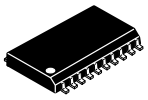
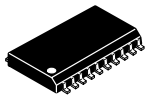
Octal Bidirectional Transceiver with 3-STATE Inputs/Outputs

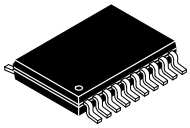
74AC245, 74ACT245



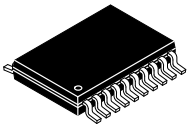
SOIC−20 WB
CASE 751D−05



SOIC−20, 300 mils
CASE 751BJ−01



TSSOP−20 WB
CASE 948E



TSSOP20, 4.4x6.5
CASE 948AQ−01

Description

The AC/ACT245 contains eight non−inverting bidirectional buffers with 3−STATE outputs and is intended for bus−oriented applications. Current sinking capability is 24 mA at both the A and B ports. The Transmit/Receive ($T/\overline{R}$) input determines the direction of data flow through the bidirectional transceiver. Transmit (active−HIGH) enables data from A ports to B ports; Receive (active−LOW) enables data from B ports to A ports. The Output Enable input, when HIGH, disables both A and B ports by placing them in a HIGH Z condition.

Features

- I_{CC} and I_{OZ} Reduced by 50%
- Non−Inverting Buffer
- Bidirectional Data Path
- A and B Outputs Source/Sink 24 mA
- ACT245 has TTL−Compatible Inputs
- These are Pb−Free Devices

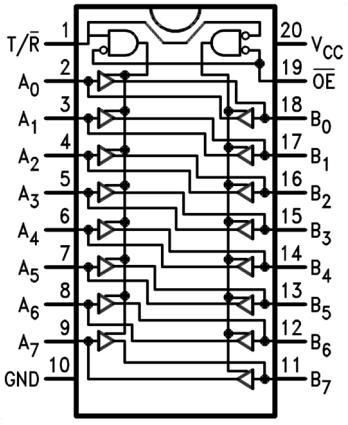
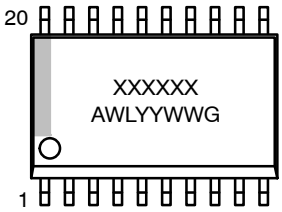


Figure 1. Connection Diagram

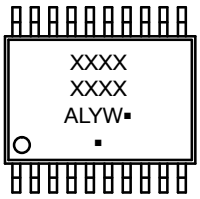
MARKING DIAGRAM

SOIC−20



XXXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
G = Pb−Free Package

TSSOP−20



XXXX = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

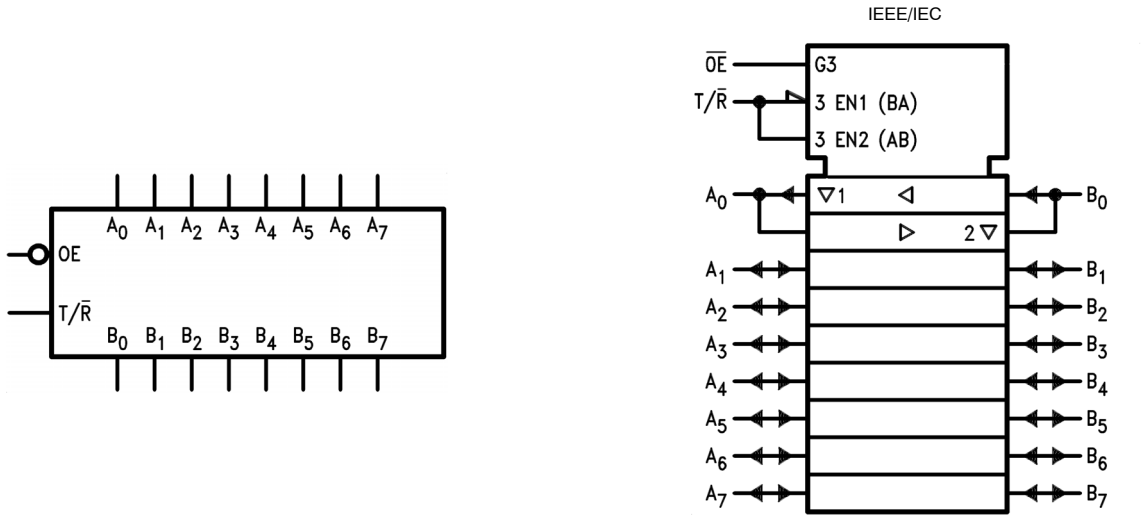


Figure 2. Logic Symbol

PIN DESCRIPTIONS

Pin Name	Description
$\overline{OE}$	Output Enable Input
T/$\overline{R}$	Transmit / Receive Input
A_0–A_7	Side A 3–STATE Inputs or 3–STATE Outputs
B_0–B_7	Side B 3–STATE Inputs or 3–STATE Outputs

