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REVISION HISTORY

2/2018—Rev. 0 to Rev. A	
Change to Features Section	1
Changes to Ordering Guide	8

10/2010—Revision 0: Initial Version

SPECIFICATIONS

$V_{CCY} = 1.65 \text{ V to } 5.5 \text{ V}$, $V_{CCA} = 1.15 \text{ V to } V_{CCY}$, $GND = 0 \text{ V}$, $T_A = -55^\circ\text{C to } +125^\circ\text{C}$ unless otherwise noted.

Table 1.

Parameter	Symbol	Test Conditions/Comments	Min	Typ ¹	Max	Unit
LOGIC INPUTS/OUTPUTS						
A Side						
Input High Voltage ²	V_{IHA}	$V_{CCA} = 1.2 \text{ V} + 0.1 \text{ V}/-0.05 \text{ V}$	$V_{CCA} \times 0.88$			V
		$V_{CCA} = 1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CCA} \times 0.72$			V
		$V_{CCA} = 2.5 \text{ V} \pm 0.2 \text{ V}$	1.7			V
		$V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$	2.2			V
		$V_{CCA} = 5 \text{ V} \pm 0.5 \text{ V}$	$V_{CCA} \times 0.7$			V
Input Low Voltage ²	V_{ILA}	$V_{CCA} = 1.2 \text{ V} + 0.1 \text{ V}/-0.05 \text{ V}$			$V_{CCA} \times 0.35$	V
		$V_{CCA} = 1.8 \text{ V} \pm 0.15 \text{ V}$			$V_{CCA} \times 0.35$	V
		$V_{CCA} = 2.5 \text{ V} \pm 0.2 \text{ V}$			0.7	V
		$V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$			0.8	V
		$V_{CCA} = 5 \text{ V} \pm 0.5 \text{ V}$			$V_{CCA} \times 0.3$	V
Output High Voltage	V_{OHA}	$V_Y = V_{CCY}$, $I_{OH} = 20 \mu\text{A}$	$V_{CCA} - 0.4$			V
Output Low Voltage	V_{OLA}	$V_Y = 0 \text{ V}$, $I_{OL} = 20 \mu\text{A}$			0.4	V
Capacitance ²	C_A	$f = 1 \text{ MHz}$, $EN = 0$		9		pF
Leakage Current	$I_{LA, HI-Z}$	$V_A = 0 \text{ V}/V_{CCA}$, $EN = 0$			± 1	μA
Y Side						
Input High Voltage ²	V_{IHY}	$V_{CCY} = 1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CCY} \times 0.67$			V
		$V_{CCY} = 2.5 \text{ V} \pm 0.2 \text{ V}$	1.7			V
		$V_{CCY} = 3.3 \text{ V} \pm 0.3 \text{ V}$	2			V
		$V_{CCY} = 5 \text{ V} \pm 0.5 \text{ V}$	$V_{CCY} \times 0.7$			V
Input Low Voltage ²	V_{ILY}	$V_{CCY} = 1.8 \text{ V} \pm 0.15 \text{ V}$			$V_{CCY} \times 0.35$	V
		$V_{CCY} = 2.5 \text{ V} \pm 0.2 \text{ V}$			0.7	V
		$V_{CCY} = 3.3 \text{ V} \pm 0.3 \text{ V}$			0.8	V
		$V_{CCY} = 5 \text{ V} \pm 0.5 \text{ V}$			$V_{CCY} \times 0.25$	V
Output High Voltage	V_{OHY}	$V_A = V_{CCA}$, $I_{OH} = 20 \mu\text{A}$	$V_{CCY} - 0.4$			V
Output Low Voltage	V_{OLY}	$V_A = 0 \text{ V}$, $I_{OL} = 20 \mu\text{A}$			0.4	V
Capacitance ²	C_Y	$f = 1 \text{ MHz}$, $EN = 0$		6		pF
Leakage Current	$I_{LY, HI-Z}$	$V_Y = 0 \text{ V}/V_{CCY}$, $EN = 0$			± 1	μA
Enable (EN)						
Input High Voltage ²	V_{IHEN}	$V_{CCA} = 1.2 \text{ V} + 0.1 \text{ V}/-0.05 \text{ V}$	$V_{CCA} \times 0.88$			V
		$V_{CCA} = 1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CCA} \times 0.72$			V
		$V_{CCA} = 2.5 \text{ V} \pm 0.2 \text{ V}$	1.7			V
		$V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$	2.2			V
		$V_{CCA} = 5 \text{ V} \pm 0.5 \text{ V}$	$V_{CCA} \times 0.7$			V
Input Low Voltage ²	V_{ILEN}	$V_{CCA} = 1.2 \text{ V} + 0.1 \text{ V}/-0.05 \text{ V}$			$V_{CCA} \times 0.35$	V
		$V_{CCA} = 1.8 \text{ V} \pm 0.15 \text{ V}$			$V_{CCA} \times 0.35$	V
		$V_{CCA} = 2.5 \text{ V} \pm 0.2 \text{ V}$			0.7	V
		$V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$			0.8	V
		$V_{CCA} = 5 \text{ V} \pm 0.5 \text{ V}$			$V_{CCA} \times 0.3$	V
Leakage Current	I_{LEN}	$V_{EN} = 0 \text{ V}/V_{CCA}$, $V_A = 0 \text{ V}$			± 1	μA
Capacitance ²	C_{EN}			3		pF
Enable Time ²	t_{EN}	$R_S = R_T = 50 \Omega$ $V_A = 0 \text{ V}/V_{CCA}$ (A $\rightarrow$ Y) $V_Y = 0 \text{ V}/V_{CCY}$ (Y $\rightarrow$ A)		1	1.8	μs

