300mA Ultra-Low Dropout Adjustable Voltage Regulators

Features

- Stable with 2.2µF Low-ESR Ceramic Capacitor
- Voltage Reference Accuracy of 2%
- Drop-out Voltage of only 320mV at 300mA and 170mV at 150mA Load Current
- Quiescent Current in Shutdown of 5µA
- Current Limit and Thermal Shutdown
- Logic Input Enable/Shutdown Pin
- RoHS-compliant halogen-free SOT-23-5

Applications

- Laptop, Notebook and Palmtop computers
- Battery Powered Equipments
- PCMCIA Vcc and Vpp Regulator
- Consumer Electronics
- High Efficiency Linear Power Supplies

Description

The APU8836 device is an efficient linear voltage regulator with better than 2% initial voltage accuracy, very low dropout voltage and very low ground current, designed especially for hand-held, battery-powered applications. Other features of the device are TTL compatible enable/shutdown control input, current-limiting and thermal shutdown.

The APU8836-HF-3 is available as an adjustable output voltage regulator in a small RoHS-compliant halogen-free SOT-23-5 package.

Typical Application

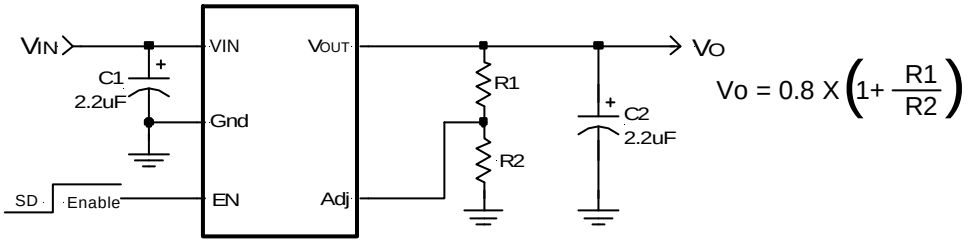


Figure 1 - Typical application of the APU8836 adjustable voltage regulator.

Ordering information

APU8836Y5-HF-3TR : in RoHS-compliant halogen-free SOT-23-5

APU8836Y5R-HF-3TR : alternate pin-out in RoHS-compliant halogen-free SOT-23-5

These products are shipped on tape and reel, 3000 pieces per reel. The device is rated MSL3 for moisture sensitivity, and the reel is shipped sealed inside a moisture barrier bag.

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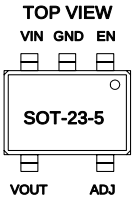
Absolute Maximum Ratings

Input Voltage (V_{IN}) 10V
Enable Input Voltage 10V
Storage Temperature Range ..... -65°C to 150°C
Operating Junction Temperature Range ..... 0°C to 125°C

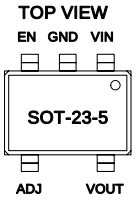
Thermal Resistance, Junction to Ambient (Rth_{ja})
SOT-23-5 ..... 256°C/W

Pin Configuration

APU8836Y5



Alternate Pin-out APU8836Y5R



Electrical Specifications

Unless otherwise specified, these specifications apply over C_{IN}=C_O=2.2F, I_O=100uA, $V_{IN(MIN)}$=2.5V, V_{OUT} = V_{FB}
V_{EN}= 2V and T_A=25°C. Typical values refer to T_A=25°C.
Low duty cycle pulse testing is used to keep junction and case temperatures equal to the ambient temperature.

PARAMETER	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Reference Voltage	Vo		-2		2	%
Line Regulation	ΔV_I	Vo + 1V<V_{IN}<10V		0.005		%/V
Load Regulation (Note 1)	ΔV_L	1mA<Io<300mA		1.5		%
Dropout Voltage (Note 2)	$\Delta V_{I(O)}$	Io=100µA Io=150mA Io=300mA		10 170 320		mV
Ground Current (Note 3)	I_Q	V_{EN}=2V, Io=1000µA		120		µA
Ground Current-SD Activated	$I_{Q(SD)}$	V_{EN}=0V to 0.8V or Open		5		µA
Current Limit	I_{CL}	Vo=0V	320	420		mA
Thermal Regulation	ΔV_P	V_{IN}=10V, Io=150mA, 10ms Pulse		0.05		%/W
Adjust Pin Current	I_{ADJ}	V_{IN}=2.5V, Vo=V_{ADJ}		0.1		µA
Enable Pin Input LO Voltage	$V_{EN(L)}$	Regulator OFF			0.8	V
Enable Pin Input HI Voltage	$V_{EN(H)}$	Regulator ON	2			V
Enable Pin Input LO Current		$V_{EN(L)}$=0V		0.1		µA
Enable Pin Input HI Current		$V_{EN(H)}$=2V		20		µA

Note 1: Low duty cycle pulse testing with Kelvin connections is required in order to maintain accurate data.

