

TC7WZ245FU, TC7WZ245FK

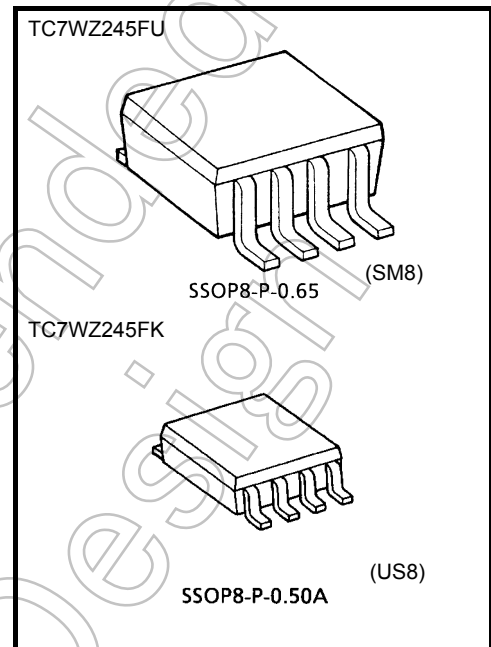
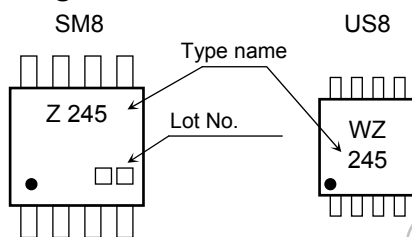
Dual Bus Transceiver

Features

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

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 to 6	V
DC input voltage	V_{IN}	-0.5 to 6	V
DC output voltage	V_{OUT}	-0.5 to 6 (Note 1)	V
		-0.5 to $V_{CC}+0.5$ (Note 2)	
Input diode current	I_{IK}	-20	mA
Output diode current	I_{OK}	-20 (Note 3)	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 to 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.

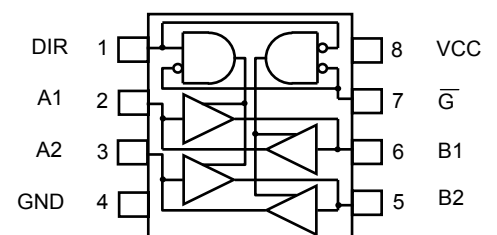
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: $V_{CC} = 0\text{V}$ or High impedance condition

Note 2: High or Low state. Do not exceed I_{OUT} of absolute maximum ratings.

Note 3: $V_{OUT} < \text{GND}$

Pin Assignment (top view)



DIR 1 8 VCC
A1 2 7 $\bar{G}$
A2 3 6 B1
GND 4 5 B2

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 to 5.5	V
		1.5 to 5.5 (Note 4)	
Input voltage	V_{IN}	0 to 5.5	V
Output voltage	V_{OUT}	0 to 5.5 (Note 5)	V
		0 to V_{CC} (Note 6)	
Operating temperature	T_{opr}	-40 to 85	°C
Input rise and fall time	dt/dv	0 to 20 ($V_{CC} = 1.80\text{ V} \pm 0.15\text{ V}$, 2.5 V $\pm 0.2\text{ V}$)	ns/V
		0 to 10 ($V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$)	
		0 to 5 ($V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}$)	

Note 4: Data retention only

 Note 5: $V_{CC} = 0\text{ V}$ or High impedance condition

Note 6: High or low state

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit	
				VCC (V)	Min	Typ.	Max	Min		Max
High-Level Input Voltage	VIH	—		1.65 to 1.95	VCC × 0.75	—	—	VCC × 0.75	—	V
				2.3 to 5.5	VCC × 0.7	—	—	VCC × 0.7	—	
Low-Level Input Voltage	VIL	—		1.65 to 1.95	—	—	VCC × 0.25	—	VCC × 0.25	V
				2.3 to 5.5	—	—	VCC × 0.3	—	VCC × 0.3	
High-level output voltage	VOH	VIN = VIH or VIL	IOH = -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	—	
			IOH = -4 mA	1.65	1.29	1.52	—	1.29	—	
			IOH = -8 mA	2.3	1.9	2.14	—	1.9	—	
			IOH = -16 mA	3.0	2.4	2.75	—	2.4	—	
			IOH = -24 mA	3.0	2.3	2.62	—	2.3	—	
			IOH = -32 mA	4.5	3.8	4.13	—	3.8	—	
Low-level output voltage	VOL	VIN = VIH or VIL	IOH = 100 μA	1.65	—	0	0.1	—	0.1	V
				2.3	—	0	0.1	—	0.1	
				3.0	—	0	0.1	—	0.1	
				4.5	—	0	0.1	—	0.1	
			IOH = 4 mA	1.65	—	0.08	0.24	—	0.24	
			IOH = 8 mA	2.3	—	0.1	0.3	—	0.3	
			IOH = 16 mA	3.0	—	0.16	0.4	—	0.4	
			IOH = 24 mA	3.0	—	0.24	0.55	—	0.55	
			IOH = 32 mA	4.5	—	0.25	0.55	—	0.55	
Input leakage current	IIN	VIN = 5.5 V or GND	0 to 5.5	—	—	±1	—	±10	μA	
3-State Output Off-State Current	IOZ	VIN = VIH or VIL VOUT = VCC or GND	1.65 to 5.5	—	—	±0.5	—	±5	μA	
Power off leakage current	IOFF	VIN or VOUT = 5.5 V	0.0	—	—	1	—	10	μA	
Quiescent supply current	ICC	VIN = 5.5 V or GND	1.65 to 5.5	—	—	1	—	10	μA	

