4-bit Dual Supply Translating Transceiver; 3-state

CJ74AVC4T245 Logic

1 Introduction

The CJ74AVC4T245 is an 4-bit, dual supply transceiver that enables bidirectional level translation. The device can be used as two 2-bit transceivers or as a 4-bit transceiver. It features four 2-bit input-output ports (nAn and nBn), a direction control input (nDIR), a output enable input (/nOE) and dual supply pins ($V_{CC(A)}$ and $V_{CC(B)}$). Both $V_{CC(A)}$ and $V_{CC(B)}$ can be supplied at any voltage between 0.8V and 3.6V making the device suitable for translating between any of the low voltage nodes (0.8V, 1.2V, 1.5V, 1.8V, 2.5V and 3.3V). Pins nAn, /nOE and nDIR are referenced to $V_{CC(A)}$ and pins nBn are referenced to $V_{CC(B)}$. A HIGH on nDIR allows transmission from nAn to nBn and a LOW on nDIR allows transmission from nBn to nAn. The output enable input (/nOE) can be used to disable the outputs so the buses are effectively isolated.

The device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing any damaging backflow current through the device when it is powered down. In suspend mode when either $V_{CC(A)}$ or $V_{CC(B)}$ are at GND level, both nAn and nBn are in the high-impedance OFF-state.

2 Available Packages

PART NUMBER	PACKAGE
CJ74AVC4T245	SOP16
	TSSOP16
	QFN3.5x2.5-16L
	QFN4x3.5-16L
	MIS16

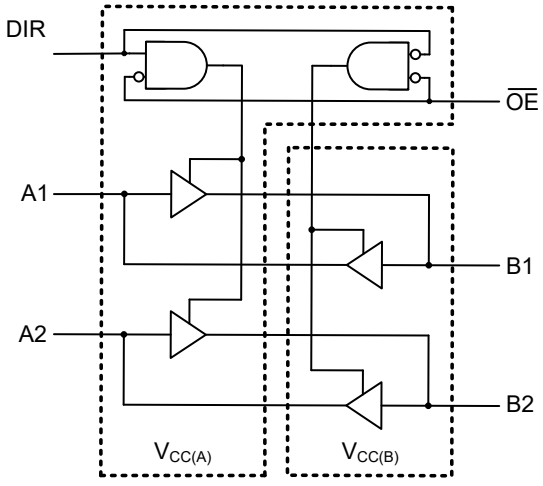
Note: For all available packages, please refer to the part Orderable Information.

3 Features

- Wide supply voltage range:
  - $V_{CC(A)}$: 0.8V to 3.6V
  - $V_{CC(B)}$: 0.8V to 3.6V
- Suspend mode
- Inputs accept voltages up to 3.6V
- I_{OFF} circuitry provides partial Power-down mode operation
- Specified from -40°C to +125°C

4 Applications

- Personal electronics
- Industrial
- Enterprise
- Telecom



Logic diagram

5 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74AVC4T245AEN	SOP16	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units/Reel	Active
CJ74AVC4T245BEN	TSSOP16	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 5000 Units/Reel	Active
CJ74AVC4T245QEN	QFN3.5x2.5-16L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units/Reel	Active
CJ74AVC4T245QGN	QFN4x3.5-16L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 1500 Units/Reel	Active
CJ74AVC4T245NCN	MIS16	-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

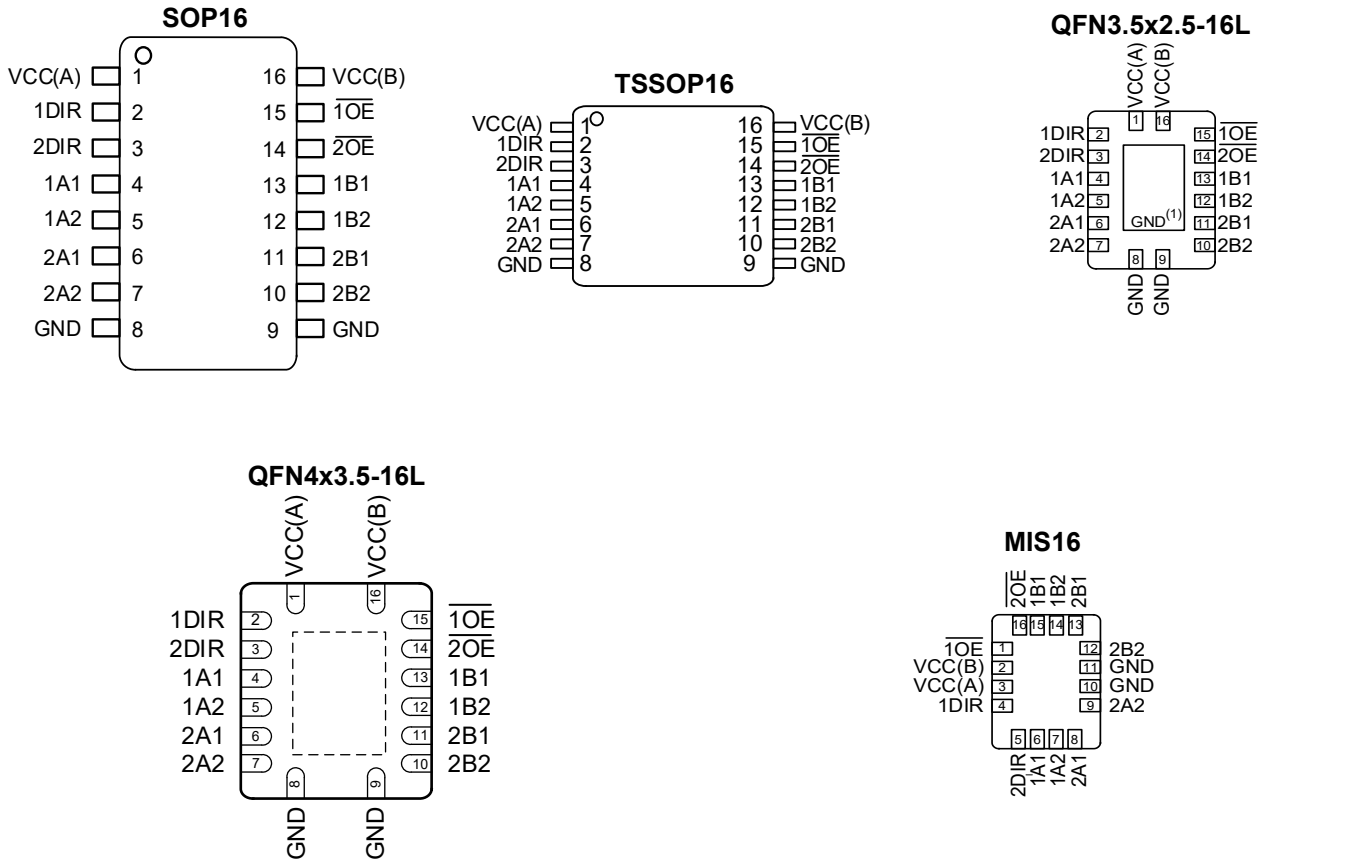


Figure 6-1 Pin configuration

(1) This is not a supply pin, the substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad. However if it is soldered the solder land should remain floating or be connected to GND.

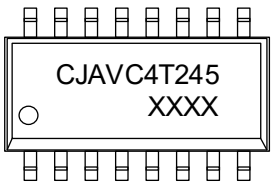
6.2 Pin Function

PIN		NAME	I/O(1)	DESCRIPTION
No.				
MIS16	Others			
3	1	VCC(A)	P	Supply voltage A (nAn, $\overline{nOE}$ and nDIR inputs are referenced to VCC(A))
4	2	1DIR	-	Direction control
5	3	2DIR	-	Direction control
6	4	1A1	I/O	Data input or output
7	5	1A2	I/O	Data input or output
8	6	2A1	I/O	Data input or output
9	7	2A2	I/O	Data input or output
10	8	GND	G	Ground (0V)
11	9	GND	G	Ground (0V)
12	10	2B2	I/O	Data input or output
13	11	2B1	I/O	Data input or output
14	12	1B2	I/O	Data input or output
15	13	1B1	I/O	Data input or output
16	14	$\overline{2OE}$	I	Output enable input (active LOW)
1	15	$\overline{1OE}$	I	Output enable input (active LOW)
2	16	VCC(B)	P	Supply voltage B (nBn inputs are referenced to VCC(B))

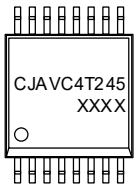
(1) I-Input, O-Output, P-Power, G-Ground.

6.3 Marking Information

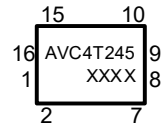
SOP16



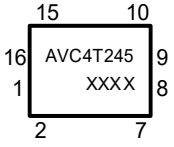
TSSOP16



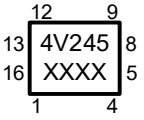
QFN3.5x2.5-16L



QFN4x3.5-16L



MIS16



XXXX: Code, indicates weekly record information.

