

### Features

- Dual channel output with each individual output can be either fixed output version or adjustable version.
- Maximum output current for each channel is 1A
- Range of operation input voltage: Max.12V
- Standby current of each output: 2mA(typ.)
- Line regulation: 0.1%/V (typ.)
- Load regulation: 10mV (typ.)
- Environment Temperature:-20°C~85°C
- Compatible with tantalum capacitor, electrolytic capacitor and MLCC.

### Applications

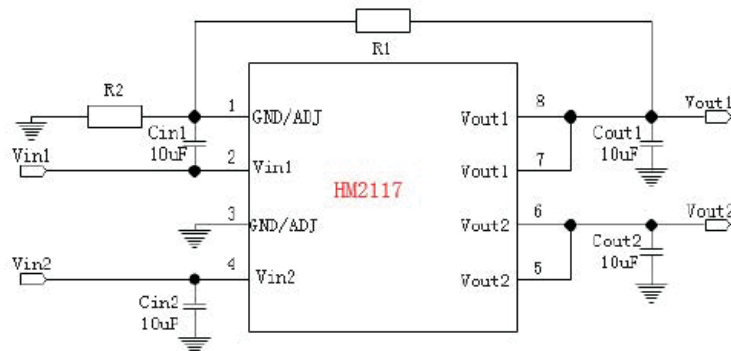
- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

### General Description

HM2117 is a dual channel low-dropout regulator that delivers a maximum current of 1A for each individual output. Typical dropout voltage at 1A load current is 1.3V. Each individual output voltage can be set independently as fixed voltage (e.g 1.2V,1.8V, 2.5V, 3.3V, 5V) or adjustable output which can provide an output voltage from 1.25 to 12V with two external resistors. The output accuracy of each channel is set within 2% by trimming.

HM2117 offers thermal shut down and current limit functions to ensure reliability of device and power system. Package input/output pin configuration can be customized on demand ( i.e both output can share one input to save one input capacitor and corresponding PCB real estate).HM2117 is available in lead (Pb)-free ESOP-8(with exposed pad for heat dissipation) package.

### Typical Application



Application circuit of HM2117 fixed version

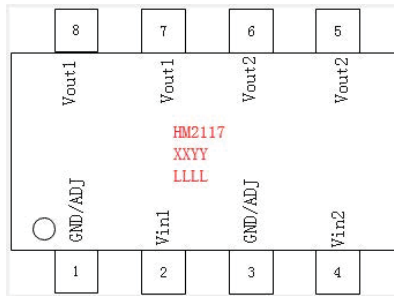
## Order Information

HM2117 1 2 3 4 5

Code	Description
1	Temperature&Rohs: C:-40℃ ~85℃ , Pb Free Rohs Std.
2	Package type: S8: ESOP-8
3	Packing type: TR: Tape&Reel (Standard)
4	CH1 Output voltage: e.g. 33=3.3V ; AD=ADJ
5	CH2 Output voltage: e.g. 33=3.3V ; AD=ADJ

## Marking Description And Pin Configuration

Marking	HM2117 <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span> <span style="border: 1px solid black; padding: 0 2px;"> </span>	PIN	Symbol	Description
HM2117	Product Code	1	GND/ADJ	CH1 GND/ADJ
LLLL	Lot No.	2	Vin1	CH1 Input
XXYY	XX: Vo1 Output Voltage	3	GND/ADJ	CH2 GND/ADJ
	YY: Vo2 Output Voltage	4	Vin2	CH2 Input
		5	Vout2	CH2 Output
		6	Vout2	CH2 Output
		7	Vout1	CH1 Output
		8	Vout1	CH1 Output



## ABSOLUTE MAXIMUM RATING

Parameter	Value
Max Input Voltage	12V
Operating Junction Temperature(Tj)	125℃
Ambient Temperature(Ta)	-20℃ -85℃
Package Thermal Resistance (jc)	ESOP8 10℃ / W
Storage Temperature(Ts)	-40℃ -150℃
Lead Temperature & Time	260℃,10S

### Note:

- 1) Exceed these limits to damage to the device.
- 2) Exposure to absolute maximum rating conditions may affect device reliability.

