

MC74AC138, MC74ACT138

1-of-8 Decoder/Demultiplexer

The MC74AC138/74ACT138 is a high-speed 1-of-8 decoder/demultiplexer. This device is ideally suited for high-speed bipolar memory chip select address decoding.

The multiple input enables allow parallel expansion to a 1-of-24 decoder using just three MC74AC138/74ACT138 devices or a 1-of-32 decoder using four MC74AC138/74ACT138 devices and one inverter.

- Demultiplexing Capability
- Multiple Input Enable for Easy Expansion
- Active LOW Mutually Exclusive Outputs
- Outputs Source/Sink 24 mA
- 'ACT138 Has TTL Compatible Inputs
- These devices are available in Pb-free package(s). Specifications herein apply to both standard and Pb-free devices. Please see our website at www.onsemi.com for specific Pb-free orderable part numbers, or contact your local ON Semiconductor sales office or representative.

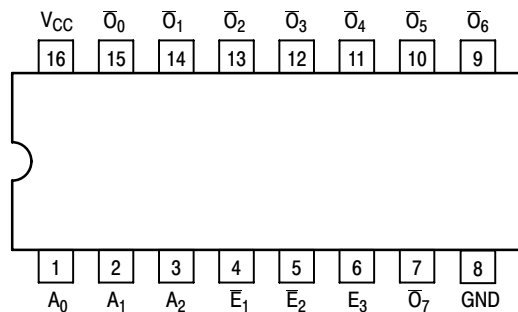


Figure 1. Pinout: 16-Lead Packages Conductors (Top View)

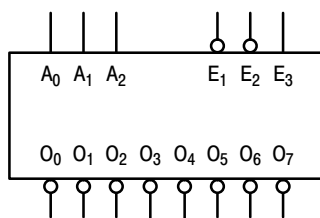


Figure 2. Logic Symbol

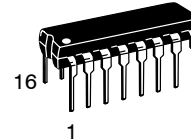
PIN ASSIGNMENT

| PIN | FUNCTION |
|--------------------------------|----------------|
| A ₀ -A ₂ | Address Inputs |
| \bar{E}_1 - \bar{E}_2 | Enable Inputs |
| E ₃ | Enable Input |
| \bar{O}_0 - \bar{O}_7 | Outputs |

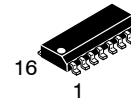


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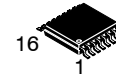
<http://onsemi.com>



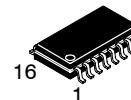
DIP-16
N SUFFIX
CASE 648



SO-16
D SUFFIX
CASE 751B



TSSOP-16
DT SUFFIX
CASE 948F



EIAJ-16
M SUFFIX
CASE 966

ORDERING INFORMATION

| Device | Package | Shipping |
|----------------|----------|------------------|
| MC74AC138N | PDIP-16 | 25 Units/Rail |
| MC74ACT138N | PDIP-16 | 25 Units/Rail |
| MC74AC138D | SOIC-16 | 48 Units/Rail |
| MC74ACT138D | SOIC-16 | 48 Units/Rail |
| MC74AC138DR2 | SOIC-16 | 2500 Tape & Reel |
| MC74ACT138DR2 | SOIC-16 | 2500 Tape & Reel |
| MC74AC138DT | TSSOP-16 | 96 Units/Rail |
| MC74ACT138DT | TSSOP-16 | 96 Units/Rail |
| MC74AC138DTR2 | TSSOP-16 | 2500 Tape & Reel |
| MC74ACT138DTR2 | TSSOP-16 | 2500 Tape & Reel |
| MC74AC138M | EIAJ-16 | 50 Units/Rail |
| MC74ACT138M | EIAJ-16 | 50 Units/Rail |
| MC74AC138MEL | EIAJ-16 | 2000 Tape & Reel |
| MC74ACT138MEL | EIAJ-16 | 2000 Tape & Reel |

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 6 of this data sheet.

