Dual 0.8A Low Dropout Linear Regulator

➢ Description

The AF1118A is a dual low dropout linear regulator that can independently output 0.8A of current with a dropout voltage as small as 1.3V. The output voltage has a fixed voltage of 1.8V, 3.3V and an adjustable output voltage of 1.25V~12V. The AF1118A has internal thermal protection and current limiting protection to ensure effective protection of both the product and the load. The AF1118A is packaged in an ESOP8 package to provide better heat dissipation and a custom-made pin package.

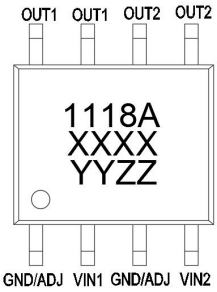
➢ Applications

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

➢ Features

- Dual channel output with each individual output can be either fixed output version or adjustable version
- Maximum output current for each channel is 0.8A
- Range of operation input voltage : Max 18V
- Standby current of each output : 2mA (typ.)
- Line regulation : 0.1%/V(typ.)
- Load regulation : 10mV (typ.)

➢ Marking Rule



➢ Ordering Information

Device	Package	Shipping
AF1118A-1833E	ESOP8	3000/Reel
AF1118A-ADJ33E		
AF1118A-33ADJE		

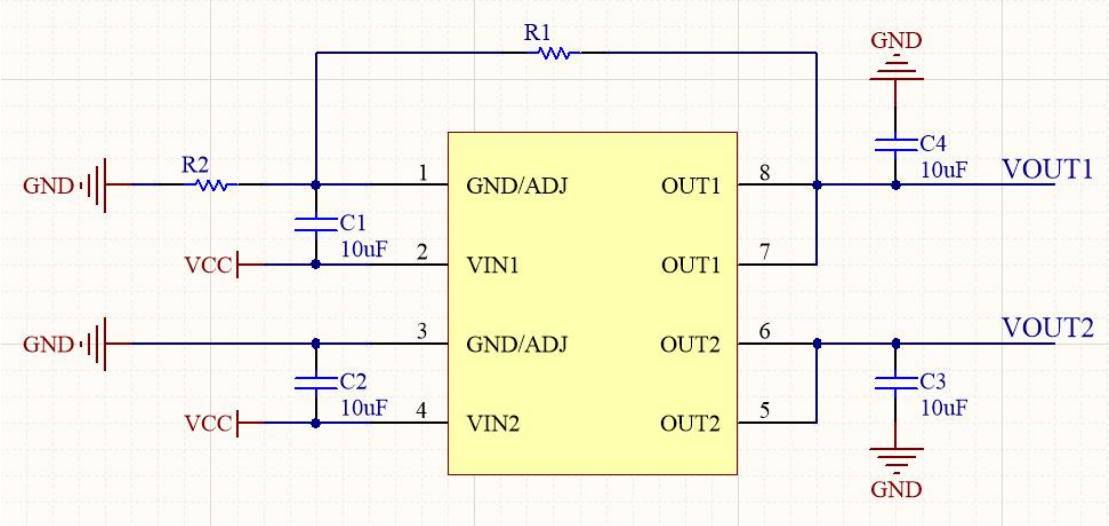
AF1118A – XX XX E
① ② ③ ④

1118A	Product Name
XXXX(X)	Output Voltage
1833	OUT1=1.8V OUT2=3.3V
ADJ33	OUT1= ADJ OUT2= 3.3V
YYZZ	Year Week
1911	Production in the 11th week of 2019

Notes:

① : Product Code
② : OUT1 Voltage
③ : OUT2 Voltage
④ : Package ESOP8

➢ Typical Application



➢ Absolute Maximum Ratings(T_A=25℃ unless otherwise noted)

Parameter	Value
Max Input Voltage	18V
Max Power Dissipation	1.05W
Max Output Current	0.8A
Max Operating Junction Temperature	125℃
Storage Temperature	-40℃~125℃
Lead Temperature & Time	260℃,10s

