

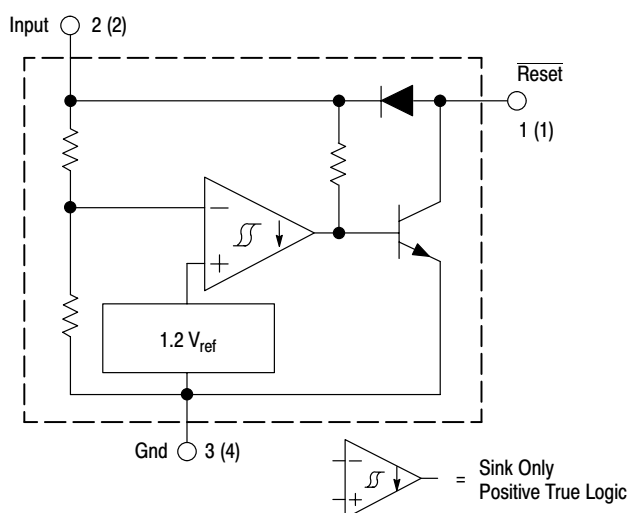
# MC34064, MC33064, NCV33064

## Undervoltage Sensing Circuit

The MC34064 is an undervoltage sensing circuit specifically designed for use as a reset controller in microprocessor-based systems. It offers the designer an economical solution for low voltage detection with a single external resistor. The MC34064 features a trimmed-in-package bandgap reference, and a comparator with precise thresholds and built-in hysteresis to prevent erratic reset operation. The open collector reset output is capable of sinking in excess of 10 mA, and operation is guaranteed down to 1.0 V input with low standby current. The MC devices are packaged in 3-pin TO-226AA, 8-pin SO-8 and Micro8 surface mount packages. The NCV device is packaged in SO-8 and TO-226AA.

Applications include direct monitoring of the 5.0 V MPU/logic power supply used in appliance, automotive, consumer and industrial equipment.

- Trimmed-In-Package Temperature Compensated Reference
- Comparator Threshold of 4.6 V at 25°C
- Precise Comparator Thresholds Guaranteed Over Temperature
- Comparator Hysteresis Prevents Erratic Reset
- Reset Output Capable of Sinking in Excess of 10 mA
- Internal Clamp Diode for Discharging Delay Capacitor
- Guaranteed Reset Operation with 1.0 V Input
- Low Standby Current
- Economical TO-226AA, SO-8 and Micro8 Surface Mount Packages



Pin numbers adjacent to terminals are for the 3-pin TO-226AA package. Pin numbers in parenthesis are for the 8-lead packages.

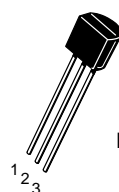
This device contains 21 active transistors.

**Figure 1. Representative Block Diagram**



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**TO-226AA  
P SUFFIX  
CASE 29**

