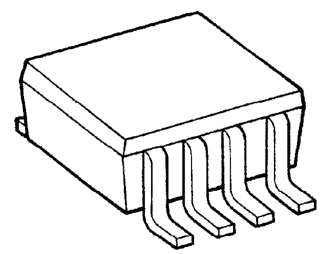
TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7W241FU

NON-INVERTED, 3-STATE OUTPUTS

The TC7W241FU is a high speed C^2MOS DUAL BUS BUFFERS fabricated with silicon gate C^2MOS technology.
It achieve the high speed operation similar to equivalent LSTTL while maintaining the C^2MOS low power dissipation.
It is a non-inverting 3-state buffer has one active-high and one active-low output enable.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.



SSOP8-P-0.65

Weight : 0.02g (Typ.)

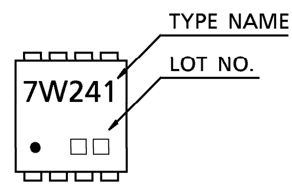
FEATURES

- High Speed ························ t_{pd} = 10ns (Typ.) at V_{CC} = 5V
- Low Power Dissipation ··········· I_{CC} = 2μA (Max.) at Ta = 25°C
- High Noise Immunity ·············· $V_{NIH} = V_{NIL}$ = 28% V_{CC} (Min.)
- Output Drive Capability ··········· 15 LSTTL Loads
- Symmetrical Output Impedance··· $|I_{OH}| = I_{OL}$ = 6mA (Min.)
- Balanced Propagation Delays ······ $t_{pLH} \fallingdotseq t_{pHL}$
- Wide Operating Voltage Range··· $V_{CC\,(opr)}$ = 2~6V

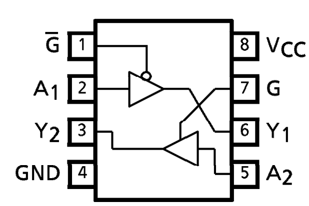
MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	−0.5~7	V
DC Input Voltage	V_{IN}	−0.5~V_{CC}+0.5	V
DC Output Voltage	V_{OUT}	−0.5~V_{CC}+0.5	V
Input Diode Current	I_{IK}	±20	mA
Output Diode Current	I_{OK}	±20	mA
DC Output Current	I_{OUT}	±35	mA
DC V_{CC}/Ground Current	I_{CC}	±37.5	mA
Power Dissipation	P_D	300	mW
Storage Temperature	T_{stg}	−65~150	°C
Lead Temperature (10s)	T_L	260	°C

MARKING



PIN ASSIGNMENT (TOP VIEW)



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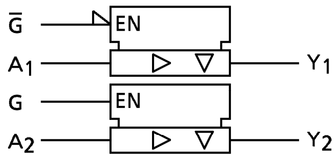
LOGIC DIAGRAM



TRUTH TABLE

INPUT			OUTPUT
$\overline{G}$	G	A	Y
L	H	L	L
L	H	H	H
H	L	X	Z

X : Don't Care
Z : High Impedance

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2~6	V
Input Voltage	V_{IN}	0~V_{CC}	V
Output Voltage	V_{OUT}	0~V_{CC}	V
Operating Temperature	T_{opr}	−40~85	°C
Input Rise and Fall Time	t_r, t_f	0~1000 (V_{CC} = 2.0V) 0~ 500 (V_{CC} = 4.5V) 0~ 400 (V_{CC} = 6.0V)	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CIRCUIT	TEST CONDITION		V_{CC}	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
High-Level Input Voltage	V_{IH}	—	—		2.0	1.5	—	—	1.5	—	V
					4.5	3.15	—	—	3.15	—	
					6.0	4.2	—	—	4.2	—	
Low-Level Input Voltage	V_{IL}	—	—		2.0	—	—	0.5	—	0.5	V
					4.5	—	—	1.35	—	1.35	
					6.0	—	—	1.8	—	1.8	
High-Level Output Voltage	V_{OH}	—	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20μA	2.0	1.9	2.0	—	1.9	—	V
					4.5	4.4	4.5	—	4.4	—	
					6.0	5.9	6.0	—	5.9	—	
				I_{OH} = −6mA	4.5	4.18	4.31	—	4.13	—	
				I_{OH} = −7.8mA	6.0	5.68	5.80	—	5.63	—	
Low-Level Output Voltage	V_{OL}	—	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20μA	2.0	—	0.0	0.1	—	0.1	V
					4.5	—	0.0	0.1	—	0.1	
					6.0	—	0.0	0.1	—	0.1	
				I_{OL} = 6mA	4.5	—	0.17	0.26	—	0.33	
				I_{OL} = 7.8mA	6.0	—	0.18	0.26	—	0.33	
3-State Output Off-State Current	I_{OZ}	—	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		6.0	—	—	±0.5	—	±5.0	μA
Input Leakage Current	I_{IN}	—	V_{IN} = V_{CC} or GND		6.0	—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I_{CC}	—	V_{IN} = V_{CC} or GND		6.0	—	—	2.0	—	20.0	μA

