HA17431H Series

Shunt Regulator

R03DS0088EJ0300
Rev.3.00
Jan 10, 2014

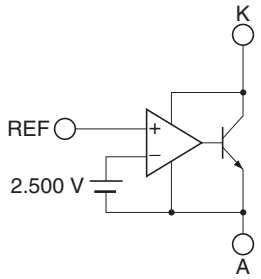
Description

The HA17431H series is temperature-compensated variable shunt regulators. The main application of these products is in voltage regulators that provide a variable output voltage. The on-chip high-precision reference voltage source can provide ±1% accuracy, which have a V_{KA} max of 36 volts.

Features

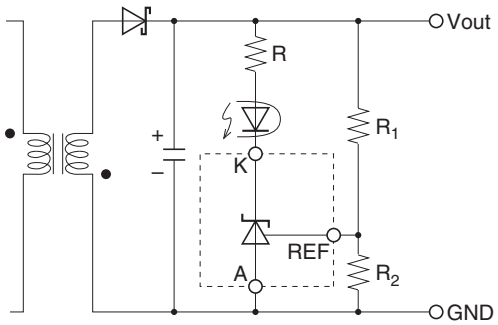
- The reference voltage provide 2.500 V ±1% at Ta = 25°C
- The reference voltage has a low temperature coefficient
- The MPAK-5V (5 pin), MPAKV (3 pin) and UPAKV miniature packages are optimal for use on high mounting density circuit boards

Block Diagram



Application Circuit Example

Switching power supply secondary-side error amplification circuit



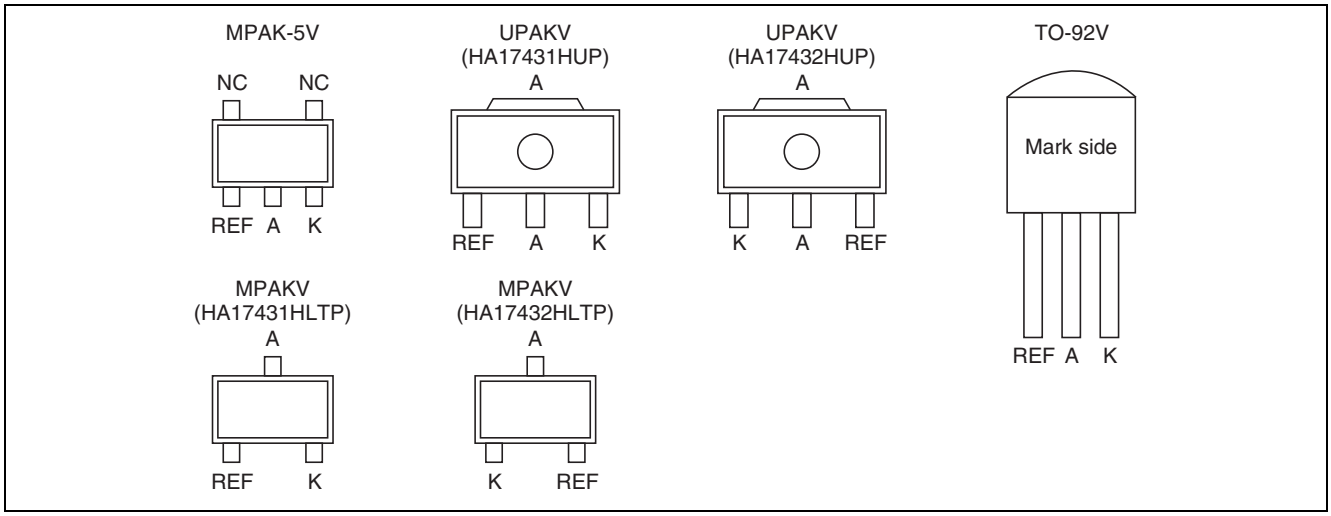
HA17431H Series

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Ordering Information

Item		Package Code (Previous Code)	Temp. Range
Industrial use	HA17431HLTP	PLSP0003ZB-A (MPAKV)	–20 to +85°C
	HA17432HLTP		
	HA17431HLP	PLSP0005ZB-A (MPAK-5V)	
	HA17431HP	PRSS0003DA-A (TO-92V)	
	HA17431HUP	PLZZ0004CA-A (UPAKV)	
	HA17432HUP		

