

8-Bit Dual-Supply Bus Transceiver with Configurable Voltage Translation and 3-State Output

1 FEATURES

- **Control Input V_{IH}/V_{IL} Levels are Referenced to V_{CCA} Voltage**
- **Power-Supply Range:**
 V_{CCA} and V_{CCB} : 1.65V to 5.5V
- **Latch-up performance exceeds 100mA per JESD 78, Class II**
- **V_{CC} Isolation: If Either V_{CC} is at GND, Both Ports are in the High-Impedance State**
- **I_{OFF} : Supports Partial-Power-Down Mode Operation**
- **Extended Temperature: -40°C to +125°C**

3 DESCRIPTIONS

This 8-bit non-inverting bus transceiver is a bidirectional voltage-level translator and can be used to establish digital switching compatibility between mixed-voltage systems. It uses two separate configurable power-supply rails, Both $V_{CC(A)}$ and $V_{CC(B)}$ supporting operating voltages from 1.65V to 5.5V, A ports, DIR and $\overline{OE}$ tracks the V_{CCA} supply and B ports tracks the V_{CCB} supply. This allows the support of both lower and higher logic signal levels while providing bidirectional translation capabilities between any of the 1.8V, 2.5V, 3.3V and 5.5V voltage nodes.

2 APPLICATIONS

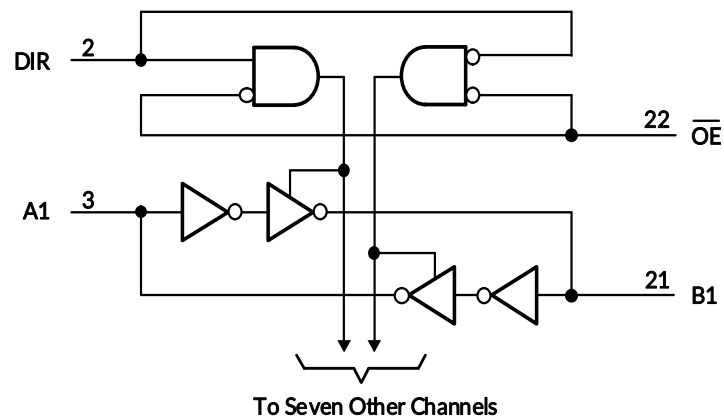
- Handset
- Smartphone
- Tablet
- Desktop PC

Device Information ⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RES74LVC4245APW	TSSOP24	7.80mm×4.40mm
RES74LVC4245AD	SOIC24	15.40mm×7.50mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

4 Functional Block Diagram



Function Table

CONTROL INPUTS		OUTPUT CIRCUITS		OPERATION
$\overline{OE}$	DIR	A PORT	B PORT	
L	L	Enabled	Hi-Z	B data to A bus
L	H	Hi-Z	Enabled	A data to B bus
H	X	Hi-Z	Hi-Z	Isolation

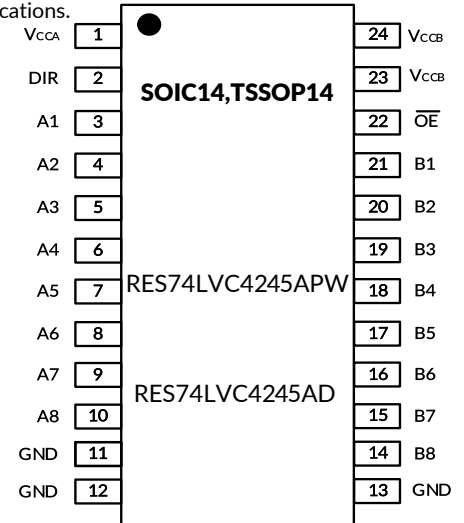
6 PACKAGE/ORDERING INFORMATION ⁽¹⁾

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING ⁽²⁾	MSL ⁽³⁾	PACKAGE OPTION
RES74245	RES74LVC4245APW	-40°C ~+125°C	TSSOP24	RES74LVC4245APW	MSL3	Tape and Reel, 4000
	RES74LVC4245AD	-40°C ~+125°C	SOIC24	RES74LVC4245AD	MSL3	Tape and Reel, 1200

NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.
- (2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

