

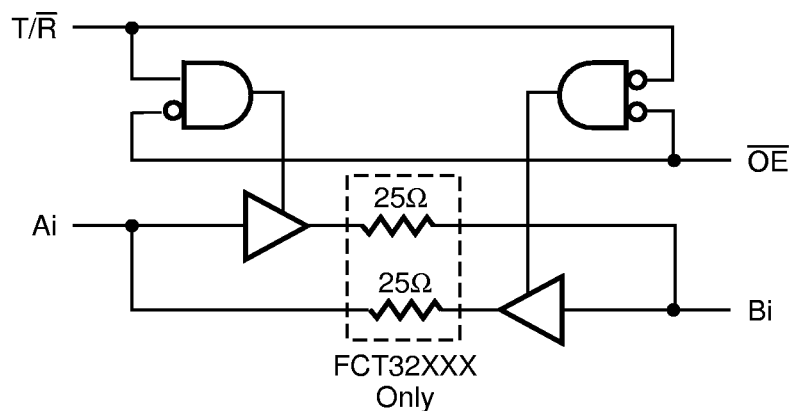
FEATURES/BENEFITS

- Pin and function compatible to the 74F245, 74LVT245 and 74FCT245T
- Available in SOIC and QSOP
- Undershoot clamp diodes on all inputs
- Ground bounce controlled outputs
- Low power QCMOS: 0.03 μ W typ static
- JEDEC spec compatible
- $I_{OL} = 24$ mA Com.
- TTL-compatible input and output levels
- Extended temperature -40°C to $+85^{\circ}\text{C}$
- 2.7V to 3.6V Supply Voltage
- 25 Ω series termination option

DESCRIPTION

The QSFCT3245 is an 8-bit non-inverting transceiver that has three-state outputs which are useful for bus-oriented applications. The Transmit/Receive ($T/\bar{R}$) input determines the direction of data flow, either from A to B or B to A, and the Output Enable ($\overline{OE}$) input enables the selected port for output. All inputs have clamp diodes for undershoot noise suppression and all outputs have ground bounce suppression (see QSI Application Note AN-001). Control pins can be driven by 3.3V or 5V components allowing voltage transition in mixed supply systems. Ultra-low power QCMOS technology makes this product ideal for portable computing systems or communications devices.

FUNCTIONAL BLOCK DIAGRAM

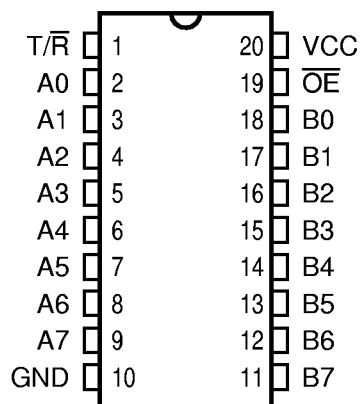


PIN CONFIGURATION

(All Pins Top View)

Note: For QVSOP, see QS74FCT2X3245 Datasheet (MDSL-00062)

SOIC, QSOP



PIN DESCRIPTION

Name	I/O	Description
Ai	I/O	Data Bus A
Bi	I/O	Data Bus B
T/R	I	Direction
OE	I	Output Enable

FUNCTION TABLE

OE	T/R	A	B	Function
H	X	Hi-Z	Hi-Z	Disable
L	L	Output	Input	Bus B to Bus A
L	H	Input	Output	Bus A to Bus B

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Supply Voltage to Ground	−0.5V to +4.6V
DC Output Voltage V_{OUT} (Including I/O Pins)	−0.5V to $V_{CC} + 0.5V^{(2)}$
DC Input Voltage V_{IN} (Except I/O Pins)	−0.5V to $V_{CC} + 0.5V$
AC Input Voltage (for a pulse width ≤ 20 ns)	−3.0V
DC Input Diode Current with $V_{IN} < 0$	± 20 mA
DC Output Diode Current with $V_{OUT} < 0$	± 50 mA
DC Output Current Max. Sink Current/Pin	± 60 mA
Maximum Power Dissipation	0.5 watts
T_{STG} Storage Temperature	−65° to +150°C

Note:

1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to this device resulting in functional or reliability type failures.
2. Not to exceed 4.6V

CAPACITANCE

$T_A = 25^\circ\text{C}$, $f = 1$ MHz, $V_{IN} = 0V$, $V_{OUT} = 0V$

Pins	SOIC	QSOP	Unit
1, 19	4	4	pF
2-9, 11-18	8	8	pF

Note: Capacitance is characterized but not tested.

