74AVC4T245
4-Bit Dual-Supply Translating Transceiver with Configurable Voltage Translation and 3-State Outputs

GENERAL DESCRIPTION

The 74AVC4T245 is a 4-bit, dual-supply voltage level transceiver with 3-state outputs and bidirectional level translation. The device can be used as two 2-bit transceivers or one 4-bit transceiver. The nAn and nBn are four data input-output ports. nDIR are the direction control inputs and $n\overline{OE}$ are the output enable inputs. V_{CCA} and V_{CCB} are the supply pins. The supply voltage of V_{CCA} and V_{CCB} can range from 0.8V to 3.6V, making the device suitable for bidirectional translating among any of the 0.8V, 1.2V, 1.5V, 1.8V, 2.5V and 3.3V voltage nodes. The nAn, nDIR and $n\overline{OE}$ signals are referenced to V_{CCA} and nBn signals are referenced to V_{CCB}.

When nDIR is set high, it allows transmission from nAn to nBn. When nDIR is set low, it allows transmission from nBn to nAn. $n\overline{OE}$ can be used to make the outputs disabled so that the buses are effectively isolated. In suspend mode, 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 leakage current (I_{OFF}) circuit. When the device is powered down, the outputs are disabled, and the current backflow can be prevented from passing through the device.

FEATURES

- **V_{CCA} Supply Voltage Range: 0.8V to 3.6V**
- **V_{CCB} Supply Voltage Range: 0.8V to 3.6V**
- **Inputs Accept Voltages up to 3.6V**
- **+12mA/-12mA Output Current**
- **Data Rates:**
  - **380Mbps (≥ 1.8V to 3.3V Translation)**
  - **200Mbps (≥ 1.1V to 3.3V Translation)**
  - **200Mbps (≥ 1.1V to 2.5V Translation)**
  - **200Mbps (≥ 1.1V to 1.8V Translation)**
  - **150Mbps (≥ 1.1V to 1.5V Translation)**
  - **100Mbps (≥ 1.1V to 1.2V Translation)**
- **Outputs in High-Impedance State when V_{CCA} or V_{CCB} = 0V**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green TSSOP-16 and UTQFN-2.6×1.8-16L Packages**

APPLICATIONS

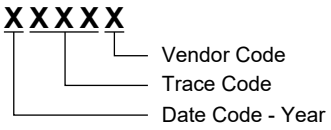
Personal Electronic
Industrial Equipment
Enterprise Infrastructure
Telecom Equipment

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
74AVC4T245	TSSOP-16	-40℃ to +125℃	74AVC4T245XTS16G/TR	03R XTS16 XXXXX	Tape and Reel, 4000
	UTQFN-2.6×1.8-16L	-40℃ to +125℃	74AVC4T245XUSY16G/TR	07X XXXXX	Tape and Reel, 3000
		-40℃ to +125℃	74AVC4T245XUSY16SG/TR	07X XXXXX	Tape and Reel, 3000

MARKING INFORMATION

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



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 (1)

Supply Voltage Range, V_{CCA} ..... -0.5V to 4.6V
Supply Voltage Range, V_{CCB} ..... -0.5V to 4.6V
Input Voltage Range, V_I (2) ..... -0.5V to 4.6V
Output Voltage Range, V_O (2)
Suspend or 3-State Mode ..... -0.5V to 4.6V
Active Mode
A Ports .....-0.5V to MIN(4.6V, V_{CCA} + 0.5V)
B Ports .....-0.5V to MIN(4.6V, 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 (V_O = 0V to V_{CC}) ..... ±50mA
Continuous Current through $V_{CCA/B}$ or GND..... ±100mA
Junction Temperature (3) .....+150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s).....+260℃
ESD Susceptibility
HBM.....6000V
CDM 1000V

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.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CCA} ..... 0.8V to 3.6V
Supply Voltage Range, V_{CCB} ..... 0.8V to 3.6V
Input Voltage Range, V_I..... 0V to 3.6V
Output Voltage Range, V_O
Suspend or 3-State Mode..... 0V to 3.6V
Active Mode
A Ports..... 0V to V_{CCA}
B Ports..... 0V to V_{CCB}
High-State or Low-State Output Current, I_O..... .±12mA
Input Transition Rise or Fall Rate, Δt/ΔV
V_{CCI} = 0.8V to 3.6V ..... 5ns/V (MAX)
Operating Temperature Range..... -40℃ to +125℃

OVERSTRESS CAUTION

1. 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.

