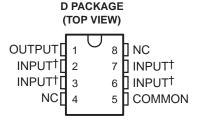
SLVS011D - OCTOBER 1982 - REVISED AUGUST 2003

- 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

### 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



† Internally connected NC – No internal connection

## LP PACKAGE (TOP VIEW)



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.

#### ORDERING INFORMATION

TJ	OUTPUT VOLTAGE TOLERANCE	NOMINAL OUTPUT VOLTAGE (V)	PACKAG	Ε <sup>†</sup>	ORDERABLE PART NUMBER	TOP-SIDE MARKING		
			COIC (D)	Tube of 75	MC79L05ACD	701.054		
		_	SOIC (D)	Reel of 2500	MC79L05ACDR	79L05A		
	5%	<b>-</b> 5	TO 000 / TO 00 // D)	Bulk of 1000	MC79L05ACLP	701.0540		
			TO-226 / TO-92 (LP)	Reel of 2000	MC79L05ACLPR	79L05AC		
		-12	2010 (D)	Tube of 75	MC79L12ACD	701.404		
			SOIC (D)	Reel of 2500	MC79L12ACDR	79L12A		
0°C to 125°C				Bulk of 1000	MC79L12ACLP	701.404.0		
			TO-226 / TO-92 (LP)	Reel of 2000	MC79L12ACLPR	79L12AC		
				Bulk of 1000	MC79L15ACLP			
		-15	TO-226 / TO-92 (LP)	Ammo of 2000	MC79L15ACLPM	79L15AC		
				Reel of 2000	MC79L15ACLPR			
	400/	-12	TO-226 / TO-92 (LP)	Bulk of 1000	MC79L12CLP	79L12C		
	10%	-15	SOIC (D) Tube of 75 MC79L15CD			79L15C		

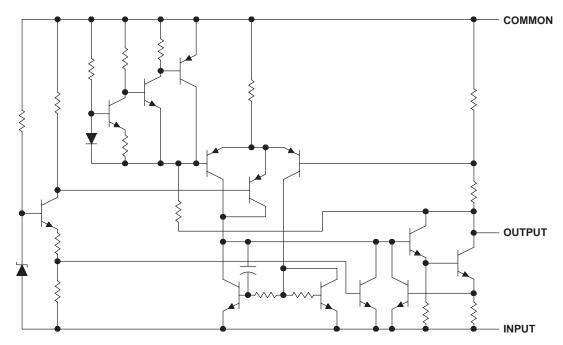
<sup>†</sup> Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



### 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, θ <sub>JA</sub> (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 <sub>stg</sub>	$-65^{\circ}$ C to $150^{\circ}$ C

<sup>†</sup> 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.

### recommended operating conditions

			MIN	MAX	UNIT
		MC79L05	-7	-20	
٧į	Input voltage	MC79L12	-14.5	-27	V
		MC79L15	-17.5	-30	
lo	Output current			100	mA
TJ	Operating virtual junction temperature		0	125	°C



NOTES: 1. Maximum power dissipation is a function of  $T_J(max)$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(max) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.

<sup>2.</sup> The package thermal impedance is calculated in accordance with JESD 51-7.

# electrical characteristics at specified virtual junction temperature, $V_I = -10 \text{ V}$ , $I_O = 40 \text{ mA}$ (unless otherwise noted)

DADAMETED	TTOT CONDITIONS!	-	M	C79L05	С	МС	UNIT			
PARAMETER	TEST CONDITIONS†	TJ	MIN	TYP	MAX	MIN	TYP	MAX	UNII	
		25°C	-4.6	-5	-5.4	-4.8	-5	-5.2		
Output voltage <sup>‡</sup>	$V_I = -7 \text{ V to } -20 \text{ V},$ $I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C	-4.5		-5.5	-4.75		-5.25	V	
	$V_I = -10 \text{ V}, I_O = 1 \text{ mA to } 70 \text{ mA}$	0°C to 125°C	-4.5		-5.5	-4.75		-5.25		
	V <sub>I</sub> = -7 V to -20 V	250			200			150	.,	
Input regulation	$V_{I} = -8 \text{ V to } -20 \text{ V}$	25°C			150			100	mV	
Ripple rejection	$V_1 = -8 \text{ V to } -18 \text{ V, f} = 120 \text{ Hz}$	25°C	40	49		41	49		dB	
Outrast as audation	I <sub>O</sub> = 1 mA to 100 mA	0500			60			60	>/	
Output regulation	$I_O = 1 \text{ mA to } 40 \text{ mA}$	25°C			30			30	mV	
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	
5:		25°C			6			6		
Bias current		125°C			5.5			5.5	mA	
D'an annual alan	V <sub>I</sub> = −8 V to −20 V	000 1- 40500			1.5			1.5	4	
Bias current change	$I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C			0.2			0.1	mA	

