

MC74AC125, MC74ACT125

Quad Buffer with 3-State Outputs

Features

- Outputs Source/Sink
- 'ACT125 Has TTL Compatible Inputs
- Pb-Free Packages are Available*

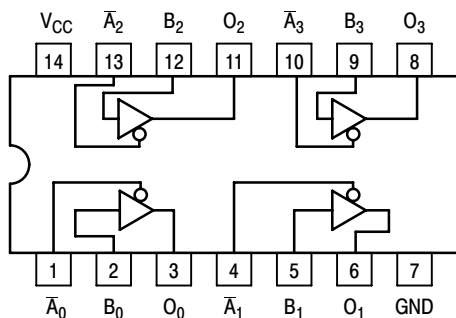


Figure 1. Pinout: 14-Lead Packages Conductors (Top View)

PIN ASSIGNMENT

PIN	FUNCTION
\bar{A}_n, B_n	Inputs
O _n	Outputs

FUNCTION TABLE

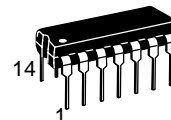
Inputs		Output
\bar{A}_n	B _n	O _n
L	L	L
L	H	H
H	X	Z

NOTE: H = High Voltage Level;
L = Low Voltage Level;
Z = High Impedance;
X = Immaterial

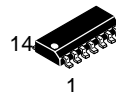


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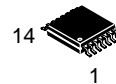
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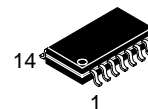
PDIP-14
N SUFFIX
CASE 646



SOIC-14
D SUFFIX
CASE 751A



TSSOP-14
DT SUFFIX
CASE 948G



SOEIAJ-14
M SUFFIX
CASE 965

ORDERING INFORMATION

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

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 5 of this data sheet.

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

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MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
V_{out}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	$^{\circ}\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V_{CC}	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V_{in}, V_{out}	DC Input Voltage, Output Voltage (Ref. to GND)	0	-	V_{CC}	V	
t_r, t_f	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V_{CC} @ 3.0 V	-	150	-	ns/V
		V_{CC} @ 4.5 V	-	40	-	
		V_{CC} @ 5.5 V	-	25	-	
T_J	Junction Temperature (PDIP)	-	-	140	$^{\circ}\text{C}$	
T_A	Operating Ambient Temperature Range	-40	25	85	$^{\circ}\text{C}$	
I_{OH}	Output Current - HIGH	-	-	-24	mA	
I_{OL}	Output Current - LOW	-	-	24	mA	

- V_{in} from 30% to 70% V_{CC} ; see individual Data Sheets for devices that differ from the typical input rise and fall times.
- V_{in} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

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DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74AC		74AC		Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 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	1.5	0.9	0.9	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 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	2.99	2.9	2.9	V	I _{OUT} = - 50 μA	
		4.5	4.46	4.4	4.4			
		5.5	5.49	5.4	5.4			
			3.0	-	2.56	2.46	V	*V _{IN} = V _{IL} or V _{IH} -12 mA I _{OH} - 24 mA - 24 mA
			4.5	-	3.86	3.76		
			5.5	-	4.86	4.76		
V _{OL}	Minimum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I _{OUT} = 50 μA	
		4.5	0.001	0.1	0.1			
		5.5	0.001	0.1	0.1			
			3.0	-	0.36	0.44	V	*V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA
			4.5	-	0.36	0.44		
			5.5	-	0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μA	V _I = V _{CC} , GND	
I _{OZ}	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND	5.5	-	±0.5	±5.0	μA	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND	
I _{OLD}	†Minimum Dynamic	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}	Output Current	5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5	-	8.0	80	μA	V _{IN} = V _{CC} or GND	

*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one input loaded at a time.

NOTE: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V.