- Pin
1. Reset
  2. Input
  3. Ground

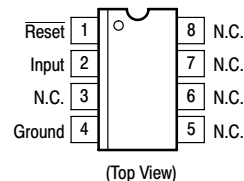


**SO-8  
D SUFFIX  
CASE 751**



**Micro8  
DM SUFFIX  
CASE 846A**

### PIN CONNECTIONS



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

### DEVICE MARKING INFORMATION

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



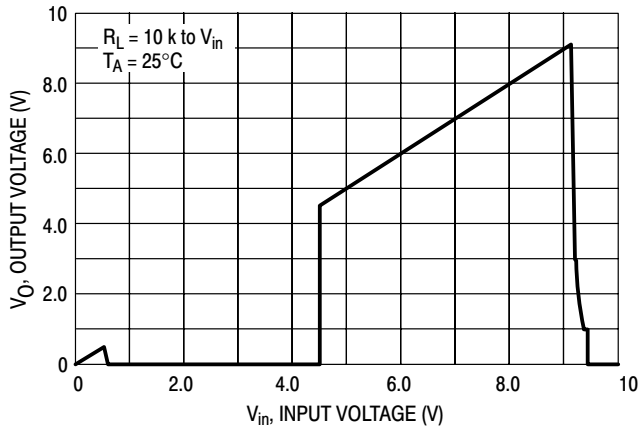


Figure 2. Reset Output Voltage versus Input Voltage

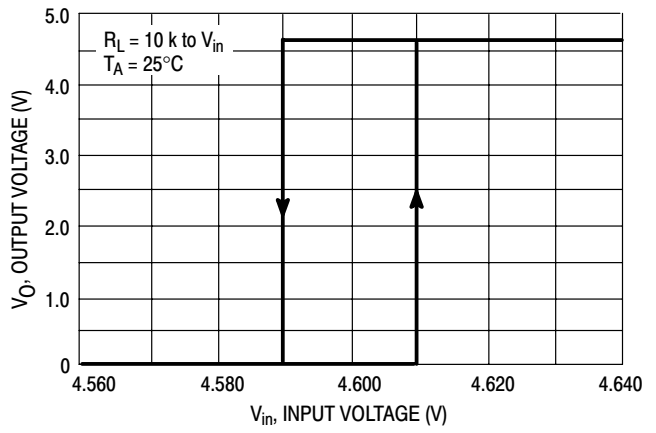