Parameter	Symbol	Test Conditions/Comments	Min	Typ ¹	Max	Unit
SWITCHING CHARACTERISTICS ²						
$3.3\text{ V} \pm 0.3\text{ V} \leq V_{CCA} \leq V_{CCY}, V_{CCY} = 5\text{ V} \pm 0.5\text{ V}$						
A→Y Level Translation		$R_S = R_T = 50\ \Omega, C_L = 50\text{ pF}$				
Propagation Delay	$t_{P, A \rightarrow Y}$			6	15	ns
Rise Time	$t_{R, A \rightarrow Y}$			2	5	ns
Fall Time	$t_{F, A \rightarrow Y}$			2	5	ns
Maximum Data Rate	$D_{MAX, A \rightarrow Y}$			50		Mbps
Channel-to-Channel Skew	$t_{SKEW, A \rightarrow Y}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, A \rightarrow Y}$			3		ns
Y→A Level Translation		$R_S = R_T = 50\ \Omega, C_L = 15\text{ pF}$				
Propagation Delay	$t_{P, Y \rightarrow A}$			4	10	ns
Rise Time	$t_{R, Y \rightarrow A}$			1	5	ns
Fall Time	$t_{F, Y \rightarrow A}$			3	10	ns
Maximum Data Rate	$D_{MAX, Y \rightarrow A}$			50		Mbps
Channel-to-Channel Skew	$t_{SKEW, Y \rightarrow A}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, Y \rightarrow A}$			2		ns
$1.8\text{ V} \pm 0.15\text{ V} \leq V_{CCA} \leq V_{CCY}, V_{CCY} = 3.3\text{ V} \pm 0.3\text{ V}$						
A→Y Translation		$R_S = R_T = 50\ \Omega, C_L = 50\text{ pF}$				
Propagation Delay	$t_{P, A \rightarrow Y}$			8	15	ns
Rise Time	$t_{R, A \rightarrow Y}$			2	8	ns
Fall Time	$t_{F, A \rightarrow Y}$			2	8	ns
Maximum Data Rate	$D_{MAX, A \rightarrow Y}$			50		Mbps
Channel-to-Channel Skew	$t_{SKEW, A \rightarrow Y}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, A \rightarrow Y}$			4		ns
Y→A Translation		$R_S = R_T = 50\ \Omega, C_L = 15\text{ pF}$				
Propagation Delay	$t_{P, Y \rightarrow A}$			5	12	ns
Rise Time	$t_{R, Y \rightarrow A}$			2	5	ns
Fall Time	$t_{F, Y \rightarrow A}$			2	5	ns
Maximum Data Rate	$D_{MAX, Y \rightarrow A}$			50		Mbps
Channel-to-Channel Skew	$t_{SKEW, Y \rightarrow A}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, Y \rightarrow A}$			3		ns
$1.15\text{ V to }1.3\text{ V} \leq V_{CCA} \leq V_{CCY}, V_{CCY} = 3.3\text{ V} \pm 0.3\text{ V}$						
A→Y Translation		$R_S = R_T = 50\ \Omega, C_L = 50\text{ pF}$				
Propagation Delay	$t_{P, A \rightarrow Y}$			9	27	ns
Rise Time	$t_{R, A \rightarrow Y}$			3	8	ns
Fall Time	$t_{F, A \rightarrow Y}$			2	8	ns
Maximum Data Rate	$D_{MAX, A \rightarrow Y}$			40		Mbps
Channel-to-Channel Skew	$t_{SKEW, A \rightarrow Y}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, A \rightarrow Y}$			10		ns
Y→A Translation		$R_S = R_T = 50\ \Omega, C_L = 15\text{ pF}$				
Propagation Delay	$t_{P, Y \rightarrow A}$			5	13	ns
Rise Time	$t_{R, Y \rightarrow A}$			2	6	ns
Fall Time	$t_{F, Y \rightarrow A}$			2	6	ns
Maximum Data Rate	$D_{MAX, Y \rightarrow A}$			40		Mbps
Channel-to-Channel Skew	$t_{SKEW, Y \rightarrow A}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, Y \rightarrow A}$			4		ns

