

# HA17800V/VP/VPJ Series

## 3-terminal Fixed Voltage Regulators

# HITACHI

### Description

HA17800V series is positive output 1 A three-terminal regulator IC. Which features are as follows. It is designed to suit to the power supply of various equipments and to stabilize the multi switching regulator voltage, and to supply power to some kind of control devices.

### Features

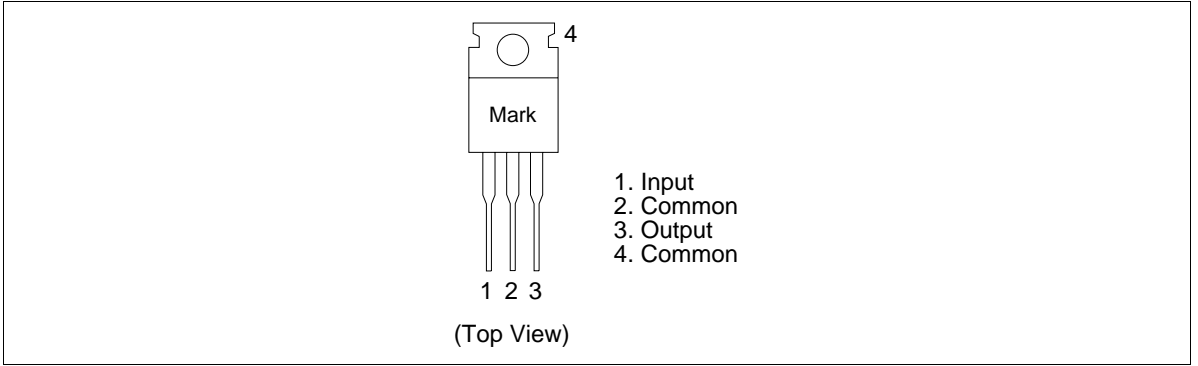
- High ripple rejection ratio up to high frequency  
(f = 20 kHz): 60 dB(in the case of HA17805V/VP/VPJ)
- Protected against oscillation
- Regulated output voltage against temperature  
(0 Ta = 125°C, 80 ppm/°C typ)
- Hard to breakdown against irrelevant connection
- Built-in circuits as over current control circuit, temperature protection circuit, and area of safety operation control circuit

### Ordering Information

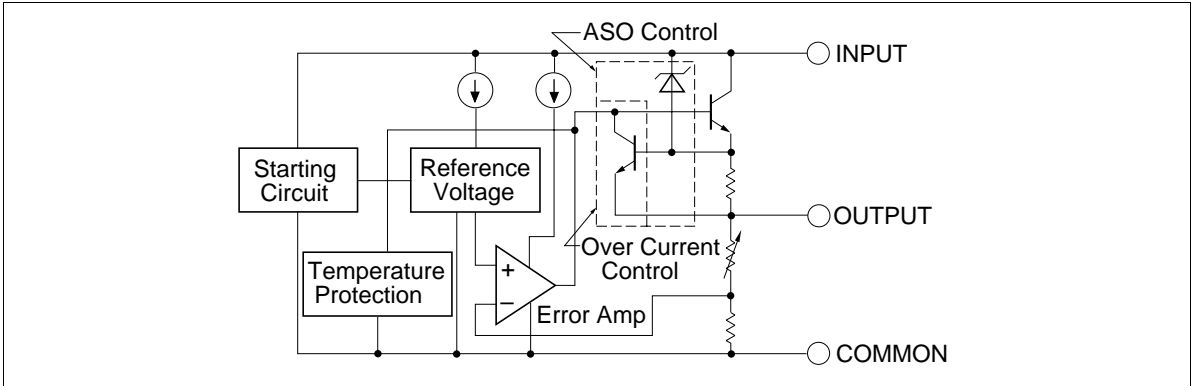
Output Voltage (V)	Automotive Use	Industrial Use	Commercial Use	Package
5	HA17805VPJ	HA17805VP	HA17805V	TO - 220AB
6	HA17806VPJ	HA17806VP	HA17806V	
7	HA17807VPJ	HA17807VP	HA17807V	
8	HA17808VPJ	HA17808VP	HA17808V	
12	HA17812VPJ	HA17812VP	HA17812V	
15	HA17815VPJ	HA17815VP	HA17815V	
18	HA17818VPJ	HA17818VP	HA17818V	
24	HA17824VPJ	HA17824VP	HA17824V	