7 Specifications

7.1 Absolute Maximum Ratings

T_{amb}=25°C, all voltage referenced to GND, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CC(A)}$	Supply voltage A	-	-0.5	+4.6	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	-	-0.5	+4.6	V
I_{OK}	Output clamping current	V_O<0V	-50	-	mA
V_O	Output voltage	Active mode(1) (2) (3)	-0.5	V_{CCO}+0.5	V
		Suspend or 3-state mode(1)	-0.5	+4.6	V
I_O	Output current	V_O=0V to V_{CCO}(2)	-	±50	mA
I_{CC}	Supply current	Per $V_{CC(A)}$ or $V_{CC(B)}$ pin	-	100	mA
I_{GND}	Ground current	Per GND pin	-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 minimum input voltage ratings 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 port.

(3) V_{CCO}+0.5V should not exceed 4.6V.

7.2 Recommended Operating Conditions

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CC(A)}$	Supply voltage A	-	0.8	-	3.6	V
$V_{CC(B)}$	Supply voltage B	-	0.8	-	3.6	V
V_I	Input voltage	-	0	-	3.6	V
V_O	Output voltage	Active mode(1)	0	-	V_{CCO}	V
		Suspend or 3-state mode	0	-	3.6	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C
Δt/ΔV	Input transition rise and fall rate	V_{CCI}=0.8V to 3.6V(2)	-	-	5	ns/V

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

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

7.3 ESD Ratings

SYMBOL	ESD RATINGS		VALUE	UNIT
$V_{ESD-HBM}$	Electrostatic discharge	Human body model (HBM) (1)	±1000	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}=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified.(1)(2)

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{OH}	HIGH-level output voltage	V_I=V_{IH} or V_{IL}	I_O=-1.5mA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V	-	0.69	-	V
V_{OL}	LOW-level output voltage	V_I=V_{IH} or V_{IL}	I_O=1.5mA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V	-	0.07	-	V
I_I	Input leakage current	nDIR, $\overline{nOE}$ input; V_I=0V or 3.6V; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V		-	-	±1	uA
I_{OZ}	OFF-state output current	A or B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=$V_{CC(B)}$=3.6V(3)		-	-	±2.5	uA
		Suspend mode A port; V_O=0V or V_{CCO}; $V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V(3)		-	-	±2.5	uA
		Suspend mode B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V(3)		-	-	±2.5	uA
I_{OFF}	Power-off leakage current	A port; V_I or V_O=0V to 3.6V; $V_{CC(A)}$=0V; $V_{CC(B)}$=0.8V to 3.6V		-	-	±1	uA
		B port; V_I or V_O=0V to 3.6V; $V_{CC(B)}$=0V; $V_{CC(A)}$=0.8V to 3.6V		-	-	±1	uA
C_I	Input capacitance	nDIR, $\overline{nOE}$ input; V_I=0V or 3.3V; $V_{CC(A)}$=$V_{CC(B)}$=3.3V		-	1.0	-	pF
$C_{I/O}$	Input/output capacitance	A and B port; V_O=3.3V or 0V; $V_{CC(A)}$=$V_{CC(B)}$=3.3V		-	4.0	-	pF

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

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

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

7.4.2 DC Characteristics 2

T_{amb}=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.(1)(2)

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	Data input	V_{CCI}=0.8V	0.70V_{CCI}	-	-	V
			V_{CCI}=1.1V to 1.95V	0.65V_{CCI}	-	-	V
			V_{CCI}=2.3V to 2.7V	1.6	-	-	V
			V_{CCI}=3.0V to 3.6V	2	-	-	V
		nDIR, $\overline{nOE}$ input	$V_{CC(A)}$=0.8V	0.70$V_{CC(A)}$	-	-	V
			$V_{CC(A)}$=1.1V to 1.95V	0.65$V_{CC(A)}$	-	-	V
			$V_{CC(A)}$=2.3V to 2.7V	1.6	-	-	V
			$V_{CC(A)}$=3.0V to 3.6V	2	-	-	V
V_{IL}	LOW-level input voltage	Data input	V_{CCI}=0.8V	-	-	0.30V_{CCI}	V
			V_{CCI}=1.1V to 1.95V	-	-	0.35V_{CCI}	V
			V_{CCI}=2.3V to 2.7V	-	-	0.7	V
			V_{CCI}=3.0V to 3.6V	-	-	0.8	V
		nDIR, $\overline{nOE}$ input	$V_{CC(A)}$=0.8V	-	-	0.30$V_{CC(A)}$	V
			$V_{CC(A)}$=1.1V to 1.95V	-	-	0.35$V_{CC(A)}$	V

			$V_{CC(A)}$=2.3V to 2.7V	-	-	0.7	V
			$V_{CC(A)}$=3.0V to 3.6V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	V_I=V_{IH} or V_{IL}	I_O=-100uA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V	V_{CCO}-0.1	-	-	V
			I_O=-3mA; $V_{CC(A)}$=$V_{CC(B)}$=1.1V	0.85	-	-	V
			I_O=-6mA; $V_{CC(A)}$=$V_{CC(B)}$=1.4V	1.05	-	-	V
			I_O=-8mA; $V_{CC(A)}$=$V_{CC(B)}$=1.65V	1.2	-	-	V
			I_O=-9mA; $V_{CC(A)}$=$V_{CC(B)}$=2.3V	1.75	-	-	V
			I_O=-12mA; $V_{CC(A)}$=$V_{CC(B)}$=3.0V	2.3	-	-	V
V_{OL}	LOW-level output voltage	V_I=V_{IH} or V_{IL}	I_O=100uA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V	-	-	0.1	V
			I_O=3mA; $V_{CC(A)}$=$V_{CC(B)}$=1.1V	-	-	0.25	V
			I_O=6mA; $V_{CC(A)}$=$V_{CC(B)}$=1.4V	-	-	0.35	V
			I_O=8mA; $V_{CC(A)}$=$V_{CC(B)}$=1.65V	-	-	0.45	V
			I_O=9mA; $V_{CC(A)}$=$V_{CC(B)}$=2.3V	-	-	0.55	V
			I_O=12mA; $V_{CC(A)}$=$V_{CC(B)}$=3.0V	-	-	0.7	V
I_I	Input leakage current	nDIR, $\overline{nOE}$ input; V_I=0V or 3.6V; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V		-	-	±1	uA
I_{OZ}	OFF-state output current	A or B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=$V_{CC(B)}$=3.6V(3)		-	-	±5	uA
		Suspend mode A port; V_O=0V or V_{CCO}; $V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V(3)		-	-	±5	uA
		Suspend mode B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V(3)		-	-	±5	uA
I_{OFF}	Power-off leakage current	A port; V_I or V_O=0V to 3.6V; $V_{CC(A)}$=0V; $V_{CC(B)}$=0.8V to 3.6V		-	-	±5	uA
		B port; V_I or V_O=0V to 3.6V; $V_{CC(B)}$=0V; $V_{CC(A)}$=0.8V to 3.6V		-	-	±5	uA
I_{CC}	Supply current	A port; V_I=0V or V_{CCI}; I_O=0A	$V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V	-	-	10	uA
			$V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V	-	-	8	uA
			$V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V	-	-	8	uA
			$V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V	-2	-	-	uA
		B port; V_I=0V or V_{CCI}; I_O=0A	$V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V	-	-	10	uA
			$V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V	-	-	8	uA
			$V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V	-2	-	-	uA
			$V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V	-	-	8	uA
		A plus B port ($I_{CC(A)}$+$I_{CC(B)}$); I_O=0A;V_I=0V or V_{CCI};		-	-	20	uA

		$V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V				
		A plus B port ($I_{CC(A)}$+$I_{CC(B)}$); I_O=0A;V_I=0V or V_{CCI}; $V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V	-	-	16	uA

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

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

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

7.4.3 DC Characteristics 3

T_{amb}=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.[1][2]

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	Data input	V_{CCI}=0.8V	0.70V_{CCI}	-	-	V
			V_{CCI}=1.1V to 1.95V	0.65V_{CCI}	-	-	V
			V_{CCI}=2.3V to 2.7V	1.6	-	-	V
			V_{CCI}=3.0V to 3.6V	2	-	-	V
		$\overline{nOE}$ input	$V_{CC(A)}$=0.8V	0.70$V_{CC(A)}$	-	-	V
			$V_{CC(A)}$=1.1V to 1.95V	0.65$V_{CC(A)}$	-	-	V
			$V_{CC(A)}$=2.3V to 2.7V	1.6	-	-	V
			$V_{CC(A)}$=3.0V to 3.6V	2	-	-	V
V_{IL}	LOW-level input voltage	Data input	V_{CCI}=0.8V	-	-	0.30V_{CCI}	V
			V_{CCI}=1.1V to 1.95V	-	-	0.35V_{CCI}	V
			V_{CCI}=2.3V to 2.7V	-	-	0.7	V
			V_{CCI}=3.0V to 3.6V	-	-	0.8	V
		$\overline{nOE}$ input	$V_{CC(A)}$=0.8V	-	-	0.30$V_{CC(A)}$	V
			$V_{CC(A)}$=1.1V to 1.95V	-	-	0.35$V_{CC(A)}$	V
			$V_{CC(A)}$=2.3V to 2.7V	-	-	0.7	V
			$V_{CC(A)}$=3.0V to 3.6V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	V_I=V_{IH} or V_{IL}	I_O=-100uA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V	V_{CCO}-0.1	-	-	V
			I_O=-3mA; $V_{CC(A)}$=$V_{CC(B)}$=1.1V	0.85	-	-	V
			I_O=-6mA; $V_{CC(A)}$=$V_{CC(B)}$=1.4V	1.05	-	-	V
			I_O=-8mA; $V_{CC(A)}$=$V_{CC(B)}$=1.65V	1.2	-	-	V
			I_O=-9mA; $V_{CC(A)}$=$V_{CC(B)}$=2.3V	1.75	-	-	V
			I_O=-12mA; $V_{CC(A)}$=$V_{CC(B)}$=3.0V	2.3	-	-	V
V_{OL}	LOW-level output voltage	V_I=V_{IH} or V_{IL}	I_O=100uA; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V	-	-	0.1	V
			I_O=3mA; $V_{CC(A)}$=$V_{CC(B)}$=1.1V	-	-	0.25	V