7 PIN CONFIGURATIONS



PIN DESCRIPTION

RES74LVC4245APW RES74LVC4245AD SOIC14,TSSOP14	NAME	TYPE ⁽¹⁾	FUNCTION
3	A1	I/O	Input/output A1. Reference to V _{CCA} .
4	A2	I/O	Input/output A2. Reference to V _{CCA} .
5	A3	I/O	Input/output A3. Reference to V _{CCA} .
6	A4	I/O	Input/output A4. Reference to V _{CCA} .
7	A5	I/O	Input/output A5. Reference to V _{CCA} .
8	A6	I/O	Input/output A6. Reference to V _{CCA} .
9	A7	I/O	Input/output A7. Reference to V _{CCA} .
10	A8	I/O	Input/output A8. Reference to V _{CCA} .
14	B8	I/O	Input/output B8. Reference to V _{CCB} .
15	B7	I/O	Input/output B7. Reference to V _{CCB} .
16	B6	I/O	Input/output B6. Reference to V _{CCB} .
17	B5	I/O	Input/output B5. Reference to V _{CCB} .
18	B4	I/O	Input/output B4. Reference to V _{CCB} .
19	B3	I/O	Input/output B3. Reference to V _{CCB} .
20	B2	I/O	Input/output B2. Reference to V _{CCB} .
21	B1	I/O	Input/output B1. Reference to V _{CCB} .
2	DIR	I	Direction-control signal.
11,12,13	GND	G	Ground.
22	$\overline{OE}$	I	Output Enable (Active Low). Pull $\overline{OE}$ high to place all outputs in 3-state mode. Referenced to V _{CCA} .
1	V _{CCA}	P	A-port supply voltage. 1.65V ≤ V _{CCA} ≤ 5.5V
23,24	V _{CCB}	P	B-port supply voltage. 1.65V ≤ V _{CCB} ≤ 5.5V

(1) I=input, O=output, I/O=input and output, P=power

8 SPECIFICATIONS

8.1 Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) ⁽¹⁾

SYMBOL	PARAMETER		MIN	MAX	UNIT
V _{CCA}	Supply Voltage Range		-0.5	6.5	V
V _{CCB}	Supply Voltage Range		-0.5	6.5	V
V _I ⁽²⁾	Input Voltage Range	A port	-0.5	6.5	V
		B port	-0.5	6.5	
		Control inputs	-0.5	6.5	
V _O ⁽²⁾	Voltage range applied to any output in the high-impedance or power-off state	A port	-0.5	6.5	V
		B port	-0.5	6.5	
V _O ⁽²⁾⁽³⁾	Voltage range applied to any output in the high or low state	A port	-0.5	V _{CCA} +0.5	V
		B port	-0.5	V _{CCB} +0.5	
I _{IK}	Input clamp current	V _I <0		-50	mA
I _{OK}	Output clamp current	V _O <0		-50	mA
I _O	Continuous output current			±50	mA
	Continuous current through V _{CCA} , V _{CCB} or GND			±100	mA
θ _{JA}	Package thermal impedance ⁽⁴⁾	TSSOP24		35	°C/W
		SOIC24		85	
T _J	Junction Temperature ⁽⁵⁾		-40	150	°C
T _{stg}	Storage temperature		-65	+150	

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The value of V_{CCA} and V_{CCB} are provided in the recommended operating conditions table.

(4) The package thermal impedance is calculated in accordance with JESD-51.

(5) The maximum power dissipation is a function of T_{J(MAX)}, R_{θJA}, and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / R_{θJA}. All numbers apply for packages soldered directly onto a PCB.

8.2 ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾	±3000	V
		Machine Model (MM)	±400	V

(1) JEDEC document JEP155 states that 500 V HBM allows safe manufacturing with a standard ESD control process.



ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.3 Recommended Operating Conditions

V_{CCI} is the supply voltage associated with the input port. V_{CCO} is the supply voltage associated with the output port.

PARAMETER		V _{CCI} ⁽¹⁾	V _{CCO} ⁽²⁾	MIN	TYP	MAX	UNIT
Supply voltage ⁽¹⁾	V _{CCA}			1.65		5.5	V
	V _{CCB}			1.65		5.5	
High-level input Voltage (V _{IH})	Data inputs ⁽⁵⁾	1.65V to 1.95V		V _{CCI} x 0.75			V
		2.3V to 2.7V		V _{CCI} x 0.7			
		3V to 3.6V		V _{CCI} x 0.7			
		4.5V to 5.5V		V _{CCI} x 0.7			
Low-level input Voltage (V _{IL})	Data inputs ⁽⁵⁾	1.65V to 1.95V				V _{CCI} x 0.35	V
		2.3V to 2.7V				V _{CCI} x 0.3	
		3V to 3.6V				V _{CCI} x 0.3	
		4.5V to 5.5V				V _{CCI} x 0.3	
High-level input Voltage (V _{IH})	Control inputs (referenced to V _{CCA}) ⁽⁶⁾	1.65V to 1.95V		V _{CCA} x 0.75			V
		2.3V to 2.7V		V _{CCA} x 0.7			
		3V to 3.6V		V _{CCA} x 0.7			
		4.5V to 5.5V		V _{CCA} x 0.7			
Low-level input Voltage (V _{IL})	Control inputs (referenced to V _{CCA}) ⁽⁶⁾	1.65V to 1.95V				V _{CCA} x 0.35	V
		2.3V to 2.7V				V _{CCA} x 0.3	
		3V to 3.6V				V _{CCA} x 0.3	
		4.5V to 5.5V				V _{CCA} x 0.3	
Input voltage (V _I)	Control inputs ⁽⁴⁾			0		5.5	V
Input/output voltage (V _{I/O})	Active state			0		V _{CCO}	V
	3-state			0		5.5	V
High-level output current (I _{OH})			1.65V to 1.95V			-4	mA
			2.3V to 2.7V			-8	
			3V to 3.6V			-24	
			4.5V to 5.5V			-32	
Low-level output current (I _{OL})			1.65V to 1.95V			4	mA
			2.3V to 2.7V			8	
			3V to 3.6V			24	
			4.5V to 5.5V			32	
Input transition rise or fall rate(Δt/Δv)	Data inputs ⁽³⁾	1.65V to 1.95V				20	ns/V
		2.3V to 2.7V				20	
		3V to 3.6V				10	
		4.5V to 5.5V				5	
T _A Operating free-air temperature				-40		125	°C

