Octal Buffer/Line Driver with 3-STATE Outputs

74AC244, 74ACT244

General Description

The AC/ACT244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus−oriented transmitter/receiver which provides improved PC board density.

Features

- I_{CC} and I_{OZ} Reduced by 50%
- 3−STATE Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- ACT244 has TTL−Compatible Inputs

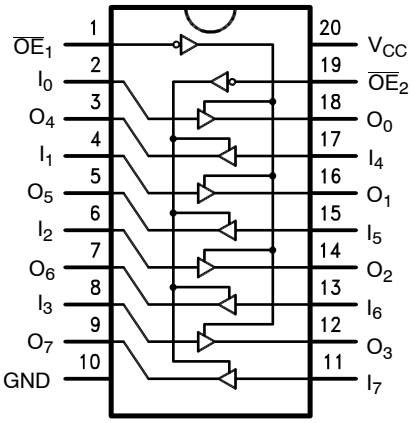


Figure 1. Connection Diagram

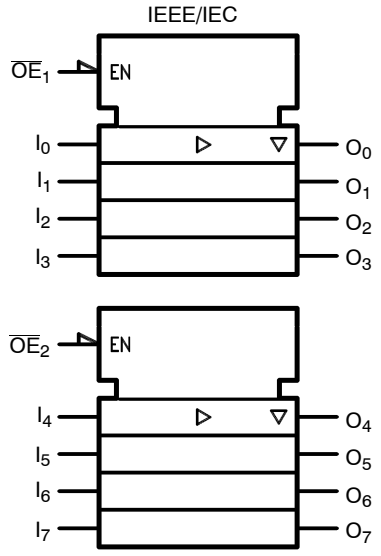
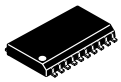
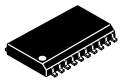


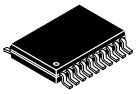
Figure 2. Logic Symbol



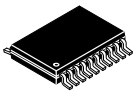
SOIC−20, 300 mils
CASE 751BJ−01



SOIC−20 WB
CASE 751D−05



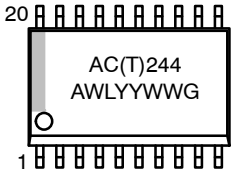
TSSOP−20 WB
CASE 948E



TSSOP20, 4.4 x 6.5
CASE 948AQ−01

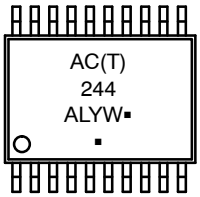
MARKING DIAGRAMS

SOIC−20



AC244, ACT244	= Specific Device Code
A	= Assembly Location
WL	= Wafer Lot
YY	= Year
WW	= Work Week
G	= Pb−Free Package

TSSOP−20



AC244, ACT244	= 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 6 of this data sheet.

PIN DESCRIPTION

Pin Name	Description
$\overline{OE}_1$, $\overline{OE}_2$	3−STATE Output Enable Inputs
I_0−I_7	Inputs
O_0−O_7	Outputs

TRUTH TABLE

Inputs		Outputs
$\overline{OE}_1$	I_n	(Pins 12, 14, 16, 18)
L	L	L
L	H	H
H	X	Z

NOTE: X = Immaterial, Z = High Impedance

TRUTH TABLE (continued)

Inputs		Outputs
$\overline{OE}_2$	I_n	(Pins 3, 5, 7, 9)
L	L	L
L	H	H
H	X	Z

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	−0.5 to +7.0	V
DC Input Diode Current V_I = −0.5 V	I_{IK}	−20	mA
V_I = V_{CC} + 0.5		+20	
DC Input Voltage	V_I	−0.5 to V_{CC} + 0.5	V
DC Output Diode Current V_O = −0.5 V	I_{OK}	−20	mA
V_I = V_{CC} + 0.5 V		+20	
DC Output Voltage	V_O	−0.5 to V_{CC} + 0.5	V
DC Output Source or Sink Current	I_O	±50	mA
DC V_{CC} or Ground Current per Output Pin	I_{CC} or I_{GND}	±50	mA
Storage Temperature	T_{STG}	−65 to +150	°C
Junction Temperature	T_J	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

