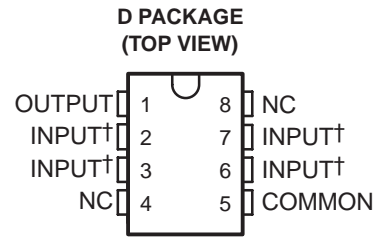


MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

SLVS011D – OCTOBER 1982 – REVISED AUGUST 2003

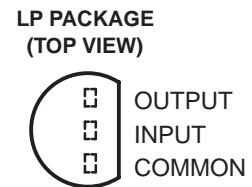
- 3-Terminal Regulators
- Output Current Up To 100 mA
- No External Components Required
- Internal Thermal-Overload Protection
- Internal Short-Circuit Current Limiting
- Direct Replacement for Industry-Standard MC79L00 Series
- Available in 5% or 10% Selections



† 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.



ORDERING INFORMATION

T _J	OUTPUT VOLTAGE TOLERANCE	NOMINAL OUTPUT VOLTAGE (V)	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE 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	MC79L05ACL	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	MC79L12ACL	79L12AC		
		Reel of 2000	MC79L12ACLPR			
	-15	TO-226 / TO-92 (LP)	Bulk of 1000	MC79L15ACL	79L15AC	
			Ammo of 2000	MC79L15ACLPM		
			Reel of 2000	MC79L15ACLPR		
	10%	-12	TO-226 / TO-92 (LP)	Bulk of 1000	MC79L12CLP	79L12C
-15				SOIC (D)	Tube of 75	MC79L15CD

† 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.

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**

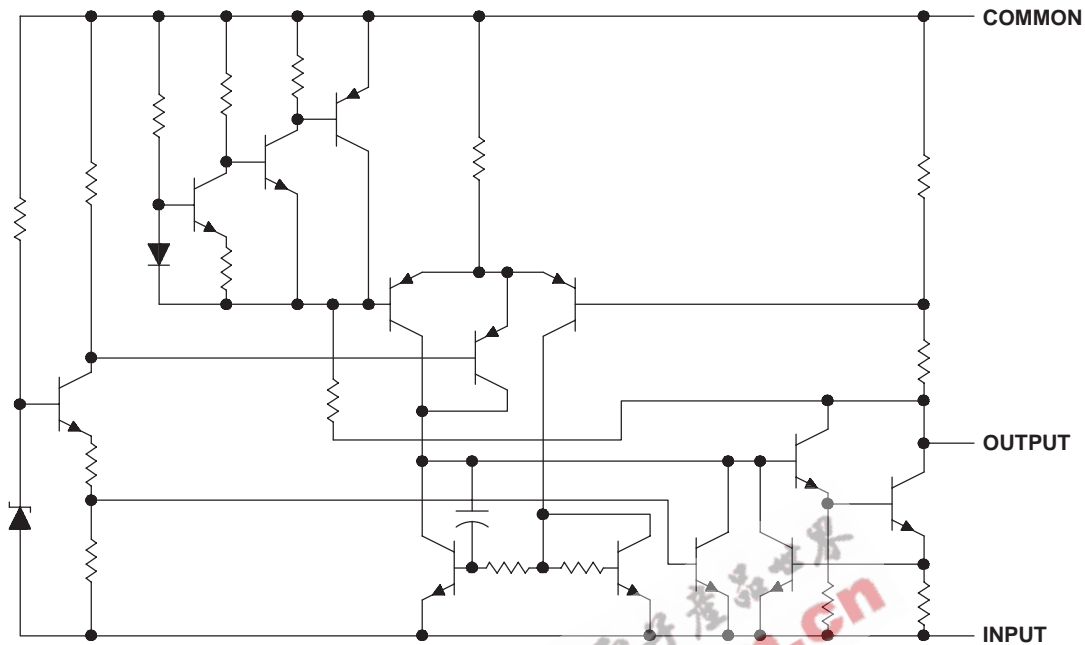
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MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