			I_O=6mA; $V_{CC(A)}$=$V_{CC(B)}$=1.4V	-	-	0.35	V
			I_O=8mA; $V_{CC(A)}$=$V_{CC(B)}$=1.65V	-	-	0.45	V
			I_O=9mA; $V_{CC(A)}$=$V_{CC(B)}$=2.3V	-	-	0.55	V
			I_O=12mA; $V_{CC(A)}$=$V_{CC(B)}$=3.0V	-	-	0.7	V
I_I	Input leakage current	nDIR, $\overline{nOE}$ input; V_I=0V or 3.6V; $V_{CC(A)}$=$V_{CC(B)}$=0.8V to 3.6V		-	-	±5	uA
I_{OZ}	OFF-state output current	A or B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=$V_{CC(B)}$=3.6V(3)		-	-	±30	uA
		Suspend mode A port; V_O=0V or V_{CCO}; $V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V(3)		-	-	±30	uA
		Suspend mode B port; V_O=0V or V_{CCO}; $V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V(3)		-	-	±30	uA
I_{OFF}	Power-off leakage current	A port; V_I or V_O=0V to 3.6V; $V_{CC(A)}$=0V; $V_{CC(B)}$=0.8V to 3.6V		-	-	±30	uA
		B port; V_I or V_O=0V to 3.6V; $V_{CC(B)}$=0V; $V_{CC(A)}$=0.8V to 3.6V		-	-	±30	uA
I_{CC}	Supply current	A port; V_I=0V or V_{CCI}; I_O=0A	$V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V	-	-	55	uA
			$V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V	-	-	50	uA
			$V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V	-	-	50	uA
			$V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V	-12	-	-	uA
		B port; V_I=0V or V_{CCI}; I_O=0A	$V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V	-	-	55	uA
			$V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V	-	-	50	uA
			$V_{CC(A)}$=3.6V; $V_{CC(B)}$=0V	-12	-	-	uA
			$V_{CC(A)}$=0V; $V_{CC(B)}$=3.6V	-	-	50	uA
		A plus B port ($I_{CC(A)}$+$I_{CC(B)}$); I_O=0A;V_I=0V or V_{CCI}; $V_{CC(A)}$=0.8V to 3.6V; $V_{CC(B)}$=0.8V to 3.6V		-	-	70	uA
		A plus B port ($I_{CC(A)}$+$I_{CC(B)}$); I_O=0A;V_I=0V or V_{CCI}; $V_{CC(A)}$=1.1V to 3.6V; $V_{CC(B)}$=1.1V to 3.6V		-	-	65	uA

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

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

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

7.4.4 Typical Total Supply Current ($I_{CC(A)}$+$I_{CC(B)}$)

$V_{CC(A)}$	$V_{CC(B)}$							UNIT
	0V	0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
0V	0	0.1	0.1	0.1	0.1	0.1	0.1	uA
0.8V	0.1	0.1	0.1	0.1	0.1	0.3	1.6	uA
1.2V	0.1	0.1	0.1	0.1	0.1	0.1	0.8	uA
1.5V	0.1	0.1	0.1	0.1	0.1	0.1	0.4	uA
1.8V	0.1	0.1	0.1	0.1	0.1	0.1	0.2	uA
2.5V	0.1	0.3	0.1	0.1	0.1	0.1	0.1	uA
3.3V	0.1	1.6	0.8	0.4	0.2	0.1	0.1	uA

7.4.5 AC Characteristics 1

T_{amb}=25°C, $V_{CC(A)}$=$V_{CC(B)}$, voltages are referenced to GND (ground=0V), unless otherwise specified. (1)(2)

SYMBOL	PARAMETER	CONDITIONS	$V_{CC(A)}$=$V_{CC(B)}$						UNIT
			0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
C_{PD}	Power dissipation capacitance	A port: (direction nAn to nBn); output enabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		A port: (direction nAn to nBn); output disabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		A port: (direction nBn to nAn); output enabled	9.5	9.7	9.8	9.9	10.7	11.9	pF
		A port: (direction nBn to nAn); output disabled	0.6	0.6	0.6	0.6	0.7	0.7	pF
		B port: (direction nAn to nBn); output enabled	9.5	9.7	9.8	9.9	10.7	11.9	pF
		B port: (direction nAn to nBn); output disabled	0.6	0.6	0.6	0.6	0.7	0.7	pF
		B port: (direction nBn to nAn); output enabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		B port: (direction nBn to nAn); output disabled	0.2	0.2	0.2	0.2	0.3	0.4	pF

(1) C_{PD} is used to determine the dynamic power dissipation (P_D in uW). $P_D=C_{PD}xV_{CC}^2xf_ixN+\Sigma(C_LxV_{CC}^2xf_o)$ where:
f_i=input frequency in MHz;
f_o=output frequency in MHz;
C_L=load capacitance in pF;
V_{CC}=supply voltage in V;
N=number of inputs switching;
$\Sigma(C_LxV_{CC}^2xfo)$=sum of the outputs.

(2) f_i=10MHz; V_I=GND to V_{CC}; $t_r=t_f$=1ns; C_L=0pF; R_L=∞Ω.

7.4.6 AC Characteristics 2

T_{amb}=25°C, $V_{CC(A)}$=0.8V, voltages are referenced to GND (ground=0V), unless otherwise specified.(1)

SYMBOL	CHARACTERISTIC	CONDITIONS	$V_{CC(B)}$						UNIT
			0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
t_{pd}	Propagation delay	nAn to nBn	14.5	7.3	6.5	6.2	5.9	6.0	ns
		nBn to nAn	14.5	12.7	12.4	12.3	12.1	12.0	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	14.3	14.3	14.3	14.3	14.3	14.3	ns
		$\overline{nOE}$ to nBn	17.0	9.9	9.0	9.4	9.0	9.7	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	18.2	18.2	18.2	18.2	18.2	18.2	ns
		$\overline{nOE}$ to nBn	19.2	10.7	9.8	9.6	9.7	10.2	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; ten is the same as t_{PZL} and t_{PZH}.

7.4.7 AC Characteristics 3

T_{amb}=25°C, $V_{CC(B)}$=0.8V, voltages are referenced to GND (ground=0V), unless otherwise specified. (1)

SYMBOL	CHARACTERISTIC	CONDITIONS	$V_{CC(A)}$						UNIT
			0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
t_{pd}	Propagation delay	nAn to nBn	14.5	12.7	12.4	12.3	12.1	12.0	ns
		nBn to nAn	14.5	7.3	6.5	6.2	5.9	6.0	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	14.3	5.5	4.1	4.0	3.0	3.5	ns
		$\overline{nOE}$ to nBn	17.0	13.8	13.4	13.1	12.9	12.7	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	18.2	5.6	4.0	3.2	2.4	2.2	ns
		$\overline{nOE}$ to nBn	19.2	14.6	14.1	13.9	13.7	13.6	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; ten is the same as t_{PZL} and t_{PZH}.

