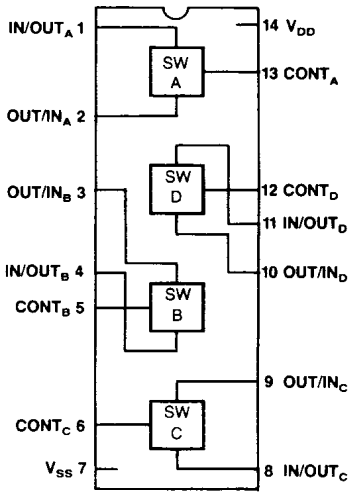
TL 4066B
Quad Bilateral Switch

GENERAL DESCRIPTION

The TL 4066B is a quad bilateral switch designed to transmit or multiplex analog or digital signals. It is pin-for-pin compatible with CD 4016, MC 14016, CD 4066 and MC 14066 but has much lower ON resistance than the 4016 type devices. ON resistance of the TL 4066B is relatively independent of input signal voltage variation.

Each of the four bilateral switches in the TL 4066B is controlled by its own control input pin. The p-channel and n-channel devices within a switch are either both ON or both OFF. To eliminate changes in ON resistance due to threshold variation caused by changes in input voltage, the well of the n-channel device on each switch is connected to the input pin when the switch is ON and to VSS when the switch is OFF.

The TL 4066B is available in 14-lead ceramic and plastic DIP, SOIC, and in die form.

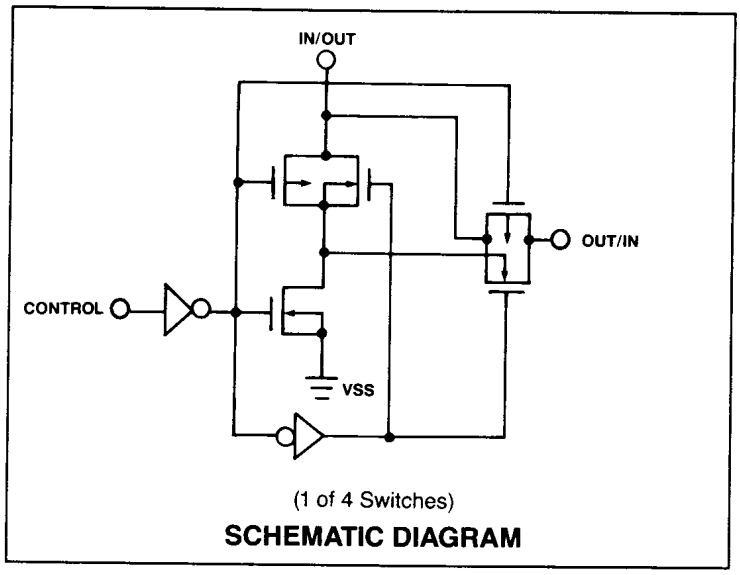


PIN CONFIGURATION

FEATURES

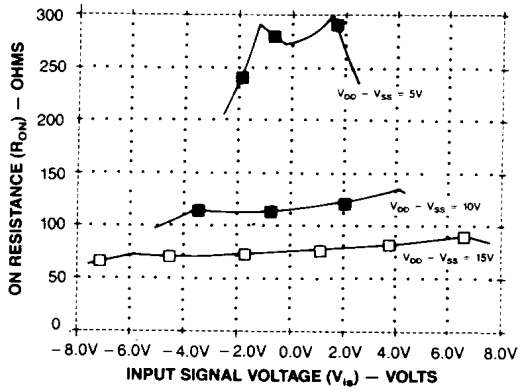
- Replaces CD4066 and MC14066
- Wide supply voltage range: 3Vdc to 18Vdc
- 15V digital switching or ±7.5V peak-to-peak switching
- Low ON resistance (80Ω typ @ 15V)
- Individual switch ON resistances matched to within 5Ω
- Constant ON resistance independent of input signal voltage variation
- High ON/OFF output voltage ratio (80 dB typ @ f_{is} = 10 KHz, R_L = 10KΩ)
- High linearity (0.1% distortion typ @ f_{is} = 1 KHz, V_{is} = 5V p-p)
- Extremely low leakage (switch OFF, 100 pA typ @ $V_{DD} - V_{SS}$ = 10V, T_A = 25°C)
- Extremely high control input impedance (10^{12}Ω typ)
- Low switch-to-switch crosstalk (−50dB typ @ f_{is} = 0.9 MHz, R_L = 1KΩ)
- Matched output-to-input capacitance
- 40 MHz typ frequency response (switch ON)
- Quiescent current specified over entire voltage range
- 1 μA max control input leakage @ 15V over package-temperature range
- MIL-STD-883 screening available