Figure 3. Reset Output Voltage versus Input Voltage

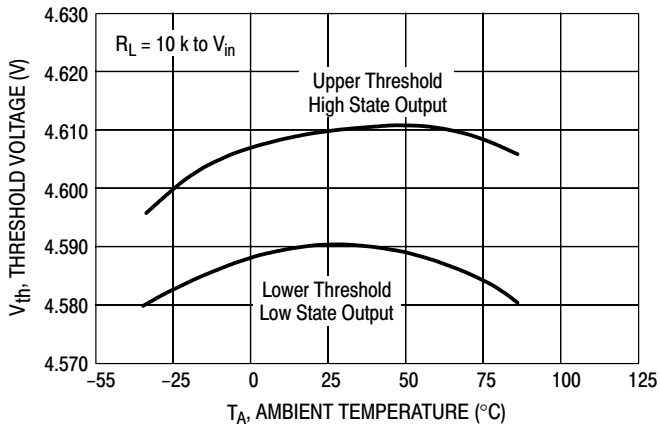


Figure 4. Comparator Threshold Voltage versus Temperature

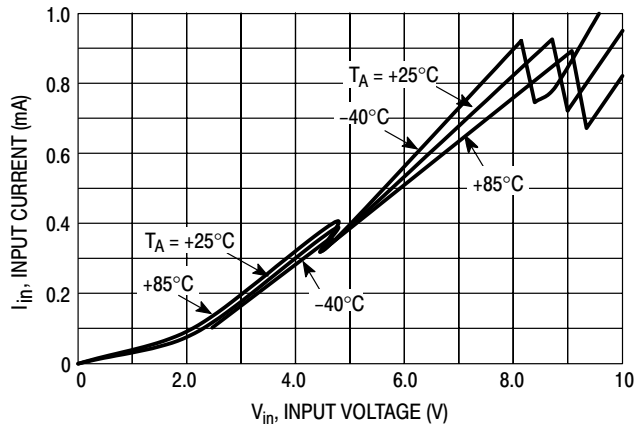


Figure 5. Input Current versus Input Voltage

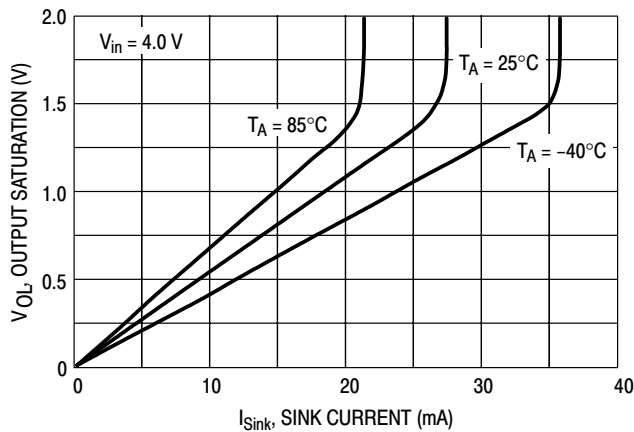


Figure 6. Reset Output Saturation versus Sink Current

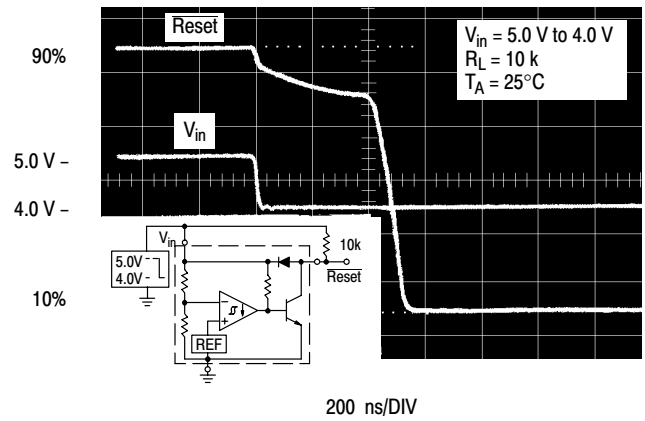
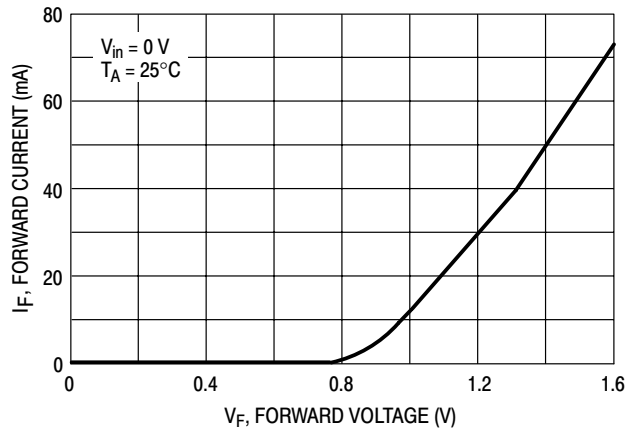
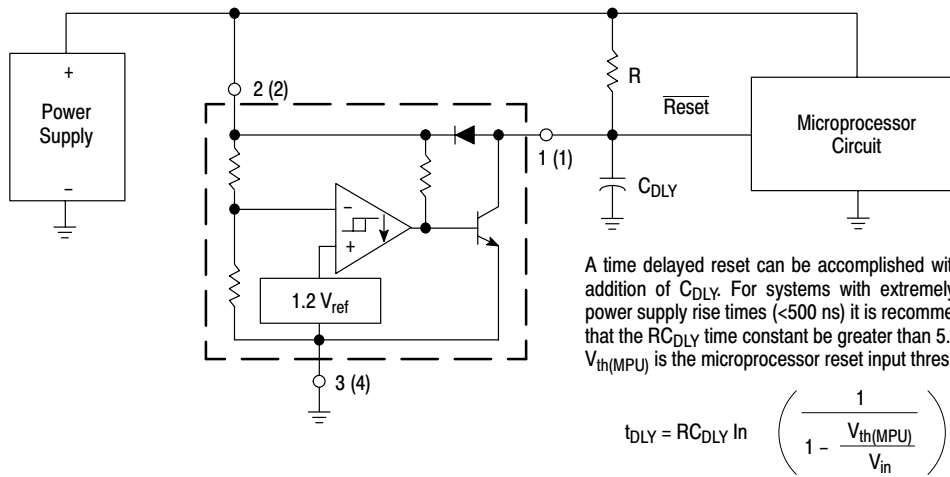


