

---

# 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

# HA179L00 Series

## Ordering Information

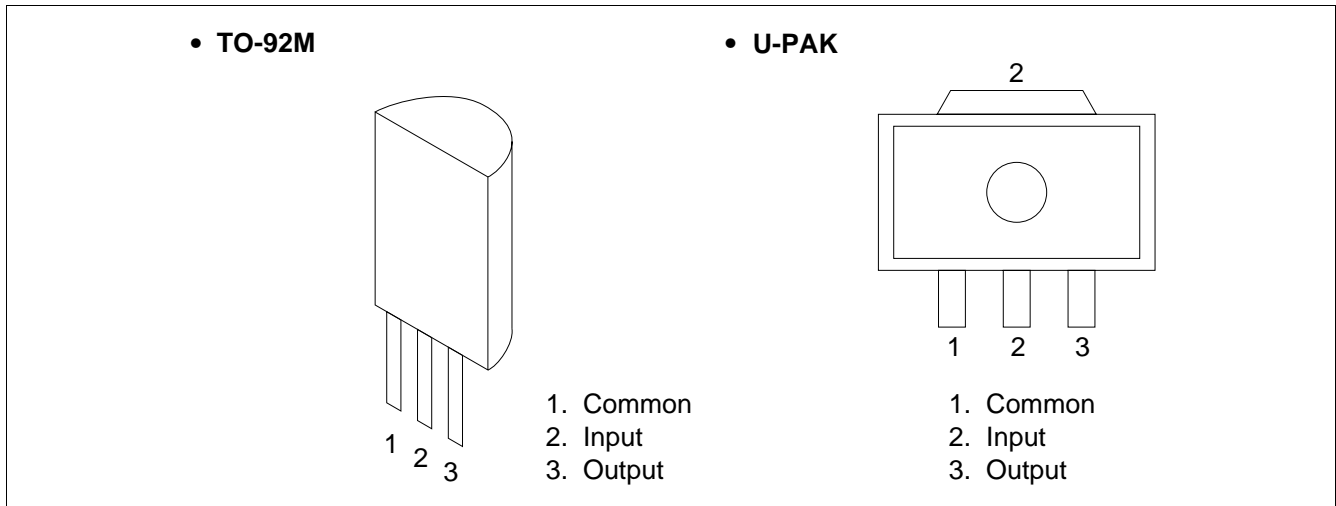
Application	OutputVoltage	TypeName	Package
Industrial use	-5	HA179L05P	TO-92M
	-6	HA179L06P	
	-8	HA179L08P	
	-9	HA179L09P	
	-10	HA179L10P	
	-12	HA179L12P	
	-15	HA179L15P	
Commercial use	-5	HA179L05	TO-92M
	-6	HA179L06	
	-8	HA179L08	
	-9	HA179L09	
	-10	HA179L10	
	-12	HA179L12	
	-15	HA179L15	
Commercial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

## Output Voltage Accuracy Grade

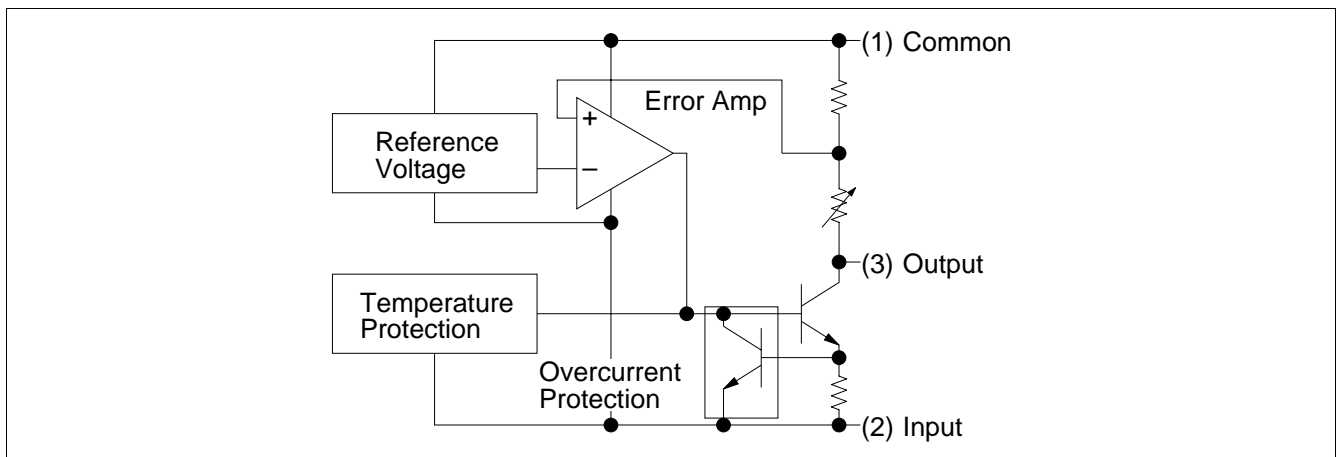
Use	Standard ( $\pm 4\%$ )
Industrial Use	HA179L00P
Commercial Use	HA179L00
	HA179L00U

