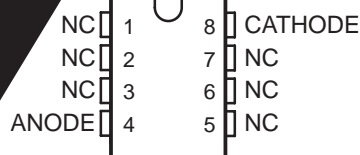


# LM285, LM385-1.2, LM385B-1.2 CROPOVOLTAGE REFERENCES

APRIL 1989 – REVISED DECEMBER 2005

- **Operating Current Range**
  - LM285 . . . 10  $\mu$ A to 20 mA
  - LM385 . . . 15  $\mu$ A to 20 mA
  - LM385B . . . 15  $\mu$ A to 20 mA

LM285-1.2 . . . D PACKAGE  
LM385-1.2, LM385B-1.2 . . . D, PS, OR PW PACKAGE  
LM385-1.2 . . . D OR PW PACKAGE  
(TOP VIEW)



NC – No internal connection

LM285-1.2, LM385-1.2, LM385B-1.2 . . . LP PACKAGE  
(TOP VIEW)



NC – No internal connection

These references operate over a 10- $\mu$ A to 20-mA current range and provide good temperature stability. On-chip trimming provides excellent accuracy. These devices have low noise and long-term stability.

## ORDERING INFORMATION

TEMPERATURE RANGE	PRECISION	PACKAGE	QUANTITY	ORDERABLE PART NUMBER	TOP-SIDE MARKING	
–40°C to 85°C	2%	SOIC (D)	Reel of 75	LM385D-1-2	385-12	
			Reel of 2000	LM385DR-1-2		
		SOP (PS)	Reel of 2000	LM385PSR-1-2	L385-12	
			TO-226 / T	Reel of 1000	LM385LP-1-2	385-12
				Reel of 2000	LM385LPR-1-2	
	1%	TSSOP (P)	Reel of 150	LM385PW-1-2	385-12	
			Reel of 2000	LM385PWR-1-2		
		SOIC (D)	Reel of 75	LM385BD-1-2	385B12	
			Reel of 2000	LM385BDR-1-2		
			TO-226 / T	Reel of 1000		LM385BLP-1-2
Reel of 2000	LM385BLPR-1-2					
1%	TSSOP (P)	Reel of 150	LM385BPW-1-2	385B12		
		Reel of 2000	LM385BPWR-1-2			
		SOIC (D)	Reel of 75		LM285D-1-2	285-12
Reel of 2000	LM285DR-1-2					
1%	TO-226 / T	Reel of 1000	LM285LP-1-2	285-12		

† Package drawings, standard packing quantities, and other information are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

Symbolization, and PCB design guidelines are available



Please be aware that an important notice regarding the availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products

hereto appears at the end of this data sheet.

