Dual-Bit Dual-Supply Bus Transceiver with Configurable Voltage-Level Shifting and 3-State Outputs with Independent Direction Control Inputs

1 FEATURES

- **Each Channel Has an Independent DIR Control Input**
- **Control Inputs V_{IH}/V_{IL} Levels are Referenced to V_{CCA} Voltage**
- **Power-Supply Range: V_{CCA} and V_{CCB}: 0.9V to 3.6V**
- **V_{CC} Isolation Feature: If Either V_{CC} Input is Below 100 mV, all I/Os Outputs are Disabled and Become High Impedance**
- **I_{OFF}: Supports Partial-Power-Down Mode Operation**
- **Extended Temperature: -40°C to +125°C**

2 APPLICATIONS

- **Desktop PC**
- **Personal electronics**
- **Industrial**
- **Enterprise**

3 DESCRIPTIONS

This dual-bit noninverting bus transceiver uses two separate configurable power-supply rails. The A port is designed to track V_{CCA}. V_{CCA} accepts any supply voltage from 0.9 V to 3.6 V. The B port is designed to track V_{CCB}. V_{CCB} accepts any supply voltage from 0.9 to 3.6 V. This allows for universal low-voltage bi-directional translation between any of the 0.9V, 1.2V, 1.5V, 1.8V, 2.5V, and 3.3V voltage nodes.

The RS2T245 is designed for asynchronous communication between two data buses. The logic levels of the direction-control (DIR) input and the output-enable ($\overline{OE}$) input activate either the B-port outputs or the A-port outputs or place both output ports into the high-impedance mode.

The device transmits data from the A bus to the B bus when the B-port outputs are activated, and from the B bus to the A bus when the A-port outputs are activated. The input circuitry on both A and B ports is always active and must have a logic HIGH or LOW level applied to prevent excess I_{CC} and I_{CCZ}.

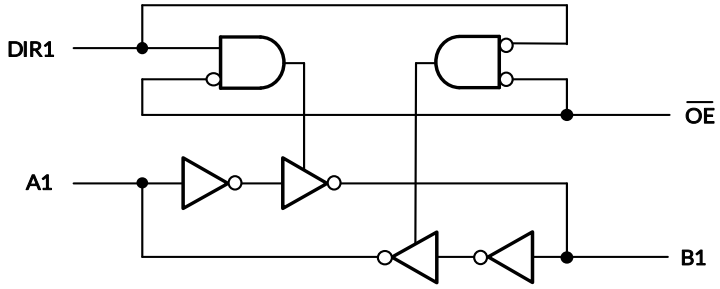
This device is fully specified for partial-power-down applications using I_{OFF}. The I_{OFF} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RS2T245	UQFN1.4X1.8-10	1.40mm×1.80mm

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

4 Functional Block Diagram



Logic Diagram (Positive Logic)

Function Table

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

Table of Contents

5 Revision History

Note: Page numbers for previous revisions may different from page numbers in the current version.

VERSION	Change Date	Change Item
A.1	2023/03/10	Initial version completed
A.1.1	2024/02/23	Modify packaging naming
A.2	2024/04/08	1. Add Package thermal impedance on Page 7@RevA.1.1 2. Update PACKAGE note

6 PACKAGE/ORDERING INFORMATION (1)

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING (2)	MSL(3)	PACKAGE OPTION
RS2T245	RS2T245XUTQK10	-40°C ~+125°C	UQFN1.4X1.8-10	2T245	MSL3	Tape and Reel, 4000

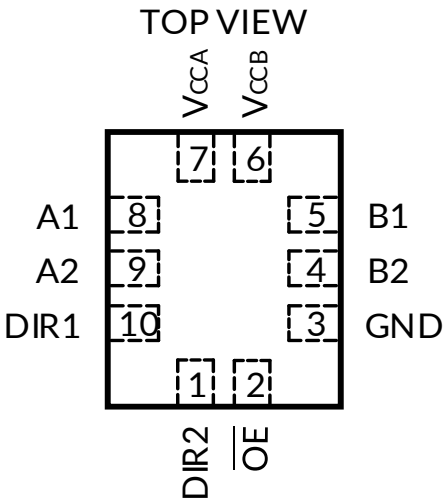
NOTE:

(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



UQFN1.4X1.8-10

PIN DESCRIPTION

PIN	NAME	TYPE (1)	FUNCTION
UQFN1.4X1.8-10			
1	DIR2	I	Direction-control input referenced to V_{CCA}, controls signal flow for the second (A2/B2) I/O channels.
2	$\overline{OE}$	I	3-state output-mode enables. Pull $\overline{OE}$ high to place all outputs in 3-state mode. Referenced to V_{CCA}.
3	GND	G	Ground.
4	B2	I/O	Input/output B2. Reference to V_{CCB}.
5	B1	I/O	Input/output B1. Reference to V_{CCB}.
6	V_{CCB}	P	B-port supply voltage. 0.9V ≤ V_{CCB} ≤ 3.6V
7	V_{CCA}	P	A-port supply voltage. 0.9V ≤ V_{CCA} ≤ 3.6V
8	A1	I/O	Input/output A1. Reference to V_{CCA}.
9	A2	I/O	Input/output A2. Reference to V_{CCA}.
10	DIR1	I	Direction-control input referenced to V_{CCA}, controls signal flow for the first(A1/B1) I/O channels.

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

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	4.6	V
V_{CCB}	Supply Voltage Range		-0.5	4.6	V
V_I(2)	Input Voltage Range	A port	-0.5	4.6	V
		B port	-0.5	4.6	V
		Control inputs	-0.5	4.6	
V_O(2)	Voltage range applied to any output in the high-impedance or power-off state	A port	-0.5	4.6	V
		B port	-0.5	4.6	
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	Vo<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)	UQFN1.4X1.8-10		115	°C/W
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 $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. 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)	±4000	V
		Charged-device model (CDM), per ANSI/ESDA/JEDEC JS-002 (2)	±1500	V
		Machine Model (MM)	±300	V

(1) JEDEC document JEP155 states that 500 V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250 V CDM 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. (1)(2)(3)

