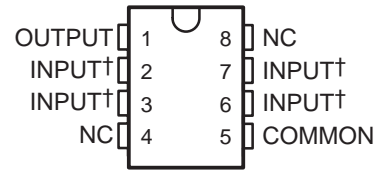


# MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

SLVS011D – OCTOBER 1982 – REVISED AUGUST 2003

- 3-Terminal Regulators
- Output Current Up To 100 mA
- No External Components Required
- Internal Thermal-Overload Protection
- Internal Short-Circuit Current Limiting
- Direct Replacement for Industry-Standard MC79L00 Series
- Available in 5% or 10% Selections

**D PACKAGE  
(TOP VIEW)**



† Internally connected  
NC – No internal connection

## description/ordering information

This series of fixed negative-voltage integrated-circuit voltage regulators is designed for a wide range of applications. These include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used to control series pass elements to make high-current voltage-regulator circuits. One of these regulators can deliver up to 100 mA of output current. The internal current-limiting and thermal-shutdown features essentially make the regulators immune to overload. When used as a replacement for a Zener-diode and resistor combination, these devices can provide an effective improvement in output impedance of two orders of magnitude, with lower bias current.

**LP PACKAGE  
(TOP VIEW)**



## ORDERING INFORMATION

| T <sub>J</sub> | OUTPUT<br>VOLTAGE<br>TOLERANCE | NOMINAL<br>OUTPUT<br>VOLTAGE<br>(V) | PACKAGE†            |              | ORDERABLE<br>PART NUMBER | TOP-SIDE<br>MARKING |
|----------------|--------------------------------|-------------------------------------|---------------------|--------------|--------------------------|---------------------|
| 0°C to 125°C   | 5%                             | -5                                  | SOIC (D)            | Tube of 75   | MC79L05ACD               | 79L05A              |
|                |                                |                                     |                     | Reel of 2500 | MC79L05ACDR              |                     |
|                |                                |                                     | TO-226 / TO-92 (LP) | Bulk of 1000 | MC79L05ACLP              | 79L05AC             |
|                |                                |                                     |                     | Reel of 2000 | MC79L05ACLPR             |                     |
|                |                                | -12                                 | SOIC (D)            | Tube of 75   | MC79L12ACD               | 79L12A              |
|                |                                |                                     |                     | Reel of 2500 | MC79L12ACDR              |                     |
|                |                                |                                     | TO-226 / TO-92 (LP) | Bulk of 1000 | MC79L12ACLP              | 79L12AC             |
|                |                                |                                     |                     | Reel of 2000 | MC79L12ACLPR             |                     |
|                | 10%                            | -15                                 | TO-226 / TO-92 (LP) | Bulk of 1000 | MC79L15ACLP              | 79L15AC             |
|                |                                |                                     |                     | Ammo of 2000 | MC79L15ACLPM             |                     |
|                |                                |                                     |                     | Reel of 2000 | MC79L15ACLPR             |                     |
|                |                                | -12                                 | TO-226 / TO-92 (LP) | Bulk of 1000 | MC79L12CLP               | 79L12C              |
|                |                                | -15                                 | SOIC (D)            | Tube of 75   | MC79L15CD                | 79L15C              |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

