

TC7PA19FU

Chip Select Decoder

Features

Operating voltage range: $V_{CC} = 1.4$ to 3.6 V

High-speed operation: $t_{pd} = 3.3$ ns (max) at $V_{CC} = 3.0$ to 3.6 V

$t_{pd} = 3.9$ ns (max) at $V_{CC} = 2.3$ to 2.7 V

$t_{pd} = 8.0$ ns (max) at $V_{CC} = 1.65$ to 1.95 V

$t_{pd} = 10.0$ ns (max) at $V_{CC} = 1.4$ to 1.6 V

High-level output current:

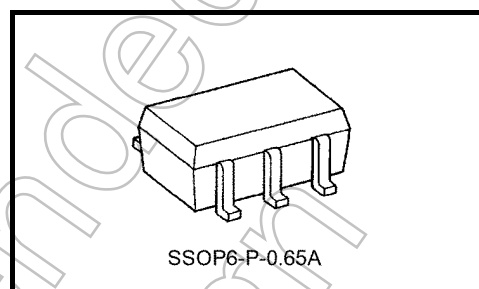
$I_{OH}/I_{OL} = \pm 24$ mA (min) at $V_{CC} = 3.0$ V

$I_{OH}/I_{OL} = \pm 18$ mA (min) at $V_{CC} = 2.3$ V

$I_{OH}/I_{OL} = \pm 4$ mA (min) at $V_{CC} = 1.4$ V

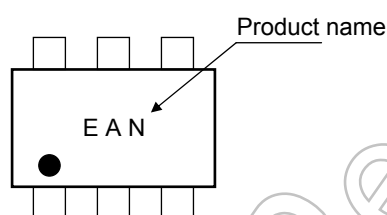
3.6 V tolerant inputs

3.6 V power down protection outputs



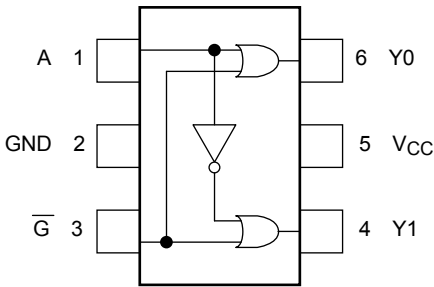
Weight: 0.0068 g (typ.)

Marking



Start of commercial production
2006-05

Pin Assignment (top view)



Truth Table

Inputs		Outputs		Selected Output
Enable	Select	Y0	Y1	
\overline{G}	A			
H	X	H	H	None
L	L	L	H	Y0
L	H	H	L	Y1

X: Don't care

Absolute Maximum Ratings(Ta= 25°C)

Characteristics	Symbol	Rating	Unit
Power supply voltage	V _{CC}	-0.5 to 4.6	V
DC input voltage	V _{IN}	-0.5 to 4.6	V
DC output voltage	V _{OUT}	-0.5 to 4.6 (Note1)	V
		-0.5 to V _{CC} + 0.5 (Note2)	
Input diode current	I _{IK}	-50	mA
Output diode current	I _{OK}	-50 (Note3)	mA
DC output current	I _{OUT}	±50	mA
Power dissipation	PD	200	mW
DC V _{CC} /ground current	I _{CC}	±100	mA
Storage temperature	T _{stg}	-65 to 150	°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).

Note1: V_{CC} = 0 V

Note2: High or Low state. The I_{OUT} absolute maximum rating must be adhered to.

Note3: V_{OUT} < GND

Operating Ranges

Characteristics	Symbol	Rating	Unit
Power supply voltage	V _{CC}	1.4 to 3.6	V
		1.2 to 3.6 (Note4)	
Input voltage	V _{IN}	-0.3 to 3.6	V
Output voltage	V _{OUT}	0 to 3.6 (Note5)	V
		0 to V _{CC} (Note6)	
Output Current	I _{OH} /I _{OL}	±24 (Note7)	mA
		±18 (Note8)	
		±4 (Note9)	
Operating temperature	T _{opr}	-40 to 85	°C
Input rise and fall time	dt/dv	0 to 10 (Note10)	ns/V

Note4: Data retention only

Note5: V_{CC} = 0 V

Note6: High or Low state

Note7: V_{CC} = 3.0 to 3.6 V

Note8: V_{CC} = 2.3 to 2.7 V

Note9: V_{CC} = 1.4 to 1.9 V

Note10: V_{IN} = 0.8 to 2.0 V, V_{CC} = 3.0 V

DC Electrical Characteristics ($T_a = -40$ to 85°C , $2.7\text{ V} < V_{CC} \leq 3.6\text{ V}$)