TRUTH TABLE

Input		Output
$\overline{OE}$	$\overline{TR}$	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	HIGH–Z State

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage	−0.5 to +6.5	V
I_{IK}	DC Input Diode Current V_I = −0.5 V	−20	mA
	V_I = V_{CC} + 0.5	+20	mA
V_I	DC Input Voltage	−0.5 to V_{CC} + 0.5	V
I_{OK}	DC Output Diode Current V_O = −0.5 V	−20	mA
	V_O = V_{CC} + 0.5 V	+20	mA
V_O	DC Output Voltage	−0.5 to V_{CC} + 0.5	V
I_O	DC Output Source or Sink Current	±50	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current per Output Pin	±50	mA
T_{STG}	Storage Temperature	−65 to +150	°C
T_J	Junction Temperature	140	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage AC	2.0 to 6.0	V
	ACT	4.5 to 5.5	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_A	Operating Temperature	−40 to +85	°C
$\Delta V / \Delta t$	Minimum Input Edge Rate, AC Devices: V_{IN} from 30% to 70% of V_{CC}, V_{CC} @ 3.3 V, 4.5 V, 5.5 V	125	mV/ns
$\Delta V / \Delta t$	Minimum Input Edge Rate, ACT Devices: V_{IN} from 0.8 V to 2.0 V, V_{CC} @ 4.5 V, 5.5 V	125	mV/ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

DC ELECTRICAL CHARACTERISTICS FOR AC

Symbol	Parameter	V_{CC} (V)	Conditions	T_A = +25°C	T_A = −40°C to +85°C		Unit
				Typ.	Guaranteed Limits		
V_{IH}	Minimum HIGH Level Input Voltage	3.0	V_{OUT} = 0.1 V or V_{CC} − 0.1 V	1.5	2.1	2.1	V
		4.5		2.25	3.15	3.15	
		5.5		2.75	3.85	3.85	
V_{IL}	Maximum LOW Level Input Voltage	3.0	V_{OUT} = 0.1 V or V_{CC} − 0.1 V	1.5	0.9	0.9	V
		4.5		2.25	1.35	1.35	
		5.5		2.75	1.65	1.65	
V_{OH}	Minimum HIGH Level Output Voltage	3.0	I_{OUT} = −50 μA	2.99	2.9	2.9	V
		4.5		4.49	4.4	4.4	
		5.5		5.49	5.4	5.4	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −12 mA	–	2.56	2.46	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24 mA	–	3.86	3.76	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24 mA (Note 1)	–	4.86	4.76	
V_{OL}	Maximum LOW Level Output Voltage	3.0	I_{OUT} = 50 μA	0.002	0.1	0.1	V
		4.5		0.001	0.1	0.1	
		5.5		0.001	0.1	0.1	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 12 mA	–	0.36	0.44	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA	–	0.36	0.44	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA (Note 1)	–	0.36	0.44	
I_{IN} (Note 2)	Maximum Input Leakage Current	5.5	V_I = V_{CC}, GND	–	±0.1	±1.0	μA
I_{OLD}	Minimum Dynamic Output Current (Note 3)	5.5	V_{OLD} = 1.65 V Max.	–	–	75	mA
I_{OHD}		5.5	V_{OHD} = 3.85 V Min.	–	–	−75	mA
I_{CC} (Note 2)	Maximum Quiescent Supply Current	5.5	V_{IN} = V_{CC} or GND	–	4.0	40.0	μA
I_{OZT}	Maximum I/O Leakage Current	5.5	V_I(OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND	–	±0.3	±0.3	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. All outputs loaded; thresholds on input associated with output under test.
2. I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.
3. Maximum test duration 2.0 ms, one output loaded at a time.