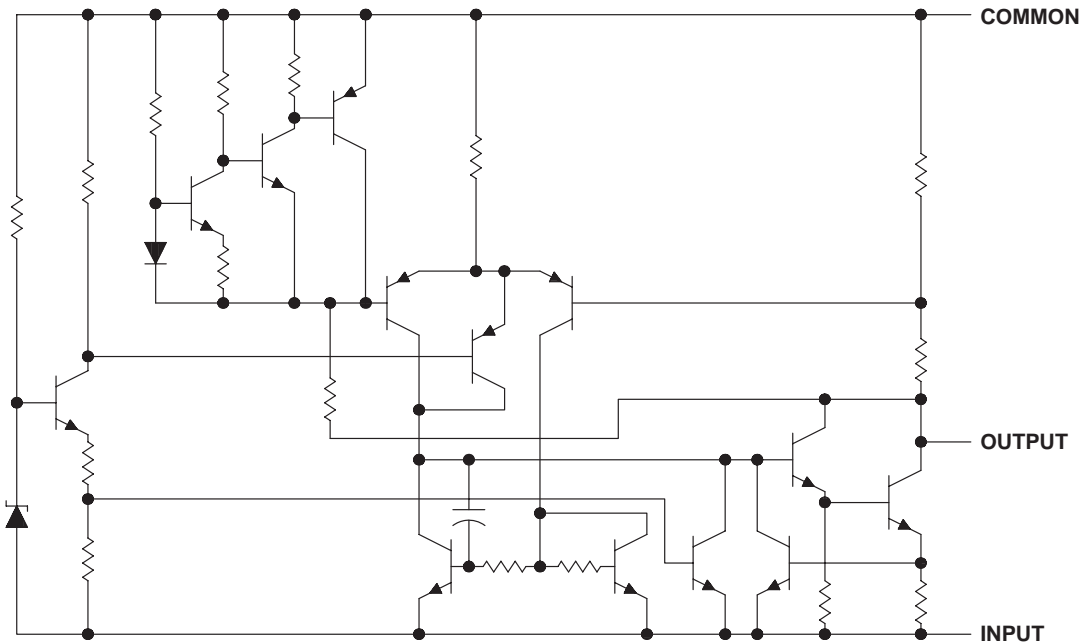
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# MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

SLVS011D – OCTOBER 1982 – REVISED AUGUST 2003

## equivalent schematic



## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

|   |                |
|---|----------------|
| Input voltage: MC79L05  | –30 V          |
| MC79L12, MC79L15  | –35 V          |
| Package thermal impedance, $\theta_{JA}$ (see Notes 1 and 2): D package | 97°C/W         |
| LP package  | 140°C/W        |
| Operating free-air, case, or virtual junction temperature               | 150°C          |
| Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds            | 260°C          |
| Storage temperature range, $T_{stg}$                                    | –65°C to 150°C |

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. Maximum power dissipation is a function of  $T_J(\text{max})$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions

|  |         | MIN   | MAX | UNIT |
|--|---------|-------|-----|------|
| $V_I$ Input voltage                          | MC79L05 | –7    | –20 | V    |
|  | MC79L12 | –14.5 | –27 |      |
|  | MC79L15 | –17.5 | –30 |      |
| $I_O$ Output current                         |         |       | 100 | mA   |
| $T_J$ Operating virtual junction temperature |         | 0     | 125 | °C   |

# MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

SLVS011D – OCTOBER 1982 – REVISED AUGUST 2003

**electrical characteristics at specified virtual junction temperature,  $V_I = -10$  V,  $I_O = 40$  mA (unless otherwise noted)**

