虹茂半导体
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HM8805

600mA LOW DROPOUT CMOS VOLTAGE REGULATORS

FEATURES

- Maximum output current 600mA
- Highly accurate output voltage: +/-1.5%
- Low power consumption
- On-chip protections: thermal, short-circuit
- Small input/output differential: 600mV at 600mA
- Adjustable version

APPLICATIONS

- Battery-operated systems
- Portable computers
- Portable cameras and video recorders
- Reference voltage sources
- Instrumentation
- Pagers

PRODUCT DESCRIPTION

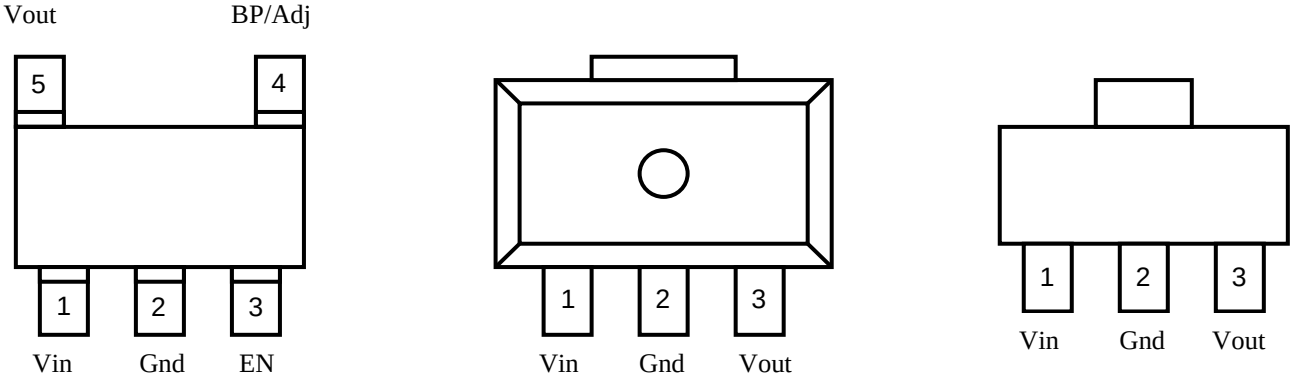
The HM8805 series is a low-dropout linear regulator. This device is designed specifically for battery-operated systems. Its ground current is very small - 50μA (typ.) that significantly extends the battery life. The low power consumption and high accuracy are achieved through CMOS and programmable fuse technologies. Its versions are HM8805-adj (Vref=1.27V), HM8805-1.2,HM8805-1.8, HM8805-2.5, HM8805-2.6, HM8805-3.3. It is possible to extend the output voltage range from 1.2V to 6.0V. The HM8805 consists of a high-precision voltage reference, an error-correction circuit, and a current-limited output driver. With good transient responses the device output remains stable even when the load changes. The EN (Shutdown) input enables the output to be turned off resulting in reduced power consumption.

The HM8805 can stably work with cheap MLCC output capacitors.
Owing to high ripple rejection ratios, the HM8805 series can be used in the case of a power supply with noise. A 470pF capacitor from the BP (bypass) input to the ground reduces the noise, which is present on the internal reference, and that, in turn, significantly reduces the output noise. If that noise is not a concern, the said input may be left unconnected. Larger C_{BP} capacitor values may be used, but that extends a time period until the rated output voltage is reached after the power has been initially applied.
The HM8805 incorporates both over-temperature and over-current protections.
The small packages - SOT23-5 (300mW) and SOT-89 (500mW) - are usable too.

