

GENERAL DESCRIPTION

The 74LVC16T245 is a 16-bit, dual-supply bus transceiver with configurable voltage translation. The device has two separate configurable power-supply rails. The A and B ports track the V_{CCA} supply and V_{CCB} supply respectively. The supply voltage pins accept voltage range from 1.65V to 5.5V, which makes the device suitable for low voltage bidirectional translation voltage nodes of 1.8V, 2.5V, 3.3V and 5.0V.

The 74LVC16T245 features that two data buses can communicate asynchronously. $nDIR$ is the direction control input and $\overline{nOE}$ is the output enable input. The $nDIR$ and $\overline{nOE}$ logic levels can control either the A port outputs or the B port outputs to be activated, or all outputs to be in high-impedance state. The $nDIR$ and $\overline{nOE}$ pins are supplied by V_{CCA} . When B port outputs are activated, the device allows the data to transmit from A bus to B bus. On the contrary, when A port outputs are activated, the device allows the data to transmit from B bus to A bus. The input circuit is always active on the two ports. A logic level of high or low must be set to avoid excessive supply current. The V_{CC} isolation can allow both nAn and nBn are in high-impedance state when either V_{CCA} or V_{CCB} input is at GND level.

This device is highly suitable for partial power-down applications by using power-off circuit. When the device is powered down, the outputs are disabled, and the current backflow can be prevented from passing through the device.

The 74LVC16T245 is available in Green SSOP-48 and TSSOP-48 packages. It operates over a temperature range of -40°C to +125°C.

FEATURES

- V_{CCA} Supply Voltage Range: 1.65V to 5.5V
- V_{CCB} Supply Voltage Range: 1.65V to 5.5V
- Inputs Accept Voltages Higher than the Supply Voltage and up to 5.5V
- Control Inputs ($nDIR$ and $\overline{nOE}$) Referenced to V_{CCA}
- Each Port Operates in the Full Supply Voltage Range 1.65V to 5.5V by Fully Configurable Dual-Rail Design
- Outputs in High-Impedance State when V_{CCA} or $V_{CCB} = 0V$
- -40°C to +125°C Operating Temperature Range
- Available in Green SSOP-48 and TSSOP-48 Packages

APPLICATIONS

Personal Electronics
Industrial Equipment
Enterprise Equipment
Telecom Equipment

16-Bit Dual-Supply Bus Transceiver with 74LVC16T245 Configurable Voltage Translation and 3-State Outputs

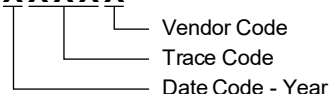
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74LVC16T245	SSOP-48	-40°C to +125°C	74LVC16T245XSS48G/TR	74LVC16T245 XSS48 XXXXX	Tape and Reel, 1000
	TSSOP-48	-40°C to +125°C	74LVC16T245XTS48G/TR	74LVC16T245 XTS48 XXXXX	Tape and Reel, 2500

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

XXXXX



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range, V_{CCA}	-0.5V to 6.5V
Supply Voltage Range, V_{CCB}	-0.5V to 6.5V
Input Voltage Range, V_I ⁽¹⁾	-0.5V to 6.5V
Output Voltage Range, V_O ⁽¹⁾	
High-Impedance State	-0.5V to 6.5V
High-State or Low-State	
A Ports	-0.5V to MIN(6.5V, $V_{CCA} + 0.5V$)
B Ports	-0.5V to MIN(6.5V, $V_{CCB} + 0.5V$)
Input Clamp Current, I_{IK} ($V_I < 0V$)	-50mA
Output Clamp Current, I_{OK} ($V_O < 0V$)	-50mA
Continuous Output Current, I_O	±50mA
Continuous Current through $V_{CCA/B}$ or GND	±100mA
Junction Temperature ⁽²⁾	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(3) (4)}	
HBM	±4000V
CDM	±1000V

NOTES:

- The input and output voltage ratings may be exceeded if the input and output clamp current ratings are observed.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.
- For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
- For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

(1) (2) (3)