Pin Arrangement



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Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings				Unit	Notes
		HA17431HLP	HA17431HP	HA17431HUP/ HA17432HUP	HA17431HLTP/ HA17432HLTP		
Cathode voltage	V_{KA}	36	36	36	36	V	1
Continuous cathode current	I_K	–50 to +50	–50 to +50	–50 to +50	–50 to +50	mA	
Reference input current	Iref	–0.05 to +6	–0.05 to +6	–0.05 to +6	–0.05 to +6	mA	
Power dissipation	P_T	150 *2	500 *3	800 *4	150 *2	mW	2,3,4
Operating temperature range	Topr	–20 to +85	–20 to +85	–20 to +85	–20 to +85	°C	
Storage temperature	Tstg	–55 to +150	–55 to +150	–55 to +150	–55 to +150	°C	

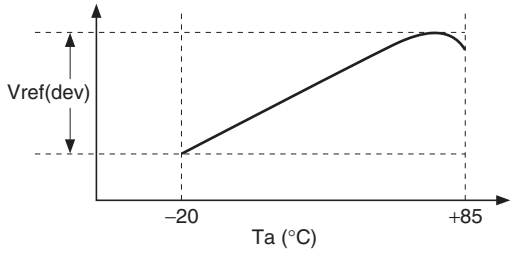
Notes: 1. Voltages are referenced to anode.
2. Ta ≤ 25°C. If Ta > 25°C, derate by 1.2 mW/°C.
3. Ta ≤ 25°C. If Ta > 25°C, derate by 4.0 mW/°C.
4. 15 mm × 25 mm × 0.7mmt alumina ceramic board,Ta ≤ 25°C. If Ta > 25°C, derate by 6.4 mW/°C.

Electrical Characteristics

(Ta = 25°C, I_K = 10 mA)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions	Notes
Reference voltage	Vref	2.475	2.500	2.525	V	V_{KA} = Vref	
Reference voltage temperature deviation	Vref(dev)	—	10	—	mV	V_{KA} = Vref, Ta = –20°C to +85°C	1
Reference voltage temperature coefficient	ΔVref/ΔTa	—	±30	—	ppm/°C	V_{KA} = Vref, 0°C to 50°C gradient	
Reference voltage regulation	$\Delta Vref/\Delta V_{KA}$	—	2.0	3.7	mV/V	V_{KA} = Vref to 36 V	
Reference input current	Iref	—	0.6	3	µA	R_1 = 10 kΩ, R_2 = ∞	
Reference current temperature deviation	Iref(dev)	—	0.5	—	µA	R_1 = 10 kΩ, R_2 = ∞, Ta = –20°C to +85°C	
Minimum cathode current	Imin	—	0.06	0.2	mA	V_{KA} = Vref	2
Off state cathode current	Ioff	—	0.001	1.0	µA	V_{KA} = 36 V, Vref = 0 V	
Dynamic impedance	Z_{KA}	—	0.2	0.5	Ω	V_{KA} = Vref, I_K = 1 mA to 50 mA	

Notes: 1. Vref(dev) = Vref(max) – Vref(min)

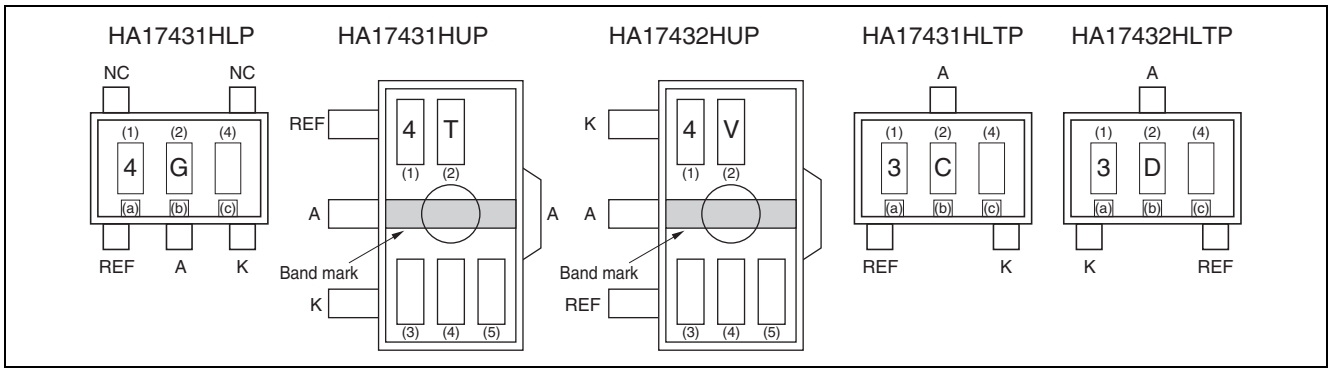


2. Imin is given by the cathode current at Vref = $Vref_{(IK=10mA)}$ – 15 mV.

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MPAK-5V (5 pin), MPAKV (3 pin) and UPAKV Marking Patterns

The marking patterns shown below are used on MPAK-5V, MPAKV and UPAKV products. 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. The letters (1) and (2) show the product specific mark pattern.

