FAN1112

1A 1.2V Low Dropout Linear Regulator

Features

- Low dropout voltage
- Load regulation: 0.05% typical
- Trimmed current limit
- On-chip thermal limiting
- Standard SOT-223 and TO-252 packages
- Three-terminal fixed 1.2V

Applications

- Post regulator for switching supplies
- Supply for low-voltage processors

Description

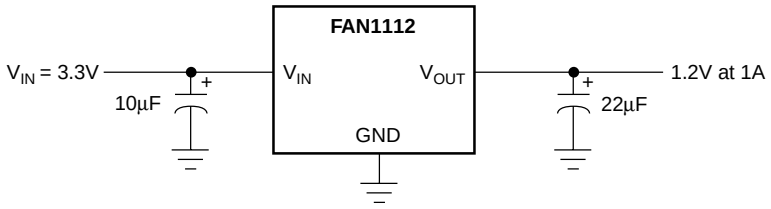
The FAN1112 is a 1.2V low dropout three-terminal regulator with 1A output current capability. The device has been optimized for low voltage where transient response and minimum input voltage are critical.

Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures.

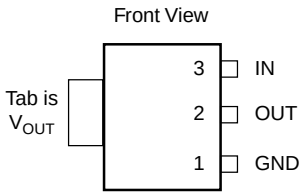
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the FAN1112 flows into the load, increasing efficiency.

The FAN1112 regulator is available in the industry-standard SOT-223 and TO-252 (DPAK) power packages.

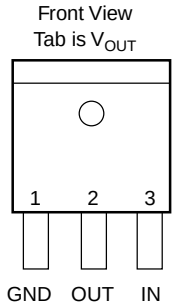
Typical Application



Pin Assignments



4-Lead Plastic SOT-223
Θ_{JC} = 15°C/W*



3-Lead Plastic TO-252
Θ_{JC} = 3°C/W*

*With package soldered to 0.5 square inch copper area over backside ground plane or internal power plane., Θ_{JA} can vary from 30°C/W to more than 50°C/W. Other mounting techniques may provide better thermal resistance than 30°C/W.

Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
V_{IN}		18	V
$(V_{IN} - V_{OUT}) * I_{OUT}$		See Figure 1	
Operating Junction Temperature Range	0	125	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (Soldering, 10 sec.)		300	°C

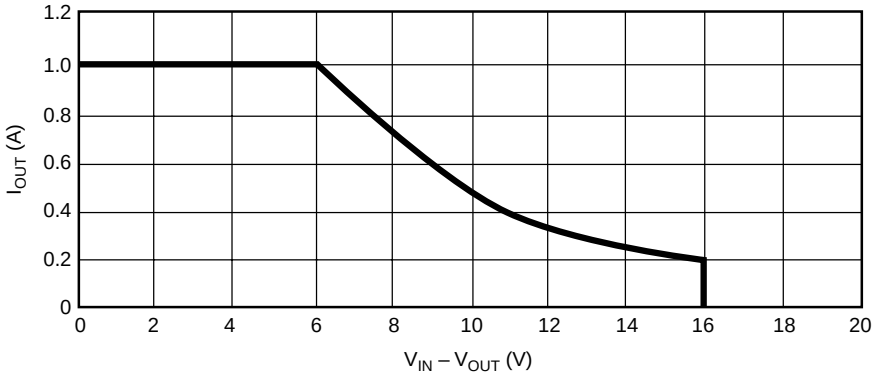


Figure 1. Absolute Maximum Safe Operating Area

Electrical Characteristics

Operating Conditions: $V_{IN} \leq 7V$, $T_J = 25°C$ unless otherwise specified.

The • denotes specifications which apply over the specified operating temperature range.