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CIR-CUIT	TEST CONDITION	C_L	V_{CC}	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
Output Transition Time	t_{TLH} t_{THL}	—	—	50	2.0	—	25	60	—	75	ns
					4.5	—	7	12	—	15	
					6.0	—	6	10	—	13	
Propagation Delay Time	t_{pLH} t_{pHL}	—	—	50	2.0	—	36	90	—	115	
					4.5	—	12	18	—	23	
					6.0	—	10	15	—	20	
				150	2.0	—	51	130	—	165	
					4.5	—	17	26	—	33	
					6.0	—	14	22	—	28	
Output Enable Time	t_{pZL} t_{pZH}	—	$R_L = 1k\Omega$	50	2.0	—	48	125	—	155	
					4.5	—	16	25	—	31	
					6.0	—	14	21	—	26	
				150	2.0	—	63	165	—	205	
					4.5	—	21	33	—	41	
					6.0	—	18	28	—	35	
Output Disable Time	t_{pLZ} t_{pHZ}	—	$R_L = 1k\Omega$	50	2.0	—	32	125	—	155	
					4.5	—	15	25	—	31	
					6.0	—	14	21	—	26	
Input Capacitance	C_{IN}	—	—	—	—	—	5	10	—	10	pF
Output Capacitance	C_{OUT}	—	—	—	—	—	10	—	—	—	
Power Dissipation Capacitance	C_{PD}	—	Note (1)	—	—	—	33	—	—	—	

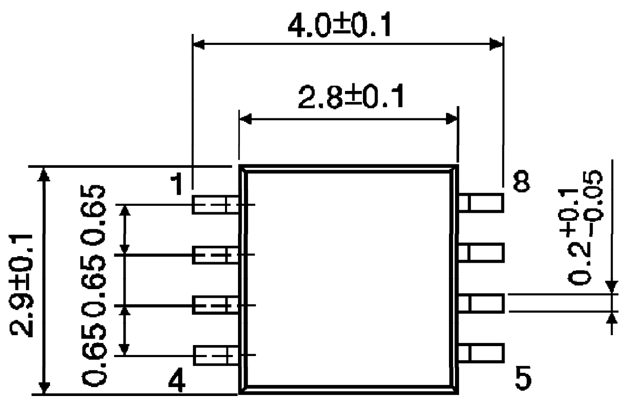
Note (1) : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation :

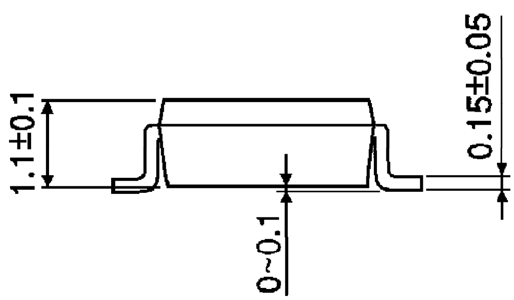
$$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 2 \text{ (per Gate)}$$

OUTLINE DRAWING

SSOP8-P-0.65

Unit : mm





Weight : 0.02g (Typ.)