

TC7WZ245FU, TC7WZ245FK

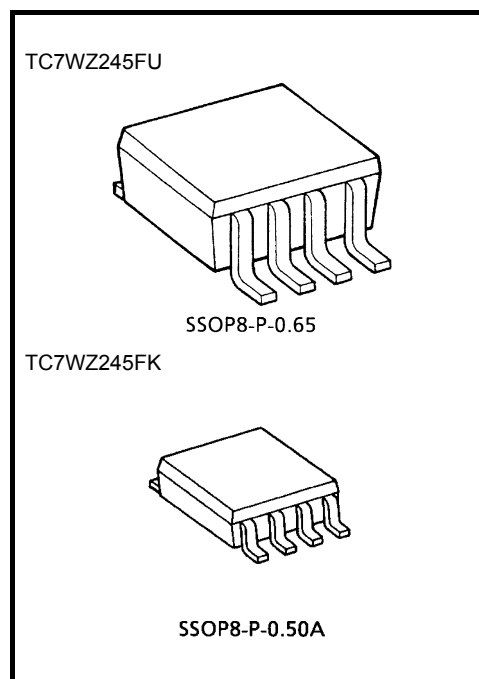
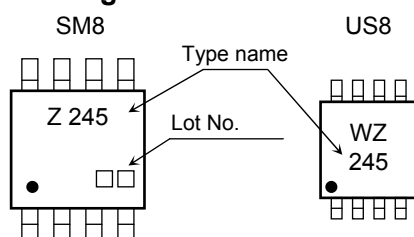
Dual Bus Transceiver

Features

- High output drive : ± 24 mA (min) at $V_{CC} = 3$ V
- Super high speed operation : $t_{pd} = 5.0$ ns(max)
at $V_{CC} = 5$ V, 50 pF
- Operation voltage range : $V_{CC} (opr) = 1.65 \sim 5.5$ V
- 5.5-V tolerant inputs
- 5.5-V power down protection outputs
- Matches the performance of TC74LCX series when operated at 3.3-V V_{CC}

Note : Do not apply a signal to any pins when it is the output mode. Damage may result.
All floating (high impedance) bus pins must have their input levels fixed by means of pull-up or pull-down resistors.

Marking



Weight
SSOP8-P-0.65 : 0.02 g (typ.)
SSOP8-P-0.50A : 0.01 g (typ.)

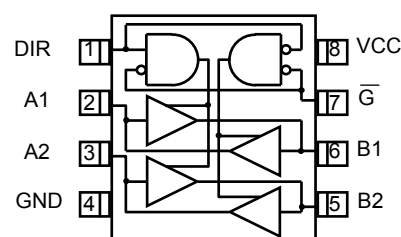
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	$-0.5 \sim 6$	V
DC input voltage	V_{IN}	$-0.5 \sim 6$	V
DC output voltage	V_{OUT}	$-0.5 \sim 6$	V
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	-20	mA
DC output current	I_{OUT}	± 50	mA
DC V_{CC} /ground current	I_{CC}	± 50	mA
Power dissipation	P_D	300 (SM8) 200 (US8)	mW
Storage temperature	T_{stg}	$-65 \sim 150$	$^\circ\text{C}$
Lead temperature (10 s)	T_L	260	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Pin Assignment (top view)



Truth Table

INPUT		FUNCTION		OUTPUT
\overline{G}	DIR	A BUS	B BUS	
L	L	OUTPUT	INPUT	A = B
L	H	INPUT	OUTPUT	B = A
H	X	High Impedance		Z

X : Don't Care

Z : High Impedance

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	1.65~5.5	V
		1.5~5.5 (Note 1)	
Input voltage	V_{IN}	0~5.5	V
Output voltage	V_{OUT}	0~5.5 (Note 2)	V
		0~ V_{CC} (Note 3)	
Operating temperature	T_{opr}	-40~85	°C
Input rise and fall time	dt/dv	0~20 ($V_{CC} = 1.8\text{ V} \pm 0.15\text{ V}$, 2.5 V $\pm 0.2\text{ V}$)	ns/V
		0~10 ($V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$)	
		0~5 ($V_{CC} = 5.5\text{ V} \pm 0.5\text{ V}$)	

