Toshiba CMOS Digital Integrated Circuit Silicon Monolithic

TC7MB3245FT, TC7MB3245FK

Octal Bus Switch

The TC7MB3245 provides eight bits of high-speed TTL-compatible bus switching in a standard '245 device pinout. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device is organized as one 8-bit switch. When output enable (\overline{OE}) is low, the switch is on and port A is connected to port B. When \overline{OE} is high, the switch is open and a high-impedance state exists between the two ports.

All inputs are equipped with protection circuits against static discharge.

Features

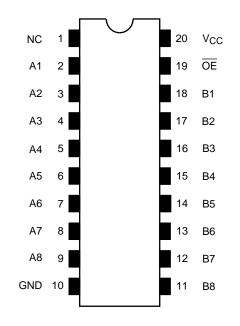
- Operating voltage: $V_{CC} = 4.5$ to 5.5 V
- High speed: $t_{pd} = 0.25$ ns (max)
- Low on resistance: $R_{ON} = 5 \Omega$ (typ.)
- ESD performance: Machine model $\ge \pm 200 \text{ V}$ Human body model $\ge \pm 2000 \text{ V}$
- Compatible with TTL outputs (control inputs)
- Package: TSSOP20,VSSOP20 (US20)
- Pin compatible with the 74xx245 type. Functionally equivalent to (FST/CBT) 3245.

TC7MB3245FT TSSOP20-P-0044-0.65A TC7MB3245FK VSSOP20-P-0030-0.50 Weight

TSSOP20-P-0044-0.65A VSSOP20-P-0030-0.50

: 0.08 g (typ.) : 0.03 g (typ.)

Pin Assignment (top view)



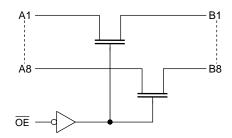
NC-No Internal Connection

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Truth Table

Inputs	Function	
OE	FUNCTION	
L	A port = B port	
Н	Disconnect	

System Diagram



Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
Power supply range	V _{CC}	-0.5 to 7.0	V
DC input voltage	V _{IN}	-0.5 to 7.0	V
DC switch voltage	VS	-0.5 to 7.0	V
Input diode current	I _{IK}	-50	mA
Continuous channel circuit	IS	128	mA
Power dissipation	PD	180	mW
DC V _{CC} /ground current	I _{CC} /I _{GND}	±100	mA
Storage temperature	T _{stg}	-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).

Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	4.5 to 5.5	V
Input voltage	V _{IN}	0 to 5.5	V
Switch voltage	VS	0 to 5.5	V
Operating temperature	T _{opr}	-40 to 85	°C
Input rise and fall time	dt/dv	0 to 10	ns/V

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

Electrical Characteristics

DC Characteristics (Ta = -40 to 85°C)

Charac	teristics	Symbol	Test Condition			Min	Тур.	Мах	Unit
Charac	lensucs	Symbol	Test Con	alion	$V_{CC}(V)$	IVIIII	(Note 1)	IVIAX	Unit
Input voltage	"H" level	VIH	—		4.5to5.5	2.0	_		V
input voltage	"L" level	VIL	_		4.5to5.5		_	0.8	v
Input leakage of	current	I _{IN}	$V_{IN} = 0$ to 5.5 V		4.5to5.5	_	_	±1.0	μA
Power off leaka	age current	I _{OFF}	A, B, $\overline{OE} = 0$ to 5.5 V		0	_	_	±1.0	μA
Off-STATE leal (switch off)	kage current	I _{SZ}	A, B = 0 to 5.5 V, \overline{OE}	= V _{CC}	4.5to5.5	_		±1.0	μΑ
				I _{IS} = 64 mA	4.5		5	7	
ON resistance	(Note 2)	R _{ON}	$V_{IS} = 0 V$	I _{IS} = 30 mA	4.5		5	7	Ω
			$V_{IS} = 2.4 \text{ V}, I_{IS} = 15 \text{ mA}$		4.5	_	10	15	
Quiescent supp	oly current	ICC	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$		5.5		—	10	μΑ
Increase in I _{CC}	per input	ΔI_{CC}	V _{IN} = 3.4 V (one input)		5.5		_	2.5	mA

Note 1: Typical values are at $V_{CC} = 5 V$, Ta = $25^{\circ}C$.

Note 2: Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the two (A or B) pins.

