ .

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## **AC CHARACTERISTICS**

 $GND = 0 \text{ V; } t_r = t_f \leq 2.5 \text{ns; } C_L = 50 \text{pF}$ 

		CONDIT	ION			LIMITS			
SYMBOL	PARAMETER	CONDIT	ION	_	40 to +85 °	C	-40 to	+125 °C	UNIT
01202		V <sub>CC</sub> (V)	OTHER	MIN	TYP <sup>1</sup>	MAX	MIN	MAX	· · · · ·
		1.2			25				
		2.0			9	17		20	
tt	Propagation delay	2.7	$R_L = \infty$ ; $C_L = 50 \text{ pF}$		6	13		15	ns
t <sub>PHL</sub> /t <sub>PLH</sub>	$V_{is}$ to $V_{os}$	3.0 to 3.6	Figure 12		5 <sup>2</sup>	10		12	115
		4.5	T ~		4	9		10	
		6.0			3	8		8	
		1.2			145				
		2.0	$R_L = 1k\Omega$ ;		49	94		112	
+ /+	Turn-on time	2.7	$C_L = 50 \text{ pF}$		36	69		83	200
t <sub>PZH</sub> /t <sub>PZL</sub>	E to V <sub>OS</sub>	3.0 to 3.6	Figures 13		28 <sup>2</sup>	55		66	ns
		4.5	and 1		25	47		56	
		6.0	$\neg$		19	38		43	
		1.2			140				ns
		2.0	$R_L = 1k\Omega;$		48	90		107	
± /±	Turn-on time	2.7	$C_L = 50 \text{ pF}$		35	66		79	
t <sub>PZH</sub> /t <sub>PZL</sub>	$S_n$ to $V_{OS}$	3.0 to 3.6	Figures 13		27 <sup>2</sup>	53		63	
		4.5	and 1		24	45		54	
		6.0	$\neg$		18	34		41	
		1.2			145				
		2.0	$R_L = 1k\Omega$		51	93		110	
. /.	Turn-off time	2.7	$C_L = 50 \text{ pF}$		38	69		82	
t <sub>PHZ</sub> /t <sub>PLZ</sub>	Ē to V <sub>OS</sub>	3.0 to 3.6	Figures 13		30 <sup>2</sup>	56		66	ns
		4.5	and 1		29	48		56	
		6.0	$\neg$		21	37		44	
		1.2			115				
		2.0	$R_L = 1k\Omega$		41	73		90	1
4 /4	Turn-off time	2.7	$C_L = 50 \text{ pF}$		31	54		67	
t <sub>PHZ</sub> /t <sub>PLZ</sub>	S <sub>n</sub> to V <sub>OS</sub>	3.0 to 3.6	Figures 13		24 <sup>2</sup>	44	İ	54	ns ns
		4.5	and 1		22	37		46	
		6.0	$\dashv$		17	29		36	

Unless otherwise stated, all typical values are measured at T<sub>amb</sub> = 25°C
 Typical values are measured at V<sub>CC</sub> = 3.3 V.

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## **ADDITIONAL AC CHARACTERISTICS**

Recommended conditions and typical values GND = 0 V;  $t_{r}$  =  $t_{f}\!\leq\!2.5 ns$ 

SYMBOL	PARAMETER	TYP.	UNIT	V <sub>CC</sub> (V)	V <sub>is(p-p)</sub> (V)	CONDITIONS
	Sine-wave distortion f = 1 kHz			3.0 6.0	2.75 5.50	$R_L = 10 \text{ k}\Omega; C_L = 50 \text{ pf}$ Figure 9 and 10
	Sine-wave distortion f = 10 kHz	2.40 1.20	%	3.0 6.0	2.75 5.50	$R_L = 10 \text{ k}\Omega; C_L = 50 \text{ pf}$ Figure 9 and 10
	Switch "OFF" signal feed through	-50 -50	dB	3.0 6.0	Note 1	$R_L = 600 \ \Omega$ ; $C_L = 50 \ pf$ ; $f = 1 \ MHz$ Figures 5 and 11
	Crosstalk between any two switches/multiplexers	-60 -60	dB	3.0 6.0	Note 1	$R_L = 600 \Omega$ ; $C_L = 50 \text{ pf}$ ; $f = 1 \text{ MHz}$ Figure 8
V <sub>(p-p)</sub>	p-p) Crosstalk voltage between enable or address input to any switch (peak-to-peak value)		mV	3.0 6.0		$R_L = 600 \ \Omega$ ; $C_L = 50 \ pf$ ; $f = 1 \ MHz$ ( $S_n$ or $E$ , square wave between $V_{CC}$ and $GND \ t_r = t_f = 6 \ ns$ ) Figure 8
f <sub>max</sub>	Minimum frequency response (–3 dB)		MHz	3.0 6.0	Note 2	$R_L = 50 \Omega$ ; $C_L = 50 pF$ Figures 5, 8 and 9
C <sub>S</sub>	Maximum switch capacitance	5	pf			

