

# MC74AC08, MC74ACT08

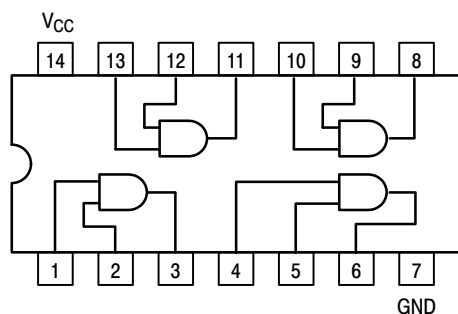
## Quad 2-Input AND Gate

- Outputs Source/Sink 24 mA
- 'ACT08 Has TTL Compatible Inputs
- Pb-Free Packages are Available

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage (Referenced to GND)	$V_{CC}$	-0.5 to +7.0	V
DC Input Voltage (Referenced to GND)	$V_{in}$	-0.5 to $V_{CC} + 0.5$	V
DC Output Voltage (Referenced to GND)	$V_{out}$	-0.5 to $V_{CC} + 0.5$	V
DC Input Current, per Pin	$I_{in}$	$\pm 20$	mA
DC Output Sink/Source Current, per Pin	$I_{out}$	$\pm 50$	mA
DC $V_{CC}$ or GND Current per Output Pin	$I_{CC}$	$\pm 50$	mA
Storage Temperature	$T_{stg}$	-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.



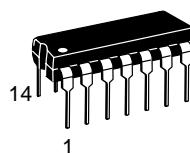
**Figure 1. Pinout: 14-Lead Packages Conductors**  
(Top View)

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

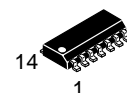


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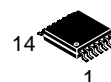
<http://onsemi.com>



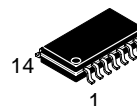
**PDIP-14**  
**N SUFFIX**  
**CASE 646**



**SO-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.

# MC74AC08, MC74ACT08

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Typ	Max	Unit
V <sub>CC</sub>	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V <sub>in</sub> , V <sub>out</sub>	DC Input Voltage, Output Voltage (Ref. to GND)		0	–	V <sub>CC</sub>	V
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 3.0 V	–	150	–	ns/V
		V <sub>CC</sub> @ 4.5 V	–	40	–	
		V <sub>CC</sub> @ 5.5 V	–	25	–	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V <sub>CC</sub> @ 4.5 V	–	10	–	ns/V
		V <sub>CC</sub> @ 5.5 V	–	8.0	–	
T <sub>J</sub>	Junction Temperature (PDIP)		–	–	140	°C
T <sub>A</sub>	Operating Ambient Temperature Range		–40	25	85	°C
I <sub>OH</sub>	Output Current – High		–	–	–24	mA
I <sub>OL</sub>	Output Current – Low		–	–	24	mA

1. V<sub>in</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. V<sub>in</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

## DC CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	74AC		74AC	Unit
				T <sub>A</sub> = +25°C		T <sub>A</sub> = –40°C to +85°C	
						Typ	
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	3.0	1.5	2.1	2.1	V
			4.5	2.25	3.15	3.15	
			5.5	2.75	3.85	3.85	
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	3.0	1.5	0.9	0.9	V
			4.5	2.25	1.35	1.35	
			5.5	2.75	1.65	1.65	
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OUT</sub> = –50 μA	3.0	2.99	2.9	2.9	V
			4.5	4.49	4.4	4.4	
			5.5	5.49	5.4	5.4	
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Note 3) –12 mA I <sub>OH</sub> –24 mA –24 mA	3.0	–	2.56	2.46	V
			4.5	–	3.86	3.76	
			5.5	–	4.86	4.76	
V <sub>OL</sub>	Maximum Low Level Output Voltage	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Note 3) 12 mA	3.0	–	0.36	0.44	V
		I <sub>OL</sub> 24 mA	4.5	–	0.36	0.44	
		24 mA	5.5	–	0.36	0.44	
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> , GND	5.5	–	±0.1	±1.0	μA
I <sub>OLD</sub>	Minimum Dynamic (Note 4) Output Current	V <sub>OLD</sub> = 1.65 V Max	5.5	–	–	75	mA
I <sub>OHD</sub>		V <sub>OHD</sub> = 3.85 V Min	5.5	–	–	–75	mA
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	–	4.0	40	μA