7.4.8 AC Characteristics 4

T_{amb}=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified. (1)

SYMBOL	PARAMETER	CONDITIONS	$V_{CC(B)}$										UNIT
			1.2V±0.1V		1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
$V_{CC(A)}$=1.1V to 1.3V													
t_{pd}	Propagation Delay	nAn to nBn	0.5	9.4	0.5	7.1	0.5	6.2	0.5	5.2	0.5	5.1	ns
		nBn to nAn	0.5	9.4	0.5	8.9	0.5	8.7	0.5	8.4	0.5	8.2	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	10.9	1.8	10.9	1.8	10.9	1.8	10.9	1.8	10.9	ns
		$\overline{nOE}$ to nBn	1.9	12.4	1.9	9.6	1.9	9.5	1.4	8.1	1.2	9.1	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	1.4	12.8	1.4	12.8	1.4	12.8	1.4	12.8	1.4	12.8	ns
		$\overline{nOE}$ to nBn	1.1	13.3	1.1	10.0	1.1	8.9	1.0	7.9	1.0	7.7	ns
$V_{CC(A)}$=1.4V to 1.6V													
t_{pd}	Propagation Delay	nAn to nBn	0.3	8.9	0.3	6.3	0.3	5.2	0.3	4.2	0.3	4.2	ns
		nBn to nAn	0.7	7.1	0.7	6.3	0.5	6.0	0.4	5.7	0.3	5.6	ns

t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	10.2	1.8	10.2	1.5	10.2	1.3	10.2	1.6	10.2	ns
		$\overline{nOE}$ to nBn	1.9	11.3	1.9	10.3	1.9	9.1	1.4	7.4	1.2	7.6	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	1.1	9.4	1.4	9.4	1.1	9.4	0.7	9.4	0.4	9.4	ns
		$\overline{nOE}$ to nBn	1.4	12.1	1.4	9.6	1.1	7.7	0.9	5.8	0.9	5.6	ns
$V_{CC(A)}$=1.65V to 1.95V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	8.7	0.1	6.0	0.1	4.9	0.1	3.9	0.3	3.9	ns
		nBn to nAn	0.6	6.2	0.6	5.3	0.5	4.9	0.3	4.6	0.3	4.5	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	8.6	1.6	8.6	1.8	8.6	1.3	8.6	1.6	8.6	ns
		$\overline{nOE}$ to nBn	1.7	10.9	1.7	9.9	1.6	8.7	1.2	6.9	1.0	6.9	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	1.0	7.2	1.0	7.2	1.0	7.2	0.6	7.2	0.4	7.2	ns
		$\overline{nOE}$ to nBn	1.2	11.7	1.2	9.2	1.0	7.4	0.8	5.3	0.8	4.6	ns
$V_{CC(A)}$=2.3V to 2.7V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	8.4	0.1	5.7	0.1	4.6	0.2	3.5	0.1	3.6	ns
		nBn to nAn	0.6	5.2	0.6	4.2	0.4	3.9	0.2	3.4	0.2	3.3	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.0	6.2	1.0	6.2	1.0	6.2	1.0	6.2	1.0	6.2	ns
		$\overline{nOE}$ to nBn	1.5	10.4	1.5	8.8	1.3	8.2	1.1	6.2	0.9	5.2	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	0.7	4.8	0.7	4.8	0.7	4.8	0.6	4.8	0.4	4.8	ns
		$\overline{nOE}$ to nBn	0.9	11.3	0.9	8.8	0.8	7.0	0.6	4.8	0.6	4.0	ns
$V_{CC(A)}$=3.0V to 3.6V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	8.2	0.1	5.6	0.1	4.5	0.1	3.3	0.1	2.9	ns
		nBn to nAn	0.6	5.1	0.6	4.2	0.4	3.4	0.2	3.0	0.1	2.8	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	0.7	5.6	0.7	5.6	0.7	5.6	0.7	5.6	0.7	5.6	ns
		$\overline{nOE}$ to nBn	1.4	10.2	1.4	9.3	1.2	8.1	1.0	6.4	0.8	6.2	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	0.6	3.8	0.6	3.8	0.6	3.8	0.6	3.8	0.4	3.8	ns
		$\overline{nOE}$ to nBn	0.8	11.3	0.8	8.7	0.6	6.8	0.5	4.7	0.5	3.8	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; ten is the same as t_{PZL} and t_{PZH}.

7.4.9 AC Characteristics 5

T_{amb}=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified. (1)

SYMBOL	PARAMETER	CONDITIONS	$V_{CC(B)}$										UNIT
			1.2V±0.1V		1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
$V_{CC(A)}$=1.1V to 1.3V													
t_{pd}	Propagation Delay	nAn to nBn	0.5	10.4	0.5	7.9	0.5	6.9	0.5	5.8	0.5	5.7	ns
		nBn to nAn	0.5	10.4	0.5	9.8	0.5	9.6	0.5	9.3	0.5	9.1	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	12.0	1.8	12.0	1.8	12.0	1.8	12.0	1.8	12.0	ns
		$\overline{nOE}$ to nBn	1.9	13.7	1.9	10.6	1.9	10.5	1.4	9.0	1.2	10.1	ns
	Enable time	$\overline{nOE}$ to nAn	1.4	14.1	1.4	14.1	1.4	14.1	1.4	14.1	1.4	14.1	ns

t_{en}		$\overline{nOE}$ to nBn	1.1	14.7	1.1	11.0	1.1	9.8	1.0	8.7	1.0	8.5	ns
$V_{CC(A)}$=1.4V to 1.6V													
t_{pd}	Propagation Delay	nAn to nBn	0.3	9.8	0.3	7.0	0.3	5.8	0.3	4.7	0.3	4.7	ns
		nBn to nAn	0.7	7.9	0.7	7.0	0.5	6.6	0.4	6.3	0.3	6.2	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	11.3	1.8	11.3	1.5	11.3	1.3	11.3	1.6	11.3	ns
		$\overline{nOE}$ to nBn	1.9	12.5	1.9	11.4	1.9	10.1	1.4	8.2	1.2	8.4	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	1.1	10.4	1.4	10.4	1.1	10.4	0.7	10.4	0.4	10.4	ns
		$\overline{nOE}$ to nBn	1.4	13.3	1.4	10.6	1.1	8.5	0.9	6.4	0.9	6.2	ns
$V_{CC(A)}$=1.65V to 1.95V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	9.6	0.1	6.6	0.1	5.4	0.1	4.3	0.3	4.3	ns
		nBn to nAn	0.6	6.9	0.6	5.9	0.5	5.4	0.3	5.1	0.3	5.0	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.8	9.5	1.6	9.5	1.8	9.5	1.3	9.5	1.6	9.5	ns
		$\overline{nOE}$ to nBn	1.7	12.0	1.7	10.9	1.6	9.6	1.2	7.6	1.0	7.6	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	1.0	8.0	1.0	8.0	1.0	8.0	0.6	8.0	0.4	8.0	ns
		$\overline{nOE}$ to nBn	1.2	12.9	1.2	10.2	1.0	8.2	0.8	5.9	0.8	5.1	ns
$V_{CC(A)}$=2.3V to 2.7V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	9.3	0.1	6.3	0.1	5.1	0.2	4.0	0.1	4.0	ns
		nBn to nAn	0.6	5.8	0.6	4.7	0.4	4.3	0.2	3.9	0.2	3.8	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	1.0	6.9	1.0	6.9	1.0	6.9	1.0	6.9	1.0	6.9	ns
		$\overline{nOE}$ to nBn	1.5	11.5	1.5	10.4	1.3	9.1	1.1	6.9	0.9	5.8	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	0.7	5.3	0.7	5.3	0.7	5.3	0.6	5.3	0.4	5.3	ns
		$\overline{nOE}$ to nBn	0.9	12.4	0.9	9.7	0.8	7.7	0.6	5.3	0.6	4.4	ns
$V_{CC(A)}$=3.0V to 3.6V													
t_{pd}	Propagation Delay	nAn to nBn	0.1	9.1	0.1	6.2	0.1	5.0	0.1	3.8	0.1	3.3	ns
		nBn to nAn	0.6	5.7	0.6	4.7	0.4	3.9	0.2	3.4	0.1	3.3	ns
t_{dis}	Disable time	$\overline{nOE}$ to nAn	0.7	6.2	0.7	6.2	0.7	6.2	0.7	6.2	0.7	6.2	ns
		$\overline{nOE}$ to nBn	1.4	11.3	1.4	10.3	1.2	9.0	1.0	7.1	0.8	6.9	ns
t_{en}	Enable time	$\overline{nOE}$ to nAn	0.6	4.2	0.6	4.2	0.6	4.2	0.6	4.2	0.4	4.2	ns
		$\overline{nOE}$ to nBn	0.8	12.4	0.8	9.6	0.6	7.5	0.5	5.2	0.5	4.2	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; ten is the same as t_{PZL} and t_{PZH}.

8 Detailed Description

8.1 Overview

The CJ74AVC4T245 is an 4-bit, dual supply transceiver that enables bidirectional level translation. The device can be used as two 2-bit transceivers or as a 4-bit transceiver. It features four 2-bit input-output ports (nAn and nBn), a direction control input (nDIR), a output enable input (/nOE) and dual supply pins ($V_{CC(A)}$ and $V_{CC(B)}$). Both $V_{CC(A)}$ and $V_{CC(B)}$ can be supplied at any voltage between 0.8V and 3.6V making the device suitable for translating between any of the low voltage nodes (0.8V, 1.2V, 1.5V, 1.8V, 2.5V and 3.3V). Pins nAn, /nOE and nDIR are referenced to $V_{CC(A)}$ and pins nBn are referenced to $V_{CC(B)}$. A HIGH on nDIR allows transmission from nAn to nBn and a LOW on nDIR allows transmission from nBn to nAn. The output enable input (/nOE) can be used to disable the outputs so the buses are effectively isolated.

The device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing any damaging backflow current through the device when it is powered down. In suspend mode when either $V_{CC(A)}$ or $V_{CC(B)}$ are at GND level, both nAn and nBn are in the high-impedance OFF-state.