(1) V_{CCI} is the V_{CC} associated with the data input port.

(2) V_{CCO} is the V_{CC} associated with the output port.

(3) All unused or driven (floating) data inputs (I/Os) of the device must be held at logic HIGH or LOW (preferably V_{CCI} or GND) to ensure proper device operation and minimize power.

(4) All unused control inputs must be held at V_{CCA} or GND to ensure proper device operation and minimize power consumption.

(5) For V_{CCI} values not specified in the data sheet, $V_{IH} \min = V_{CCI} \times 0.7$ V, $V_{IL} \max = V_{CCI} \times 0.3$ V.

(6) For V_{CCA} values not specified in the data sheet, $V_{IH} \min = V_{CCA} \times 0.7$ V, $V_{IL} \max = V_{CCA} \times 0.3$ V.

8.4 Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted) ^{(1) (2)}

PARAMETER	CONDITIONS	V _{CCA}	V _{CCB}	TEMP	MIN ⁽³⁾	TYP ⁽⁴⁾	MAX ⁽³⁾	UNIT
V _{OH}	I _{OH} = -100 μ A V _I =V _{IH}	1.65V to 4.5V	1.65V to 4.5V	Full	V _{CCO} - 0.1			V
	I _{OH} = -4mA V _I =V _{IH}	1.65V	1.65V		1.2			
	I _{OH} = -8mA V _I =V _{IH}	2.3V	2.3V		1.9			
	I _{OH} = -24mA V _I =V _{IH}	3V	3V		2.4			
	I _{OH} = -32mA V _I =V _{IH}	4.5V	4.5V		3.8			
V _{OL}	I _{OL} = 100 μ A V _I =V _{IL}	1.65V to 4.5V	1.65V to 4.5V				0.1	V
	I _{OL} = 4mA V _I =V _{IL}	1.65V	1.65V				0.45	
	I _{OL} = 8mA V _I =V _{IL}	2.3V	2.3V				0.3	
	I _{OL} = 24mA V _I =V _{IL}	3V	3V				0.55	
	I _{OL} = 32mA V _I =V _{IL}	4.5V	4.5V				0.55	
I _I DIR	V _I = V _{CCA} or GND	1.65V to 5.5V	1.65V to 5.5V	+25°C			±1	μ A
				Full			±2	
I _{off} A or B Port	V _I or V _O = 0 to 5.5V	0V	0V to 5.5V	+25°C			±1	μ A
		0V to 5.5V	0V	Full			±2	
I _{OZ} ⁽⁵⁾ A or B Port	V _O = V _{CCO} or GND, $\overline{OE}$ =V _{IH}	1.65V to 5.5V	1.65V to 5.5V	+25°C			±1	μ A
				Full			±2	
I _{CCA} V _{CCA} supply current	V _I = V _{CCI} or GND ⁽⁶⁾ I _O = 0	1.65V to 5.5V	1.65V to 5.5V	Full			15	μ A
		5V	0V	Full			15	
		0V	5V	Full			-2	
I _{CCB} V _{CCB} supply current	V _I = V _{CCB} or GND ⁽⁶⁾ I _O = 0	1.65V to 5.5V	1.65V to 5.5V	Full			15	μ A
		5V	0V	Full			-2	
		0V	5V	Full			15	
I _{CCA} + I _{CCB} Combined supply current	V _I = V _{CCI} or GND I _O = 0	1.65V to 5.5V	1.65V to 5.5V	Full			25	μ A
Δ I _{CCA}	A port	One A port at V _{CCA} - 0.6 V, DIR at V _{CCA} , B port = open	3V to 5.5V	3V to 5.5V	Full		50	μ A
	DIR	DIR at V _{CCA} - 0.6 V, B port = open A port at V _{CCA} or GND			Full		50	μ A
Δ I _{CCB}	B port	One B port at V _{CCB} - 0.6 V, DIR at GND, A port = open	3V to 5.5V	3V to 5.5V	Full		50	μ A
C _I Control inputs	V _I = V _{CCA} or GND	3.3V	3.3V	+25°C		4		pF
C _{IO}	A port	3.3V	3.3V	+25°C		8.5		pF
	B port	3.3V	3.3V	+25°C		8.5		

(1) V_{CCI} is the V_{CC} associated with the input port.