Supply Voltage Range, V_{CCA}	1.65V to 5.5V
Supply Voltage Range, V_{CCB}	1.65V to 5.5V
Input Voltage Range, V_I (Control Inputs)	0V to 5.5V
Input/Output Voltage Range, $V_{I/O}$	
High-Impedance State	0V to 5.5V
High-State or Low-State	
A Ports	0V to V_{CCA}
B Ports	0V to V_{CCB}
Input Transition Rise or Fall Rate, $\Delta t/\Delta V$ (Data Inputs)	
$V_{CCI} = 1.65V$ to 1.95V	20ns/V (MAX)
$V_{CCI} = 2.3V$ to 2.7V	20ns/V (MAX)
$V_{CCI} = 3.0V$ to 3.6V	10ns/V (MAX)
$V_{CCI} = 4.5V$ to 5.5V	5ns/V (MAX)
Operating Temperature Range	-40°C to +125°C

NOTES:

- V_{CCI} is the supply voltage associated with the data input ports.
- Unused control input pins must be held at V_{CCA} or GND to guarantee normal operation of the device and minimum power consumption.
- Unused data inputs (I/O) must be held at high or low logic level (V_{CCI} or GND are preferred option) to guarantee normal operation of the device and minimum power consumption.

74LVC16T245 16-Bit Dual-Supply Bus Transceiver with Configurable Voltage Translation and 3-State Outputs

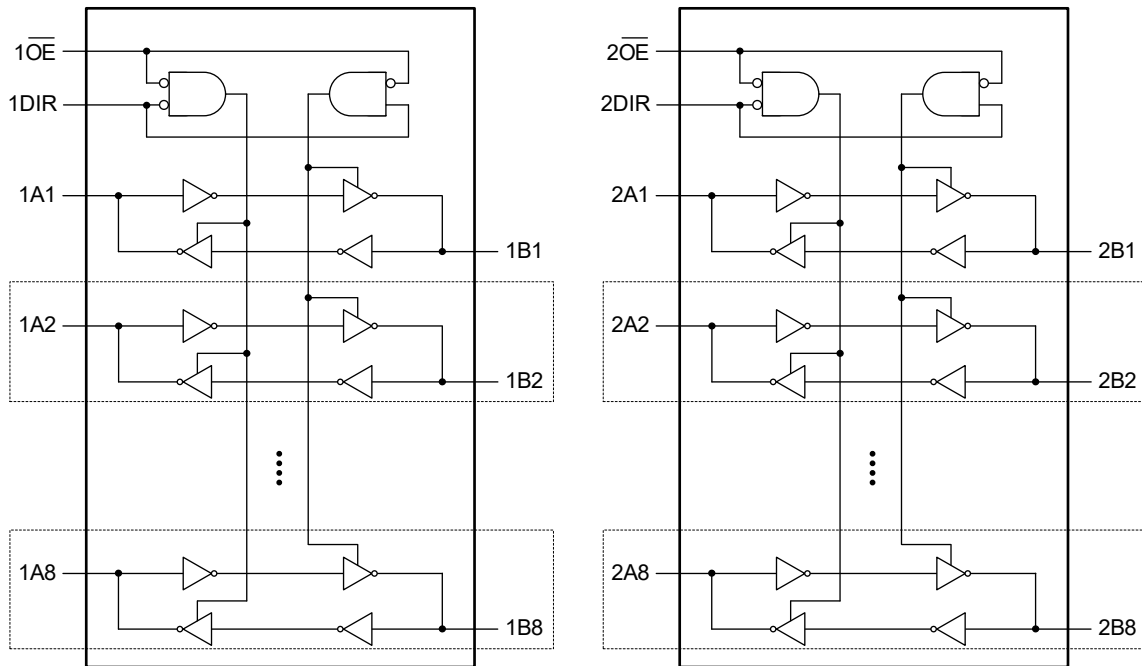
OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

LOGIC DIAGRAM



ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

FUNCTION TABLE

SUPPLY VOLTAGE	CONTROL INPUT		INPUT/OUTPUT ⁽¹⁾	
$V_{CCA}, V_{CCB}^{(2)}$	$\overline{nOE}$	$nDIR$	nAn	nBn
1.65V to 5.5V	L	L	$nAn = nBn$	Inputs
1.65V to 5.5V	L	H	Inputs	$nBn = nAn$
1.65V to 5.5V	H	X	Z	Z
GND ⁽³⁾	X	X	Z	Z