NOTE: I<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

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

4. Maximum test duration 2.0 ms, one output loaded at a time.

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**AC CHARACTERISTICS** (For Figures and Waveforms – See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

Symbol	Parameter	V <sub>CC</sub> (V) (Note5 )	74AC			74AC		Unit	Fig. No.
			T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	3.3 5.0	1.5 1.5	7.5 5.5	9.5 7.5	1.0 1.0	10.0 8.5	ns	3-5
t <sub>PHL</sub>	Propagation Delay	3.3 5.0	1.5 1.5	7.0 5.5	8.5 7.0	1.0 1.0	9.0 7.5	ns	3-5

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.

## DC CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	74ACT		74ACT		Unit
				T <sub>A</sub> = +25°C		T <sub>A</sub> = –40°C to +85°C		
						Typ	Guaranteed Limits	
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	4.5	1.5	2.0	2.0	V	
			5.5	1.5	2.0	2.0		
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> – 0.1 V	4.5	1.5	0.8	0.8	V	
			5.5	1.5	0.8	0.8		
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OUT</sub> = –50 μA	4.5	4.49	4.4	4.4	V	
			5.5	5.49	5.4	5.4		
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Note 6)					V	
			–24 mA	4.5	–	3.86		3.76
	–24 mA	5.5	–	4.86	4.76			
V <sub>OL</sub>	Maximum Low Level Output Voltage	I <sub>OUT</sub> = 50 μA	4.5	0.001	0.1	0.1	V	
			5.5	0.001	0.1	0.1		
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Note 6)					V	
			24 mA	4.5	–	0.36		0.44
	24 mA	5.5	–	0.36	0.44			
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> , GND	5.5	–	±0.1	±1.0	μA	
ΔI <sub>CCT</sub>	Additional Max. I <sub>CC</sub> /Input	V <sub>I</sub> = V <sub>CC</sub> – 2.1 V	5.5	0.6	–	1.5	mA	
I <sub>OLD</sub>	Minimum Dynamic (Note 7) Output Current	V <sub>OLD</sub> = 1.65 V Max	5.5	–	–	75	mA	
I <sub>OHD</sub>		V <sub>OHD</sub> = 3.85 V Min	5.5	–	–	–75	mA	
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	–	4.0	40	μA	

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

# MC74AC08, MC74ACT08

**AC CHARACTERISTICS** (For Figures and Waveforms – See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

Symbol	Parameter	V <sub>CC</sub> (V) (Note 8)	74ACT			74ACT		Unit	Fig. No.
			T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = –40°C to +85°C C <sub>L</sub> = 50 pF			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	5.0	1.0	–	9.0	1.0	10.0	ns	3–5
t <sub>PHL</sub>	Propagation Delay	5.0	1.0	–	9.0	1.0	10.0	ns	3–5

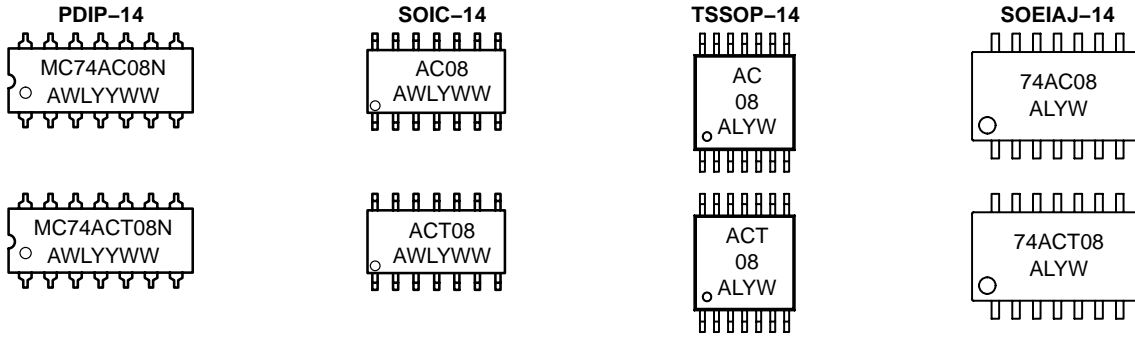
8. Voltage Range 5.0 V is 5.0 V ±0.5 V.