# HA17800V/VP/VPJ Series

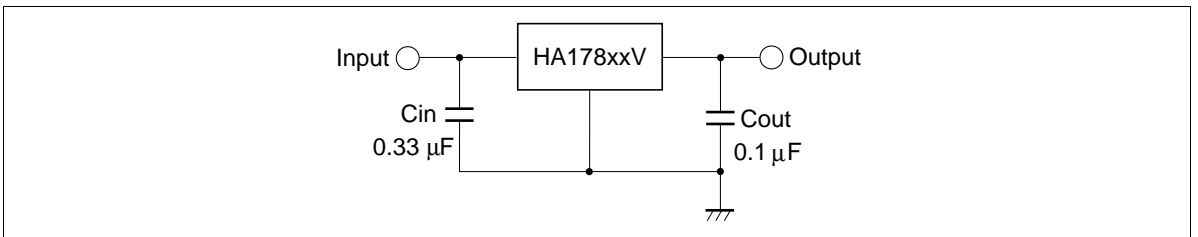
## Pin Arrangement



## Block Diagram



## Standard Circuit

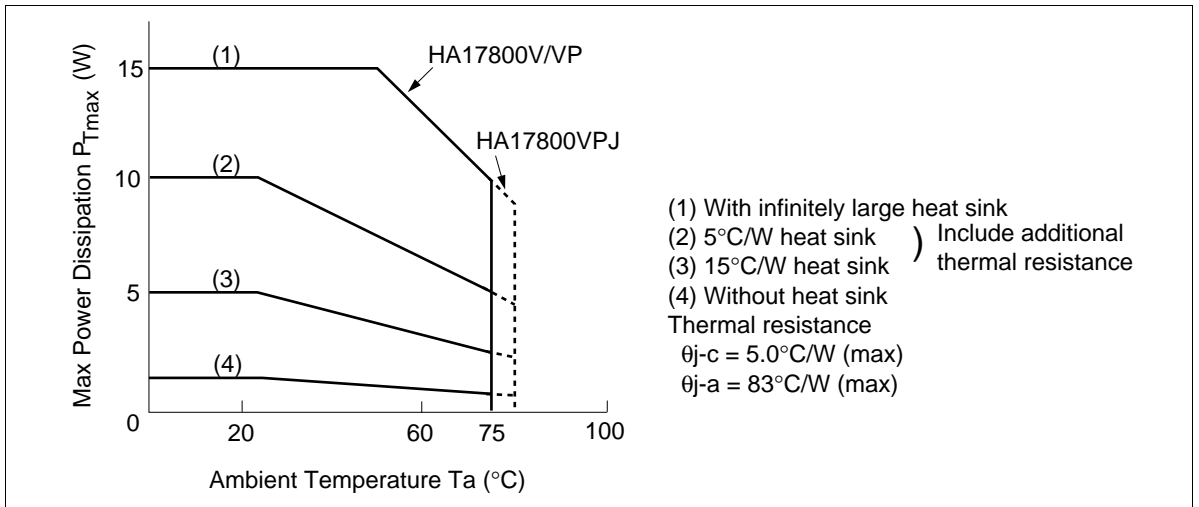


## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings		Unit	Notes
		HA17800V/VP	HA17800VPJ		
Input voltage	$V_{IN}$	35	35	V	1
Power dissipation	$P_T$	15	15	W	2
Operating ambient temperature	$T_{opr}$	-20 to +75	-40 to +85	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-55 to +125	-50 to +125	$^\circ\text{C}$	
Operating junction temperature	$T_j$	-20 to +125	-40 to +125	$^\circ\text{C}$	

Notes: 1. HA17824V/VP/VPJ, 40 V

2. Follow derating curve



# HA17800V/VP/VPJ Series

## HA17805V/VP/VPJ Electrical Characteristics

( $V_{IN} = 10\text{ V}$ ,  $I_{OUT} = 500\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	4.8	5.0	5.2	V	$T_j = 25^\circ\text{C}$
	$V_{OUT2}$	4.75	—	5.25	V	$7\text{ V} \leq V_{IN} \leq 20\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	30	100	mV	$T_j = 25^\circ\text{C}$ , $7\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta V_{OLine2}$	—	10	50	mV	$T_j = 25^\circ\text{C}$ , $8\text{ V} \leq V_{IN} \leq 12\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	30	100	mV	$T_j = 25^\circ\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	10	50	mV	$T_j = 25^\circ\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.5	7.0	mA	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.3	mA	$7\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	60	—	dB	$T_j = 25^\circ\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.5	—	$\text{mV}/^\circ\text{C}$	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	120	—	$\mu\text{V}_{rms}$	$T_j = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	1.25	—	A	$T_j = 25^\circ\text{C}$
Peak output current	lop	—	2.2	—	A	$T_j = 25^\circ\text{C}$