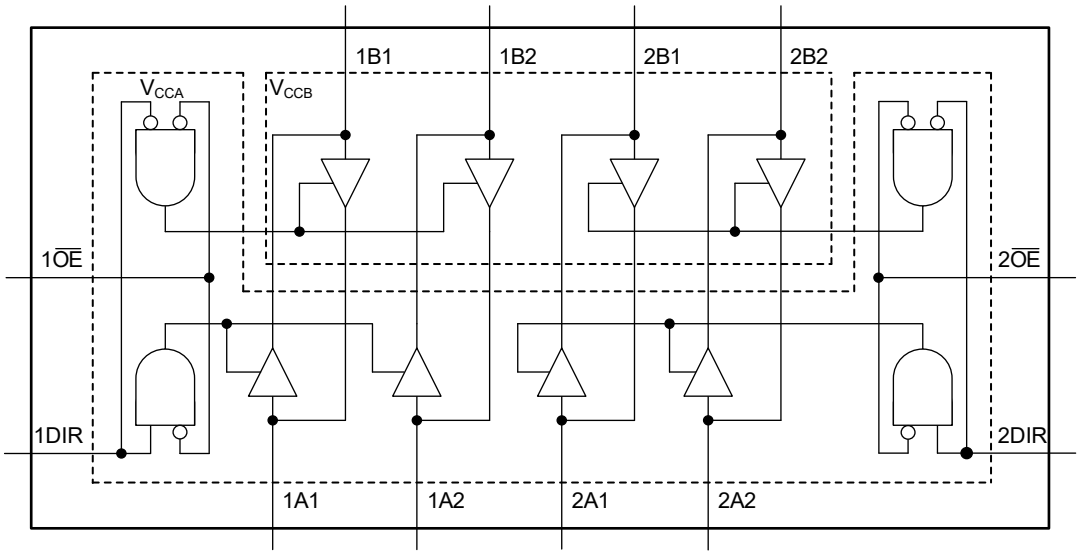
2. The minimum input voltage ratings and output voltage ratings may be exceeded if the input and output current ratings are observed.

3. The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

DISCLAIMER

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

LOGIC DIAGRAM



FUNCTION TABLE

SUPPLY VOLTAGE	CONTROL INPUT		INPUT/OUTPUT	
V_{CCA}, V_{CCB} (1)	n$\overline{OE}$	nDIR	nAn	nBn
0.8V to 3.6V	L	L	nAn = nBn	Inputs
0.8V to 3.6V	L	H	Inputs	nBn = nAn
0.8V to 3.6V	H	*X*	Z	Z
GND (2)	*X*	*X*	Z	Z

H = High Voltage Level

L = Low Voltage Level

Z = High-Impedance State

X = Don't Care

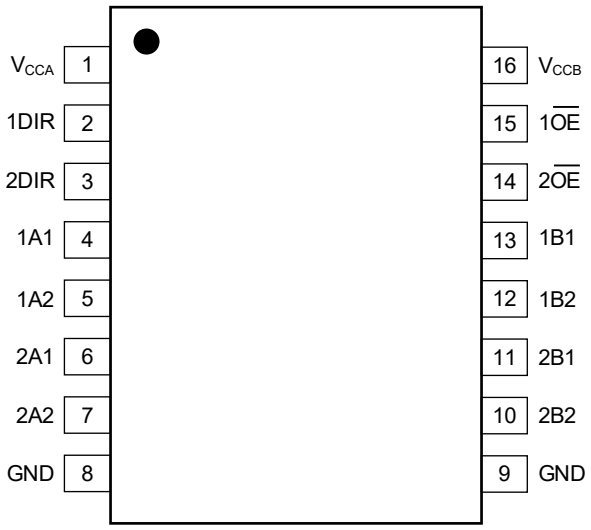
NOTES:

1. The nAn, nDIR and n$\overline{OE}$ signals are referenced to V_{CCA}. The nBn signals are referenced to V_{CCB}.

2. If at least one of V_{CCA} or V_{CCB} is at GND level, the device enters suspend mode.

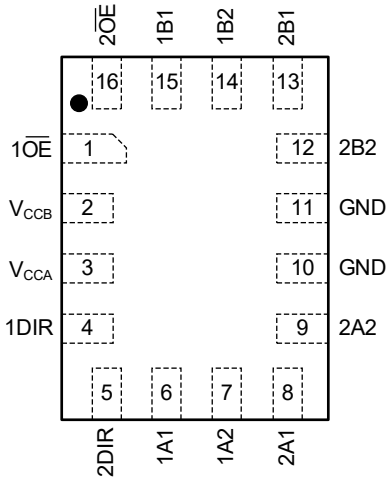
PIN CONFIGURATIONS

(TOP VIEW)



TSSOP-16

(TOP VIEW)