Parameter	Symbol	Rating	Unit
Supply Voltage AC	V_{CC}	2.0 to 6.0	V
ACT		4.5 to 5.5	
Input Voltage	V_I	0 to V_{CC}	V
Output Voltage	V_O	0 to V_{CC}	V
Operating Temperature	T_A	−40 to +85	°C
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	$\Delta V / \Delta t$	125	mV/ns
Minimum Input Edge Rate, ACT Devices: V_{IN} from 0.8 V to 2.0 V, V_{CC} @ 4.5 V, 5.5 V	$\Delta V / \Delta t$	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 = −55°C to +125°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	2.1	V
		4.5		2.25	3.15	3.15	3.15	
		5.5		2.75	3.85	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	0.9	V
		4.5		2.25	1.35	1.35	1.35	
		5.5		2.75	1.65	1.65	1.65	
V_{OH}	Minimum HIGH Level Output Voltage	3.0	I_{OUT} = −50 μA	2.99	2.9	2.9	2.9	V
		4.5		4.49	4.4	4.4	4.4	
		5.5		5.49	5.4	5.4	5.4	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OH} = 12 mA		2.56	2.40	2.46	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = 24 mA		3.86	3.70	3.76	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = 24 mA (Note 1)		4.86	4.70	4.76	
V_{OL}	Maximum LOW Level Output Voltage	3.0	I_{OUT} = 50 μA	0.002	0.1	0.1	0.1	V
		4.5		0.001	0.1	0.1	0.1	
		5.5		0.001	0.1	0.1	0.1	
		3.0	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 12 mA		0.36	0.50	0.44	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA		0.36	0.50	0.44	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA (Note 1)		0.36	0.50	0.44	
I_{IN} (Note 2)	Maximum Input Leakage Current	5.5	V_I = V_{CC}, GND		±0.1	±1.0	±1.0	μA
I_{OZ}	Maximum 3−STATE Leakage Current	5.5	V_I (OE) = V_{IL}, V_{IH}; V_I = V_{CC}, V_{GND}; V_O = V_{CC}, GND		±0.25	±5.0	±2.5	μA
I_{OLD}	Minimum Dynamic Output Current (Note 3)	5.5	V_{OLD} = 1.65 V Max.			50	75	mA
I_{OHD}		5.5	V_{OHD} = 3.85 V Min.			−50	−75	mA
I_{CC} (Note 2)	Maximum Quiescent Supply Current	5.5	V_{IN} = V_{CC} or GND		4.0	80.0	40.0	μA

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 = −55°C to +125°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	2.0	V
		5.5		1.5	2.0	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	0.8	V
		5.5		1.5	0.8	0.8	0.8	
V_{OH}	Minimum HIGH Level Output Voltage	4.5	I_{OUT} = −50 μA	4.49	4.4	4.4	4.4	V
		5.5		5.49	5.4	5.4	5.4	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = 24 mA		3.86	3.70	3.76	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OH} = 24 mA (Note 4)		4.86	4.70	4.76	
V_{OL}	Maximum LOW Level Output Voltage	4.5	I_{OUT} = 50 μA	0.001	0.1	0.1	0.1	V
		5.5		0.001	0.1	0.1	0.1	
		4.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA		0.36	0.50	0.44	
		5.5	V_{IN} = V_{IL} or V_{IH}, I_{OL} = 24 mA (Note 4)		0.36	0.50	0.44	
I_{IN}	Maximum Input Leakage Current	5.5	V_I = V_{CC}, GND		±0.1	±1.0	±1.0	μA
I_{OZ}	Maximum 3−STATE Leakage Current	5.5	V_I = V_{IL}, V_{IH}; V_O = V_{CC}, GND		±0.25	±5.0	±2.5	μA
I_{CCT}	Maximum I_{CC}/Input	5.5	V_I = V_{CC} − 2.1 V	0.6		1.6	1.5	mA
I_{OLD}	Minimum Dynamic Output Current (Note 5)	5.5	V_{OLD} = 1.65 V Max.			50	75	mA
I_{OHD}		5.5	V_{OHD} = 3.85 V Min.			−50	−75	mA
I_{CC}	Maximum Quiescent Supply Current	5.5	V_{IN} = V_{CC} or GND		4.0	80.0	40.0	μA

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 = −55°C to +125°C C_L = 50 pF		T_A = −40°C to +85°C C_L = 50 pF		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay, Data to Output	3.3	2.0	6.5	9.0	1.0	12.5	1.5	10.0	ns
		5.0	1.5	5.0	7.0	1.0	9.5	1.0	7.5	
t_{PHL}	Propagation Delay, Data to Output	3.3	2.0	6.5	9.0	1.0	12.0	2.0	10.0	ns
		5.0	1.5	5.0	7.0	1.0	9.0	1.0	7.5	
t_{PZH}	Output Enable Time	3.3	2.0	6.0	10.5	1.0	11.5	1.5	11.0	ns
		5.0	1.5	5.0	7.0	1.0	9.0	1.5	8.0	
t_{PZL}	Output Enable Time	3.3	2.5	7.5	10.0	1.0	13.0	2.0	11.0	ns
		5.0	1.5	5.5	8.0	1.0	10.5	1.5	8.5	
t_{PHZ}	Output Disable Time	3.3	3.0	7.0	10.0	1.0	12.5	1.5	10.5	ns
		5.0	2.5	6.5	9.0	1.0	10.5	1.0	9.5	
t_{PLZ}	Output Disable Time	3.3	2.5	7.5	10.5	1.0	13.0	2.5	11.5	ns
		5.0	2.0	6.5	9.0	1.0	11.0	2.0	9.5	

