

# TC7PZ17FU

## 1. Functional Description

- Dual Schmitt Buffer

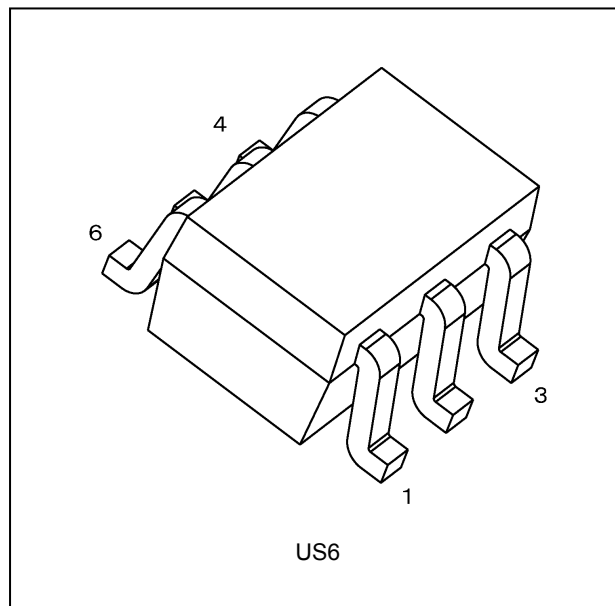
## 2. Features

- (1) AEC-Q100 (Rev. H) (Note 1)
- (2) Wide operating temperature range:  $T_{opr} = -40$  to  $125$  °C (Note 2)
- (3) High output current:  $\pm 24$  mA (min) at  $V_{CC} = 3.0$  V
- (4) Super high speed operation:  $t_{pd} = 3.7$  ns (typ.) at  $V_{CC} = 5.0$  V,  $C_L = 50$  pF
- (5) Operation voltage range:  $V_{CC} = 1.65$  to  $5.5$  V
- (6) 5.5 V tolerant inputs
- (7) 5.5 V power down protection output

Note 1: This device is compliant with the reliability requirements of AEC-Q100. For details, contact your Toshiba sales representative.

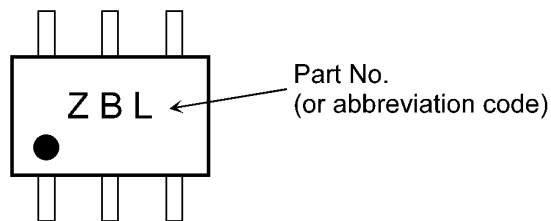
Note 2: For devices with the ordering part number ending in J(CT).  $T_{opr} = -40$  to  $85$  °C for the other devices.

## 3. Packaging

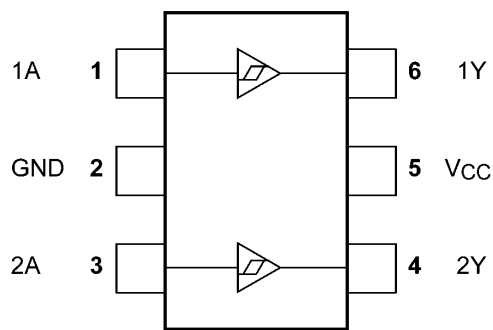


Start of commercial production  
2010-03

### 4. Marking and Pin Assignment

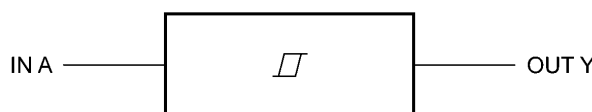


Marking



Pin Assignment (Top view)

### 5. IEC Logic Symbol



### 6. Truth Table

A	Y
L	L
H	H

### 7. Absolute Maximum Ratings (Note) (Unless otherwise specified, T<sub>a</sub> = 25 °C)

Characteristics	Symbol	Note	Rating	Unit
Supply voltage	V <sub>CC</sub>		-0.5 to 6.0	V
Input voltage	V <sub>IN</sub>		-0.5 to 6.0	V
DC output voltage	V <sub>OUT</sub>	(Note 1)	-0.5 to 6.0	V
		(Note 2)	-0.5 to V <sub>CC</sub> + 0.5	
Input diode current	I <sub>IK</sub>		-20	mA
Output diode current	I <sub>OK</sub>	(Note 3)	-20	mA
DC output current	I <sub>OUT</sub>		±50	mA
V <sub>CC</sub> /ground current	I <sub>CC</sub>		±100	mA
Power dissipation	P <sub>D</sub>		200	mW
Storage temperature	T <sub>stg</sub>		-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

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<sub>CC</sub> = 0 V

Note 2: High (H) or Low (L) state. I<sub>OUT</sub> absolute maximum rating must be observed.