**HITACHI**

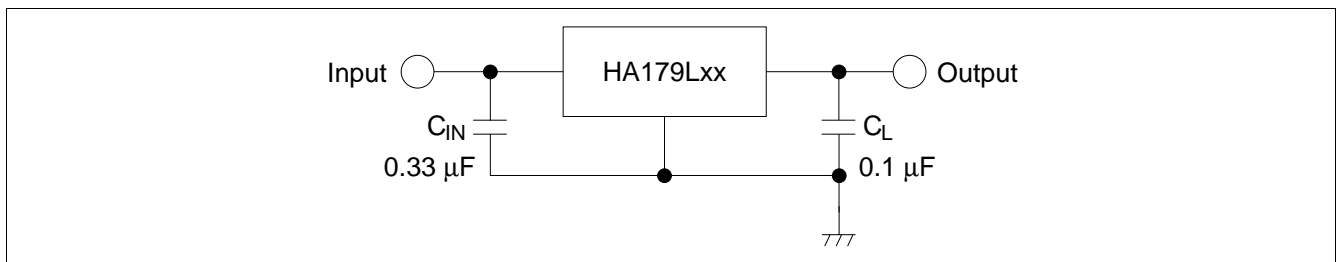
Pin Arrangement



Block Diagram



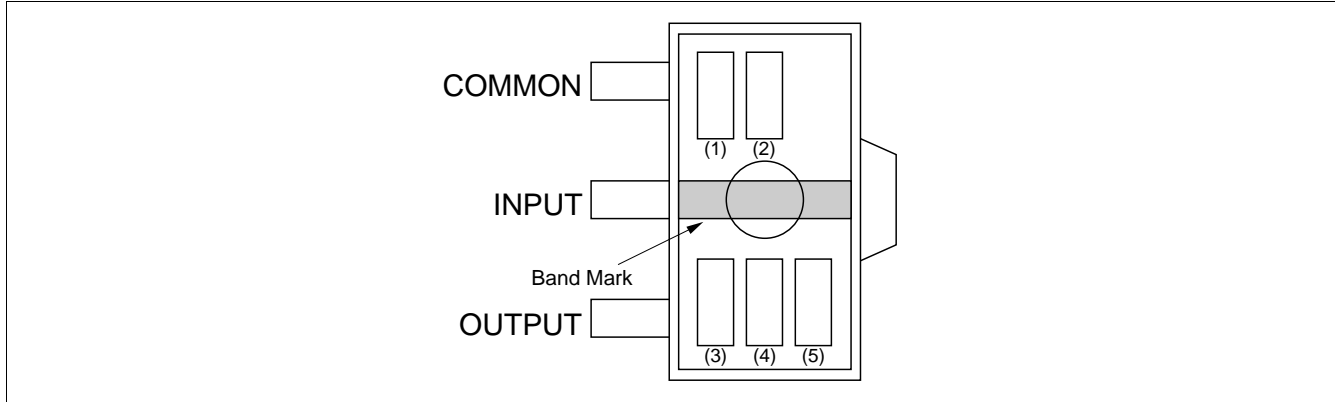
Standard Circuit



## 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**

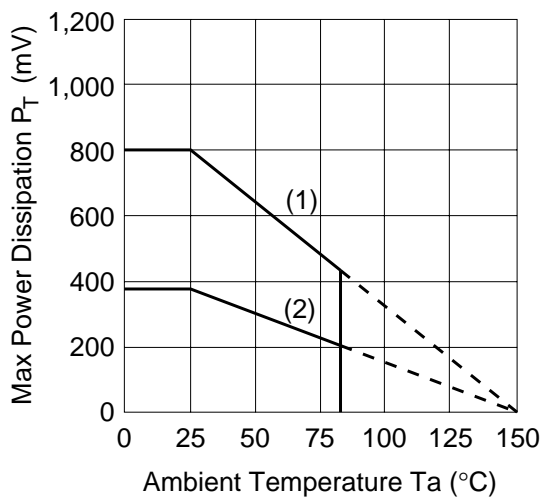
Production Month	1	2	3	4	5	6	7	8	9	10	11	12
Marked Code	A	B	C	D	E	F	G	H	J	K	L	M

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.  $T_a \leq 25^\circ\text{C}$ , If  $T_a > 25^\circ\text{C}$ , derate by 6.4 mW/°C  
 2. 15 mm × 25 mm × 0.7 mm glass epoxy board,  $T_a \leq 25^\circ\text{C}$



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

# HA179L00 Series

## Electrical Characteristics

### HA179L05P, HA179L05, HA179L05U

( $V_{IN} = -10\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\ \mu\text{F}$ ,  $C_L = 0.1\ \mu\text{F}$ )

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

**HA179L06P, HA179L06, HA179L06U**
 $(V_{IN} = -11\text{ V}, I_{OUT} = 40\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_L = 0.1\text{ }\mu\text{F})$ 

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

**HA179L08P, HA179L08, HA179L08U**
 $(V_{IN} = -14\text{ V}, I_{OUT} = 40\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_L = 0.1\text{ }\mu\text{F})$ 

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

# HA179L00 Series

## HA179L09P, HA179L09, HA179L09U

( $V_{IN} = -15\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\ \mu\text{F}$ ,  $C_L = 0.1\ \mu\text{F}$ )

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

## HA179L10P, HA179L10, HA179L10U

( $V_{IN} = -16\text{ V}$ ,  $I_{OUT} = 40\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\ \mu\text{F}$ ,  $C_L = 0.1\ \mu\text{F}$ )