TLSI, Inc. • 815 Broadhollow Road • Farmingdale, New York 11735 • Phone: (516) 755-7005 • Fax: (516) 755-7626



(1 of 4 Switches)

SCHEMATIC DIAGRAM



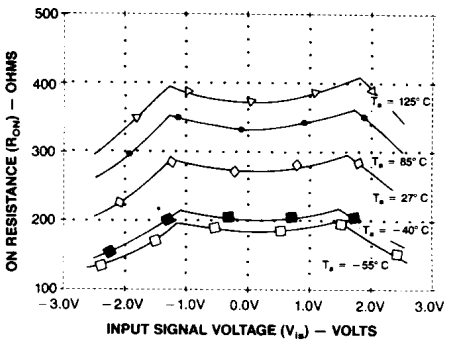
Typical ON Resistance vs. Input Signal Voltage at $T_a = 27°C$.

ABSOLUTE MAXIMUM RATINGS

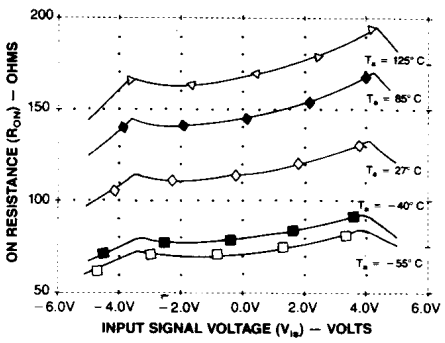
Supply Voltage Range (Referenced to VSS)	−0.5V to +18Vdc
Input Voltage	VSS −0.5V to VDD +0.5V
Operating Temperature (commercial)	0°C to +70°C
Operating Temperature (industrial)	−40°C to +85°C
Operating Temperature (military)	−55°C to +125°C
Storage Temperature	−65°C to +150°C
Lead Temperature (soldering, 10 sec)	265°C
Power Dissipation (ceramic package, Ta = −55°C to +100°C)	500mW
Power Dissipation (ceramic package, Ta = +100°C to +125°C)*	200mW
Power Dissipation (plastic package, Ta = −40°C to +60°C)	500mW
Power Dissipation (plastic package, Ta = +60°C to +85°C)*	200mW
Power Dissipation (each switch)	100mW

General Note: Absolute maximum ratings are those limits which, if exceeded, may cause damage to the device. Proper operation is not implied at these limits.

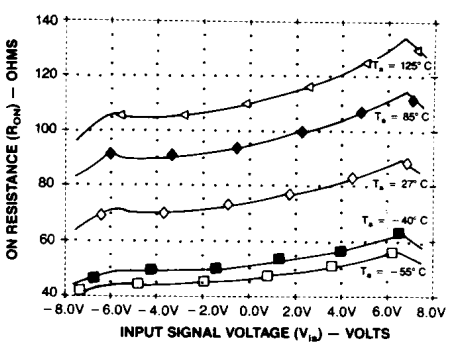
**Derate linearly at 12 mW/°C*



Typical ON Resistance vs. Input Signal Voltage for $V_{DD} - V_{SS} = 5V$.



Typical ON Resistance vs. Input Signal Voltage for $V_{DD} - V_{SS} = 10V$.



Typical ON Resistance vs. Input Signal Voltage for $V_{DD} - V_{SS} = 15V$.

ELECTRICAL CHARACTERISTICS

PARAMETER	V_{DD}*	**				TYP	MAX	UNITS	CONDITIONS
		−55°C	−40°C	+85°C	+125°C	+25°C			
Quiescent Current, I_L max (ceramic package)	5V	0.25			7.5	0.01	0.25	µA	
	10V	0.5			15	0.01	0.5		
	15V	1.0			30	0.01	1.0		
Quiescent Current, I_L max (plastic package)	5V		1	15		0.25	1	µA	
	10V		2	30		0.25	2		
	15V		4	500		0.5	4		

SIGNAL INPUTS, V_{is} AND OUTPUTS, V_{os}

ON Resistance, R_{ON} max	5V	800	850	1200	1300	270	1050	ohm	$V_C = V_{DD}$; R_L = 10K connected to ½ (V_{DD})
	10V	310	330	520	550	120	400		
	15V	200	210	300	320	80	240		
$\triangle_{ON}$ Resistance Between Any 2 of 4 Switches, $\triangle R_{ON}$	5V					15		ohm	$V_C = V_{DD}$; R_L = 10K connected to ½ (V_{DD})
	10V					10			
	15V					5			
Total Harmonic Distortion, THD (Sine Wave Input)						0.1		%	$V_C = V_{DD}$ = 5V; R_L = 10K; V_{SS} = −5V; f_{is} = 1KHz; ***
Frequency Response, Switch ON (Sine Wave Input) ($20 \log_{10} \frac{V_{is}}{V_{os}} = -3dB$)						40		MHz	$V_C = V_{DD}$ = 5V; R_L = 1K V_{SS} = −5V; ***
Feedthrough, Switch OFF ($20 \log_{10} \frac{V_{is}}{V_{os}} = -50dB$)						1		MHz	$V_C = V_{SS}$ = −5V; R_L = 1K; ***
Leakage, Input to Output, Switch OFF (OFF Resistance) (ceramic package)	15V					±0.1	±100	nA	$V_C = V_{SS}$
(plastic package)	15V					±0.1	±300		
Crosstalk Frequency Between Any 2 Switches ($20 \log_{10} \frac{V_{is}}{V_{os}} = -50dB$)						8		MHz	V_C (A) = V_{DD} = +5V; V_C (B) = V_{SS} = −5V; R_L = 1K; ***

