GS1117A

1A Low Dropout Voltage Regulator

Product Description

The GS1117A is a low dropout three-terminal regulator with 1A output current capability. In order to obtain lower dropout voltage and fast transient response , which is critical for low voltage applications.

The GS1117A has been optimized. The device is available in an adjustable version and fixed output voltage of 1.2V, 1.5V, 1.8V, 2.5V, 3.3V and 5V. Dropout voltage is guaranteed at a maximum of 1.3V at 1A.

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 that would create excessive junction temperatures.

The GS1117A is available in the three leads SOT-89, SOT-223 and TO-252 surface mount packages.

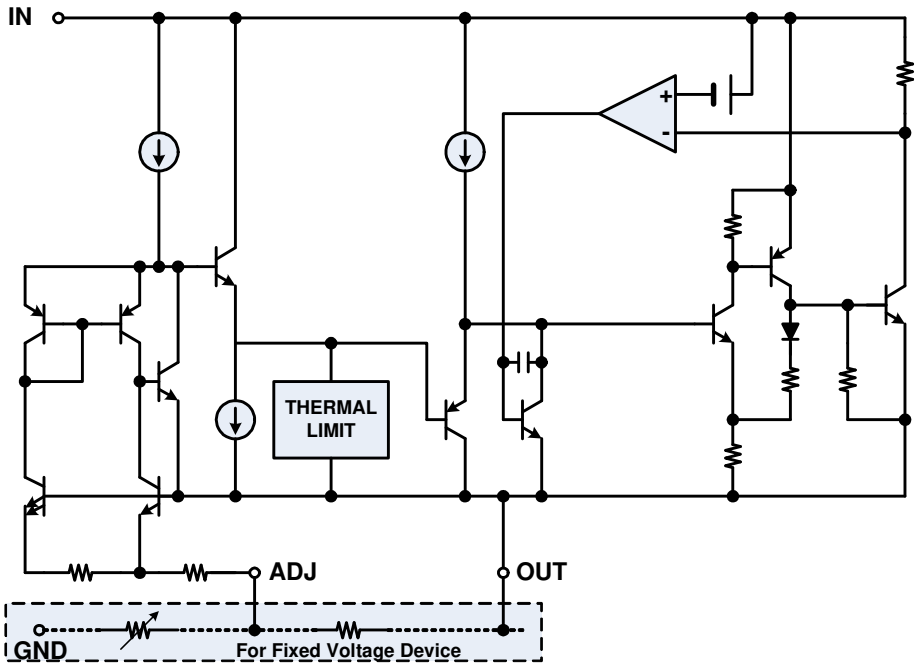
Features

- Adjustable or Fixed Output
- Current Limit and Thermal Protection
- Low ESR MLCC at Input/ Output Capacitors
- Output Current of 1A
- 1.3V Dropout Voltage
- Line Regulation typically at 0.2% Max.
- Load Regulation typically at 0.4% Max.
- RoHS Compliant, 100%Pb & Halogen Free

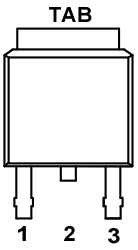
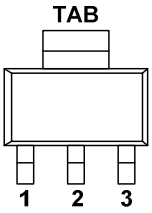
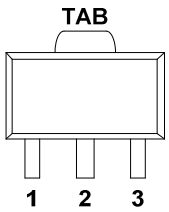
Applications

- Battery-Power Circuitry
- Post Regulator for Switching Power Supply
- Low Voltage Logic Suppliers

Block Diagram

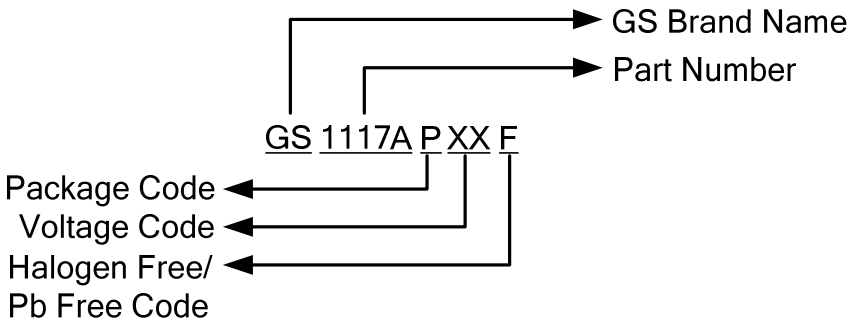


Packages & Pin Assignments

TO-252	SOT-223	SOT-89
		

Pin	GS1117AD	Pin	GS1117AX	Pin	GS1117AY
1	GND/ADJ	1	GND/ADJ	1	GND/ADJ
2	V_{OUT}	2	V_{OUT}	2	V_{OUT}
3	V_{IN}	3	V_{IN}	3	V_{IN}