RECOMMENDED OPERATING CONDITIONS

Symbol	Description	Min	Max	Unit
V_{CC}	Supply Voltage	2.7	3.6	V
V_{IN}	Input Voltage	0	V_{CC}	V
V_{OUT}	Output Voltage	0	V_{CC}	V
T_A	Ambient Operating Temperature	−40	+85	°C
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate ⁽¹⁾	0	8	ns/V

Notes:

1. As measured between 0.8V and 2V.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Recommended operating conditions apply unless otherwise specified.

Symbol	Parameter	Test Conditions	Min	Typ ⁽¹⁾	Max	Unit
V_{IH}	Input HIGH Voltage	Input Pins	2.0	—	5.5	V
		I/O Pins	2.0	—	$V_{CC}+0.5$	V
V_{IL}	Input LOW Voltage	Input Pins	-0.5	—	0.8	V
ΔV_T	Input Hysteresis	$V_{TLH} - V_{THL}$ for All Inputs	—	0.2	—	V
$ I_{IH} $ $ I_{IL} $	Input Current Input HIGH or LOW	$V_{CC} = \text{Max.}, 0 \leq V_{IN} < V_{CC}$	—	—	1	μA
$ I_{OZ} $	Off-State Output Current (Hi-Z)	$V_{CC} = \text{Max.}, 0 \leq V_{IN} \leq V_{CC}$	—	—	5	μA
I_{OS}	Short Circuit Current	$V_{CC} = \text{Max.}, V_{OUT} = \text{GND}^{(2,3)}$	-60	—	-225	mA
V_{IC}	Input Clamp Voltage	$V_{CC} = \text{Min.}, I_{IN} = -18 \text{ mA}^{(3)}$	—	-0.7	—	V
V_{OH}	Output HIGH Voltage	$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = \text{Min.}, I_{OH} = -100 \mu\text{A}$	$V_{CC}-0.2$	—	—	V
		$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = 3\text{V}, I_{OH} = -8 \text{ mA}$	2.4	—	—	V
V_{OL}	Output LOW Voltage (FCT3245)	$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = \text{Min.}, I_{OL} = 100 \mu\text{A}$	—	—	0.2	V
		$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = 3\text{V}, I_{OL} = 16 \text{ mA}$	—	—	0.4	V
		$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = 3\text{V}, I_{OL} = 24 \text{ mA}$	—	—	0.5	V
V_{OL}	Output LOW Voltage (FCT32245-25 Ω)	$V_I = V_{IH} \text{ or } V_{IL}, V_{CC} = 3\text{V}, I_{OL} = 8 \text{ mA}$	—	—	0.5	V
R_{OUT}	Output Resistance ⁽⁴⁾ (FCT32245-25 Ω)	$V_{CC} = 3\text{V}, I_{OL} = 8 \text{ mA}$	—	40	—	Ω

Notes:

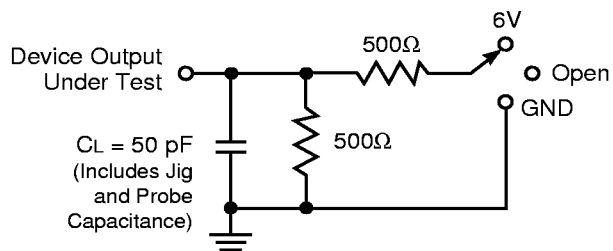
1. Typical values indicate $V_{CC} = 3.3\text{V}$ and $T_A = 25^\circ\text{C}$.
2. Not more than one output should be shorted and the duration is ≤ 1 second.
3. These parameters are guaranteed by design but not tested.
4. R_{OUT} represents total output impedance and includes added series termination resistance.