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INSTRUMENTS

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

# LM285-1.2, LM385-1.2, LM385B-1.2 MICROPOWER VOLTAGE REFERENCES

SLVS075I – APRIL 1989 – REVISED DECEMBER 2005

symbol ANODE

CATHODE



XA

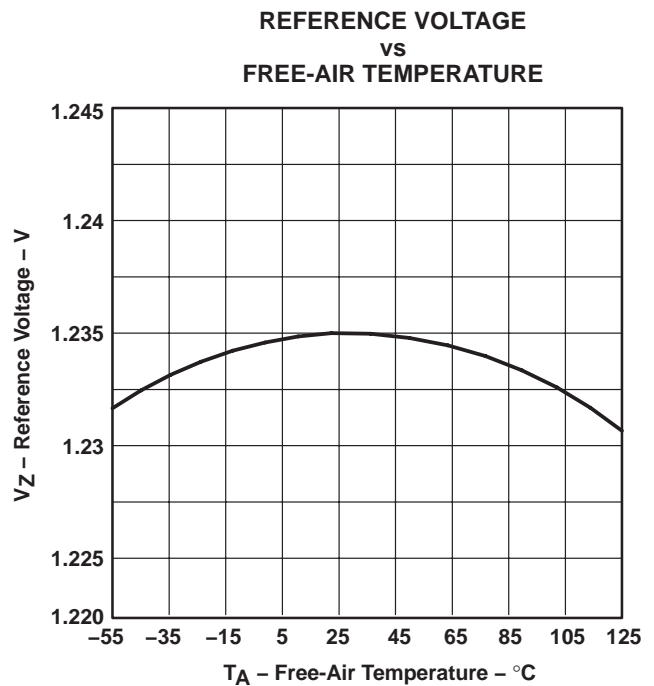
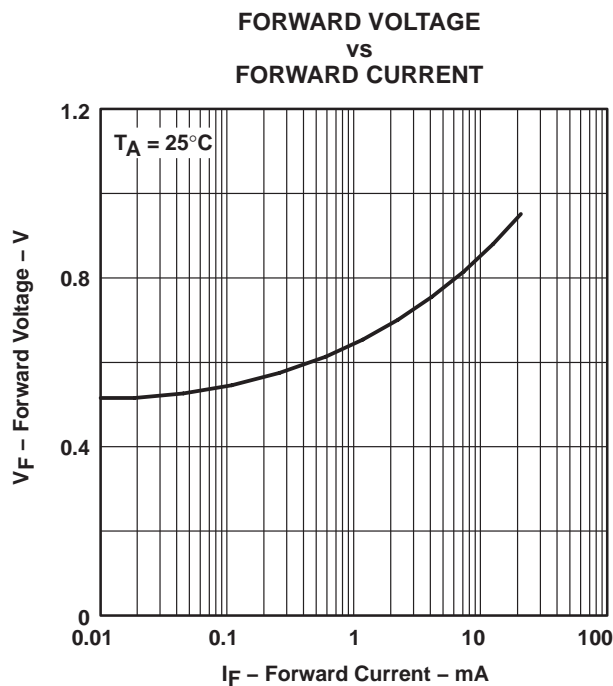
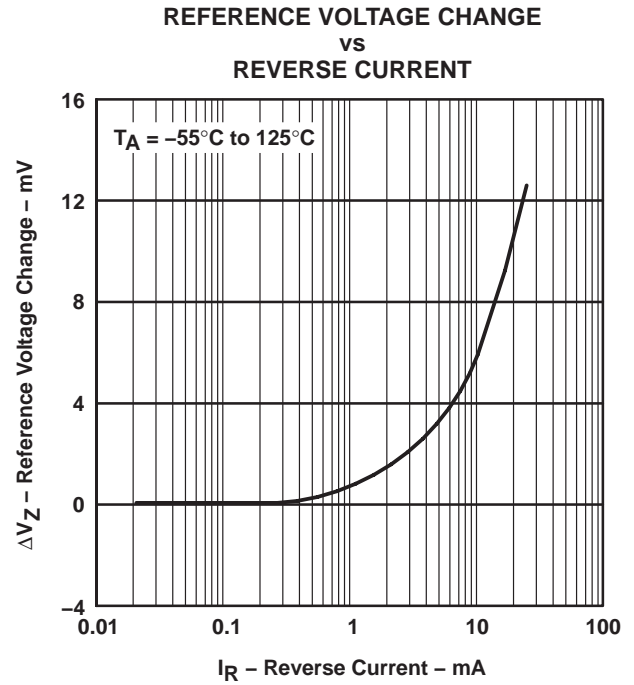
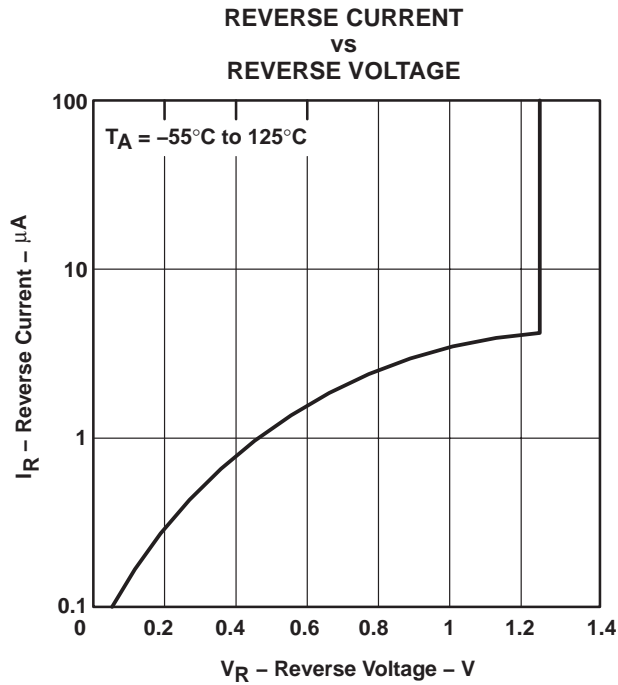
# LM285-1.2, LM385-1.2, LM385B-1.2 MICROPOWER VOLTAGE REFERENCES