**HA17806V/VP/VPJ Electrical Characteristics**
 $(V_{IN} = 11\text{ V}, I_{OUT} = 500\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_{OUT} = 0.1\text{ }\mu\text{F})$ 

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	5.75	6.00	6.25	V	$T_j = 25^{\circ}\text{C}$
	$V_{OUT2}$	5.7	—	6.3	V	$8\text{ V} \leq V_{IN} \leq 21\text{ V},$ $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}, P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	36	120	mV	$T_j = 25^{\circ}\text{C}, 8\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta V_{OLine2}$	—	12	60	mV	$T_j = 25^{\circ}\text{C}, 9\text{ V} \leq V_{IN} \leq 13\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	36	120	mV	$T_j = 25^{\circ}\text{C}, 5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	12	60	mV	$T_j = 25^{\circ}\text{C}, 250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.5	7.0	mA	$T_j = 25^{\circ}\text{C}, I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.3	mA	$8\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^{\circ}\text{C}, I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	60	—	dB	$T_j = 25^{\circ}\text{C}, f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.5	—	mV/°C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	120	—	$\mu\text{V}_{rms}$	$T_j = 25^{\circ}\text{C}, 10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	1.2	—	A	$T_j = 25^{\circ}\text{C}$
Peak output current	Iop	—	2.2	—	A	$T_j = 25^{\circ}\text{C}$

# HA17800V/VP/VPJ Series

## HA17807V/VP/VPJ Electrical Characteristics

( $V_{IN} = 12.5\text{ V}$ ,  $I_{OUT} = 500\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\ \mu\text{F}$ ,  $C_{OUT} = 0.1\ \mu\text{F}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	6.72	7.00	7.28	V	$T_j = 25^\circ\text{C}$
	$V_{OUT2}$	6.65	—	7.35	V	$9\text{ V} \leq V_{IN} \leq 22\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	45	140	mV	$T_j = 25^\circ\text{C}$ , $9\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta V_{OLine2}$	—	15	70	mV	$T_j = 25^\circ\text{C}$ , $10\text{ V} \leq V_{IN} \leq 15\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	45	140	mV	$T_j = 25^\circ\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	15	70	mV	$T_j = 25^\circ\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.5	7.0	mA	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.3	mA	$9\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	58	—	dB	$T_j = 25^\circ\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.6	—	mV/C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	140	—	$\mu\text{V}_{rms}$	$T_j = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	1.1	—	A	$T_j = 25^\circ\text{C}$
Peak output current	lop	—	2.2	—	A	$T_j = 25^\circ\text{C}$

**HA17808V/VP/VPJ Electrical Characteristics**
 $(V_{IN} = 14\text{ V}, I_{OUT} = 500\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_{OUT} = 0.1\text{ }\mu\text{F})$ 

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	7.70	8.00	8.30	V	$T_j = 25^{\circ}\text{C}$
	$V_{OUT2}$	7.6	—	8.4	V	$10.5\text{ V} \leq V_{IN} \leq 23\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	58	160	mV	$T_j = 25^{\circ}\text{C}$ , $10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta V_{OLine2}$	—	20	80	mV	$T_j = 25^{\circ}\text{C}$ , $11\text{ V} \leq V_{IN} \leq 17\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	58	160	mV	$T_j = 25^{\circ}\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	20	80	mV	$T_j = 25^{\circ}\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.5	7.0	mA	$T_j = 25^{\circ}\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.0	mA	$10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^{\circ}\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	58	—	dB	$T_j = 25^{\circ}\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.6	—	mV/C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	150	—	$\mu\text{Vrms}$	$T_j = 25^{\circ}\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	1.0	—	A	$T_j = 25^{\circ}\text{C}$
Peak output current	Iop	—	2.2	—	A	$T_j = 25^{\circ}\text{C}$

