

# CGS2534V Commercial/CGS2534TV Industrial Quad Memory Array Clock Drivers

## General Description

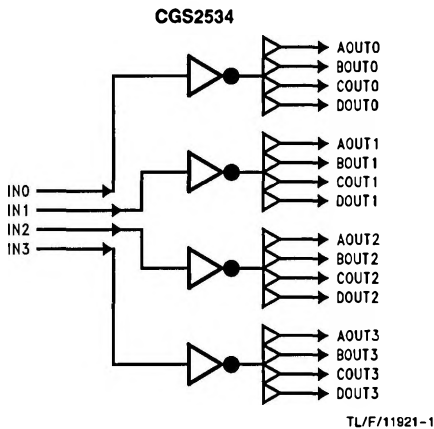
These Clock Generation and Support clock drivers are specifically designed for driving memory arrays requiring large fanouts while operating at high speeds.

CGS2534 is a 4 to 16 inverting driver with TTL compatible I/Os. This device has minimum skew specifications of 500 ps pin-to-pin as well as a 1 ns specification for part-to-part propagation delay variation.

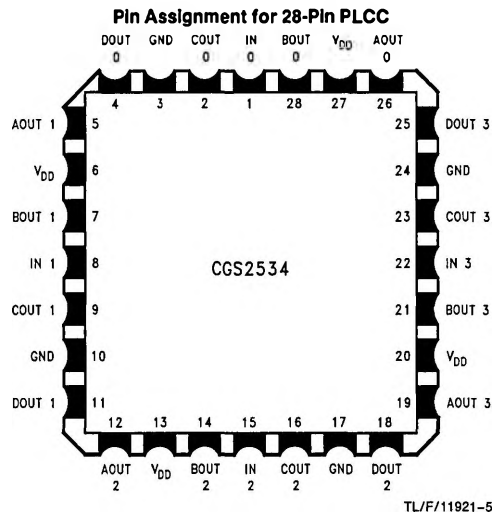
## Features

- Guaranteed and tested:
  - 500 ps pin-to-pin skew ( $t_{OSH}$  and  $t_{OHL}$ )
- Implemented on National's ABT family process
- Symmetric output current drive:  $-36/36$  mA  $I_{OH}/I_{OL}$
- Industrial temperature of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- 28-pin PLCC for optimum skew performance
- Symmetric package orientation
- Large fanout for memory driving applications
- Guaranteed 2 kV ESD protection

## Logic Diagram



## Connection Diagram



## Truth Table

Device	Input	Output
CGS2534	In(0-3)	$\overline{ABCD}$ Out (0-3)

**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	
Industrial Grade	-40°C to +85°C
Commercial Grade	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical $\theta_{JA}$	
<b>Airflow</b>	<b>V</b>
0 LFM	62 °C/W
225 LFM	43 °C/W
500 LFM	34 °C/W
900 LFM	27 °C/W

**Recommended Operating Conditions**

Supply Voltage ( $V_{CC}$ )	4.75V to 5.25V
High Level Input Voltage ( $V_{IH}$ )	2V
Low Level Input Voltage ( $V_{IL}$ )	0.8V
High Level Output Current ( $I_{OH}$ )	-36 mA
Low Level Output Current ( $I_{OL}$ )	36 mA
Free Air Operating Temperature ( $T_A$ )	
Industrial	-40°C to +85°C
Commercial	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	Unit
$V_{IL}$	Input Low Level Voltage				0.8	V
$V_{IH}$	Input High Level Voltage		2.0			V
$V_{IK}$	Input Clamp Voltage	$V_{CC} = 4.75V$ , $I_I = -18 mA$			-1.2	V
$V_{OH}$	High Level Output Voltage	$I_{OH} = -3 mA$ , $V_{CC} = 4.75V$	2.4			V
		$I_{OH} = -36 mA$ , $V_{CC} = 4.75V$	2.0			
$V_{OL}$	Low Level Output Voltage	$V_{CC} = 4.75V$ , $I_{OL} = 36 mA$		0.35	0.44	V
		$V_{CC} = 4.75V$ , $I_{OL} = 50 \mu A$		0.1	0.1	
$I_I$	Input Current @ Max Input Voltage	$V_{CC} = 5.25V$ , $V_{IH} = 7V$			7	$\mu A$
$I_{IH}$	High Level Input Current	$V_{CC} = 5.25V$ , $V_{IH} = 2.7V$			5	$\mu A$
$I_{IL}$	Low Level Input Current	$V_{CC} = 5.25V$ , $V_{IL} = 0.4V$	-5			$\mu A$
$I_{OS}$	Output Drive Current	$V_{CC} = 5.25V$ , $V_O = 0V$	-100		275	mA
$I_{OLD}$	Minimum Dynamic Output Current*	$V_{CC} = 5.25V$ , $V_{OLD} = 1.65V$ Max		50	75	mA
$I_{CCT}$	Maximum $I_{CC}/Input$	$V_{CC} = 5.25V$			2.5	mA
$I_{CC}$	Supply Current *2534 (Quiescent)	$V_{CC} = 5.25V$			80	$\mu A$
$C_{IN}$	Input Capacitance	$V_{CC} = 5V$		5		pF

\*Maximum test duration 2.0 ms, one output loaded at a time.

## AC Electrical Characteristics

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

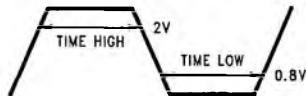
Symbol	Parameter	$V_{CC}^*$ (V)	CGS2534						Unit
			$T_A = +25^\circ C$ $C_L = 50\text{ pF}$ $R_L = 500\Omega$			$T_A = -40^\circ C \text{ to } +85^\circ C$ $C_L = 50\text{ pF}$ $R_L = 500\Omega$			
			Min	Typ	Max	Min	Typ	Max	
$f_{MAX}$	Frequency Maximum	5.0					100		MHz
$t_{PLH}$	Low-to-High Propagation Delay CK to $O_n$	5.0			4.0			4.0	ns
$t_{PHL}$	High-to-Low Propagation Delay CK to $O_n$	5.0			4.0			4.0	ns
$t_{OSHL}$	Maximum Skew Common Edge Output-to-Output Variation (Note 1)	5.0			500			500	ps
$t_{OSLH}$	Maximum Skew Common Edge Output-to-Output Variation (Note 1)	5.0		150	500			500	ps
$t_{RISE}$ , $t_{FALL}$	Rise/Fall Time (from 0.8V/2.0V to 2.0V/0.8V)				1.5			1.5	ns
$t_{HIGH}$ $t_{LOW}$	Pulse Width Duration High Pulse Width Duration Low		4 4			4 4			ns
$t_{PVLH}$	Part-to-Part Variation of Low-to-High Transitions	5.0			750			750	ps
$t_{PVHL}$	Part-to-Part Variation of High-to-Low Transitions	5.0			750			750	ps

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

**Note 1:** Output-to-Output Skew is defined as the absolute value of the difference between the actual propagation delay for any outputs within the same packaged device. The specifications apply to any outputs switching in the same direction either HIGH to LOW ( $t_{OSHL}$ ) or LOW to HIGH ( $t_{OSLH}$ ).

Time high is measured with outputs at 2.0V or above.

Time low is measured with outputs at 0.8V or below.



Timing information.

