

Octal Dual Supply Translating Transceiver: 3-state**CJ74LVC4245 Logic****1 Introduction**

The CJ74LVC4245 is an octal dual supply translating transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions. It is designed to interface between a 3V and 5V bus in a mixed 3V and 5V supply environment.

The device features an output enable input (pin /OE) for easy cascading and a send/receive input (pin DIR) for direction control. Pin /OE controls the outputs so that the buses are effectively isolated.

In suspend mode, when $V_{CC(A)}$ is zero, there will be no current flow from one supply to the other supply. The A-outputs must be set 3-state and the voltage on the A-bus must be smaller than V_{diode} (typical 0.7V).

$V_{CC(A)} \geq V_{CC(B)}$, except in suspend mode.

2 Available Packages

PART NUMBER	PACKAGE
CJ74LVC4245	SOP24
	SSOP24
	TSSOP24
	QFN5.5x3.5-24L

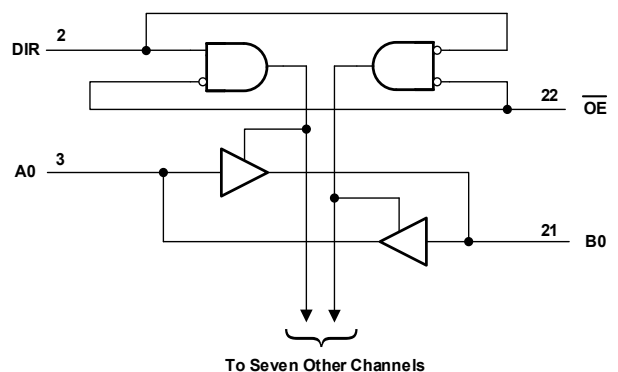
Note: For all available packages, please refer to the part Orderable Information.

3 Features

- 5V tolerant inputs/outputs, for interfacing with 5V logic
- Wide supply voltage range:
 - 3V bus ($V_{CC(B)}$): 1.5V to 3.6V
 - 5V bus ($V_{CC(A)}$): 1.5V to 5.5V
- CMOS low-power consumption
- Direct interface with TTL levels
- Inputs accept voltages up to 5.5V
- High-impedance when $V_{CC(A)}=0V$
- Specified from $-40^{\circ}C$ to $+125^{\circ}C$

4 Applications

- ATCA solutions
- CPAP machines
- Chemical or gas sensors
- CT scanners
- Field transmitters: pressure sensors and temperature sensors
- High-speed data acquisition and generation
- HMI (human machine interface)



Simplified schematic

5 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74LVC4245AHN	SOP24	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 1250 Units / Reel	Active
CJ74LVC4245SHA	SSOP24	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units / Reel	Active
CJ74LVC4245BHN	TSSOP24	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units / Reel	Active
CJ74LVC4245QFN	QFN5.5x3.5-24L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active

Note:

ECO PLAN: For the RoHS and Green certification standards of this product, please refer to the official report provided by JSCJ.

MSL: Moisture Sensitivity Level. Determined according to JEDEC industry standard classification.

SORT: Specifically defined as follows:

Active: Recommended for new products;

Customized: Products manufactured to meet the specific needs of customers;

Preview: The device has been released and has not been fully mass produced. The sample may or may not be available;

NoRD: It is not recommended to use the device for new design. The device is only produced for the needs of existing customers;

Obsolete: The device has been discontinued.

6 Pin Configuration and Marking Information

6.1 Pin Configuration

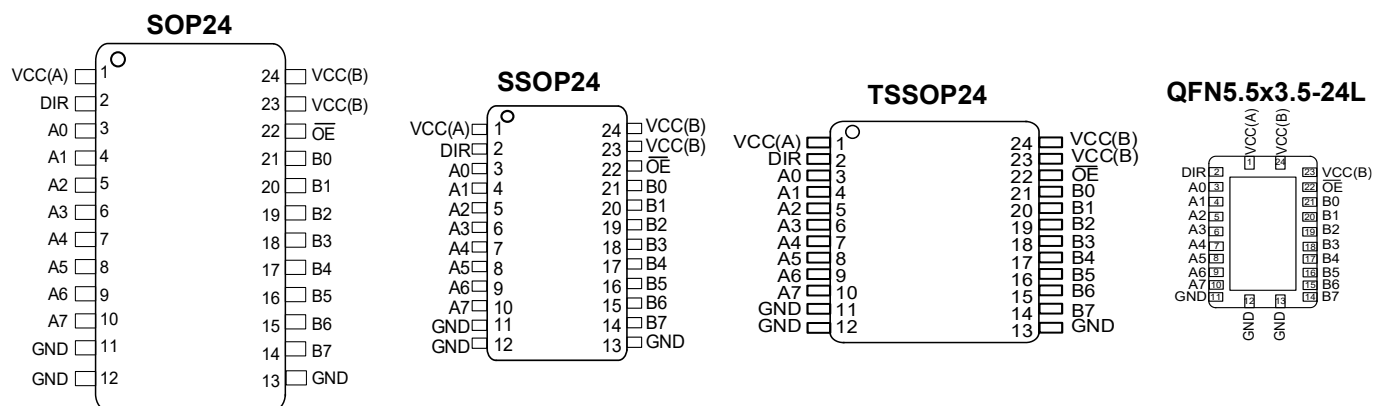
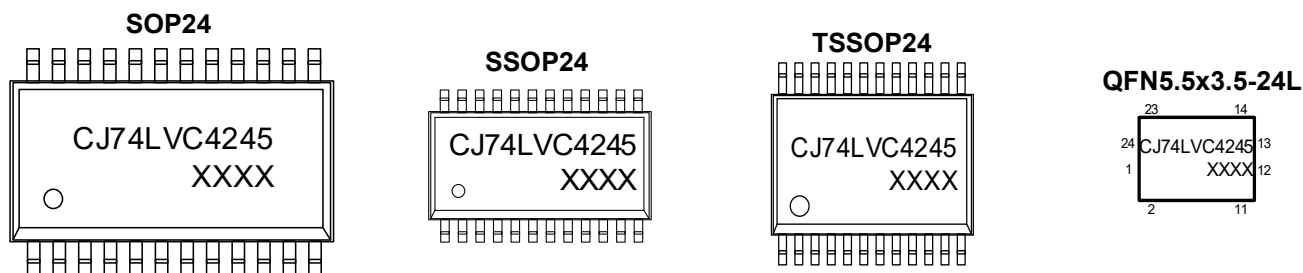