(2) V_{CCO} is the V_{CC} associated with the output port.

(3) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.

(4) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

(5) For I/O ports, the parameter I_{OZ} includes the input leakage current.

(6) Hold all unused data inputs of the device at V_{CCI} or GND to assure proper device operation.

8.5 Switching Characteristics

8.5.1 $V_{CCA}=1.8V\pm0.15V$

over recommended operating free-air temperature range, Full=-40°C to 125°C.

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEMP	$V_{CCB}=1.8V$ $\pm0.15V^{(1)}$		$V_{CCB}=2.5V$ $\pm0.2V^{(1)}$		$V_{CCB}=3.3V$ $\pm0.3V^{(1)}$		$V_{CCB}=5V$ $\pm0.5V^{(1)}$		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	Full	2.0	24.6	1.5	17.2	1.2	18.6	0.9	18.5	ns
t_{PHL}												
t_{PLH}	Bn	An	Full	1.0	24.6	0.9	24.5	0.8	23.2	0.8	23.2	ns
t_{PHL}												
t_{PHZ}	$\overline{OE}$	An	Full	1.8	31.5	1.8	21.9	1.8	25.2	1.6	20.3	ns
t_{PLZ}												
t_{PHZ}	$\overline{OE}$	Bn	Full	2.8	27.9	2.2	29.0	2.0	30.2	1.5	28.4	ns
t_{PLZ}												
t_{PZH}	$\overline{OE}$	An	Full	0.5	29.7	0.5	21.2	0.5	23.0	0.5	18.2	ns
t_{PZL}												
t_{PZH}	$\overline{OE}$	Bn	Full	2.1	23.9	1.8	24.0	1.4	38.7	1.0	41.6	ns
t_{PZL}												

(1) This parameter is ensured by design and/or characterization and is not tested in production.

8.5.2 $V_{CCA}=2.5V\pm0.2V$

over recommended operating free-air temperature range, Full=-40°C to 125°C.

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEMP	$V_{CCB}=1.8V$ $\pm0.15V^{(1)}$		$V_{CCB}=2.5V$ $\pm0.2V^{(1)}$		$V_{CCB}=3.3V$ $\pm0.3V^{(1)}$		$V_{CCB}=5V$ $\pm0.5V^{(1)}$		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	Full	1.8	24.5	1.4	16.5	0.9	15.4	0.7	16.6	ns
t_{PHL}												
t_{PLH}	Bn	An	Full	1.4	17.2	1.2	16.5	1.2	16.2	1.0	16.2	ns
t_{PHL}												
t_{PHZ}	$\overline{OE}$	An	Full	1.6	29.3	1.6	18.0	1.6	21.6	1.6	15.9	ns
t_{PLZ}												
t_{PHZ}	$\overline{OE}$	Bn	Full	2.7	17.1	2.1	16.7	2.0	17.0	1.0	18.6	ns
t_{PLZ}												
t_{PZH}	$\overline{OE}$	An	Full	1.2	25.1	1.2	16.7	1.2	18.2	1.2	13.5	ns
t_{PZL}												
t_{PZH}	$\overline{OE}$	Bn	Full	2.0	16.7	1.8	15.3	1.4	24.2	1.2	22.1	ns
t_{PZL}												

(1) This parameter is ensured by design and/or characterization and is not tested in production.

8.5.3 $V_{CCA}=3.3V\pm0.3V$

over recommended operating free-air temperature range, Full=-40°C to 125°C.

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEMP	$V_{CCB}=1.8V$ $\pm0.15V^{(1)}$		$V_{CCB}=2.5V$ $\pm0.2V^{(1)}$		$V_{CCB}=3.3V$ $\pm0.3V^{(1)}$		$V_{CCB}=5V$ $\pm0.5V^{(1)}$		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	Full	1.8	23.2	1.3	16.2	0.9	15.2	0.6	15.1	ns
t_{PHL}												
t_{PLH}	Bn	An	Full	0.9	18.6	0.9	15.4	0.8	15.2	0.7	15.8	ns
t_{PHL}												
t_{PHZ}	$\overline{OE}$	An	Full	1.9	27.2	1.9	17.4	1.9	20.1	1.9	15.2	ns
t_{PLZ}												
t_{PHZ}	$\overline{OE}$	Bn	Full	2.5	21.8	2.0	19.7	1.8	20.0	0.9	19.2	ns
t_{PLZ}												
t_{PZH}	$\overline{OE}$	An	Full	0.9	23.4	0.9	16.2	0.9	17.9	0.9	13.4	ns
t_{PZL}												
t_{PZH}	$\overline{OE}$	Bn	Full	2.1	13.5	1.6	14.0	1.3	17.0	1.0	17.1	ns
t_{PZL}												

(1) This parameter is ensured by design and/or characterization and is not tested in production.