8.2 Functional Block Diagram

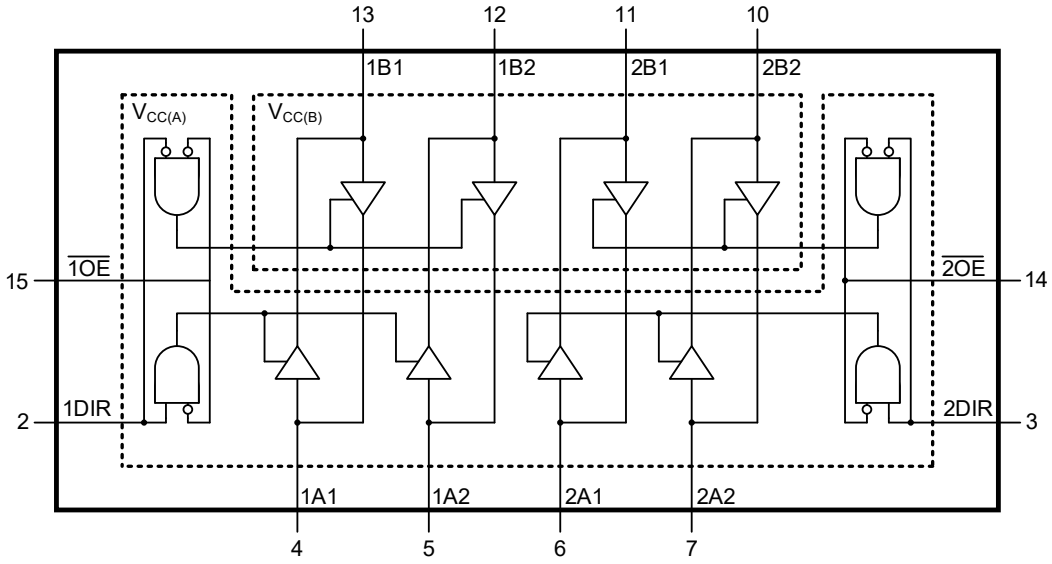


Figure 8-1 Logic symbol

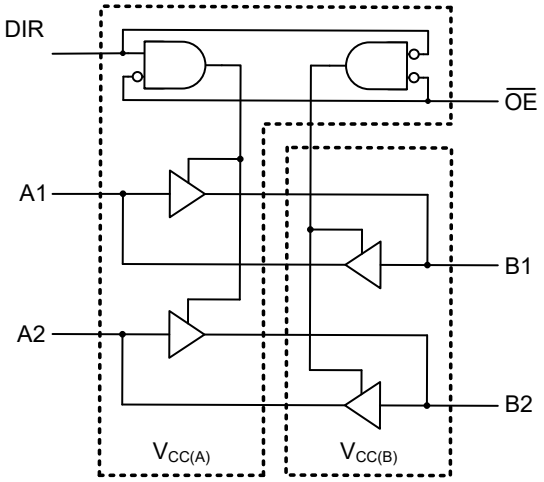


Figure 8-2 Logic diagram (one 2-bit transceiver)

8.3 Function Table(3)

SUPPLY VOLTAGE	INPUT		INPUT/OUTPUT(1)	
$V_{CC(A)}$, $V_{CC(B)}$	$\overline{nOE}$(2)	nDIR(2)	nAn(2)	nBn(2)
0.8V to 3.6V	L	L	nAn=nBn	Input
0.8V to 3.6V	L	H	Input	nBn=nAn
0.8V to 3.6V	H	X	Z	Z
GND(1)	X	X	Z	Z

Note:

(1) If at least one of $V_{CC(A)}$ or $V_{CC(B)}$ is at GND level, the device goes into suspend mode.

(2) The nAn, nDIR and $\overline{nOE}$ input circuit is referenced to $V_{CC(A)}$; The nBn input circuit is referenced to $V_{CC(B)}$.

(3) 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

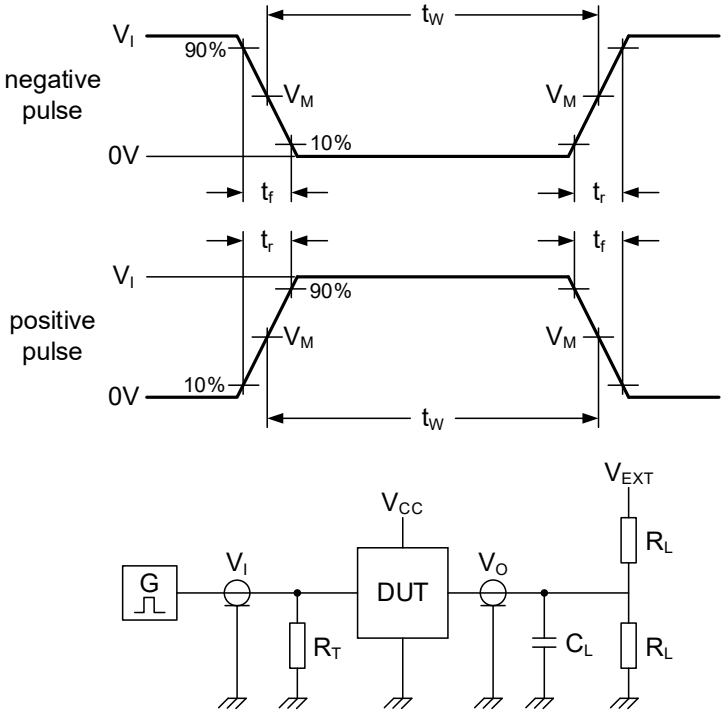


Figure 8-3 Test circuit for measuring switching times

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

R_T=Termination resistance.

V_{EXT}=External voltage for measuring switching times.

8.4.2 AC Testing Waveforms

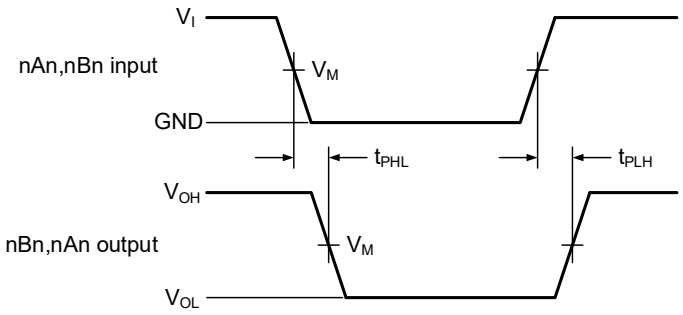


Figure 8-4 The data input (nAn, nBn) to output (nBn, nAn) propagation delay times

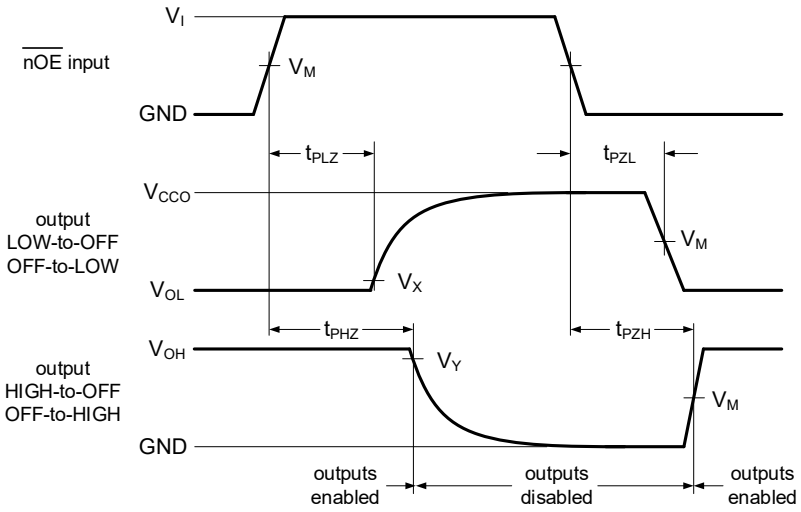


Figure 8-5 Enable and disable times

8.4.3 Measurement Points

SUPPLY VOLTAGE	INPUT(1)	OUTPUT(2)		
$V_{CC(A)}$, $V_{CC(B)}$	V_M	V_M	V_X	V_Y
0.8V to 1.6V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL}+0.1V	V_{OH}-0.1V
1.65V to 2.7V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL}+0.15V	V_{OH}-0.15V
3.0V to 3.6V	$0.5V_{CCI}$	$0.5V_{CCO}$	V_{OL}+0.3V	V_{OH}-0.3V

(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.