Parameter	Symbol	Test Conditions/Comments	Min	Typ ¹	Max	Unit
1.15 V to 1.3 V $\leq V_{CCA} \leq V_{CCY}$, $V_{CCY} = 1.8 \text{ V} \pm 0.3 \text{ V}$						
A $\rightarrow$ Y Translation						
Propagation Delay	$t_{P, A \rightarrow Y}$	$R_S = R_T = 50 \Omega$, $C_L = 50 \text{ pF}$		12	35	ns
Rise Time	$t_{R, A \rightarrow Y}$			7	18	ns
Fall Time	$t_{F, A \rightarrow Y}$			3	8	ns
Maximum Data Rate	$D_{MAX, A \rightarrow Y}$			25		Mbps
Channel-to-Channel Skew	$t_{SKEW, A \rightarrow Y}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, A \rightarrow Y}$			15		ns
Y $\rightarrow$ A Translation						
Propagation Delay	$t_{P, Y \rightarrow A}$	$R_S = R_T = 50 \Omega$, $C_L = 15 \text{ pF}$		14	40	ns
Rise Time	$t_{R, Y \rightarrow A}$			5	24	ns
Fall Time	$t_{F, Y \rightarrow A}$			2.5	10	ns
Maximum Data Rate	$D_{MAX, Y \rightarrow A}$			25		Mbps
Channel-to-Channel Skew	$t_{SKEW, Y \rightarrow A}$			3		ns
Part-to-Part Skew	$t_{PPSKEW, Y \rightarrow A}$			23.5		ns
2.5 V $\pm 0.2 \text{ V} \leq V_{CCA} \leq V_{CCY}$, $V_{CCY} = 3.3 \text{ V} \pm 0.3 \text{ V}$						
A $\rightarrow$ Y Translation						
Propagation Delay	$t_{P, A \rightarrow Y}$	$R_S = R_T = 50 \Omega$, $C_L = 50 \text{ pF}$		7	15	ns
Rise Time	$t_{R, A \rightarrow Y}$			2.5	6	ns
Fall Time	$t_{F, A \rightarrow Y}$			2	8	ns
Maximum Data Rate	$D_{MAX, A \rightarrow Y}$			60		Mbps
Channel-to-Channel Skew	$t_{SKEW, A \rightarrow Y}$			1.5		ns
Part-to-Part Skew	$t_{PPSKEW, A \rightarrow Y}$			4		ns
Y $\rightarrow$ A Translation						
Propagation Delay	$t_{P, Y \rightarrow A}$	$R_S = R_T = 50 \Omega$, $C_L = 15 \text{ pF}$		5	12	ns
Rise Time	$t_{R, Y \rightarrow A}$			1	6	ns
Fall Time	$t_{F, Y \rightarrow A}$			3	8	ns
Maximum Data Rate	$D_{MAX, Y \rightarrow A}$			60		Mbps
Channel-to-Channel Skew	$t_{SKEW, Y \rightarrow A}$			2		ns
Part-to-Part Skew	$t_{PPSKEW, Y \rightarrow A}$			3		ns
POWER REQUIREMENTS						
Power Supply Voltages	V_{CCA}	$V_{CCA} \leq V_{CCY}$	1.15		5.5	V
	V_{CCY}		1.65		5.5	V
Quiescent Power Supply Current	I_{CCA}	$V_A = 0 \text{ V}/V_{CCA}$, $V_Y = 0 \text{ V}/V_{CCY}$, $V_{CCA} = V_{CCY} = 5.5 \text{ V}$, $EN = 1$		0.17	5	μA
	I_{CCY}	$V_A = 0 \text{ V}/V_{CCA}$, $V_Y = 0 \text{ V}/V_{CCY}$, $V_{CCA} = V_{CCY} = 5.5 \text{ V}$, $EN = 1$		0.27	5	μA
Three-State Mode Power Supply Current	$I_{HI-Z, A}$	$V_{CCA} = V_{CCY} = 5.5 \text{ V}$, $EN = 0$		0.1	5	μA
	$I_{HI-Z, Y}$	$V_{CCA} = V_{CCY} = 5.5 \text{ V}$, $EN = 0$		0.1	5	μA

¹ T_A for typical specifications is +25°C.² Guaranteed by design, not production tested.

ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 2.