AC CHARACTERISTICS

Symbol	Parameter	V _{CC} * (V)	74AC		74AC		Unit
			T _A = +25°C C _L = 50 pF		T _A = -40°C to +85°C C _L = 50 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Data to Output	3.3	1.0	9.0	1.0	10	ns
		5.0	1.0	7.0	1.0	7.5	
t _{PHL}	Propagation Delay Data to Output	3.3	1.0	9.0	1.0	10	ns
		5.0	1.0	7.0	1.0	7.5	
t _{PZH}	Output Enable Time	3.3	1.0	10.5	1.0	11	ns
		5.0	1.0	7.0	1.0	8.0	
t _{PZL}	Output Enable Time	3.3	1.0	10	1.0	11	ns
		5.0	1.0	8.0	1.0	8.5	
t _{PHZ}	Output Disable Time	3.3	1.0	10	1.0	10.5	ns
		5.0	1.0	9.0	1.0	9.5	
t _{PLZ}	Output Disable Time	3.3	1.0	10.5	1.0	11.5	ns
		5.0	1.0	9.0	1.0	9.5	

*Voltage Range 3.3 V is 3.3 V ±0.3 V.

Voltage Range 5.0 V is 5.0 V ±0.5 V.

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DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74ACT		74ACT		Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	4.5	1.5	2.2	2.0		V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		5.5	1.5	2.0	2.0			
V _{IL}	Maximum Low Level Input Voltage	4.5	1.5	0.8	0.8		V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		5.5	1.5	0.8	0.8			
V _{OH}	Minimum High Level Output Voltage	4.5	4.49	4.4	4.4		V	I _{OUT} = - 50 μA
		5.5	5.49	5.4	5.4			
		4.5	-	3.86	3.76		V	*V _{IN} = V _{IL} or V _{IH} - 24 mA I _{OH} - 24 mA
		5.5	-	4.86	4.76			
V _{OL}	Minimum Low Level Output Voltage	4.5	0.001	0.1	0.1		V	I _{OUT} = - 50 μA
		5.5	0.001	0.1	0.1			
		4.5	-	0.36	0.44		V	*V _{IN} = V _{IL} or V _{IH} I _{OH} - 24 mA - 24 mA
		5.5	-	0.36	0.44			
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0		μA	V _I = V _{CC} , GND
I _{OZ}	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND	5.5	-	±0.5	±5.0		μA	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND
ΔI _{CCCT}	Additional Max. I _{CC} /Input	5.5	0.6	-	1.5		mA	V _I = V _{CC} - 2.1 V
I _{OLD}	†Minimum Dynamic Output Current	5.5	-	-	75		mA	V _{OLD} = 1.65 V Max
I _{OHD}	Output Current	5.5	-	-	-75		mA	V _{OHD} = 3.85 V Min
I _{CC}	Maximum Quiescent Supply Current	5.5	-	8.0	80		μA	V _{IN} = V _{CC} or GND

*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one input loaded at a time.

AC CHARACTERISTICS

Symbol	Parameter	V _{CC} * (V)	74ACT		74ACT		Unit
			T _A = +25°C C _L = 50 pF		T _A = -40°C to +85°C C _L = 50 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns
t _{PHL}	Propagation Delay Data to Output	5.0	1.0	9.0	1.0	10	ns
t _{PZH}	Output Enable Time	5.0	1.0	8.5	1.0	9.5	ns
t _{PZL}	Output Enable Time	5.0	1.0	9.5	1.0	10.5	ns
t _{PHZ}	Output Disable Time	5.0	1.0	9.5	1.0	10.5	ns
t _{PLZ}	Output Disable Time	5.0	1.0	10	1.0	10.5	ns

*Voltage Range 5.0 V is 5.0 V ±0.5 V.

CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	45	pF	V _{CC} = 5.0 V

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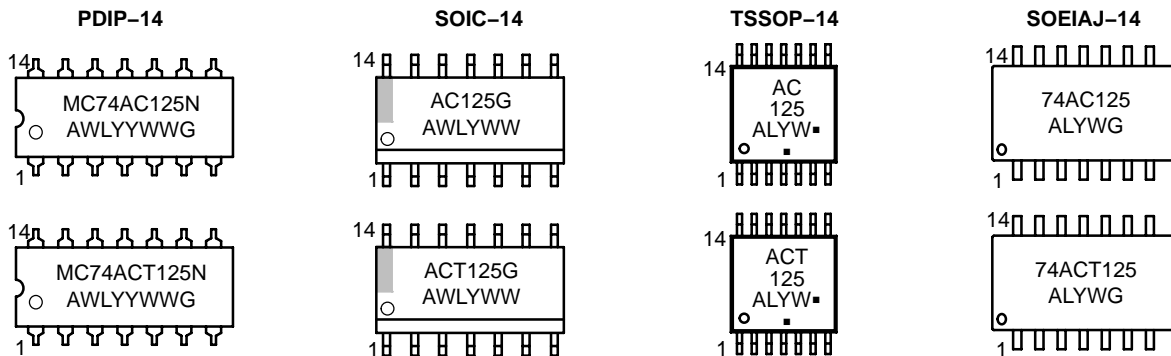
ORDERING INFORMATION