H = High Voltage Level

L = Low Voltage Level

Z = High-Impedance State

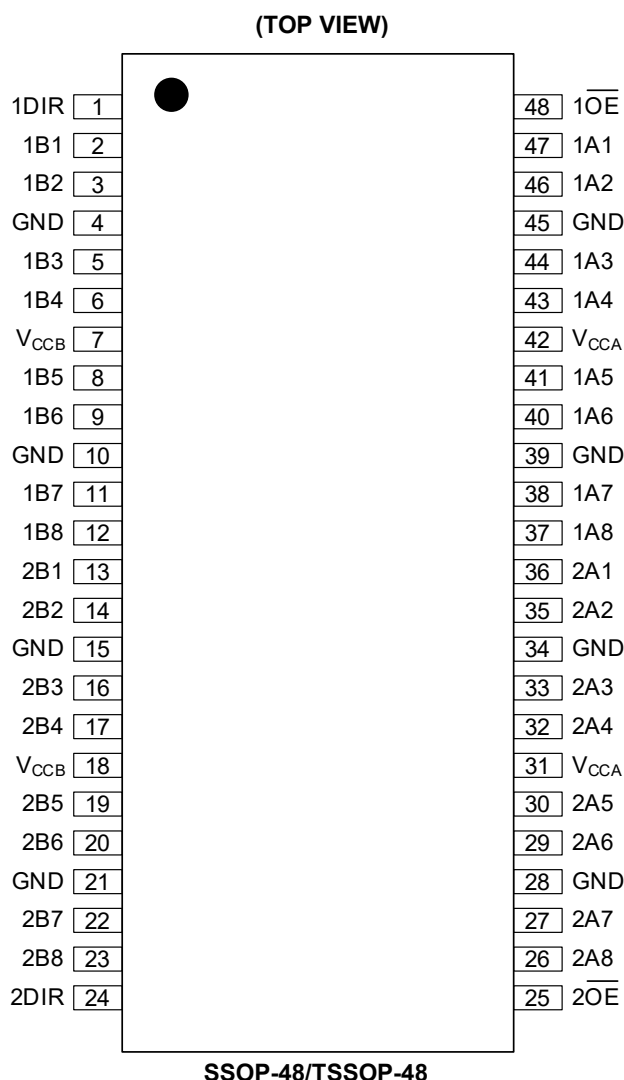
X = Don't Care

NOTES:

1. The input circuit of the data I/O is always active.
2. The nAn , $nDIR$ and $\overline{nOE}$ signals are referenced to V_{CCA} . The nBn signals are referenced to V_{CCB} .
3. If at least one of V_{CCA} or V_{CCB} is at GND level, the outputs are in high-impedance state.

16-Bit Dual-Supply Bus Transceiver with 74LVC16T245 Configurable Voltage Translation and 3-State Outputs

PIN CONFIGURATIONS

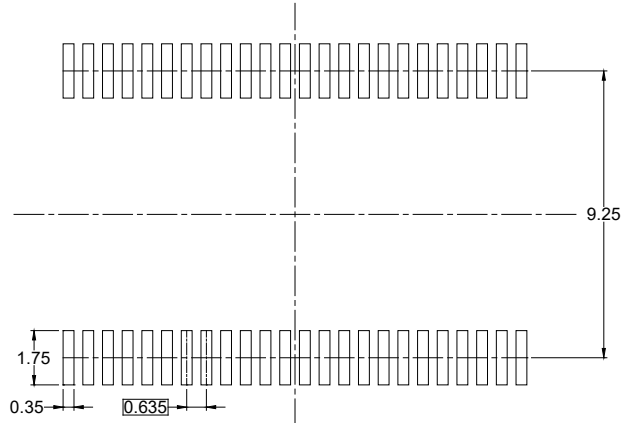
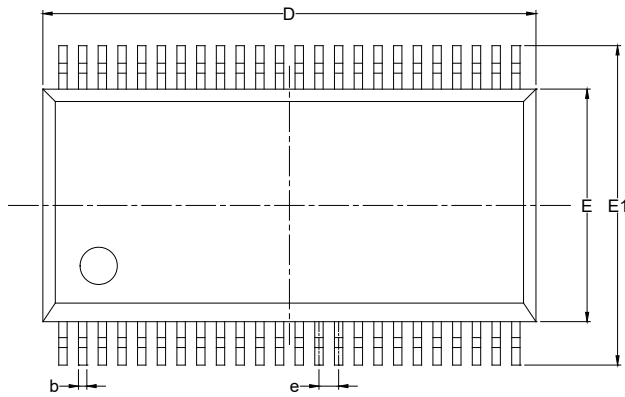


