

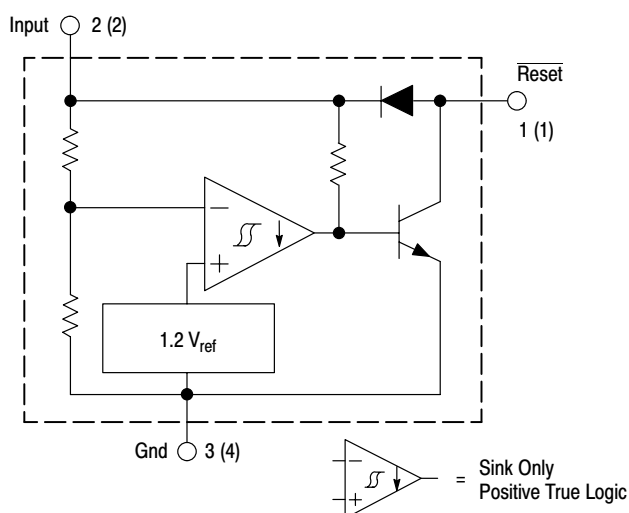
MC34064, MC33064, NCV33064

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.

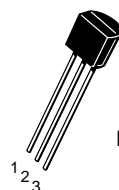
This device contains 21 active transistors.

Figure 1. Representative Block Diagram



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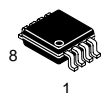


