300mA Low Drop-out Positive Voltage Regulators

Features

- Stable with 2.2μF Ceramic Capacitor
- Voltage Reference Accuracy of 2%
- Only 270mV Dropout at 300mA and 170mV Dropout at 150mA
- Quiescent Current in Shutdown of 5μA
- Current Limit and Thermal Shutdown
- Logic Input Enable Pin
- RoHS-compliant, halogen-free SOT-23-5 or SOT-23-5R with alternate pin-out

Applications

- Laptop, Notebook and Palmtop computers
- Battery Powered Equipment
- PCMCIA Vcc & Vpp Regulators
- Consumer Electronics
- High Efficiency Linear Power Supplies

Description

The APU1205 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 APU1205 is available in fixed and adjustable output voltage versions in a small SOT-23 5-pin package.

Typical Applications

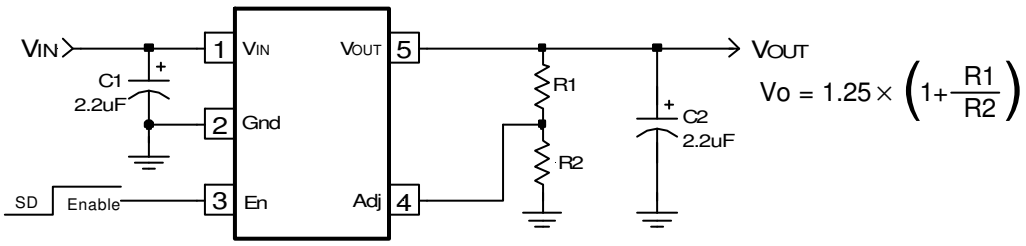


Figure 1 - Typical application of the APU1205 adjustable voltage regulator.

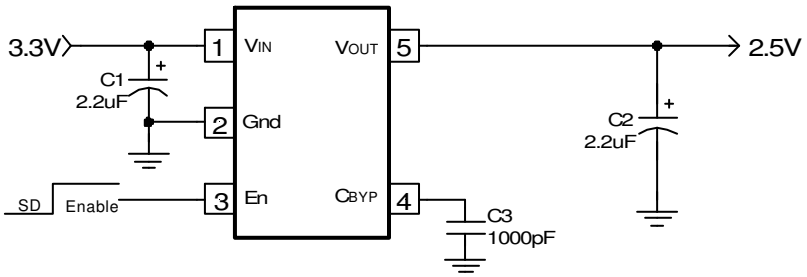


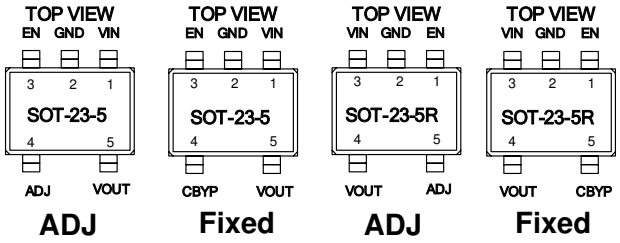
Figure 2 - Typical application of the APU1205-25 fixed voltage regulator.

Ordering Information

T_J (°C)	Part Number		Output Voltage
0 to 125	APU1205Y5-HF-3TR	APU1205Y5R-HF-3TR	Adjustable
0 to 125	APU1205Y5-18-HF-3TR	APU1205Y5R-18-HF-3TR	1.8V
0 to 125	APU1205Y5-25-HF-3TR	APU1205Y5R-25-HF-3TR	2.5V
0 to 125	APU1205Y5-33-HF-3TR	APU1205Y5R-33-HF-3TR	3.3V

Parts are shipped on tape and reel, 3000pcs/reel

Pin Configuration



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 dropout voltage during the load transient response. This pin must always be higher than V_{OUT} by at least the amount of the dropout voltage plus 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_N for normal operation.
Adj (Adjustable Only)	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.
C_{BYP} (Fixed Only)	A 470 to 1000pF bypass capacitor connected to this pin reduces the output noise.
V_{OUT}	The output of the regulator. A capacitor of at least 2.2μF with max ESR of 1Ω must be connected from this pin to ground to ensure stability.

