

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC3W02F, TC3W02FU

2-TO-3 LINE DECODER WITH ENABLE

The TC3W02 is a high speed C²MOS 2 to 3 LINE DECODER / DEMULTIPLEXER fabricated with silicon gate C²MOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation.

The active low enable input can be used for gating or it can be used as a data input for demultiplexing applications.

When the enable input is held "H", all three outputs are fixed at a high logic level independent of the other inputs.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

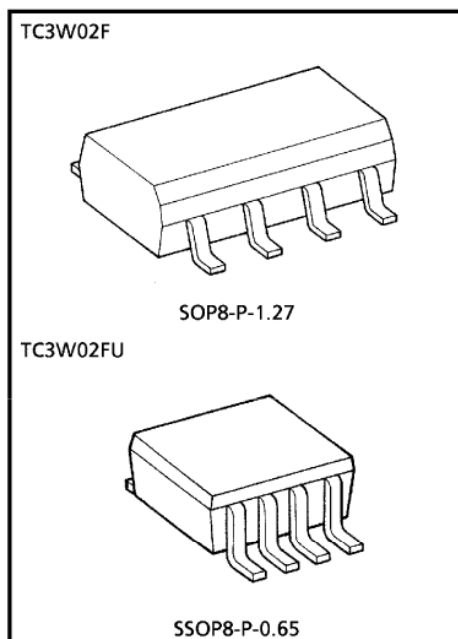
FEATURES

- High Speed $t_{pd} = 16\text{ns}$ (Typ.) at $V_{CC} = 5\text{V}$
- Low Power Dissipation $I_{CC} = 2\mu\text{A}$ (Max.) at $T_a = 25^\circ\text{C}$
- High Noise Immunity $V_{NIH} = V_{NIL} = 28\%$, V_{CC} (Min.)
- Output Drive Capability 10 LSTTL Loads
- Symmetrical Output Impedance ... $|I_{OH}| = I_{OL} = 4\text{mA}$ (Min.)
- Balanced Propagation Delays $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range ... $V_{CC}(\text{opr}) = 2\sim 6\text{V}$

TRUTH TABLE

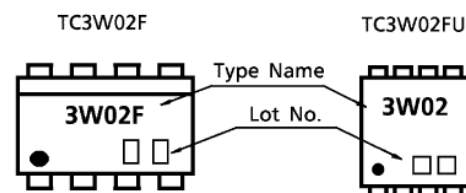
INPUTS			OUTPUTS			SELECTED OUTPUT
ENABLE	SELECT		$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	
\overline{G}	B	A				
H	x	x	H	H	H	NONE
L	L	L	H	H	H	NONE
L	L	H	L	H	H	$\overline{Y1}$
L	H	L	H	L	H	$\overline{Y2}$
L	H	H	H	H	L	$\overline{Y3}$

x : Don't care

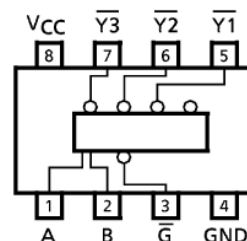


Weight SOP8-P-1.27 : 0.05g (Typ.)
SSOP8-P-0.65 : 0.02g (Typ.)

MARKING



PIN ASSIGNMENT (TOP VIEW)



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	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}	± 25	mA
DC V _{CC} / Ground Current	I _{CC}	± 25	mA
Power Dissipation	P _D	300	mW
Storage Temperature	T _{stg}	-65~150	°C
Lead Temperature (10s)	T _L	260	°C

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	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

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = -40~85°C		UNIT
				V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.
High-Level Input Voltage	V _{IH}	—		2.0 4.5 6.0	1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	V
Low-Level Input Voltage	V _{IL}	—		2.0 4.5 6.0	— — —	— — —	0.5 1.35 1.8	— — —	V
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 μ A	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	— — —	1.9 4.4 5.9	V
			I _{OH} = -4mA	4.5	4.18	4.31	—	4.13	
			I _{OH} = -5.2mA	6.0	5.68	5.80	—	5.63	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20 μ A	2.0 4.5 6.0	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	V
			I _{OL} = 4mA	4.5	—	0.17	0.26	—	
			I _{OL} = 5.2mA	6.0	—	0.18	0.26	—	
Input Leakage Current	I _{IN}	V _{IN} = V _{CC} or GND		6.0	—	—	±0.1	—	μ A
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND		6.0	—	—	2.0	—	