**TO-226AA
P SUFFIX
CASE 29**

- Pin
1. Reset
 2. Input
 3. Ground

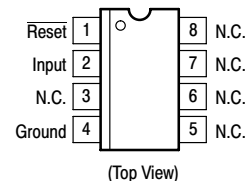


**SO-8
D SUFFIX
CASE 751**



**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.

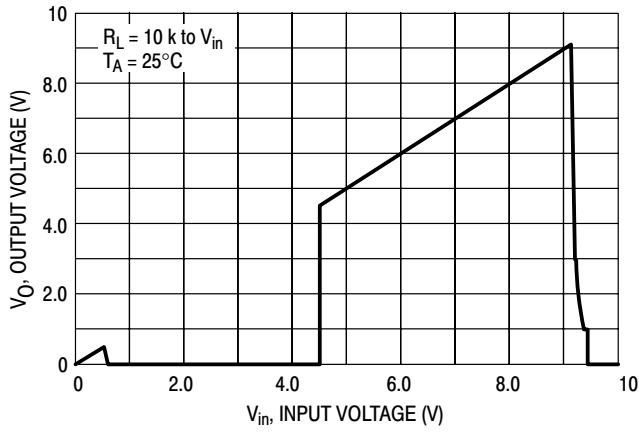


Figure 2. Reset Output Voltage versus Input Voltage

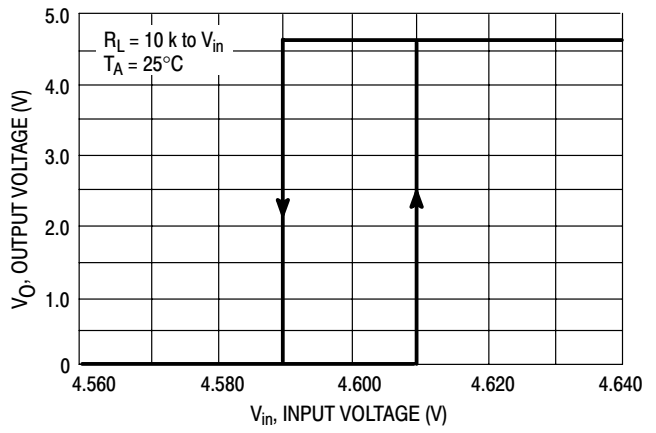


Figure 3. Reset Output Voltage versus Input Voltage

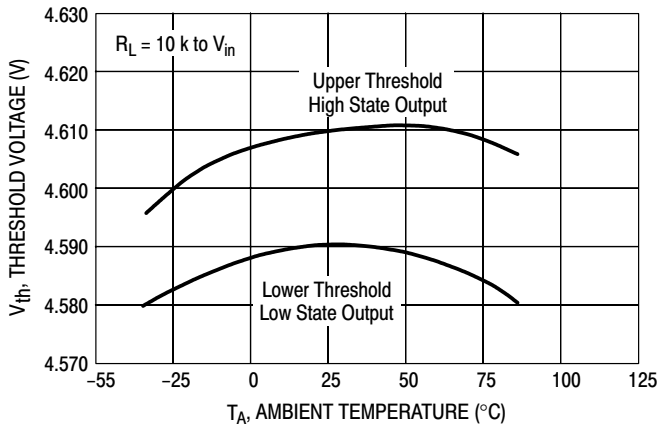