| PARAMETER            | TEST CONDITIONS†  | T <sub>J</sub> | MC79L05C |     |      | MC79L05AC |       |       | UNIT |
|----------------------|---|----------------|----------|-----|------|-----------|-------|-------|------|
|                      |   |                | MIN      | TYP | MAX  | MIN       | TYP   | MAX   |      |
| Output voltage‡      |   | 25°C           | -4.6     | -5  | -5.4 | -4.8      | -5    | -5.2  | V    |
|                      | V <sub>I</sub> = -7 V to -20 V,<br>I <sub>O</sub> = 1 mA to 40 mA | 0°C to 125°C   | -4.5     |     | -5.5 |           | -4.75 | -5.25 |      |
|                      | V <sub>I</sub> = -10 V, I <sub>O</sub> = 1 mA to 70 mA            | 0°C to 125°C   | -4.5     |     | -5.5 |           | -4.75 | -5.25 |      |
| Input regulation     | V <sub>I</sub> = -7 V to -20 V                                    | 25°C           | 200      |     |      | 150       |       |       | mV   |
|                      | V <sub>I</sub> = -8 V to -20 V                                    |                | 150      |     |      | 100       |       |       |      |
| Ripple rejection     | V <sub>I</sub> = -8 V to -18 V, f = 120 Hz                        | 25°C           | 40       | 49  |      | 41        | 49    |       | dB   |
| Output regulation    | I <sub>O</sub> = 1 mA to 100 mA                                   | 25°C           | 60       |     |      | 60        |       |       | mV   |
|                      | I <sub>O</sub> = 1 mA to 40 mA                                    |                | 30       |     |      | 30        |       |       |      |
| Output noise voltage | f = 10 Hz to 100 kHz  | 25°C           | 40       |     |      | 40        |       |       | μV   |
| Dropout voltage      | I <sub>O</sub> = 40 mA  | 25°C           | 1.7      |     |      | 1.7       |       |       | V    |
| Bias current         |   | 25°C           | 6        |     |      | 6         |       |       | mA   |
|                      |   | 125°C          | 5.5      |     |      | 5.5       |       |       |      |
| Bias current change  | V <sub>I</sub> = -8 V to -20 V                                    | 0°C to 125°C   | 1.5      |     |      | 1.5       |       |       | mA   |
|                      | I <sub>O</sub> = 1 mA to 40 mA                                    |                | 0.2      |     |      | 0.1       |       |       |      |

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

<sup>‡</sup> This specification applies only for dc power dissipation permitted by absolute maximum ratings.

**electrical characteristics at specified virtual junction temperature,  $V_I = -19$  V,  $I_O = 40$  mA (unless otherwise noted)**

| PARAMETER            | TEST CONDITIONS†   | T <sub>J</sub> | MC79L12C |     |       | MC79L12AC |       |       | UNIT |
|----------------------|--|----------------|----------|-----|-------|-----------|-------|-------|------|
|                      |  |                | MIN      | TYP | MAX   | MIN       | TYP   | MAX   |      |
| Output voltage‡      |  | 25°C           | -11.1    | -12 | -12.9 | -11.5     | -12   | -12.5 | V    |
|                      | V <sub>I</sub> = -14.5 V to -27 V,<br>I <sub>O</sub> = 1 mA to 40 mA | 0°C to 125°C   | -10.8    |     | -13.2 |           | -11.4 | -12.6 |      |
|                      | V <sub>I</sub> = -19 V, I <sub>O</sub> = 1 mA to 70 mA               | 0°C to 125°C   | -10.8    |     | -13.2 |           | -11.4 | -12.6 |      |
| Input regulation     | V <sub>I</sub> = -14.5 V to -27 V                                    | 25°C           | 250      |     |       | 250       |       |       | mV   |
|                      | V <sub>I</sub> = -16 V to -27 V                                      |                | 200      |     |       | 200       |       |       |      |
| Ripple rejection     | V <sub>I</sub> = -15 V to -25 V, f = 120 Hz                          | 25°C           | 36       | 42  |       | 37        | 42    |       | dB   |
| Output regulation    | I <sub>O</sub> = 1 mA to 100 mA                                      | 25°C           | 100      |     |       | 100       |       |       | mV   |
|                      | I <sub>O</sub> = 1 mA to 40 mA                                       |                | 50       |     |       | 50        |       |       |      |
| Output noise voltage | f = 10 Hz to 100 kHz   | 25°C           | 80       |     |       | 80        |       |       | μV   |
| Dropout voltage      | I <sub>O</sub> = 40 mA   | 25°C           | 1.7      |     |       | 1.7       |       |       | V    |
| Bias current         |  | 25°C           | 6.5      |     |       | 6.5       |       |       | mA   |
|                      |  | 125°C          | 6        |     |       | 6         |       |       |      |
| Bias current change  | V <sub>I</sub> = -16 V to -27 V                                      | 0°C to 125°C   | 1.5      |     |       | 1.5       |       |       | mA   |
|                      | I <sub>O</sub> = 1 mA to 40 mA                                       |                | 0.2      |     |       | 0.1       |       |       |      |

<sup>†</sup> All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

<sup>‡</sup> This specification applies only for dc power dissipation permitted by absolute maximum ratings.