➢ Thermal Resistance Ratings(T_A=25℃ unless otherwise noted)

Symbol	Parameter	Typical	Maximum	Unit
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance		95	℃/W
$R_{\theta JC}$	Junction-to-Case Thermal Resistance		40	

➢ Recommended Work Conditions

Parameter	Value
Input Voltage Range	Max.15V
Ambient Temperature	-20℃~85℃

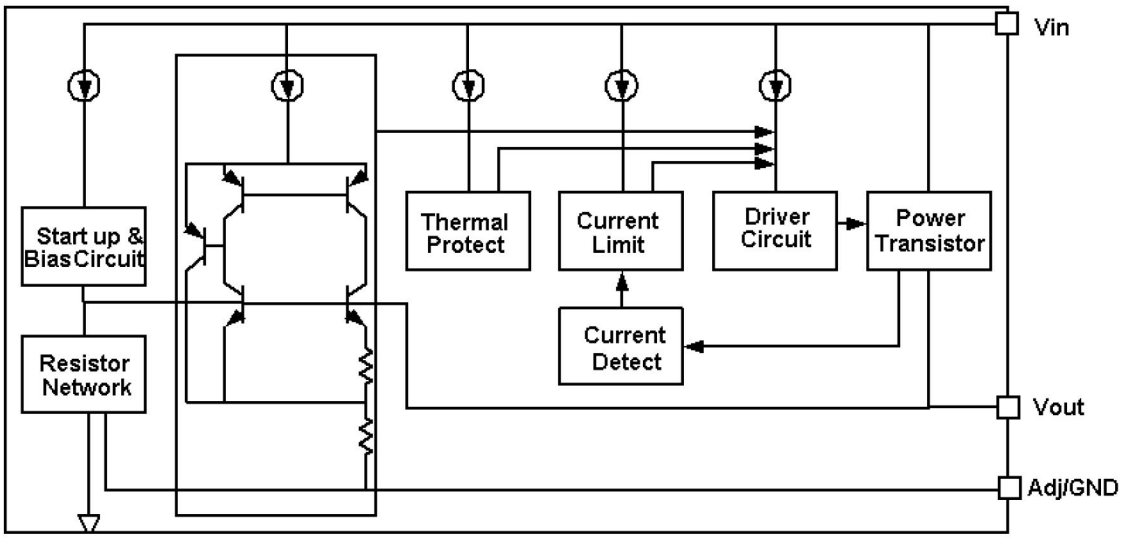
➢ Electronics Characteristics(T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Vref	Reference voltage	AF1118A-ADJ 10mA≤Iout≤0.8A, Vin=3.25V	1.225	1.25	1.275	V
Vout	Output Voltage	AF1118A-1.8V 0≤Iout≤0.8A, Vin=3.8V	1.76	1.8	1.836	V
		AF1118A-3.3V 0≤Iout≤0.8A, Vin=5.3V	3.234	3.3	3.366	
ΔVout	Line Regulation	AF1118A-ADJ Iout=10mA 2.75V≤Vin≤12V		0.1	0.4	%/V
		AF1118A-1.8V Iout=10mA 3.3V≤Vin≤12V		0.1	0.4	
		AF1118A-3.3V Iout=10mA 4.8V≤Vin≤12V		0.1	0.4	
Vdrop	Dropout voltage	Iout=0.1A		1.2	1.3	V
		Iout=0.8A		1.3	1.5	V
ΔVout	Load Regulation	AF1118A-ADJ Vin=2.75V,10mA≤Iout≤0.8A		10	32	mV
		AF1118A-1.8V Vin=3.3V,10mA≤Iout≤0.8A		10	32	
		AF1118A-3.3V Vin=4.8V,10mA≤Iout≤0.8A		10	32	
IQ	Quiescent Current	AF1118A-ADJ,Vin=12V		2	5	mA
		AF1118A-1.8V,Vin=12V		2	5	
		AF1118A-3.3V,Vin=12V		2	5	
PSRR	Power Supply Rejection Ratio	f=100Hz, Cout=104		-65		dB
		f=1KHz, Cout=104		-65		
		f=10KHz, Cout=104		-60		
Iadj	Adjust pin current	AF1118A-ADJ Vin=5V,10mA≤Iout≤0.8A		55	120	uA
Ichange	Change current	AF1118A-ADJ Vin=5V,10mA≤Iout≤0.8A		0.2	10	uA
Ilim	Output Limit Current	Vin-Vout=2V	0.8			A
Imin	Minimum load current	AF1118A-ADJ		2	10	mA
ΔV/ΔT	Temperature Coefficient	Iout =40mA		±100		ppm/℃