Figure 4. Comparator Threshold Voltage versus Temperature

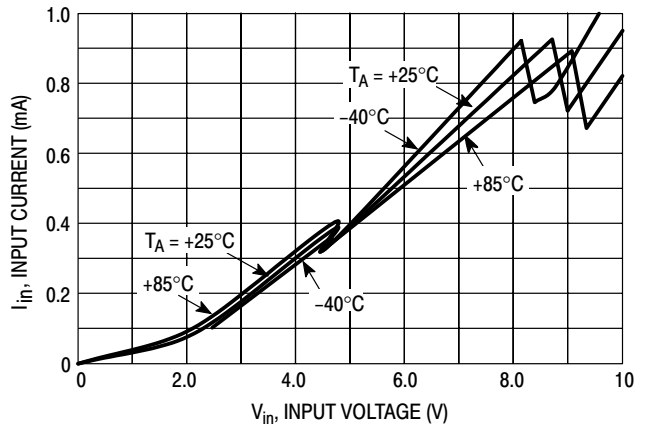


Figure 5. Input Current versus Input Voltage

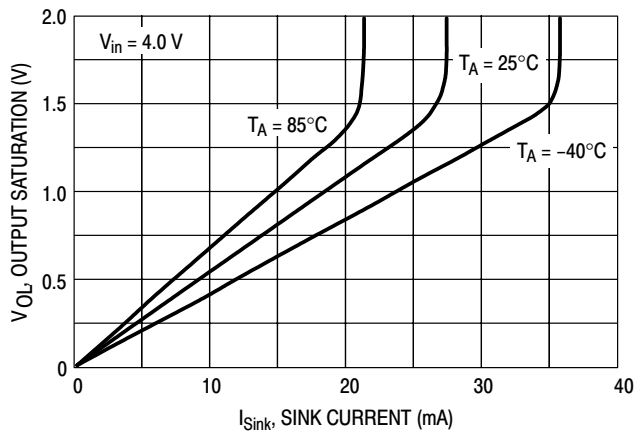


Figure 6. Reset Output Saturation versus Sink Current

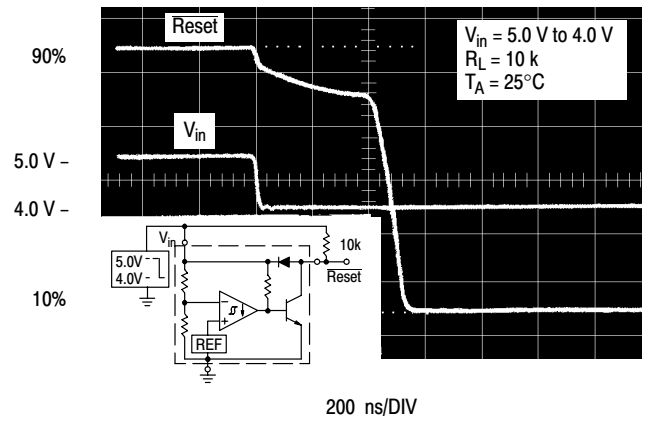


Figure 7. Reset Delay Time

MC34064, MC33064, NCV33064

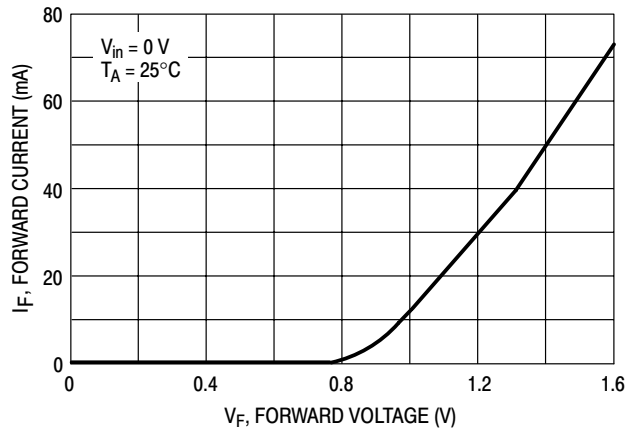


Figure 8. Clamp Diode Forward Current versus Voltage

