HA179L00 Series

3-terminal Negative Fixed Voltage Regulators

HITACHI

ADE-204-054 (Z)
Rev. 0
Dec. 2000

Description

The HA179L00 series are three-terminal fixed output voltage regulators. These are small outline packages which are useful ICs. For application example, as Zener diodes, easy stabilized power sources.

Features

- Some kinds output voltage series
- Superior ripple rejection ratio for audio frequency
- Large maximum power dissipation: 800 mW
- Over current and over temperature protection

Hitachi semiconductor

Ordering Information

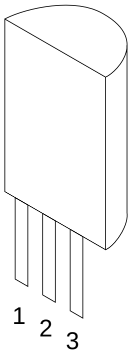
Application	OutputVoltage	TypeName	Package
Industrial use	–5	HA179L05P	TO-92M
	–6	HA179L06P	
	–8	HA179L08P	
	–9	HA179L09P	
	–10	HA179L10P	
	–12	HA179L12P	
	–15	HA179L15P	
Commercial use	–5	HA179L05	TO-92M
	–6	HA179L06	
	–8	HA179L08	
	–9	HA179L09	
	–10	HA179L10	
	–12	HA179L12	
	–15	HA179L15	
Commercial use	–5	HA179L05U	UPAK
	–6	HA179L06U	
	–8	HA179L08U	
	–9	HA179L09U	
	–10	HA179L10U	
	–12	HA179L12U	
	–15	HA179L15U	

Output Voltage Accuracy Grade

Use	Standard (±4 %)
Industrial Use	HA179L00P
Commercial Use	HA179L00
	HA179L00U

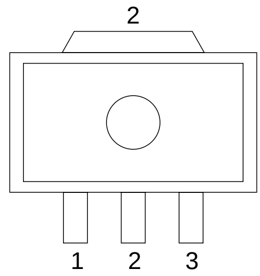
Pin Arrangement

• **TO-92M**



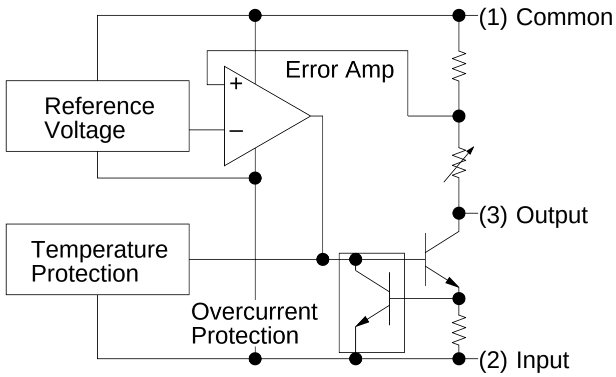
1. Common
2. Input
3. Output

• **U-PAK**

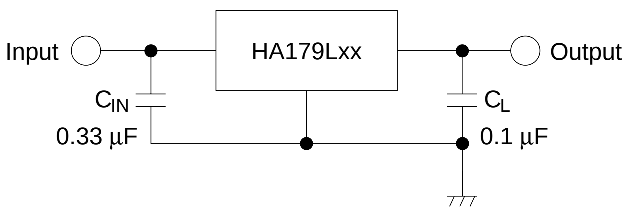


1. Common
2. Input
3. Output

Block Diagram



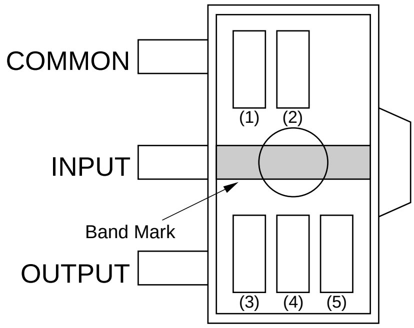
Standard Circuit



UPAK Product (HA179L00U) Mark Patterns

The mark patterns shown below are used. on UPAK products, as the package is small. Note that the product code and mark pattern are different.

The pattern is laser-printed.



