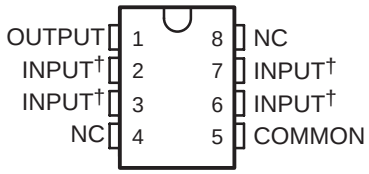
SLVS011D − OCTOBER 1982 − REVISED AUGUST 2003

- **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

LP PACKAGE
(TOP VIEW)

description/ordering information

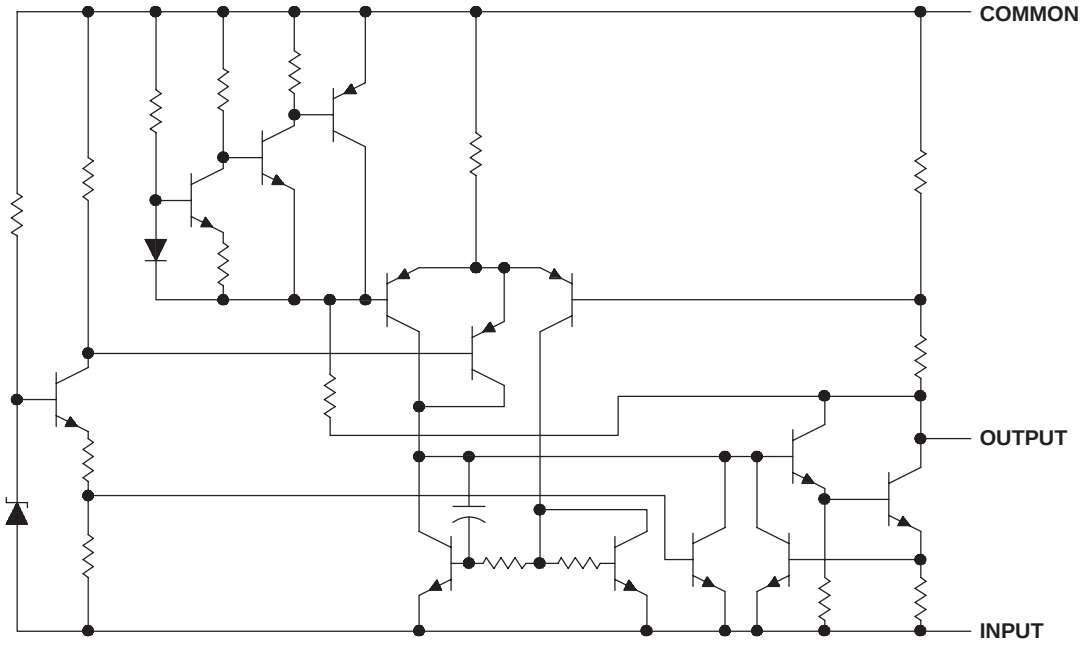
This series of fixed negative-voltage integrated-circuit voltage regulators is designed for a wide range of applications. These include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used to control series pass elements 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	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	
		−15	TO-226 / TO-92 (LP)	Bulk of 1000	MC79L15ACLP	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	79L15C

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

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 $T_J(max)$, θ_{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.
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

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

PARAMETER	TEST CONDITIONS†	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 V to −20 V, I_O = 1 mA to 40 mA	0°C to 125°C	−4.5		−5.5	−4.75		−5.25	
	V_I = −10 V, I_O = 1 mA to 70 mA	0°C to 125°C	−4.5		−5.5	−4.75		−5.25	
Input regulation	V_I = −7 V to −20 V	25°C			200			150	mV
	V_I = −8 V to −20 V				150			100	
Ripple rejection	V_I = −8 V to −18 V, f = 120 Hz	25°C	40	49		41	49		dB
Output regulation	I_O = 1 mA to 100 mA	25°C			60			60	mV
	I_O = 1 mA to 40 mA				30			30	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		40			40		μV
Dropout voltage	I_O = 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_I = −8 V to −20 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.