# MC79L00 SERIES

## NEGATIVE-VOLTAGE REGULATORS

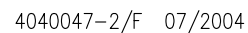
SLVS011D – OCTOBER 1982 – REVISED AUGUST 2003

**electrical characteristics at specified virtual junction temperature,  $V_I = -23$  V,  $I_O = 40$  mA (unless otherwise noted)**

| PARAMETER            | TEST CONDITIONS†                                     | $T_J$        | MC79L15C |     |       | MC79L15AC |     |        | UNIT |
|----------------------|--|--------------|----------|-----|-------|-----------|-----|--------|------|
|                      |  |              | MIN      | TYP | MAX   | MIN       | TYP | MAX    |      |
| Output voltage‡      |  | 25°C         | -13.8    | -15 | -16.2 | -14.4     | -15 | -15.6  | V    |
|                      | $V_I = -17.5$ V to $-30$ V,<br>$I_O = 1$ mA to 40 mA | 0°C to 125°C | -13.5    |     | -16.5 | -14.25    |     | -15.75 |      |
|                      | $V_I = -23$ V, $I_O = 1$ mA to 70 mA                 | 0°C to 125°C | -13.5    |     | -16.5 | -14.25    |     | -15.75 |      |
| Input regulation     | $V_I = -17.5$ V to $-30$ V                           | 25°C         |          |     | 300   |           |     | 300    | mV   |
|                      | $V_I = -17.5$ V to $-30$ V                           |              |          |     | 250   |           |     | 250    |      |
| Ripple rejection     | $V_I = -18.5$ V to $-28.5$ V, $f = 120$ Hz           | 25°C         | 33       | 39  |       | 34        | 39  |        | dB   |
| Output regulation    | $I_O = 1$ mA to 100 mA                               | 25°C         |          |     | 150   |           |     | 150    | mV   |
|                      | $I_O = 1$ mA to 40 mA                                |              |          |     | 75    |           |     | 75     |      |
| Output noise voltage | $f = 10$ Hz to 100 kHz                               | 25°C         |          | 90  |       |           | 90  |        | μV   |
| Dropout voltage      | $I_O = 40$ mA  | 25°C         |          | 1.7 |       |           | 1.7 |        | V    |
| Bias current         |  | 25°C         |          |     | 6.5   |           |     | 6.5    | mA   |
|                      |  | 125°C        |          |     | 6     |           |     | 6      |      |
| Bias current change  | $V_I = -20$ V to $-30$ V                             | 0°C to 125°C |          |     | 1.5   |           |     | 1.5    | mA   |
|                      | $I_O = 1$ mA to 40 mA                                |              |          |     | 0.2   |           |     | 0.1    |      |

† All characteristics are measured with a 0.33-μF capacitor across the input and a 0.1-μF capacitor across the output. Pulse-testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