DC ELECTRICAL CHARACTERISTICS FOR ACT

Symbol	Parameter	V_{CC} (V)	Conditions	T_A = +25°C	T_A = −40°C to +85°C		Unit
				Typ.	Guaranteed Limits		
V_{IH}	Minimum HIGH Level Input Voltage	4.5	V_{OUT} = 0.1 V or V_{CC} −0.1 V	1.5	2.0	2.0	V
		5.5		1.5	2.0	2.0	
V_{IL}	Maximum LOW Level Input Voltage	4.5	V_{OUT} = 0.1 V or V_{CC} −0.1 V	1.5	0.8	0.8	V
		5.5		1.5	0.8	0.8	
V_{OH}	Minimum HIGH Level Output Voltage	4.5	I_{OUT} = −50 μA	4.49	4.4	4.4	V
		5.5		5.49	5.4	5.4	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24 mA	–	3.86	3.76	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = −24mA (Note 4)	–	4.86	4.76	
V_{OL}	Maximum LOW Level Output Voltage	4.5	I_{OUT} = 50 μA	0.001	0.1	0.1	V
		5.5		0.001	0.1	0.1	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA	–	0.36	0.44	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA (Note 4)	–	0.36	0.44	
I_{IN}	Maximum Input Leakage Current	5.5	V_I = V_{CC}, GND	–	±0.1	±1.0	μA
I_{CCT}	Maximum I_{CC}/Input	5.5	V_I = V_{CC} −2.1V	0.6	–	1.5	mA
I_{OLD}	Minimum Dynamic Output Current (Note 5)	5.5	V_{OLD} = 1.65 V Max.	–	–	75	mA
I_{OHD}		5.5	V_{OHD} = 3.85 V Min.	–	–	−75	mA
I_{CC}	Maximum Quiescent Supply Current	5.5	V_{IN} = V_{CC} or GND	–	4.0	40.0	μA
I_{OZT}	Maximum I/O Leakage Current	5.5	V_I (OE) = V_{IL}, V_{IH}; V_I = V_{CC}, GND; V_O = V_{CC}, GND	–	±0.3	±3.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. All outputs loaded; thresholds on input associated with output under test.
5. Maximum test duration 2.0 ms, one output loaded at a time.

AC ELECTRICAL CHARACTERISTICS FOR AC

Symbol	Parameter	V_{CC} (V) (Note 6)	T_A = +25°C C_L = 50 pF			T_A = −40°C to +85°C C_L = 50 pF		Unit
			Min.	Typ.	Max.	Min.	Max.	
t_{PLH}	Propagation Delay, An to B_n or B_n to A_n	3.3	1.5	5.0	8.5	1.0	9.0	ns
		5.0	1.5	3.5	6.5	1.0	7.0	
t_{PHL}	Propagation Delay, A_n to B_n or B_n to A_n	3.3	1.5	5.0	8.5	1.0	9.0	ns
		5.0	1.5	3.5	6.0	1.0	7.0	
t_{PZH}	Output Enable Time	3.3	2.5	7.0	11.5	2.0	12.5	ns
		5.0	1.5	5.0	8.5	1.0	9.0	
t_{PZL}	Output Enable Time	3.3	2.5	7.5	12.0	2.0	13.5	ns
		5.0	1.5	5.5	9.0	1.0	9.5	
t_{PHZ}	Output Disable Time	3.3	2.0	6.5	12.0	1.0	12.5	ns
		5.0	1.5	5.5	9.0	1.0	10.0	
t_{PLZ}	Output Disable Time	3.3	2.0	7.0	11.5	1.5	13.0	ns
		5.0	1.5	5.5	9.0	1.0	10.0	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

6. Voltage range 3.3 is 3.3 V ±0.3 V. Voltage range 5.0 is 5.0 V ±0.5 V.

AC ELECTRICAL CHARACTERISTICS FOR ACT

Symbol	Parameter	V_{CC} (V) (Note 7)	T_A = +25°C, C_L = 50 pF			T_A = −40°C to +85°C, C_L = 50 pF		Unit
			Min.	Typ.	Max.	Min.	Max.	
t_{PLH}	Propagation Delay, A_n to B_n or B_n to A_n	5.0	1.5	4.0	7.5	1.5	8.0	ns
t_{PHL}	Propagation Delay, A_n to B_n or B_n to A_n	5.0	1.5	4.0	8.0	1.0	9.0	ns
t_{PZH}	Output Enable Time	5.0	1.5	5.0	10.0	1.5	11.0	ns
t_{PZL}	Output Enable Time	5.0	1.5	5.5	10.0	1.5	12.0	ns
t_{PHZ}	Output Disable Time	5.0	1.5	5.5	10.0	1.0	11.0	ns
t_{PLZ}	Output Disable Time	5.0	2.0	5.0	10.0	1.5	11.0	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