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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_{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 $T_J(\text{max})$, θ_{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

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

PARAMETER	TEST CONDITION†	T_J	MC79L05C			MC79L05AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage‡		25°C	-4.6	-5	-5.4	-4.8	-5	-5.2	V
	$V_I = -7\text{ V to }-20\text{ V}$, $I_O = 1\text{ mA to }40\text{ mA}$	0°C to 125°C	-4.5		-5.5	-4.75		-5.25	
	$V_I = -10\text{ V}$, $I_O = 1\text{ mA to }70\text{ mA}$	0°C to 125°C	-4.5		-5.5	-4.75		-5.25	
Input regulation	$V_I = -7\text{ V to }-20\text{ V}$	25°C				200			mV
	$V_I = -8\text{ V to }-20\text{ V}$					150			
Ripple rejection	$V_I = -8\text{ V to }-18\text{ V}$, $f = 120\text{ Hz}$	25°C	40	49		41	49		dB
Output regulation	$I_O = 1\text{ mA to }100\text{ mA}$	25°C				60			mV
	$I_O = 1\text{ mA to }40\text{ mA}$					30			
Output noise voltage	$f = 10\text{ Hz to }100\text{ kHz}$	25°C	40			40			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C	1.7			1.7			V
Bias current		25°C				6			mA
		125°C				5.5			
Bias current change	$V_I = -8\text{ V to }-20\text{ V}$	0°C to 125°C				1.5			mA
	$I_O = 1\text{ mA to }40\text{ mA}$					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.

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

PARAMETER	TEST CONDITION†	T_J	MC79L12C			MC79L12AC			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Output voltage‡		25°C	-11.1	-12	-12.9	-11.5	-12	-12.5	V
	$V_I = -14.5\text{ V to }-27\text{ V}$, $I_O = 1\text{ mA to }40\text{ mA}$	0°C to 125°C	-10.8		-13.2	-11.4		-12.6	
	$V_I = -19\text{ V}$, $I_O = 1\text{ mA to }70\text{ mA}$	0°C to 125°C	-10.8		-13.2	-11.4		-12.6	
Input regulation	$V_I = -14.5\text{ V to }-27\text{ V}$	25°C				250			mV
	$V_I = -16\text{ V to }-27\text{ V}$					200			
Ripple rejection	$V_I = -15\text{ V to }-25\text{ V}$, $f = 120\text{ Hz}$	25°C	36	42		37	42		dB
Output regulation	$I_O = 1\text{ mA to }100\text{ mA}$	25°C				100			mV
	$I_O = 1\text{ mA to }40\text{ mA}$					50			
Output noise voltage	$f = 10\text{ Hz to }100\text{ kHz}$	25°C	80			80			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C	1.7			1.7			V
Bias current		25°C				6.5			mA
		125°C				6			
Bias current change	$V_I = -16\text{ V to }-27\text{ V}$	0°C to 125°C				1.5			mA
	$I_O = 1\text{ mA to }40\text{ mA}$					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.

MC79L00 SERIES NEGATIVE-VOLTAGE REGULATORS

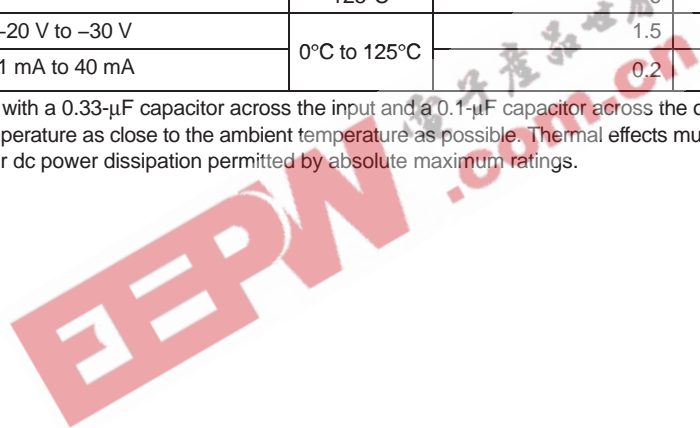
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electrical characteristics at specified virtual junction temperature, $V_I = -23\text{ V}$, $I_O = 40\text{ mA}$ (unless otherwise noted)