Figure 6-1 Pin configuration

6.2 Pin Function

PIN		I/O	DESCRIPTION
No.	NAME		
1	VCC(A)	P	Supply voltage (5V bus)
2	DIR	-	Direction control
3	A0	I/O	Data input or output
4	A1	I/O	Data input or output
5	A2	I/O	Data input or output
6	A3	I/O	Data input or output
7	A4	I/O	Data input or output
8	A5	I/O	Data input or output
9	A6	I/O	Data input or output
10	A7	I/O	Data input or output
11	GND	G	Ground (0V)
12	GND	G	Ground (0V)
13	GND	G	Ground (0V)
14	B7	I/O	Data input or output
15	B6	I/O	Data input or output
16	B5	I/O	Data input or output
17	B4	I/O	Data input or output
18	B3	I/O	Data input or output
19	B2	I/O	Data input or output
20	B1	I/O	Data input or output
21	B0	I/O	Data input or output
22	OE	I	Output enable input (active LOW)
23	VCC(B)	P	Supply voltage (3V bus)
24	VCC(B)	P	Supply voltage (3V bus)

6.3 Marking Information



XXXX: Code, indicates weekly record information.

7 Specifications

7.1 Absolute Maximum Ratings

Voltages are referenced to GND(ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CC(A)}$	Supply voltage A	-	-0.5	+6.5	V
$V_{CC(B)}$	Supply voltage B	-	-0.5	+4.6	V
I_{IK}	Input clamping current	$V_I < 0V$	-50	-	mA
V_I	Input voltage	-(1)	-0.5	+6.5	V
I_{OK}	Output clamping current	$V_O > V_{CCO}$ or $V_O < 0V^{(2)}$	-	± 50	mA
V_O	Output voltage	Output HIGH or LOW state ⁽¹⁾	-0.5	$V_{CC}+0.5$	V
		Output 3-state ⁽¹⁾	-0.5	+6.5	V
I_O	Output current	$V_O = 0V$ to $V_{CCO}^{(2)}$	-	± 50	mA
I_{CC}	Supply current	-	-	100	mA
I_{GND}	Ground current	-	-100	-	mA
T_{stg}	Storage temperature	-	-65	+150	°C
P_{tot}	Total power dissipation	-	-	500	mW
T_L	Soldering temperature	10s	-	260	°C

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

(2) V_{CCO} is the supply voltage associated with the output.

7.2 Recommended Operating Conditions

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CC(A)}$	Supply voltage A	$V_{CC(A)} \geq V_{CC(B)}$; See Figure 8-4 for maximum speed performance	1.5	-	5.5	V
$V_{CC(B)}$	Supply voltage B	$V_{CC(A)} \geq V_{CC(B)}$; See Figure 8-4 for low-voltage applications	1.5	-	3.6	V
V_I	Input voltage	For control inputs	0	-	5.5	V
V_O	Output voltage	Output HIGH or LOW state	0	-	V_{CC}	V
		Output 3-state	0	-	5.5	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C
$\Delta t/\Delta V$	Input transition rise and fall rate	$V_{CC(B)} = 2.7V$ to $3.0V$	-	-	20	ns/V
		$V_{CC(B)} = 3.0V$ to $3.6V$	-	-	10	ns/V
		$V_{CC(A)} = 3.0V$ to $4.5V$	-	-	20	ns/V
		$V_{CC(A)} = 4.5V$ to $5.5V$	-	-	10	ns/V

7.3 ESD Ratings

SYMBOL	ESD RATINGS		VALUE	UNIT
$V_{ESD-HBM}$	Electrostatic discharge	Human body model (HBM) ⁽¹⁾	± 2000	V

(1) JEDEC document JEP155 states that 500-V H1BM allows safe manufacturing with a standard ESD control process.