7. Voltage Range 5.0 is 5.0 V ±0.5 V.

CAPATICANCE

Symbol	Parameter	Conditions	Typ.	Unit
C_{IN}	Input Capacitance	V_{CC} = OPEN	4.5	pF
$C_{I/O}$	Input/Output Capacitance	V_{CC} = 5.0 V	15.0	pF
C_{PD}	Power Dissipation Capacitance	V_{CC} = 5.0 V	45.0	pF

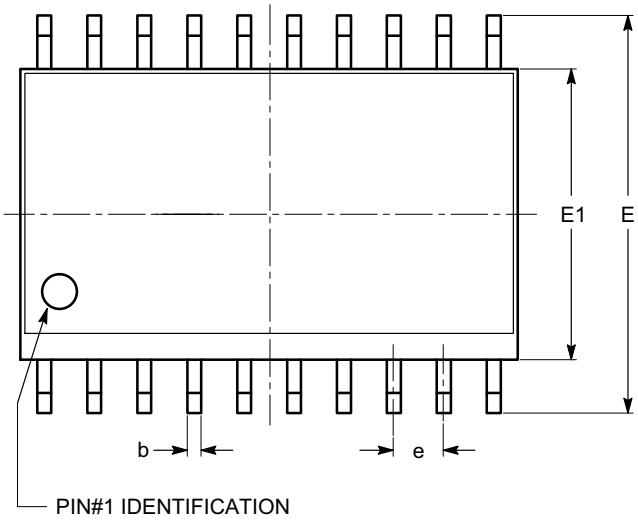
ORDERING INFORMATION

Device	Marking	Package	Shipping†
74AC245MTC	AC 245	TSSOP−20	75 Units / Tube
74AC245MTCX	AC 245	TSSOP−20	2500 / Tape & Reel
74AC245SCX	AC245	SOIC−20	1000 / Tape & Reel
74ACT245MTCX	ACT 245	TSSOP−20	2500 / Tape & Reel
74ACT245SC	ACT245	SOIC−20	38 Units / Tube
74ACT245SCX	ACT245	SOIC−20	1000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

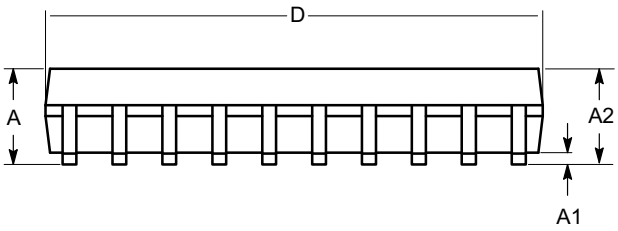
SOIC−20, 300 mils
CASE 751BJ
ISSUE O

DATE 19 DEC 2008

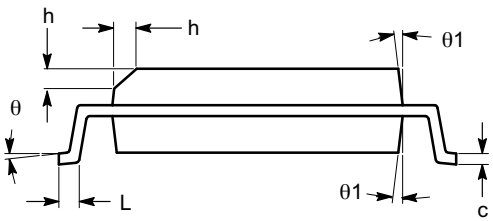


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	2.36	2.49	2.64
A1	0.10		0.30
A2	2.05		2.55
b	0.31	0.41	0.51
c	0.20	0.27	0.33
D	12.60	12.80	13.00
E	10.01	10.30	10.64
E1	7.40	7.50	7.60
e		1.27 BSC	
h	0.25		0.75
L	0.40	0.81	1.27
θ	0°		8°
θ1	5°		15°



SIDE VIEW



END VIEW

Notes:
(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC MS-013.

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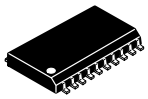
DESCRIPTION:	SOIC−20, 300 MILS	PAGE 1 OF 1