8.5.4 $V_{CCA}=5V\pm0.5V$

over recommended operating free-air temperature range, Full=-40°C to 125°C.

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEMP	$V_{CCB}=1.8V$ $\pm0.15V^{(1)}$		$V_{CCB}=2.5V$ $\pm0.2V^{(1)}$		$V_{CCB}=3.3V$ $\pm0.3V^{(1)}$		$V_{CCB}=5V$ $\pm0.5V^{(1)}$		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	Full	1.8	23.2	1.2	16.2	0.8	15.8	0.5	15.2	ns
t_{PHL}												
t_{PLH}	Bn	An	Full	0.8	18.5	0.5	16.6	0.4	15.1	0.4	15.2	ns
t_{PHL}												
t_{PHZ}	$\overline{OE}$	An	Full	0.4	27.8	0.4	17.4	0.4	19.2	0.4	15.5	ns
t_{PLZ}												
t_{PHZ}	$\overline{OE}$	Bn	Full	2.4	14.6	1.9	14.4	1.6	14.6	0.8	14.7	ns
t_{PLZ}												
t_{PZH}	$\overline{OE}$	An	Full	0.8	24.5	0.8	16.5	0.8	18.3	0.8	13.5	ns
t_{PZL}												
t_{PZH}	$\overline{OE}$	Bn	Full	1.8	12.8	1.5	12.8	1.2	12.8	1.0	12.8	ns
t_{PZL}												

(1) This parameter is ensured by design and/or characterization and is not tested in production.

8.6 Operating Characteristics

$T_A=25^\circ C$

PARAMETER		TEST CONDITIONS	$V_{CCA}=$ $V_{CCB}=1.8V$	$V_{CCA}=$ $V_{CCB}=2.5V$	$V_{CCA}=$ $V_{CCB}=3.3V$	$V_{CCA}=$ $V_{CCB}=5V$	UNIT
			TYP	TYP	TYP	TYP	
$C_{pdA}^{(1)}$	A-port input, B-port output	$C_L=0,$ $f=10MHz,$ $t_r=t_f=5ns$	3	4	6	9	pF
	B-port input, A-port output		14	17	22	32	
$C_{pdB}^{(1)}$	A-port input, B-port output		14	16	21	32	
	B-port input, A-port output		3	4	6	9	

(1) Power dissipation capacitance per transceiver

8.7 Typical Characteristics

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only.

At $T_A = +25^{\circ}\text{C}$, $V_{CCA}=5\text{V}$, $V_{CCB}=5\text{V}$, unless otherwise noted.