SLVS075I – APRIL 1989 – REVISED DECEMBER 2005

## electrical characteristics at specified free-air temperature

PARAMETER	TEST CONDITIONS	T <sub>A</sub> <sup>†</sup>	LM285-1.2			LM385-1.2			LM385B-1.2			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
V <sub>Z</sub>	Reference voltage	I <sub>Z</sub> = I(min) to 20 mA <sup>‡</sup>	25°C	1.223	1.235	1.247	1.21	1.235	1.26	1.223	1.235	1.247	V
α <sub>VZ</sub>	Average temperature coefficient of reference voltage <sup>§</sup>	I <sub>Z</sub> = I(min) to 20 mA <sup>‡</sup>	Full range	±20			±20			±20			ppm/°C
ΔV <sub>Z</sub>	Change in reference voltage with current	I <sub>Z</sub> = I(min) to 1 mA <sup>‡</sup>	25°C										mV
			Full range										
		I <sub>Z</sub> = 1 mA to 20 mA	25°C										
			Full range	30			30			30			
ΔV <sub>Z</sub> /Δt	Long-term change in reference t												

TYPICAL CHARACTERISTICS†



† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

5-1.2, LM385-1.2, LM385E  
POWER VOLTAGE REF

1 - APRIL 1989 - REVISED DECEMBER 2000

E

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# LM285-1.2, LM385-1.2, LM385B-1.2 MICROPOWER VOLTAGE REFERENCES