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 = −55°C to +125°C C_L = 50 pF		T_A = −40°C to +85°C C_L = 50 pF		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay, Data to Output	5.0	2.0	6.5	9.0	1.0	10.0	1.5	10.0	ns
t_{PHL}	Propagation Delay, Data to Output	5.0	2.0	7.0	9.0	1.0	10.0	1.5	10.0	ns
t_{PZH}	Output Enable Time	5.0	1.5	6.0	8.5	1.0	9.5	1.0	9.5	ns
t_{PZL}	Output Enable Time	5.0	2.0	7.0	9.5	1.0	11.0	1.5	10.5	ns
t_{PHZ}	Output Disable Time	5.0	2.0	7.0	9.5	1.0	11.0	1.5	10.5	ns
t_{PLZ}	Output Disable Time	5.0	2.5	7.5	10.0	1.0	11.5	2.0	10.5	ns

7. Voltage range 5.0 is 5.0 V ± 0.5 V.

CAPACITANCE

Symbol	Parameter	Conditions	Typ	Unit
C_{IN}	Input Capacitance	V_{CC} = OPEN	4.5	pF
C_{PD}	Power Dissipation Capacitance	V_{CC} = 5.0 V	45.0	pF

ORDERING INFORMATION

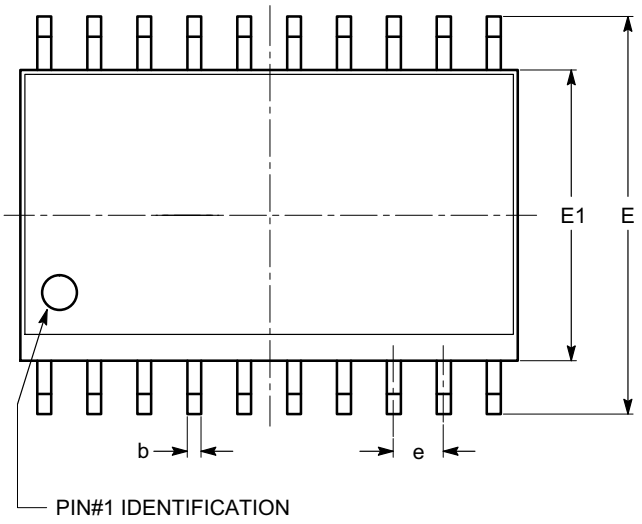
Order Number	Package	Shipping† (Qty / Packing)
74AC244SC	SOIC−20W (Pb−Free)	38 / Tube
74AC244SCX	SOIC−20W (Pb−Free)	1000 / Tape & Reel
74AC244MTC	TSSOP−20 (Pb−Free)	75 / Tube
74AC244MTCX	TSSOP−20 (Pb−Free)	2500 / Tape & Reel
74ACT244SC	SOIC−20W (Pb−Free)	38 / Tube
74ACT244SCX	SOIC−20W (Pb−Free)	1000 / Tape & Reel
74ACT244MTC	TSSOP−20 (Pb−Free)	75 / Tube
74ACT244MTCX	TSSOP−20 (Pb−Free)	2500 / 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

NOTE: All packages are lead free per JEDEC: J−STD−020B standard.

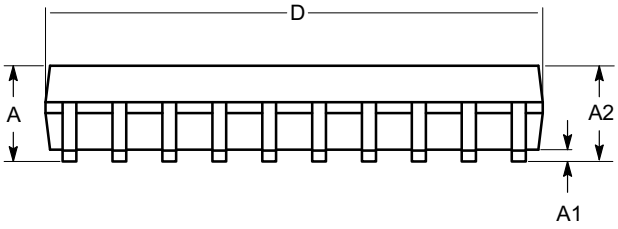
SOIC−20, 300 mils
CASE 751BJ−01
ISSUE O

DATE 19 DEC 2008

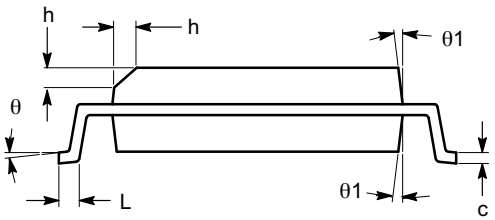


TOP VIEW

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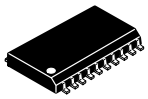
DESCRIPTION:	**SOIC−20, 300 MILS**	**PAGE 1 OF 1**