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage[3]	10mA ≤ I_{OUT} ≤ 1A FAN1112, 3.0V ≤ V_{IN} ≤ 7.2V	•	1.140	1.200	1.260	V
Line Regulation[1,2]	3.0V ≤ V_{IN} ≤ 12V, I_{OUT} = 10mA	•		0.005	0.2	%
Load Regulation[1,2]	(V_{IN} – V_{OUT}) = 2V, 10mA ≤ I_{OUT} ≤ 1A	•		0.05	0.5	%
Dropout Voltage	ΔV_{REF} = 1%, I_{OUT} = 1A	•		1.100	1.200	V
Current Limit	(V_{IN} – V_{OUT}) = 2V	•	1.1	1.5		A
GND Pin Current		•		35	120	µA
GND Pin Current Change	3.0V ≤ V_{IN} ≤ 7V, 10mA ≤ I_{OUT} ≤ 1A	•		0.2	5	µA
Minimum Load Current	3.0V ≤ V_{IN} ≤ 15V	•	10			mA
Quiescent Current	V_{IN} = 7V	•		4	13	mA
Ripple Rejection	f = 120Hz, C_{OUT} = 22µF Tantalum, (V_{IN} – V_{OUT}) = 3V, I_{OUT} = 1A		60	72		dB
Thermal Regulation	T_A = 25°C, 30ms pulse			0.004	0.02	%/W
Temperature Stability		•		0.5		%
Long-Term Stability	T_A = 125°C, 1000hrs.			0.03	1.0	%
RMS Output Noise (% of V_{OUT})	T_A = 25°C, 10Hz ≤ f ≤ 10kHz			0.003		%
Thermal Resistance, Junction to Case	SOT-223			15		°C/W
	TO-252			3		°C/W
Thermal Shutdown	Junction Temperature			155		°C
Thermal Shutdown Hysteresis				10		°C

Notes:

1. See thermal regulation specifications for changes in output voltage due to heating effects. Load and line regulation are measured at a constant junction temperature by low duty cycle pulse testing.
2. Line and load regulation are guaranteed up to the maximum power dissipation (18W). Power dissipation is determined by input/output differential and the output current. Guaranteed maximum output power will not be available over the full input/output voltage range.
3. Output current must be limited to meet the absolute maximum ratings of the part.