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

**HITACHI**



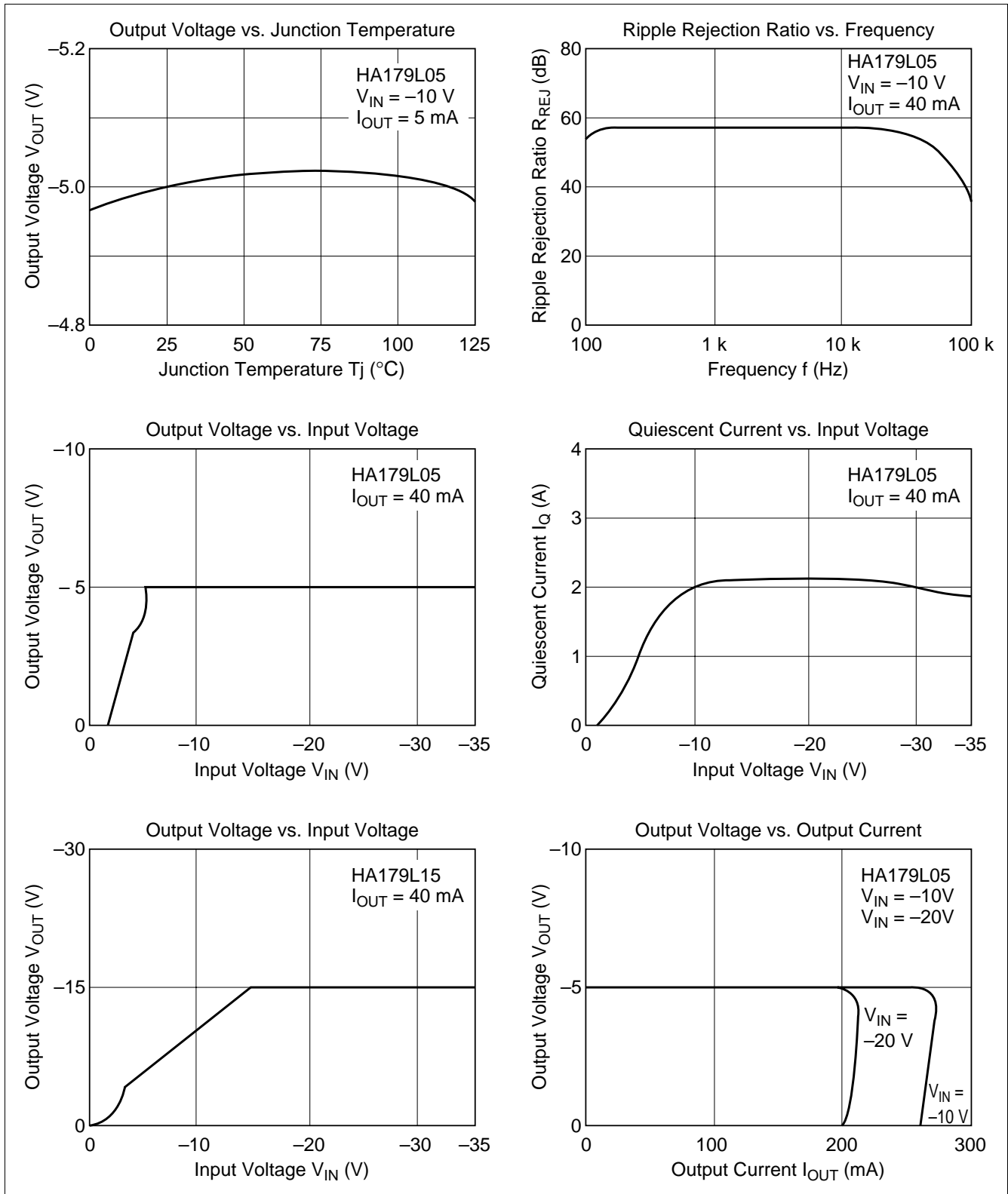
**HA179L12P, HA179L12, HA179L12U**
 $(V_{IN} = -19\text{ V}, I_{OUT} = 40\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_L = 0.1\text{ }\mu\text{F})$ 

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

**HA179L15P, HA179L15, HA179L15U**
 $(V_{IN} = -23\text{ V}, I_{OUT} = 40\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_L = 0.1\text{ }\mu\text{F})$ 