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATING	UNIT
Input voltage		Vin	8	V
Output current		Iout	1	A
Output voltage		Vout	-0.3 to Vin+0.3	V
Continuous total power dissipation	SOT-23-5 SOT-89 SOT-223	P_D	300 500 625	mW
Operating ambient temperature		T_{Opr}	-40 to +125	°C
Storage temperature		T_{STG}	-40 to +125	°C

PIN CONFIGURATION



SOT-23-5 SOT-89 SOT-223

ELECTRICAL CHARACTERISTICS

(At T_A = 25°C, Vin = Vout (nominal)+1V, unless otherwise noted)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT	TEST CIRCUIT
Output voltage accuracy **Reference voltage** in Adj version (Note 2)	Iout = 1mA Iout = 1 to 600mA	-1.5 -3		+1.5 +2	%	
Line Regulation ΔVout/ΔVinVout	Iout =1mA, (Vout+1V) < Vin < 6.5V	-0.3	0.05	0.3	%/V	Fig.1
Load regulation (Note1)	1mA ≤ Iout ≤ 600mA, Cout = 1μF		0.5	1.5	%	Fig.2
Dropout voltage for Vout > 2.8V 2.0V < Vout ≤ 2.8V Vout ≤ 2.0V	Iout = 600mA		600 800 1300	750 1000 1600	mV	
Maximum output current	Vout > 0.96*Vrating	600			mA	
Current limit			1300		mA	
EN exit delay	C_{BP} = 0μF, Cout = 1μF Iout = 100mA		600		μsec	
EN input bias current	V_{EN} = Vin			100	nA	
EN input Low current	V_{EN} = Gnd	-1	-0.3		μA	
EN supply current	V_{EN} = Gnd		0.01	1	μA	
EN input threshold Low	Vin = 2.5 to 5.5V			0.4	V	
EN input threshold High	Vin = 2.5 to 5.5V	2			V	
Gnd (Ground) pin current	Iout = 0mA to 600mA		50	85	μA	Fig.3
Over-temperature shutdown	Iout = 10mA		155		°C	
Over-temperature hysteresis	Iout = 10mA		10		°C	
V_{OUT} temperature coefficient	Iout = 10mA		30		ppm	
PSRR	Iout =100mA,Cout = 2.2μF, f = 100Hz		55		dB	
Output voltage noise	f = 20Hz to 100kHz Iout = 10mA		12		μVrms	

Note:

1. The **Load regulation** is measured by using pulse techniques with the duty cycle < 5%
2. The **Reference voltage** nominal value of the adjustable version is 1.27V