Device	Package	Shipping†
MC74AC125N	PDIP-14	25 Units / Rail
MC74AC125NG	PDIP-14 (Pb-Free)	
MC74AC125D	SOIC-14	55 Units / Rail
MC74AC125DG	SOIC-14 (Pb-Free)	
MC74AC125DR2	SOIC-14	2500 Tape & Reel
MC74AC125DR2G	SOIC-14 (Pb-Free)	
MC74AC125DTR2	TSSOP-14*	
MC74AC125DTR2G	TSSOP-14*	
MC74AC125M	SOEIAJ-14	50 Units / Rail
MC74AC125MG	SOEIAJ-14 (Pb-Free)	
MC74AC125MEL	SOEIAJ-14	2000 Tape & Reel
MC74AC125MELG	SOEIAJ-14 (Pb-Free)	
MC74ACT125AN	PDIP-14	25 Units / Rail
MC74ACT125ANG	PDIP-14 (Pb-Free)	
MC74ACT125D	SOIC-14	55 Units / Rail
MC74ACT125DG	SOIC-14 (Pb-Free)	
MC74ACT125DR2	SOIC-14	2500 Tape & Reel
MC74ACT125DR2G	SOIC-14 (Pb-Free)	
MC74ACT125DTR2	TSSOP-14*	
MC74ACT125DTR2G	TSSOP-14*	
MC74ACT125MEL	SOEIAJ-14	2000 Tape & Reel
MC74ACT125MELG	SOEIAJ-14 (Pb-Free)	

†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.

*This package is inherently Pb-Free.

MARKING DIAGRAMS

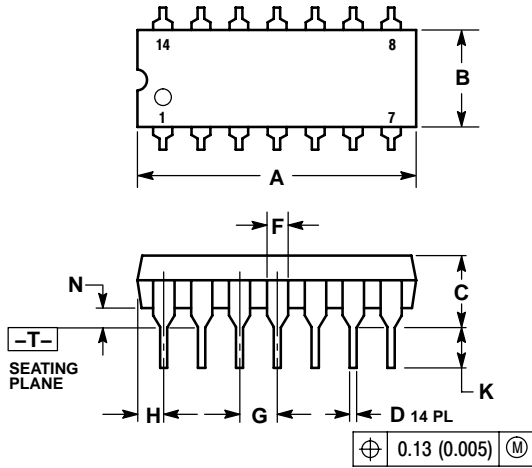


A = Assembly Location
 L, WL = Wafer Lot
 Y, YY = Year
 W, WW = Work Week
 G or ■ = Pb-Free Package
 (Note: Microdot may be in either location)

MC74AC125, MC74ACT125

PACKAGE DIMENSIONS

PDIP-14
N SUFFIX
CASE 646-06
ISSUE N

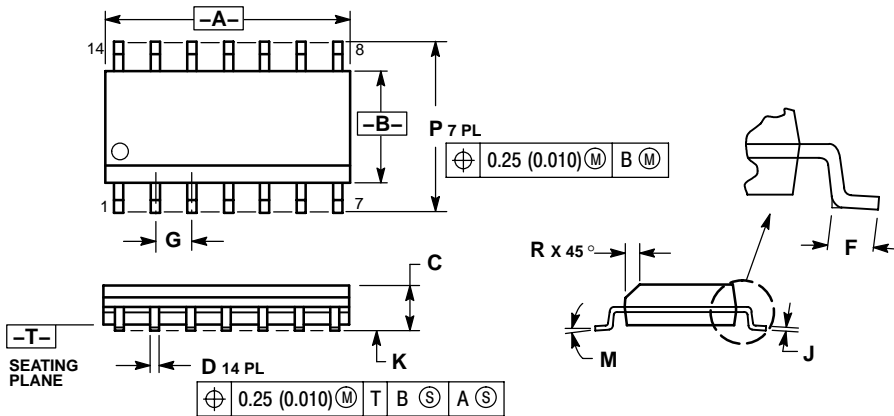


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	18.80
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.290	0.310	7.37	7.87
M	10°		10°	
N	0.015	0.039	0.38	1.01