Note 2: Dropout voltage is defined as the minimum differential voltage between VIN and VOUT required to maintain regulation at VOUT. It is measured when the output voltage drops 1% below its nominal value.

Note 3: Ground current is the regulator quiescent current plus the pass transistor current. The total current from the supply is the sum of the load current plus the ground pin current.

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Pin Descriptions

PIN SYMBOL	PIN DESCRIPTION
V_{IN}	The input pin of the regulator. Typically a large storage capacitor is connected from this pin to ground to ensure that the input voltage does not sag below the minimum drop out voltage during the load transient response. This pin must always be higher than V_{OUT} by at least the amount of the dropout voltage and some margin in order for the device to regulate properly.
Gnd	Ground pin. This pin must be connected to the lowest potential in the system and all other pins must be at higher potential with respect to this pin.
En	Enable pin. A low signal or left open on this pin shuts down the output. This pin must be tied HI or to V_{IN} for normal operation.
Adj	A resistor divider from this pin to the V_{OUT} pin and ground sets the output voltage. To minimize the error due to the error amplifier, select the values of the resistor dividers to be less than 10kΩ.
V_{OUT}	The output of the regulator. A capacitor with a minimum value of 2.2μF and max ESR of 1Ω must be connected from this pin to ground to ensure stability.

Block Diagram

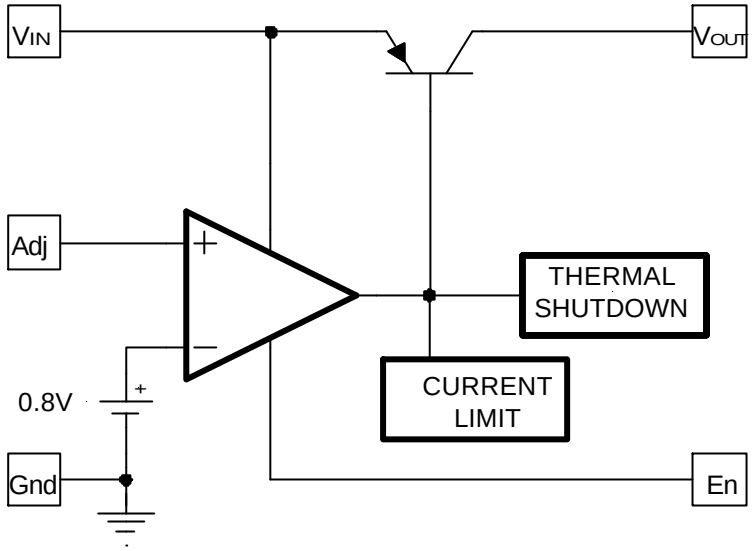


Figure 2 - APU8836 adjustable output block diagram.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.
APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.
APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

Typical Performance Characteristics

Current Limit (V_{OUT} vs. I_{OUT})



VIN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)

Load Transient

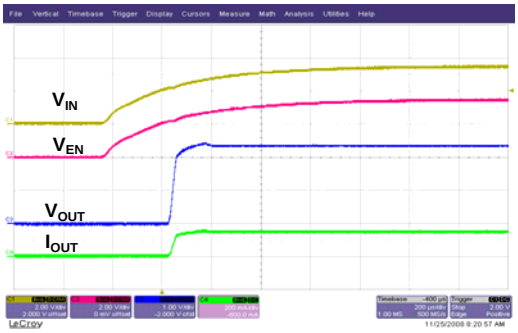
I_{OUT}=0mA ~ 150mA



VIN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)
Ton=Toff=1mS, Rising=Falling=0.25A/uS

Power Sequence

Power ON (R_L=16Ω)



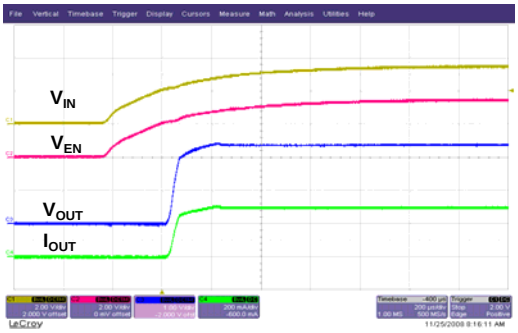
Power OFF (R_L=16Ω)



VIN=VEN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)

Power Sequence

Power ON (R_L=8Ω)



Power OFF (R_L=8Ω)



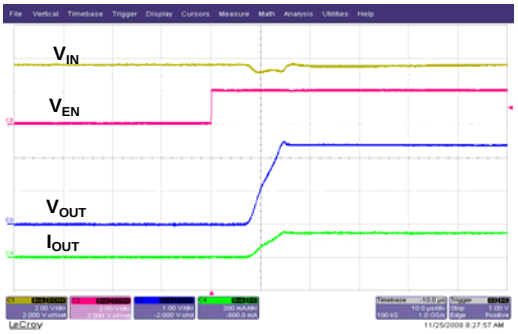
VIN=VEN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)

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Typical Performance Characteristics (cont.)