# HA17800V/VP/VPJ Series

## HA17812V/VP/VPJ Electrical Characteristics

( $V_{IN} = 19\text{ V}$ ,  $I_{OUT} = 500\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\text{ }\mu\text{F}$ ,  $C_{OUT} = 0.1\text{ }\mu\text{F}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	11.5	12.0	12.5	V	$T_j = 25^\circ\text{C}$
	$V_{OUT2}$	11.4	—	12.6	V	$14.5\text{ V} \leq V_{IN} \leq 27\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $PT \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	100	240	mV	$T_j = 25^\circ\text{C}$ , $14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$
	$\delta V_{OLine2}$	—	33	120	mV	$T_j = 25^\circ\text{C}$ , $16\text{ V} \leq V_{IN} \leq 22\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	100	240	mV	$T_j = 25^\circ\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	33	120	mV	$T_j = 25^\circ\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.6	7.2	mA	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.0	mA	$14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	58	—	dB	$T_j = 25^\circ\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.8	—	mV/C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	290	—	$\mu\text{Vrms}$	$T_j = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	0.6	—	A	$T_j = 25^\circ\text{C}$
Peak output current	lop	—	2.1	—	A	$T_j = 25^\circ\text{C}$



**HA17815V/VP/VPJ Electrical Characteristics**
 $(V_{IN} = 23 \text{ V}, I_{OUT} = 500 \text{ mA}, 0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}, C_{IN} = 0.33 \mu\text{F}, C_{OUT} = 0.1 \mu\text{F})$ 

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	14.4	15.0	15.6	V	$T_j = 25^\circ\text{C}$
	$V_{OUT2}$	14.25	—	15.75	V	$17.5 \text{ V} \leq V_{IN} \leq 30 \text{ V},$ $5 \text{ mA} \leq I_{OUT} \leq 1.0 \text{ A}, P_T \leq 15 \text{ W}$
Line regulation	$\delta V_{OLine1}$	—	144	300	mV	$T_j = 25^\circ\text{C}, 17.5 \text{ V} \leq V_{IN} \leq 30 \text{ V}$
	$\delta V_{OLine2}$	—	48	150	mV	$T_j = 25^\circ\text{C}, 20 \text{ V} \leq V_{IN} \leq 26 \text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	144	300	mV	$T_j = 25^\circ\text{C}, 5 \text{ mA} \leq I_{OUT} \leq 1.5 \text{ A}$
	$\delta V_{OLoad2}$	—	48	150	mV	$T_j = 25^\circ\text{C}, 250 \text{ mA} \leq I_{OUT} \leq 750 \text{ mA}$
Quiescent current	$I_Q$	0.8	3.6	7.2	mA	$T_j = 25^\circ\text{C}, I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.0	mA	$17.5 \text{ V} \leq V_{IN} \leq 30 \text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5 \text{ mA} \leq I_{OUT} \leq 1.0 \text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^\circ\text{C}, I_{OUT} = 1.0 \text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	58	—	dB	$T_j = 25^\circ\text{C}, f = 10 \text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.8	—	mV/C	$I_{OUT} = 5 \text{ mA}$
Output noise voltage	Vn	—	300	—	$\mu\text{V}_{rms}$	$T_j = 25^\circ\text{C}, 10 \text{ Hz} \leq f \leq 100 \text{ kHz}$
Output short circuit current	$I_{OS}$	—	0.4	—	A	$T_j = 25^\circ\text{C}$
Peak output current	lop	—	2.1	—	A	$T_j = 25^\circ\text{C}$