MC74AC138, MC74ACT138

FUNCTIONAL DESCRIPTION

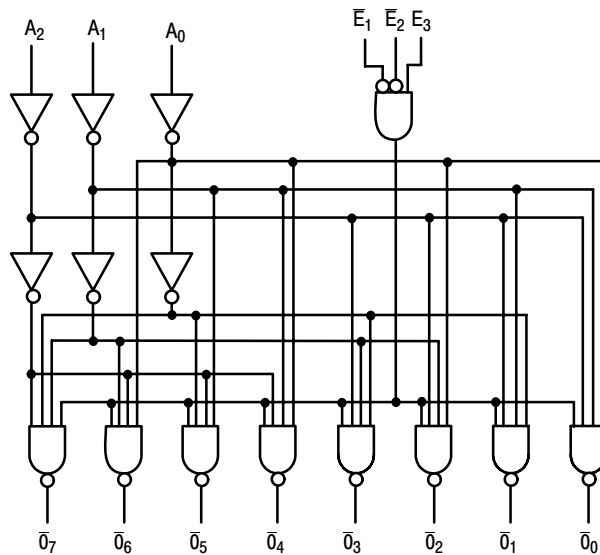
The MC74AC138/74ACT138 high-speed 1-of-8 decoder/demultiplexer accepts three binary weighted inputs (A_0, A_1, A_2) and, when enabled, provides eight mutually exclusive active-LOW outputs ($\bar{O}_0-\bar{O}_7$). The MC74AC138/74ACT138 features three Enable inputs, two active-LOW (\bar{E}_1, \bar{E}_2) and one active-HIGH (E_3). All outputs will be HIGH unless \bar{E}_1 and \bar{E}_2 are LOW and E_3 is

HIGH. This multiple enabled function allows easy parallel expansion of the device to a 1-of-32 (5 lines to 32 lines) decoder with just four MC74AC138/74ACT138 devices and one inverter (See Figure 4). The MC74AC138/74ACT138 can be used as an 8-output demultiplexer by using one of the active LOW Enable inputs as the data input and the other Enable inputs as strobes. The Enable inputs which are not used must be permanently tied to their appropriate active-HIGH or active-LOW state.

TRUTH TABLE

| Inputs | | | | | | Outputs | | | | | | | |
|-------------|-------------|-------------|-------|-------|-------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| \bar{E}_1 | \bar{E}_2 | \bar{E}_3 | A_0 | A_1 | A_2 | \bar{O}_0 | \bar{O}_1 | \bar{O}_2 | \bar{O}_3 | \bar{O}_4 | \bar{O}_5 | \bar{O}_6 | \bar{O}_7 |
| H | X | X | X | X | X | H | H | H | H | H | H | H | H |
| X | H | X | X | X | X | H | H | H | H | H | H | H | H |
| X | X | L | X | X | X | H | H | H | H | H | H | H | H |
| L | L | H | L | L | L | L | H | H | H | H | H | H | H |
| L | L | H | H | L | L | H | L | H | H | H | H | H | H |
| L | L | H | L | H | L | H | H | L | H | H | H | H | H |
| L | L | H | H | H | L | H | H | H | L | H | H | H | H |
| L | L | H | L | L | H | H | H | H | H | L | H | H | H |
| L | L | H | H | L | H | H | H | H | H | H | L | H | H |
| L | L | H | L | H | H | H | H | H | H | H | H | L | H |
| L | L | H | H | H | H | H | H | H | H | H | H | H | L |

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



NOTE: This diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Figure 3. Logic Diagram