8.4.4 Test Data

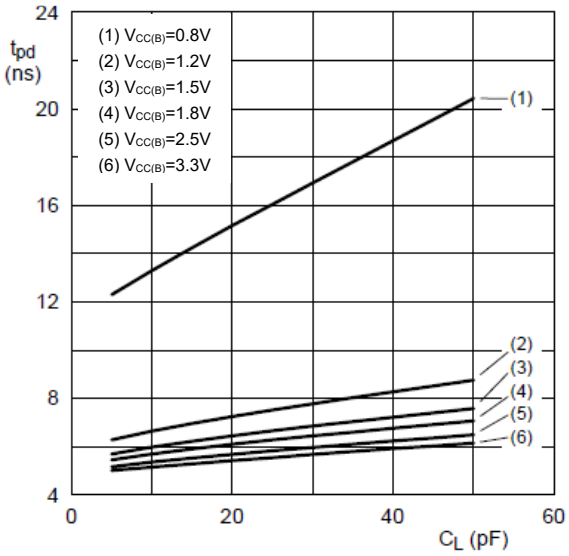
SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}		
$V_{CC(A)}$, $V_{CC(B)}$	V_I(1)	$\Delta t/\Delta V$(2)	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}(3)
0.8V to 1.6V	V_{CCI}	≤1.0ns/V	15pF	2kΩ	Open	GND	$2V_{CCO}$
1.65V to 2.7V	V_{CCI}	≤1.0ns/V	15pF	2kΩ	Open	GND	$2V_{CCO}$
3.0V to 3.6V	V_{CCI}	≤1.0ns/V	15pF	2kΩ	Open	GND	$2V_{CCO}$

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

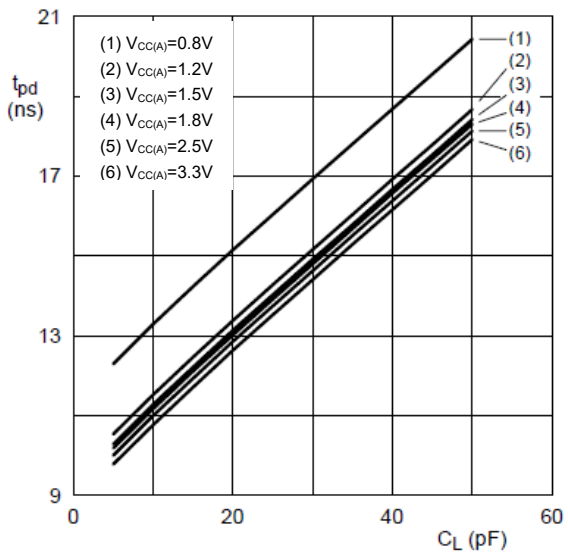
(2) dV/dt≥1.0V/ns.

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

9 Characteristic Curve

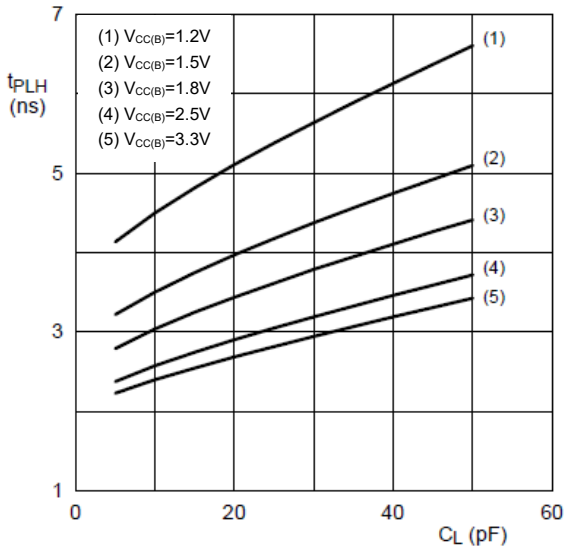


a. Propagation delay (A to B);
$V_{CC(A)}$=0.8V

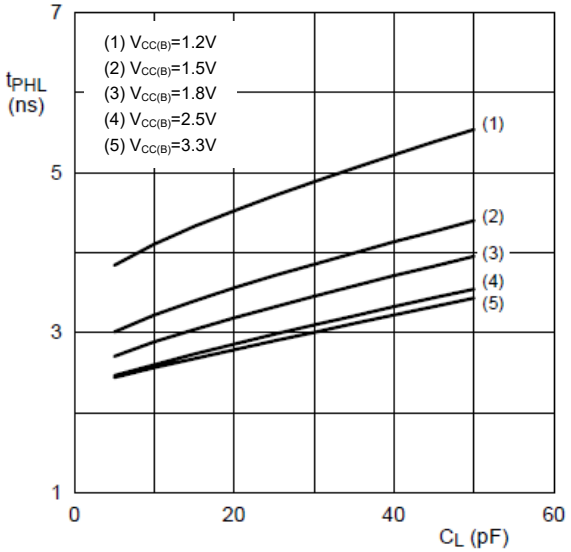


b. Propagation delay (A to B);
$V_{CC(B)}$=0.8V

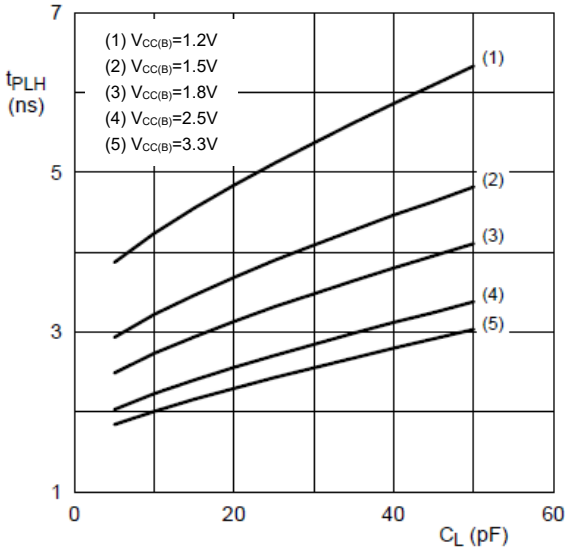
Figure 9-1 Typical propagation delay versus load capacitance; T_{amb}=25°C



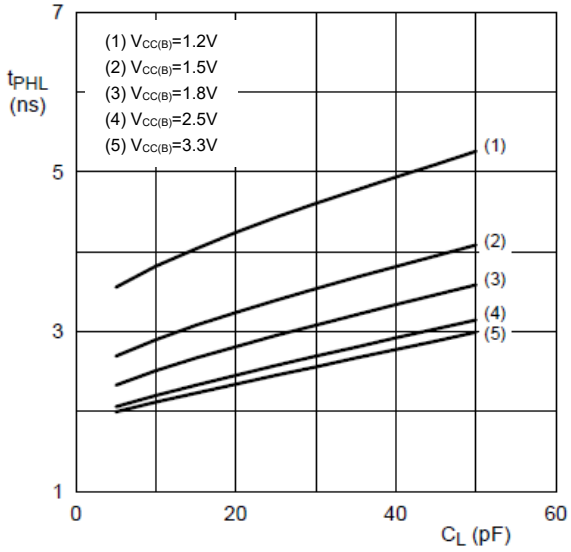
a. LOW to HIGH propagation delay (A to B); $V_{CC(A)}$=1.2V



b. HIGH to LOW propagation delay (A to B); $V_{CC(A)}$=1.2V

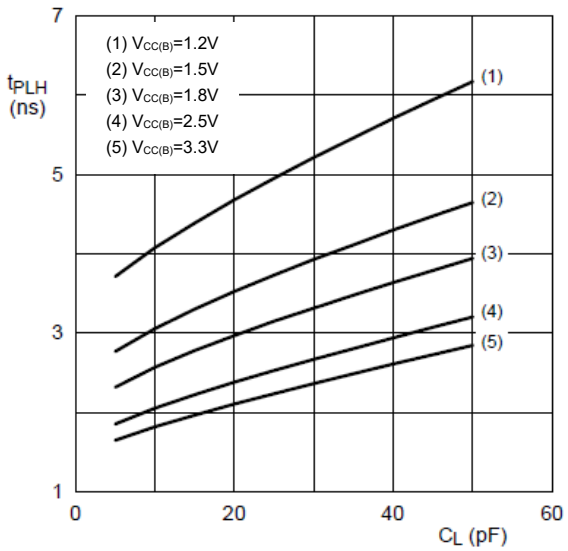


c. LOW to HIGH propagation delay (A to B); $V_{CC(A)}$=1.5V

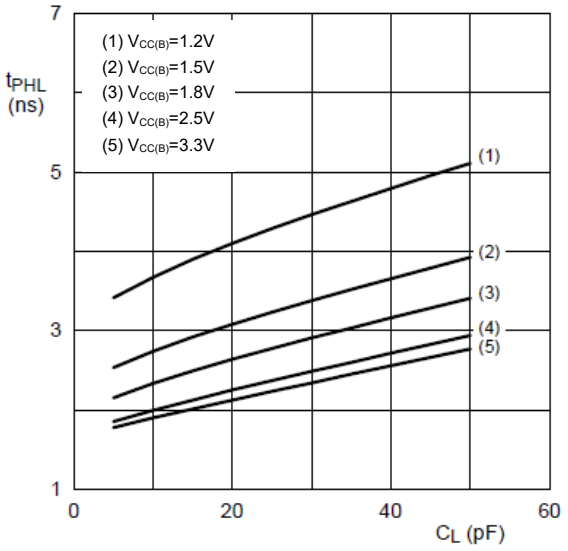


d. HIGH to LOW propagation delay (A to B); $V_{CC(A)}$=1.5V

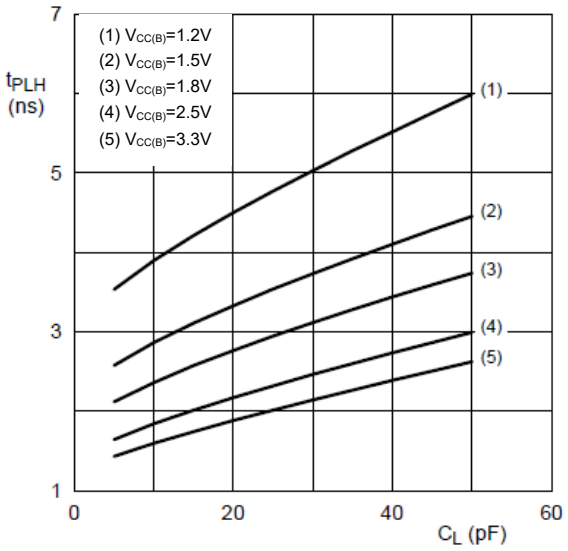
Figure 9-2 Typical propagation delay versus load capacitance; T_{amb}=25°C