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

PARAMETER	TEST CONDITIONS†	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 V to −27 V, I_O = 1 mA to 40 mA	0°C to 125°C	−10.8		−13.2	−11.4		−12.6	
	V_I = −19 V, I_O = 1 mA to 70 mA	0°C to 125°C	−10.8		−13.2	−11.4		−12.6	
Input regulation	V_I = −14.5 V to −27 V	25°C			250			250	mV
	V_I = −16 V to −27 V				200			200	
Ripple rejection	V_I = −15 V to −25 V, f = 120 Hz	25°C	36	42		37	42		dB
Output regulation	I_O = 1 mA to 100 mA	25°C			100			100	mV
	I_O = 1 mA to 40 mA				50			50	
Output noise voltage	f = 10 Hz to 100 kHz	25°C		80			80		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 = −16 V to −27 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.

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, 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.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
MC79L05ACD	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACD.A	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDE4	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDG4	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDR	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDR.A	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDRE4	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACDRG4	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L05A
MC79L05ACLP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L05AC
MC79L05ACLP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L05AC
MC79L05ACLPE3	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L05AC
MC79L05ACLPR	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L05AC
MC79L05ACLPR.A	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L05AC
MC79L12ACD	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A
MC79L12ACD.A	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A
MC79L12ACDE4	Active	Production	SOIC (D) | 8	75 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A
MC79L12ACDR	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A
MC79L12ACDR.A	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 125	79L12A
MC79L12ACLP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12ACLP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12ACLPE3	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12ACLPR	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12ACLPR.A	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12ACLPRE3	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L12AC
MC79L12CLP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L12C
MC79L12CLP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L12C
MC79L15ACLP	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC
MC79L15ACLP.A	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC
MC79L15ACLPE3	Active	Production	TO-92 (LP) | 3	1000 | BULK	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
MC79L15ACLPR	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC
MC79L15ACLPR.A	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC
MC79L15ACLPRE3	Active	Production	TO-92 (LP) | 3	2000 | LARGE T&R	Yes	SN	N/A for Pkg Type	0 to 125	79L15AC

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

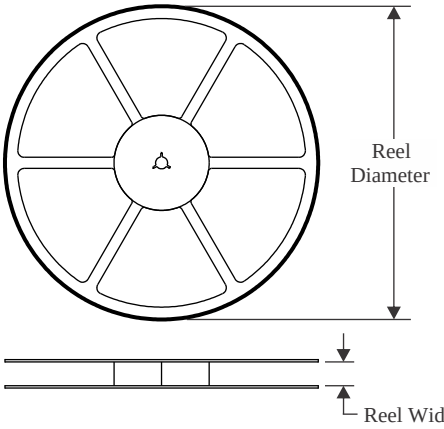
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

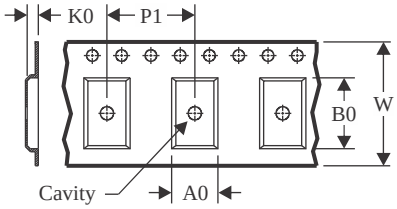
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