SOIC−20 WB
CASE 751D−05
ISSUE H

DATE 22 APR 2015



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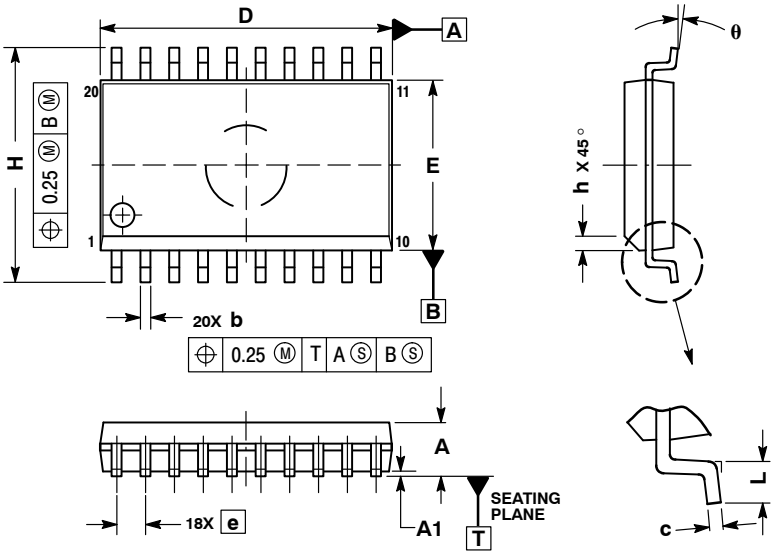
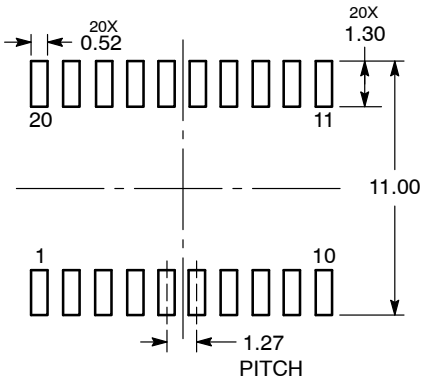


NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
b	0.35	0.49
c	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

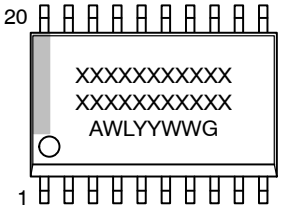
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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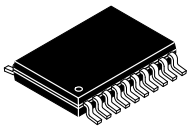
DESCRIPTION:	**SOIC−20 WB**		**PAGE 1 OF 1**

TSSOP–20 WB
CASE 948E
ISSUE D

DATE 17 FEB 2016



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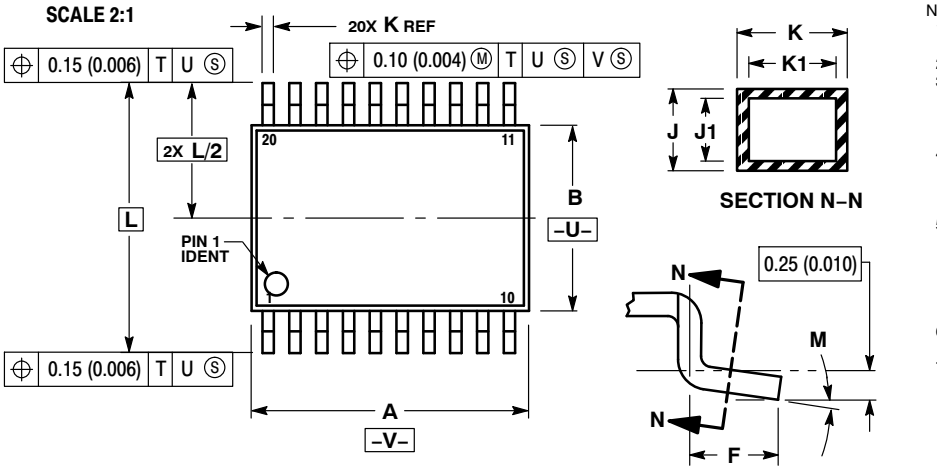
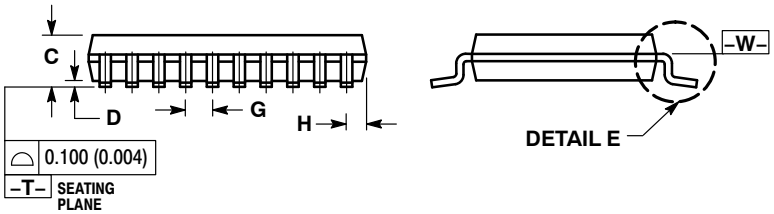