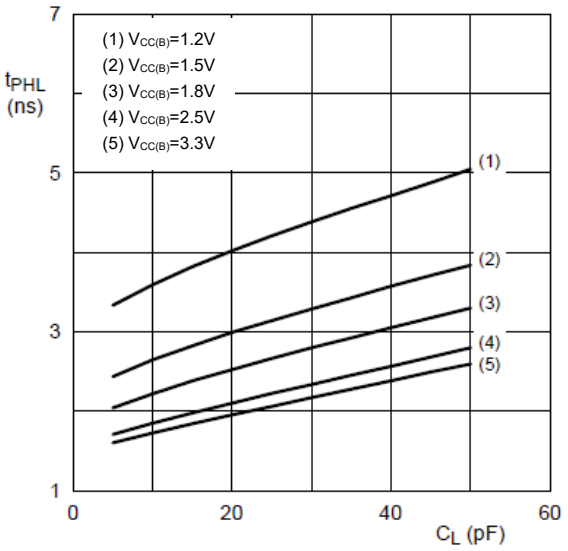
a. LOW to HIGH propagation delay (A to B); $V_{CC(A)}$=1.8V



b. HIGH to LOW propagation delay (A to B); $V_{CC(A)}$=1.8V

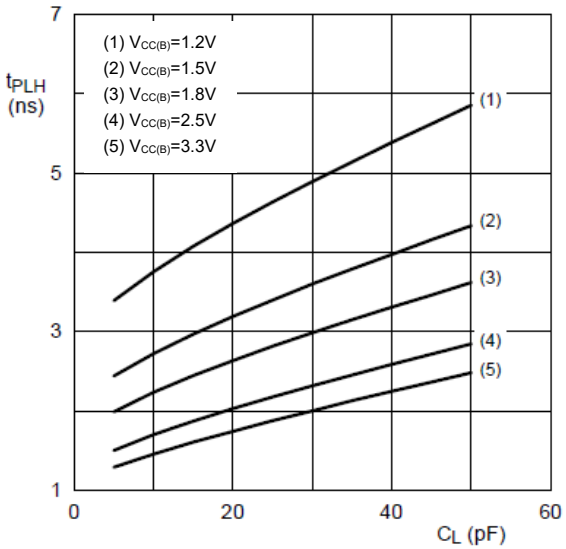


c. LOW to HIGH propagation delay (A to B); $V_{CC(A)}$=2.5V

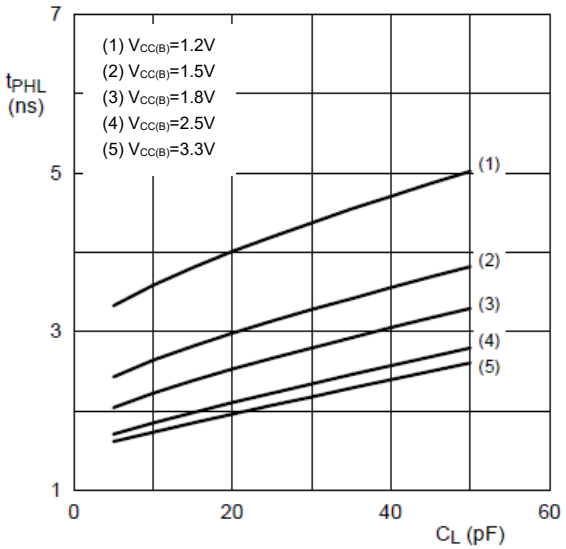


d. HIGH to LOW propagation delay (A to B); $V_{CC(A)}$=2.5V

Figure 9-3 Typical propagation delay versus load capacitance; T_{amb}=25°C



a. LOW to HIGH propagation delay (A to B); $V_{CC(A)}$=3.3V



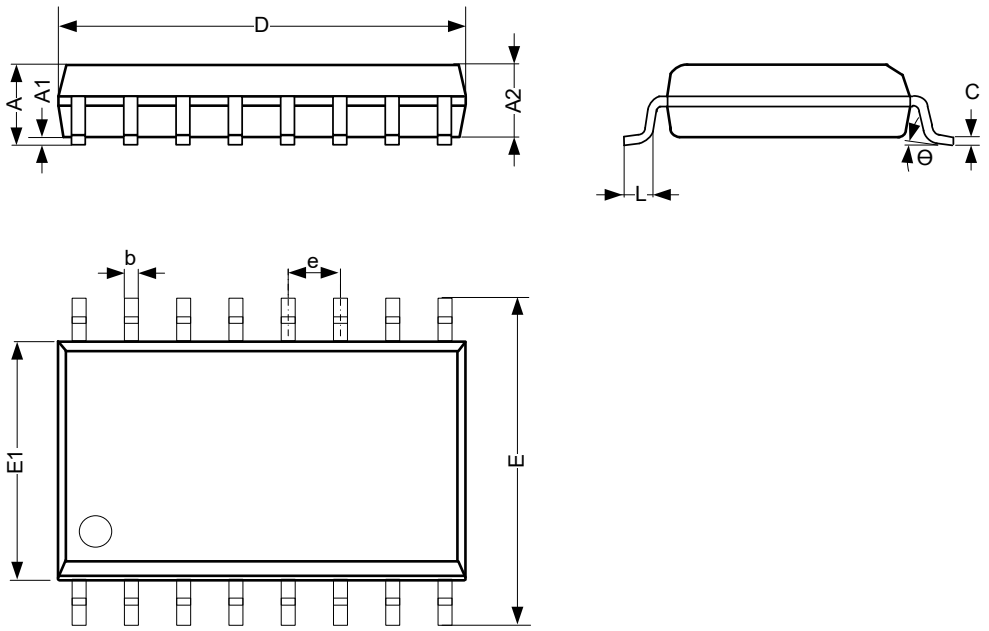
b. HIGH to LOW propagation delay (A to B); $V_{CC(A)}$=3.3V

Figure 9-4 Typical propagation delay versus load capacitance; T_{amb}=25°C

10 Mechanical Information

10.1 SOP16 Mechanical Information

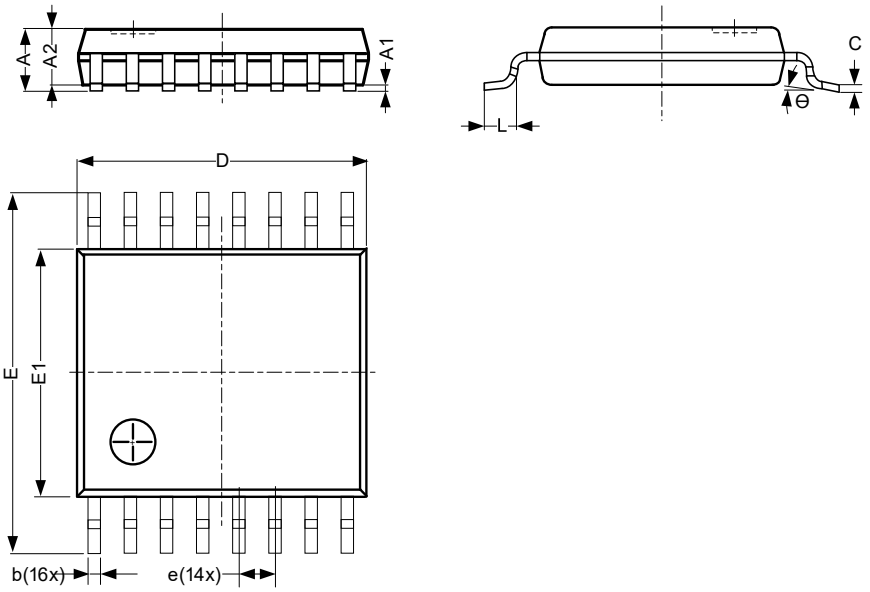
10.1.1 SOP16 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	1.35	-	1.80
A1	0.10	-	0.25
A2	1.25	-	1.55
b	0.33	-	0.51
c	0.19	-	0.25
D	9.50	-	10.10
E	5.80	-	6.30
E1	3.70	-	4.10
e	1.27 BSC		
L	0.35	-	0.89
θ	0°	-	8°
Unit: mm			