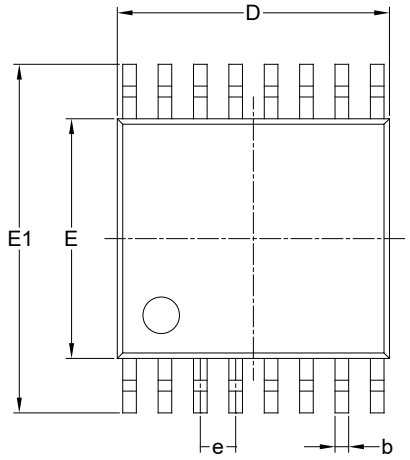
UTQFN-2.6×1.8-16L

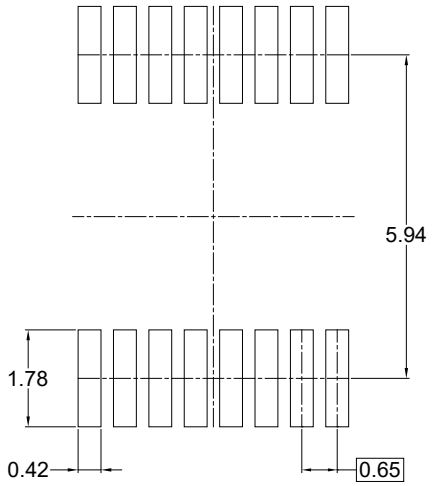
PIN DESCRIPTION

PIN		NAME	FUNCTION
TSSOP-16	UTQFN-2.6×1.8-16L		
1	3	V_{CCA}	Supply Voltage V_{CCA}. The nAn, nDIR and n$\overline{OE}$ signals are referenced to V_{CCA}.
2, 3	4, 5	1DIR, 2DIR	Direction Control Inputs.
4, 5	6, 7	1A1, 1A2	Data Inputs/Outputs.
6, 7	8, 9	2A1, 2A2	Data Inputs/Outputs.
8, 9	10, 11	GND	Ground.
11, 10	13, 12	2B1, 2B2	Data Inputs/Outputs.
13, 12	15, 14	1B1, 1B2	Data Inputs/Outputs.
15, 14	1, 16	1$\overline{OE}$, 2$\overline{OE}$	Output Enable Inputs (Active Low).
16	2	V_{CCB}	Supply Voltage V_{CCB}. The nBn signals are referenced to V_{CCB}.

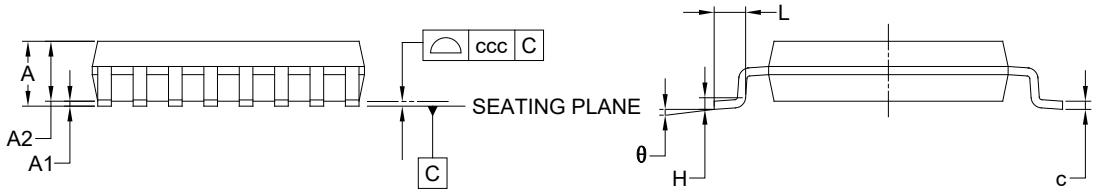
PACKAGE OUTLINE DIMENSIONS

TSSOP-16





RECOMMENDED LAND PATTERN (Unit: mm)

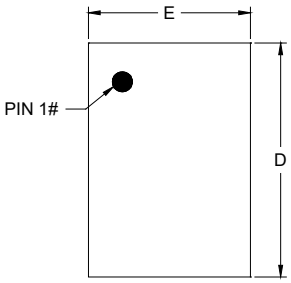


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.200
A1	0.050	-	0.150
A2	0.800	-	1.050
b	0.190	-	0.300
c	0.090	-	0.200
D	4.860	-	5.100
E	4.300	-	4.500
E1	6.200	-	6.600
e	0.650 BSC		
L	0.450	-	0.750
H	0.250 TYP		
θ	0°	-	8°
ccc	0.100		

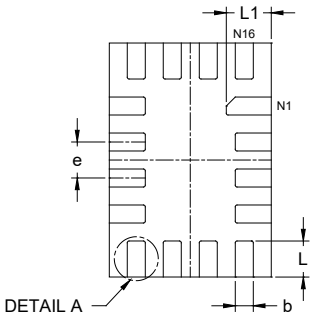
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-153.