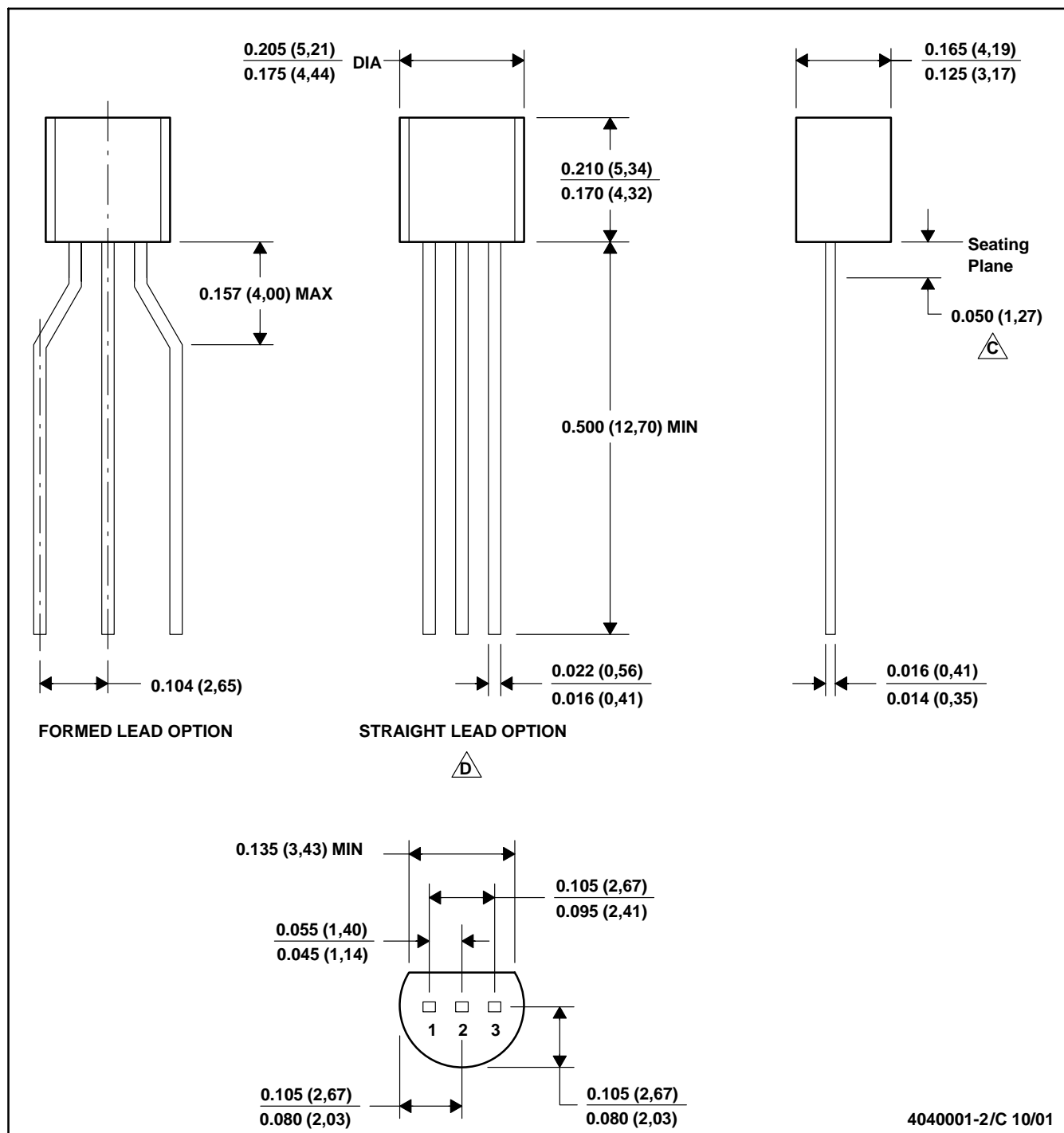
‡ This specification applies only for dc power dissipation permitted by absolute maximum ratings.



A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.  
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).  
D. Falls within JEDEC MS-012 variation AA.