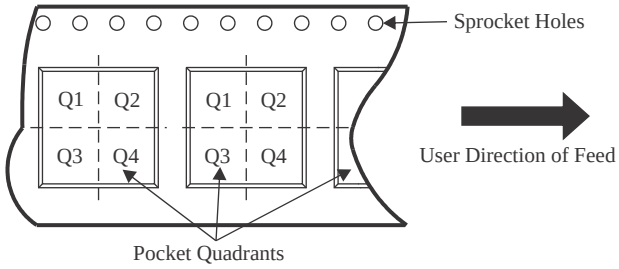


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

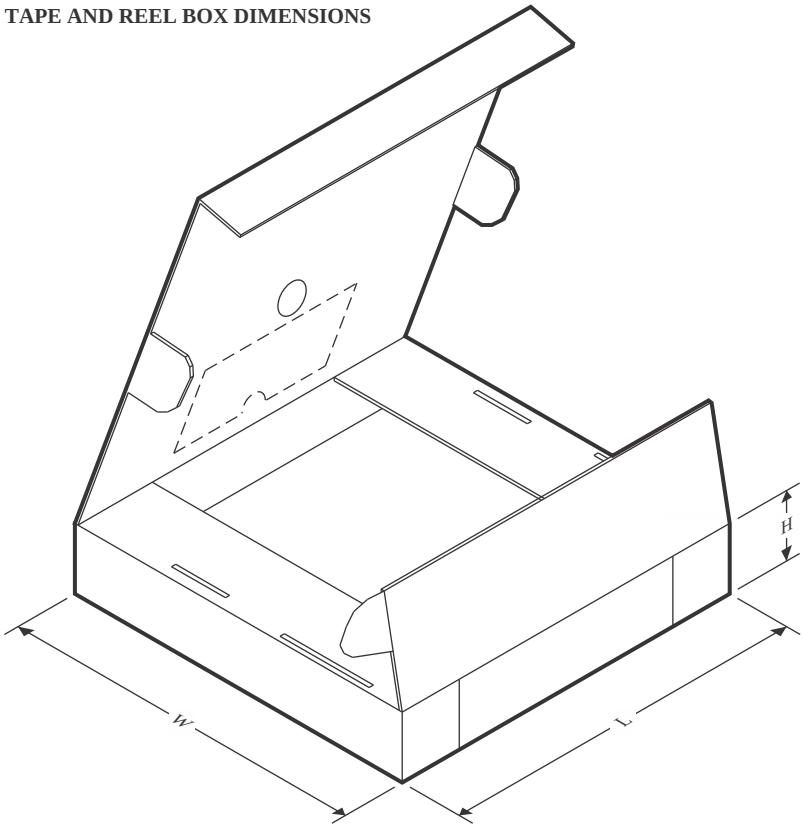
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
MC79L05ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
MC79L12ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

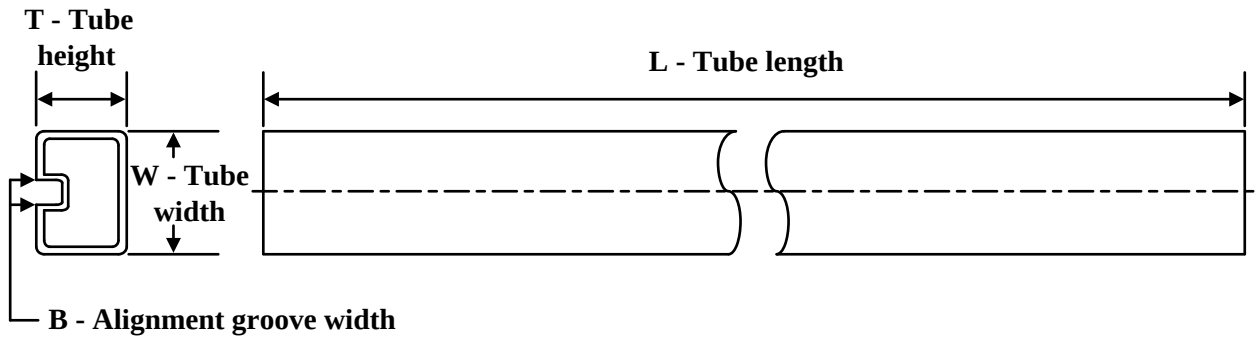
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