Product	(1)	(2)
HA17431HLP	4	G
HA17431HUP	4	T
HA17432HUP	4	V
HA17431HLTP	3	C
HA17432HLTP	3	D

3. The letter (3) shows the production year code (the last digit of the year) for UPAKV products.

4. The bars (a), (b) and (c) show a production year code for MPAK-5V and MPAKV products as shown below. After 2010 the code is repeated every 8 years.

Year	2002	2003	2004	2005	2006	2007	2008	2009
(a)	None	None	None	Bar	Bar	Bar	Bar	None
(b)	None	Bar	Bar	None	None	Bar	Bar	None
(c)	Bar	None	Bar	None	Bar	None	Bar	None

5. The letter (4) shows the production month code (see table below).

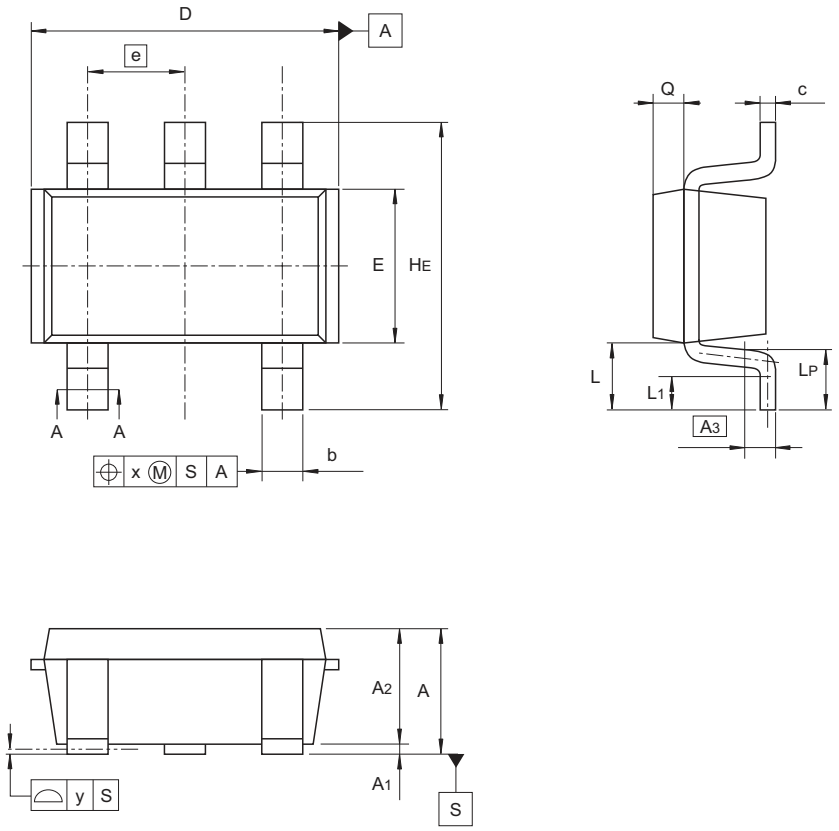
Production month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Marked code	A	B	C	D	E	F	G	H	J	K	L	M

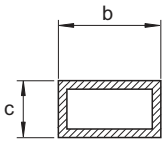
6. The letter (5) shows manufacturing code. For UPAKV products.

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Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
SC-74A	PLSP0005ZB-A	MPAK-5 / MPAK-5V	0.015





