400mA Low Drop-out Linear Regulator

Features

- Low Dropout Voltage of 1.5V at Full Load Current
- Fast Transient Response
- Output Current Limiting
- Built-in Thermal Shutdown
- Needs only 1µF Capacitor for Stability
- Good Noise Rejection
- 3-Terminal Fixed 1.5V, 1.8V, 2.5V, 3.3V, 5.0V
- Low-ESR Ceramic Capacitor for Output Stability
- Tiny SOT-23 packages
- RoHS-compliant and Halogen-free

Applications

- PC peripherals
- Communications
- LCD Modules

Description

The APE8880-3 is a low dropout positive fixed-mode regulator with a minimum output current capability of 400mA. The regulator is able to operate with an output capacitor as small as a 1uF ceramic capacitor for stability.
The product is specifically designed to provide well-regulated supplies for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supplies.

The APE8880-3 is also well suited for other applications such as VGA cards. The APE8880-3 is guaranteed to have no more than 1.5V dropout at full load current, making it ideal to provide well-regulated outputs of 1.25V to 5.0V with input supplies of 6.4V to 12V.

The APE8800-3 is available with several fixed output voltages from 1.5V to 3.6V, and is packaged in 3-lead SOT-23 package.

Typical Application Circuit

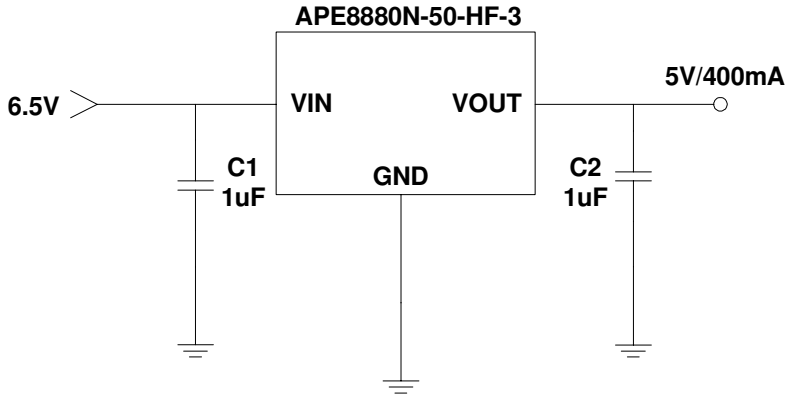
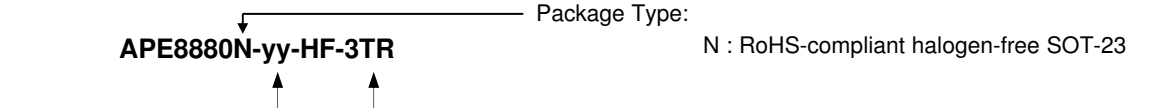


Figure 1. Typical Application Circuit of APE8880-3

Ordering Information



The device is rated MSL3 for moisture sensitivity, and the reel is packed in a moisture-barrier bag.

Absolute Maximum Ratings (at T_A=25℃)

Input Voltage (VIN) ---------- -0.6V to 16V
Power Dissipation, SOT-23 ---------- 0.4W
Lead Temperature (Soldering, 10 sec.) T_{LEAD} ------ 260℃
Storage Temperature Range ---------- -65℃ to +150℃
Maximum Junction Temperature ---------- 150℃
Maximum Thermal Resistance :
Junction-ambient ------- 250℃/W
Junction-case ---------- 110℃/W

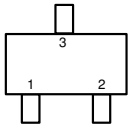
Electrical Specifications

Parameter	SYM	TEST CONDITION		MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT-1.5V}$	I_{OUT}=10mA, T_J=25°C	3V ≤ V_{IN} ≤ 12V	1.47	1.5	1.53	V
	$V_{OUT-1.8V}$		3.3V ≤ V_{IN} ≤ 12V	1.764	1.8	1.836	
	$V_{OUT-2.5V}$		4V ≤ V_{IN} ≤ 12V	2.45	2.5	2.55	
	$V_{OUT-3.3V}$		4.8V ≤ V_{IN} ≤ 12V	3.235	3.3	3.375	
	$V_{OUT-5.0V}$		6.5V ≤ V_{IN} ≤ 12V	4.9	5	5.1	
Line Regulation	V_{LINE}	I_{OUT}=10mA, V_{OUT}+1.5V < V_{IN} < V_{OUT}+6V, T_J=25°C		-	-	0.5	%
Load Regulation (Note1,2)	$V_{LOAD-1.5V}$	0 ≤ I_{OUT} ≤ 400mA, T_J=25°C	V_{IN} = 3V	-	12	15	mV
	$V_{LOAD-1.8V}$		V_{IN} = 3.3V	-	15	18	
	$V_{LOAD-2.5V}$		V_{IN} = 4V	-	20	25	
	$V_{LOAD-3.3V}$		V_{IN} = 5V	-	26	33	
	$V_{LOAD-5.0V}$		V_{IN} = 8V	-	40	50	
Dropout Voltage	V_{Drop}	I_{OUT} = 400mA, ΔV_{OUT}=1%V_{OUT}		-	1.3	1.5	V
Current Limit	I_{LIM}	V_{IN}-V_{OUT} = 5V		450	-	-	mA
Minimum Load Current		0°C < T_J < 125°C		-	1	3	mA
Thermal Regulation		T_A=25°C, 30ms pulse		-	0.008	0.04	%W
Ripple Rejection		f=120Hz, C_{OUT}=25uF Tantalum, I_{OUT}=0.4A V_{IN}=V_{OUT}+3V		-	60	70	db
Temperature Stability		I_{OUT}=10mA		-	0.5	-	%
Thermal Shutdown Temperature	T_{SD}			-	160	-	°C
Thermal Shutdown Temperature Recovery				-	130	-	
Quiescent Current	I_Q	APE8880-18, V_{IN} ≤ 9V		-	5.5	10	mA
		APE8880-25 V_{IN} ≤ 9V		-	5.5	10	
		APE8880-33 V_{IN} ≤ 12V		-	5.5	10	