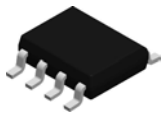
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
MC79L05ACDR	SOIC	D	8	2500	353.0	353.0	32.0
MC79L12ACDR	SOIC	D	8	2500	353.0	353.0	32.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
MC79L05ACD	D	SOIC	8	75	507	8	3940	4.32
MC79L05ACD.A	D	SOIC	8	75	507	8	3940	4.32
MC79L05ACDE4	D	SOIC	8	75	507	8	3940	4.32
MC79L05ACDG4	D	SOIC	8	75	507	8	3940	4.32
MC79L12ACD	D	SOIC	8	75	507	8	3940	4.32
MC79L12ACD.A	D	SOIC	8	75	507	8	3940	4.32
MC79L12ACDE4	D	SOIC	8	75	507	8	3940	4.32

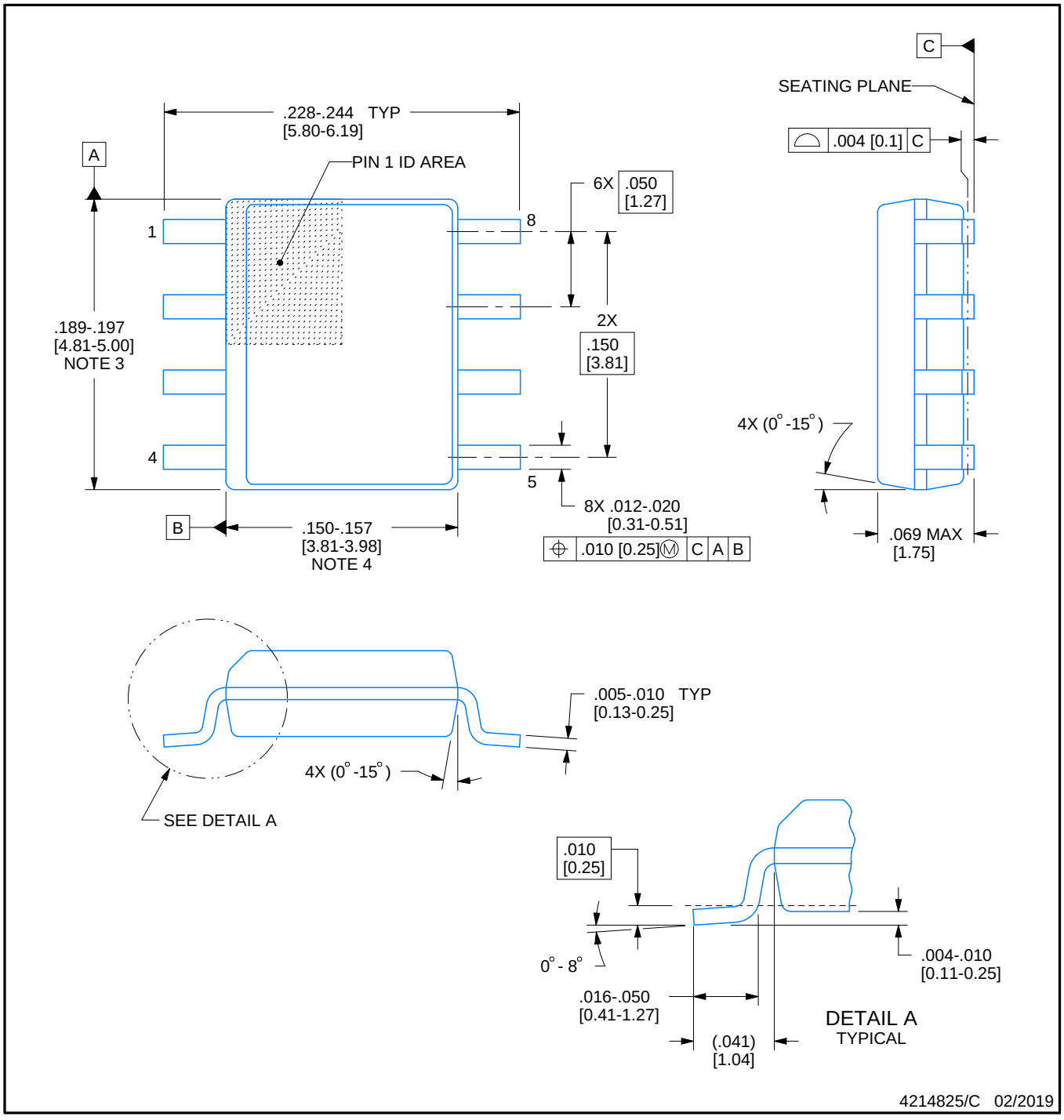


PACKAGE OUTLINE

D0008A

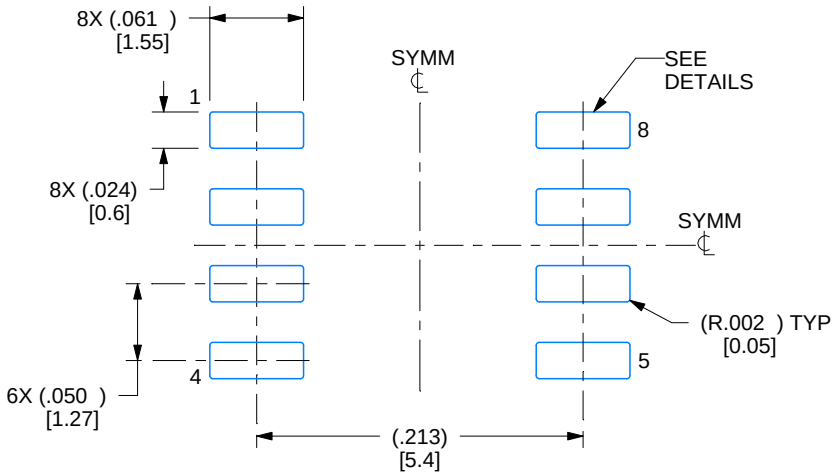
SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

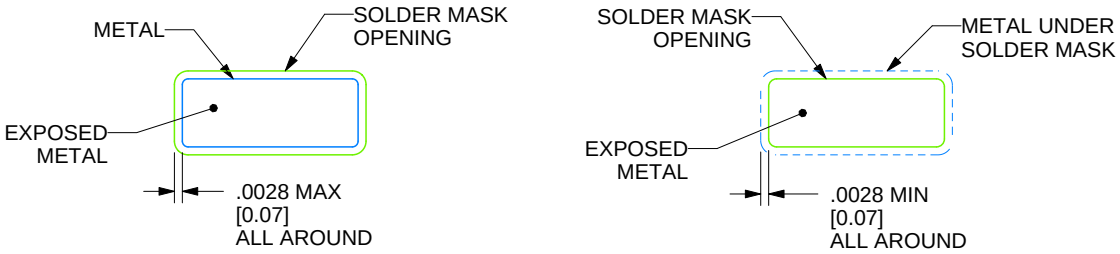


NOTES:

1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X



SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

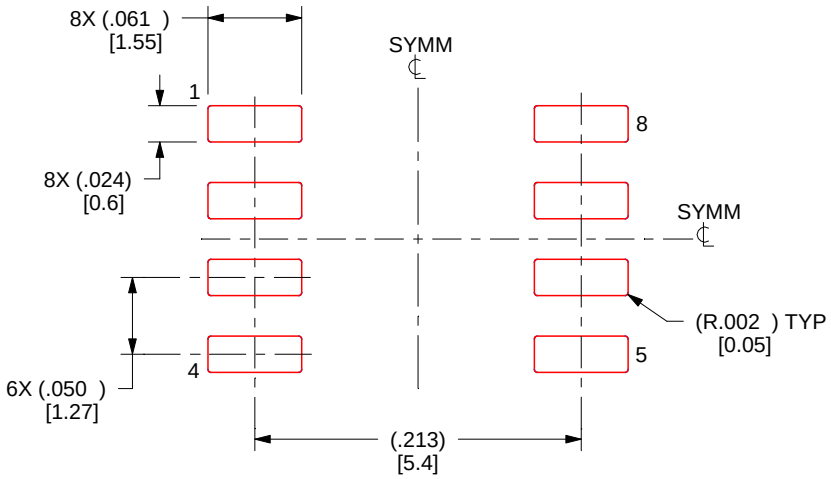
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.125 MM] THICK STENCIL
SCALE:8X