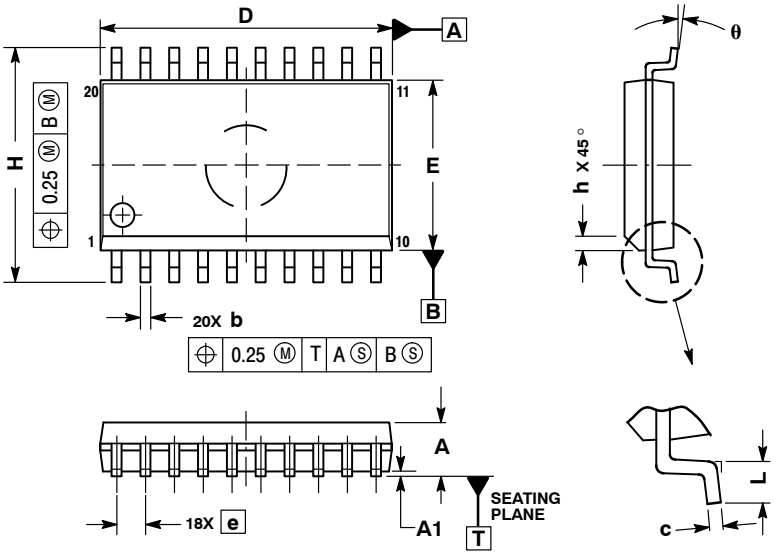
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

SOIC−20 WB
CASE 751D−05
ISSUE H

DATE 22 APR 2015



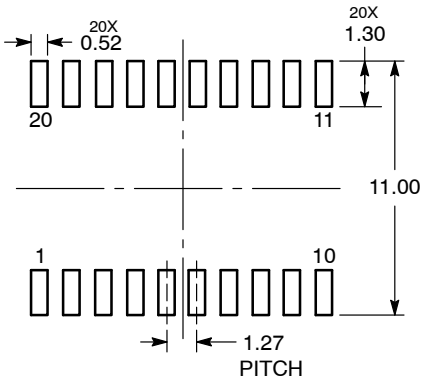
SCALE 1:1



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°

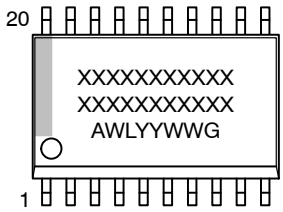
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor 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.

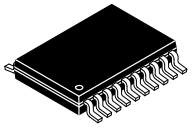
DOCUMENT NUMBER:	**98ASB42343B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**SOIC−20 WB**	**PAGE 1 OF 1**