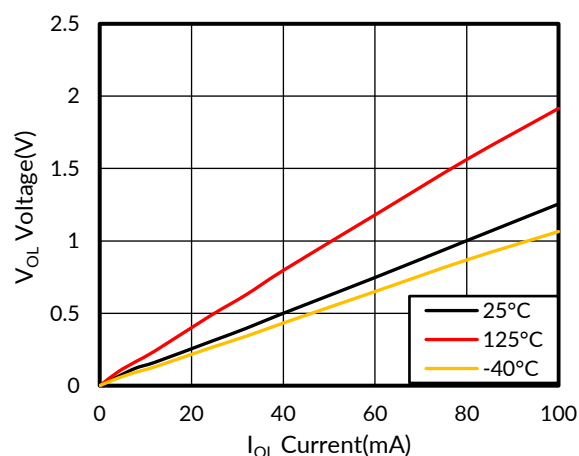


Figure 1. Voltage vs Current

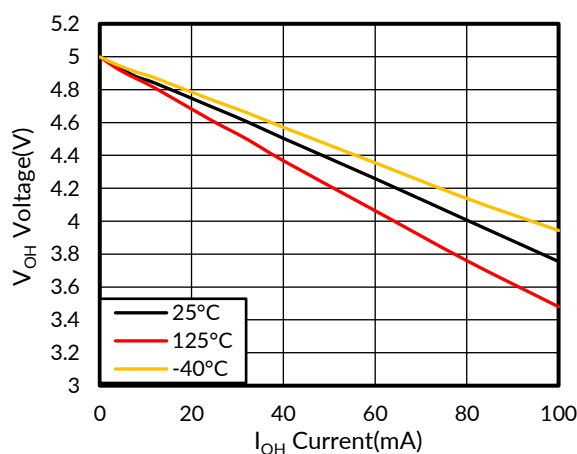
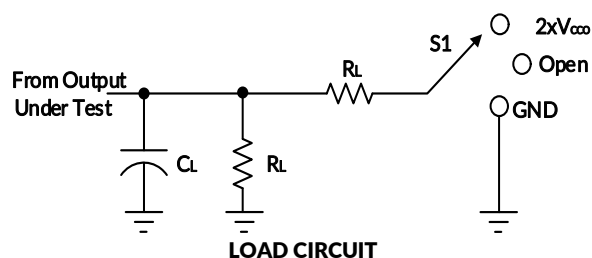


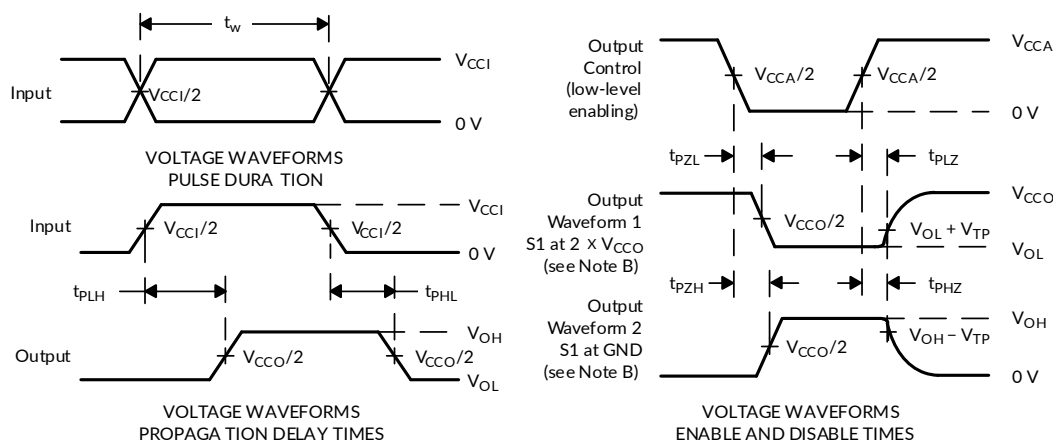
Figure 2. Voltage vs Current

9 Parameter Measurement Information



TEST	S1
t_{pd}	Open
t_{PLZ}/t_{PZL}	2 X V_{CCO}
t_{PHZ}/t_{PZH}	GND

V_{CC}	C_L	R_L	V_{TP}
1.8V±0.15V	15pF	2kΩ	0.15V
2.5V±0.2V	15pF	2kΩ	0.15V
3.3V±0.3V	15pF	2kΩ	0.3V
5V±0.5V	15pF	2kΩ	0.3V



NOTES: A. C_L includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.

Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_o = 50\Omega$, $dv/dt \geq 1V/ns$.

D. The outputs are measured one at a time, with one transition per measurement.

E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .

F. t_{PZL} and t_{PZH} are the same as t_{en} .

G. t_{PLH} and t_{PHL} are the same as t_{pd} .

H. All parameters and waveforms are not applicable to all devices.

Figure 3. Load Circuit and Voltage Waveforms

10 Application Information

The RES74LVC4245AD, RES74LVC4245APW device can be used in level translation applications for interfacing devices or systems operating at different interface voltages with one another. The maximum output current can be up to 32 mA when device is powered by 5 V.