PACKAGE OUTLINE DIMENSIONS

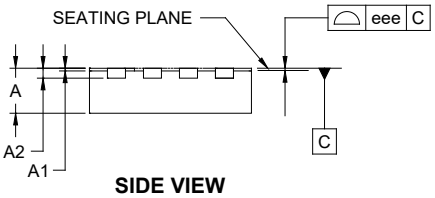
UTQFN-2.6×1.8-16L



TOP VIEW



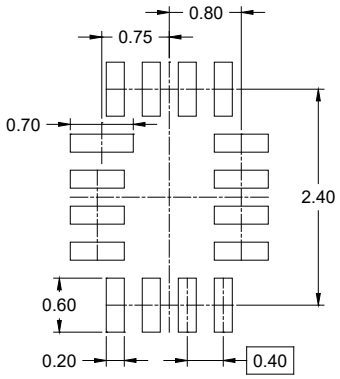
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL CONSTRUCTION



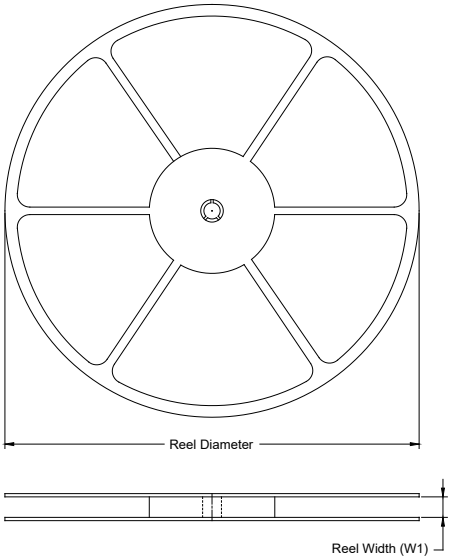
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.450	-	0.550
A1	-0.004	-	0.050
A2	0.110 REF		
b	0.150	-	0.250
D	2.500	-	2.700
E	1.700	-	1.900
e	0.400 BSC		
L	0.300	-	0.500
L1	0.400	-	0.600
eee	0.050		

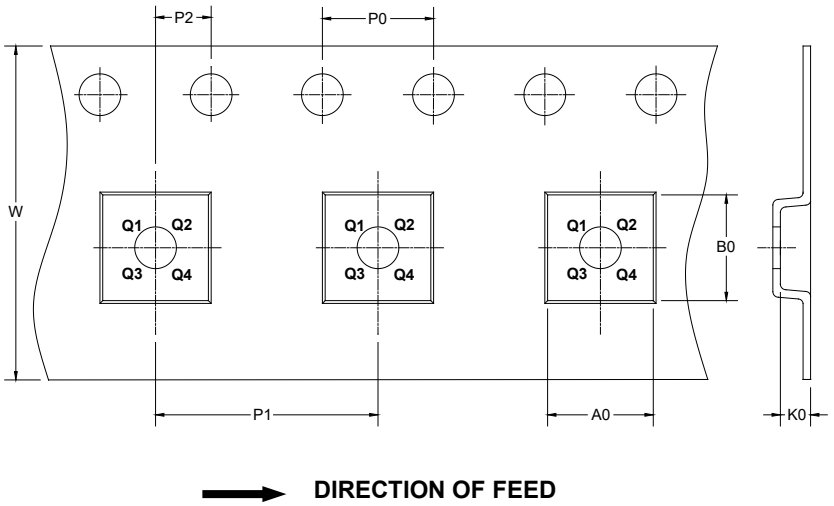
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



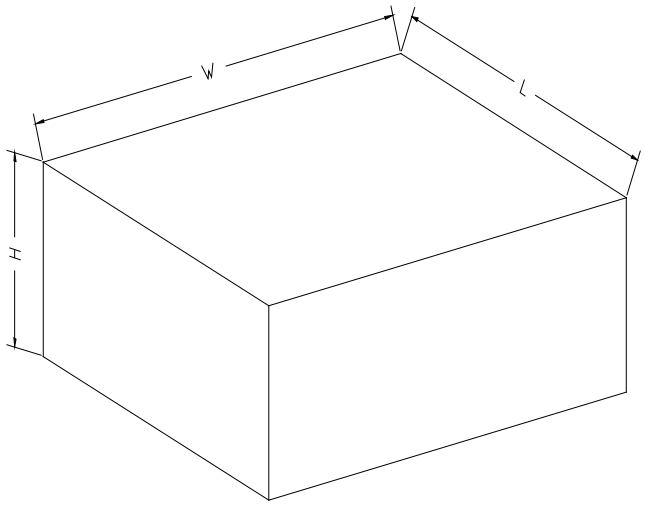
NOTE: The picture is only for reference. Please make the object as the standard.

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
TSSOP-16	13″	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1
UTQFN-2.6×1.8-16L (74AVC4T245XUSY16G/TR)	7"	9.5	2.10	2.90	0.75	4.0	4.0	2.0	8.0	Q1
UTQFN-2.6×1.8-16L (74AVC4T245XUSY16SG/TR)	7"	12.4	2.10	2.90	0.75	4.0	4.0	2.0	12.0	Q1

DD0001

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
7″ (Option)	368	227	224	8
7″	442	410	224	18
13″	386	280	370	5

DD0002