4214825/C 02/2019

NOTES: (continued)

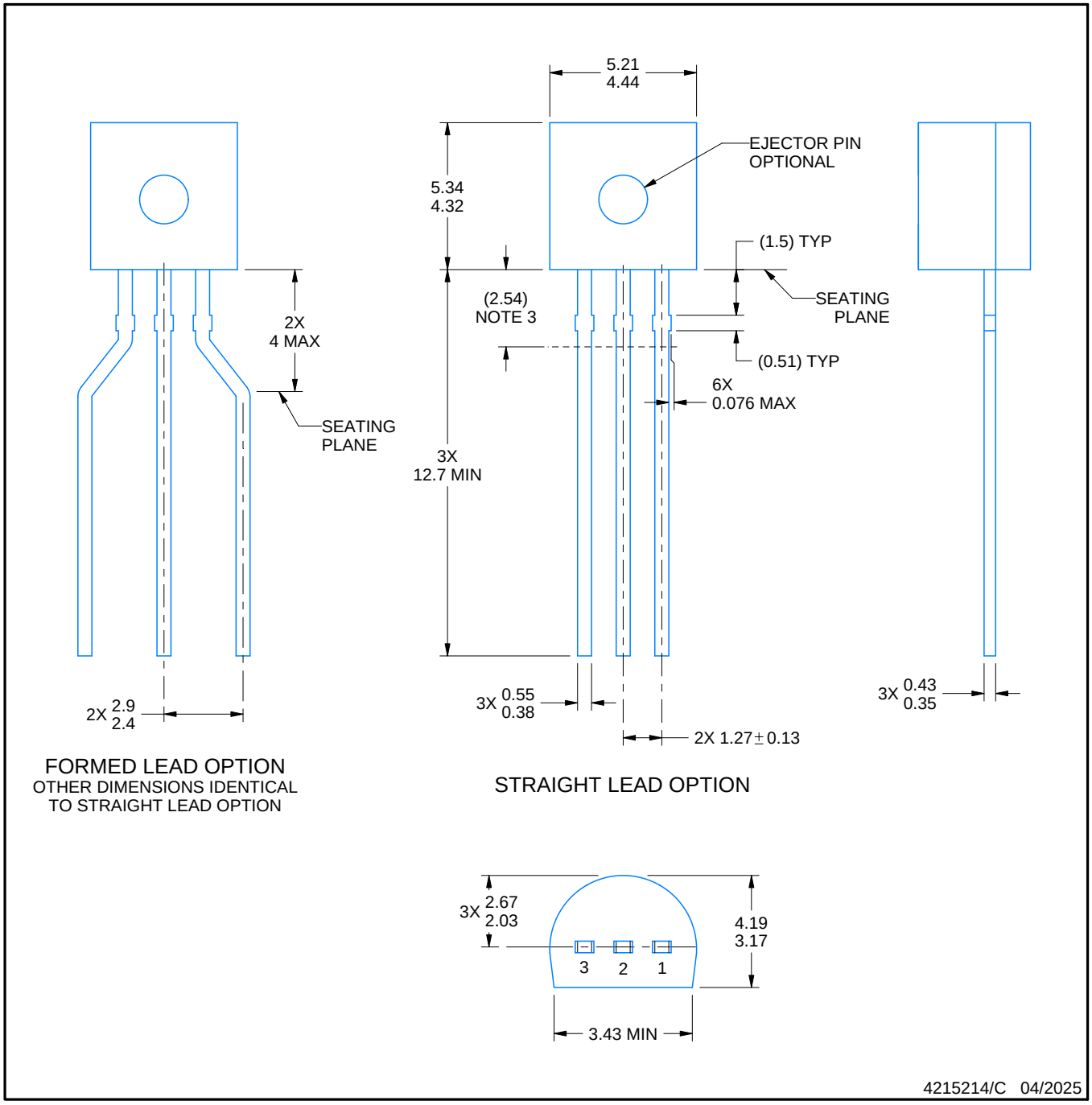
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