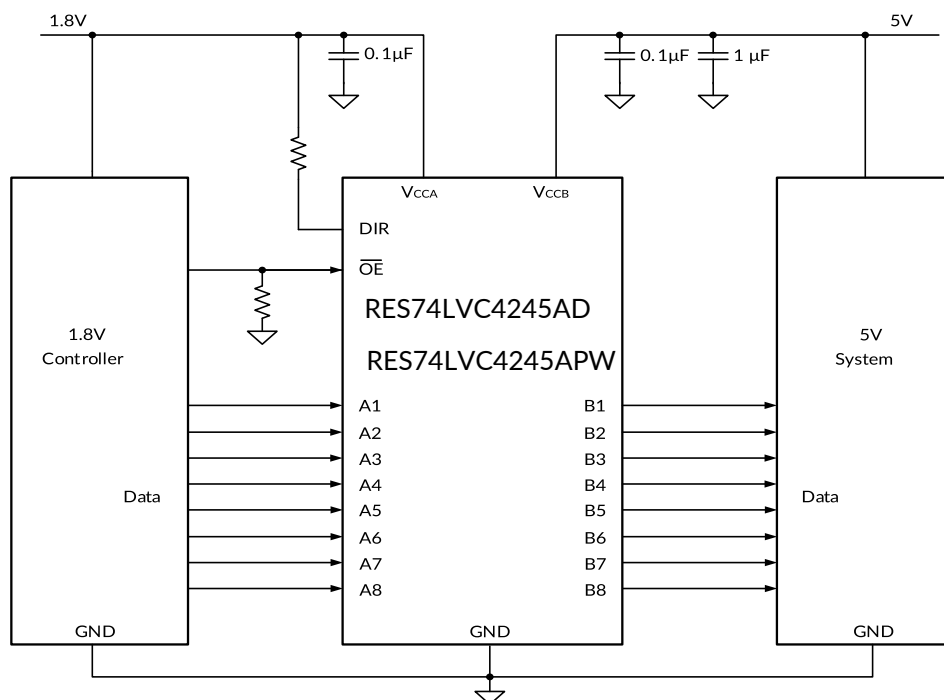
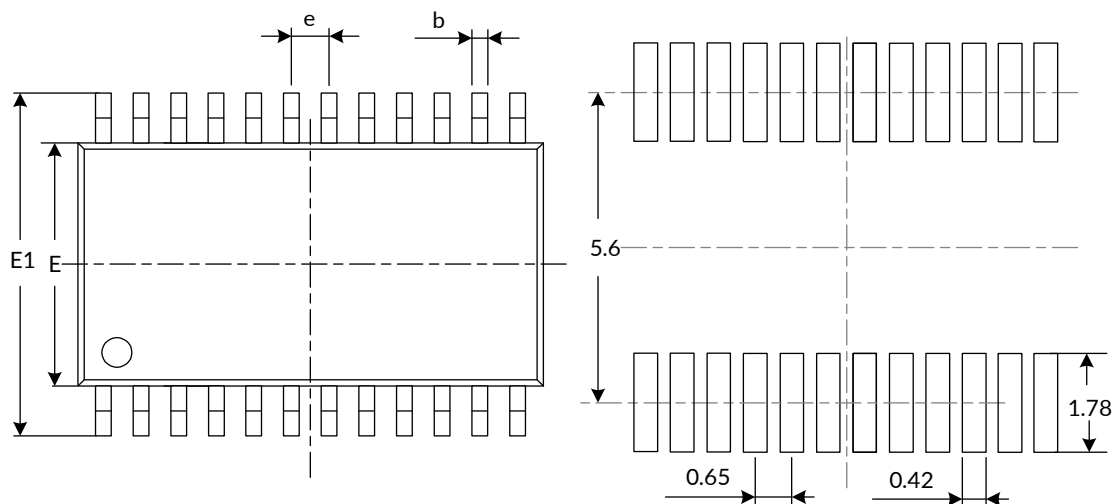


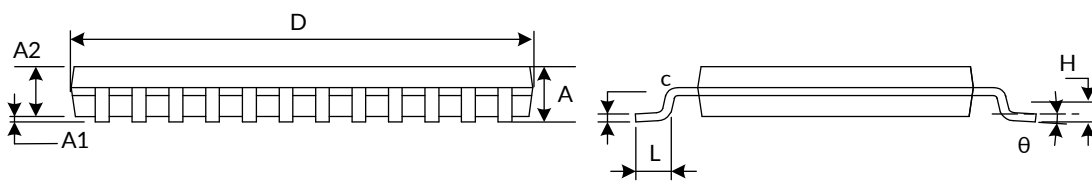
Figure 4. Typical Application Circuit

11 PACKAGE OUTLINE DIMENSIONS

TSSOP24⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)