Characteristics	Symbol	Test Condition		Min	Max	Unit
High-Level Input Voltage	V_{IH}	—	V_{CC} (V) 2.7 to 3.6	2.0	—	V
Low-Level Input Voltage	V_{IL}	—	2.7 to 3.6	—	0.8	
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -100\text{ }\mu\text{A}$ 2.7 to 3.6	$V_{CC} - 0.2$	—	V
			$I_{OH} = -12\text{ mA}$ 2.7	2.2	—	
			$I_{OH} = -18\text{ mA}$ 3.0	2.4	—	
			$I_{OH} = -24\text{ mA}$ 3.0	2.2	—	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 100\text{ }\mu\text{A}$ 2.7 to 3.6	—	0.2	V
			$I_{OL} = 12\text{ mA}$ 2.7	—	0.4	
			$I_{OL} = 18\text{ mA}$ 3.0	—	0.4	
			$I_{OL} = 24\text{ mA}$ 3.0	—	0.55	
Input Leakage Current	I_{IN}	$V_{IN} = 0$ to 3.6 V	2.7 to 3.6	—	± 10.0	μA
Power-off Leakage Current	I_{OFF}	V_{IN} or $V_{OUT} = 0$ to 3.6 V	0	—	10.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	2.7 to 3.6	—	20.0	μA
		$V_{CC} \leq V_{IN} \leq 3.6\text{ V}$	2.7 to 3.6	—	± 20.0	
Increase in I_{CC} per Input	ΔI_{CC}	$V_{IH} = V_{CC} - 0.6\text{ V}$	2.7 to 3.6	—	750	

DC Electrical Characteristics ($T_a = -40$ to 85°C , $2.3\text{ V} \leq V_{CC} \leq 2.7\text{ V}$)

Characteristics	Symbol	Test Condition		Min	Max	Unit
High-Level Input Voltage	V_{IH}	—	V_{CC} (V) 2.3 to 2.7	1.6	—	V
Low-Level Input Voltage	V_{IL}	—	2.3 to 2.7	—	0.7	
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -100\text{ }\mu\text{A}$ 2.3 to 2.7	$V_{CC} - 0.2$	—	V
			$I_{OH} = -6\text{ mA}$ 2.3	2.0	—	
			$I_{OH} = -12\text{ mA}$ 2.3	1.8	—	
			$I_{OH} = -18\text{ mA}$ 2.3	1.7	—	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 100\text{ }\mu\text{A}$ 2.3 to 2.7	—	0.2	V
			$I_{OL} = 12\text{ mA}$ 2.3	—	0.4	
			$I_{OL} = 18\text{ mA}$ 2.3	—	0.6	
Input Leakage Current	I_{IN}	$V_{IN} = 0$ to 3.6 V	2.3 to 2.7	—	± 10.0	μA
Power-off Leakage Current	I_{OFF}	V_{IN} or $V_{OUT} = 0$ to 3.6 V	0	—	10.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	2.3 to 2.7	—	20.0	μA
		$V_{CC} \leq V_{IN} \leq 3.6\text{ V}$	2.3 to 2.7	—	± 20.0	

DC Electrical Characteristics (Ta = -40 to 85°C, 1.4 V ≤ VCC < 2.3 V)

Characteristics	Symbol	Test Condition		Min	Max	Unit	
				V _{CC} (V)			
High-Level Input Voltage	V _{IH}	—		1.4 to 2.3	V _{CC} × 0.7	V	
Low-Level Input Voltage	V _{IL}	—		1.4 to 2.3	—		V _{CC} × 0.13
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -100 μA	1.4	V _{CC} - 0.2	V	
			I _{OH} = -4 mA	1.4	1.0		—
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 100 μA	1.4	—	V	
			I _{OL} = 4 mA	1.4	—		0.3
Input Leakage Current	I _{IN}	V _{IN} = 0 to 3.6 V		1.4	—	±10.0	μA
Power-off Leakage Current	I _{OFF}	V _{IN} or V _{OUT} = 0 to 3.6 V		0	—	10.0	μA
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND		1.4	—	20.0	μA
		V _{CC} ≤ V _{IN} ≤ 3.6 V		1.4	—	±20.0	

AC Electrical Characteristics (Ta = -40 to 85°C, input t_r = t_f = 2.0 ns)

Characteristics	Symbol	Test Condition			Min	Max	Unit
				V _{CC} (V)			
Propagation delay time (A or \overline{G} – Y0 or Y1)	t _{pLH}	(Figure 1 and 2)	C _L =15pF, R _L =1MΩ	1.5 ± 0.1	1.8	10.0	ns
				1.8 ± 0.15	1.5	8.0	
				2.5 ± 0.2	0.8	3.9	
				3.3 ± 0.3	0.6	3.3	
	t _{pHL}	(Figure 1 and 2)	C _L =30pF, R _L =500Ω	1.5 ± 0.1	2.0	13.0	ns
				1.8 ± 0.15	1.8	9.5	
				2.5 ± 0.2	1.2	5.0	
				3.3 ± 0.3	1.0	4.0	

For C_L = 50 pF, add approximately 300 ps to the AC maximum specification.