PARAMETER	TEST CONDITION†	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
	$V_I = -17.5\text{ V to }-30\text{ V}$, $I_O = 1\text{ mA to }40\text{ mA}$	0°C to 125°C	-13.5		-16.5	-14.25		-15.75	
	$V_I = -23\text{ V}$, $I_O = 1\text{ mA to }70\text{ mA}$	0°C to 125°C	-13.5		-16.5	-14.25		-15.75	
Input regulation	$V_I = -17.5\text{ V to }-30\text{ V}$	25°C	300			300			mV
	$V_I = -17.5\text{ V to }-30\text{ V}$		250			250			
Ripple rejection	$V_I = -18.5\text{ V to }-28.5\text{ V}$, $f = 120\text{ Hz}$	25°C	33	39		34	39		dB
Output regulation	$I_O = 1\text{ mA to }100\text{ mA}$	25°C	150			150			mV
	$I_O = 1\text{ mA to }40\text{ mA}$		75			75			
Output noise voltage	$f = 10\text{ Hz to }100\text{ kHz}$	25°C	90			90			μV
Dropout voltage	$I_O = 40\text{ mA}$	25°C	1.7			1.7			V
Bias current		25°C	6.5			6.5			mA
		125°C	6			6			
Bias current change	$V_I = -20\text{ V to }-30\text{ V}$	0°C to 125°C	1.5			1.5			mA
	$I_O = 1\text{ mA to }40\text{ mA}$		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.



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
MC79L05ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L05ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05ACLPM	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05ACL PME3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L05AILP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI
MC79L05CD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI
MC79L05CDR	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI
MC79L05CLP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI
MC79L12ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L12ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L12ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L12ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L12ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L12CD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
MC79L12CLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L12CLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACD	OBSOLETE	SOIC	D	8		TBD	Call TI	Call TI
MC79L15ACLP	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACLPE3	ACTIVE	TO-92	LP	3	1000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACLPM	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACL PME3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACLPR	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15ACLPRE3	ACTIVE	TO-92	LP	3	2000	Pb-Free (RoHS)	CU SN	N / A for Pkg Type
MC79L15CD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L15CDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L15CDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
MC79L15CLP	OBSOLETE	TO-92	LP	3		TBD	Call TI	Call TI

⁽¹⁾ 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.

⁽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)

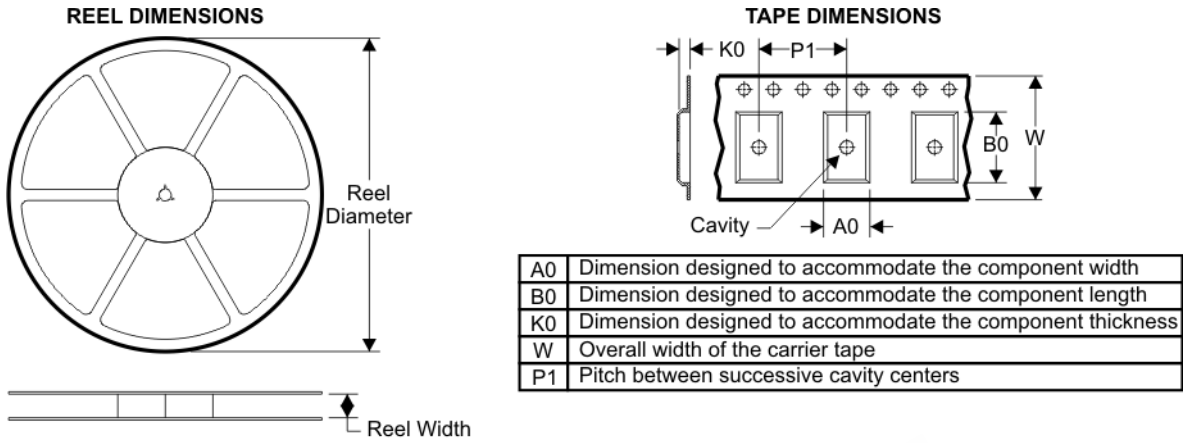
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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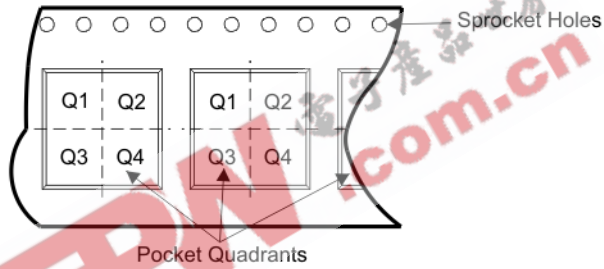
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TAPE AND REEL BOX INFORMATION