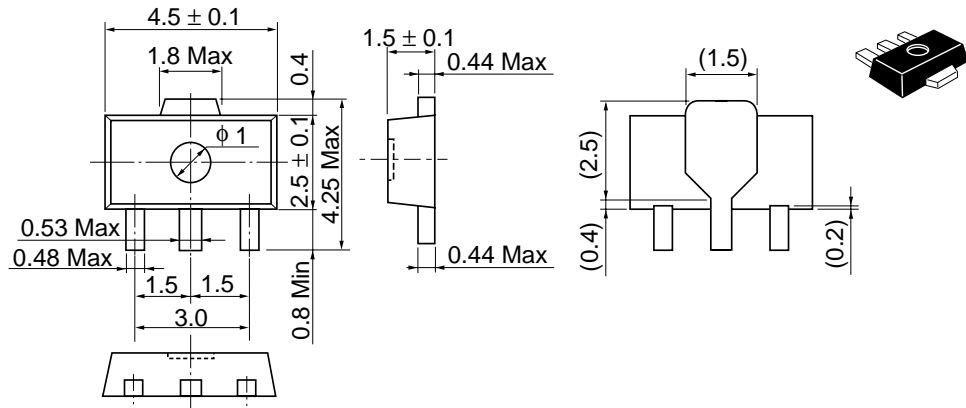
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Output voltage	$V_{OUT}$	-14.4	-15	-15.6	V	$T_j = 25^{\circ}\text{C}$
		-14.25	—	-15.75		$V_{IN} = -23\text{ V}, 1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$
Line regulation	$\Delta V_{OLINE}$	—	130	300	mV	$T_j = 25^{\circ}\text{C}$ $-30\text{ V} \leq V_{IN}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