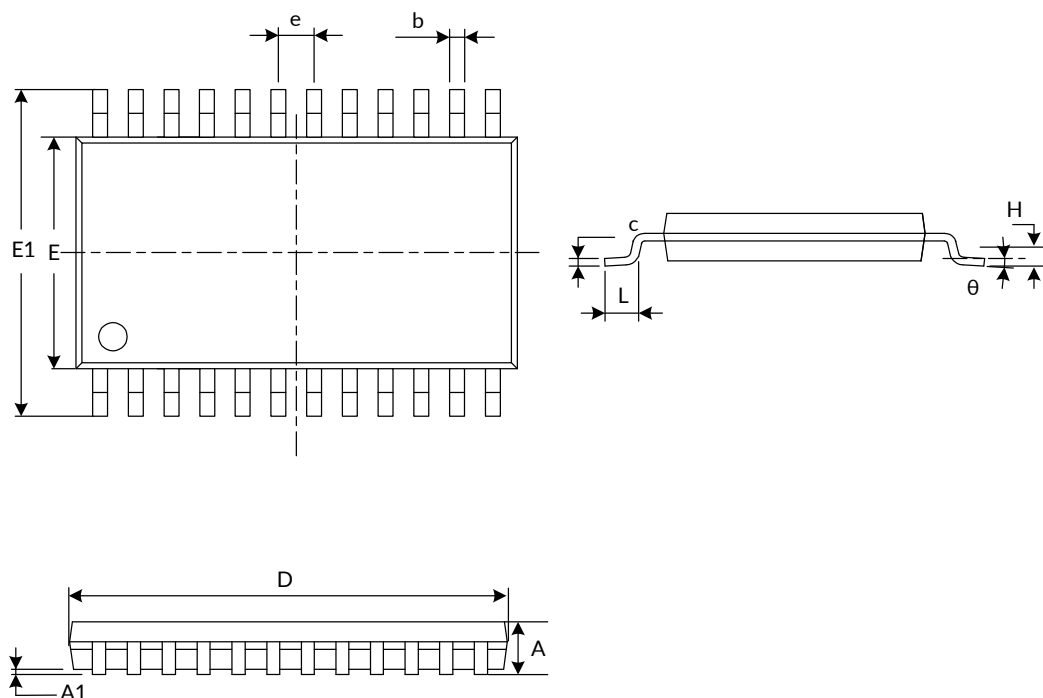


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.200	0.290	0.008	0.011
c	0.130	0.170	0.005	0.007
D ⁽¹⁾	7.700	7.900	0.303	0.311
E ⁽¹⁾	4.300	4.500	0.169	0.177
E1	6.200	6.600	0.244	0.260
e	0.650 (BSC) ⁽²⁾		0.026 (BSC) ⁽²⁾	
L	0.450	0.750	0.018	0.030
H	0.250 (TYP)		0.010 (TYP)	
θ	0°	8°	0°	8°

NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

SOIC24⁽³⁾



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾		2.650		0.104
A1	0.100	0.300	0.004	0.012
b	0.310	0.510	0.012	0.020
c	0.230	0.270	0.009	0.011
D ⁽¹⁾	15.20	15.60	0.598	0.614
E ⁽¹⁾	7.400	7.600	0.291	0.299
E1	9.970	10.63	0.393	0.419
e	1.270 (BSC) ⁽²⁾		0.050 (BSC) ⁽²⁾	
L	0.450	0.750	0.018	0.030
H	0.250 (TYP)		0.010 (TYP)	
θ	0°	8°	0°	8°

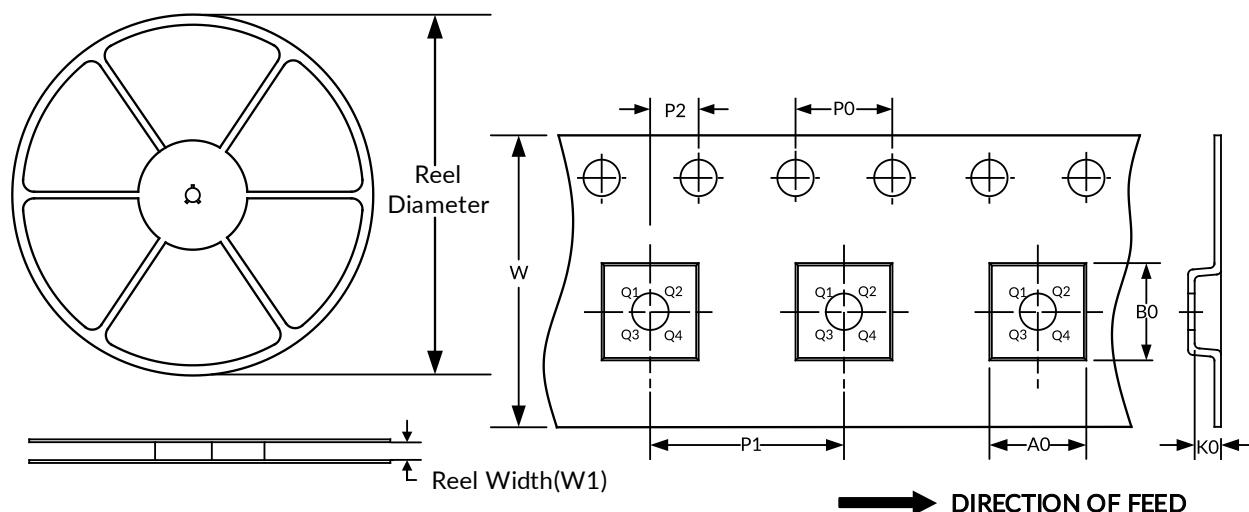
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

12 TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TSSOP24	13"	16.4	6.95	8.30	1.60	4.0	8.0	2.0	16.0	Q1
SOIC24	13"	24.4	10.85	16.15	2.85	4.0	16.0	2.0	24.0	Q1

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.