TEST CIRCUITS

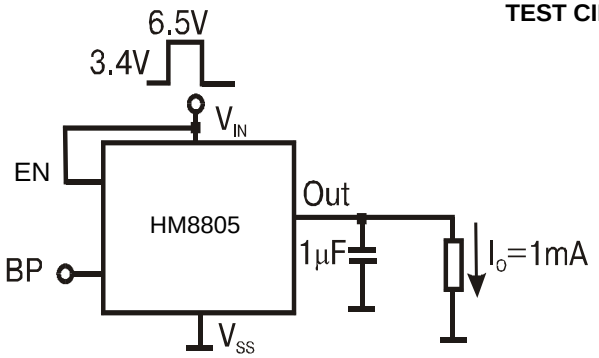


Fig.1. Line regulation

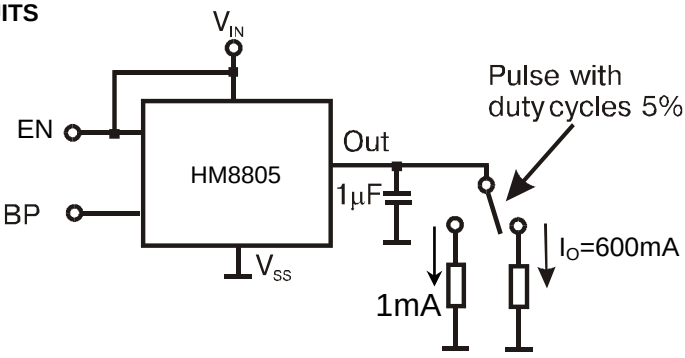


Fig.2. Load regulation

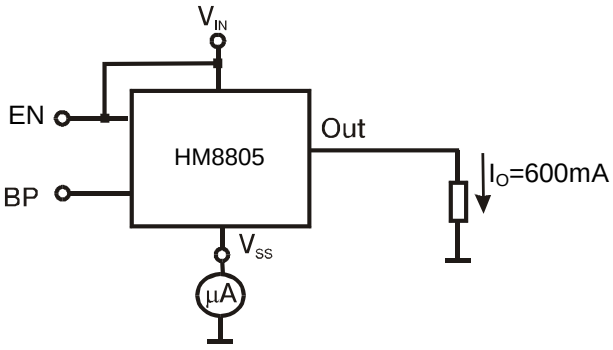
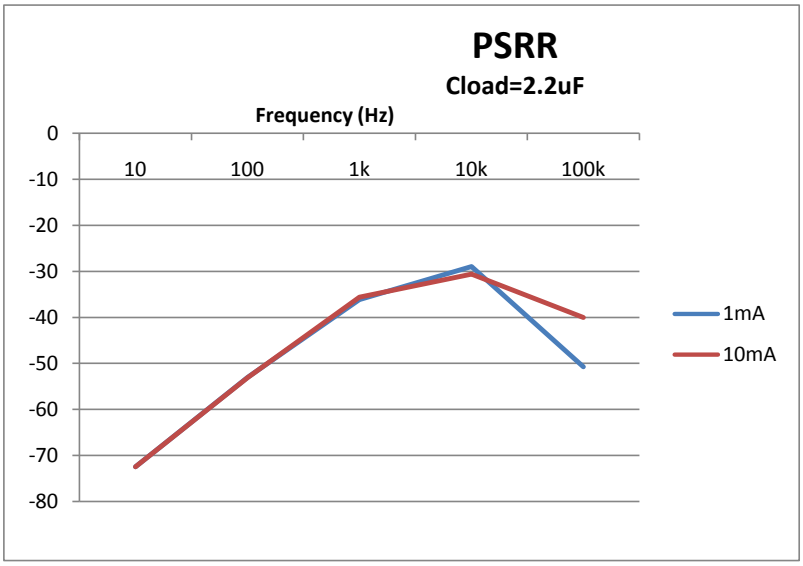
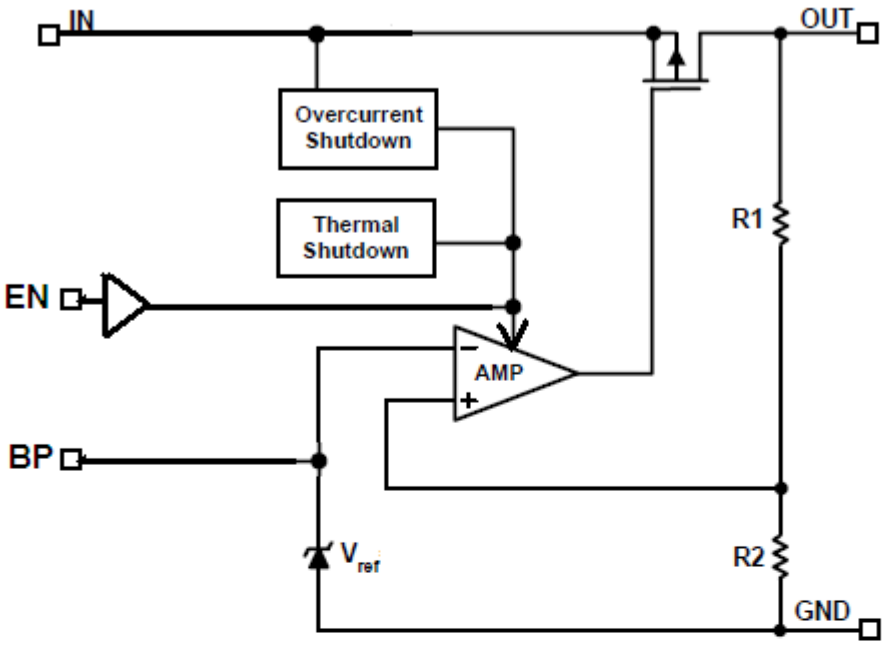