PIN DESCRIPTION

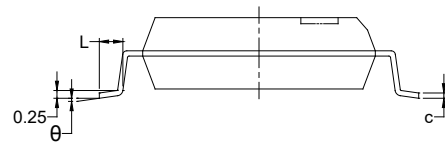
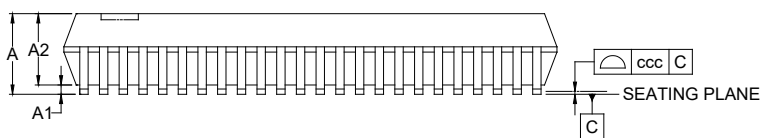
PIN	NAME	FUNCTION
1, 24	1DIR, 2DIR	Direction Control Inputs. nDIR controls the signal direction of channel nAn and nBn.
2, 3, 5, 6, 8, 9, 11, 12	1B1, 1B2, 1B3, 1B4, 1B5, 1B6, 1B7, 1B8	Data Inputs/Outputs. The nBn signals are referenced to V _{CCB} .
13, 14, 16, 17, 19, 20, 22, 23	2B1, 2B2, 2B3, 2B4, 2B5, 2B6, 2B7, 2B8	Data Inputs/Outputs. The nBn signals are referenced to V _{CCB} .
4, 10, 15, 21, 28, 34, 39, 45	GND	Ground.
7, 18	V _{CCB}	B Port Power Supply. The voltage range is from 1.65V to 5.5V.
48, 25	1OE, 2OE	Output Enable Inputs (Active-Low). Driving the active-low nOE pin to logic high can set all output ports to high-impedance state, with V _{CCA} as the reference voltage.
47, 46, 44, 43, 41, 40, 38, 37	1A1, 1A2, 1A3, 1A4, 1A5, 1A6, 1A7, 1A8	Data Inputs/Outputs. The nAn signals are referenced to V _{CCA} .
36, 35, 33, 32, 30, 29, 27, 26	2A1, 2A2, 2A3, 2A4, 2A5, 2A6, 2A7, 2A8	Data Inputs/Outputs. The nAn signals are referenced to V _{CCA} .
31, 42	V _{CCA}	A Port Power Supply. The voltage range is from 1.65V to 5.5V.

PACKAGE OUTLINE DIMENSIONS

SSOP-48



RECOMMENDED LAND PATTERN (Unit: mm)



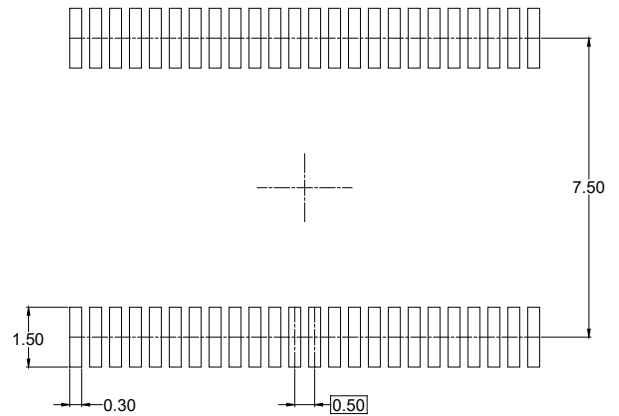
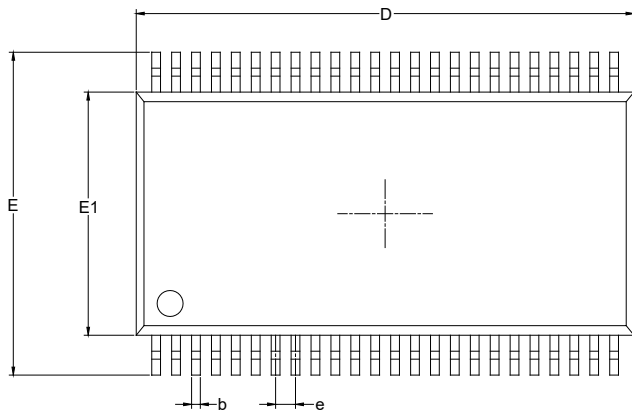
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	2.800
A1	0.200	-	0.400
A2	2.300 REF		
b	0.203	-	0.343
c	0.130	-	0.250
D	15.750	-	16.000
E	7.390	-	7.600
E1	10.030	-	10.670
e	0.635 BSC		
L	0.510	-	1.020
θ	0°	-	8°
ccc	0.100		

NOTES:

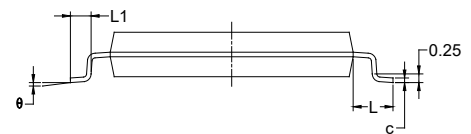
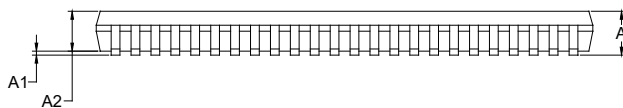
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-118.

