
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

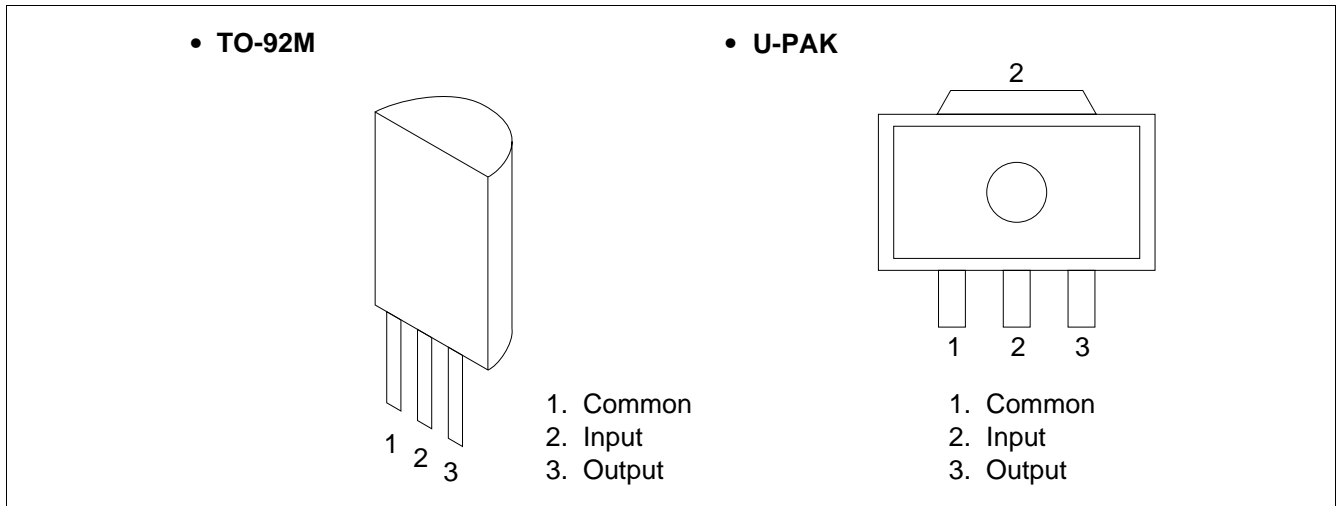
Application	OutputVoltage	TypeName	Package
Industrial use	-5	HA179L05P	TO-92M
	-6	HA179L06P	
	-8	HA179L08P	
	-9	HA179L09P	
	-10	HA179L10P	
	-12	HA179L12P	
	-15	HA179L15P	
Commercial use	-5	HA179L05	TO-92M
	-6	HA179L06	
	-8	HA179L08	
	-9	HA179L09	
	-10	HA179L10	
	-12	HA179L12	
	-15	HA179L15	
Commercial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

Output Voltage Accuracy Grade

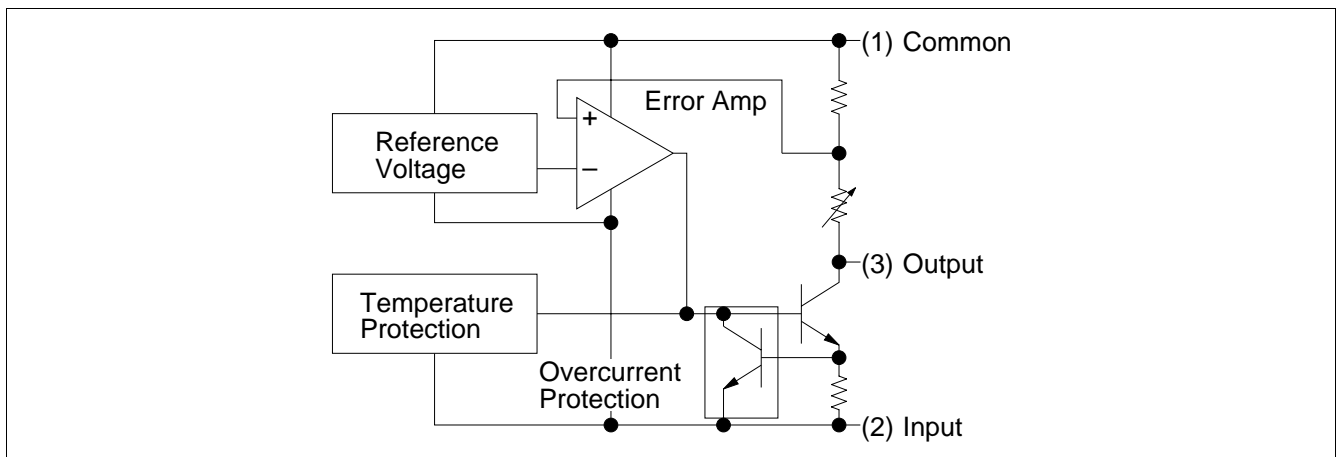
Use	Standard ($\pm 4\%$)
Industrial Use	HA179L00P
Commercial Use	HA179L00
	HA179L00U