## RECOMMENDED WORK CONDITIONS

Parameter	Value
Input Voltage Range	Max. 12V
Ambient Temperature	-20℃ ~85℃

## Electrical Characteristics

\*For each individual channel output

Test Conditions:  $C_{in}=0.1\mu F$ ,  $C_{out}=10\mu F$ ,  $T_A=25^{\circ}C$ , unless otherwise specified

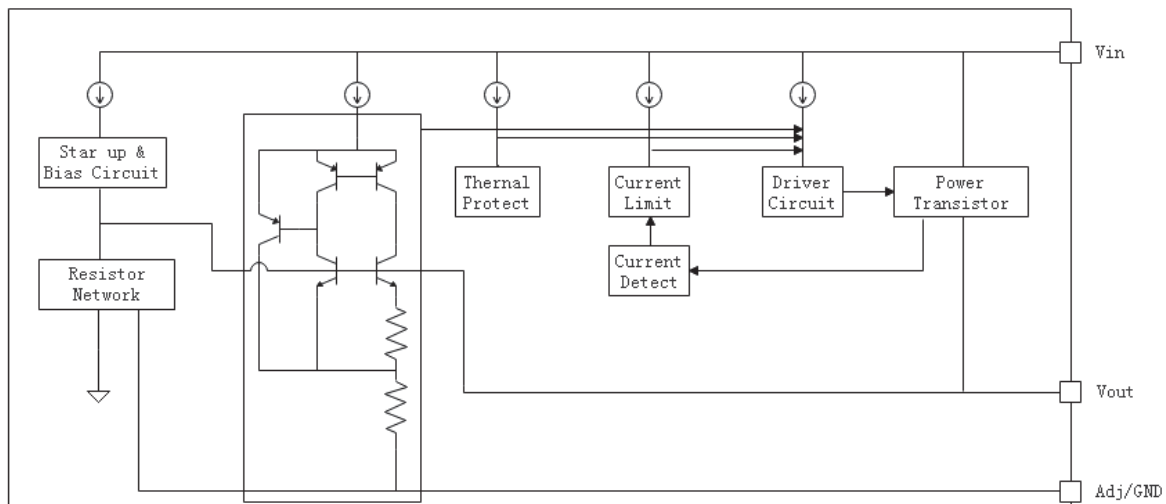
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>ref</sub>	Reference voltage	HM2117-Adj $10mA \leq I_{out} \leq 1A$ , $V_{in}=3.25V$	1.225	1.25	1.275	V
V <sub>out</sub>	Output voltage	HM2117-1.2V $0 \leq I_{out} \leq 1A$ , $V_{in}=3.2V$	1.176	1.2	1.224	V
		HM2117-1.8V $0 \leq I_{out} \leq 1A$ , $V_{in}=3.8V$	1.764	1.8	1.836	V
		HM2117-2.5V $0 \leq I_{out} \leq 1A$ , $V_{in}=4.5V$	2.45	2.5	2.55	V
		HM2117-3.3V $0 \leq I_{out} \leq 1A$ , $V_{in}=5.3V$	3.234	3.3	3.366	V
		HM2117-5.0V $0 \leq I_{out} \leq 1A$ , $V_{in}=7.0V$	4.9	5	5.1	V
$\Delta V_{out}$	Line regulation	HM2117-1.2V $I_{out}=10mA$ , $2.7V \leq V_{in} \leq 10V$		0.1	0.2	%/V
		HM2117-ADJ $I_{out}=10mA$ , $2.75V \leq V_{in} \leq 12V$		0.1	0.2	%/V
		HM2117-1.8V $I_{out}=10mA$ , $3.3V \leq V_{in} \leq 12V$		0.1	0.2	%/V
		HM2117-2.5V $I_{out}=10mA$ , $4.0V \leq V_{in} \leq 12V$		0.1	0.2	%/V
		HM2117-3.3V $I_{out}=10mA$ , $4.8V \leq V_{in} \leq 12V$		0.1	0.2	%/V
		HM2117-5.0V $I_{out}=10mA$ , $6.5V \leq V_{in} \leq 12V$		0.1	0.2	%/V
$\Delta V_{out}$	Load regulation	HM2117-1.2V $V_{in}=2.7V$ , $10mA \leq I_{out} \leq 1A$		2	8	mV
		HM2117-ADJ $V_{in}=2.75V$ , $10mA \leq I_{out} \leq 1A$		2	8	mV
		HM2117-1.8V $V_{in}=3.3V$ , $10mA \leq I_{out} \leq 1A$		3	12	mV
		HM2117-2.5V $V_{in}=4.0V$ , $10mA \leq I_{out} \leq 1A$		4	16	mV
		HM2117-2.85V $V_{in}=4.35V$ , $10mA \leq I_{out} \leq 1A$		5	20	mV
		HM2117-3.3 $V_{in}=4.8V$ , $10mA \leq I_{out} \leq 1A$		6	24	mV
		HM2117-5.0 $V_{in}=6.5V$ , $10mA \leq I_{out} \leq 1A$		9	36	mV
V <sub>drop</sub>	Dropout voltage	$I_{out}=100mA$		1.15	1.3	V
		$I_{out}=1A$		1.3	1.5	V
I <sub>min</sub>	Minimum load current	HM2117-ADJ		2	10	mA
I <sub>q</sub>	Quiescent Current	HM2117-1.2V, $V_{in}=10V$		2	5	mA
		HM2117-1.8V, $V_{in}=12V$		2	5	mA
		HM2117-2.5V, $V_{in}=12V$		2	5	mA
		HM2117-2.85V, $V_{in}=12V$		2	5	mA