PARAMETER		V_{CCI} (1)	V_{CCO} (2)	MIN	TYP	MAX	UNIT
Supply voltage (1)	V_{CCA}			0.9		3.6	V
	V_{CCB}			0.9		3.6	
High-level input Voltage (V_{IH})	Data inputs (4)	0.9V to 1.95V		V_{CCI}x0.75			V
		1.95V to 2.7V		V_{CCI}x0.75			
		2.7V to 3.6V		V_{CCI}x0.75			
Low-level input Voltage (V_{IL})	Data inputs (4)	0.9V to 1.95V				V_{CCI}x0.35	V
		1.95V to 2.7V				V_{CCI}x0.35	
		2.7V to 3.6V				V_{CCI}x0.35	
High-level input Voltage (V_{IH})	Control inputs (referenced to V_{CCA}) (5)	0.9V to 1.95V		V_{CCI}x0.75			V
		1.95V to 2.7V		V_{CCI}x0.75			
		2.7V to 3.6V		V_{CCI}x0.75			
Low-level input Voltage (V_{IL})	Control inputs (referenced to V_{CCA}) (5)	0.9V to 1.95V				V_{CCI}x0.35	V
		1.95V to 2.7V				V_{CCI}x0.35	
		2.7V to 3.6V				V_{CCI}x0.35	
Input voltage (V_I)				0		3.6	V
output voltage (V_O)	Active state			0		V_{CCO}	V
	3-state			0		3.6	V
High-level output current (I_{OH})			0.9V to 1.3V			-3	mA
			1.4V to 1.6V			-6	
			1.65V to 1.95V			-8	
			2.3V to 2.7V			-9	
			3V to 3.6V			-12	
Low-level output current (I_{OL})			0.9V to 1.3V			3	mA
			1.4V to 1.6V			6	
			1.65V to 1.95V			8	
			2.3V to 2.7V			9	
			3V to 3.6V			12	
Input transition rise or fall rate(Δt/Δv)						5	ns/V
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 data inputs of the device must be held at V_{CCI} or GND to ensure proper device operation.
(4) For V_{CCI} values not specified in the data sheet, V_{IH} min = V_{CCI} × 0.75 V, V_{IL} max = V_{CCI} × 0.35 V.
(5) For V_{CCA} values not specified in the data sheet, V_{IH} min = V_{CCA} × 0.75 V, V_{IL} max = V_{CCA} × 0.35 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} = −100μA V_I=V_{IH}	0.9V to 3.6V	0.9V to 3.6V	Full	V_{CCO} - 0.2			V
		I_{OH} = −3mA V_I=V_{IH}	1.2V	1.2V		0.95			
		I_{OH} = −6mA V_I=V_{IH}	1.4V	1.4V		1.05			
		I_{OH} = −8mA V_I=V_{IH}	1.65V	1.65V		1.2			
		I_{OH} = −9mA V_I=V_{IH}	2.3V	2.3V		1.75			
		I_{OH} = −12mA V_I=V_{IH}	3V	3V		2.3			
V_{OL}		I_{OL} = 100μA V_I=V_{IL}	0.9V to 3.6V	0.9V to 3.6V				0.2	V
		I_{OL} = 3mA V_I=V_{IL}	1.2V	1.2V				0.25	
		I_{OL} = 6mA V_I=V_{IL}	1.4V	1.4V				0.35	
		I_{OL} = 8mA V_I=V_{IL}	1.65V	1.65V				0.45	
		I_{OL} = 9mA V_I=V_{IL}	2.3V	2.3V				0.55	
		I_{OL} = 12mA V_I=V_{IL}	3V	3V				0.7	
I_I	DIR	V_I = V_{CCA} or GND	0.9V to 3.6V	0.9V to 3.6V	+25°C			±1	μA
					Full			±5	
I_{off}	A or B Port	V_I or V_O= 0 to 3.6V	0V	0V to 3.6V	+25°C			±1	μA
			0V to 3.6V	0V	Full			±5	
I_{OZ} (5)	A or B Port	V_O=V_{CCO} or GND V_{IH}=V_{CCI} or GND $\overline{OE}$=V_{IH}	3.6V	3.6V	+25°C			±1	μA
					Full			±2	
I_{CCA}	V_{CCA} supply current	V_I = V_{CCI} or GND (6) I_O = 0	0.9V to 3.6V	0.9V to 3.6V	Full			15	μA
			0V	0V to 3.6V	Full	-2			
			0V to 3.6V	0V	Full			15	
I_{CCB}	V_{CCB} supply current	V_I = V_{CCI} or GND (6) I_O = 0	0.9V to 3.6V	0.9V to 3.6V	Full			15	μA
			0V	0V to 3.6V	Full			15	
			0V to 3.6V	0V	Full	-2			
I_{CCA} + I_{CCB}	Combined supply current	V_I = V_{CCI} or GND I_O = 0	0.9V to 3.6V	0.9V to 3.6V	Full			30	μA
C_I	Control inputs	V_I = V_{CCA} or GND	3.3V	3.3V	+25°C		2.5		pF
C_{IO}	A or B Port	V_O = V_{CCA} or GND	3.3V	3.3V	+25°C		5		pF

(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}=0.9V±0.1 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.6	23.9	5.9	18.6	5.5	17.0	5.2	16.5	5.0	15.9	5.0	15.9	ns
t_{PHL}			5.9	18.9	4.9	16.1	4.8	15.5	4.6	15.3	4.8	15.2	4.8	15.0	
t_{PLH}	Bn	An	7.7	24.5	6.8	21.3	6.2	21.2	6.3	19.5	6.1	19.1	6.4	20.1	ns
t_{PHL}			5.9	19.2	5.2	16.5	4.9	16.1	4.7	16.1	4.5	14.9	4.4	14.3	
t_{PZH}	$\overline{OE}$	An	10.2	60.0	7.6	39.3	6.4	42.8	6.0	32.6	5.6	28.1	7.4	27.8	ns
t_{PZL}			9.1	30.2	8.2	27.8	7.8	26.3	7.8	25.4	7.7	25.2	7.5	24.0	
t_{PZH}	$\overline{OE}$	Bn	10.1	44.3	10.7	44.7	10.7	48.9	10.1	56.3	10.7	47.4	12.6	52.4	ns
t_{PZL}			7.3	30.2	6.6	30.9	6.5	30.2	5.8	29.3	6.4	27.5	6.9	30.8	
t_{PHZ}	$\overline{OE}$	An	6.4	31.2	5.8	25.2	5.2	24.5	5.6	22.1	5.4	19.2	7.1	24.3	ns
t_{PLZ}			7.2	29.1	5.7	24.6	4.9	22.2	4.9	23.3	4.8	20.4	6.4	23.6	
t_{PHZ}	$\overline{OE}$	Bn	6.0	28.5	5.5	26.1	5.6	30.2	5.7	28.8	5.6	28.4	5.5	27.9	ns
t_{PLZ}			9.2	31.5	9.4	31.8	9.4	31.4	9.2	31.4	9.6	32.4	9.8	32.4	