Figure 7. Reset Delay Time

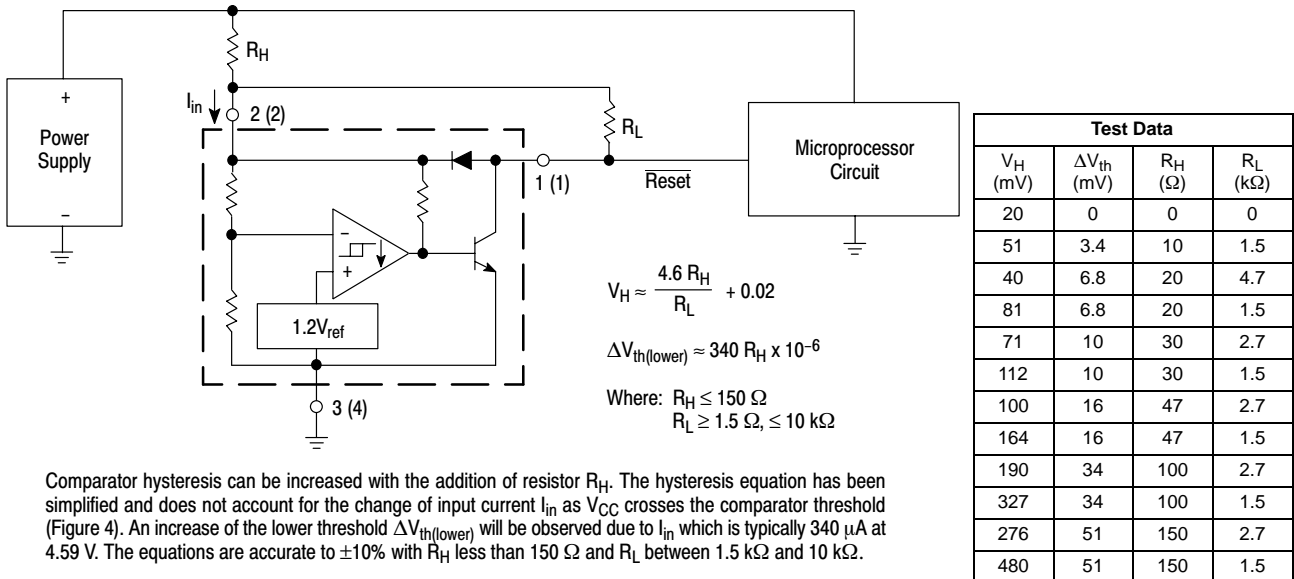
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**Figure 8. Clamp Diode Forward Current versus Voltage**



**Figure 9. Low Voltage Microprocessor Reset**



**Figure 10. Low Voltage Microprocessor Reset with Additional Hysteresis**

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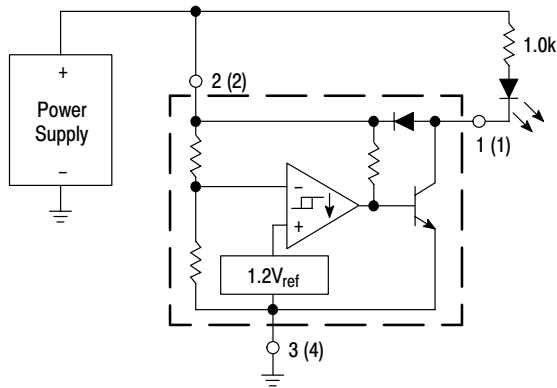