Note 1 : Data retention only

Note 2 : $V_{CC} = 0\text{ V}$

Note 3 : High or low state

Electrical Characteristics
DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C				Ta = -40~85°C		Unit	
				V _{CC} (V)	Min	Typ.	Max	Min	Max		
High-Level Input Voltage	V _{IH}	—		1.65~1.95	V _{CC} × 0.75	—	—	V _{CC} × 0.75	—	V	
				2.3~5.5	V _{CC} × 0.7	—	—	V _{CC} × 0.7	—		
Low-Level Input Voltage	V _{IL}	—		1.65~1.95	—	—	V _{CC} × 0.25	—	V _{CC} × 0.25		
				2.3~5.5	—	—	V _{CC} × 0.3	—	V _{CC} × 0.3		
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -100 μA	1.65	1.55	1.65	—	1.55	—	V	
				2.3	2.2	2.3	—	2.2	—		
				3.0	2.9	3.0	—	2.9	—		
				4.5	4.4	4.5	—	4.4	—		
			I _{OH} = -4 mA	1.65	1.29	1.52	—	1.29	—		
				I _{OH} = -8 mA	2.3	1.9	2.14	—	1.9		—
				I _{OH} = -16 mA	3.0	2.4	2.75	—	2.4		—
				I _{OH} = -24 mA	3.0	2.3	2.62	—	2.3		—
				I _{OH} = -32 mA	4.5	3.8	4.13	—	3.8		—
				Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = 100 μA	1.65	—		0
2.3	—	0	0.1					—	0.1		
3.0	—	0	0.1					—	0.1		
4.5	—	0	0.1					—	0.1		
I _{OH} = 4 mA	1.65	—	0.08				0.24	—	0.24		
	I _{OH} = 8 mA	2.3	—				0.1	0.3	—	0.3	
	I _{OH} = 16 mA	3.0	—				0.16	0.4	—	0.4	
	I _{OH} = 24 mA	3.0	—				0.24	0.55	—	0.55	
	I _{OH} = 32 mA	4.5	—				0.25	0.55	—	0.55	
	Input leakage current	I _{IN}	V _{IN} = 5.5 V or GND				0~5.5	—	—	±1	—
3-State Output Off-State Current	I _{OZ}	V _{IN} =V _{IH} or V _{IL} V _{OUT} =V _{CC} or GND	1.65~5.5	—	—	±0.5	—	±5	μA		
Power off leakage current	I _{OFF}	V _{IN} or V _{OUT} = 5.5 V	0.0	—	—	1	—	10	μA		
Quiescent supply current	I _{CC}	V _{IN} = 5.5 V or GND	1.65~5.5	—	—	1	—	10	μA		

AC Characteristics (input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition	Ta = 25°C				Ta = -40~85°C		Unit
			V _{CC} (V)	Min	Typ.	Max	Min	Max	
Propagation delay time	t _{pLH} t _{pHL}	C _L = 15 pF, R _L = 1 MΩ	1.8 ± 0.15	2.0	—	15.0	2.0	16.5	ns
			2.5 ± 0.2	1.0	—	7.5	1.0	8.0	
			3.3 ± 0.3	0.8	—	5.2	1.2	6.0	
			5.0 ± 0.5	0.5	—	4.5	0.8	5.5	
		C _L = 50 pF, R _L = 500 Ω	3.3 ± 0.3	1.5	—	6.7	1.5	7.0	
			5.0 ± 0.5	0.8	—	5.0	0.8	5.3	
3-state output Enable time	t _{pZL} p _{ZH}	C _L = 50 pF, R _L = 500 Ω	1.8 ± 0.15	2.0	—	20.0	2.0	22.0	ns
			2.5 ± 0.2	1.8	—	10.5	1.8	11.2	
			3.3 ± 0.3	1.5	—	8.1	1.5	8.5	
			5.0 ± 0.5	0.8	—	5.5	0.8	5.8	
3-state output Disable time	t _{pLZ} t _{pHZ}	C _L = 50 pF, R _L = 500 Ω	1.8 ± 0.15	2.5	—	17.0	2.5	18.8	ns
			2.5 ± 0.2	1.5	—	8.6	1.5	9.1	
			3.3 ± 0.3	1.5	—	7.1	1.5	7.5	
			5.0 ± 0.5	0.3	—	4.7	0.3	5.0	
Output to output skew	t _{osLH}	(Note 4)	3.3 ± 0.3	—	—	1.0	—	1.0	ns
	t _{osHL}		5.0 ± 0.5	—	—	0.8	—	0.8	
Input capacitance	C _{IN}	DIR,DE	0	—	7	—	—	—	pF
Bus input capacitance	C _{I / O}	An,Bn	5.5	—	8	—	—	—	pF
Power dissipation capacitance	C _{PD}	(Note 5)	3.3	—	29	—	—	—	pF
			5.5	—	33	—	—	—	