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**XA  
STRUMENTS**

**PACKAGING INFORMATION**

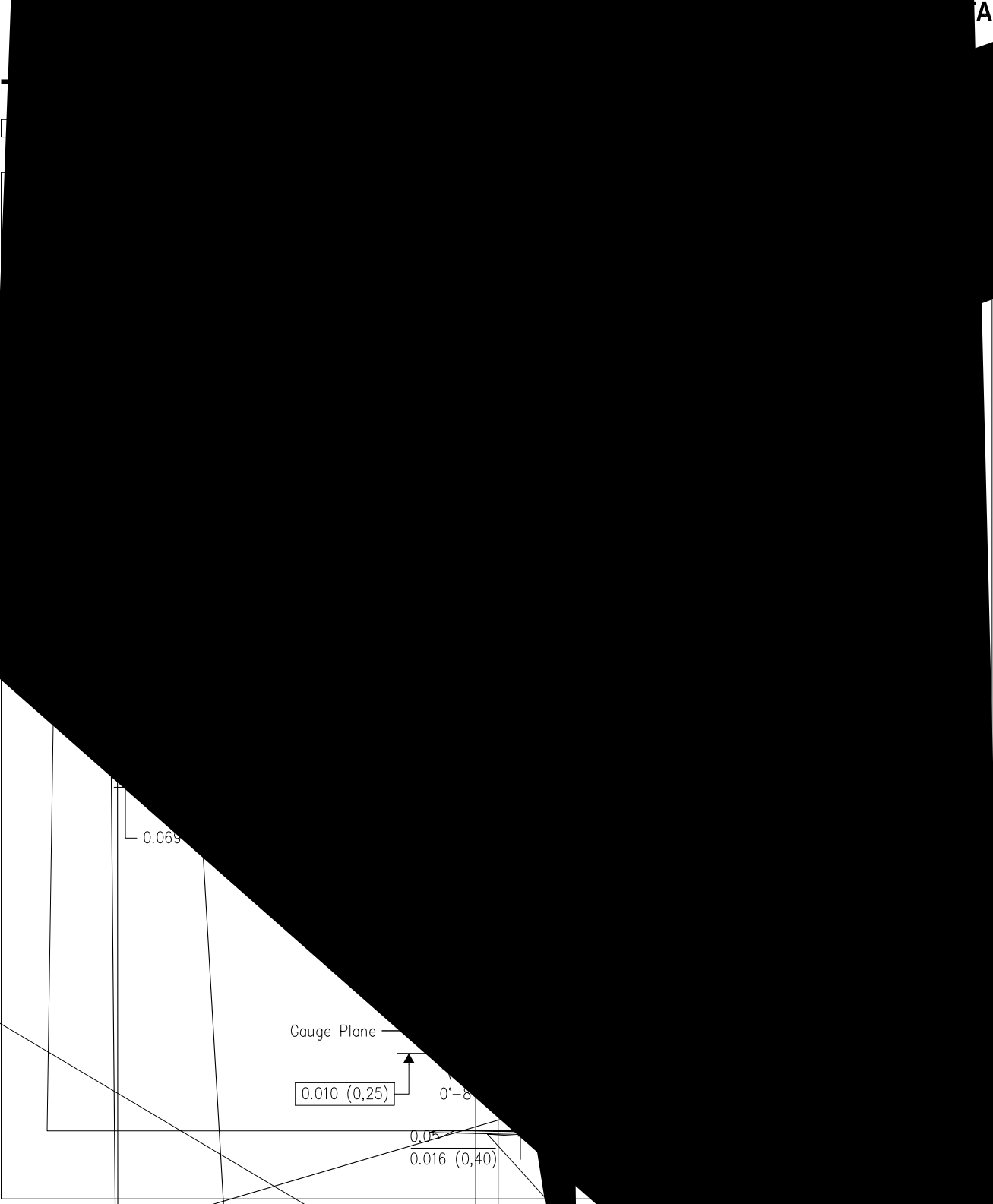
Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL P (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM285D-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	285-12	<a href="#">Samples</a>
LM285DE4-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	285-12	<a href="#">Samples</a>
LM285DG4-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	285-12	<a href="#">Samples</a>
LM285DR-1-2	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	285-12	<a href="#">Samples</a>
LM285DRE4-1-2	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)					



Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM385BLPR-1-2	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385B12	<a href="#">Samples</a>
LM385BLPRE3-1-2	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385B12	<a href="#">Samples</a>
LM385BPW-1-2	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385BPWE4-1-2	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385BPWG4-1-2	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385BPWR-1-2	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385BPWRE4-1-2	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385BPWRG4-1-2	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385B12	<a href="#">Samples</a>
LM385D-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385DE4-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385DG4-1-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385DR-1-2	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385DRE4-1-2	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385DRG4-1-2	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	385-12	<a href="#">Samples</a>
LM385LP-1-2	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385-12	<a href="#">Samples</a>
LM385LPE3-1-2	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385-12	<a href="#">Samples</a>
LM385LPR-1-2	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385-12	<a href="#">Samples</a>
LM385LPRE3-1-2	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	0 to 70	385-12	<a href="#">Samples</a>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
LM385PW-1-2	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)					

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash and burrs not exceed 0.006 (0,15) each side.
  - D. R
  - E. Reference JEDEC MS-012 variation AA.