LP0003A

PACKAGE OUTLINE

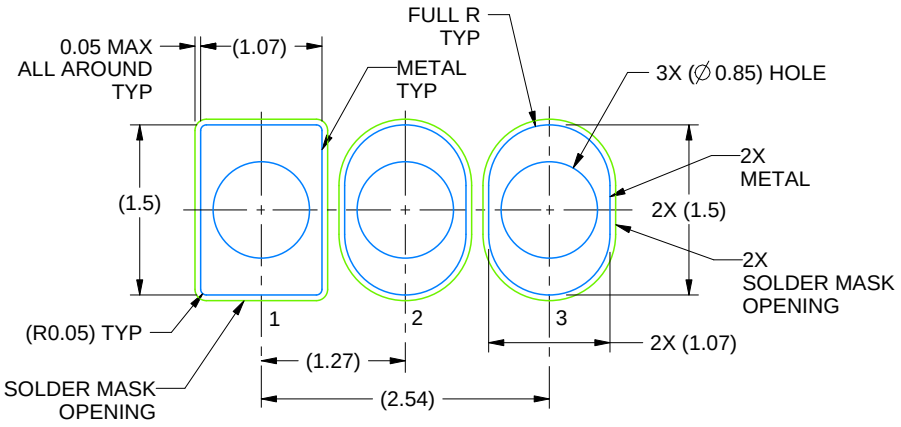
TO-92 - 5.34 mm max height

TO-92

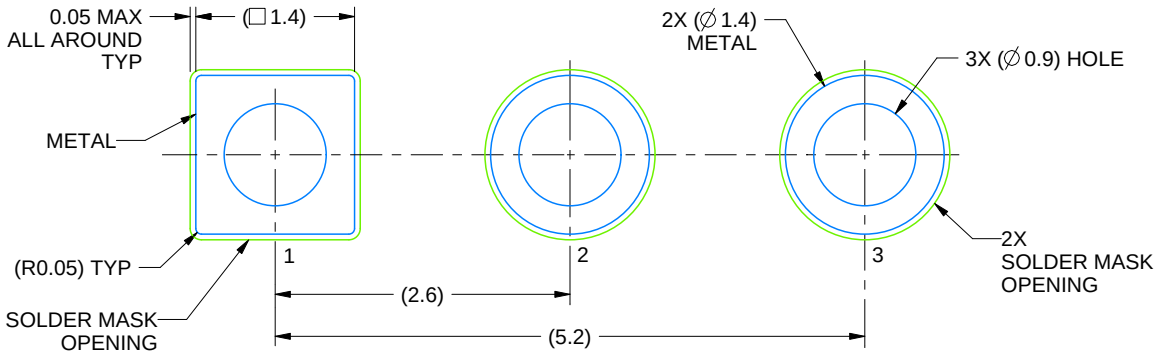


NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Lead dimensions are not controlled within this area.
4. Reference JEDEC TO-226, variation AA.
5. Shipping method:
   a. Straight lead option available in bulk pack only.
   b. Formed lead option available in tape and reel or ammo pack.
   c. Specific products can be offered in limited combinations of shipping medium and lead options.
   d. Consult product folder for more information on available options.