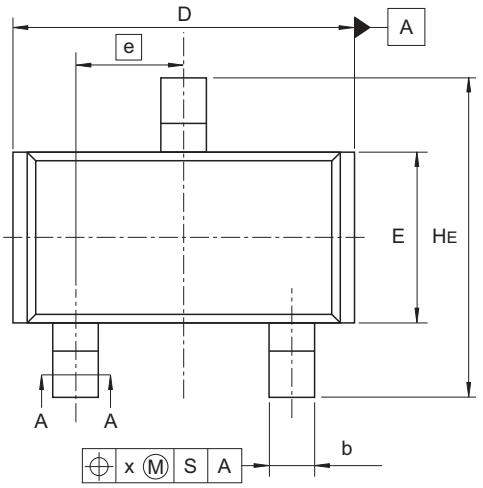
A-A Section

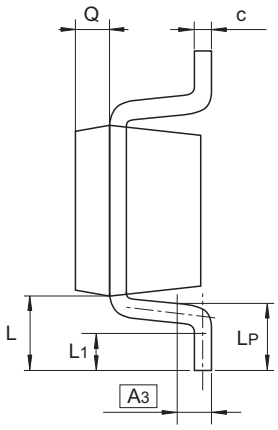
Reference Symbol	Dimensions in millimeters		
	Min	Nom	Max
A	1.0	—	1.4
A_1	0	—	0.1
A_2	1.0	1.1	1.3
$\boxed{A_3}$	—	0.25	—
b	0.35	0.4	0.5
c	0.11	0.16	0.26
D	2.8	2.95	3.1
E	1.5	1.6	1.8
$\boxed{e}$	—	0.95	—
H_E	2.5	2.8	3.0
L	0.3	—	0.7
L_1	0.1	—	0.5
L_P	0.2	—	0.6
x	—	—	0.05
y	—	—	0.05
Q	—	0.3	—

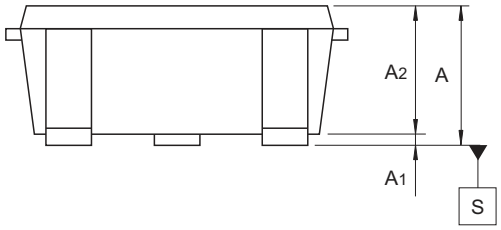
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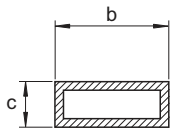
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JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
SC-59A	PLSP0003ZB-A	MPAK(T) / MPAK(T)V	0.011









A-A Section

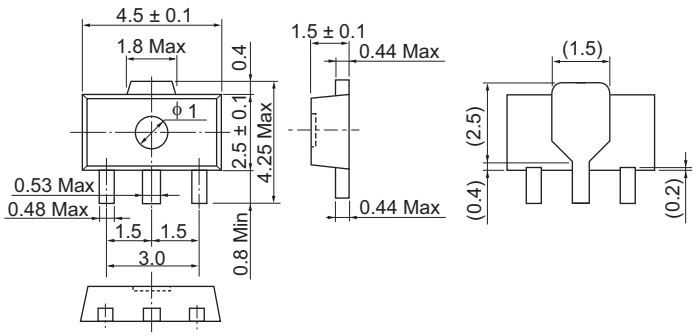
Reference Symbol	Dimensions in millimeters		
	Min	Nom	Max
A	1.0	—	1.3
A_1	0	—	0.1
A_2	1.0	1.1	1.2
A_3	—	0.25	—
b	0.35	0.4	0.5
c	0.1	0.16	0.26
D	2.7	—	3.1
E	1.35	1.5	1.65
e	—	0.95	—
H_E	2.2	2.8	3.0
L	0.35	—	0.75
L_1	0.15	—	0.55
L_P	0.25	—	0.65
x	—	—	0.05
Q	—	0.3	—

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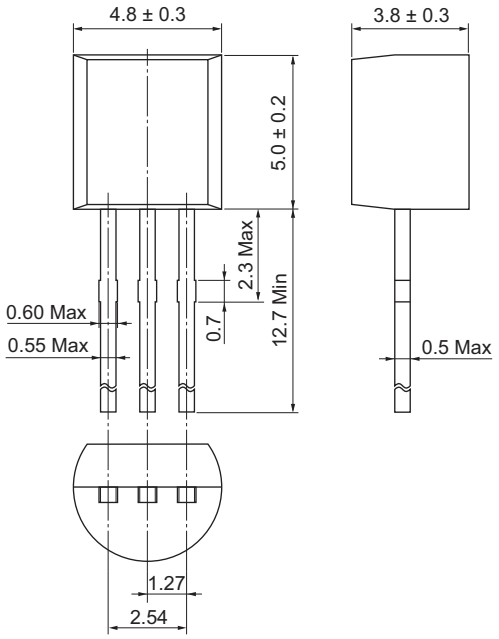
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050g

Unit: mm



JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SC-43A	PRSS0003DA-A	TO-92(1) / TO-92(1)V	0.25g

Unit: mm



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