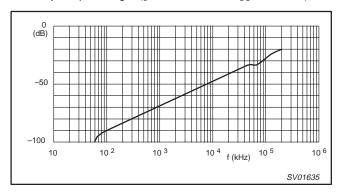
#### **GENERAL NOTES:**

 $V_{is}$  is the input voltage at nY or Z terminal, whichever is assigned as an input.

 $V_{\mbox{OS}}$  is the output voltage at nY or Z terminal, whichever is assigned as an output.

#### NOTES:

- 1. Adjust input voltage  $V_{is}$  is 0 dBm level (0 dBm = 1 mW into 600  $\Omega$ ).
- 2. Adjust input voltage  $V_{is}$  is 0 dBm level at  $V_{OS}$  for 1 MHz (0 dBm = 1 mW into 50  $\Omega$ ).



0 10 10 2 10 3 10 4 10 5 10 6 SV01636

Figure 6. Typical switch "OFF" signal feed-through as a function of frequency.

Figure 7. Typical frequency response.

## **NOTES TO FIGURES 6 AND 7:**

Test conditions:  $V_{CC}$  = 3.0 V; GND = 0 V;  $V_{EE}$  = -3.0 V;  $R_L$  = 50  $\Omega$ ;  $R_{SOURCE}$  = 1k $\Omega$ .

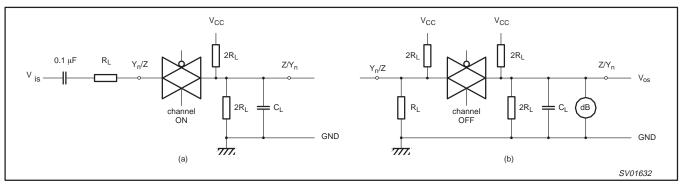


Figure 8. Test circuit for measuring crosstalk between any two switches.
(a) channel ON condition; (b) channel OFF condition.

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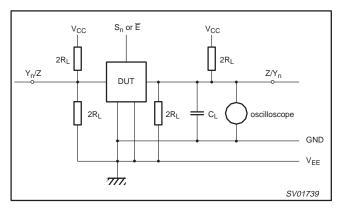


Figure 9. Test circuit for measuring crosstalk between control and any switch.

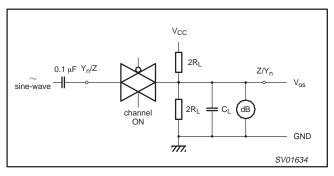


Figure 10. Test circuit for measuring minimum frequency response.

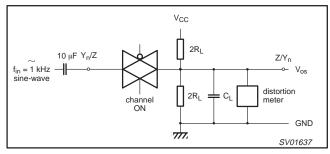
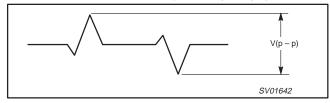


Figure 11. Test circuit for measuring sine-wave distortion.

#### **NOTE TO FIGURE 8:**

The crosstalk is defined as follows (oscilloscope output):



## NOTE TO FIGURE 9:

Adjust input voltage to obtain 0 dBm at  $V_{OS}$  when  $F_{in}$  = 1 MHz. After set-up frequency of  $f_{in}$  is increased to obtain a reading of –3 dB at  $V_{OS}$ .

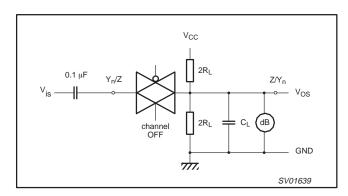


Figure 12. Test circuit for measuring switch "OFF" signal feed-through.