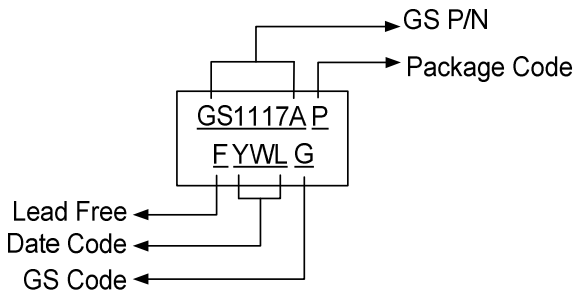
Ordering Information

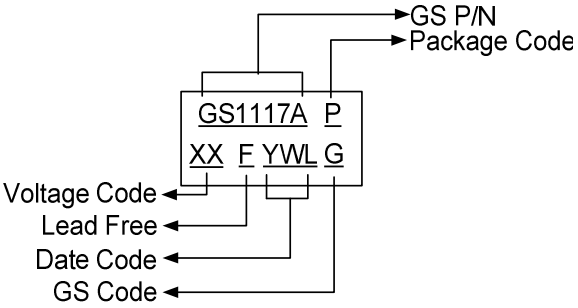


GS1117A			
TO-252	SOT-223	SOT-89	Output
GS1117ADF	GS1117AXF	GS1117AYF	ADJ
GS1117AD12F	GS1117AX12F	GS1117AY12F	1.2V
GS1117AD15F	GS1117AX15F	GS1117AY15F	1.5V
GS1117AD18F	GS1117AX18F	GS1117AY18F	1.8V
GS1117AD25F	GS1117AX25F	GS1117AY25F	2.5V
GS1117AD33F	GS1117AX33F	GS1117AY33F	3.3V
GS1117AD50F	GS1117AX50F	GS1117AY50F	5.0V

Note:
*GS1117AXF, X means package type and F means Lead Free part.
*For other voltages, please contact factory.
*Adjustable Version does not need Voltage Code.

Marking Information





Absolute Maximum Ratings

Symbol	Parameter	Maximum		Unit
V_{IN}	Input Voltage	18		V
T_J	Junction Temperature	150		ºC
T_{STG}	Storage temperature Range	-65 to 150		ºC
T_{LEAD}	Lead Temperature (Soldering, 10 sec)	300		ºC
θ_{JA}	Thermal Resistance Junction to Ambient	SOT-223 SOT-89 TO-252	135 175 68	ºC/W
θ_{JC}	Thermal Resistance Junction to Case	SOT-223 SOT-89 TO-252	19 100 7.5	ºC/W
P_D	Power Dissipation	SOT-223 SOT-89 TO-252	0.9 0.5 1.2	W

Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied.
Exposure to Absolute Maximum Ratings conditions for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter Name	Min.	Max.	Unit
Input Voltage Range		15	V
Environment Temperature	-40	125	°C