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

8.5.2 V_{CCA}=1.2V±0.1 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.8	21.5	5.1	16.7	4.5	14.1	4.1	13.7	4.1	12.6	4.0	12.6	ns
t_{PHL}			5.0	17.0	4.1	14.3	3.9	12.9	3.8	12.5	3.8	11.7	3.6	12	
t_{PLH}	Bn	An	6.1	18.9	5.0	17.0	4.7	16.2	4.5	15.5	4.0	15.2	4.0	15	ns
t_{PHL}			5.1	16.2	4.2	14.4	4.0	14.3	3.7	13.1	3.6	12.3	3.6	11.6	
t_{PZH}	$\overline{OE}$	An	10.2	42.0	7.4	29.1	6.2	31.2	5.6	23.9	5.4	21.5	5.1	20.0	ns
t_{PZL}			7.1	25.5	6.0	22.4	5.7	21.0	5.3	19.7	5.2	18.6	5.1	17.9	
t_{PZH}	$\overline{OE}$	Bn	7.3	29.3	7.2	29.0	7.3	29.7	7.1	29.3	7.1	27.8	7.5	27.5	ns
t_{PZL}			5.1	23.3	5.0	22.1	4.9	21.2	4.5	23.1	5.0	20.6	5.0	20.6	
t_{PHZ}	$\overline{OE}$	An	5.4	27.6	5.4	24.5	4.2	22.7	5.3	21.2	4.7	17.4	5.7	22.8	ns
t_{PLZ}			5.9	25.8	4.8	22.5	4.2	17.7	4.9	20.1	4.3	17.1	5.4	20.4	
t_{PHZ}	$\overline{OE}$	Bn	4.8	23.3	4.6	20.0	5.1	21.0	5.1	21.3	4.6	22.5	4.8	22.8	ns
t_{PLZ}			6.1	21.9	5.9	21.8	6.0	22.8	6.0	21.9	5.9	22.8	5.8	22.5	

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

8.5.3 V_{CCA}=1.5V±0.1 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.5	21.0	4.6	16.1	4.0	13.7	3.9	12.8	3.6	11.9	3.5	11.1	ns
t_{PHL}			4.9	15.9	4.0	13.1	3.5	11.9	3.5	11.7	3.2	11.1	3.3	11.1	
t_{PLH}	Bn	An	5.1	17.0	4.4	14.4	4.0	13.7	3.7	13.5	3.5	12.5	3.5	12.5	ns
t_{PHL}			4.9	15.8	4.1	13.2	3.8	12.6	3.4	12.2	3.4	11.3	3.3	11.0	
t_{PZH}	$\overline{OE}$	An	8.7	49.4	6.2	26.3	5.6	22.7	5.0	18.5	4.8	17.7	4.4	16.5	ns
t_{PZL}			6.4	24.3	5.0	18.9	4.8	18.3	4.4	17.4	4.5	16.8	4.1	15.5	
t_{PZH}	$\overline{OE}$	Bn	5.6	22.4	5.6	21.8	5.7	21.5	5.7	21.9	5.5	22.5	5.6	21.8	ns
t_{PZL}			4.0	19.1	4.3	19.8	4.6	19.2	4.0	17.1	3.9	20.1	4.2	21.2	
t_{PHZ}	$\overline{OE}$	An	6.2	25.8	5.1	24.2	4.1	24.0	5.2	20.1	4.0	16.7	5.1	20.7	ns
t_{PLZ}			5.2	26.7	4.8	19.8	4.1	18.9	4.3	20.1	3.9	16.7	5.3	19.7	
t_{PHZ}	$\overline{OE}$	Bn	3.3	18.0	3.5	17.4	3.4	18.6	3.7	20.1	4.0	17.9	3.9	19.5	ns
t_{PLZ}			5.1	18.9	4.8	18.5	4.9	19.2	4.7	18.2	4.9	18.3	4.8	18.6	

