

CGS64/74B2529

550 ps 1 to 10 Minimum Skew Clock Driver

General Description

This minimum skew clock driver is designed for Clock Generation and Support (CGS) applications operating from 33 MHz to 80 MHz. The devices guarantee minimum output skew across the outputs of a given device.

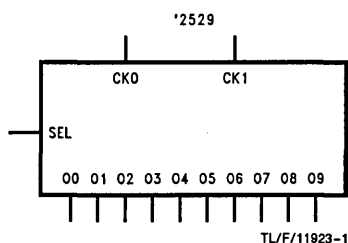
Skew parameters are also provided as a means to measure duty cycle requirements as those found in high speed clocking systems. The '2529 is a minimum skew clock driver with two selectable inputs driving ten outputs.

The SEL pin is used to determine which CKn will have an active effect on the outputs of the circuit. When SEL = 1, the CK1 input is selected and when SEL = 0, the CK0 input is selected. The non-selected CKn input will not have any effect on the logical output level of the circuit. The output pins act as a single entity and will follow the state of the CK inputs.

Features

- Clock Generation and Support (CGS) devices
- Ideal for high frequency signal generation or clock distribution applications
- CGS74B version features National's Advanced Bipolar FAST® LSI process
- 1-to-10 low skew clock distribution
- 550 ps pin-to-pin output skew (V package)
- Specification for transition skew to meet duty cycle requirements
- 20-center pin V_{CC} and GND configuration or PLCC to minimize high speed switching noise
- Current sourcing 48 mA and current sinking of 64 mA
- Low dynamic power consumption above 20 MHz
- Guaranteed 4 kV ESD protection

Logic Symbols

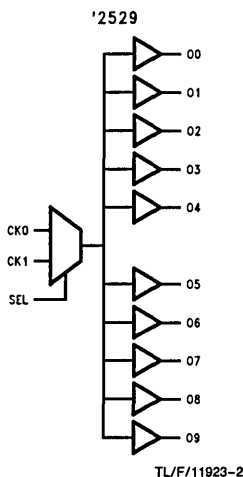


Pin Description

Pin Names	Description
CK0, CK1	Clock Input ('2529)
O0-O9	Outputs
SEL	Clock Select ('2529)

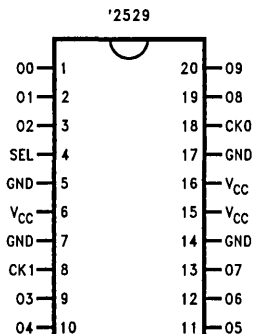
'2529			
Inputs			Outputs
CK0	CK1	SEL	O0-O9
L	X	L	L
H	X	L	L
X	L	H	L
X	H	H	H

L = Low Logic Level
H = High Logic Level
X = Immaterial

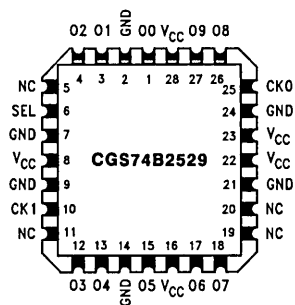


Connection Diagrams

Pin Assignment PDIP and SOIC



Pin Assignment for PCC



Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage (V_{CC})	7.0V
Input Voltage (V_i)	7.0V
Operating Temperature	
64 Grade	-40°C to +85°C
74 Grade	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical θ_{JA}	
Airflow	M N V
0 LFM	89 71 64 °C/W
225 LFM	71 57 52 °C/W
500 LFM	63 48 45 °C/W

Recommended Operating Conditions

Supply Voltage (V_{CC})	4.5V to 5.5V
High Level Input Voltage (V_{IH})	2V
Low Level Input Voltage (V_{IL})	0.8V
High Level Output Current (I_{OH})	-48 mA
Low Level Output Current (I_{OL})	64 mA
Free Air Operating Temperature (T_A)	
64 Grade	-40°C to +85°C
74 Grade	0°C to +70°C

Note: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the DC and AC Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The Recommended Operating Conditions will define the conditions for actual device operation.