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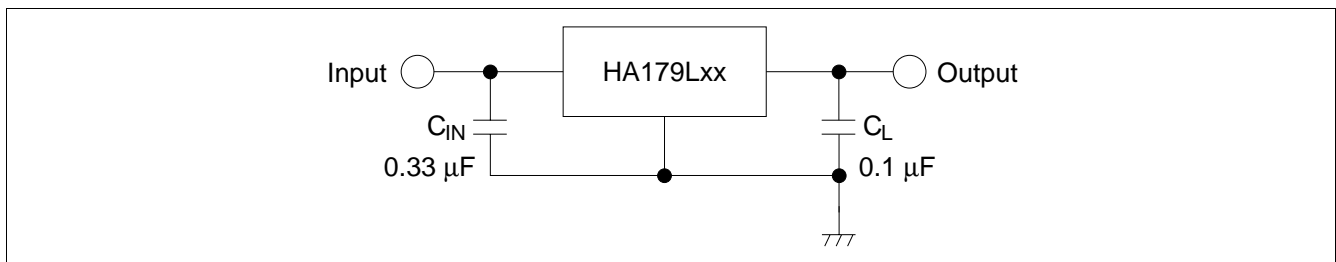
Pin Arrangement



Block Diagram



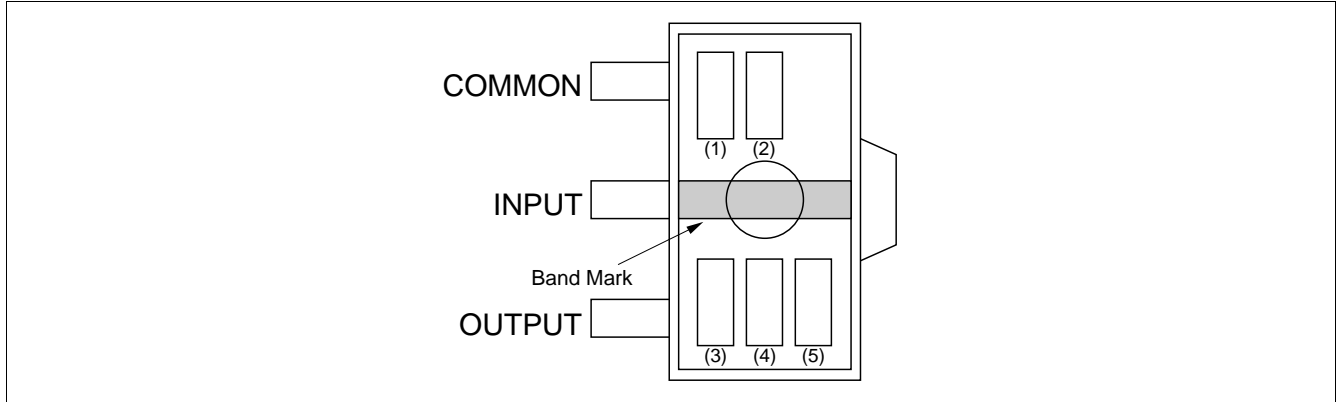
Standard Circuit



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

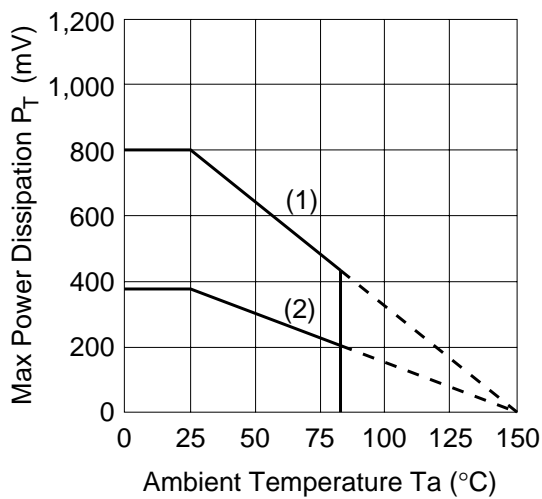
Production Month	1	2	3	4	5	6	7	8	9	10	11	12
Marked Code	A	B	C	D	E	F	G	H	J	K	L	M