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

8.5.4 V_{CCA}=1.8V±0.15 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.6	20.6	4.6	15.5	4.0	14.0	3.7	12.9	3.5	11.7	3.5	11.3	ns
t_{PHL}			4.5	15.3	3.5	12.5	3.2	11.1	3.1	10.5	3.0	10.2	3.0	9.9	
t_{PLH}	Bn	An	5.3	16.4	4.0	13.2	3.8	12.6	3.7	12.3	3.4	11.7	3.3	11.6	ns
t_{PHL}			4.7	15.3	3.9	12.8	3.7	12.0	3.3	11.3	3.2	10.7	3.2	10.4	
t_{PZH}	$\overline{OE}$	An	9.5	40.4	6.0	26.6	5.2	29.0	4.5	22.8	4.4	15.8	4.0	15.0	ns
t_{PZL}			5.7	21.5	4.5	17.7	4.1	15.9	4.0	15	3.9	14.1	3.5	13.4	
t_{PZH}	$\overline{OE}$	Bn	5.1	17.6	4.8	17.4	5.0	17.3	4.9	18.2	5.0	17.1	4.8	17.1	ns
t_{PZL}			4.6	20.0	4.6	19.1	5.2	20.9	4.9	20.1	5.1	19.7	4.5	19.1	
t_{PHZ}	$\overline{OE}$	An	5.8	27.2	5.6	24.8	4.2	21.5	4.9	23.3	4.4	16.7	5.3	21.6	ns
t_{PLZ}			6.3	27.0	4.5	20.9	4.1	19.1	4.8	20.7	4.0	16.7	5.1	18.9	
t_{PHZ}	$\overline{OE}$	Bn	4.7	21.3	4.7	20.7	5.0	19.8	4.7	21.6	4.4	20.4	4.8	21.6	ns
t_{PLZ}			4.0	15.2	4.1	15.0	3.8	15.2	4.0	14.7	3.7	15.2	3.7	15.0	

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

8.5.5 V_{CCA}=2.5V±0.2 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.3	19.8	4.3	15.5	3.8	13.1	3.4	12.2	3.3	11.1	3.2	11.0	ns
t_{PHL}			4.6	14.9	3.5	11.6	3.3	10.8	3.1	10.2	3.0	9.8	2.8	9.5	
t_{PLH}	Bn	An	4.6	15.0	3.8	12.6	3.5	11.6	3.3	11.3	3.2	10.5	2.9	10.8	ns
t_{PHL}			4.8	15.0	3.8	12.6	3.6	11.7	3.2	10.8	3.1	10.5	3.1	10.1	
t_{PZH}	$\overline{OE}$	An	8.0	37.7	5.1	23.9	4.4	21.0	4.0	15.0	3.8	13.5	3.4	12.3	ns
t_{PZL}			5.4	19.8	3.8	15.5	3.5	14.6	3.2	12.6	3.1	12.2	2.8	10.8	
t_{PZH}	$\overline{OE}$	Bn	4.0	14.3	3.9	14.1	3.9	14.3	3.8	14.3	3.9	14.4	3.9	14.0	ns
t_{PZL}			4.1	15.3	4.1	15.2	4.1	16.5	4.0	16.7	4.3	16.1	4.1	17.9	
t_{PHZ}	$\overline{OE}$	An	6.6	27.5	5.3	25.7	5.0	20.9	5.4	21.5	4.8	18.2	5.8	22.5	ns
t_{PLZ}			5.3	25.5	4.4	22.7	4.0	19.1	4.7	19.7	4.2	16.8	4.8	20.4	
t_{PHZ}	$\overline{OE}$	Bn	3.7	17.3	3.4	17.3	3.6	17.3	4.0	17.0	4.3	17.6	3.6	16.1	ns
t_{PLZ}			3.3	12.5	3.3	12.5	3.1	12.3	3.1	12.5	3.2	12.3	2.5	11.7	