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 AF1118A-ADJ will lead to unstable or oscillation output.

➢ Block Diagram



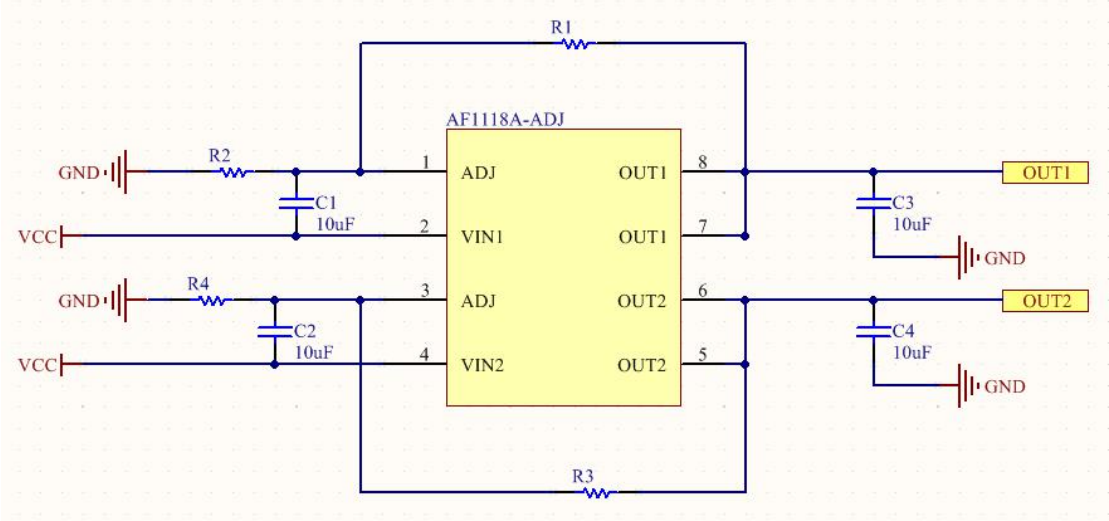
➢ Detailed Description

AF1118A is a series of low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules including start-up circuit, bias circuit, bandgap, thermal shutdown, current limit, power transistors and its driver circuit and so on.

The thermal shut down modules can assure chip and its application system working safety when the junction temperature is larger than 140°C.

The bandgap module provides stable reference voltage, whose temperature coefficient is compensated by careful design considerations. The temperature coefficient is under 100 ppm/°C. And the accuracy of output voltage is guaranteed by trimming technique.

AF1118A has an adjustable version and two fixed versions (1.8V, 3.3V)



Adjustable Output Voltage Version

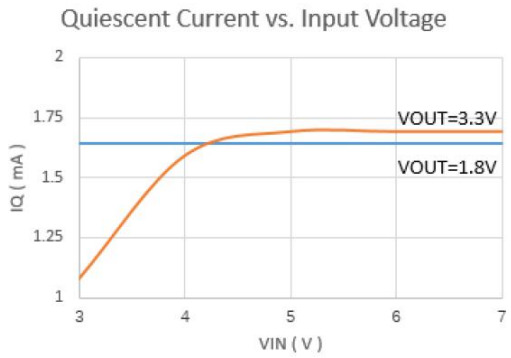
The output voltage of adjustable version follows the equation: $Vout=1.25\times(1+R2/R1)+I_{Adj}\times R2$.