Fig.3. Ground current

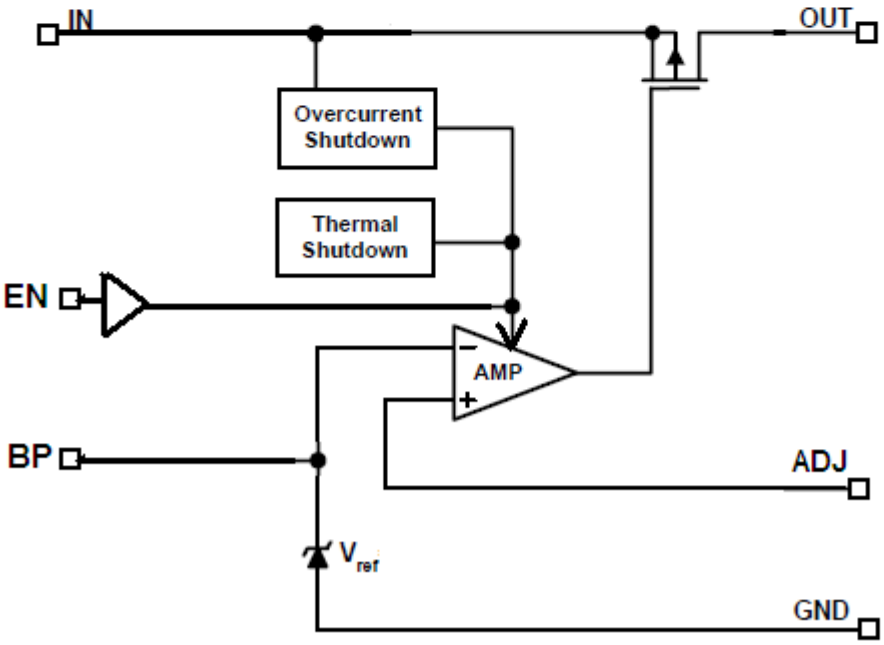
TYPICAL CHARACTERISTICS



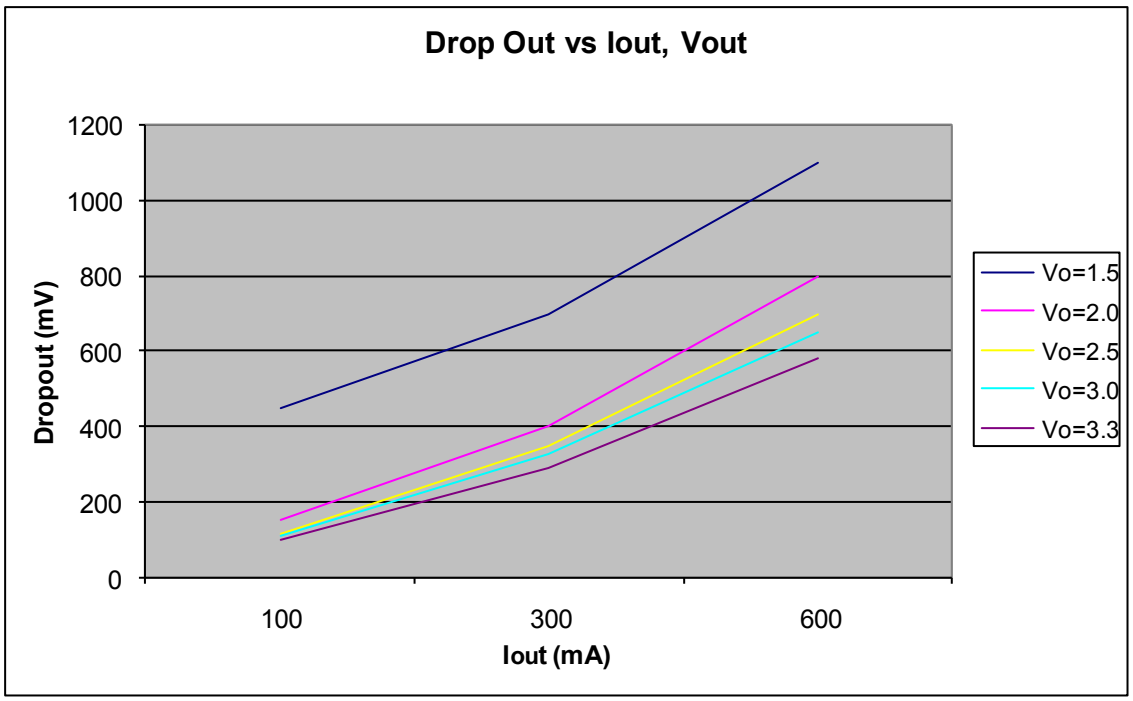
■ Functional Block Diagram

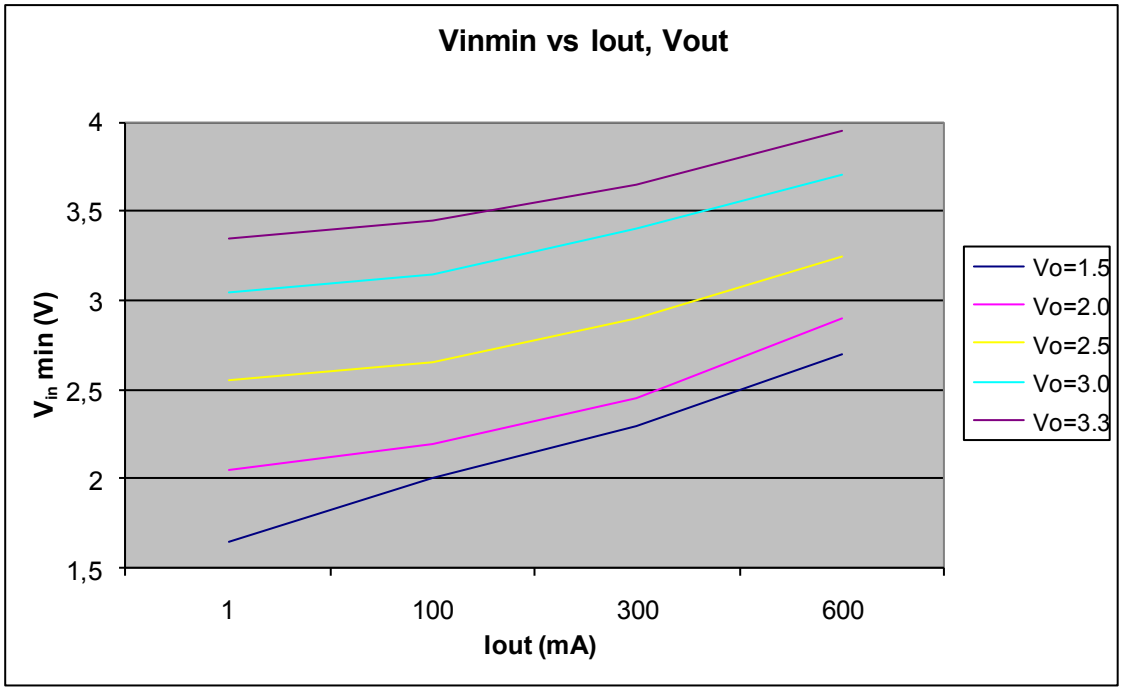


Fixed Version

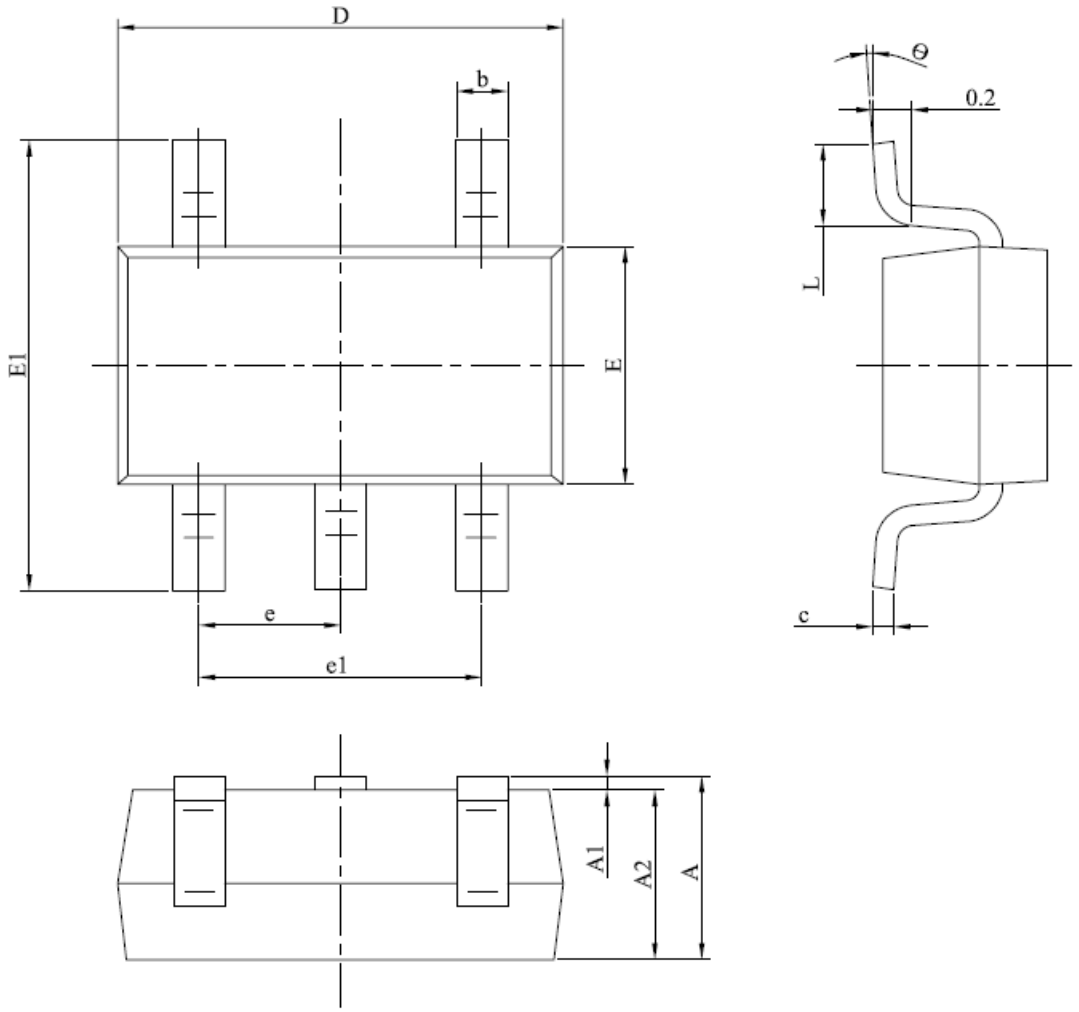


Adjustable version


Drop Out vs Iout, Vout
Dropout (mV)
1200
1000
800
600
400
200
0
100
300
600
Iout (mA)
Vo=1.5
Vo=2.0
Vo=2.5
Vo=3.0
Vo=3.3


Vinmin vs Iout, Vout
Vin min (V)
4
3,5
3
2,5
2
1,5
1
100
300
600
Iout (mA)
Vo=1.5
Vo=2.0
Vo=2.5
Vo=3.0
Vo=3.3

SOT-23-5L



UNIT \ SYMBOL		A	A1	A2	b	c	D	E	E1	e	e1	L	θ
mm	Min.	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950 (BSC)	1.800	0.300	0°
	Nom.	-	-	-	-	-	-	-	-		-	-	-
	Max.	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950		2.000	0.600	8°
inch	Min.	0.041	0.000	0.041	0.012	0.004	0.111	0.059	0.104	0.037 (BSC)	0.071	0.012	0°
	Nom.	-	-	-	-	-	-	-	-		-	-	-
	Max.	0.049	0.004	0.045	0.020	0.008	0.119	0.067	0.116		0.079	0.024	8°