5-PIN SOT-23	Output Voltage
APU1205Y5-3	1.25V
APU1205Y5-18-3	1.8V
APU1205Y5-25-3	2.5V
APU1205Y5-33-3	3.3V

Table 1- Nominal output voltage vs. part number.

The output voltage of the adjustable device can be set using:

$$Vout = 1.25 \times \left(1 + \frac{R1}{R2}\right)$$

Where:
R1 = Resistor connected from the Vout pin to the Adj pin
R2 = Resistor connected from the Adj pin to ground.

Absolute Maximum Ratings

Input Voltage (V_{IN}) 10V
Enable Input Voltage 10V
Storage Temperature Range ..... -65℃ to 150℃
Operating Junction Temperature Range ..... 0℃ to 150℃
Thermal Resistance, Junction-Ambient ..... 256℃/W

Electrical Specifications

Unless otherwise specified, these specifications apply over C_N=Co=2.2μF, Io=100μA, $V_{IN(MIN)}$=2.5V (adjustable devices), V_N=Vo + 1V (for fixed voltage devices), V_{OUT}=V_{FB} (for adjustable version only), C_{BYP}=470pF (for fixed voltage devices), VENB=2V and T_A=25°C. Typical values refer to T_A=25°C. Low duty cycle pulse testing is used which keeps junction and case temperatures equal to the ambient temperature.

PARAMETER	SYM	TEST CONDITION	MIN	TYP	MAX	UNITS
Reference Voltage (See Table 1 for typical values)	Vo		-2		2	%
Line Regulation	ΔV_I	Vo + 1V<V_N<10V		0.005		%/V
Load Regulation (Note 1)	ΔV_L	1mA<Io<100mA 100mA<Io<300mA		0.8 0.1		%
Dropout Voltage (Note 2)	$\Delta V_{(O)}$	Io=100μA Io=50mA Io=150mA Io=300mA		10 85 170 270	50 110 220 350	mV
Ground Current (Note 3)	I_Q	V_{EN}=2V, Io=100μA Io=50mA Io=150mA Io=300mA		120 420 2200 7200	160 600 2900 9500	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_N=10V, Io=150mA, 10ms Pulse		0.05		%/W
Adjust Pin Current	I_{ADJ}	V_N=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 to 0.8V		0.01		μA
Enable Pin Input HI Current		$V_{EN(H)}$=2V to V_N		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 V_{IN} and V_{OUT} required to maintain regulation at V_{OUT}. 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.

Block Diagrams

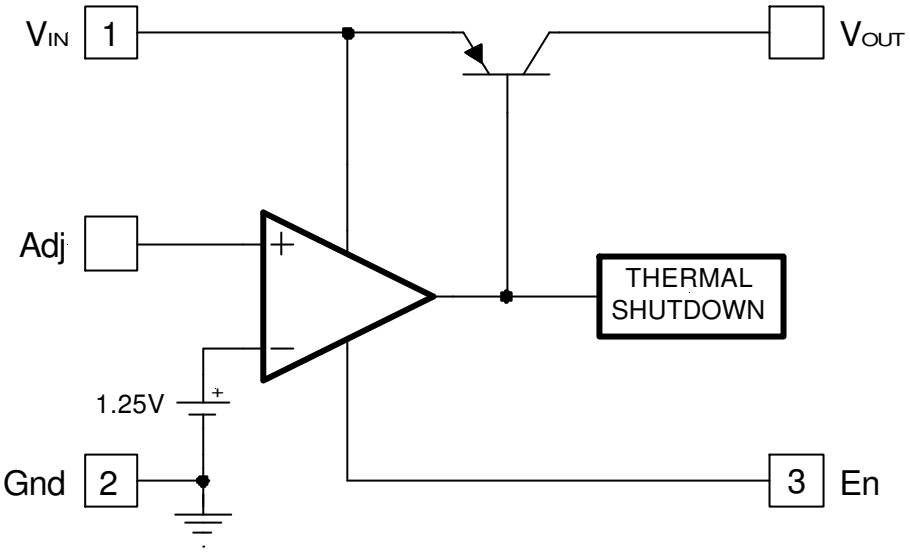


Figure 3 - APU1205 adjustable-output block diagram.