Notes: 1. Boxes (1) to (5) in the figures show the position of the letters or numerals, and are not actually marked on the package.

2. (1) and (2) show the product-specific mark pattern. (see table 1)

Table 1

Output Voltage(V)	Product No.	Mark Pattern(2 digit)
–5	HA179L05U	9B
–6	HA179L06U	9D
–8	HA179L08U	9E
–9	HA179L09U	9F
–10	HA179L10U	9G
–12	HA179L12U	9H
–15	HA179L15U	9J

3. (3) shows the production year code (the last digit of the year).
4. (4) shows the production month code (see table 2).

Table 2

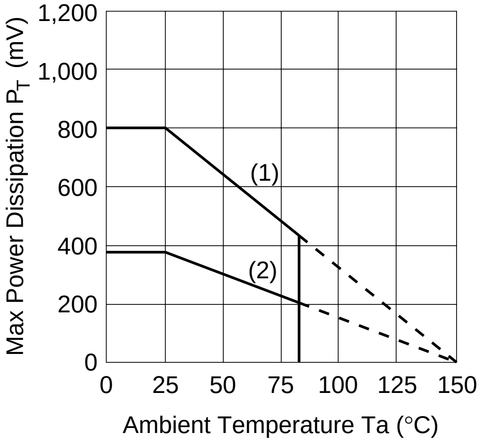
Production Month	1	2	3	4	5	6	7	8	9	10	11	12
Marked Code	A	B	C	D	E	F	G	H	J	K	L	M

5. (5) shows the production week code.

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	HA179L00P, HA179L00 Series	HA179L00U Series	Unit
Input voltage	V_{IN}	–35	–35	V
Max power dissipation	P_T*[1]	800*[2]	800*[2]	mW
Operating ambient temperature	Topr	–20 to +85	–20 to +85	°C
Storage temperature	Tstg	–55 to +150	–55 to +150	°C

Notes: 1. Ta ≤ 25°C, If Ta > 25°C, derate by 6.4 mW/°C
2. 15 mm × 25 mm × 0.7 mm glass epoxy board, Ta ≤ 25°C



(1) HA179L00P, HA179L00, HA179L00U
15 mm × 25 mm × 0.7 mm glass epoxy board
(2) HA179L00U at non-mounted

Electrical Characteristics

HA179L05P, HA179L05, HA179L05U

(V_{IN} = –10 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–4.8	–5.0	–5.2	V	Tj = 25°C	
		–4.75	—	–5.25		V_{IN} = –10 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	55	150	mV	Tj = 25°C	–20 V ≤ V_{IN} ≤ –7 V
		—	45	100			–20 V ≤ V_{IN} ≤ –8 V
Load regulation	ΔV_{OLOAD}	—	16	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	11	60			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	5.0	30			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.0	4.0	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–20 V ≤ V_{IN} ≤ –8.0 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	300	—	mA	Tj = 25°C	

HA179L06P, HA179L06, HA179L06U

(V_{IN} = –11 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–5.76	–6.0	–6.24	V	Tj = 25°C	
		–5.70	—	–6.30		V_{IN} = –11 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	50	150	mV	Tj = 25°C	–21 V ≤ V_{IN} ≤ –8.1 V
		—	45	110			–21 V ≤ V_{IN} ≤ –9.0 V
Load regulation	ΔV_{OLOAD}	—	17.5	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	12	70			1.0 mA ≤ I_{OUT} ≤ 100 mA
			5.5	35			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.0	4.0	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–21 V ≤ V_{IN} ≤ –9.0 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	300	—	mA	Tj = 25°C	

HA179L08P, HA179L08, HA179L08U

(V_{IN} = –14 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–7.68	–8.0	–8.32	V	Tj = 25°C	
		–7.60	—	–8.40		V_{IN} = –14 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	65	175	mV	Tj = 25°C	–23 V ≤ V_{IN} ≤ –10.5 V
		—	55	125			–23 V ≤ V_{IN} ≤ –11 V
Load regulation	ΔV_{OLOAD}	—	22	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	15	80			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	7.0	40			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.0	4.0	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–23 V ≤ V_{IN} ≤ –11 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	270	—	mA	Tj = 25°C	