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

8.5.6 V_{CCA}=3.3V±0.3 V

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CCB}=0.9V ±0.1V (1)		V_{CCB}=1.2V ±0.1V (1)		V_{CCB}=1.5V ±0.1V (1)		V_{CCB}=1.8V ±0.15V (1)		V_{CCB}=2.5V ±0.2V (1)		V_{CCB}=3.3V ±0.3V (1)		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	An	Bn	6.3	19.8	4.1	15.2	3.7	13.1	3.4	11.9	3.1	11.0	3.1	10.2	ns
t_{PHL}			4.3	14.0	3.5	11.3	3.2	10.5	3.1	9.8	2.9	9.3	2.9	9.2	
t_{PLH}	Bn	An	4.9	15.6	3.8	12.2	3.5	11.1	3.3	10.7	3.1	10.1	2.9	9.9	ns
t_{PHL}			4.8	15.8	3.8	12.5	3.5	11.7	3.3	10.8	3.0	10.2	3.0	9.6	
t_{PZH}	$\overline{OE}$	An	7.1	31.8	4.7	20.6	3.6	17.9	3.2	13.2	2.9	11.9	2.7	10.7	ns
t_{PZL}			4.4	18.6	3.0	13.5	2.6	11.1	2.5	10.1	2.3	9.15	1.9	8.4	
t_{PZH}	$\overline{OE}$	Bn	2.6	10.2	2.6	10.1	2.7	10.4	2.8	11.0	2.8	10.8	2.8	10.8	ns
t_{PZL}			5.1	20.9	5.8	20.6	5.3	20.3	5.7	20.3	5.8	20.4	5.8	20.4	
t_{PHZ}	$\overline{OE}$	An	6.9	29.9	5.9	27.2	5.2	22.8	5.4	23.1	4.7	18.5	5.9	21.5	ns
t_{PLZ}			5.1	28.8	4.5	20.6	4.3	18.2	4.8	21	4.2	17.9	5.0	20.1	
t_{PHZ}	$\overline{OE}$	Bn	5.6	21.5	5.5	19.7	5.7	20.4	5.1	20.1	5.0	19.7	5.3	20.6	ns
t_{PLZ}			2.1	8.55	2.0	8.6	2.0	8.6	1.8	8.7	2.0	8.4	2.0	8.6	

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

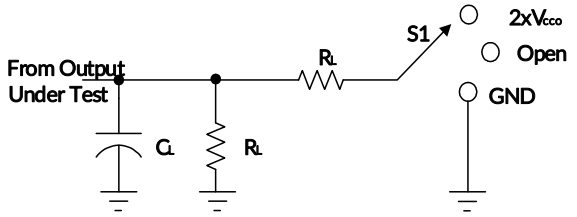
8.6 Operating Characteristics

T_A=25°C

PARAMETER		TEST CONDITIONS	V_{CCA}= V_{CCB}=0.9V	V_{CCA}= V_{CCB}=1.2V	V_{CCA}= V_{CCB}=1.5V	V_{CCA}= V_{CCB}=1.8V	V_{CCA}= V_{CCB}=2.5V	V_{CCA}= V_{CCB}=3.3V	UNIT
			TYP	TYP	TYP	TYP	TYP	TYP	
C_{pdA}(1)	A-port input, B-port output	C_L=0, f=10MHz, t_r=t_f=1ns	2	2	2	3	3	5	pF
	B-port input, A-port output		15	18	22	25	28	32	
C_{pdB}(1)	A-port input, B-port output		15	18	22	25	28	32	
	B-port input, A-port output		2	2	2	3	3	5	

(1) Power dissipation capacitance per transceiver.

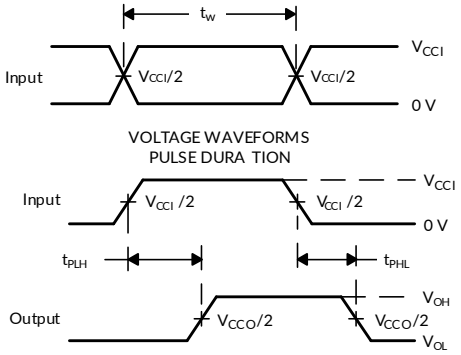
9 Parameter Measurement Information

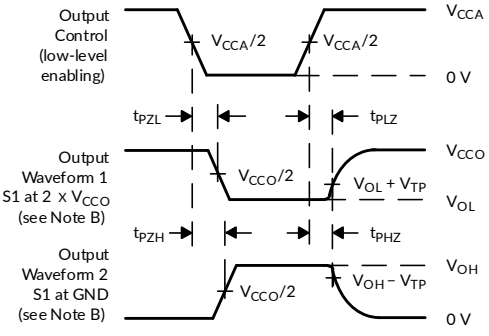


LOAD CIRCUIT

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}
1.2V±0.1V	15pF	2kΩ	0.1V
1.5V±0.1V	15pF	2kΩ	0.1V
1.8V±0.15V	15pF	2kΩ	0.15V
2.5V±0.2V	15pF	2kΩ	0.15V
3.3V±0.3V	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≤10 MHz, Z_O = 50 Ω，dv/dt≥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 1. Load Circuit and Voltage Waveforms

10 Application and Implementation

Information in the following applications sections is not part of the RUNIC component specification, and RUNIC does not warrant its accuracy or completeness. RUNIC's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

10.1 Application Information

The RS2T245 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 12 mA when device is powered by 3.3 V.