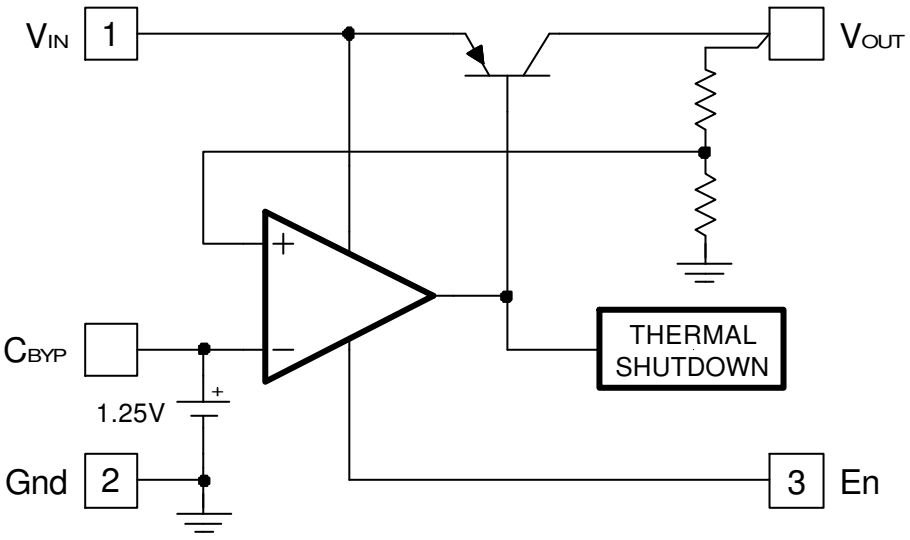
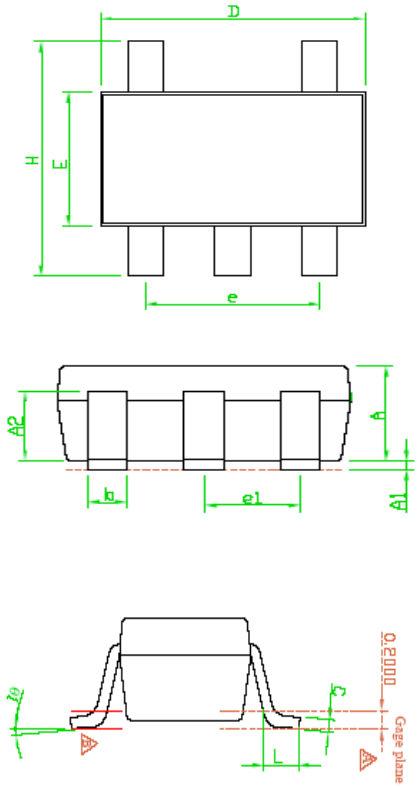


Figure 4 - APU1205-18, APU1205-25, and APU1205-33 fixed-output block diagram.

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	0.30	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.40	1.60	1.80
e	---	1.90(TYP)	---
H	2.60	2.80	3.00
L	0.37	---	---
θ1	0°	5°	9°
e1	---	0.95(TYP)	---

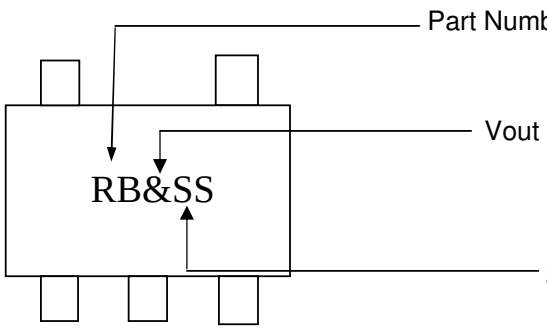
Note 1: Package dimensions exclude mold flash protrusions or gate burrs.

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.

Part Marking



Part Number: RB = APU1205Y5
Rb = APU1205Y5R

Vout = Blank : Adj
A : 1.8V
B : 2.5V
E : 3.3V

SS = Date/Lot Code
For details on how to interpret this code, please contact APEC