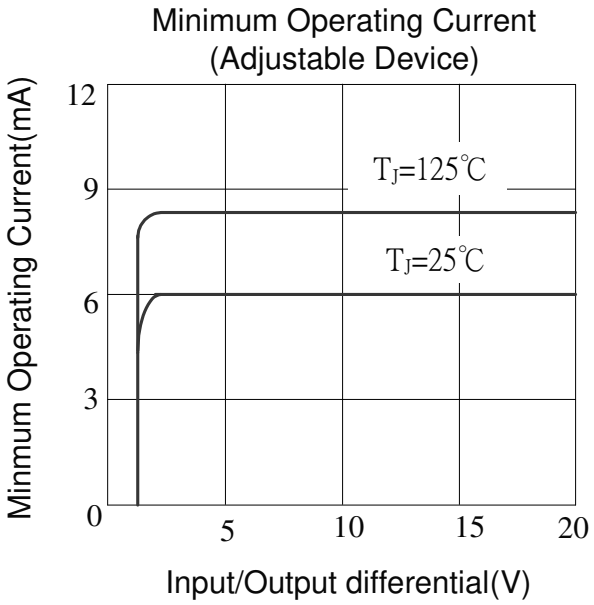
Electrical Characteristics

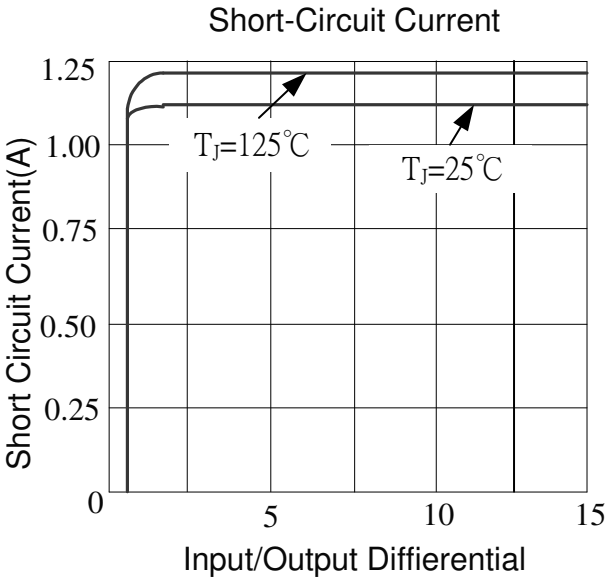
I_{OUT}=0mA,and T_J=+25 ºC unless otherwise specified.

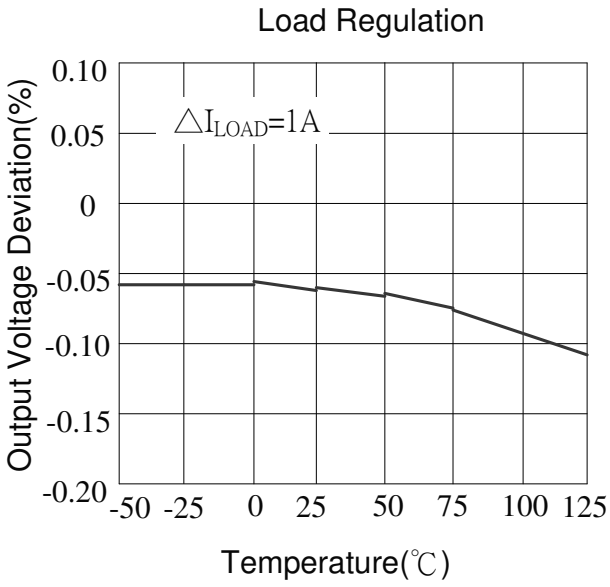
Parameter	Device	Conditions	MIN	TYP	MAX	Unit
Reference Voltage (Note)	GS1117A-Adj	V_{IN} =2.75V, I_{LOAD} =10mA	1.238	1.250	1.262	V
		*V_{IN} =2.7V to 12V, I_{LOAD} =10mA to 1A	1.225	1.250	1.275	
Output Voltage	GS1117A-1.2	V_{IN} =3.7V	1.176	1.200	1.224	V
		*V_{IN} =3.0V, I_{LOAD} =10mA to 1A	1.140	1.200	1.248	V
	GS1117A-1.5	V_{IN} =4.0V	1.485	1.500	1.515	V
		*V_{IN} =3.0V, I_{LOAD} =10mA to 1A	1.476	1.500	1.524	V
	GS1117A-1.8	V_{IN} =4.3V	1.782	1.800	1.818	V
		*V_{IN} =3.3V, I_{LOAD} =10mA to 1A	1.771	1.800	1.829	V
	GS1117A-2.5	V_{IN} =5.0V	2.475	2.500	2.525	V
		*V_{IN} =4.0V, I_{LOAD} =10mA to 1A	2.460	2.500	2.540	V
	GS1117A-3.3	V_{IN} =5.8V	3.267	3.300	3.333	V
		*V_{IN} =4.8V, I_{LOAD} =10mA to 1A	3.247	3.300	3.353	V
	GS1117A-5.0	V_{IN} =7.5V	4.950	5.000	5.050	V
		*V_{IN} =6.5V, I_{LOAD} =10mA to 1A	4.900	5.000	5.100	V
Line Regulation (Note1)	GS1117A-1.2	*I_{LOAD} =10mA, 3.0V ≤ V_{IN} ≤ 12V		10	15	mV
	All	*I_{LOAD} =10mA, (1.5V+V_{OUT}) ≤ V_{IN} ≤ 12V		0.04	0.2	%
Load Regulation (Note1)	GS1117A-1.2	V_{IN}=3.0V, 0 ≤ I_{OUT} ≤ 1A		8	20	mV
	All	*V_{IN} = V_{OUT}+1.5V, I_{LOAD} =10mA to 1A		0.2	0.4	%
Minimum Load Current	GS1117A-Adj	*V_{IN} =5V, V_{ADJ} =0V		3	7	mA
Ground Pin Current	GS1117A-XX	*V_{IN} = V_{OUT}+1.5V, I_{LOAD} =10mA to 1A		7	13	mA
Adjust Pin Current	GS1117A-Adj	*V_{IN} =2.65V to 12V, I_{LOAD} =10mA		55	90	μA
Current Limit	All	*V_{IN}- V_{OUT}=1.5V	1			A
Ripple Rejection (Note 2)	All	V_{IN} = V_{OUT}+1.5V,	60	72		dB
Dropout Voltage (Note 1,3)	All	I_{LOAD} =10mA		1.00	1.15	V
		*V_{IN} ≥ 2.65V, I_{LOAD} =1A		1.15	1.3	V
Temperature Coefficient	All	*V_{IN} =V_{OUT}=1.5V, I_{LOAD} =10mA		0.005		%/ºC
OTP			130	150	170	ºC