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾	Min	Typ	Max	Unit
I _{cc}	Quiescent Power Supply Current	V _{cc} = Max., freq = 0 0V ≤ V _{IN} ≤ 0.2V or V _{cc} -0.2V ≤ V _{IN} ≤ V _{cc}	—	0.01	20	μA
ΔI _{cc}	Supply Current per Input @ TTL HIGH	V _{cc} = Max., freq = 0, V _{IN} = V _{CC} - 0.6V	—	1.0	20	μA
Q _{CCD}	Supply Current per Input per MHz	V _{cc} = Max., Outputs Open and Enabled One Bit Toggling @ 50% Duty Cycle Other Inputs at GND or V _{cc} ^(2,3)	—	40	85	μA/ MHz

Notes:

- For conditions shown as Min. or Max., use the appropriate values specified under DC specifications.
- For flip-flops, Q_{CCD} is measured by switching one of the data input pins so that the output changes every clock cycle. This is a measurement of device power consumption only and does not include power to drive load capacitance or tester capacitance. This parameter is guaranteed by design but not tested.
- I_c can be computed using the above parameters as explained in the Technical Overview section.



Test	Switch
t _{PHL} /t _{PLH}	Open
t _{PZL} /t _{PLZ}	6V
t _{PZH} /t _{PHZ}	GND

Load Circuit for Outputs

Notes

- Input pulse characteristics: 0V to 2.7V, tr = tf = 2.5 ns (10% to 90%), transition measured at 1.5V, pulse generator Z_{OUT} = 50Ω.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Recommended operating conditions apply unless otherwise specified.

Symbol	Description ⁽¹⁾	3245, 32245 (V _{CC} = 3.3V ± 0.3V)		3245A, 32245A (V _{CC} = 3.3V ± 0.3V)		Unit
		Min	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay Ai to Bi, FCT3245	1.5	7	1.5	4.6	ns
t _{PLH} t _{PHL}	Propagation Delay Ai to Bi, FCT32245	1.5	7	1.5	4.6	ns
t _{PZH} t _{PZL}	Output Enable $\overline{OE}$, T/ $\overline{R}$ to A/B, FCT3245	1.5	9.5	1.5	6.2	ns
t _{PZH} t _{PZL}	Output Enable $\overline{OE}$, T/ $\overline{R}$ to A/B, FCT32245	1.5	9.5	1.5	6.2	ns
t _{PLZ} t _{PHZ}	Disable Time ⁽²⁾	1.5	7.5	1.5	5	ns

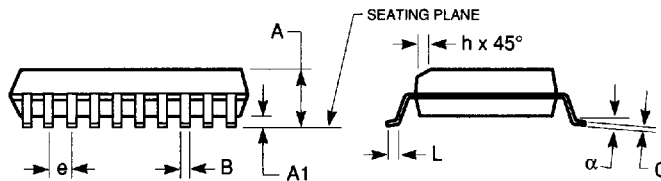
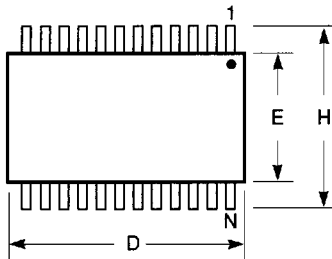
Notes:

1. Minimums guaranteed but not tested.
2. This parameter is guaranteed by design but not tested.
3. See Test Circuit and Waveforms.

300-MIL SOIC - Package Code SO **Plastic Small Outline Gull-Wing**

Notes:

1. Refer to applicable symbol list.
2. All dimensions are in inches.
3. N is the number of lead positions.
4. Dimensions D and E are to be measured at maximum material condition but do not include mold flash. Allowable mold flash is 0.006in. per side.
5. Lead coplanarity is 0.004in. maximum.