HA179L09P, HA179L09, HA179L09U

(V_{IN} = –15 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–8.64	–9.0	–9.36	V	Tj = 25°C	
		–8.55	—	–9.45		V_{IN} = –15 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	80	200	mV	Tj = 25°C	–24 V ≤ V_{IN} ≤ –11.4 V
		—	70	160			–24 V ≤ V_{IN} ≤ –12 V
Load regulation	ΔV_{OLOAD}	—	24.5	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	17	90			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	8.0	45			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.6	4.6	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–24 V ≤ V_{IN} ≤ –12 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	270	—	mA	Tj = 25°C	

HA179L10P, HA179L10, HA179L10U

(V_{IN} = –16 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–9.6	–10	–10.4	V	Tj = 25°C	
		–9.50	—	–10.50		V_{IN} = –16 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	80	230	mV	Tj = 25°C	–25 V ≤ V_{IN} ≤ –12.5 V
		—	70	170			–25 V ≤ V_{IN} ≤ –13 V
Load regulation	ΔV_{OLOAD}	—	26	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	18	90			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	8.5	45			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.6	4.6	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–25 V ≤ V_{IN} ≤ –13 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	260	—	mA	Tj = 25°C	

HA179L12P, HA179L12, HA179L12U

(V_{IN} = –19 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–11.52	–12	–12.48	V	Tj = 25°C	
		–11.40	—	–12.60		V_{IN} = –19 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	120	250	mV	Tj = 25°C	–27 V ≤ V_{IN} ≤ –14.5 V
		—	100	200			–27 V ≤ V_{IN} ≤ –16 V
Load regulation	ΔV_{OLOAD}	—	28.5	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	20	100			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	10	50			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.6	4.6	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–27 V ≤ V_{IN} ≤ –16 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25°C	
Output short circuit current	I_{OS}	—	250	—	mA	Tj = 25°C	

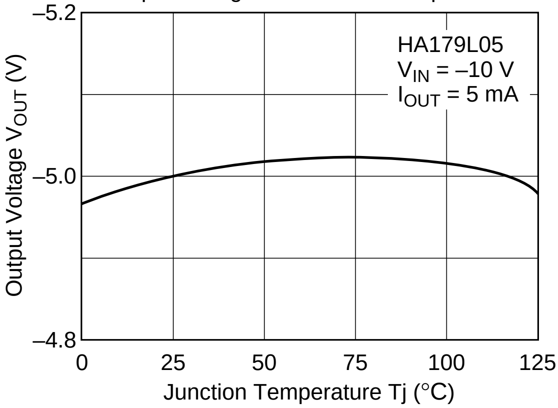
HA179L15P, HA179L15, HA179L15U

(V_{IN} = –23 V, I_{OUT} = 40 mA, 0°C ≤ Tj ≤ 125°C, C_{IN} = 0.33 µF, C_L = 0.1 µF)