AC Characteristics (unless otherwise specified, Input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition	Ta = 25°C				Ta = -40 to 85°C		Unit
			VCC (V)	Min	Typ.	Max	Min	Max	
Propagation delay time	t _{pLH} t _{pHL}	C _L = 15 pF, R _L = 1 MΩ	1.80 ± 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} t _{pZH}	C _L = 50 pF, R _L = 500 Ω	1.80 ± 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	1.80 ± 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 7)	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 8)	3.3	—	29	—	—	—	pF
			5.5	—	33	—	—	—	

Note 7: Parameter guaranteed by design.

$$t_{osLH} = |t_{pLHm} - t_{pLHn}|, t_{osHL} = |t_{pHLm} - t_{pHLn}|$$

Note 8: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

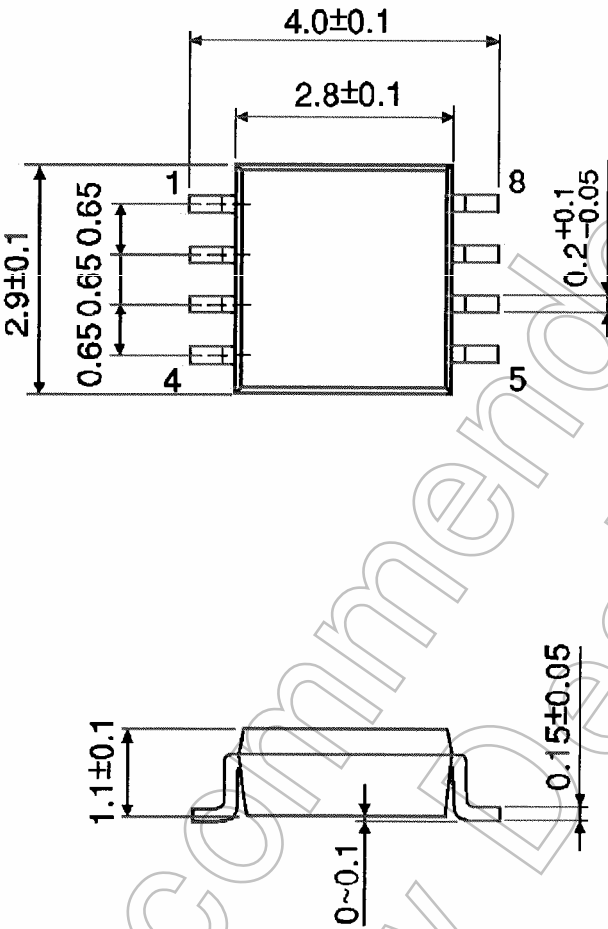
Average operating current can be obtained by the equation:

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

Package Dimensions

SSOP8-P-0.65

Unit : mm

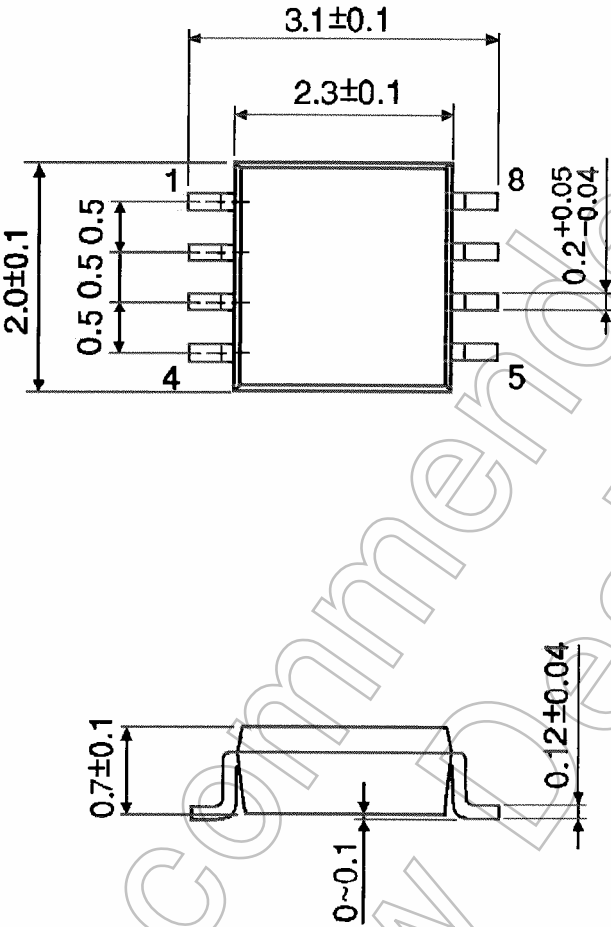


Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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