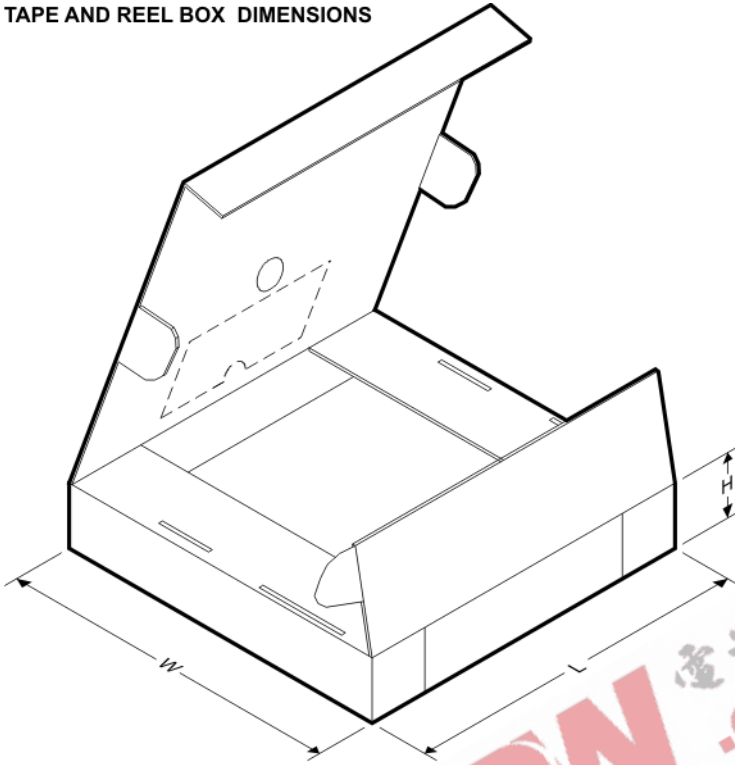


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package	Pins	Site	Reel Diameter (mm)	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
MC79L05ACDR	D	8	SITE 27	330	12	6.4	5.2	2.1	8	12	Q1
MC79L12ACDR	D	8	SITE 27	330	12	6.4	5.2	2.1	8	12	Q1