AC ELECTRICAL CHARACTERISTICS (C_L = 15pF, V_{CC} = 5V, Ta = 25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t _{TLH} t _{THL}	—	—	4	8	ns
Propagation Delay Time (A, B- \bar{Y})	t _{pLH} t _{pHL}	—	—	12	22	
Propagation Delay Time (\bar{G} - \bar{Y})	t _{pLH} t _{pHL}	—	—	10	18	

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT
			V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.
Output Transition Time	t_{TLH} t_{THL}	—	2.0	—	30	75	—	95
			4.5	—	8	15	—	19
			6.0	—	7	13	—	16
Propagation Delay Time (A, B- \bar{Y})	t_{PLH} t_{PHL}	—	2.0	—	45	130	—	165
			4.5	—	15	26	—	33
			6.0	—	13	22	—	28
Propagation Delay Time (\bar{G} - \bar{Y})	t_{PLH} t_{PHL}	—	2.0	—	39	110	—	140
			4.5	—	13	22	—	28
			6.0	—	11	19	—	24
Input Capacitance	C_{IN}	—	—	—	5	10	—	10
Power Dissipation Capacitance	C_{PD}	(Note 1)	—	—	46	—	—	—

Note 1 : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

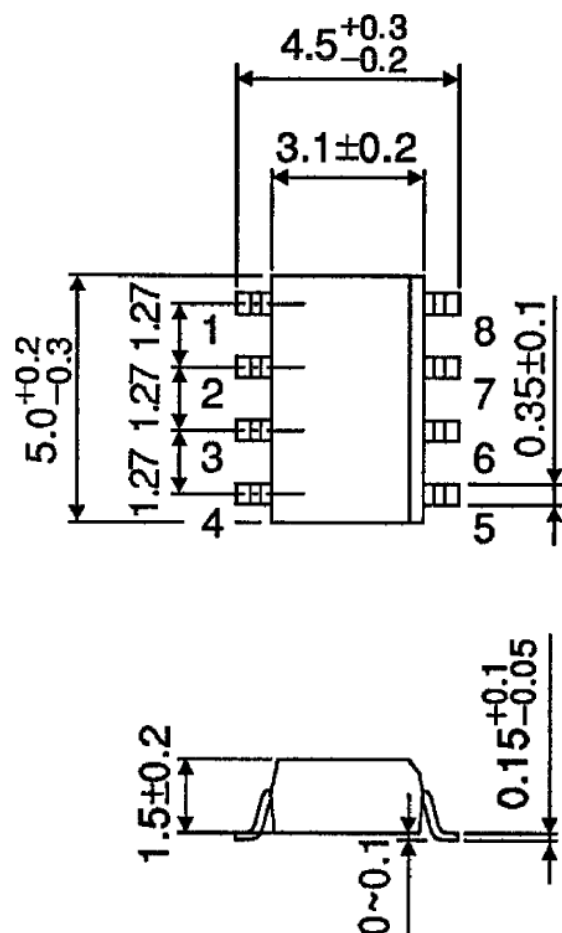
Average operating current can be obtained by the equation.

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

PACKAGE DIMENSIONS

SOP8-P-1.27

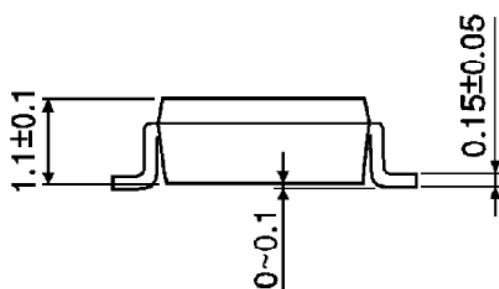
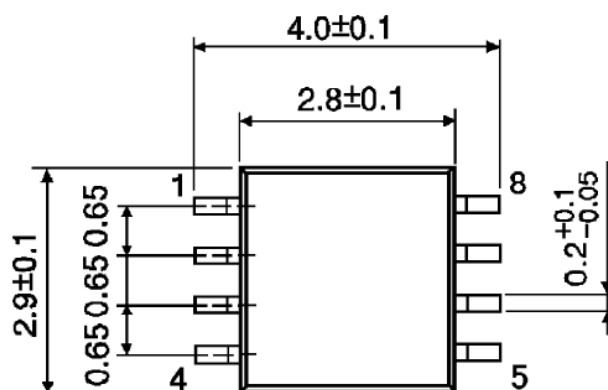
Unit : mm



Weight : 0.05g (Typ.)

PACKAGE DIMENSIONS
SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)

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20070701-EN GENERAL

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