## CAPACITANCE

Symbol	Parameter	Test Conditions	Value Typ	Unit
C <sub>IN</sub>	Input Capacitance	V <sub>CC</sub> = 5.0 V	4.5	pF
C <sub>PD</sub>	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0 V	20	pF

# MC74AC08, MC74ACT08

## MARKING DIAGRAMS



A = Assembly Location  
 WL, L = Wafer Lot  
 YY, Y = Year  
 WW, W = Work Week

## ORDERING INFORMATION

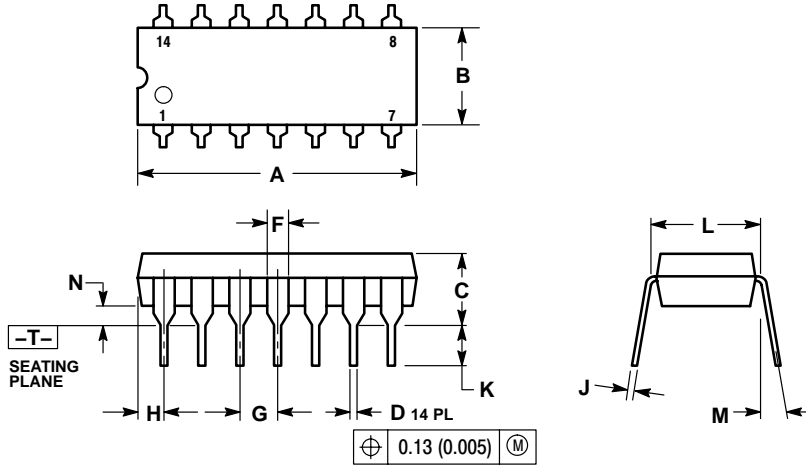
Device	Package	Shipping†
MC74AC08N	PDIP-14	500 Units / Rail
MC74AC08D	SOIC-14	55 Units / Rail
MC74AC08DR2	TSSOP-14	2500 / Tape & Reel
MC74AC08DTR2	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
MC74AC08MEL	SOEIAJ-14 (Pb-Free)	2000 / Tape & Reel
MC74ACT08N	PDIP-14	500 Units / Rail
MC74ACT08D	SOIC-14	55 Units / Rail
MC74ACT08DR2	SOIC-14	2500 / Tape & Reel
MC74ACT08DTR2G	SOIC-14 (Pb-Free)	2500 / Tape & Reel
MC74ACT08NG	PDIP-14 (Pb-Free)	500 Units / Rail
MC74ACT08MEL	SOEIAJ-14 (Pb-Free)	2000 / 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.

# MC74AC08, MC74ACT08

## PACKAGE DIMENSIONS

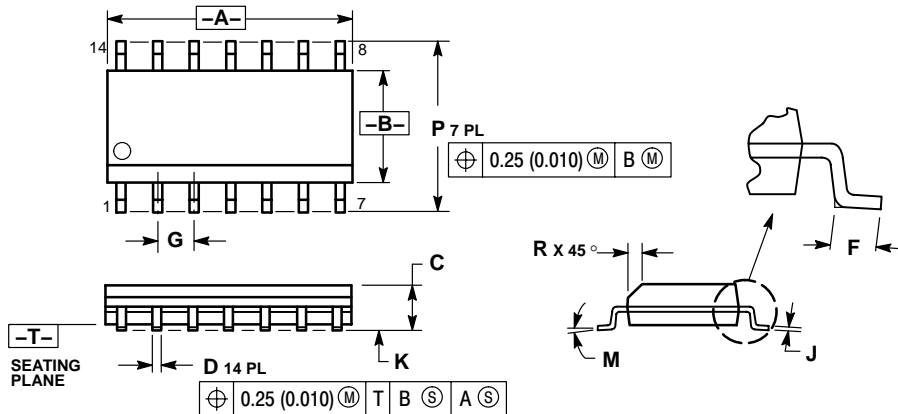
**PDIP-14**  
**N SUFFIX**  
CASE 646-06  
ISSUE N