TAPE AND REEL BOX DIMENSIONS



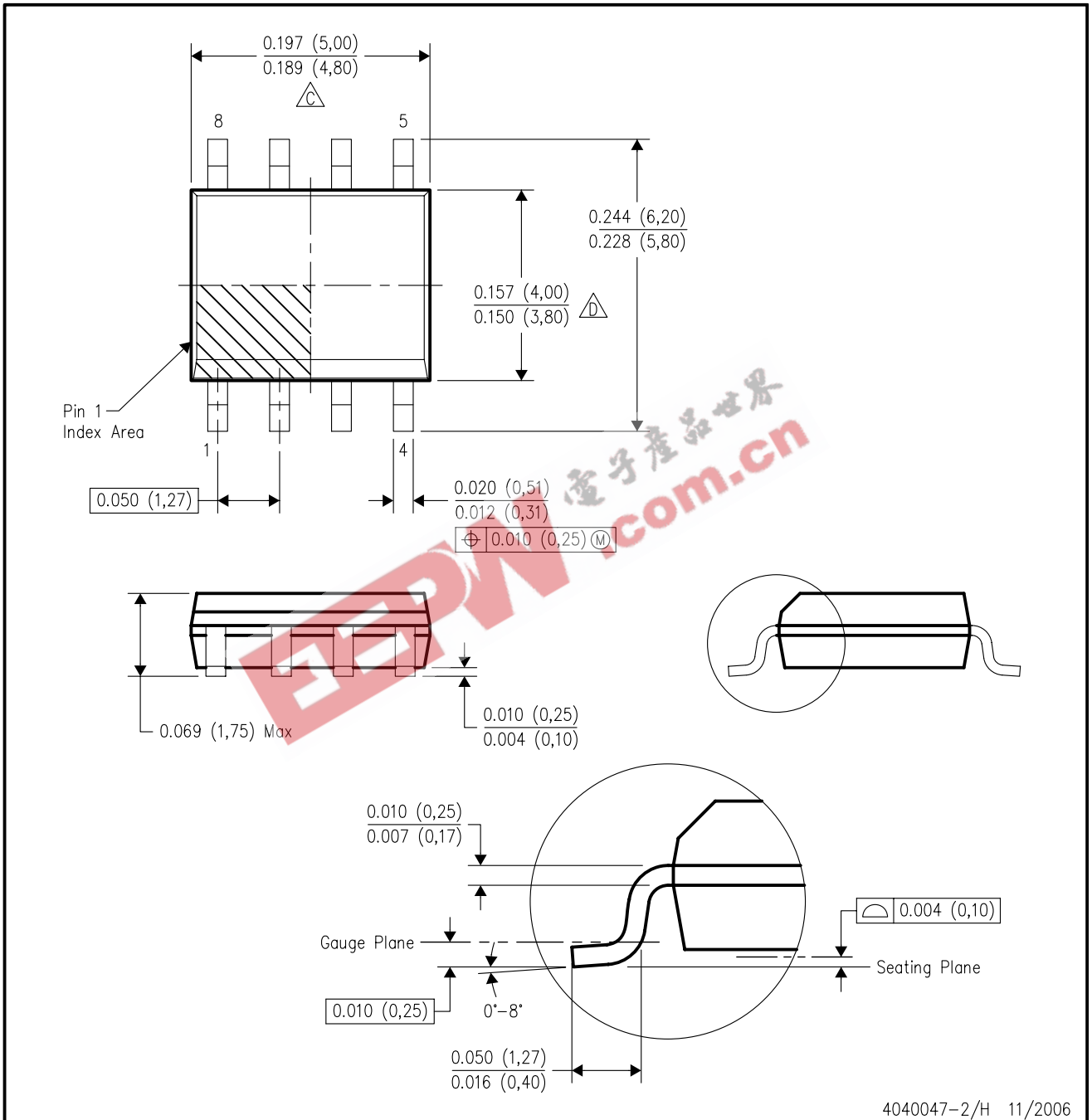
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Device	Package	Pins	Site	Length (mm)	Width (mm)	Height (mm)
MC79L05ACDR	D	8	SITE 27	342.9	338.1	20.64
MC79L12ACDR	D	8	SITE 27	342.9	338.1	20.64