Typical Performance Characteristics

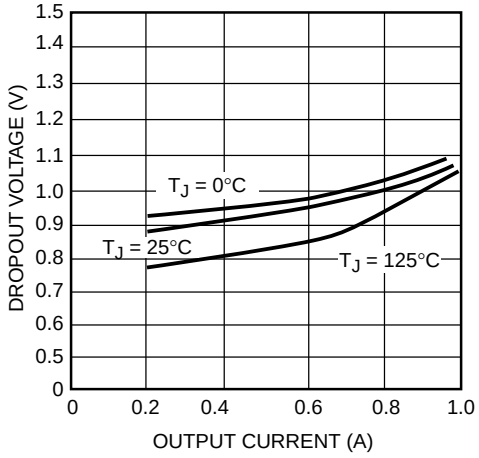


Figure 2. Dropout Voltage vs. Output Current

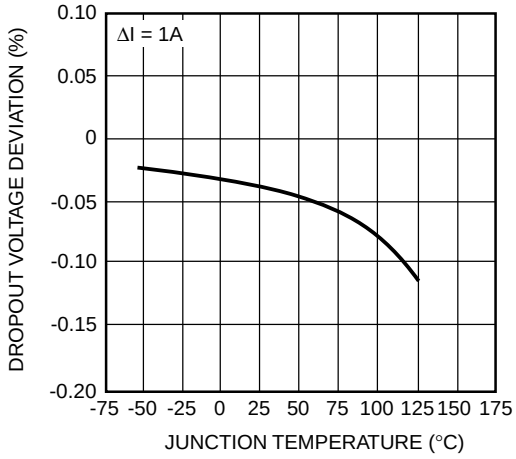


Figure 3. Load Regulation vs. Temperature

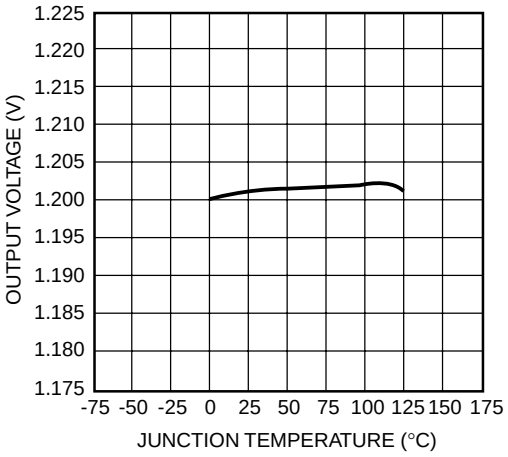


Figure 4. Reference Voltage vs. Temperature

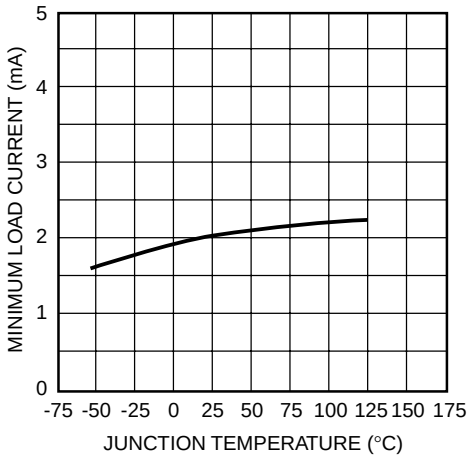


Figure 5. Minimum Load Current vs. Temperature

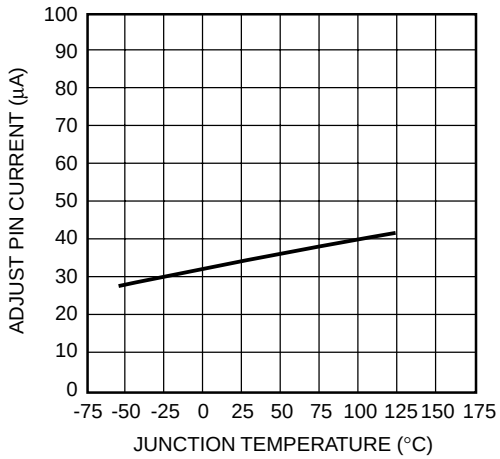


Figure 6. GND Pin Current vs. Temperature

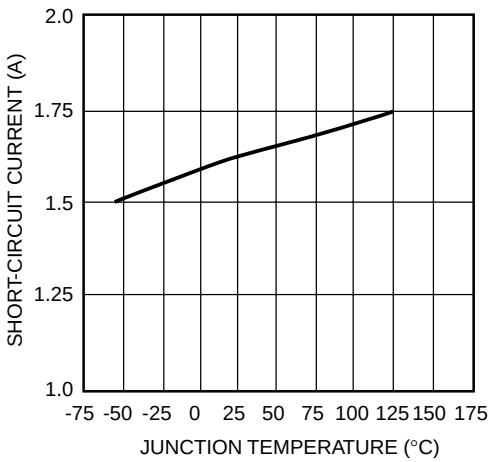


Figure 7. Short-Circuit Current vs. Temperature

Typical Performance Characteristics (continued)

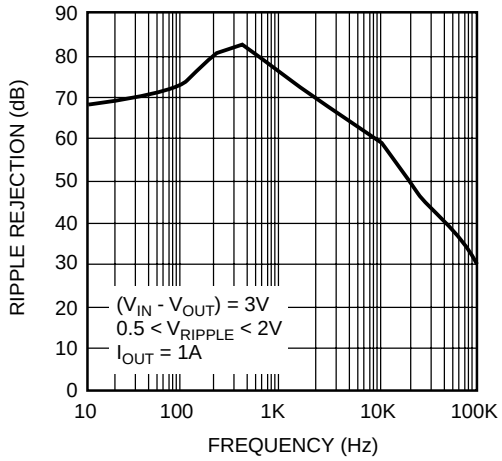


Figure 8. Ripple Rejection vs. Frequency

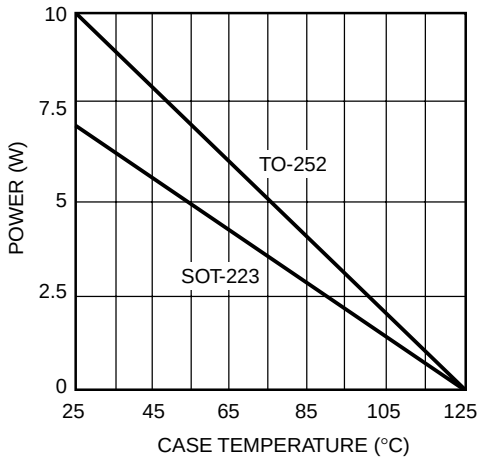
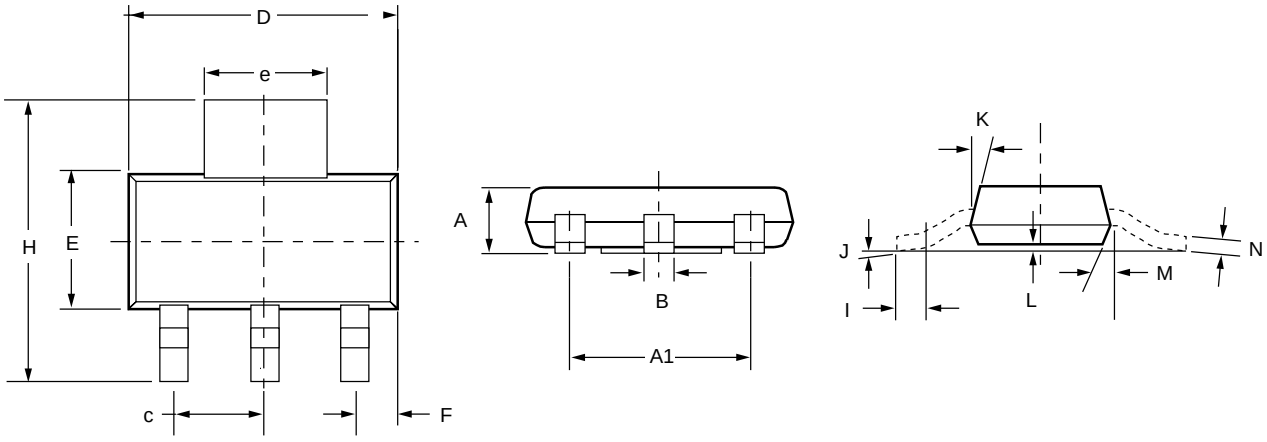