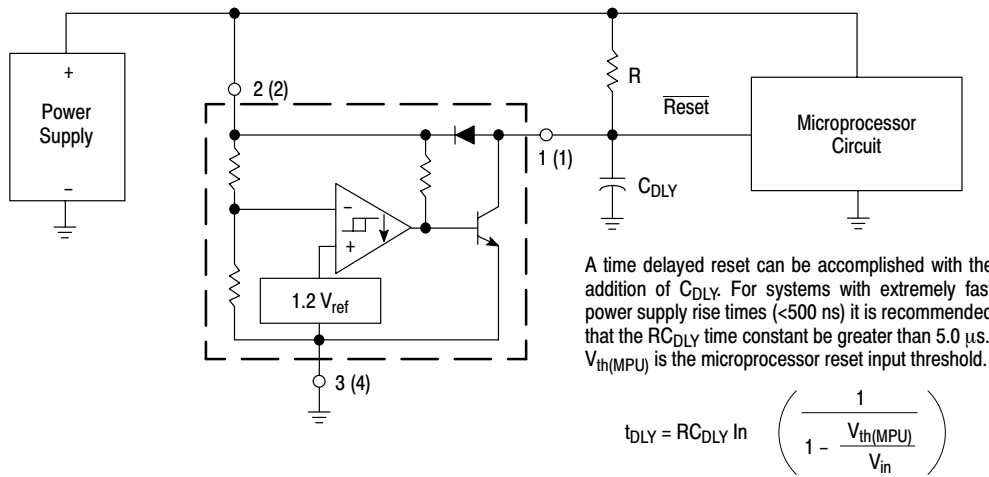


Figure 9. Low Voltage Microprocessor Reset

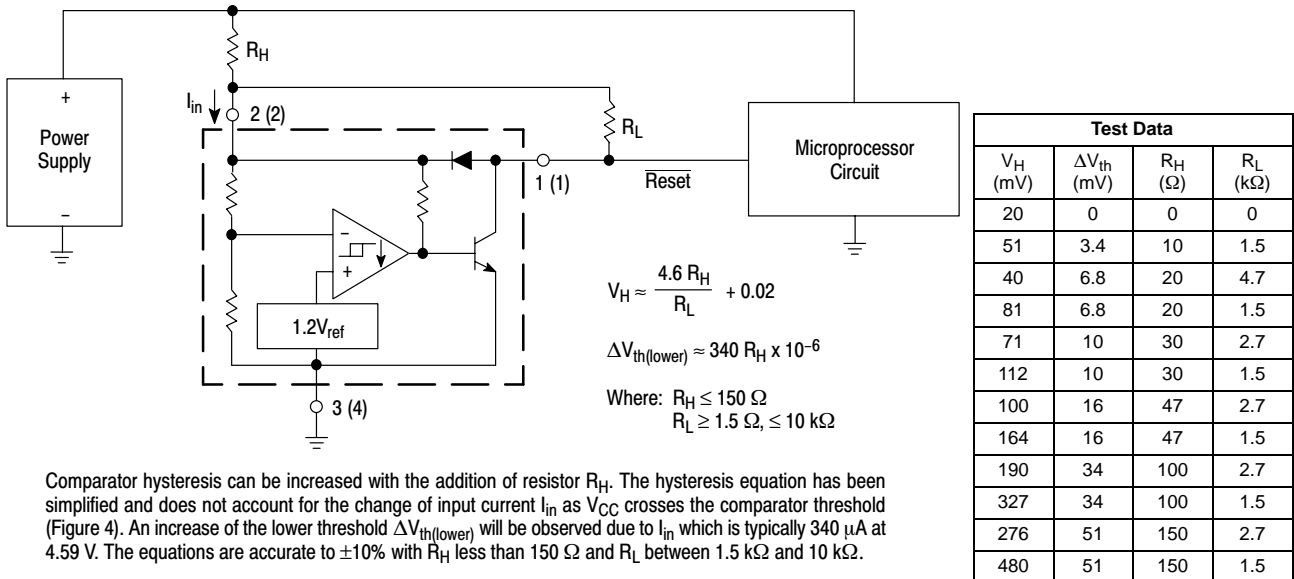


Figure 10. Low Voltage Microprocessor Reset with Additional Hysteresis

MC34064, MC33064, NCV33064

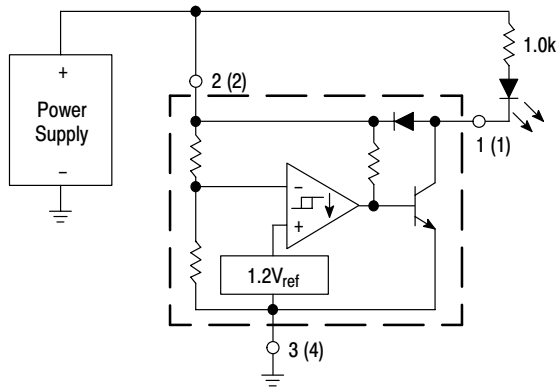


Figure 11. Voltage Monitor

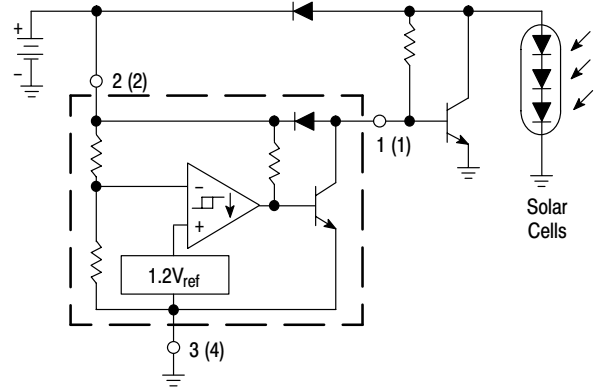
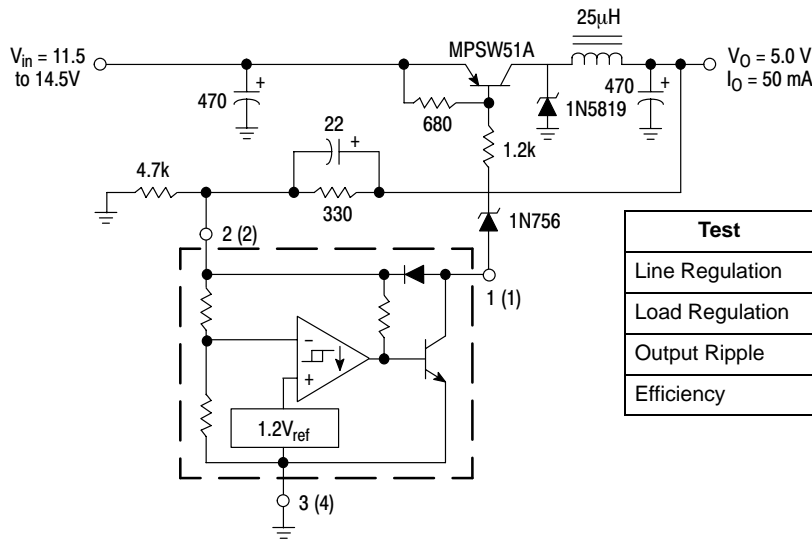
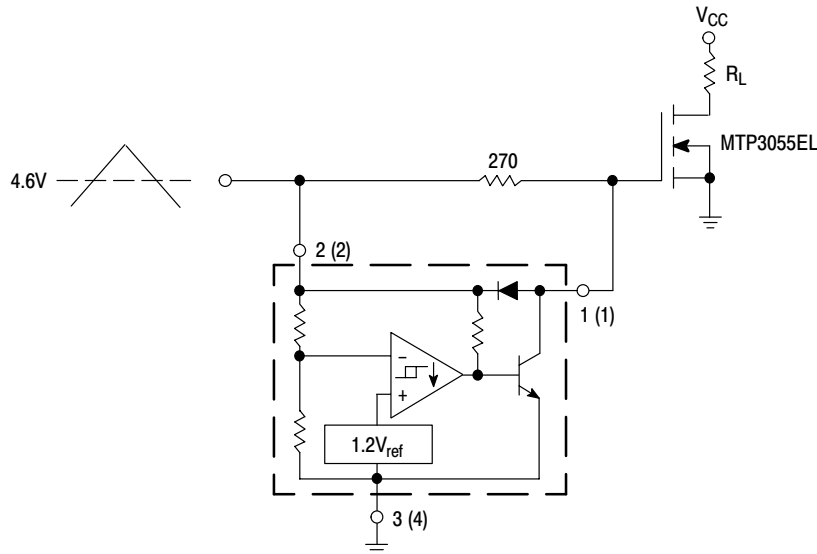