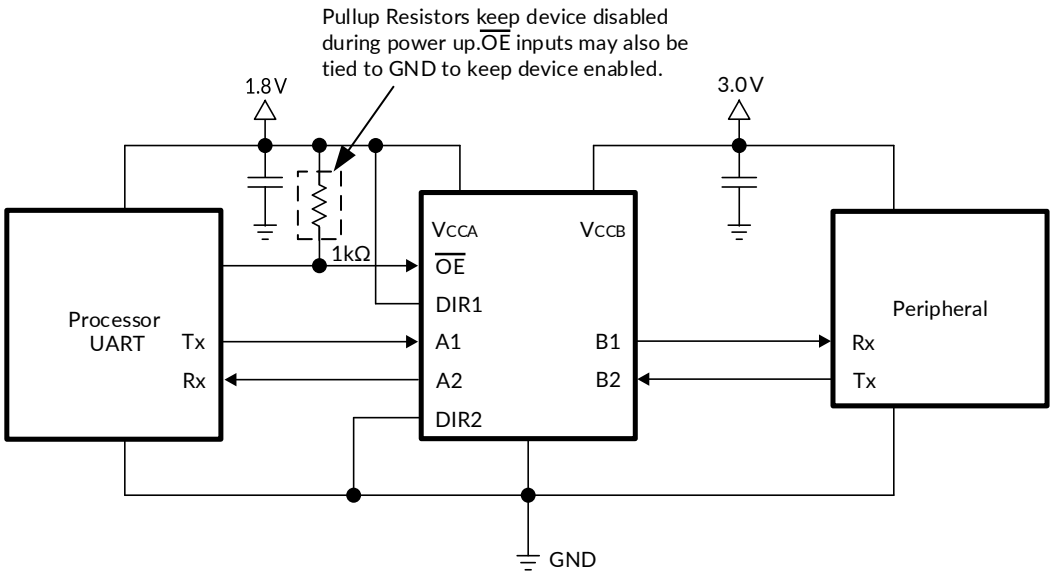


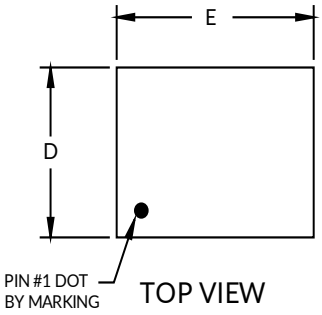
Figure 2. Typical Application Circuit

10.2 Power Supply Recommendations

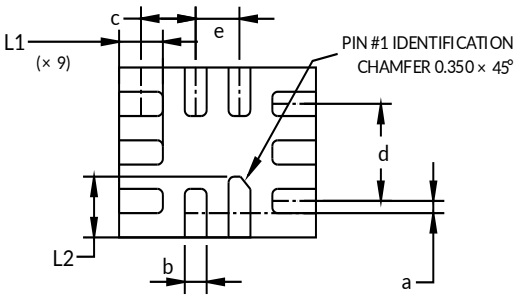
The output-enable $\overline{OE}$ input circuit is designed so that it is supplied by V_{CCA} and when the $\overline{OE}$ input is high, all outputs are placed in the high-impedance state. To ensure the high-impedance state of the outputs during power-up or power-down, the $\overline{OE}$ input pin must be tied to V_{CCA} through a pullup resistor and must not be enabled until V_{CCA} and V_{CCB} are fully ramped and stable. The minimum value of the pullup resistor to V_{CCA} is determined by the current-sinking capability of the driver.