Figure 9. Maximum Power Dissipation

Mechanical Dimensions

4-Lead SOT-223 Package

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	—	.071	—	1.80	
A1	—	.181	—	4.80	
B	.025	.033	.640	.840	
c	—	.090	—	2.29	
D	.248	.264	6.30	6.71	
E	.130	.148	3.30	3.71	
e	.115	.124	2.95	3.15	
F	.033	.041	.840	1.04	
H	.264	.287	6.71	7.29	
I	.012	—	.310	—	
J	—	10°	—	10°	
K	10°	16°	10°	16°	
L	.0008	.0040	.0203	.1018	
M	10°	16°	10°	16°	
N	.010	.014	.250	.360	



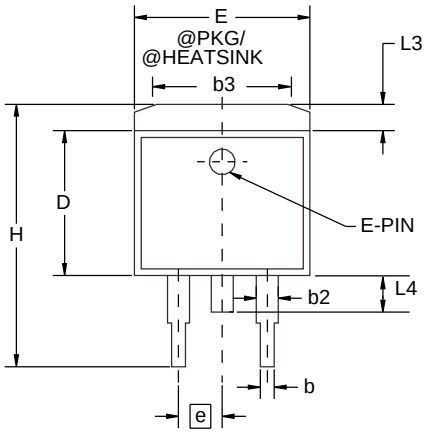
Mechanical Dimensions (continued)

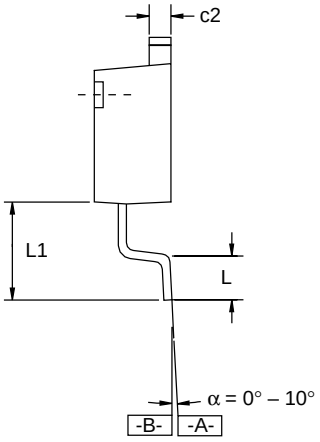
3-Lead TO-252 Package

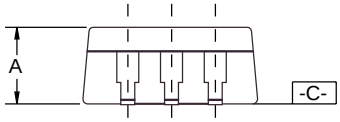
Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.086	.094	2.19	2.39	
b	.025	.035	0.64	0.89	
b2	.030	.045	0.76	1.14	
b3	.205	.215	5.21	5.46	4
c	.018	.024	0.46	0.61	
c2	.018	.023	0.46	0.58	
D	.210	.245	5.33	6.22	1
E	.250	.265	6.35	6.73	1
e	.090 BSC		2.29 BSC		
H	.370	.410	9.40	10.41	
L	.055	.070	1.40	1.78	3
L1	.108 REF		2.74 REF		
L3	.035	.080	0.89	2.03	4
L4	.025	.040	0.64	1.02	

Notes:

1. Dimensions are exclusive of mold flash, metal burrs or interlead protrusion.
2. Stand off-height is measured from lead tip with ref. to Datum -B-.
3. Foot length is measured with ref. to Datum -A- with lead surface.
4. Thermal pad contour optional within dimension b3 and L3.
5. Formed leads to be planar with respect to one another at seating place -C-.
6. Dimensions and tolerances per ASME Y14.5M-1994.







Ordering Information

Product Number	Package
FAN1112D	TO-252
FAN1112S	SOT-223

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