MC74AC138, MC74ACT138

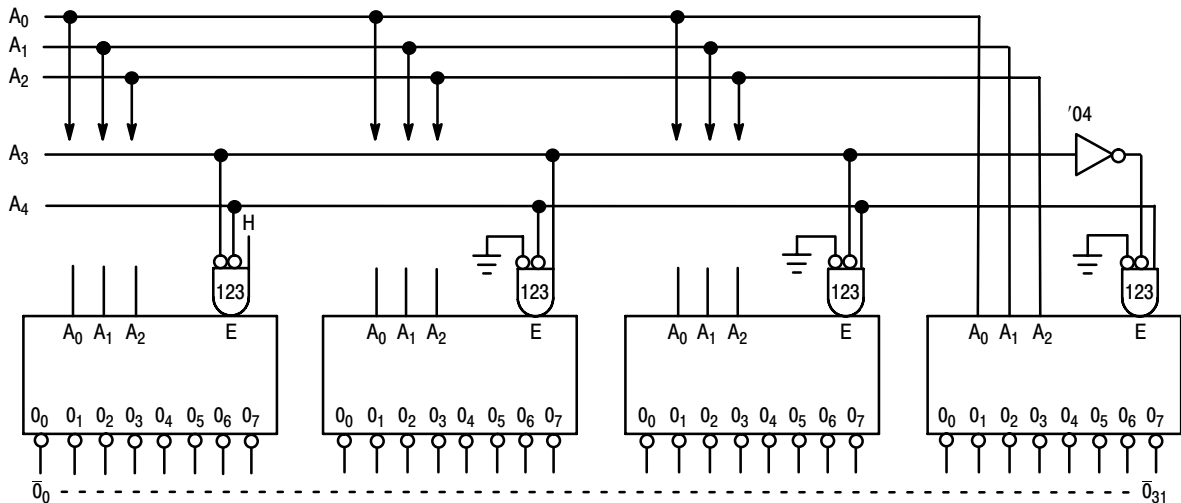


Figure 4. Expansion to 1-of-32 Decoding

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 damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

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 | $V_{CC} @ 3.0\text{ V}$ | - | 150 | - | ns/V |
| | | $V_{CC} @ 4.5\text{ V}$ | - | 40 | - | |
| | | $V_{CC} @ 5.5\text{ V}$ | - | 25 | - | |
| t_r, t_f | Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs | $V_{CC} @ 4.5\text{ V}$ | - | 10 | - | ns/V |
| | | $V_{CC} @ 5.5\text{ V}$ | - | 8.0 | - | |
| 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 | |

1. V_{IN} from 30% to 70% V_{CC} ; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. 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 | 4.49 | 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} | Maximum 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 _{OLD} | †Minimum Dynamic Output Current | 5.5 | - | - | 75 | mA | V _{OLD} = 1.65 V Max |
| I _{OHD} | | 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 output 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 V_{CC}.

MC74AC138, MC74ACT138

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

| Symbol | Parameter | V _{CC} * (V) | 74AC | | | 74AC | | Unit | Fig. No. |
|------------------|--|--------------------------|--|-------------|--------------|--|--------------|------|----------|
| | | | T _A = +25°C C _L = 50 pF | | | T _A = -40°C to +85°C C _L = 50 pF | | | |
| | | | Min | Typ | Max | Min | Max | | |
| t _{PLH} | Propagation Delay A _n to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 8.5 6.5 | 13.0 9.5 | 1.5 1.5 | 15.0 10.5 | ns | 3-6 |
| t _{PHL} | Propagation Delay A _n to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 8.0 6.0 | 12.5 9.0 | 1.5 1.5 | 14.0 10.5 | ns | 3-6 |
| t _{PLH} | Propagation Delay \bar{E}_1 or \bar{E}_2 to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 11.0 8.0 | 15.0 11.0 | 1.5 1.5 | 16.0 12.0 | ns | 3-6 |
| t _{PHL} | Propagation Delay E ₁ or E ₂ to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 9.5 7.0 | 13.5 9.5 | 1.5 1.5 | 15.0 10.5 | ns | 3-6 |
| t _{PLH} | Propagation Delay E ₃ to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 11.0 8.0 | 15.5 11.0 | 1.5 1.5 | 16.5 12.5 | ns | 3-6 |
| t _{PHL} | Propagation Delay E ₃ to \bar{O}_n | 3.3 5.0 | 1.5 1.5 | 8.5 6.0 | 13.0 8.0 | 1.5 1.0 | 14.0 9.5 | ns | 3-6 |

*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 | 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 | 2.0 | 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 | |
| | | 5.5 | - | 4.86 | 4.76 | | | |
| V _{OL} | Maximum 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} 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 | |
| ΔI _{CCT} | 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} | | 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 output loaded at a time.