11 PACKAGE OUTLINE DIMENSIONS

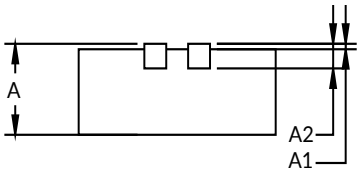
UQFN1.4X1.8-10 (3)



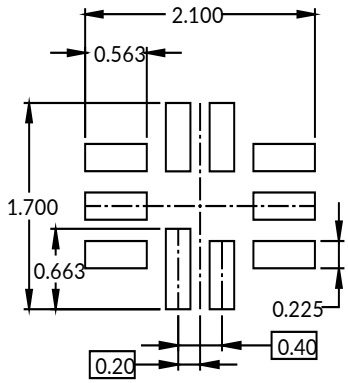
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A2	0.203 REF (2)		0.008 REF (2)	
a	0.050	0.150	0.002	0.006
b	0.150	0.250	0.006	0.010
c	0.450	0.550	0.018	0.022
d	0.800 REF (2)		0.031 REF (2)	
D (1)	1.350	1.450	0.053	0.057
E (1)	1.750	1.850	0.069	0.073
e	0.400 TYP		0.016 TYP	
L1	0.350	0.450	0.014	0.018
L2	0.450	0.550	0.018	0.022

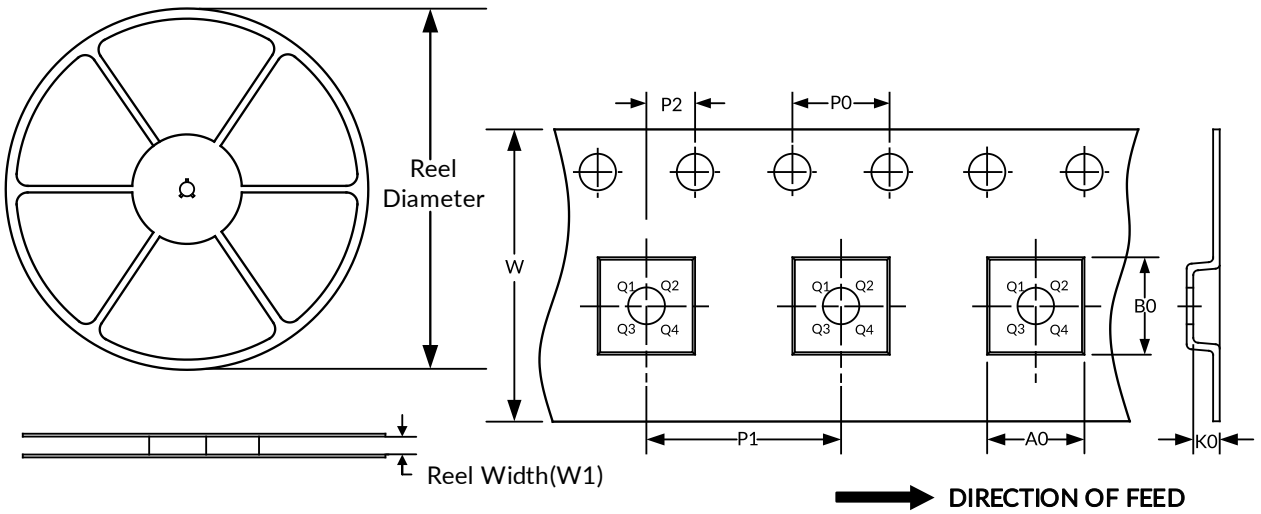
NOTE:

1. Plastic or metal protrusions of 0.075mm maximum per side are not included.
2. REF is the abbreviation for Reference.
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
UQFN1.4X1.8-10	7”	9.0	1.6	2.00	0.85	4.0	4.0	2.0	8.0	Q1

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

IMPORTANT NOTICE AND DISCLAIMER

Jiangsu RUNIC Technology Co., Ltd. will accurately and reliably provide technical and reliability data (including data sheets), design resources (including reference designs), application or other design advice, WEB tools, safety information and other resources, without warranty of any defect, and will not make any express or implied warranty, including but not limited to the warranty of merchantability Implied warranty that it is suitable for a specific purpose or does not infringe the intellectual property rights of any third party.

These resources are intended for skilled developers designing with RUNIC products You will be solely responsible for: (1) Selecting the appropriate products for your application; (2) Designing, validating and testing your application; (3) Ensuring your application meets applicable standards and any other safety, security or other requirements; (4) RUNIC and the RUNIC logo are registered trademarks of RUNIC INCORPORATED. All trademarks are the property of their respective owners; (5) For change details, review the revision history included in any revised document. The resources are subject to change without notice. Our company will not be liable for the use of this product and the infringement of patents or third-party intellectual property rights due to its use.