## LP (O-PBCY-W3)

## PLASTIC CYLINDRICAL PACKAGE



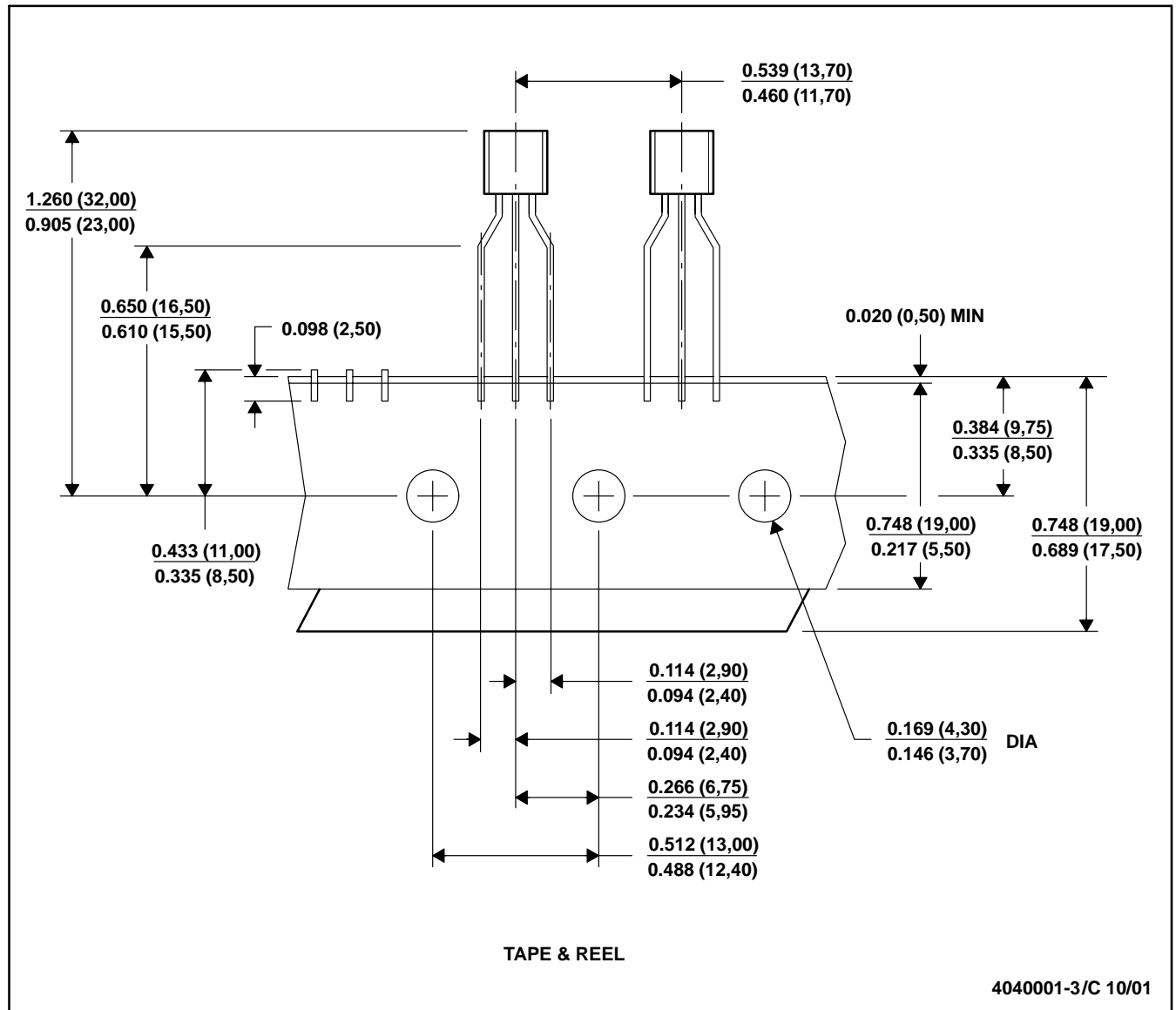
- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 $\triangle C$  Lead dimensions are not controlled within this area  
 $\triangle D$  Falls within JEDEC TO -226 Variation AA (TO-226 replaces TO-92)  
 E. Shipping Method:  
     Straight lead option available in bulk pack only.  
     Formed lead option available in tape & reel or ammo pack.

# MECHANICAL DATA

MSOT002A – OCTOBER 1994 – REVISED NOVEMBER 2001

LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGE



- NOTES: A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.  
C. Tape and Reel information for the Format Lead Option package.

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