Note 3: V<sub>OUT</sub> < GND

## 8. Operating Ranges (Note)

Characteristics	Symbol	Note	Rating	Unit
Supply voltage	V <sub>CC</sub>		1.65 to 5.5	V
		(Note 1)	1.5 to 5.5	
Input voltage	V <sub>IN</sub>		0 to 5.5	V
Output voltage	V <sub>OUT</sub>	(Note 2)	0 to 5.5	V
		(Note 3)	0 to V <sub>CC</sub>	
Operating temperature	T <sub>opr</sub>	(Note 4)	-40 to 125	°C
		(Note 5)	-40 to 85	

Note: The operating ranges must be maintained to ensure the normal operation of the device.

Unused inputs must be tied to either V<sub>CC</sub> or GND.

Note 1: Data retention only

Note 2: V<sub>CC</sub> = 0 V

Note 3: High (H) or Low (L) state.

Note 4: For devices with the ordering part number ending in J(CT).

Note 5: For devices except those with the ordering part number ending in J(CT).

## 9. Electrical Characteristics

### 9.1. DC Characteristics (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	$V_{CC}$ (V)	Min	Typ.	Max	Unit	
Positive threshold voltage	$V_P$	—	1.65	0.6	1.0	1.4	V	
			1.8	0.7	1.1	1.5		
			2.3	1.0	1.4	1.8		
			3.0	1.3	1.75	2.2		
			4.5	1.9	2.45	3.1		
			5.5	2.2	2.9	3.6		
Negative threshold voltage	$V_N$	—	1.65	0.2	0.5	0.8	V	
			1.8	0.25	0.55	0.9		
			2.3	0.4	0.75	1.15		
			3.0	0.6	1.0	1.5		
			4.5	1.0	1.43	2.0		
			5.5	1.2	1.7	2.4		
Hysteresis voltage	$V_H$	—	1.65	0.1	0.48	0.9	V	
			1.8	0.15	0.54	1.0		
			2.3	0.25	0.65	1.1		
			3.0	0.4	0.77	1.2		
			4.5	0.6	1.01	1.5		
			5.5	0.7	1.18	1.7		
High-level output voltage	$V_{OH}$	$V_{IN} = V_P$	$I_{OH} = -100\text{ }\mu\text{A}$	1.65	1.55	1.65	—	V
				1.8	1.7	1.8	—	
				2.3	2.2	2.3	—	
				3.0	2.9	3.0	—	
			4.5	4.4	4.5	—		
			$I_{OH} = -4\text{ mA}$	1.65	1.29	1.52	—	
			$I_{OH} = -8\text{ mA}$	2.3	1.9	2.15	—	
			$I_{OH} = -16\text{ mA}$	3.0	2.4	2.8	—	
			$I_{OH} = -24\text{ mA}$	3.0	2.3	2.68	—	
			$I_{OH} = -32\text{ mA}$	4.5	3.8	4.2	—	
Low-level output voltage	$V_{OL}$	$V_{IN} = V_N$	$I_{OL} = 100\text{ }\mu\text{A}$	1.65	—	0.0	0.1	V
				1.8	—	0.0	0.1	
				2.3	—	0.0	0.1	
				3.0	—	0.0	0.1	
			4.5	—	0.0	0.1		
			$I_{OL} = 4\text{ mA}$	1.65	—	0.08	0.24	
			$I_{OL} = 8\text{ mA}$	2.3	—	0.1	0.3	
			$I_{OL} = 16\text{ mA}$	3.0	—	0.15	0.4	
			$I_{OL} = 24\text{ mA}$	3.0	—	0.22	0.55	
			$I_{OL} = 32\text{ mA}$	4.5	—	0.22	0.55	
Input leakage current	$I_{IN}$	$V_{IN} = 5.5\text{ V or GND}$	0 to 5.5	—	—	$\pm 1$	$\mu\text{A}$	
Power-OFF leakage current	$I_{OFF}$	$V_{IN}\text{ or }V_{OUT} = 5.5\text{ V}$	0	—	—	1	$\mu\text{A}$	
Quiescent supply current	$I_{CC}$	$V_{IN} = 5.5\text{ V or GND}$	1.65 to 5.5	—	—	1	$\mu\text{A}$	