Enable ON Sequence (R_L=16Ω)

VEN=0V to 2V



Enable OFF Sequence (R_L=16Ω)

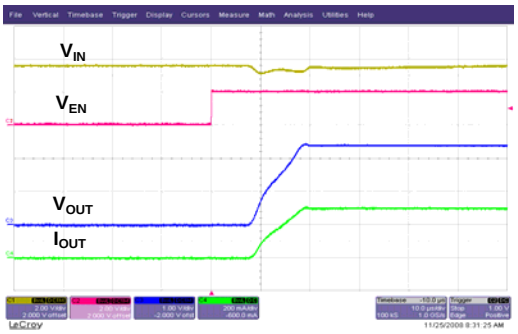
VEN=2V to 0V



VIN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)

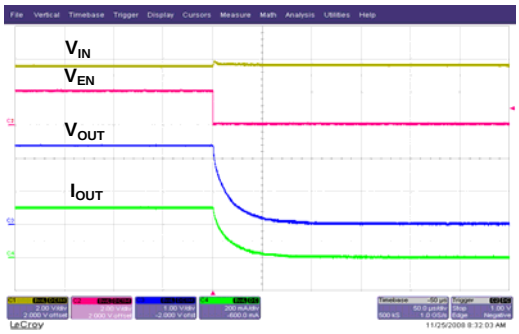
Enable ON Sequence (R_L=8Ω)

VEN=0V to 2V



Enable OFF Sequence (R_L=8Ω)

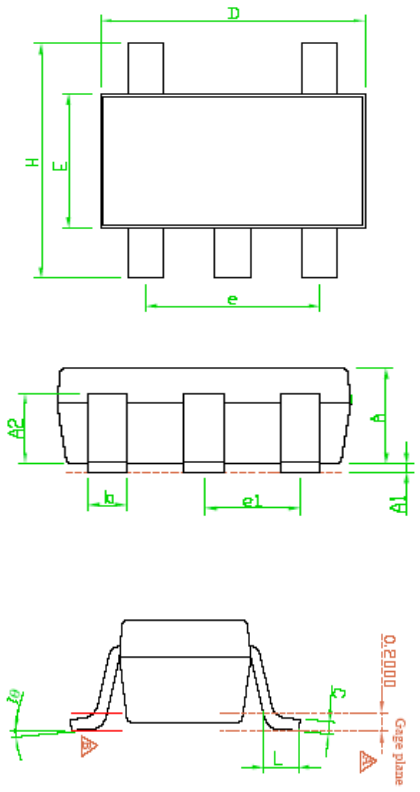
VEN=2V to 0V



VIN=3.5V, R1/R2=2KΩ/1KΩ, CIN=COUT=2.2uF(EL Cap.)

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Package Dimensions: SOT-23-5



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	---	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.50	1.60	1.80
e	---	1.90(TYP)	---
H	2.60	2.80	3.00
L	0.37	---	---
θ1	1°	5°	9°
e2	---	0.95(TYP)	---

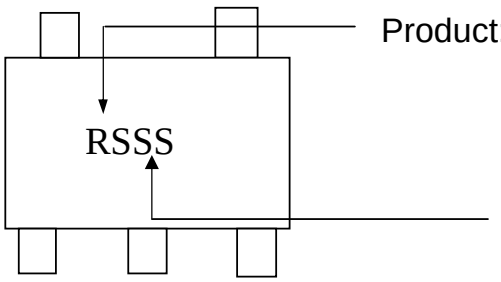
Note 1: Package body sizes exclude mold flash protrusions or gate burrs.

Note 2: Tolerance ± 0.1000 mm (4mil) unless otherwise specified.

Note 3: Coplanarity:0.1000 mm

Note 4: Dimension L is measured in gage plane.

Marking Information



Product: RS = APU8836Y5-HF-3TR

rS = APU8836Y5R-HF-3TR

Date/lot code

For details of how to convert this to standard YYWW date code format, please contact us directly.

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