MC74AC138, MC74ACT138

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

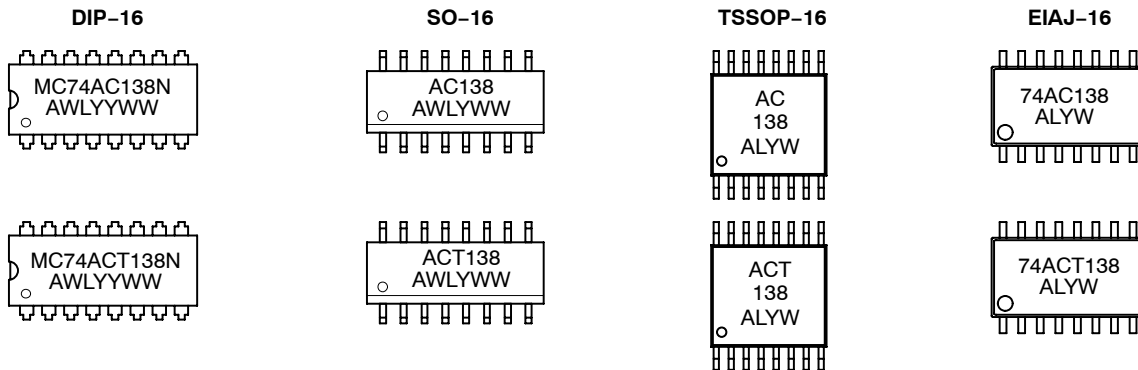
| Symbol | Parameter | V _{CC} * (V) | 74ACT | | | 74ACT | | Unit | Fig. No. |
|------------------|--|--------------------------|--|-----|------|--|------|------|----------|
| | | | T _A = +25°C C _L = 50 pF | | | T _A = -40°C to +85°C C _L = 50 pF | | | |
| | | | Min | Typ | Max | Min | Max | | |
| t _{PLH} | Propagation Delay A _n to \bar{O}_n | 5.0 | 1.5 | 7.0 | 10.5 | 1.5 | 11.5 | ns | 3-6 |
| t _{PHL} | Propagation Delay A _n to \bar{O}_n | 5.0 | 1.5 | 6.5 | 10.5 | 1.5 | 11.5 | ns | 3-6 |
| t _{PLH} | Propagation Delay \bar{E}_1 or \bar{E}_2 to \bar{O}_n | 5.0 | 2.5 | 8.0 | 11.5 | 2.0 | 12.5 | ns | 3-6 |
| t _{PHL} | Propagation Delay \bar{E}_1 or \bar{E}_2 to \bar{O}_n | 5.0 | 2.0 | 7.5 | 11.5 | 2.0 | 12.5 | ns | 3-6 |
| t _{PLH} | Propagation Delay E ₃ to \bar{O}_n | 5.0 | 2.5 | 8.0 | 12.0 | 2.0 | 13.0 | ns | 3-6 |
| t _{PHL} | Propagation Delay E ₃ to \bar{O}_n | 5.0 | 2.0 | 6.5 | 10.5 | 1.5 | 11.5 | ns | 3-6 |

*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 | 60 | pF | V _{CC} = 5.0 V |