10.2 TSSOP16 Mechanical Information

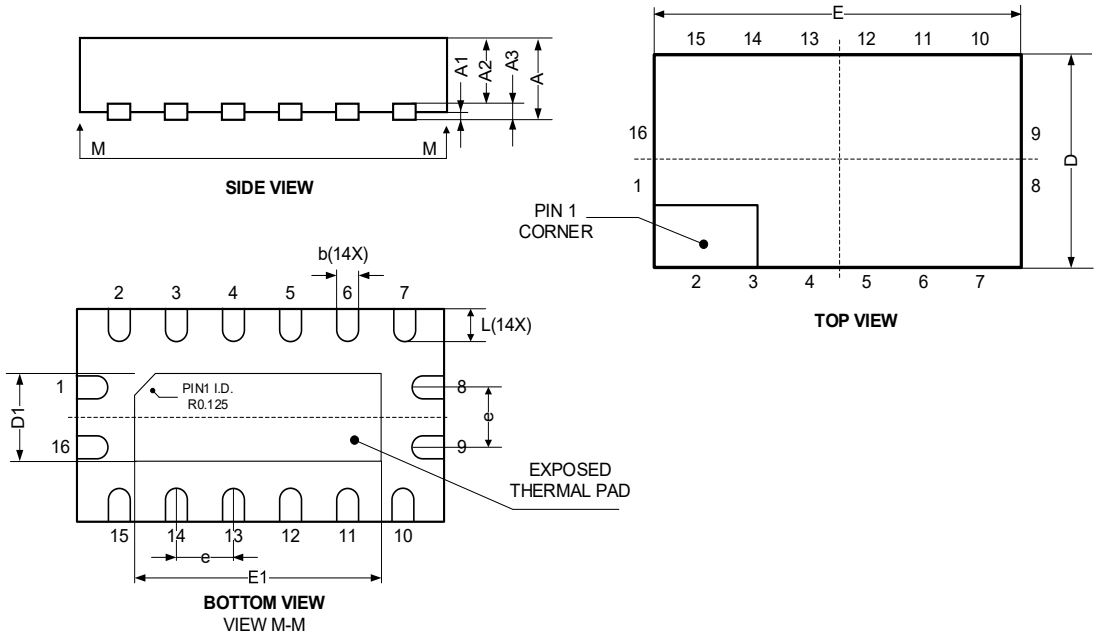
10.2.1 TSSOP16 Outline Dimensions



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	4.90	-	5.10
E	6.20	-	6.60
E1	4.30	-	4.50
e	0.65 BSC		
L	0.45	-	0.75
Θ	0°	-	8°
Unit: mm			

10.3 QFN3.5x2.5-16L Mechanical Information

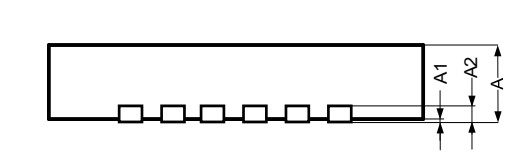
10.3.1 QFN3.5x2.5-16L Outline Dimensions



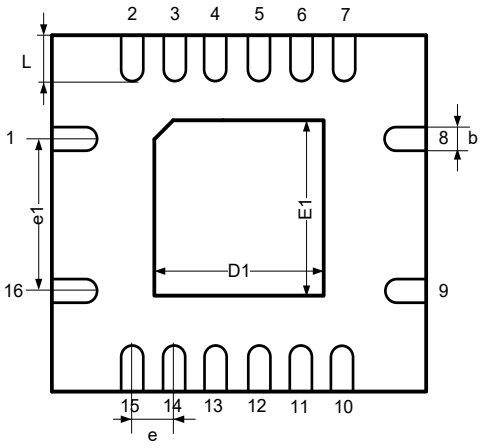
SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.80	-	1.00
A1	0.00	-	0.05
A2	0.60	-	0.70
A3	-	0.20	-
D	2.40	-	2.60
E	3.40	-	3.60
e	0.50 BSC		
b	0.18	-	0.30
L	0.30	-	0.50
D1	0.85	-	1.15
E1	1.85	-	2.15
Unit: mm			

10.4 QFN4x3.5-16L Mechanical Information

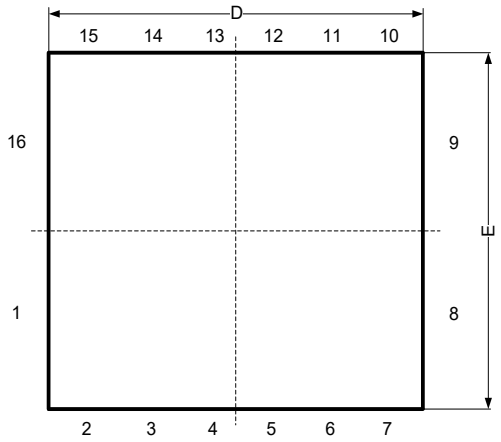
10.4.1 QFN4x3.5-16L Outline Dimensions



SIDE VIEW



BOTTOM VIEW

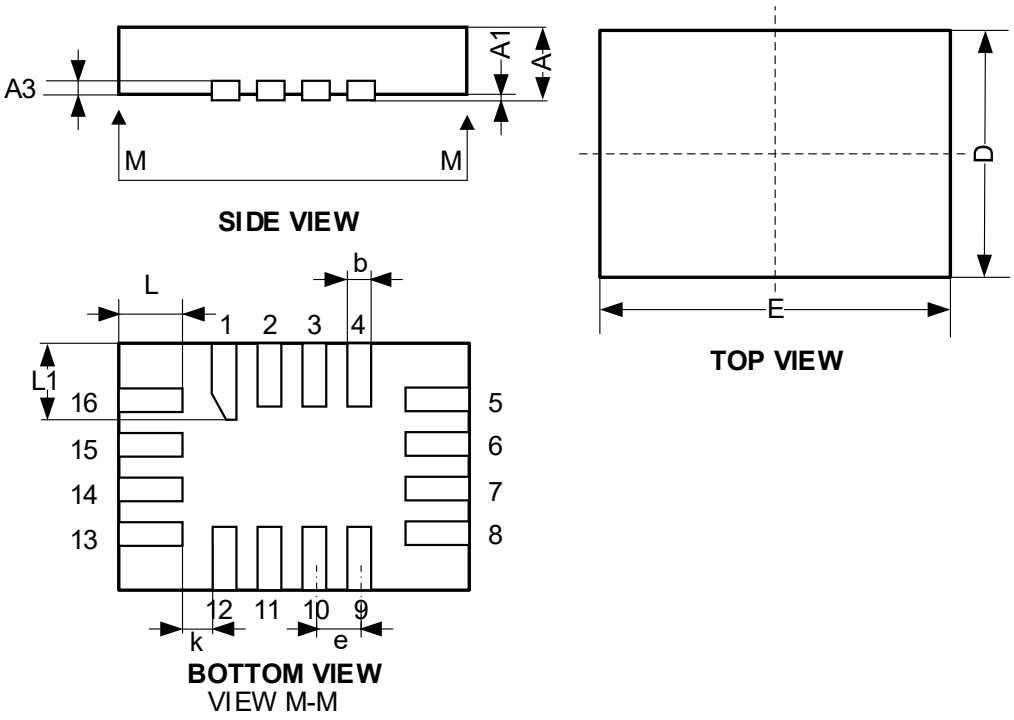


TOP VIEW

SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	-	0.75	-
A1	-	0.05	-
A2	-	0.203	-
b	0.215	-	0.265
D	-	4.00	-
D1	2.525	-	2.575
E	-	3.50	-
E1	2.025	-	2.075
e	0.475	-	0.525
e1	1.475	-	1.525
L	-	0.40	-
Unit: mm			

10.5 MIS16 Mechanical Information

10.5.1 MIS16 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.45	-	0.55
A1	0.00	-	0.046
A3	-	0.11	-
D	1.75	-	1.85
E	2.55	-	2.65
e	0.40 BSC		
k	-	0.15	-
b	0.15	-	0.25
L	0.35	-	0.45
L1	0.45	-	0.55
Unit: mm			

11 Notes and Revision History

11.1 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.

11.2 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

IMPORTANT NOTICE, PLEASE READ CAREFULLY

The information in this data sheet is intended to describe the operation and characteristics of our products. JSCJ has the right to make any modification, enhancement, improvement, correction or other changes to any content in this data sheet, including but not limited to specification parameters, circuit design and application information, without prior notice.

Any person who purchases or uses JSCJ products for design shall: 1. Select products suitable for circuit application and design; 2. Design, verify and test the rationality of circuit design; 3. Procedures to ensure that the design complies with relevant laws and regulations and the requirements of such laws and regulations. JSCJ makes no warranty or representation as to the accuracy or completeness of the information contained in this data sheet and assumes no responsibility for the application or use of any of the products described in this data sheet.

Without the written consent of JSCJ, this product shall not be used in occasions requiring high quality or high reliability, including but not limited to the following occasions: medical equipment, military facilities and aerospace. JSCJ shall not be responsible for casualties or property losses caused by abnormal use or application of this product.

Official Website: www.jscj-elec.com