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

# electrical characteristics at specified virtual junction temperature, $V_I = -19 \text{ V}$ , $I_O = 40 \text{ mA}$ (unless otherwise noted)

242445752		_	M	C79L12	С	МС	LINUT			
PARAMETER	TEST CONDITIONS†	TJ	MIN	TYP	MAX	MIN	TYP	MAX	UNIT	
		25°C	-11.1	-12	-12.9	-11.5	-12	-12.5		
Output voltage‡	$V_I = -14.5 \text{ V to } -27 \text{ V},$ $I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C	-10.8		-13.2	-11.4		-12.6	V	
	$V_I = -19 \text{ V}, I_O = 1 \text{ mA to } 70 \text{ mA}$	0°C to 125°C	-10.8		-13.2	-11.4		-12.6		
	$V_{I} = -14.5 \text{ V to } -27 \text{ V}$	0500			250			250	.,	
Input regulation	V <sub>I</sub> = -16 V to -27 V	25°C			200		200		mV	
Ripple rejection	$V_I = -15 \text{ V to } -25 \text{ V, f} = 120 \text{ Hz}$	25°C	36	42		37	42		dB	
0	I <sub>O</sub> = 1 mA to 100 mA	0500			100			100	.,	
Output regulation	I <sub>O</sub> = 1 mA to 40 mA	25°C			50			50	mV	
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	
5.		25°C			6.5			6.5	•	
Bias current		125°C			6			6	mA	
D'an annual alcana	V <sub>I</sub> = -16 V to -27 V	000 1- 40500			1.5			1.5	A	
Bias current change	$I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C			0.2			0.1	mA	

<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. ‡ 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)

DADAMETED	TTOT CONDITIONS!	_	M	C79L15	С	МС	LINUT			
PARAMETER	TEST CONDITIONS†	TJ	MIN	TYP	MAX	MIN	TYP	MAX	UNIT	
		25°C	-13.8	-15	-16.2	-14.4	-15	-15.6		
Output voltage‡	$V_I = -17.5 \text{ V to } -30 \text{ V},$ $I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C	-13.5		-16.5	-14.25		-15.75	V	
	$V_1 = -23 \text{ V}, I_0 = 1 \text{ mA to } 70 \text{ mA}$	0°C to 125°C	-13.5		-16.5	-14.25		-15.75		
lament na medations	$V_I = -17.5 \text{ V to } -30 \text{ V}$	0500			300			300	\/	
Input regulation	$V_{I} = -17.5 \text{ V to } -30 \text{ V}$	25°C			250			250	mv	
Ripple rejection	V <sub>I</sub> = -18.5 V to -28.5 V, f = 120 Hz	25°C	33	39		34	39		dB	
Outside as and office	I <sub>O</sub> = 1 mA to 100 mA	0500			150			150	>/	
Output regulation	I <sub>O</sub> = 1 mA to 40 mA	25°C			75		7		m۷	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		90			90		μV	
Dropout voltage	I <sub>O</sub> = 40 mA	25°C		1.7			1.7		V	
		25°C			6.5			6.5	0 mV dB 0 mV 5 mV V	
Bias current		125°C			6			6	mA	
D'an annual alam	V <sub>I</sub> = -20 V to -30 V	000 1- 40500			1.5			1.5	4	
Bias current change	$I_O = 1 \text{ mA to } 40 \text{ mA}$	0°C to 125°C			0.2			0.1	mA	

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







24-Jan-2013

### **PACKAGING INFORMATION**

Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
MC79L05ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A	Samples
MC79L05ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05ACLPM	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05ACLPME3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L05AC	Samples
MC79L05AILP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI	0 to 125		
MC79L05CD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI	0 to 125		
MC79L05CDR	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI	0 to 125		
MC79L05CLP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI	0 to 125		
MC79L12ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Samples
MC79L12ACDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Samples
MC79L12ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Samples





www.ti.com 24-Jan-2013

Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
MC79L12ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Sample
MC79L12ACDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Sample
MC79L12ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A	Sample
MC79L12ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12AC	Sample
MC79L12ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12AC	Sample
MC79L12ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12AC	Sample
MC79L12ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12AC	Sample
MC79L12CD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI	0 to 125		
MC79L12CLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12C	Sample
MC79L12CLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L12C	Sample
MC79L15ACD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI	0 to 125		
MC79L15ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L15AC	Sample
MC79L15ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L15AC	Sample
MC79L15ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L15AC	Sample
MC79L15ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 125	79L15AC	Sampl
MC79L15CLP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI			

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.