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 $6.4 \text{ mW}/^\circ\text{C}$
 2. $15 \text{ mm} \times 25 \text{ mm} \times 0.7 \text{ mm}$ glass epoxy board, $T_a \leq 25^\circ\text{C}$



- (1) HA179L00P, HA179L00, HA179L00U
 $15 \text{ mm} \times 25 \text{ mm} \times 0.7 \text{ mm}$ 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	ΔV_{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	ΔV_{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	ΔI_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	ΔV_{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	ΔV_{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	ΔI_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	ΔV_{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	ΔV_{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	ΔI_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	ΔV_{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	ΔV_{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	ΔI_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	ΔV_{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	ΔV_{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	ΔI_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	$T_j = 25^\circ\text{C}$

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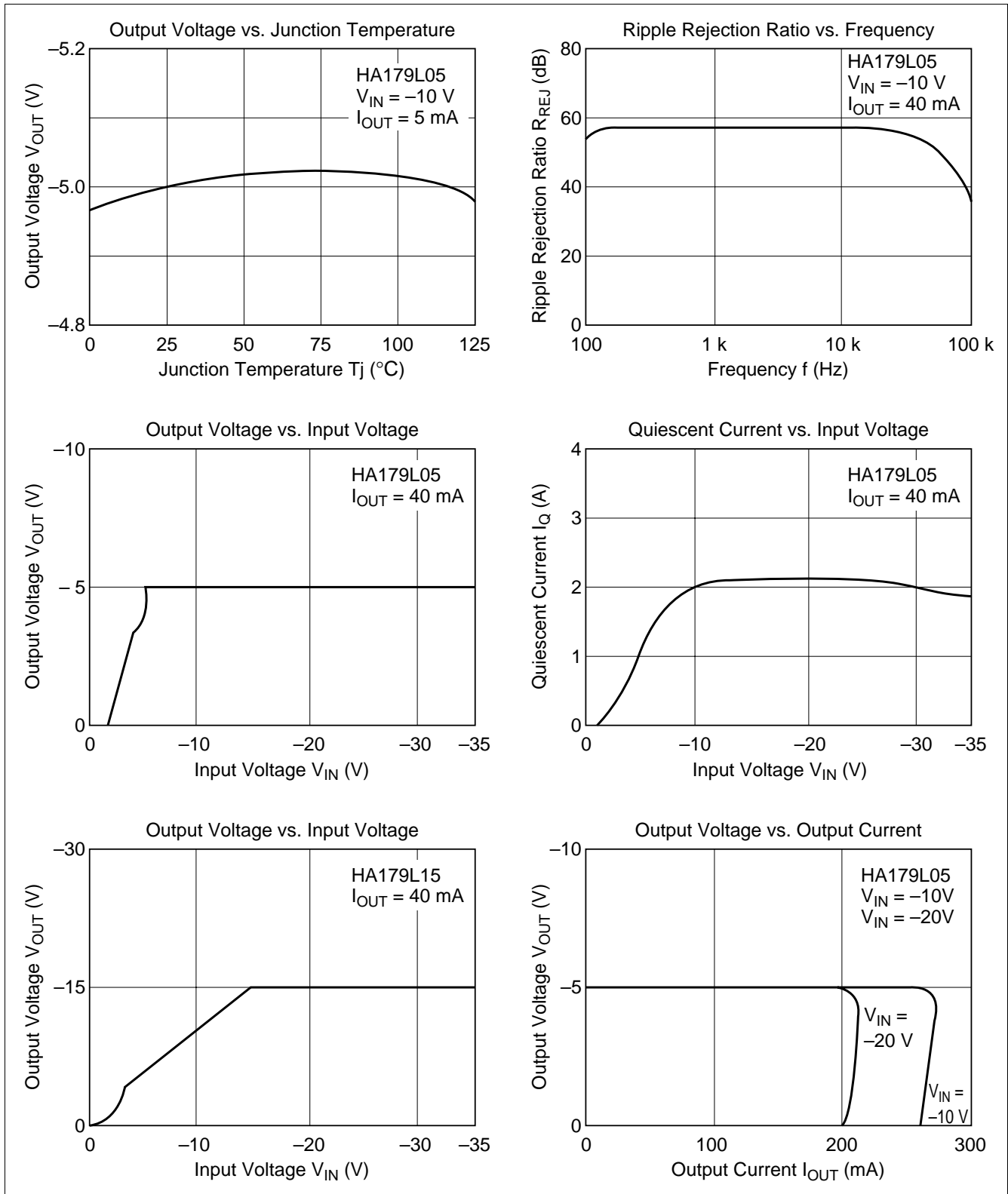
HA179L12P, HA179L12, HA179L12U
 $(V_{IN} = -19\text{ V}, I_{OUT} = 40\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_L = 0.1\text{ }\mu\text{F})$