Parameter	Rating
V_{CCA} to GND	$-0.3\text{ V to }+7\text{ V}$
V_{CCY} to GND	V_{CCA} to $+7\text{ V}$
Digital Inputs (A)	$-0.3\text{ V to } (V_{CCA} + 0.3\text{ V})$
Digital Inputs (Y)	$-0.3\text{ V to } (V_{CCY} + 0.3\text{ V})$
EN to GND	$-0.3\text{ V to }+7\text{ V}$
Operating Temperature Range	$-55^\circ\text{C to }+125^\circ\text{C}$
Storage Temperature Range	$-65^\circ\text{C to }+150^\circ\text{C}$
Junction Temperature	150°C
θ_{JA} Thermal Impedance (4-Layer Board) 14-Lead TSSOP	112.6°C/W
Lead Temperature, Soldering	215°C
Vapor Phase (60 sec)	215°C
Infrared (15 sec)	220°C

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

Only one absolute maximum rating can be applied at any one time.

ESD CAUTION



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

PIN CONFIGURATIONS AND FUNCTION DESCRIPTIONS

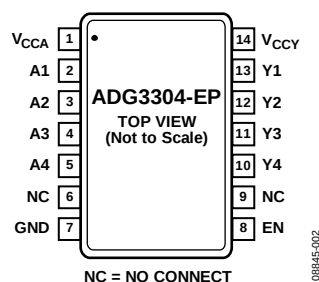


Figure 2. 14-Lead TSSOP
Pin Configuration

Table 3. 14-Lead TSSOP Pin Function Descriptions

Pin No.	Mnemonic	Description
1	V _{CCA}	Power Supply Voltage Input for the A1 to A4 Input/Output (I/O) Pins ($1.15\text{ V} \leq V_{CCA} \leq V_{CCY}$).
2	A1	Input/Output A1. Referenced to V _{CCA} .
3	A2	Input/Output A2. Referenced to V _{CCA} .
4	A3	Input/Output A3. Referenced to V _{CCA} .
5	A4	Input/Output A4. Referenced to V _{CCA} .
6, 9	NC	No Connect.
7	GND	Ground.
8	EN	Active High Enable Input.
10	Y4	Input/Output Y4. Referenced to V _{CCY} .
11	Y3	Input/Output Y3. Referenced to V _{CCY} .
12	Y2	Input/Output Y2. Referenced to V _{CCY} .
13	Y1	Input/Output Y1. Referenced to V _{CCY} .
14	V _{CCY}	Power Supply Voltage Input for the Y1 to Y4 I/O Pins ($1.65\text{ V} \leq V_{CC} \leq 5.5\text{ V}$).

Table 4. Truth Table

EN	Y I/O Pins	A I/O Pins
0	Hi-Z ¹	Hi-Z ¹
1	Normal operation ²	Normal operation ²

¹ High impedance state.

² In normal operation, the ADG3304-EP performs level translation.

OUTLINE DIMENSIONS

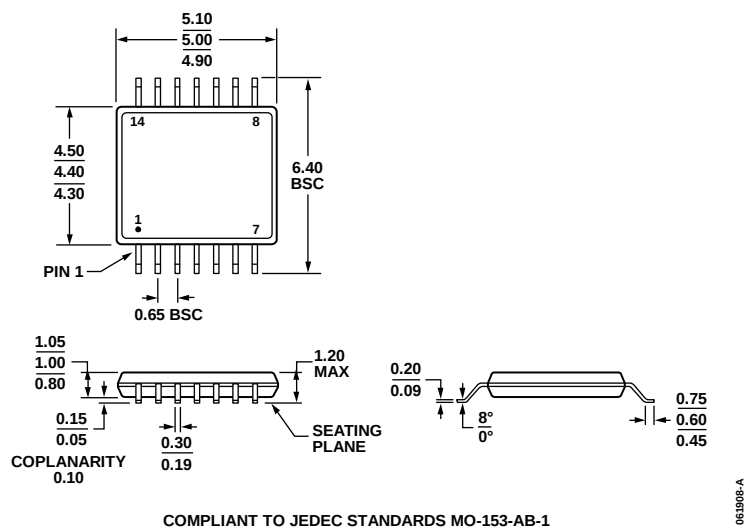


Figure 3. 14-Lead Thin Shrink Small Outline Package [TSSOP]
(RU-14)
Dimensions shown in millimeters

ORDERING GUIDE

Model ¹	Temperature Range	Package Description	Package Option
ADG3304SRU-EP-RL7	–55°C to +125°C	14-Lead Thin Shrink Small Outline Package [TSSOP]	RU-14
ADG3304SRUZ-EP-RL7	–55°C to +125°C	14-Lead Thin Shrink Small Outline Package [TSSOP]	RU-14

¹ Z= RoHS Compliant Part.