PACKAGE OUTLINE DIMENSIONS

TSSOP-48



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A			1.20
A1	0.05	0.10	0.15
A2	0.85	0.95	1.05
b	0.18		0.26
c	0.15		0.19
D	12.40	12.50	12.60
E	7.90	8.10	8.30
E1	6.00	6.10	6.20
e	0.50 BSC		
L	1.00 REF		
L1	0.45		0.75
θ	0°		8°

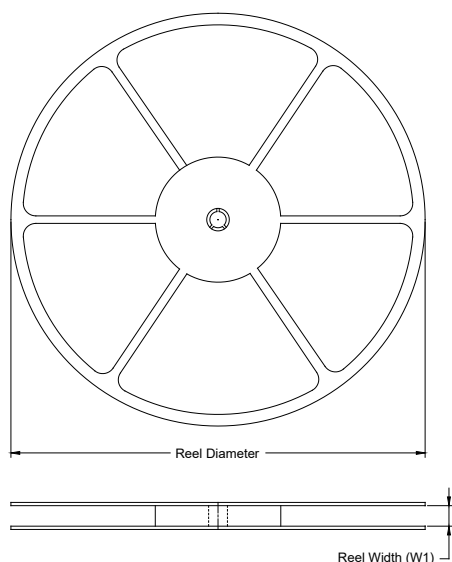
NOTES:

1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

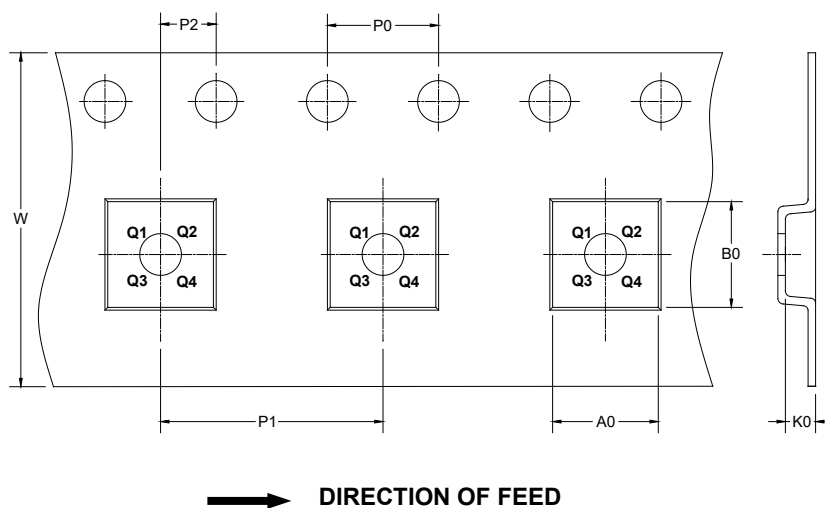
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

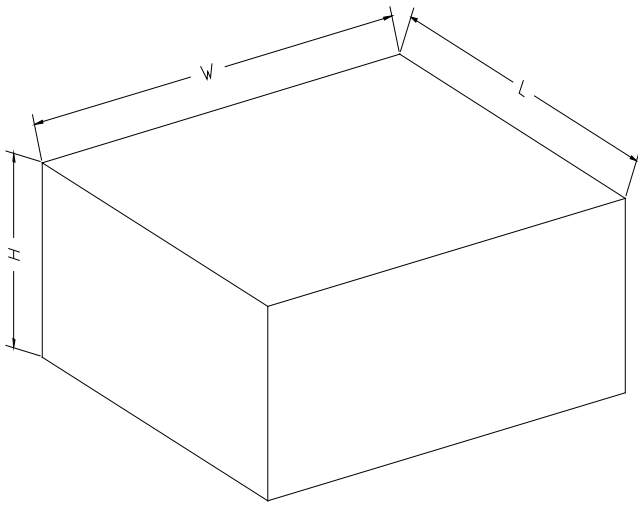
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SSOP-48	13"	32.4	10.80	16.20	3.20	4.0	16.0	2.0	32.0	Q1
TSSOP-48	13"	24.4	8.60	13.00	1.80	4.0	12.0	2.0	24.0	Q1

DD0001

PACKAGE INFORMATION

CARTON BOX DIMENSIONS



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

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5

DD0002