# HA17800V/VP/VPJ Series

## HA17818V/VP/VPJ Electrical Characteristics

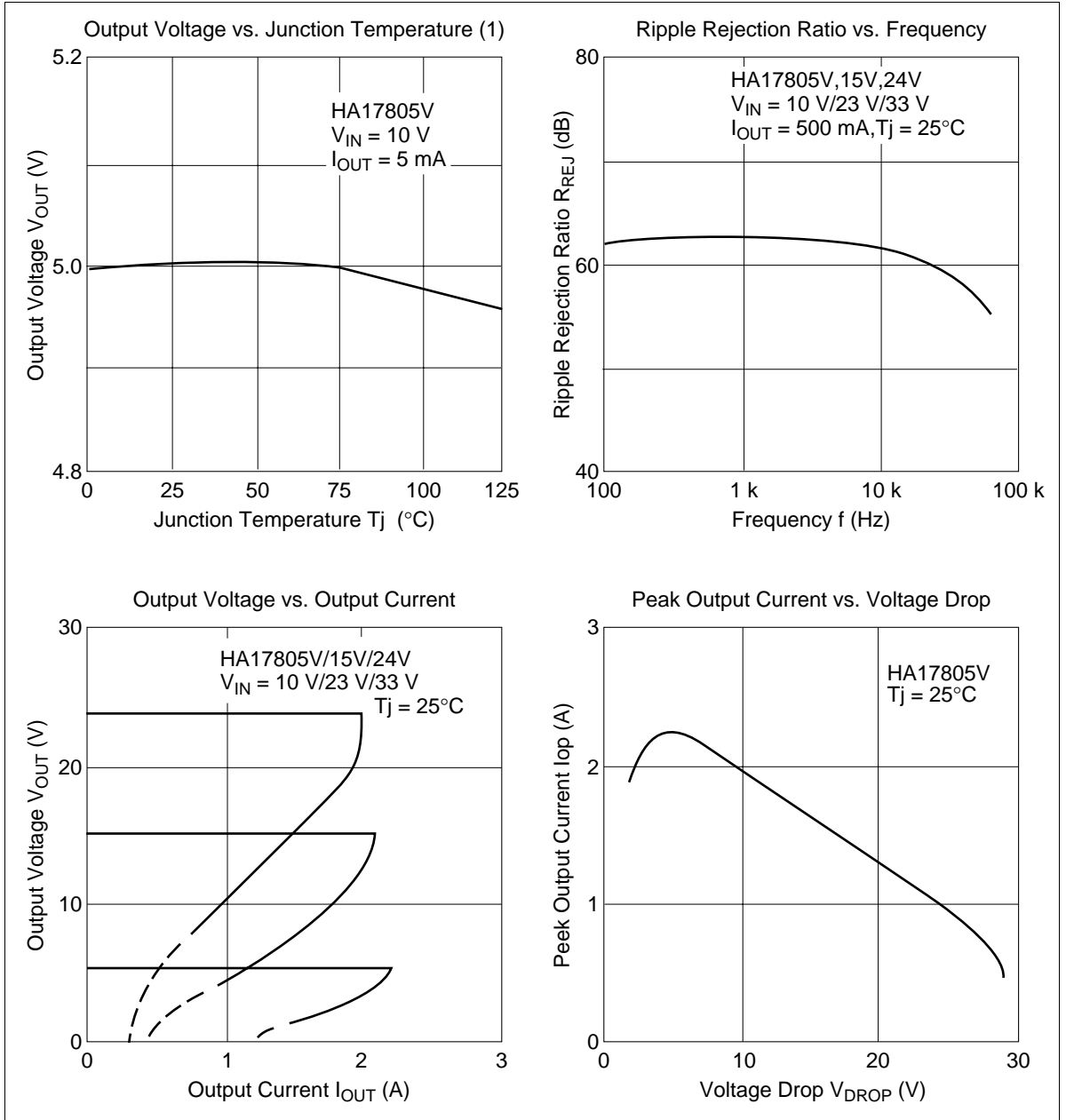
( $V_{IN} = 27\text{ V}$ ,  $I_{OUT} = 500\text{ mA}$ ,  $0^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$ ,  $C_{IN} = 0.33\ \mu\text{F}$ ,  $C_{OUT} = 0.1\ \mu\text{F}$ )

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	17.3	18.0	18.7	V	$T_j = 25^\circ\text{C}$
	$V_{OUT2}$	17.1	—	18.9	V	$21\text{ V} \leq V_{IN} \leq 33\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	195	360	mV	$T_j = 25^\circ\text{C}$ , $21\text{ V} \leq V_{IN} \leq 33\text{ V}$
	$\delta V_{OLine2}$	—	65	180	mV	$T_j = 25^\circ\text{C}$ , $24\text{ V} \leq V_{IN} \leq 30\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	195	360	mV	$T_j = 25^\circ\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	65	180	mV	$T_j = 25^\circ\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.6	7.2	mA	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.0	mA	$21\text{ V} \leq V_{IN} \leq 33\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	$V_{drop}$	—	2.0	2.5	V	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	56	—	dB	$T_j = 25^\circ\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-0.8	—	mV/C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	$V_n$	—	430	—	$\mu\text{V}_{rms}$	$T_j = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	0.35	—	A	$T_j = 25^\circ\text{C}$
Peak output current	$I_{op}$	—	2.1	—	A	$T_j = 25^\circ\text{C}$