7.4 Electrical Characteristics

7.4.1 DC Characteristics 1

T_{amb}=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP. ⁽¹⁾	MAX.	UNIT
V _{IH}	HIGH-level input voltage	V _{CC(B)} =2.7V to 3.6V		2.0	-	-	V
		V _{CC(A)} =4.5V to 5.5V		2.0	-	-	V
V _{IL}	LOW-level input voltage	V _{CC(B)} =2.7V to 3.6V		-	-	0.8	V
		V _{CC(A)} =4.5V to 5.5V		-	-	0.8	V
V _{OH}	HIGH-level output voltage	V _I =V _{IH} or V _{IL}	V _{CC(B)} =2.7V to 3.6V; I _O =-100uA	V _{CC(B)} -0.2	V _{CC(B)}	-	V
			V _{CC(B)} =2.7V; I _O =-12mA	V _{CC(B)} -0.5	-	-	V
			V _{CC(B)} =3.0V; I _O =-24mA	V _{CC(B)} -0.8	-	-	V
			V _{CC(A)} =4.5V to 5.5V; I _O =-100uA	V _{CC(A)} -0.2	V _{CC(A)}	-	V
			V _{CC(A)} =4.5V; I _O =-12mA	V _{CC(A)} -0.5	-	-	V
			V _{CC(A)} =4.5V; I _O =-24mA	V _{CC(A)} -0.8	-	-	V
V _{OL}	LOW-level output voltage	V _I =V _{IH} or V _{IL}	V _{CC(B)} =2.7V to 3.6V; I _O =100uA	-	-	0.20	V
			V _{CC(B)} =2.7V; I _O =12mA	-	-	0.40	V
			V _{CC(B)} =3.0V; I _O =24mA	-	-	0.55	V
			V _{CC(A)} =4.5V to 5.5V; I _O =100uA	-	-	0.20	V
			V _{CC(A)} =4.5V; I _O =12mA	-	-	0.40	V
			V _{CC(A)} =4.5V; I _O =24mA	-	-	0.55	V
I _I	Input leakage current	V _I =5.5V or GND		-	-	±5	uA
I _{OZ}	OFF-state output current	V _I =V _{IH} or V _{IL} ⁽²⁾	V _{CC(B)} =3.6V; V _O =V _{CC(B)} or GND	-	-	±5	uA
			V _{CC(A)} =5.5V; V _O =V _{CC(A)} or GND	-	-	±5	uA
I _{CC}	Supply current	I _O =0A	V _{CC(B)} =3.6V; Other inputs at V _{CC(B)} or GND	-	-	10	uA
			V _{CC(A)} =5.5V; Other inputs at V _{CC(A)} or GND	-	-	10	uA
ΔI _{CC}	Additional supply current	Per control pin; I _O =0A ⁽³⁾	V _{CC(B)} =2.7V to 3.6V; V _I =V _{CC(B)} -0.6V; Other inputs at V _{CC(B)} or GND	-	-	500	uA
			V _{CC(A)} =4.5V to 5.5V; V _I =V _{CC(A)} -0.6V; Other inputs at V _{CC(A)} or GND	-	-	500	uA
C _I	Input capacitance	-		-	4.0	-	pF
C _{I/O}	Input/output capacitance	An and Bn		-	5.0	-	pF

(1) All typical values are measured at V_{CC(A)}=5.0V, V_{CC(B)}=3.3V and T_{amb}=25°C.

(2) For transceivers, the parameter I_{OZ} includes the input leakage current.

(3) V_{CC(B)}=2.7V to 3.6V: other inputs at V_{CC(B)} or GND. V_{CC(A)}=4.5V to 5.5V: other inputs at V_{CC(A)} or GND.

7.4.2 DC Characteristics 2

$T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP. ⁽¹⁾	MAX.	UNIT
V_{IH}	HIGH-level input voltage	$V_{CC(B)} = 2.7\text{V to } 3.6\text{V}$		2.0	-	-	V
		$V_{CC(A)} = 4.5\text{V to } 5.5\text{V}$		2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC(B)} = 2.7\text{V to } 3.6\text{V}$		-	-	0.8	V
		$V_{CC(A)} = 4.5\text{V to } 5.5\text{V}$		-	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$	$V_{CC(B)} = 2.7\text{V to } 3.6\text{V};$ $I_O = -100\mu\text{A}$	$V_{CC(B)} - 0.3$	-	-	V
			$V_{CC(B)} = 2.7\text{V};$ $I_O = -12\text{mA}$	$V_{CC(B)} - 0.65$	-	-	V
			$V_{CC(B)} = 3.0\text{V};$ $I_O = -24\text{mA}$	$V_{CC(B)} - 1.0$	-	-	V
			$V_{CC(A)} = 4.5\text{V to } 5.5\text{V};$ $I_O = -100\mu\text{A}$	$V_{CC(A)} - 0.3$	-	-	V
			$V_{CC(A)} = 4.5\text{V};$ $I_O = -12\text{mA}$	$V_{CC(A)} - 0.65$	-	-	V
			$V_{CC(A)} = 4.5\text{V};$ $I_O = -24\text{mA}$	$V_{CC(A)} - 1.0$	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$	$V_{CC(B)} = 2.7\text{V to } 3.6\text{V};$ $I_O = 100\mu\text{A}$	-	-	0.30	V
			$V_{CC(B)} = 2.7\text{V};$ $I_O = 12\text{mA}$	-	-	0.60	V
			$V_{CC(B)} = 3.0\text{V};$ $I_O = 24\text{mA}$	-	-	0.80	V
			$V_{CC(A)} = 4.5\text{V to } 5.5\text{V};$ $I_O = 100\mu\text{A}$	-	-	0.30	V
			$V_{CC(A)} = 4.5\text{V};$ $I_O = 12\text{mA}$	-	-	0.60	V
			$V_{CC(A)} = 4.5\text{V};$ $I_O = 24\text{mA}$	-	-	0.80	V
I_I	Input leakage current	$V_I = 5.5\text{V or GND}$		-	-	± 20	μA
I_{OZ}	OFF-state output current	$V_I = V_{IH} \text{ or } V_{IL}^{(2)}$	$V_{CC(B)} = 3.6\text{V};$ $V_O = V_{CC(B)} \text{ or GND}$	-	-	± 20	μA
			$V_{CC(A)} = 5.5\text{V};$ $V_O = V_{CC(A)} \text{ or GND}$	-	-	± 20	μA
I_{CC}	Supply current	$I_O = 0\text{A}$	$V_{CC(B)} = 3.6\text{V};$ Other inputs at $V_{CC(B)} \text{ or GND}$	-	-	40	μA
			$V_{CC(A)} = 5.5\text{V};$ Other inputs at $V_{CC(A)} \text{ or GND}$	-	-	40	μA
ΔI_{CC}	Additional supply current	Per control pin; $I_O = 0\text{A}^{(3)}$	$V_{CC(B)} = 2.7\text{V to } 3.6\text{V};$ $V_I = V_{CC(B)} - 0.6\text{V};$ Other inputs at $V_{CC(B)} \text{ or GND}$	-	-	5000	μA
			$V_{CC(A)} = 4.5\text{V to } 5.5\text{V};$ $V_I = V_{CC(A)} - 0.6\text{V};$ Other inputs at $V_{CC(A)} \text{ or GND}$	-	-	5000	μA