## Characteristic Curves



Package Dimensions

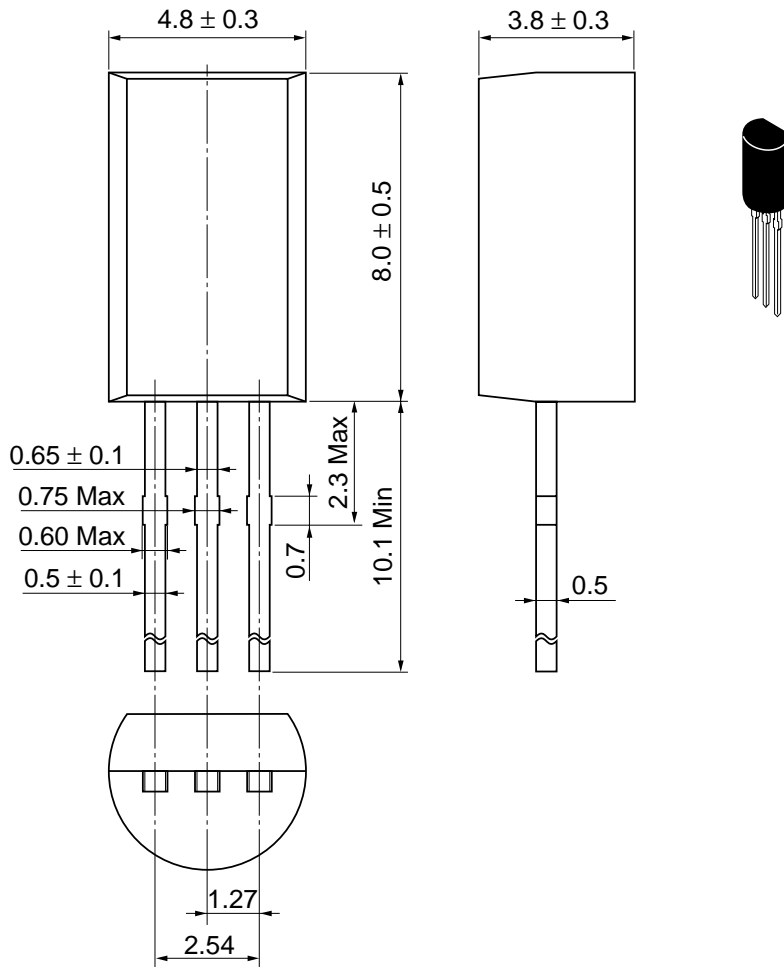
Unit: mm



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

# HA179L00 Series

Unit: mm



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

**HITACHI**

## Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      NorthAmerica      : <http://semiconductor.hitachi.com/>  
             Europe                : <http://www.hitachi-eu.com/hel/ecg>  
             Asia                        : <http://sicapac.hitachi-asia.com>  
             Japan                        : <http://www.hitachi.co.jp/Sicd/indx.htm>

### For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 585160

Hitachi Asia Ltd.  
Hitachi Tower  
16 Collyer Quay #20-00,  
Singapore 049318  
Tel : <65>-538-6533/538-8577  
Fax : <65>-538-6933/538-3877  
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.  
(Taipei Branch Office)  
4/F, No. 167, Tun Hwa North Road,  
Hung-Kuo Building,  
Taipei (105), Taiwan  
Tel : <886>-(2)-2718-3666  
Fax : <886>-(2)-2718-8180  
Telex : 23222 HAS-TP  
URL : <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower,  
World Finance Centre,  
Harbour City, Canton Road  
Tsim Sha Tsui, Kowloon,  
Hong Kong  
Tel : <852>-(2)-735-9218  
Fax : <852>-(2)-730-0281  
URL : <http://www.hitachi.com.hk>

Copyright © Hitachi, Ltd., 2000. All rights reserved. Printed in Japan.  
Colophon 2.0

## HITACHI