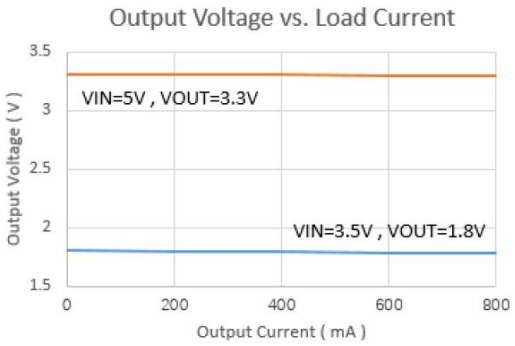
We can ignore I_{Adj} because I_{Adj} (about 50uA) is much less than the current of R1 (about 2~10mA).

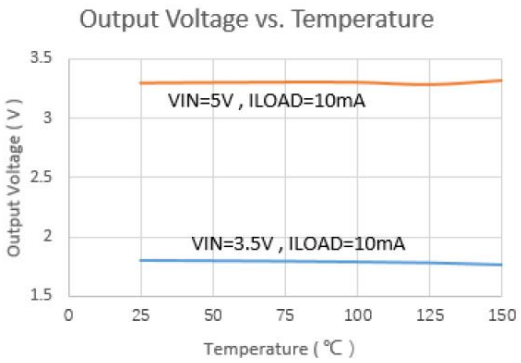
1) To meet the minimum load current (>10mA) requirement, R1 is recommended to be 125ohm or lower. As AF1118A-ADJ can keep itself stable at load current about 2mA, R1 is not allowed to be higher than 625ohm.

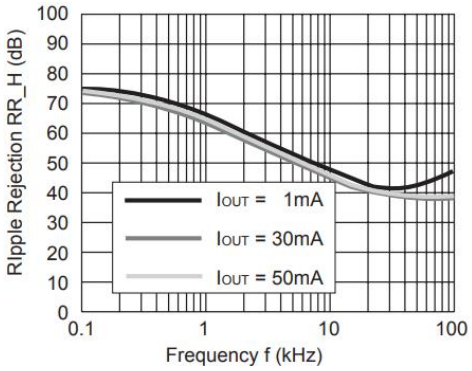
2) Using a bypass capacitor (C_{ADJ}) between the ADJ pin and ground can improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of C_{ADJ} should be less than R1 to prevent ripple from being amplified. As R1 is normally in the range of 100Ω~500Ω, the value of C_{ADJ} should satisfy this equation: $1/(2\pi\times fripple\times C_{ADJ})<R1$.

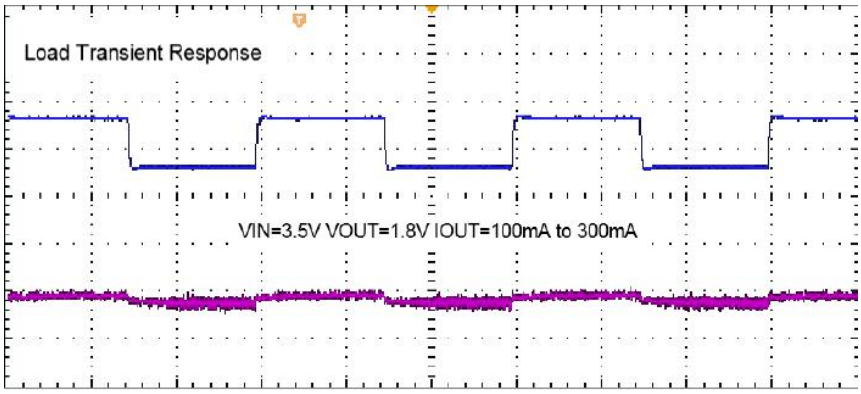
➢ **Typical Characteristics**(T_A=25℃ unless otherwise noted)