### 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.

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



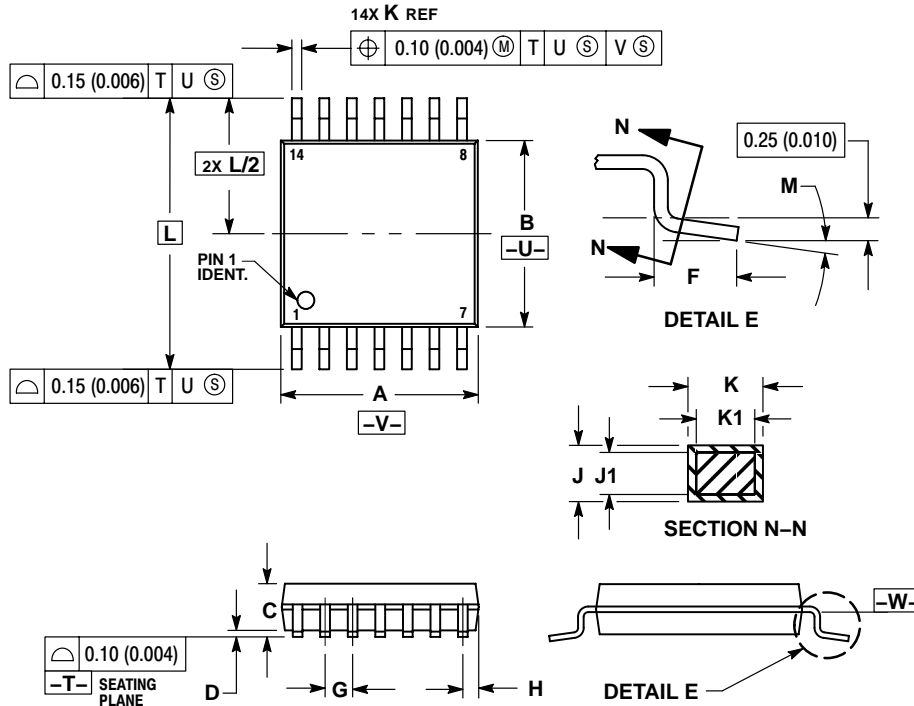
### NOTES:

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.

# MC74AC08, MC74ACT08

## PACKAGE DIMENSIONS

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

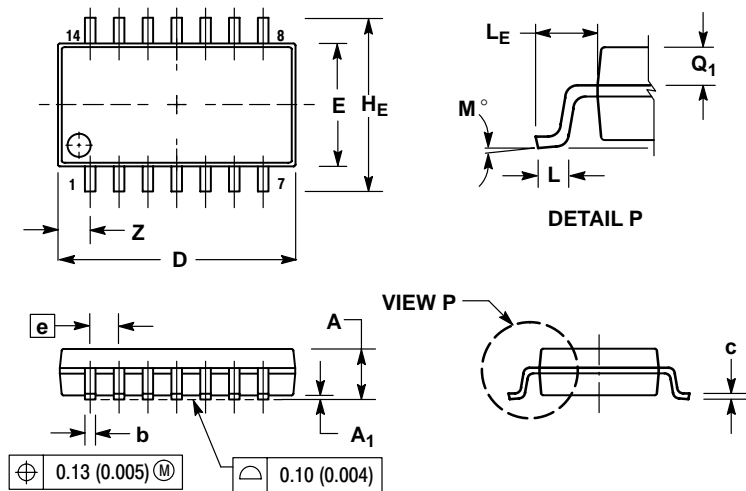


### NOTES:

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°


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 <sub>1</sub>	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 <sub>E</sub>	7.40	8.20	0.291	0.323
0.50	0.50	0.85	0.020	0.033
L <sub>E</sub>	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q <sub>1</sub>	0.70	0.90	0.028	0.035
Z	---	1.42	---	0.056

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