LAND PATTERN EXAMPLE
STRAIGHT LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X



LAND PATTERN EXAMPLE
FORMED LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X

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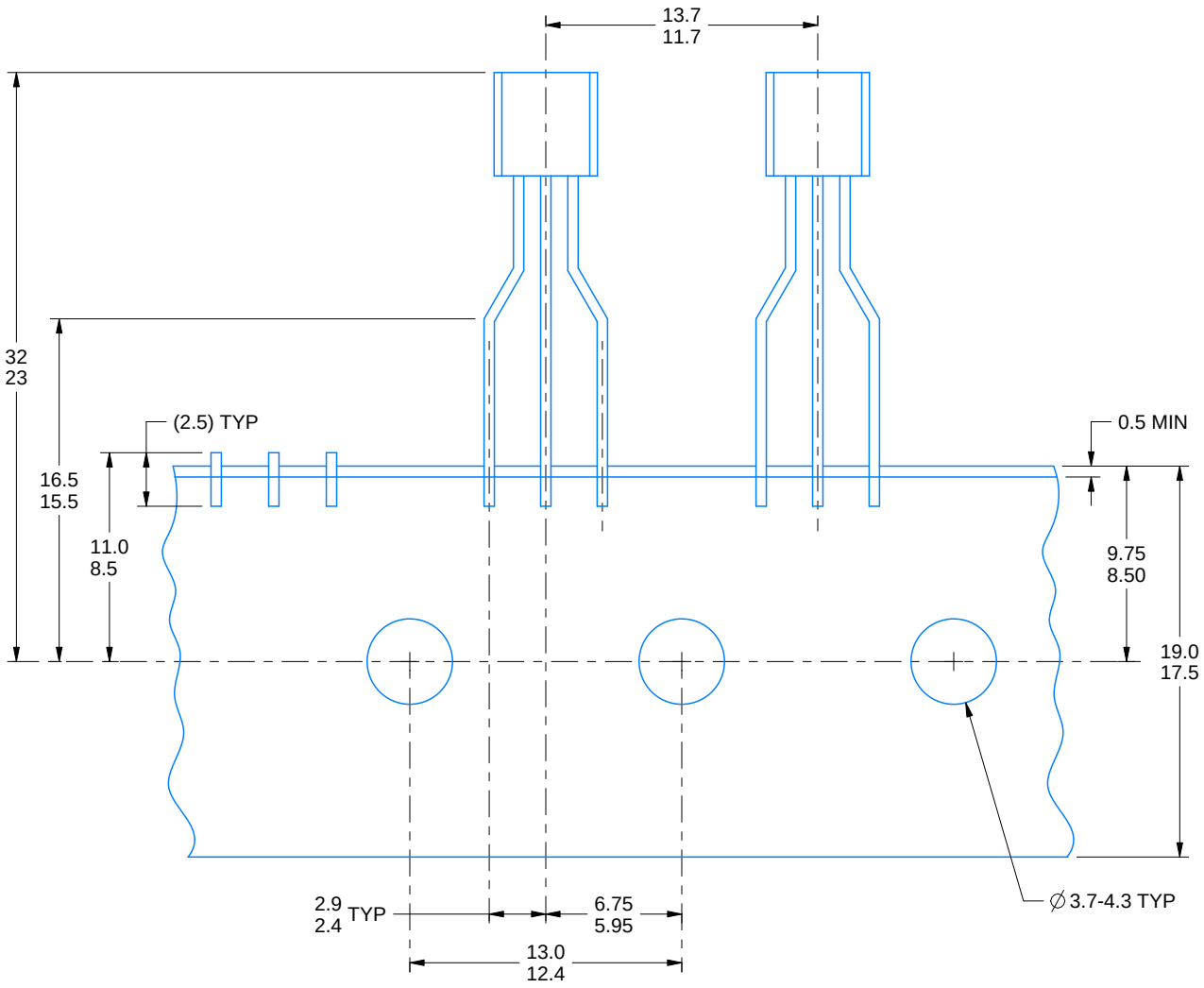
LP0003A

TO-92 - 5.34 mm max height

TO-92



FOR FORMED LEAD OPTION PACKAGE

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