Capacitive Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition		TYP.	Unit
				VCC (V)	
Input Capacitance	C _{IN}	—	1.8, 2.5, 3.3	6	pF
Power Dissipation Capacitance	C _{PD}	f _{IN} = 10 MHz (Note 11)	1.8, 2.5, 3.3	20	pF

Note 11: 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:

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

AC test circuit

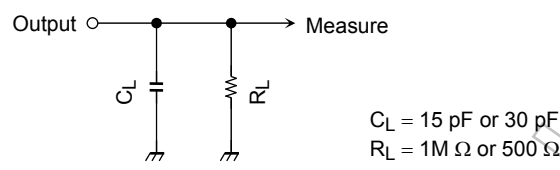
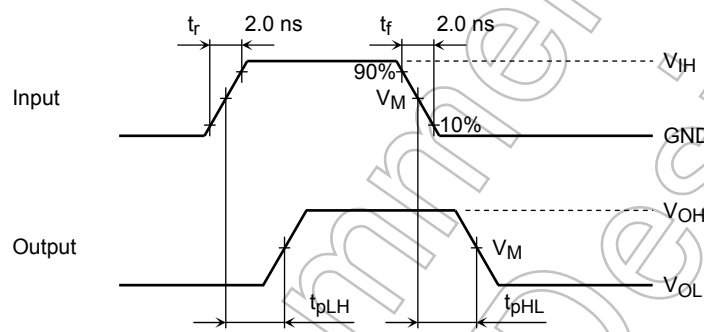


Figure 1

AC wave forms



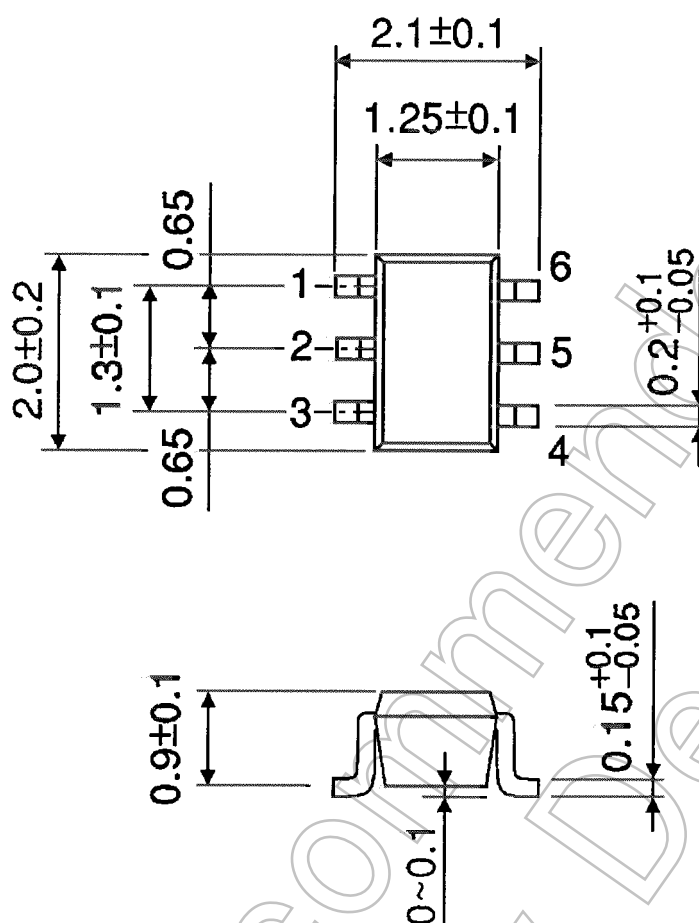
Symbol	V_{CC}			
	$3.3 \pm 0.3 \text{ V}$	$2.5 \pm 0.2 \text{ V}$	$1.8 \pm 0.15 \text{ V}$	$1.5 \pm 0.1 \text{ V}$
V_{IH}	2.7 V	V_{CC}	V_{CC}	V_{CC}
V_M	1.5 V	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$

Figure 2 t_{pLH} , t_{pHL}

Package Dimensions

SSOP6-P-0.65A

Unit: mm



Weight: 0.0068 g (typ.)

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