(1) All typical values are measured at $V_{CC(A)} = 5.0\text{V}$, $V_{CC(B)} = 3.3\text{V}$ and $T_{amb} = 25^{\circ}\text{C}$.

(2) For transceivers, the parameter I_{OZ} includes the input leakage current.

(3) $V_{CC(B)} = 2.7\text{V to } 3.6\text{V}$: other inputs at $V_{CC(B)}$ or GND. $V_{CC(A)} = 4.5\text{V to } 5.5\text{V}$: other inputs at $V_{CC(A)}$ or GND.

7.4.3 AC Characteristics 1

T_{amb}=−40°C to +85°C, voltages are referenced to GND (ground=0V). V_{CC(A)}=4.5V to 5.5V; t_r=t_f≤2.5ns, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP. ⁽¹⁾	MAX.	UNIT
t _{PHL}	HIGH to LOW propagation delay	An to Bn; See Figure 8-5	V _{CC(B)} =2.7V	1.0	3.6	6.3	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.3	6.3	ns
		Bn to An; See Figure 8-5	V _{CC(B)} =2.7V	1.0	3.4	6.1	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.4	6.1	ns
t _{PLH}	LOW to HIGH propagation delay	An to Bn; See Figure 8-5	V _{CC(B)} =2.7V	1.0	3.3	6.7	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	2.8	6.5	ns
		Bn to An; See Figure 8-5	V _{CC(B)} =2.7V	1.0	3.0	5.0	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.0	5.0	ns
t _{PZL}	OFF-state to LOW propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	V _{CC(B)} =2.7V	1.0	4.5	9.0	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	4.5	9.0	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	V _{CC(B)} =2.7V	1.0	4.4	8.7	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.8	8.1	ns
t _{PZH}	OFF-state to HIGH propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	V _{CC(B)} =2.7V	1.0	4.5	8.1	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	4.5	8.1	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	V _{CC(B)} =2.7V	1.0	4.3	8.7	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.2	8.1	ns
t _{PLZ}	LOW to OFF-state propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	V _{CC(B)} =2.7V	1.0	2.9	7.0	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	2.9	7.0	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	V _{CC(B)} =2.7V	1.0	3.9	7.7	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	3.5	7.7	ns
t _{PHZ}	HIGH to OFF-state propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	V _{CC(B)} =2.7V	1.0	2.8	5.8	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	2.8	5.8	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	V _{CC(B)} =2.7V	1.0	3.3	7.8	ns
			V _{CC(B)} =3.0V to 3.6V	1.0	2.9	7.8	ns
t _{sk(o)}	Output skew time	-	-(2)	-	-	1.0	ns
C _{PD}	Power dissipation capacitance	5V bus: Bn to An; V _I =GND to V _{CC(A)} ; V _{CC(A)} =5.0V ⁽³⁾ ; Outputs enabled	-	-	17	-	pF
		5V bus: Bn to An; V _I =GND to V _{CC(A)} ; V _{CC(A)} =5.0V ⁽³⁾ ; Outputs disabled	-	-	5	-	pF
		3V bus: An to Bn; V _I =GND to V _{CC(B)} ; V _{CC(B)} =3.3V ⁽³⁾ ; Outputs enabled	-	-	17	-	pF
		3V bus: An to Bn; V _I =GND to V _{CC(B)} ; V _{CC(B)} =3.3V ⁽³⁾ ; Outputs disabled	-	-	5	-	pF

- (1) Typical values are measured at $T_{amb}=25^{\circ}\text{C}$, $V_{CC(A)}=5.0\text{V}$, and $V_{CC(B)}=2.7\text{V}$ and 3.3V respectively.
- (2) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
- (3) C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$$P_D = (C_{PD} \times V_{CC}^2 \times f_i \times N) + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i =input frequency in MHz;

f_o =output frequency in MHz;

C_L =output load capacitance in pF;

V_{CC} =supply voltage in Volts;

N =number of inputs switching;

$\sum (C_L \times V_{CC}^2 \times f_o)$ =sum of outputs.