Note 4 :Parameter guaranteed by design. $t_{osLH} = |t_{pLHm} - t_{pLHn}|$, $t_{osHL} = |t_{pHLm} - t_{pHLn}|$

Note 5 : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

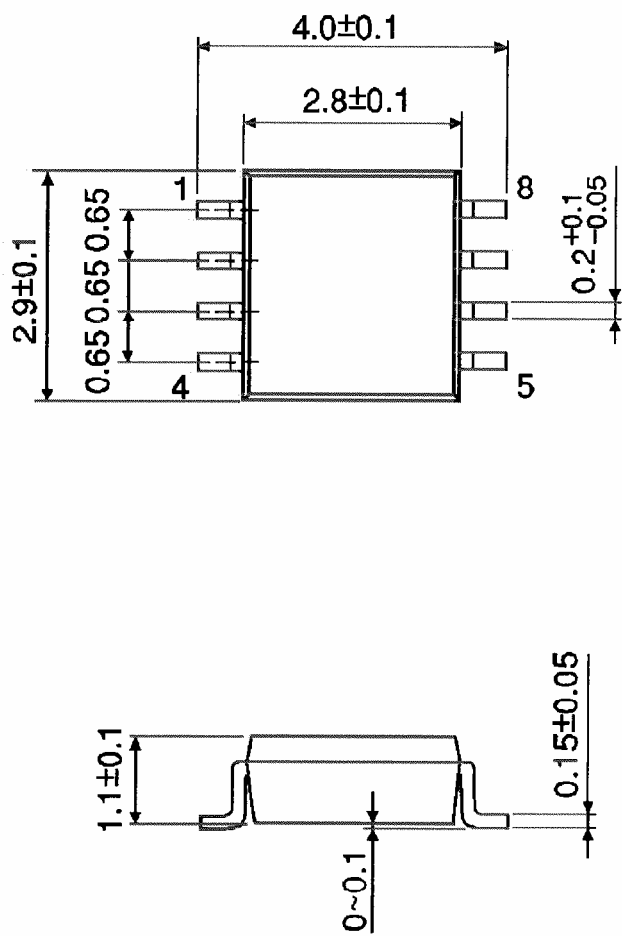
Average operating current can be obtained by the equation:

$$I_{CC}(\text{opr.}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/2$$

Package Dimensions

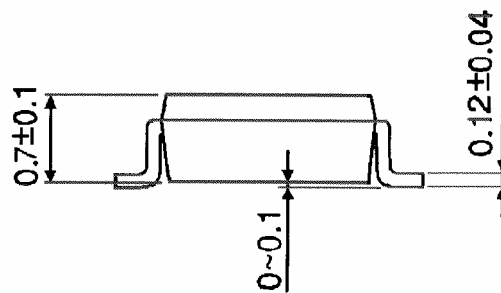
SSOP8-P-0.65

Unit : mm



Weight: 0.02 g (typ.)

SSOP8-P-0.50A



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20070701-EN GENERAL

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