Note1. See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead about 1/18" from the package.
Note2. Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the difference between input and output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.
Note3. Quiescent current is defined as the minimum output current required in maintaining regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.

Pin Configuration

SOT-23 (N)

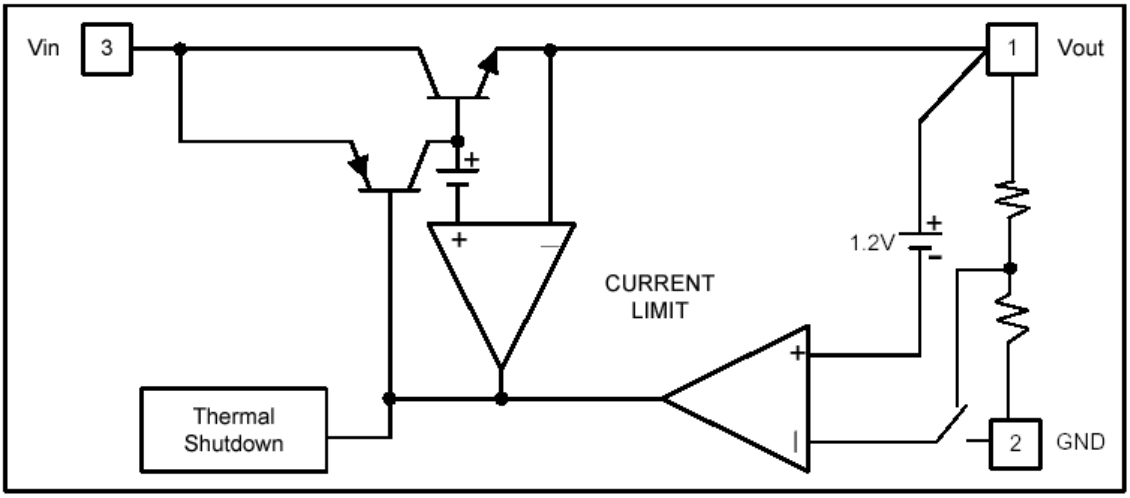


TOP VIEW
1. GND
2. VOUT
3. VIN

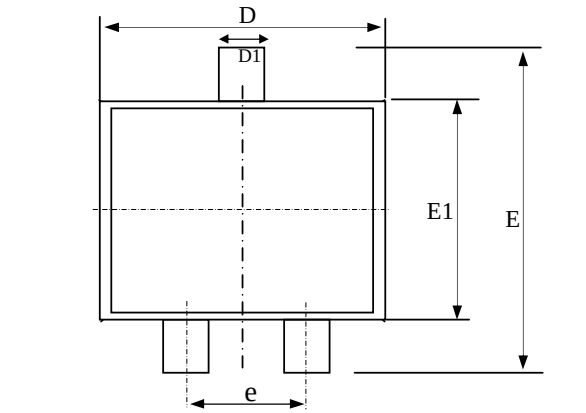
Pin Descriptions

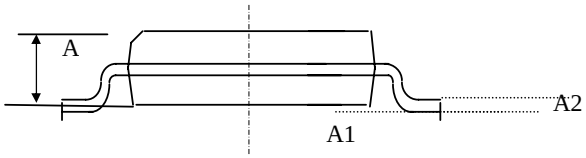
PIN SYMBOL	PIN DESCRIPTION
V_{IN}	The input pin of the regulator. A capacitor of at least 1uF is connected from this pin to ground to ensure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.5V higher than Vout in order for the device to regulate properly.
GND	Ground Pin
V_{OUT}	The output of the regulator. A capacitor of at least 1uF (10mΩ < ESR < 1Ω) must be connected from this pin to ground to ensure stability.

Block Diagram



Package Dimensions: SOT-23



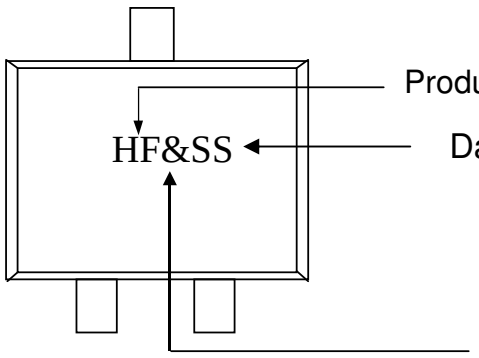


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	1.00	1.15	1.30
A1	0.00	--	0.10
A2	0.10	0.15	0.25
D1	0.30	0.40	0.50
e	1.70	2.00	2.30
D	2.70	2.90	3.10
E	2.40	2.65	3.00
E1	1.40	1.50	1.60

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information

Laser Marking



Product: HF = APE8880N

Date/lot code

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

VOUT : C : 1.5V D : 1.8V F : 2.5V
I : 3.3V J : 5.0V