		HM2117-3.3V, Vin=12V		2	5	mA
		HM2117-5.0V, Vin=12V		2	5	mA
I <sub>Adj</sub>	Adjust pin current	HM2117-ADJ Vin=5V, 10mA ≤ I <sub>out</sub> ≤ 1A		55	120	uA
I <sub>change</sub>	I <sub>adj</sub> change	HM2117-ADJ Vin=5V, 10mA ≤ I <sub>out</sub> ≤ 1A		0.2	10	uA
ΔV/ΔT	Temperature coefficient			±100		ppm
θ <sub>JC</sub>	Thermal resistance	ESOP8		63		°C/W

Note1: All test are conducted under ambient temperature 25° C and within a short period of time 20ms

Note2: Load current smaller than minimum load current of HM2117-ADJ will lead to unstable or oscillation output.

### Block Diagram



### Detailed Description

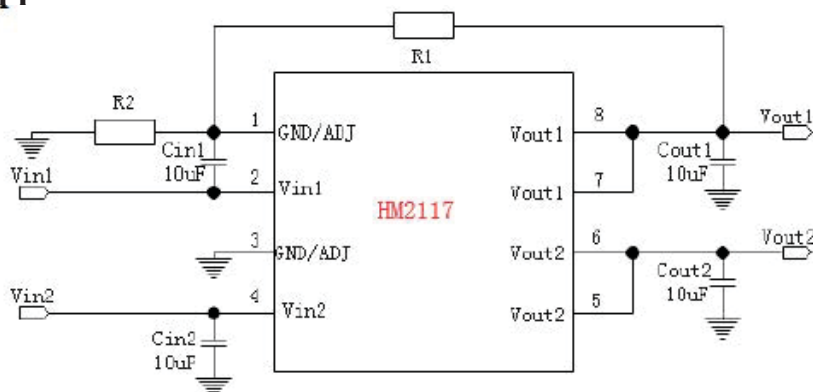
HM2117 is a series of dual channel low-dropout regulator that delivers a maximum current of 1A for each individual output. Typical dropout voltage at 1A load current is 1.3V. Each individual output voltage can be set independently as fixed voltage (i.e. 1.2V, 1.8V, 2.5V, 3.3V, 5V) or adjustable output which can provide an output voltage ranges from 1.25 to 12V with two external resistors. The output accuracy of each channel is set within 2% by trimming.