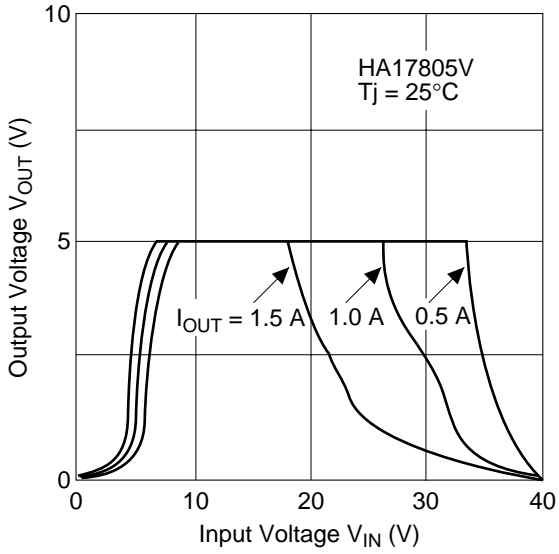
**HA17824V/VP/VPJ Electrical Characteristics**
 $(V_{IN} = 33\text{ V}, I_{OUT} = 500\text{ mA}, 0^{\circ}\text{C} \leq T_j \leq 125^{\circ}\text{C}, C_{IN} = 0.33\text{ }\mu\text{F}, C_{OUT} = 0.1\text{ }\mu\text{F})$ 

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Output voltage	$V_{OUT1}$	23.0	24.0	25.0	V	$T_j = 25^{\circ}\text{C}$
	$V_{OUT2}$	22.8	—	25.2	V	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$ , $5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$ , $P_T \leq 15\text{ W}$
Line regulation	$\delta V_{OLine1}$	—	260	480	mV	$T_j = 25^{\circ}\text{C}$ , $27\text{ V} \leq V_{IN} \leq 38\text{ V}$
	$\delta V_{OLine2}$	—	86	240	mV	$T_j = 25^{\circ}\text{C}$ , $30\text{ V} \leq V_{IN} \leq 36\text{ V}$
Load regulation	$\delta V_{OLoad1}$	—	260	480	mV	$T_j = 25^{\circ}\text{C}$ , $5\text{ mA} \leq I_{OUT} \leq 1.5\text{ A}$
	$\delta V_{OLoad2}$	—	86	240	mV	$T_j = 25^{\circ}\text{C}$ , $250\text{ mA} \leq I_{OUT} \leq 750\text{ mA}$
Quiescent current	$I_Q$	0.8	3.7	7.4	mA	$T_j = 25^{\circ}\text{C}$ , $I_{OUT} = 0$
Quiescent current change	$\delta I_{Q1}$	—	—	1.0	mA	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$
	$\delta I_{Q2}$	—	—	0.5	mA	$5\text{ mA} \leq I_{OUT} \leq 1.0\text{ A}$
Voltage drop	Vdrop	—	2.0	2.5	V	$T_j = 25^{\circ}\text{C}$ , $I_{OUT} = 1.0\text{ A}$
Ripple rejection ratio	$R_{REJ}$	—	50	—	dB	$T_j = 25^{\circ}\text{C}$ , $f = 10\text{ kHz}$
Temperature coefficient of output voltage	$\delta V_{OUT}/\delta T_a$	—	-1.2	—	mV/C	$I_{OUT} = 5\text{ mA}$
Output noise voltage	Vn	—	570	—	$\mu\text{V}_{rms}$	$T_j = 25^{\circ}\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Output short circuit current	$I_{OS}$	—	0.25	—	A	$T_j = 25^{\circ}\text{C}$
Peak output current	Iop	—	2.0	—	A	$T_j = 25^{\circ}\text{C}$