### PACKAGE OPTION ADDENDUM

24-Jan-2013

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

**Pb-Free** (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes. **Pb-Free** (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

<sup>(4)</sup> Only one of markings shown within the brackets will appear on the physical device.

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### D (R-PDSO-G8)

### PLASTIC SMALL OUTLINE



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AA.



## D (R-PDSO-G8)

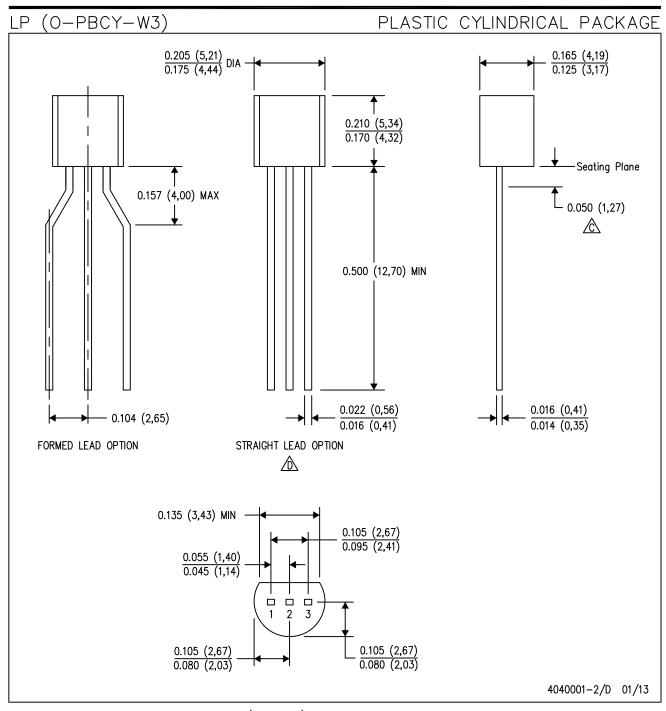
## PLASTIC SMALL OUTLINE



NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.





NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

Lead dimensions are not controlled within this area.

Falls within JEDEC TO-226 Variation AA (TO-226 replaces TO-92).

E. Shipping Method:

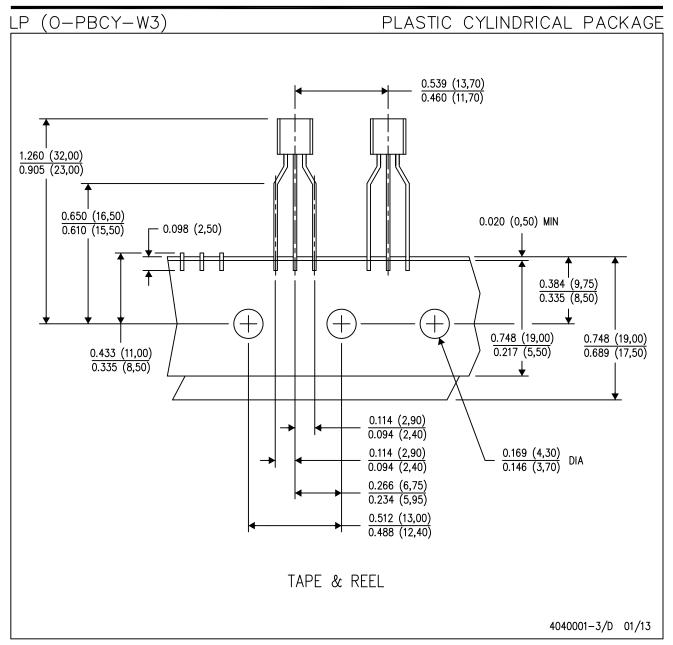
Straight lead option available in either bulk pack or tape & reel.

Formed lead option available in tape & reel or ammo pack.

Specific products can be offered in limited combinations of shipping mediums and lead options.

Consult product folder for more information on available options.





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 Formed Lead Option package.

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DSP **Energy and Lighting** dsp.ti.com www.ti.com/energy Clocks and Timers www.ti.com/clocks Industrial www.ti.com/industrial Interface interface.ti.com Medical www.ti.com/medical logic.ti.com Logic Security www.ti.com/security

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