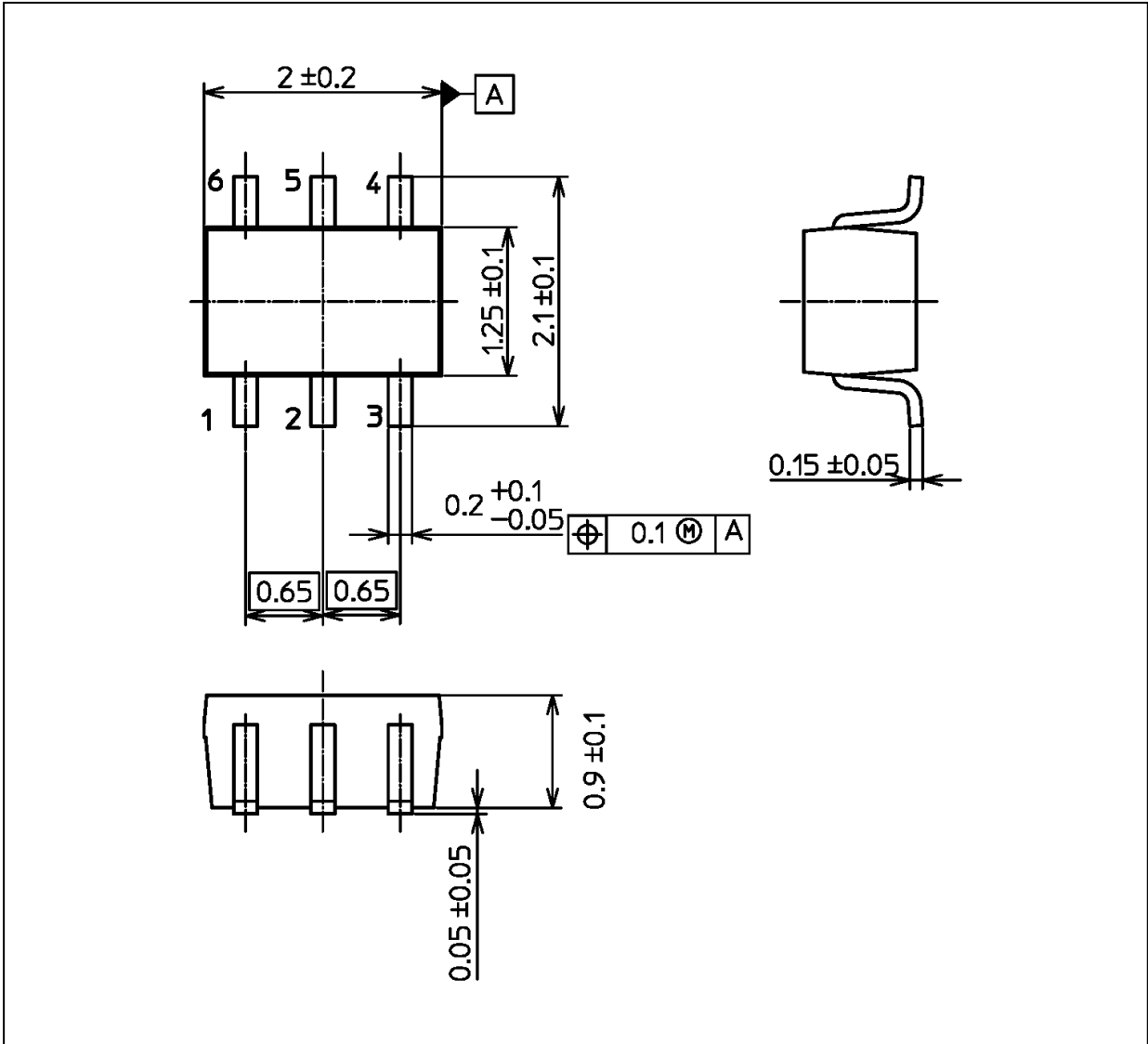






Package Dimensions

Unit: mm



Weight: 0.007 g (typ.)

Package Name(s)
JEDEC: SOT-363
Nickname: US6