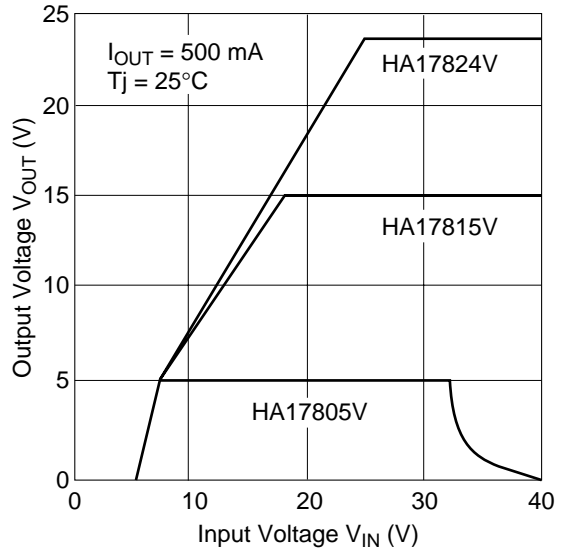
## Characteristic Curves



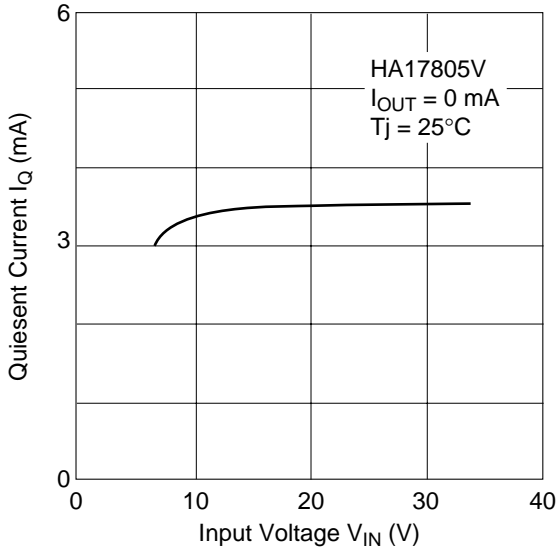
Output Voltage vs. Input Voltage (1)



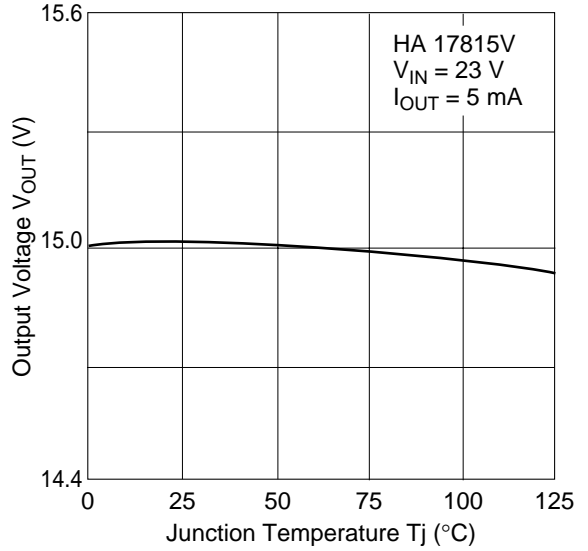
Output Voltage vs. Input Voltage (2)



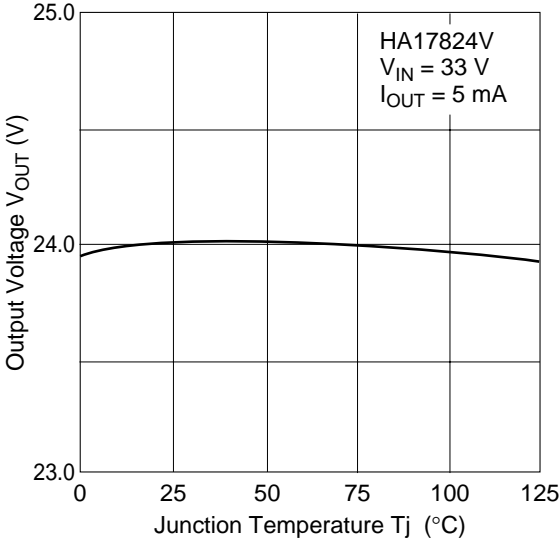
Quiescent Current vs. Input Voltage



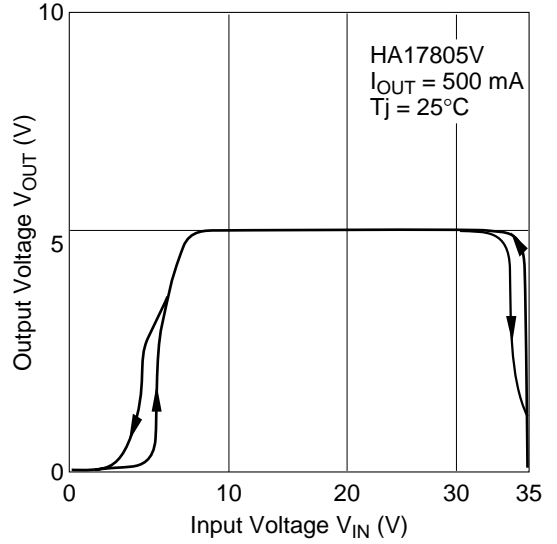
Output Voltage vs. Junction Temperature (2)