7.4.4 AC Characteristics 2

$T_{amb}=-40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V). $V_{CC(A)}=4.5\text{V}$ to 5.5V ; $t_r=t_{\leq}2.5\text{ns}$, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP. ⁽¹⁾	MAX.	UNIT
t_{PHL}	HIGH to LOW propagation delay	An to Bn; See Figure 8-5	$V_{CC(B)}=2.7\text{V}$	1.0	-	8.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	8.0	ns
		Bn to An; See Figure 8-5	$V_{CC(B)}=2.7\text{V}$	1.0	-	8.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	8.0	ns
t_{PLH}	LOW to HIGH propagation delay	An to Bn; See Figure 8-5	$V_{CC(B)}=2.7\text{V}$	1.0	-	8.5	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	8.5	ns
		Bn to An; See Figure 8-5	$V_{CC(B)}=2.7\text{V}$	1.0	-	6.5	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	6.5	ns
t_{PZL}	OFF-state to LOW propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	11.5	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	11.5	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	11.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	10.5	ns
t_{PZH}	OFF-state to HIGH propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	10.5	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	10.5	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	11.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	10.5	ns
t_{PLZ}	LOW to OFF-state propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	9.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	9.0	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	10.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	10.0	ns
t_{PHZ}	HIGH to OFF-state propagation delay	$\overline{\text{OE}}$ to An; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	7.5	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	7.5	ns
		$\overline{\text{OE}}$ to Bn; See Figure 8-6	$V_{CC(B)}=2.7\text{V}$	1.0	-	10.0	ns
			$V_{CC(B)}=3.0\text{V}$ to 3.6V	1.0	-	10.0	ns
$t_{sk(o)}$	Output skew time	-	$_{-}^{+}$ (2)	-	-	1.5	ns

- (1) Typical values are measured at $T_{amb}=25^{\circ}\text{C}$, $V_{CC(A)}=5.0\text{V}$, and $V_{CC(B)}=2.7\text{V}$ and 3.3V respectively.

- (2) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

8 Detailed Description

8.1 Overview

The CJ74LVC4245 is an octal dual supply translating transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions. It is designed to interface between a 3V and 5V bus in a mixed 3V and 5V supply environment.

The device features an output enable input (pin /OE) for easy cascading and a send/receive input (pin DIR) for direction control. Pin /OE controls the outputs so that the buses are effectively isolated.

In suspend mode, when $V_{CC(A)}$ is zero, there will be no current flow from one supply to the other supply. The A-outputs must be set 3-state and the voltage on the A-bus must be smaller than V_{diode} (typical 0.7V).

$V_{CC(A)} \geq V_{CC(B)}$, except in suspend mode.

8.2 Functional Block Diagram

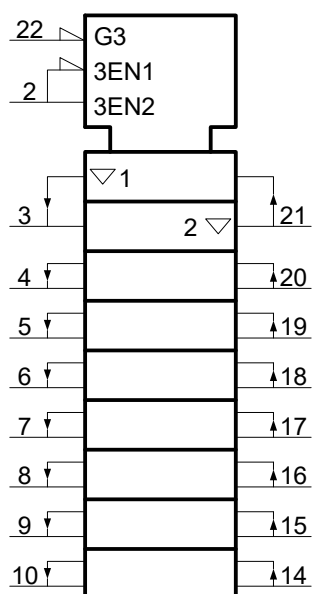


Figure 8-1 IEC Logic symbol

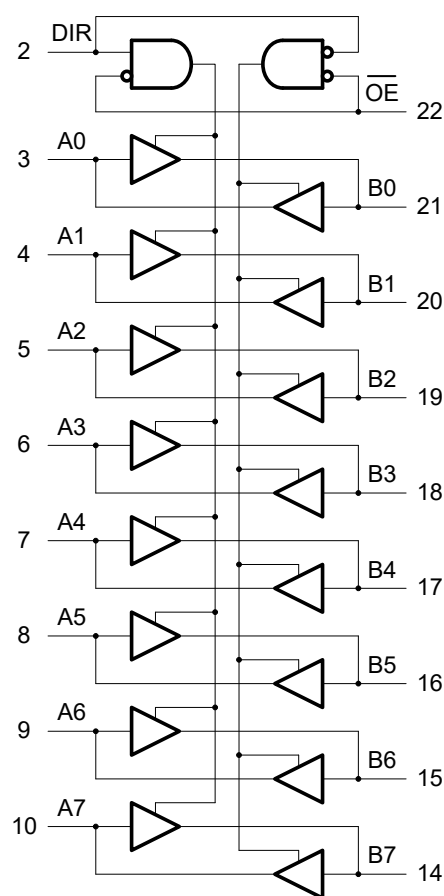


Figure 8-2 Logic diagram

8.3 Function Table⁽¹⁾

INPUT		OUTPUT	
$\overline{OE}$	DIR	A _n	B _n
L	L	A=B	input
L	H	input	B=A
H	X	Z	Z

(1) H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

8.4 Testing Circuit

8.4.1 AC Testing Circuit

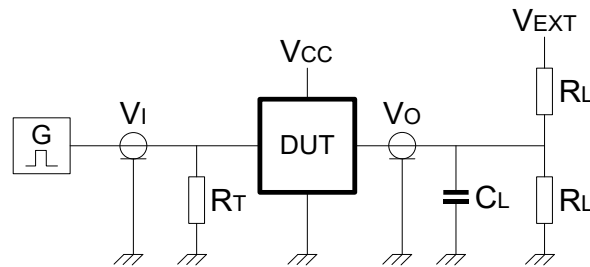


Figure 8-3 Load circuitry for switching times

Definitions for test circuit:

R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to the output impedance Z_o of the pulse generator.