SOIC-14
D SUFFIX
CASE 751A-03
ISSUE G



NOTES:

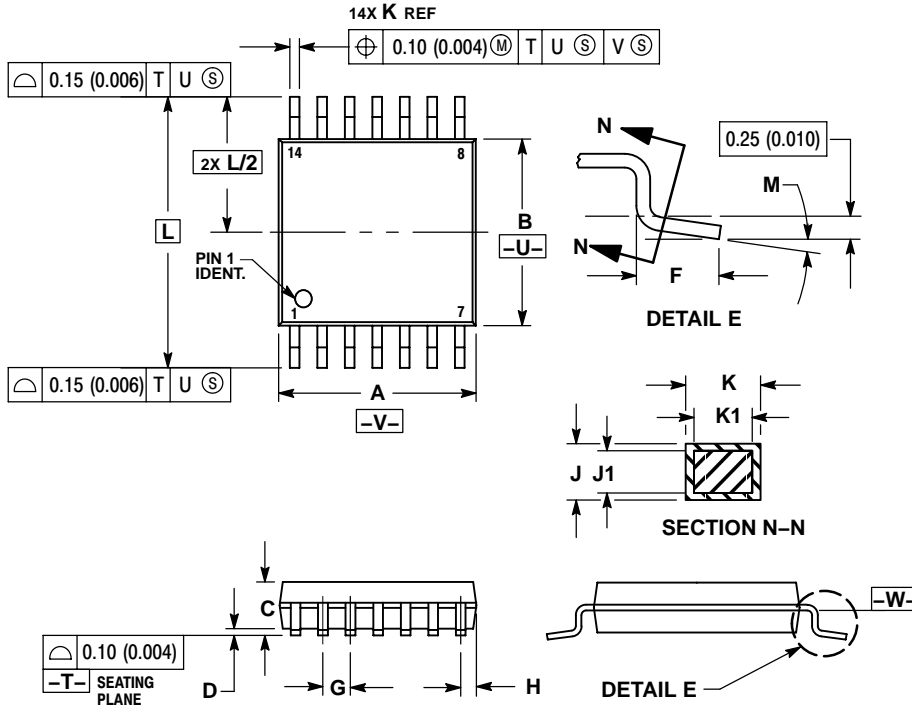
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0° 7°		0° 7°	
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

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PACKAGE DIMENSIONS

TSSOP-14
DT SUFFIX
CASE 948G-01
ISSUE A



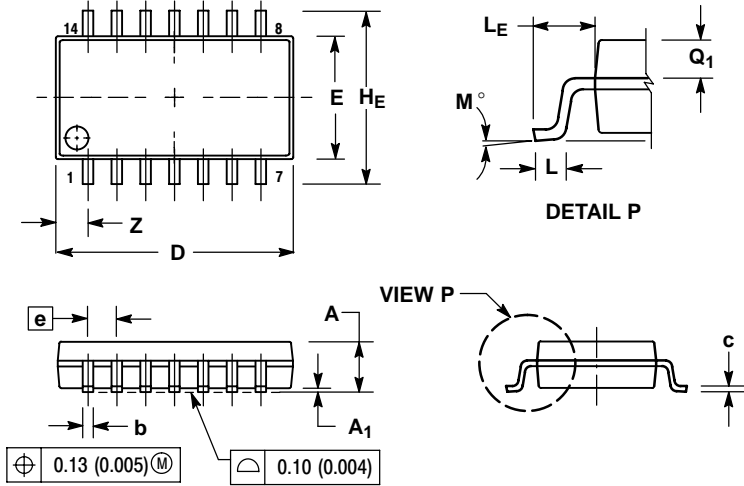
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
 4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION.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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
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	0.50	0.60	0.020	0.024
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°

MC74AC125, MC74ACT125

PACKAGE DIMENSIONS

SOEIAJ-14
M SUFFIX
CASE 965-01
ISSUE O



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A ₁	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.18	0.27	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H _E	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
L _E	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q ₁	0.70	0.90	0.028	0.035
Z	---	1.42	---	0.056

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