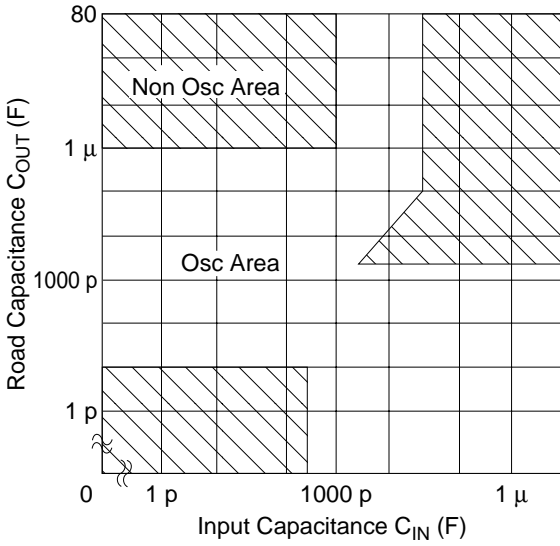
Output Voltage vs. Junction Temperature (3)



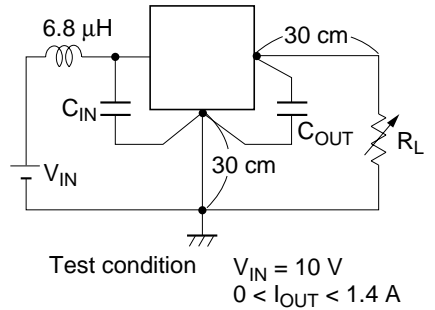
Output Voltage vs. Input Voltage (3)



Oscillation Area

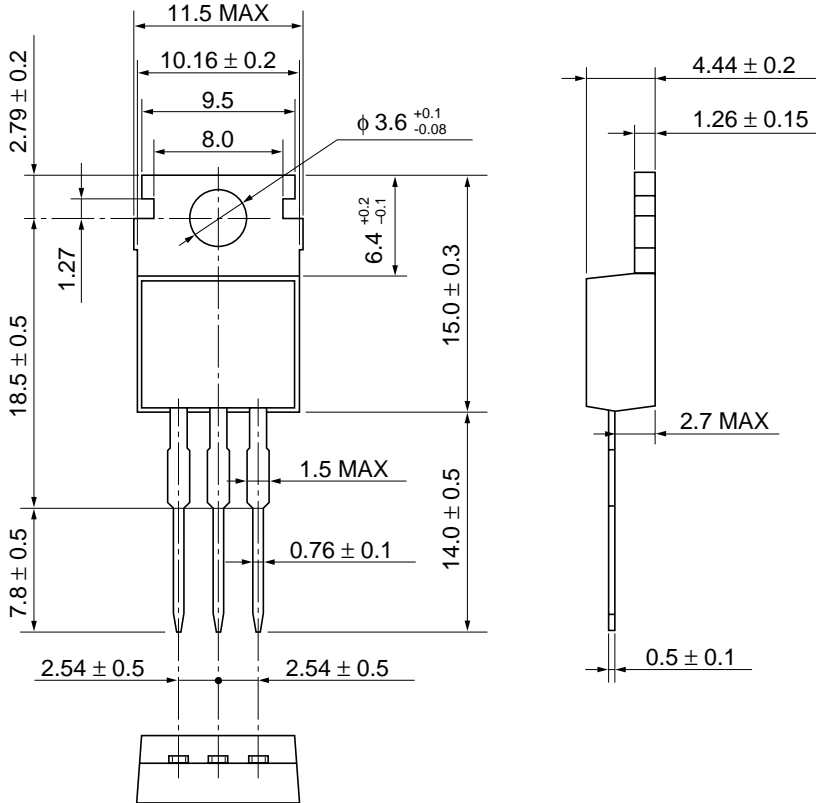


Measurement Circuit



Package Dimensions

Unit: mm



Hitachi Code	TO-220AB
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	1.8 g

## Cautions

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