8.4.2 AC Testing Waveforms

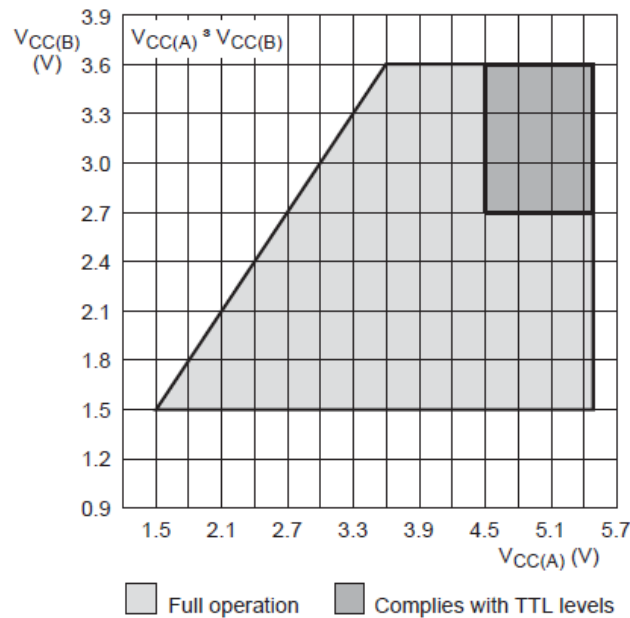
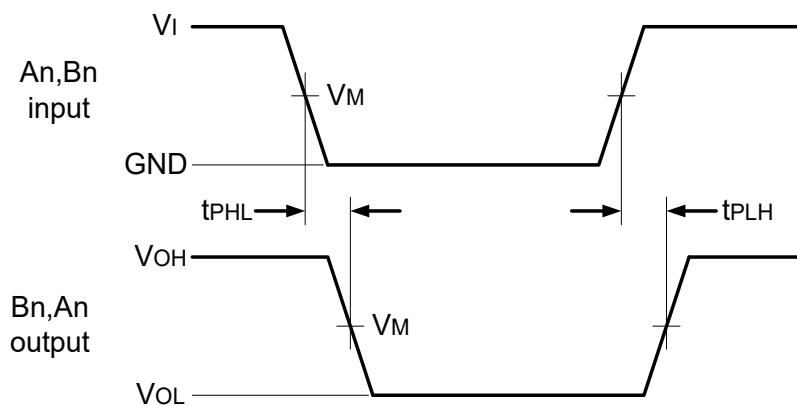


Figure 8-4 Supply operation area

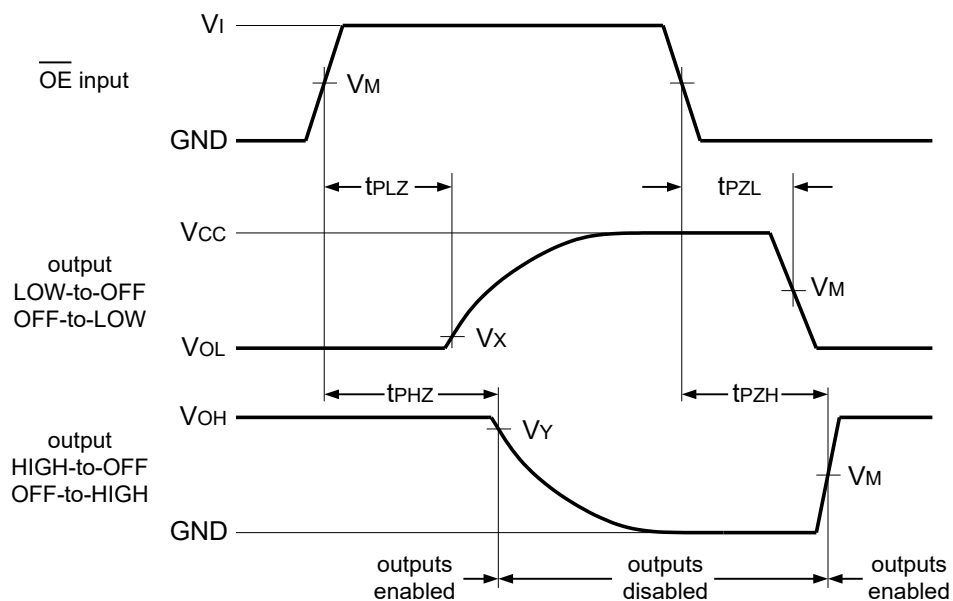


$V_M = 1.5V$ at $2.7V \leq V_{CC(B)} \leq 3.6V$;

$V_M = 0.5V_{CC(A)}$ at $V_{CC(A)} \geq 4.5V$.

V_{OL} and V_{OH} are typical output voltage drops that occur with the output load.

Figure 8-5 Input (An, Bn) to output (Bn, An) propagation delays



$V_M = 1.5V$ at $2.7V \leq V_{CC(B)} \leq 3.6V$;

$V_M = 0.5V_{CC(A)}$ at $V_{CC(A)} \geq 4.5V$.