## 8-channel analog multiplexer/demultiplexer

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#### WAVEFORMS

 $V_{M} = 1.5 \text{ V at } 2.7 \text{ V} \le V_{CC} \le 3.6 \text{ V}$ 

 $V_{M} = 0.5 \times V_{CC}$  at 2.7 V >  $V_{CC} > 3.6$  V

 $V_{OL}^{m}$  and  $V_{OH}$  are the typical output voltage drop that occur with the output load

 $\begin{array}{l} \text{V}_{\text{X}} = \text{V}_{\text{OL}} + 0.3 \text{ V at } 2.7 \text{ V} \leq \text{V}_{\text{CC}} \leq 3.6 \text{ V} \\ \text{V}_{\text{X}} = \text{V}_{\text{OL}} + 0.1 \times \text{V}_{\text{CC}} \text{ at } 2.7 \text{ V} > \text{V}_{\text{CC}} > 3.6 \text{ V} \\ \text{V}_{\text{Y}} = \text{V}_{\text{OH}} - 0.3 \text{ V at } 2.7 \text{ V} \leq \text{V}_{\text{CC}} \leq 3.6 \text{ V} \\ \text{V}_{\text{Y}} = \text{V}_{\text{OH}} - 0.1 \times \text{V}_{\text{CC}} \text{ at } 2.7 \text{ V} > \text{V}_{\text{CC}} > 3.6 \text{ V} \end{array}$ 

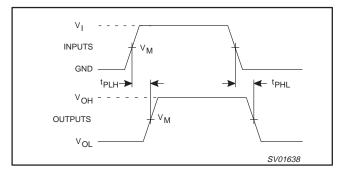


Figure 13. Input (V<sub>is</sub>) to output (V<sub>os</sub>) propagation delays.

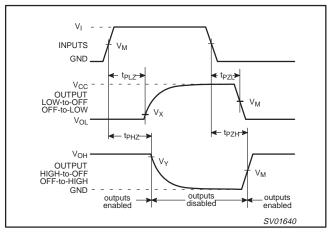


Figure 14. Turn-on and turn-off times for the inputs  $(S_n, \overline{E})$  to the output  $(V_{os})$ .

## **TEST CIRCUIT**

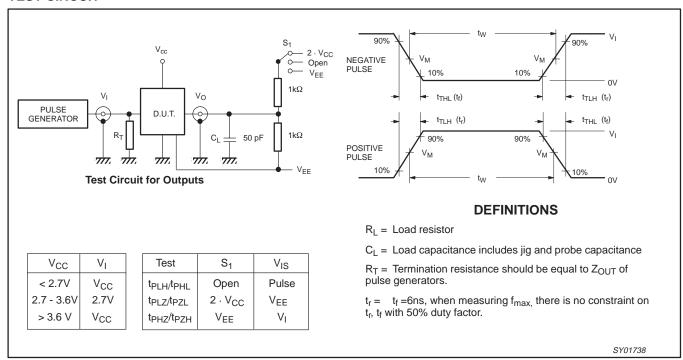


Figure 15. Load circuitry for switching times.

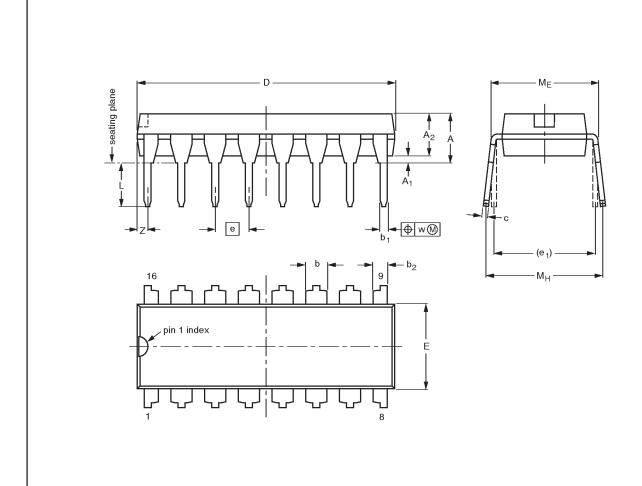
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Downloaded from Elcodis.com electronic components distributor

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## DIP16: plastic dual in-line package; 16 leads (300 mil)

SOT38-4



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

UNIT	A max.	A <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	b <sub>2</sub>	С	D <sup>(1)</sup>	E (1)	е	e <sub>1</sub>	L	ME	M <sub>H</sub>	w	Z <sup>(1)</sup> max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	1.25 0.85	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	0.76
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.049 0.033	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	0.030