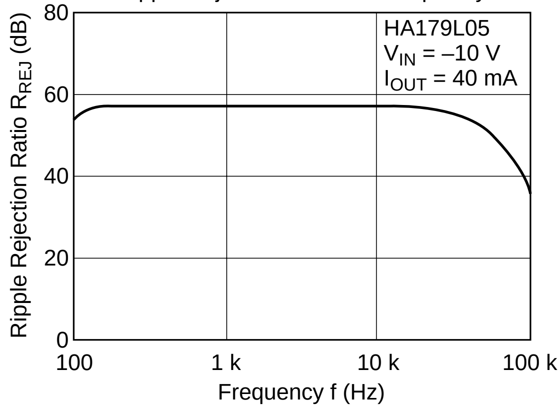
Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Output voltage	V_{OUT}	–14.4	–15	–15.6	V	Tj = 25°C	
		–14.25	—	–15.75		V_{IN} = –23 V, 1.0 mA ≤ I_{OUT} ≤ 70 mA	
Line regulation	ΔV_{OLINE}	—	130	300	mV	Tj = 25°C	–30 V ≤ V_{IN} ≤ –17.5 V
		—	110	250			–30 V ≤ V_{IN} ≤ –20 V
Load regulation	ΔV_{OLOAD}	—	36	—	mV	Tj = 25°C	1.0 mA ≤ I_{OUT} ≤ 150 mA
		—	25	150			1.0 mA ≤ I_{OUT} ≤ 100 mA
		—	12	75			1.0 mA ≤ I_{OUT} ≤ 40 mA
Quiescent current	I_Q	—	2.6	4.6	mA	Tj = 25°C	
Quiescent current change	ΔI_Q	—	—	1.5	mA	Tj = 25°C	–30 V ≤ V_{IN} ≤ –20 V
		—	—	1.0			1.0 mA ≤ I_{OUT} ≤ 40 mA
Voltage drop	V_{DROP}	—	1.3	—	V	Tj = 25° C	
Output short circuit current	I_{OS}	—	240	—	mA	Tj = 25°C	