Figure 12. Solar Powered Battery Charger



| 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 L² MOSFET.

Figure 14. MOSFET Low Voltage Gate Drive Protection

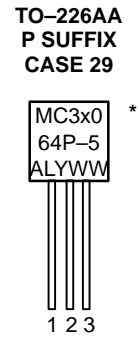
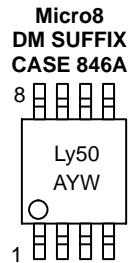
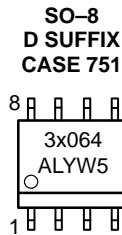
MC34064, MC33064, NCV33064

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

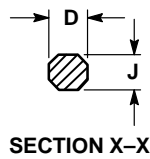
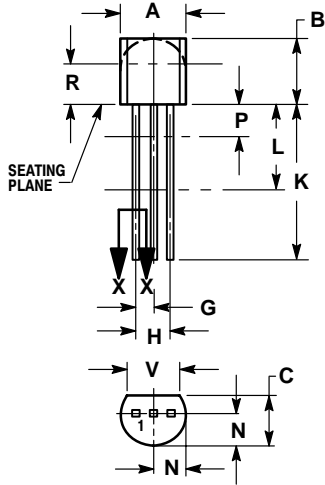


x = 3 or 4
y = I or C
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

*This marking diagram also applies to NCV33064P.

PACKAGE DIMENSIONS

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

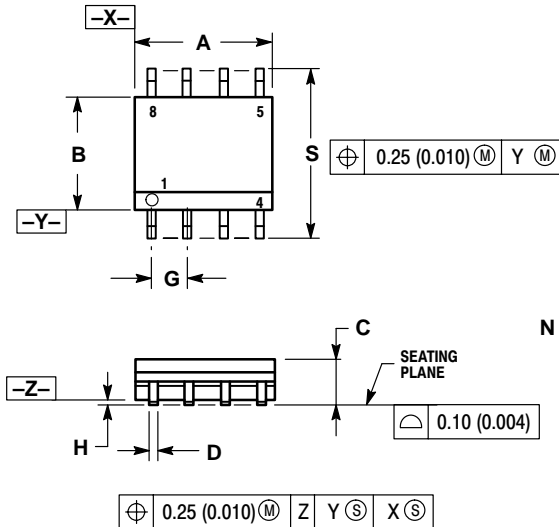


NOTES:

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:

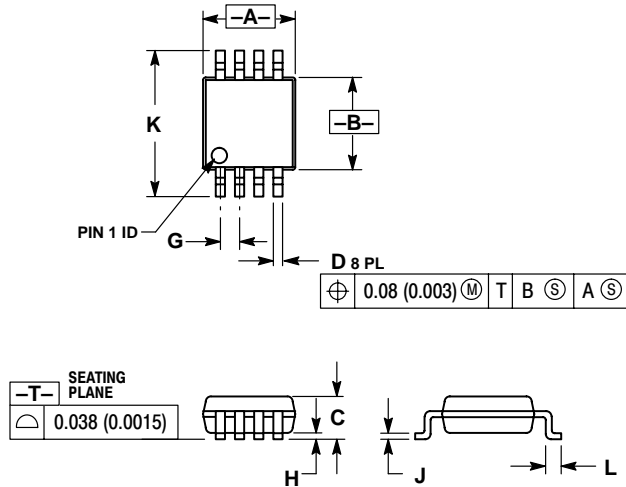
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

MC34064, MC33064, NCV33064

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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