The device has build-in modules including start-up circuit, bias circuit, bandgap, thermal shutdown, current limit, power transistors and driver circuit. Thermal shut down and current limit functions ensure reliability of device and power system. The bandgap module provides stable reference voltage whose temperature coefficient is compensated by careful design considerations. The temperature coefficient is under 100 ppm/°C. The accuracy of output voltage is guaranteed by trimming technique.

Package input/output pin configuration can be customized on demand ( i.e both output can share one input to save one input capacitor and corresponding PCB real estate).

HM2117 is available in lead (Pb)-free ESOP-8 package

### Typical Application



HM2117 has both fixed voltage version (1.2V, 1.8V, 2.5V, 3.3V, 5V ) and adjustable voltage version. The input and output capacitors of each channel can be either tantalum, electrolytic or ceramic capacitor.

Typical Application shows both fixed voltage and adjustable voltage application schematic. Channel 1 (designated as pin 1\2\7\8) is a typical application of fixed voltage. Channel 2 (designated as pin 3\4\5\6) is the schematic of adjustable version application. The adjustable version provides a 1.25V reference voltage with regard to its ADJ pin (shown as PIN 5\6 as its output and PIN3 as its adjustable pin in Fig.3). The output voltage of adjustable version follows the equation:

$$V_{out} = 1.25 \left( 1 + \frac{R_2}{R_1} \right) + I_{Adj} \cdot R_2$$

We can ignore  $I_{Adj}$  because  $I_{Adj}$  (about 50uA) is much less than the current of  $R_1$  ( in the order of several milliamps).

1) To meet the minimum load current (>10mA) requirement,  $R_1$  is recommended to be 125ohm or lower.

2) Using a bypass capacitor ( $C_{ADJ}$ ) between the ADJ pin and ground can improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of  $C_{ADJ}$  should be less than  $R_1$  to prevent ripple from being amplified. As  $R_1$  is normally in the range of 100Ω~500Ω, the value of  $C_{ADJ}$  should satisfy this equation:  $1/(2\pi \times f_{ripple} \times C_{ADJ}) < R_1$ .

### Thermal Considerations

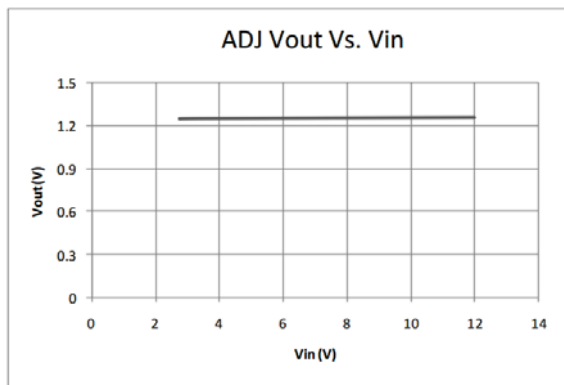
Thermal consideration has to be taken account into to ensure proper function of the device. Power dissipation of HM2117 can be calculated as

$$\text{Power Dissipation} = (V_{in1} - V_{out1}) \times I_{out1} + (V_{in2} - V_{out2}) \times I_{out2}$$

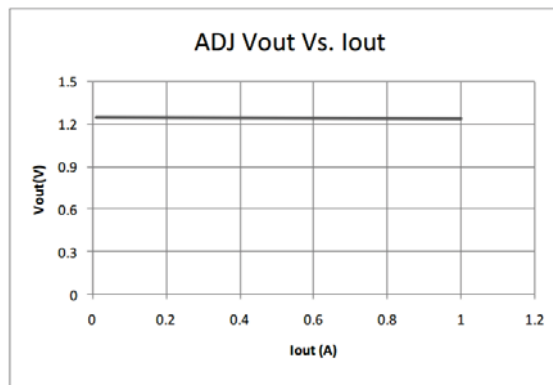
For proper function and safe operation of the device, power dissipation is recommended to be limited within 2W.