Characteristic Curves

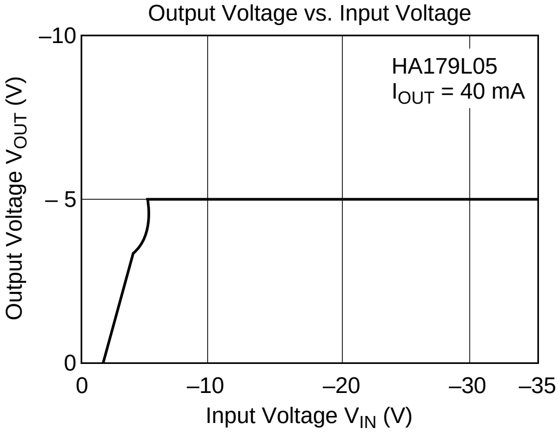
Output Voltage vs. Junction Temperature



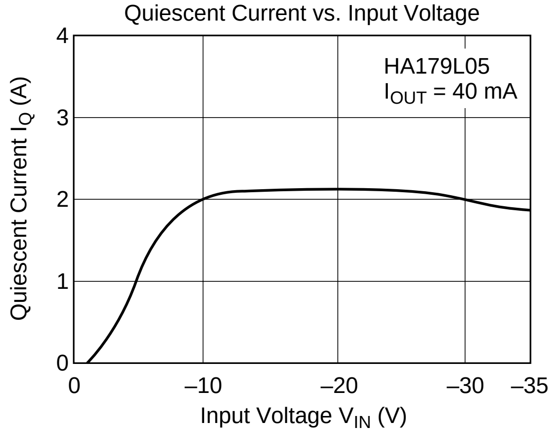
Ripple Rejection Ratio vs. Frequency



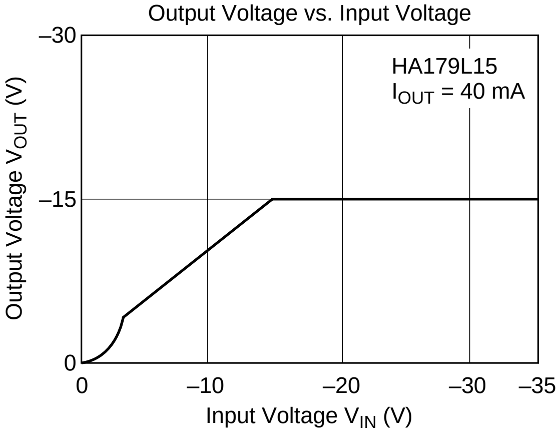
Output Voltage vs. Input Voltage



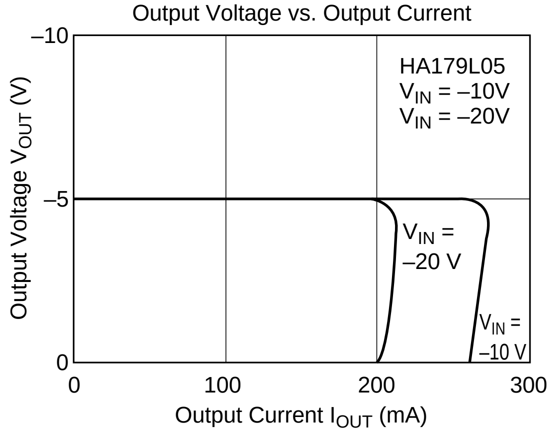
Quiescent Current vs. Input Voltage



Output Voltage vs. Input Voltage

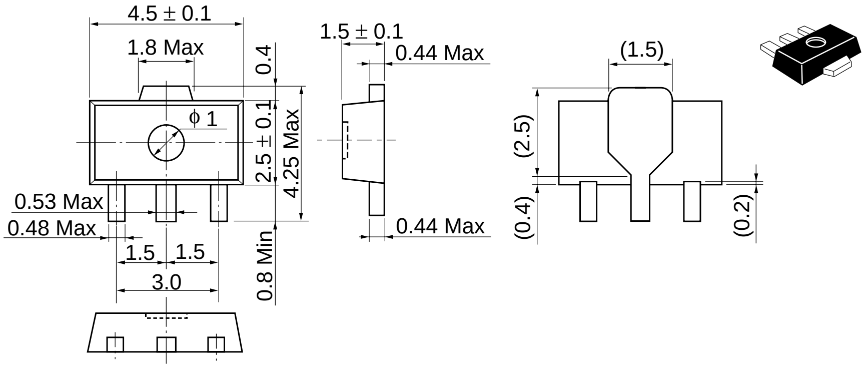


Output Voltage vs. Output Current



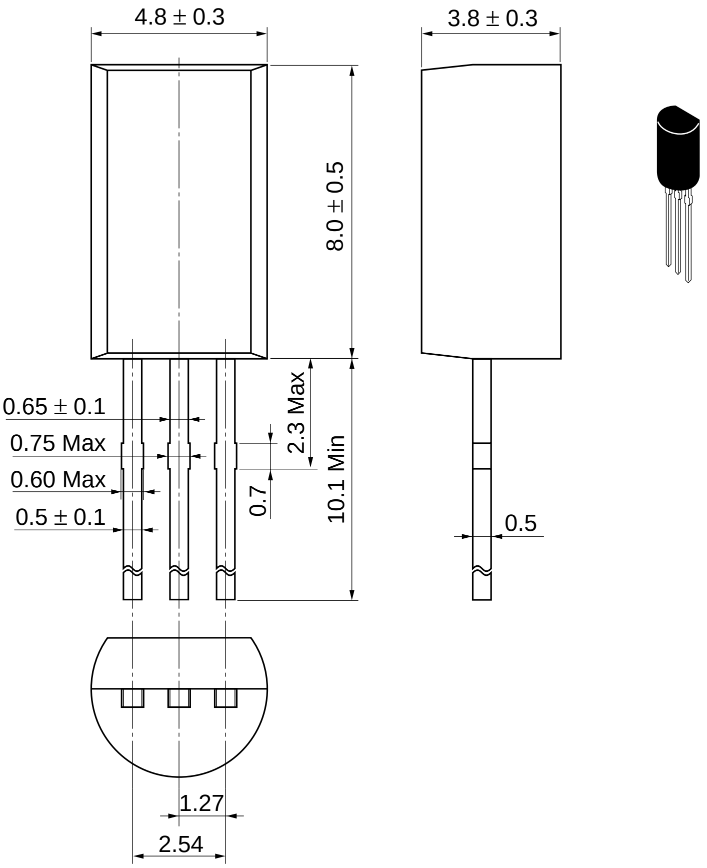
Package Dimensions

Unit: mm



Hitachi Code	UPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.050 g

Unit: mm



Hitachi Code	TO-92 Mod
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.35 g

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