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Pad Geometr

Example  
Solder Mask Opening  
(See Note E)

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OTES:

C. Publication IPC-7351 is recommended for alternate designs.

E. Customers should contact their board fabrication site for solder mask tolerances between and ar

c

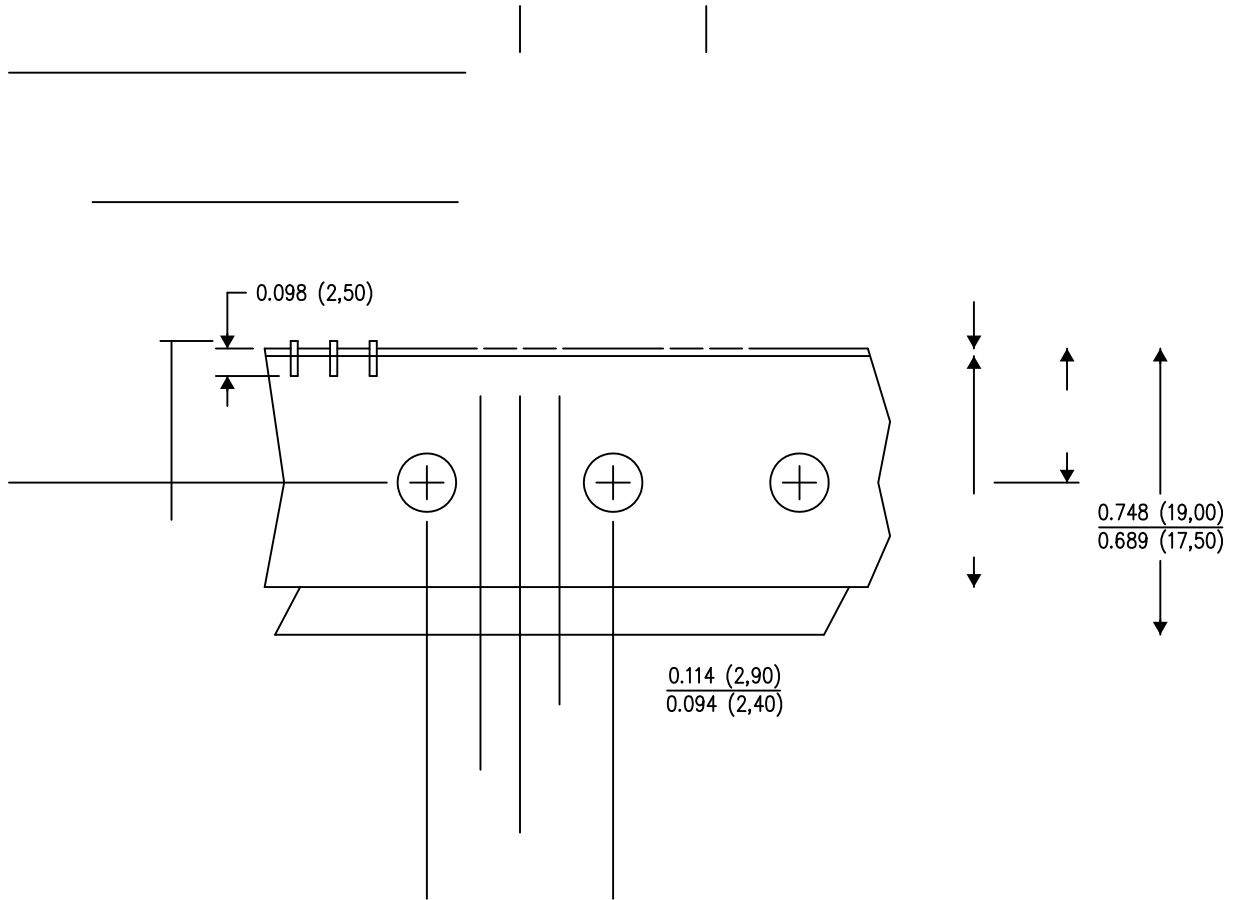


4040001-2/D 01/13

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

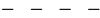
LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGING



0,65

⊕ 0,10 ⊗



0,25



0,15  
0,05

⊖ 0,10





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