Figure 11. Voltage Monitor

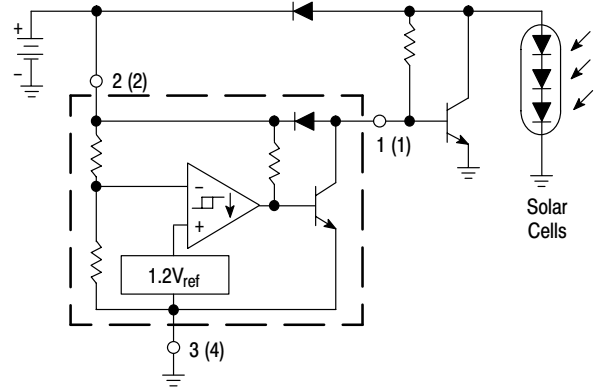
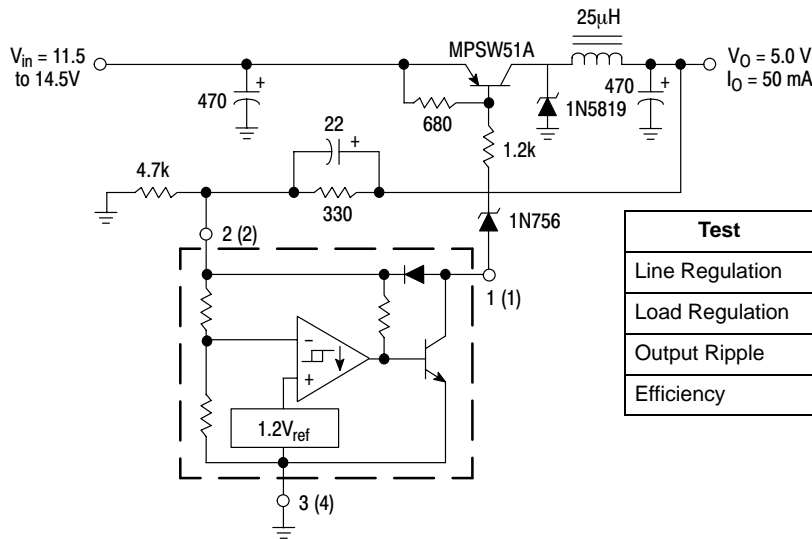
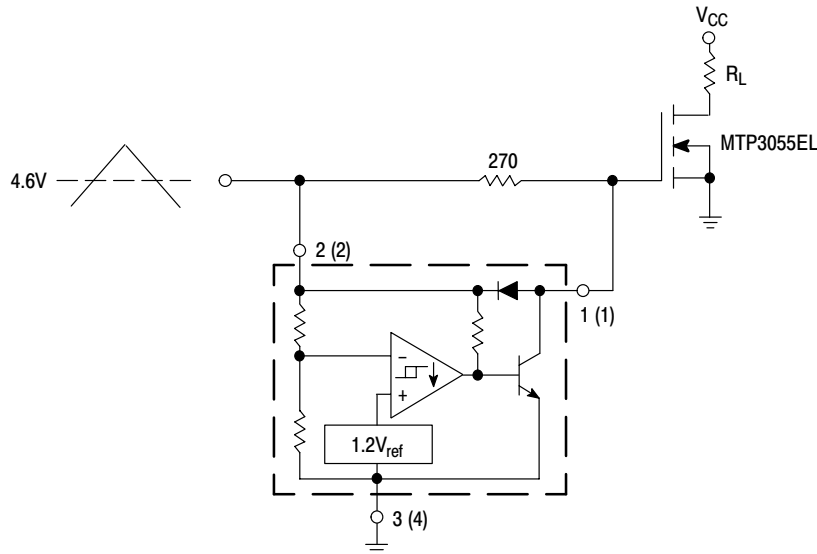


Figure 12. Solar Powered Battery Charger



Test	Conditions	Results
Line Regulation	$V_{in} = 11.5 \text{ V to } 14.5 \text{ V}, I_O = 50 \text{ mA}$	35 mV
Load Regulation	$V_{in} = 12.6 \text{ V}, I_O = 0 \text{ mA to } 50 \text{ mA}$	12 mV
Output Ripple	$V_{in} = 12.6 \text{ V}, I_O = 50 \text{ mA}$	60 mVpp
Efficiency	$V_{in} = 12.6 \text{ V}, I_O = 50 \text{ mA}$	77%

Figure 13. Low Power Switching Regulator



Overheating of the logic level power MOSFET due to insufficient gate voltage can be prevented with the above circuit. When the input signal is below the 4.6 V threshold of the MC34064, its output grounds the gate of the L<sup>2</sup> MOSFET.

Figure 14. MOSFET Low Voltage Gate Drive Protection

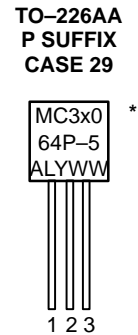
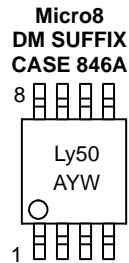
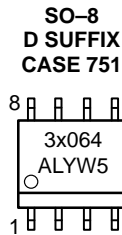
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## ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping
MC34064D-5	$T_A = 0^\circ\text{C to } +70^\circ\text{C}$	SO-8	98 Units / Rail
MC34064D-5R2		SO-8	2500 Units/ Tape & Reel
MC34064DM-5R2		Micro8	4000 Units / Tape & Reel
MC34064P-5		TO-226AA	2000 Units / Bag
MC34064P-5RA		TO-226AA	2000 Units / Tape & Reel
MC34064P-5RP		TO-226AA	2000 Units / Ammo Pack
MC33064D-5	$T_J = -40^\circ\text{C to } +85^\circ\text{C}$	SO-8	98 Units / Rail
MC33064D-5R2		SO-8	2500 Units / Tape & Reel
MC33064DM-5R2		Micro8	4000 Units / Tape & Reel
MC33064P-5		TO-226AA	2000 Units / Bag
MC33064P-5RA		TO-226AA	2000 Units / Tape & Reel
MC33064P-5RP		TO-226AA	2000 Units / Ammo Pack
NCV33064D-5R2*	$T_A = -40^\circ\text{C to } +125^\circ\text{C}$	SO-8	2500 Units / Tape & Reel
NCV33064P-5RA*		TO-226AA	2000 Units / Tape & Reel
NCV33064P-5RP*		TO-226AA	2000 Units / Ammo Pack

\*NCV33064:  $T_{low} = -40^\circ\text{C}$ ,  $T_{high} = +125^\circ\text{C}$ . Guaranteed by design. NCV prefix is for automotive and other applications requiring site and change control.