MARKING DIAGRAMS

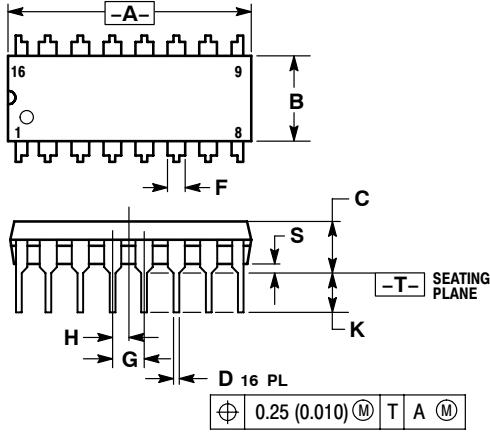


A = Assembly Location
 WL, L = Wafer Lot
 YY, Y = Year
 WW, W = Work Week

MC74AC138, MC74ACT138

PACKAGE DIMENSIONS

PDIP-16 N SUFFIX 16 PIN PLASTIC DIP PACKAGE CASE 648-08 ISSUE R

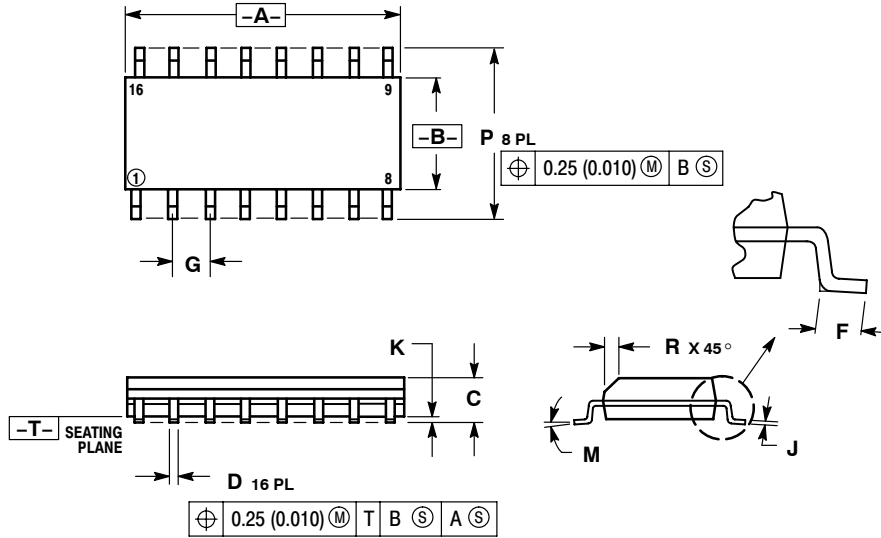


NOTES:

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 | 0.740 | 0.770 | 18.80 | 19.55 |
| B | 0.250 | 0.270 | 6.35 | 6.85 |
| C | 0.145 | 0.175 | 3.69 | 4.44 |
| D | 0.015 | 0.021 | 0.39 | 0.53 |
| F | 0.040 | 0.70 | 1.02 | 1.77 |
| G | 0.100 BSC | | 2.54 BSC | |
| H | 0.050 BSC | | 1.27 BSC | |
| J | 0.008 | 0.015 | 0.21 | 0.38 |
| K | 0.110 | 0.130 | 2.80 | 3.30 |
| L | 0.295 | 0.305 | 7.50 | 7.74 |
| M | 0° | 10° | 0° | 10° |
| S | 0.020 | 0.040 | 0.51 | 1.01 |

SO-16 D SUFFIX 16 PIN PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



NOTES:

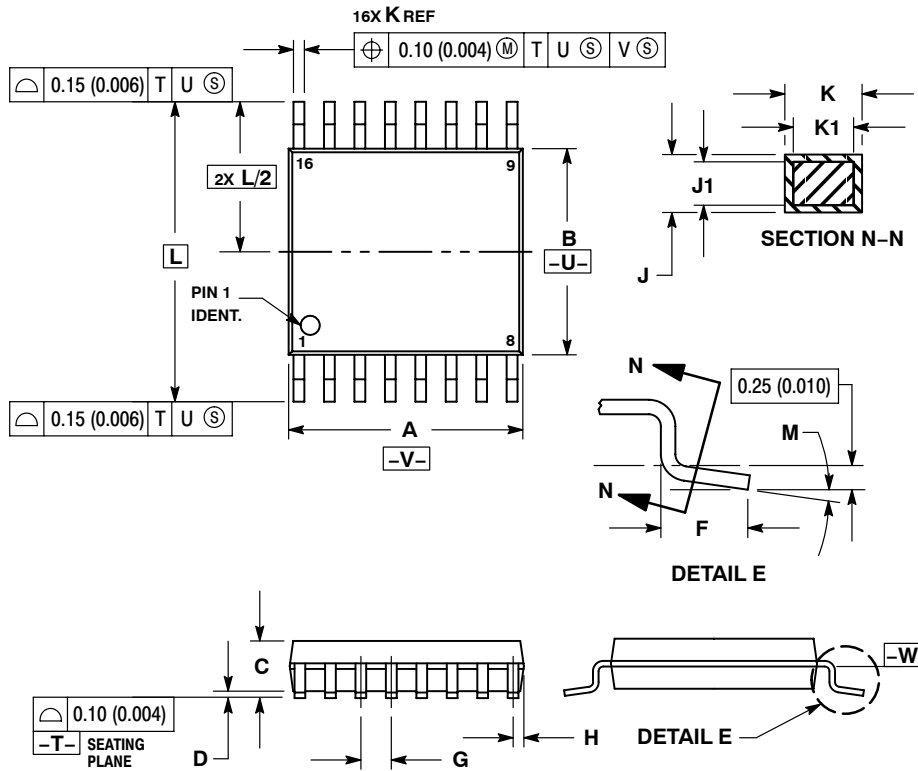
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 9.80 | 10.00 | 0.386 | 0.393 |
| 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 | 0.229 | 0.244 |
| R | 0.25 | 0.50 | 0.010 | 0.019 |

MC74AC138, MC74ACT138

PACKAGE DIMENSIONS

TSSOP-16
DT SUFFIX
 16 PIN PLASTIC TSSOP PACKAGE
 CASE948F-01
 ISSUE O

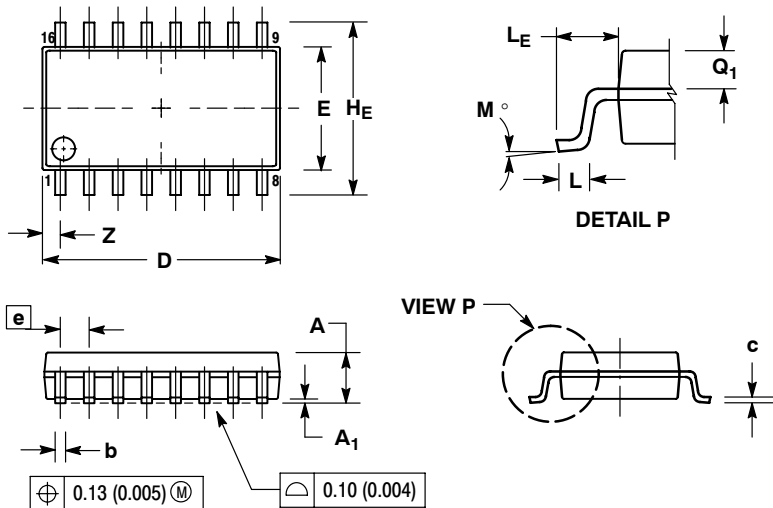


NOTES:

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 | 0.18 | 0.28 | 0.007 | 0.011 |
| 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° |

EIAJ-16
M SUFFIX
 16 PIN PLASTIC EIAJ PACKAGE
 CASE966-01
 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 |
| A1 | 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 | |
| He | 7.40 | 8.20 | 0.291 | 0.323 |
| L | 0.50 | 0.85 | 0.020 | 0.033 |
| Le | 1.10 | 1.50 | 0.043 | 0.059 |
| M | 0° | 10° | 0° | 10° |
| Q1 | 0.70 | 0.90 | 0.028 | 0.035 |
| Z | --- | 0.78 | --- | 0.031 |

Notes

Notes

Notes

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