AC Characteristics (Ta = -40 to 85° C)

Characteristics	Symbol	Test Condition	V _{CC} (V)	Min	Max	Unit
Propagation delay time	t _{pLH}	Figure 1, Figure 2 (Note)	4.5	_	0.25	ns
(bus to bus)	t _{pHL}		4.5		0.25	115
Output enable time	^t pZL	Figure 1, Figure 3	4.5		5.9	ns
	t _{pZH}		4.0		0.0	113
Output disable time	^t pLZ	Figure 1, Figure 3	4.5		5.9	ns
	t _{pHZ}		4.5		5.5	113

Note: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical On resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage the source (zero output impedance).

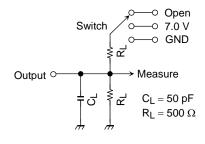
Capacitive Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	V _{CC} (V)	Тур.	Unit
Control pin input capacitance	C _{IN}	(Note	5.0	3	pF
Switch terminal capacitance	C _{I/O}	$\overline{OE} = V_{CC}$ (Note	5.0	10	pF

Note: Parameter guaranteed by design.

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AC Test Circuit



Parameter	Switch
t _{pLH} , t _{pHL}	Open
t _{pLZ} , t _{pZL}	7.0 V
t _{pHZ} , t _{pZH}	Open



AC Waveform

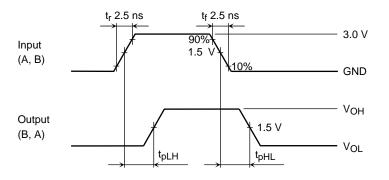
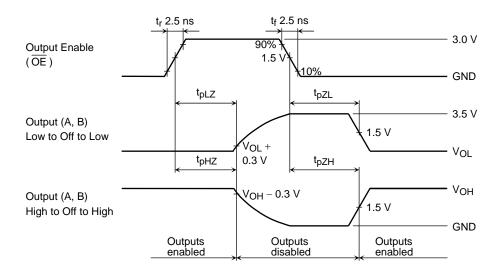
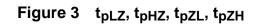


Figure 2 t_{pLH}, t_{pHL}



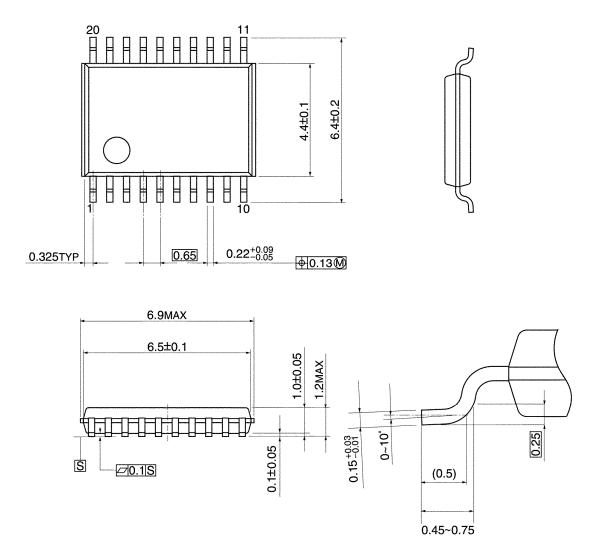


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Package Dimensions

TSSOP20-P-0044-0.65A

Unit: mm



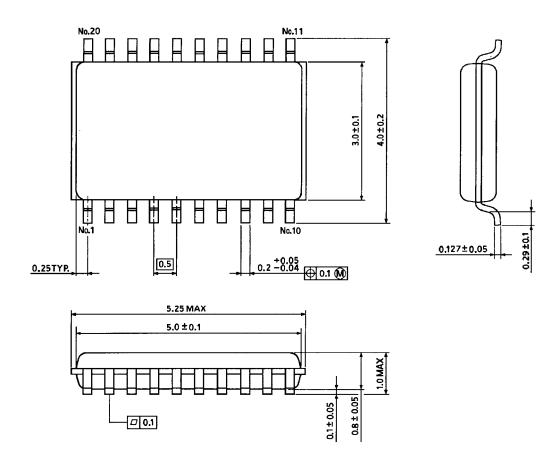
Weight: 0.08g (typ.)



Package Dimensions

VSSOP20-P-0030-0.50

Unit : mm



Weight: 0.03g (typ.)

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