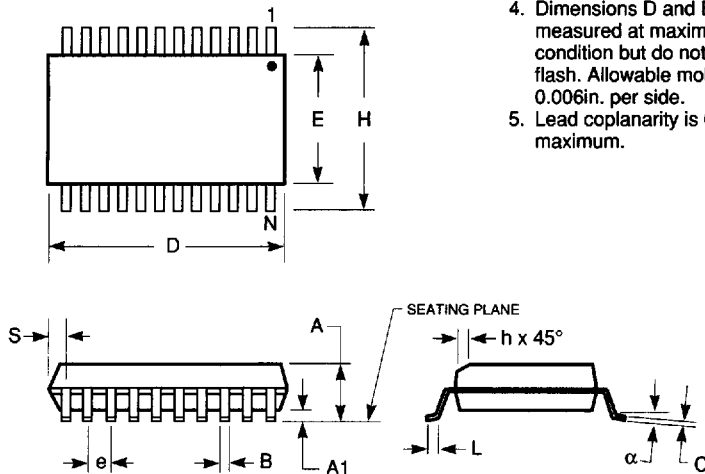
JEDEC#	MS-013AA		MS-013AC		MS-013AD		MS-013AE	
DWG#	PS16A		PS20A		PS24A		PS28A	
Symbol	Min	Max	Min	Max	Min	Max	Min	Max
A	0.096	0.104	0.096	0.104	0.096	0.104	0.096	0.104
A1	0.005	0.011	0.005	0.011	0.005	0.011	0.005	0.011
B	0.014	0.019	0.014	0.019	0.014	0.019	0.014	0.019
C	0.009	0.012	0.009	0.012	0.009	0.012	0.009	0.012
D	0.402	0.412	0.500	0.510	0.602	0.612	0.701	0.711
E	0.292	0.299	0.292	0.299	0.292	0.299	0.292	0.299
e	0.044	0.056	0.044	0.056	0.044	0.056	0.044	0.056
H	0.396	0.416	0.396	0.416	0.396	0.416	0.396	0.416
h	0.010	0.016	0.010	0.016	0.010	0.016	0.010	0.016
L	0.020	0.040	0.020	0.040	0.020	0.040	0.020	0.040
N	16		20		24		28	
α	0°	8°	0°	8°	0°	8°	0°	8°

7466803 0003749 900

QUALITY SEMICONDUCTOR, INC.

150-MIL QSOP - Package Code Q

**Quarter-Size Outline Package
Plastic Small Outline Gull-Wing**



Notes:

1. Refer to applicable symbol list.
2. All dimensions are in inches.
3. N is the number of lead positions.
4. Dimensions D and E are to be measured at maximum material condition but do not include mold flash. Allowable mold flash is 0.006in. per side.
5. Lead coplanarity is 0.004in. maximum.

JEDEC#	MO-137AB			MO-137AD			MO-137AE			MO-137AF		
DWG#	PSS-16A			PSS-20A			PSS-24A			PSS-28A		
Symbol	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max
A	0.060	0.064	0.068	0.060	0.064	0.068	0.060	0.064	0.068	0.060	0.064	0.068
A1	0.004	0.006	0.008	0.004	0.006	0.008	0.004	0.006	0.008	0.004	0.006	0.008
B	0.009	0.010	0.012	0.009	0.010	0.012	0.009	0.010	0.012	0.009	0.010	0.012
C	0.007	0.008	0.010	0.007	0.008	0.010	0.007	0.008	0.010	0.007	0.008	0.010
D	0.189	0.193	0.197	0.337	0.341	0.344	0.337	0.341	0.344	0.386	0.390	0.394
E	0.150	0.154	0.157	0.150	0.154	0.157	0.150	0.154	0.157	0.150	0.154	0.157
e	0.025 BSC			0.025 BSC			0.025 BSC			0.025 BSC		
H	0.230	0.236	0.244	0.230	0.236	0.244	0.230	0.236	0.244	0.230	0.236	0.244
h	0.010	0.013	0.016	0.010	0.013	0.016	0.010	0.013	0.016	0.010	0.013	0.016
L	0.016	0.025	0.035	0.016	0.025	0.035	0.016	0.025	0.035	0.016	0.025	0.035
N	16			20			24			28		
α	0°	5°	8°	0°	5°	8°	0°	5°	8°	0°	5°	8°
S	0.006	0.009	0.010	0.056	0.058	0.060	0.031	0.033	0.035	0.031	0.033	0.035