$V_X = V_{OL} + 0.3V$ at $V_{CC(B)} \geq 2.7V$;

$V_Y = V_{OH} - 0.3V$ at $V_{CC(B)} \geq 2.7V$.

V_{OL} and V_{OH} are typical output voltage drops that occur with the output load.

Figure 8-6 3-state enable and disable times

8.4.3 Test Data

SUPPLY VOLTAGE		INPUT	LOAD		V_{EXT}		
$V_{CC(A)}$	$V_{CC(B)}$	$V_I^{(1)}$	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	$t_{PZL}, t_{PLZ}^{(2)}$
< 2.7 V	< 2.7 V	V_{CCI}	50pF	500Ω	Open	GND	$2 \times V_{CCO}$
-	2.7V to 3.6V	2.7V	50pF	500Ω	Open	GND	$2 \times V_{CCO}$
4.5V to 5.5V	-	3.0V	50pF	500Ω	Open	GND	$2 \times V_{CCO}$

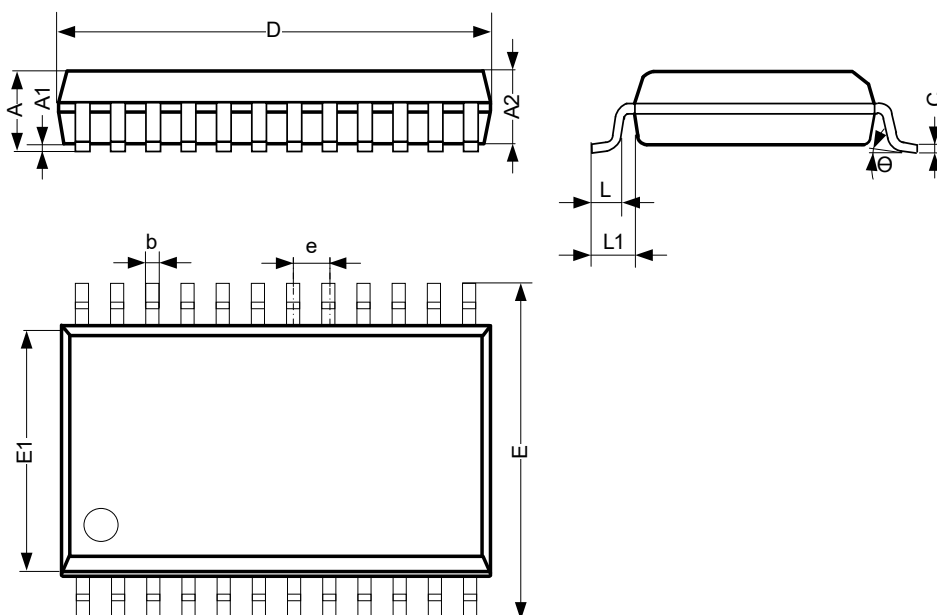
(1) V_{CCI} is the supply voltage associated with the data input port.

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

9 Mechanical Information

9.1 SOP24 Mechanical Information

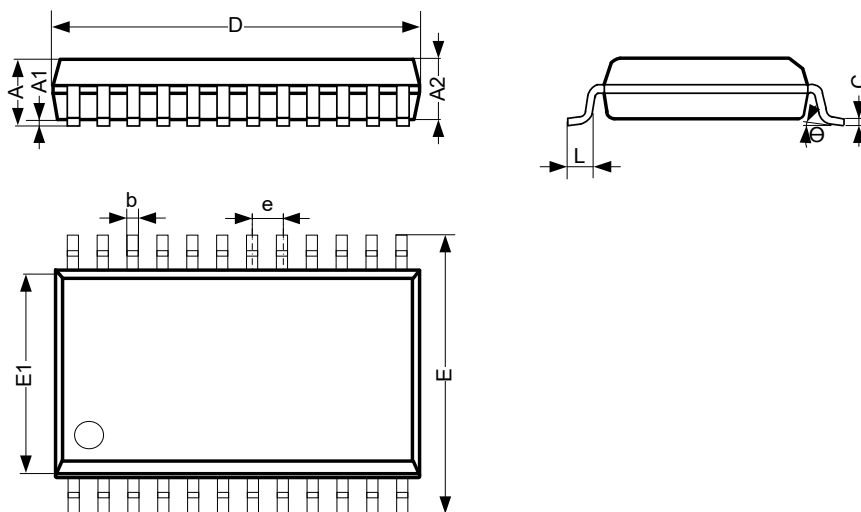
9.1.1 SOP24 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.35	-	2.65
A1	0.10	-	0.30
A2	2.13	-	2.44
b	0.39	-	0.47
c	0.25	-	0.30
D	15.19	-	15.55
E	10.10	-	10.57
E1	7.40	-	7.62
e	1.27 BSC		
L	0.41	-	1.00
L1	1.30	-	1.50
θ	0°	-	8°
Unit: mm			