MECHANICAL DATA

D (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



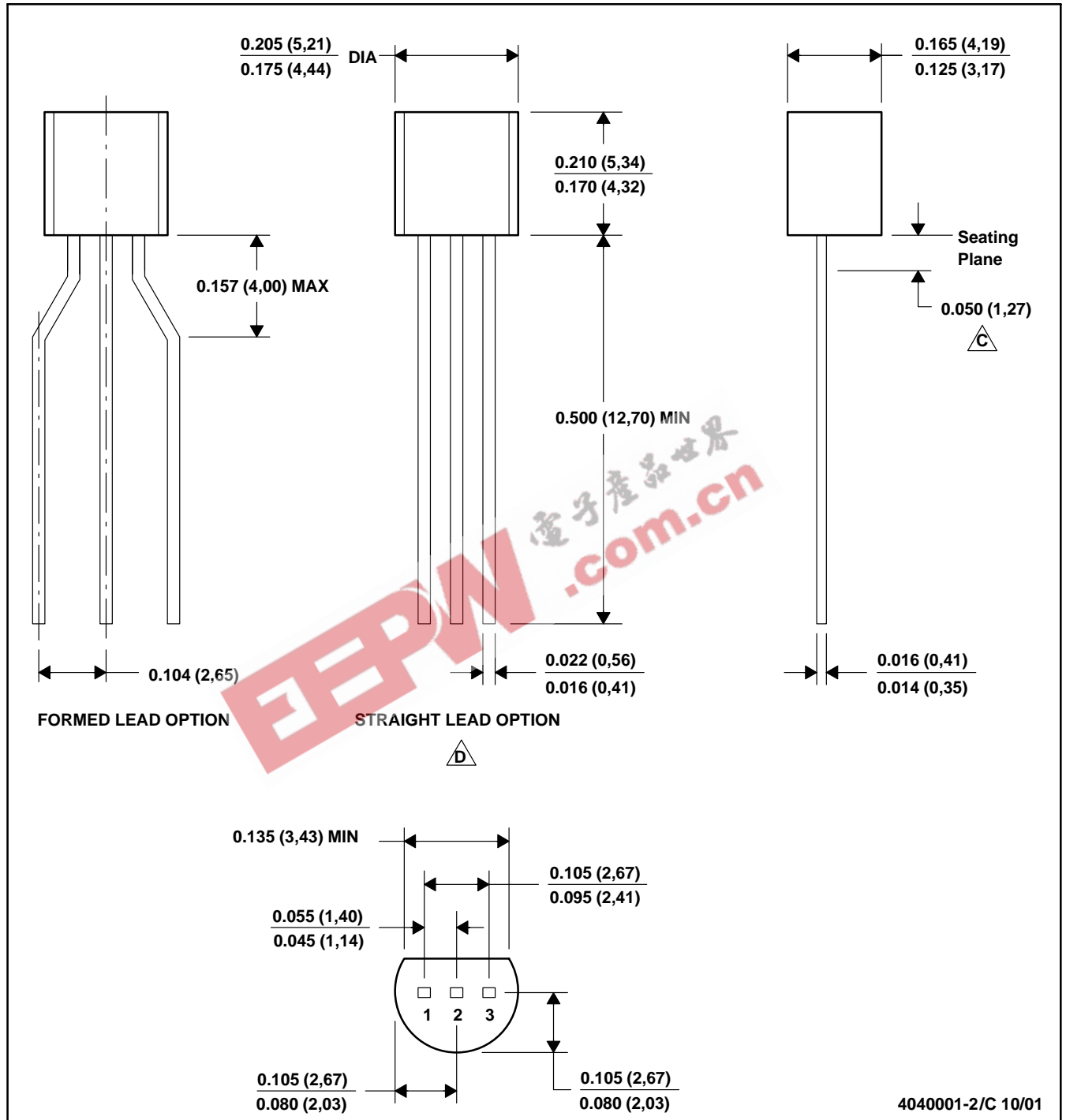
- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AA.