## MARKING DIAGRAMS

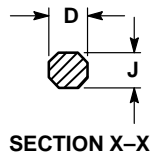
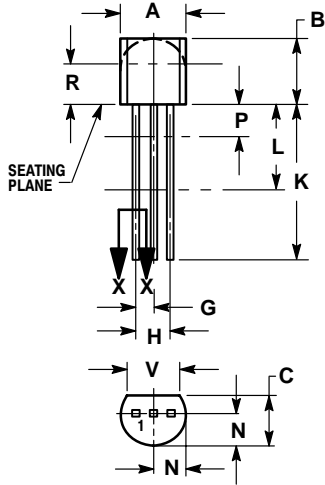


x = 3 or 4  
y = I or C  
A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week

\*This marking diagram also applies to NCV33064P.

PACKAGE DIMENSIONS

**P SUFFIX**  
 PLASTIC PACKAGE  
 CASE 29-11  
 (TO-226AA)  
 ISSUE AL

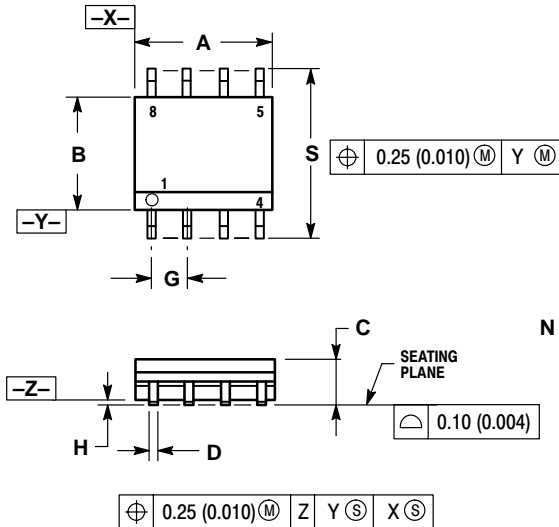


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

**D SUFFIX**  
 PLASTIC PACKAGE  
 CASE 751-07  
 (SO-8)  
 ISSUE W



NOTES:

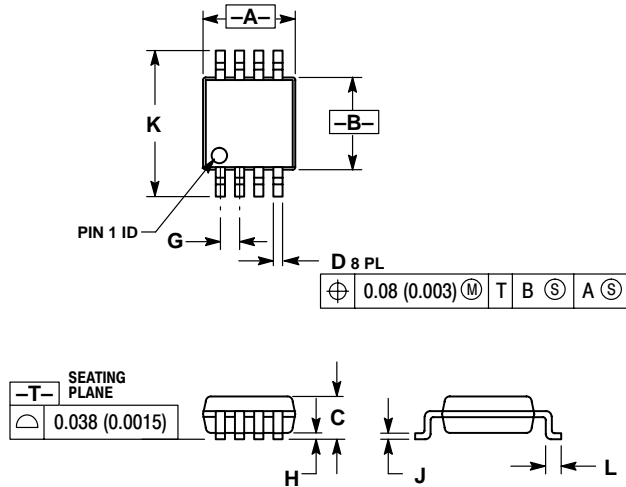
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0° - 8°		0° - 8°	
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

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## PACKAGE DIMENSIONS


DM SUFFIX  
PLASTIC PACKAGE  
CASE 846A-02  
(Micro8)  
ISSUE 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, PROTRUSIONS 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.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	---	1.10	---	0.043
D	0.25	0.40	0.010	0.016
G	0.65 BSC		0.026 BSC	
H	0.05	0.15	0.002	0.006
J	0.13	0.23	0.005	0.009
K	4.75	5.05	0.187	0.199
L	0.40	0.70	0.016	0.028

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