10 mm

## Note

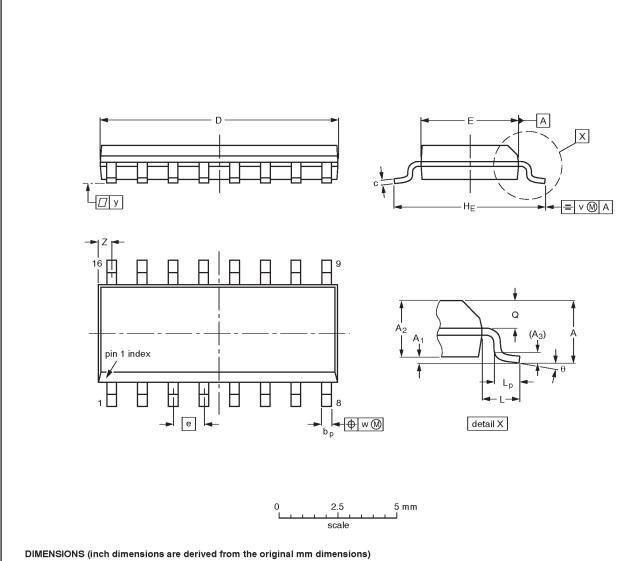
1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE	VERSION				EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	PROJECTION	ISSUE DATE		
SOT38-4					□ •	<del>92-11-17</del> 95-01-14

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## SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



UNIT	A max.	Α1	A <sub>2</sub>	A <sub>3</sub>	bp	С	D <sup>(1)</sup>	E <sup>(1)</sup>	е	HE	L	Lp	Q	v	w	у	Z <sup>(1)</sup>	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8°
inches	0.069	0.0098 0.0039		0.01		0.0098 0.0075	0.39 0.38	0.16 0.15	0.050	0.24 0.23	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	0°

#### Note

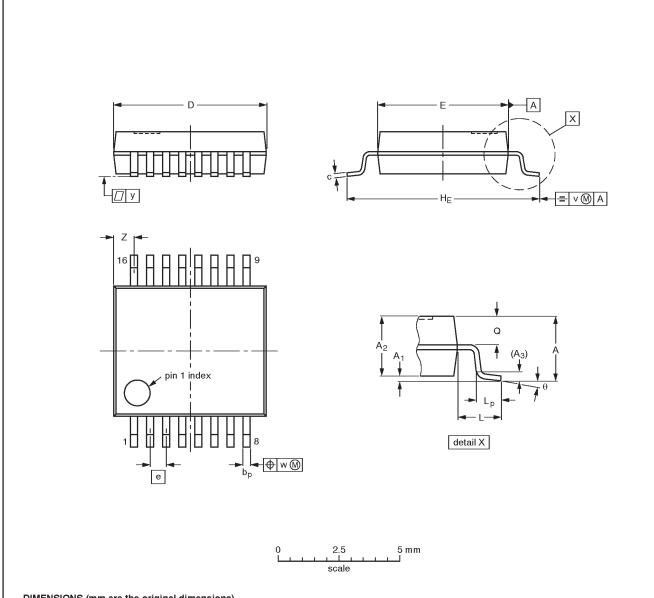
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE				
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE		
SOT109-1	076E07S	MS-012AC				<del>91-08-13</del> 95-01-23		

74LV4051

## SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1



## DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	рb	С	D <sup>(1)</sup>	E <sup>(1)</sup>	е	HE	L	Lp	Ø	v	w	у	Z <sup>(1)</sup>	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	1.00 0.55	8° 0°

## Note

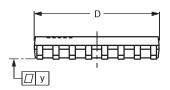
1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

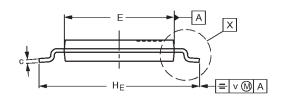
OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE	
SOT338-1		MO-150AC				<del>94-01-14</del> 95-02-04	

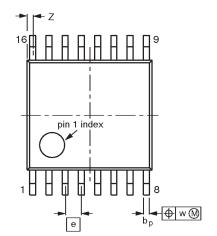
74LV4051

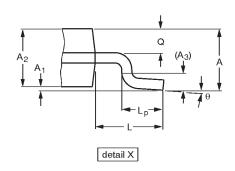
## TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

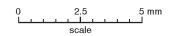
SOT403-1











## DIMENSIONS (mm are the original dimensions)

UNIT	A max.	Α1	A <sub>2</sub>	<b>A</b> <sub>3</sub>	рb	c	D <sup>(1)</sup>	E <sup>(2)</sup>	Φ	HE	L	Lp	Ø	v	w	у	Z <sup>(1)</sup>	θ
mm	1.10	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1.0	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.40 0.06	8° 0°

#### Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	RENCES	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ	PROJECTION	ISSUE DATE		
SOT403-1		MO-153			<del>-94-07-12</del> 95-04-04		

## 8-channel analog multiplexer/demultiplexer

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**NOTES** 

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