V_{DD} referenced to V_{SS}

**Values specified are maximum values unless otherwise stated.*

****5V p-p sinusoidal input centered about 0V.*

TL 4066B
Quad Bilateral Switch

ELECTRICAL CHARACTERISTICS (cont'd)

PARAMETER	V_{DD}*	**				TYP	MAX	UNITS	CONDITIONS
		−55°C	−40°C	+85°C	+125°C	+25°C			
Propagation Delay, Signal Input to Output, t_{PD}	5V 10V 15V					20 10 7	40 20 15	ns	$V_C = V_{DD}$; C_L = 50 pF; V_{is} = Square Wave; $t_r = t_f$ = 20 ns; V_{SS} = 0V; R_L = 200K
Capacitance Input, C_{is} Output, C_{os} Feedthrough, C_{ios}						 8 8 0.5		pF	V_{DD} = +5V; $V_C = V_{SS}$ = −5V

CONTROL INPUT, V_C

Input Voltage (low), max V_{ILC}	5V 10V 15V	1.5 3.0 4.0	1.5 3.0 4.0	1.5 3.0 4.0	1.5 3.0 4.0	2.25 4.5 6.75	1.5 3.0 4.0	V	
Input Voltage (high), min V_{IHC}	5V 10V 15V	3.5 7.0 11.0	3.5 7.0 11.0	3.5 7.0 11.0	3.5 7.0 11.0	2.75 5.5 8.25	3.5 7.0 11.0	V	
Input Leakage Current, I_L max (ceramic package) (plastic package)	15V 15V	±0.1 ±0.3	±0.1 ±0.3	±1.0 ±1.0	±1.0 ±1.0	±10E−5 ±10E−5	±0.1 ±0.3	µA	
Crosstalk, Control Input to Signal Output	10V					50		mV	V_C = 10V Square Wave; $t_r = t_f$ = 20ns; R_L = 10K; $V_{is} = V_{SS}$
Propagation Delay, Control Input to Output t_{PDC}	10V					20	40	ns	V_C = 10V Square Wave; $t_r = t_f$ = 20ns; C_L = 50 pF; R_L = 1K
Maximum Allowable Repetition Rate, Control Input	10V					8		MHz	V_C = 10V Square Wave; $t_r = t_f$ = 20ns; R_L = 1K; C_L = 15 pF; V_{SS} = 0V; $V_{is} = V_{DD}$
Input Capacitance, Control Input, C_{IN}						5		pF	

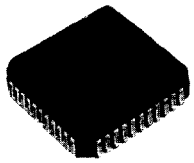
V_{DD} referenced to V_{SS}

***Values specified are maximum values unless otherwise stated.*

TLSI, Inc. • 815 Broadhollow Road, Farmingdale, New York 11735 • Phone: (516) 755-7005 • Fax: (516) 755-7626

028879 ✓ G

PACKAGES



DUAL IN-LINE PACKAGES (DIP)

PLASTIC DIP	8 through 24 (300 mil); 24 through 48 (600 mil); 64 (900 mil)
CERAMIC DIP, SIDE BRAZED	8 through 24 (300 mil); 24 through 48 (600 mil); 64 (900 mil)
CERDIP	8 through 24 (300 mil); 24 through 48 (600 mil)

SURFACE MOUNT PACKAGES

SOIC	8 through 16 (150 mil); 16 through 28 (300 mil)
PLCC	20 through 84
QUAD FLAT PACK	44 through 208
BUMPERED QFP	100 and up
CHIP CARRIER (LCC)	18 through 68
CERAMIC QFP	44 through 160 (EIJ); 132 through 164 (JEDEC)
CERFLAT	14 through 28
CERQUAD	20 through 68

PIN GRID ARRAYS

PLASTIC PGA	28 through 244
PGA	28 through 244

This is a partial list; consult factory for availability of other packages.
NOTE: Devices are available in anti-static tubes or trays, on tape & reel, or in die form.