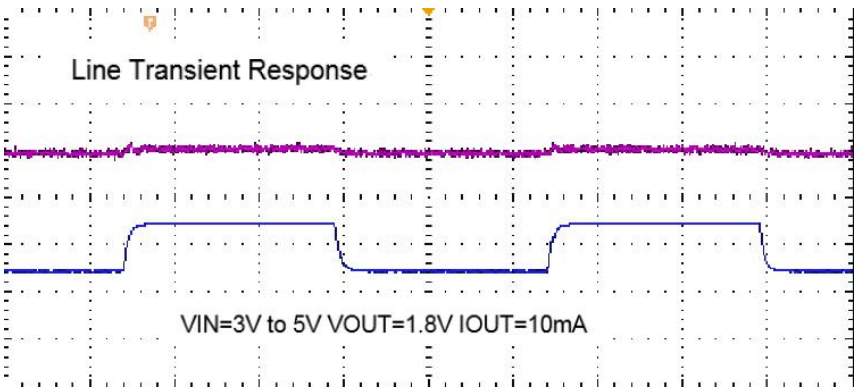




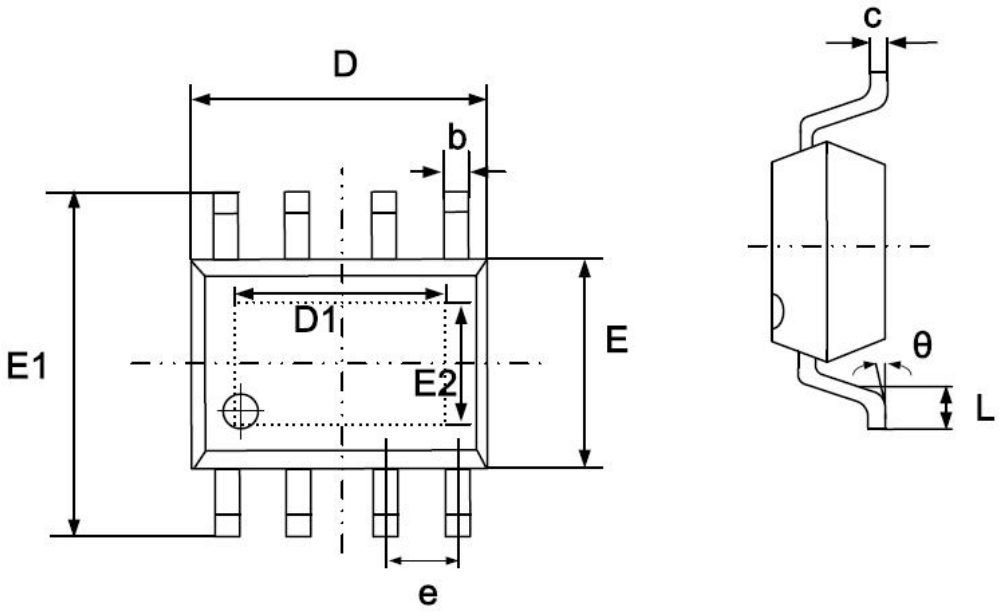


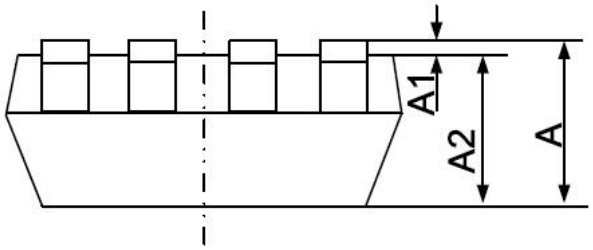






➢ Package Information





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0. 250	0.006	0.010
D	4.700	5.100	0.185	0.200
D1	3.100	3.500	0.122	0.137
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.200	2.600	0.086	0.102
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

➢ History Version

V1.0	Product datasheet	2019-04-15
V1.5	Update typical application diagram	2020-08-25