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

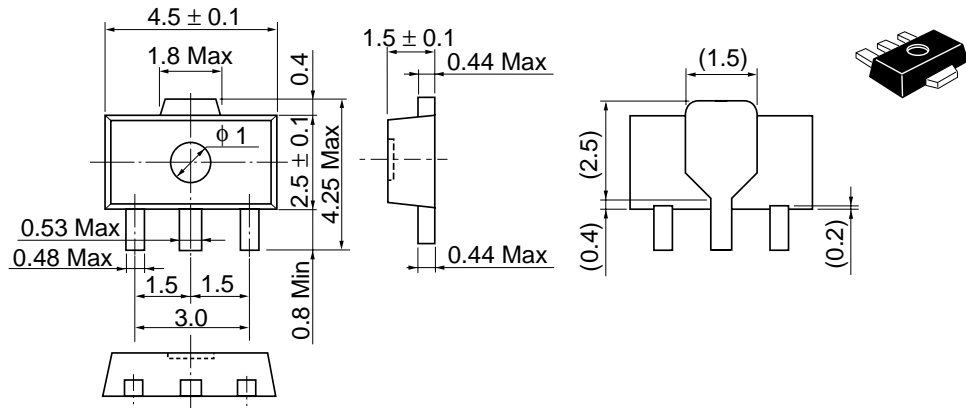
Item	Symbol	Min	Typ	Max	Unit	Test Condition
Output voltage	V_{OUT}	-14.4	-15	-15.6	V	$T_j = 25^{\circ}\text{C}$
		-14.25	—	-15.75		$V_{IN} = -23\text{ V}, 1.0\text{ mA} \leq I_{OUT} \leq 70\text{ mA}$
Line regulation	ΔV_{OLINE}	—	130	300	mV	$T_j = 25^{\circ}\text{C}$ $-30\text{ V} \leq V_{IN} \leq -17.5\text{ V}$
		—	110	250		$-30\text{ V} \leq V_{IN} \leq -20\text{ V}$
Load regulation	ΔV_{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	ΔI_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

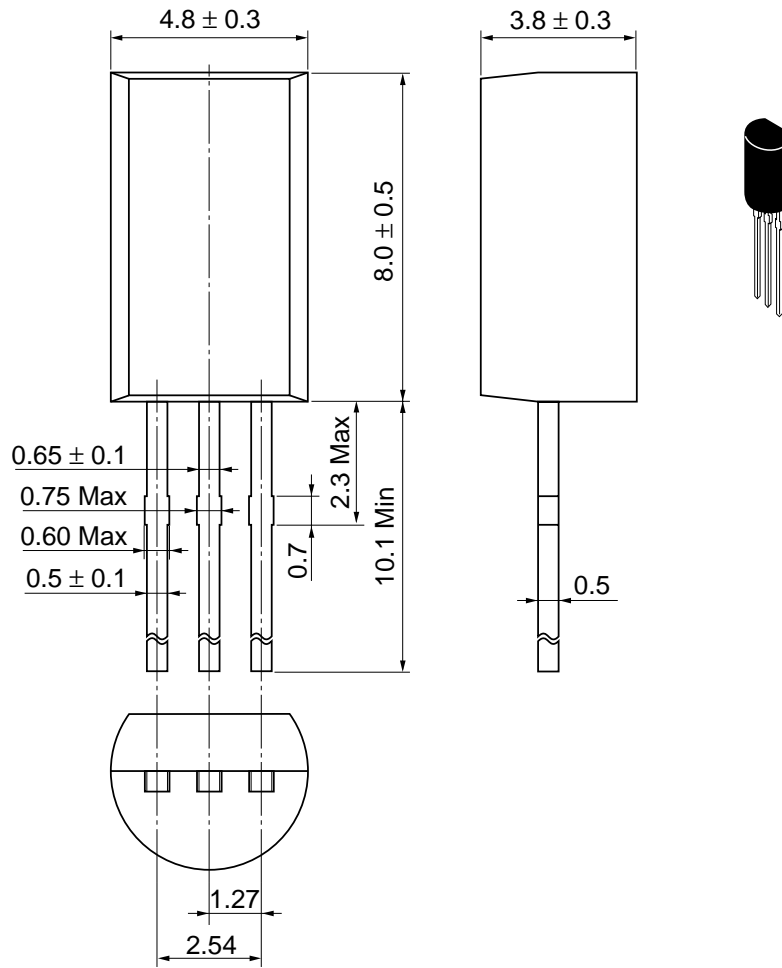
Unit: mm



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

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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>
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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>

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