SECTION N–N

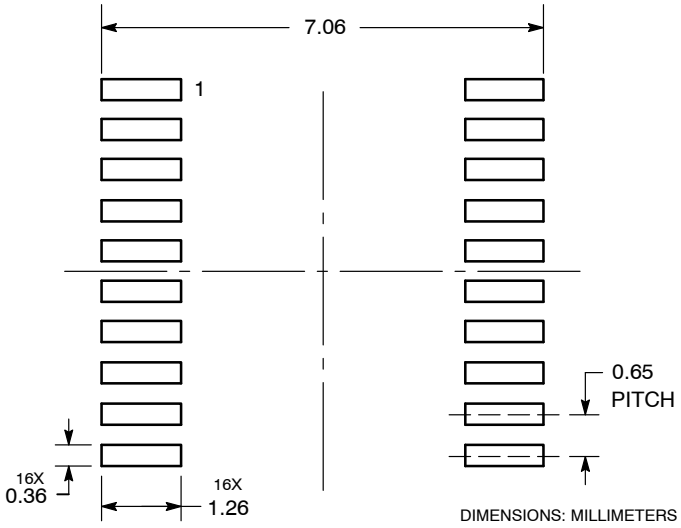
DETAIL E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE –W–.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

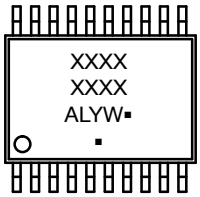
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb–Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb–Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb–Free indicator, “G” or microdot “ ▪”, may or may not be present. Some products may not follow the Generic Marking.

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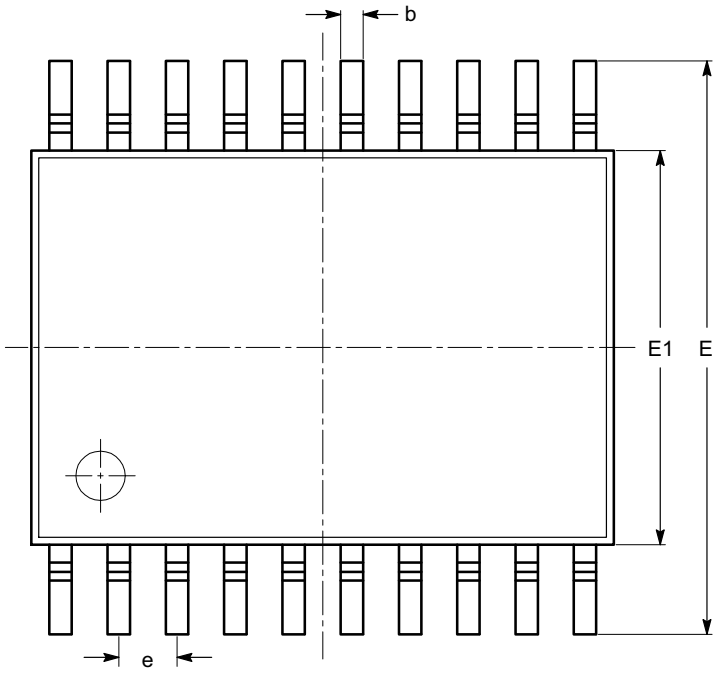
DESCRIPTION:	**TSSOP–20 WB**		**PAGE 1 OF 1**

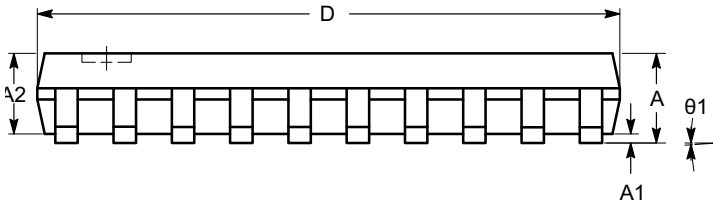
TSSOP20, 4.4x6.5
CASE 948AQ
ISSUE A

DATE 19 MAR 2009

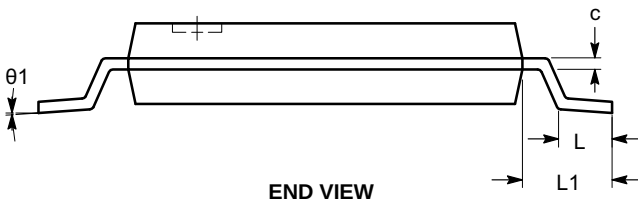


TOP VIEW

SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80		1.05
b	0.19		0.30
c	0.09		0.20
D	6.40	6.50	6.60
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e		0.65 BSC	
L	0.45	0.60	0.75
L1		1.00 REF	
θ	0°		8°



SIDE VIEW



END VIEW

Notes:
(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC MO-153.

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DESCRIPTION:	TSSOP20, 4.4X6.5	PAGE 1 OF 1

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