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

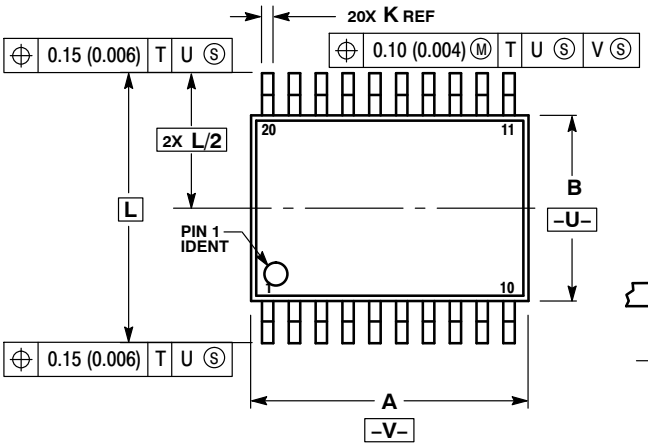
ON Semiconductor®

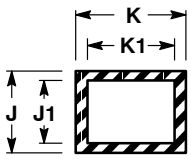
TSSOP−20 WB
CASE 948E
ISSUE D

DATE 17 FEB 2016

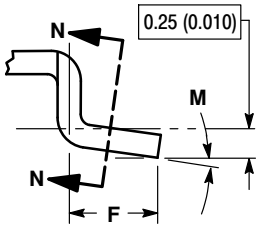


SCALE 2:1

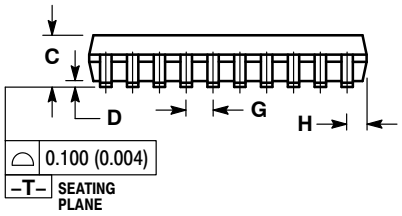


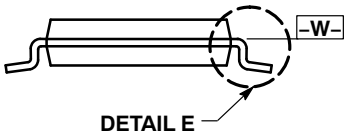


SECTION N−N



DETAIL E

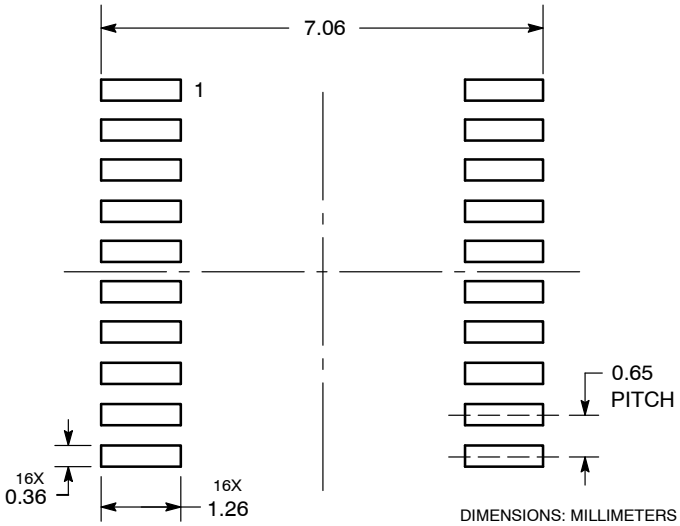




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD 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−.

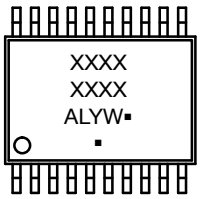
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010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

SOLDERING FOOTPRINT



DIMENSIONS: MILLIMETERS

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.

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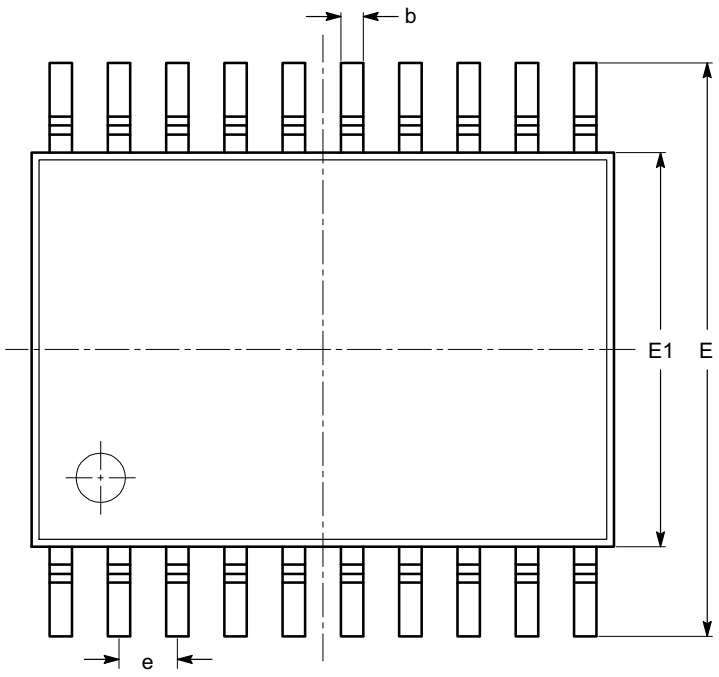
DESCRIPTION:	TSSOP−20 WB	PAGE 1 OF 1

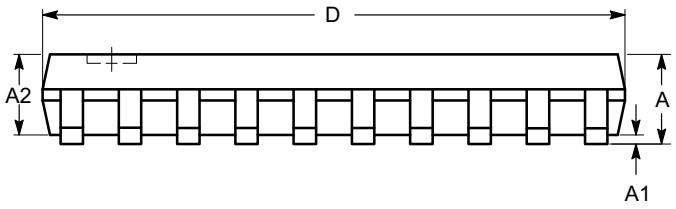
TSSOP20, 4.4x6.5
CASE 948AQ−01
ISSUE A

DATE 19 MAR 2009

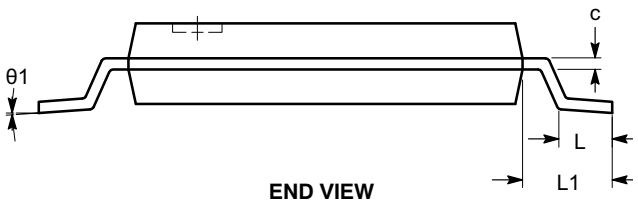


TOP VIEW

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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