### Typical Performance Characteristics(TA=25℃, unless otherwise noted)

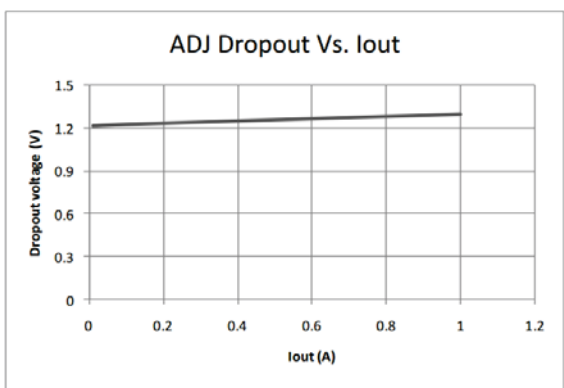
**Line regulation**



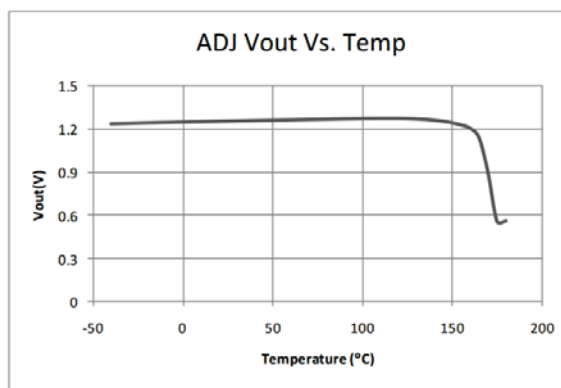
**Dropout voltage**



**Load regulation**



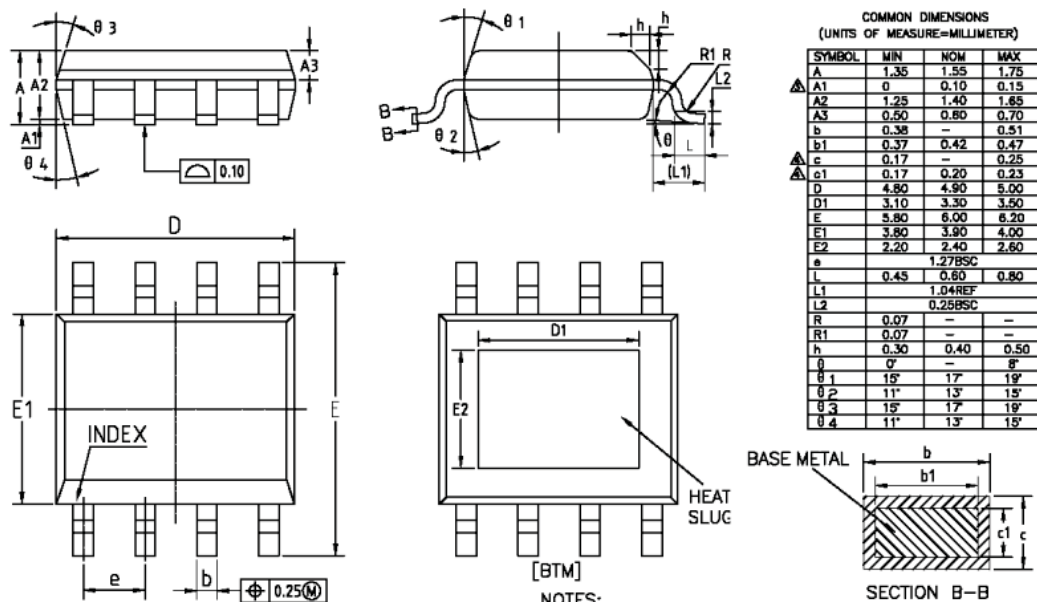
**Thermal performance with OTP**



## Package Information

Package	ESOP-8	Devices per reel	2500Pcs	Unit	mm
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### Package specification:



NOTES: SECTION B-B  
ALL DIMENSIONS REFER TO JEDEC STANDARD MS-012 AA  
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.