DC Electrical Characteristics

Over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V$, $I_i = -18\text{ mA}$			-1.2	V
V_{OH}	High Level Output Voltage	$I_{OH} = -3\text{ mA}$, $V_{CC} = 4.5V$	2.4			V
		$I_{OH} = 48\text{ mA}$, $V_{CC} = 4.5V$	2.0			
V_{OL}	Low Level Output Voltage	$V_{CC} = 4.5V$, $I_{OL} = 64\text{ mA}$		0.35	0.5	V
I_i	Input Current @ Max Input Voltage	$V_{CC} = 5.5V$, $V_{IH} = 7V$			0.1	mA
I_{IH}	High Level Input Current	$V_{CC} = 5.5V$, $V_{IH} = 2.7V$			20	μA
I_{IL}	Low Level Input Current	$V_{CC} = 5.5V$, $V_{IL} = 0.4V$		-0.5	-0.75	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$, $V_O = 2.25V$	-50		-150	mA
I_{CC}	Supply Current '2528	$V_{CC} = 5.5V$	Outputs High	24	35	mA
			Outputs Low	45	65	mA
C_{IN}	Input Capacitance	$V_{CC} = 5.5V$		5		pF

AC Electrical Characteristics

Over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$

Symbol	Parameter	$V_{CC} = 4.5V \text{ to } 5.5V$ $C_L = 50 \text{ pF}$ $R_L = 500\Omega$			Units
		Min	Typ	Max	
f_{MAX}	Frequency Maximum		80		MHz
t_{PLH}	Low-to-High Propagation Delay CK0,1 to O_n M, N	3.0	5.5	7.0	ns
	Low-to-High Propagation Delay CK0,1 to O_n V	2.5	5.5	6.0	
t_{PHL}	High-to-Low Propagation Delay CK0,1 to O_n M, N	3.0	5.5	7.0	ns
	High-to-Low Propagation Delay CK0,1 to O_n V	2.5	5.5	6.0	

Extended AC Electrical Characteristics

Over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$

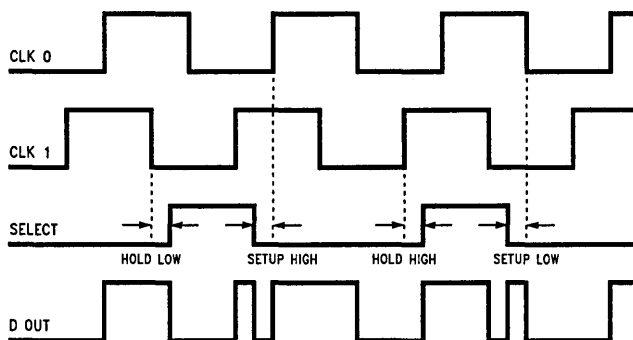
Symbol	Parameter	Package	V_{CC}^* (V)	$V_{CC} = 4.5V \text{ to } 5.5V$ $C_L = 50 \text{ pF}$ $R_L = 500\Omega$			Units
				Min	Typ	Max	
t_{OSHL}	Maximum Skew Common Edge Output-to-Output Variation	N M V	5.0		0.15	800 650 500	ps
t_{OSLH}	Maximum Skew Common Edge Output-to-Output Variation	N M V	5.0		0.15	800 650 500	ps
t_{PS}	Maximum Skew Pin (Signal) Transition Variation	N M V	5.0		0.6	750 750 850	ps
t_{Set}^{**}	Setup Time High Select to CLK0 or 1 Setup Time Low Select to CLK0 or 1	All	5.0	-2.0 -2.0			ns
t_{Hold}^{**}	Hold Time High Select to CLK0 or 1 Hold Time Low Select to CLK0 or 1	All	5.0	2.0 4.0			ns
$t_{rise},$ t_{fall}	Rise/Fall Time (from 0.8V/2.0V to 2.0V/0.8V)	CGS74	5.0			1.5	ns
		CGS64	5.0			1.75	

Note: t_{OSHL} and t_{OSLH} parameters are being tested and guaranteed at 1 MHz for V package. In addition, V package is guaranteed by design at 66 MHz until Oct. 1993, when it will be fully production tested.

*Voltage Range 5.0 is $5.0V \pm 0.5V$

**A negative setup time indicates that the correct logic levels may be initiated sometimes after the active transition of the timing pulse.

Timing Diagram for the CGS74/64B2529



TL/F/11923-1