9.2 SSOP24 Mechanical Information

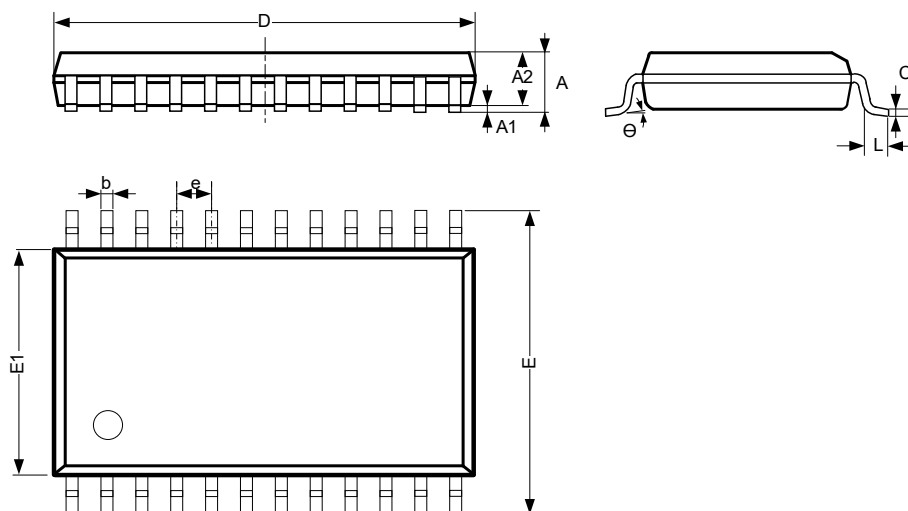
9.2.1 SSOP24 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.35	-	1.75
A1	0.10	-	0.25
A2	1.30	-	1.55
b	0.23	-	0.47
c	0.19	-	0.26
D	8.45	-	8.85
E	5.80	-	6.20
E1	3.70	-	4.10
e	0.635 BSC		
L	0.40	-	0.80
Θ	0°	-	8°
Unit: mm			

9.3 TSSOP24 Mechanical Information

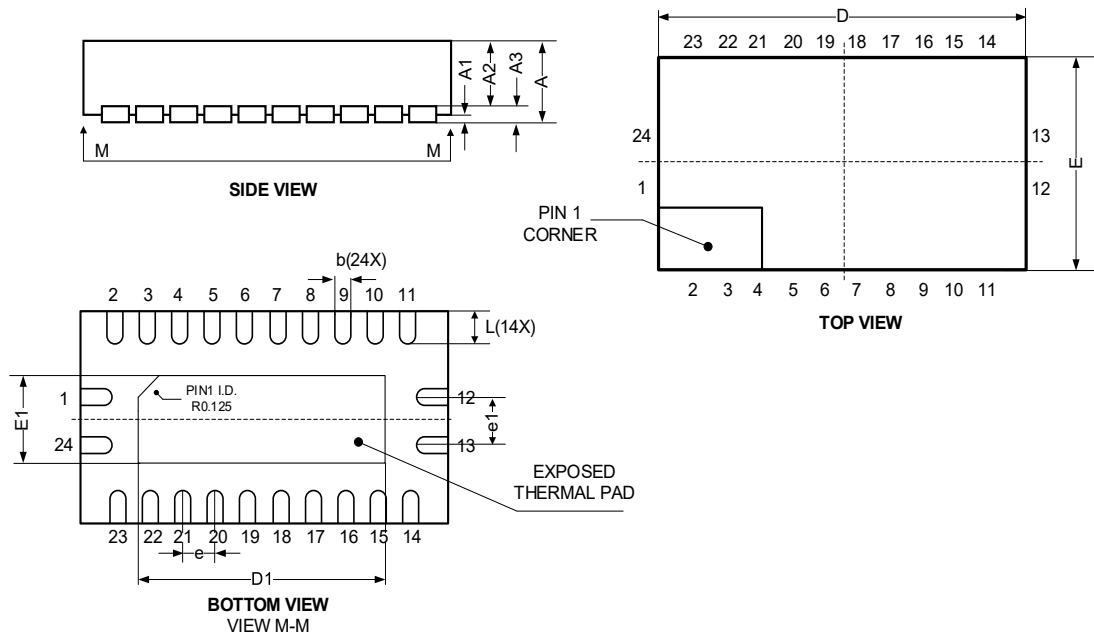
9.3.1 TSSOP24 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	-	-	1.20
A1	0.05	-	0.15
A2	0.80	-	1.05
b	0.19	-	0.30
c	0.09	-	0.20
D	7.70	-	7.90
E	6.20	-	6.60
E1	4.30	-	4.50
e	0.65 BSC		
L	0.45	-	0.75
Θ	0°	-	8°
Unit: mm			

9.4 QFN5.5x3.5-24L Mechanical Information

9.4.1 QFN5.5x3.5-24L Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.80	-	1.00
A1	0.00	-	0.05
A2	0.60	-	0.70
A3	-	0.20	-
D	5.40	-	5.60
E	3.40	-	3.60
e	0.50 BSC		
e1	-	1.50	-
b	0.18	-	0.30
L	0.30	-	0.50
D1	3.95	-	4.25
E1	1.95	-	2.25
Unit: mm			

10 Notes and Revision History

10.1 Associated Product Family and Others

To view other products of the same type or IC products of other types, click the official website of JSCJ -- <https://www.jscj-elec.com> for more details.

10.2 Notes

Electrostatic Discharge Caution



This IC may be damaged by ESD. Relevant personnel shall comply with correct installation and use specifications to avoid ESD damage to the IC. If appropriate measures are not taken to prevent ESD damage, the hazards caused by ESD include but are not limited to degradation of integrated circuit performance or complete damage of integrated circuit. For some precision integrated circuits, a very small parameter change may cause the whole device to be inconsistent with its published specifications.

DISCLAIMER

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