MECHANICAL DATA

MSOT002A – OCTOBER 1994 – REVISED NOVEMBER 2001

LP (O-PBCY-W3)

PLASTIC CYLINDRICAL PACKAGE



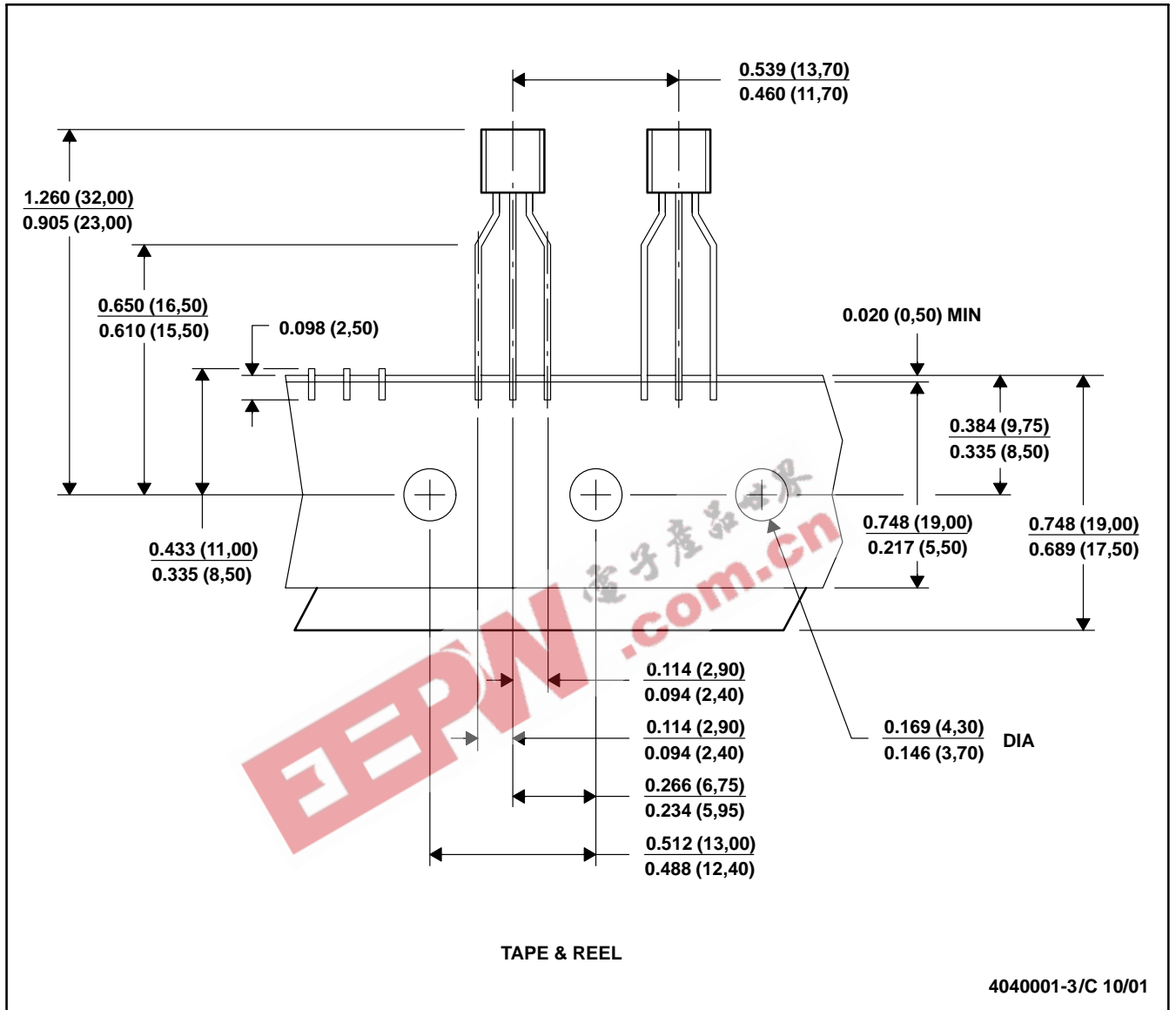
- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C** Lead dimensions are not controlled within this area
 - D** Falls within JEDEC TO -226 Variation AA (TO-226 replaces TO-92)
 - E. Shipping Method:
 - Straight lead option available 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:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - Tape and Reel information for the Format Lead Option package.

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