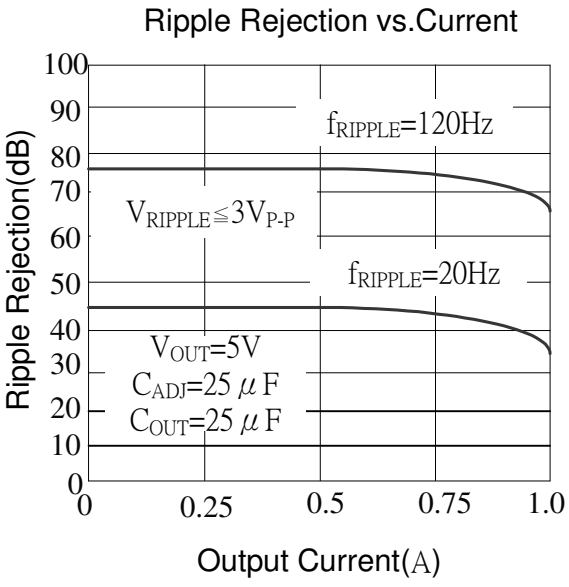
The * denotes the specifications which apply over the full temperature range.
Note 1: Low duty pulse testing with Kelvin connections required.
Note 2: 120Hz input ripple (C_{ADJ} for ADJ=25μF)
Note 3: ΔV_{OUT}, ΔV_{REF}=1%

Typical Performance Characteristics









Typical Applications

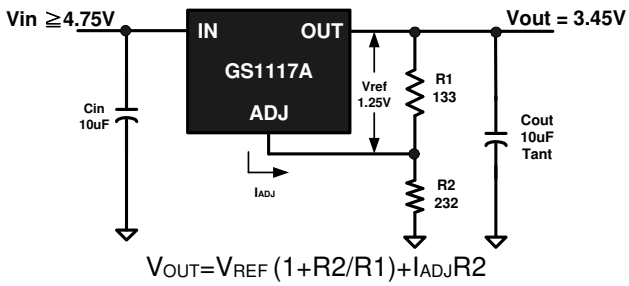


Figure 1. Adjustable Voltage Regulator

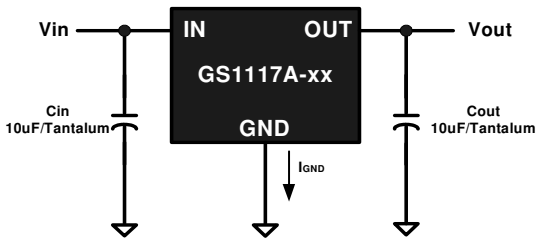


Figure 2. Fixed Voltage Regulator

Application Hints (Continues)

The ripple of the output Capacitors is a MLCC Test condition:V_{IN}=5V,V_{OUT}=3.3V,C_{IN}=1uF(Ceramic,X7R,6.3V,0603),CH1:V_{OUT}.CH4:I_{OUT}

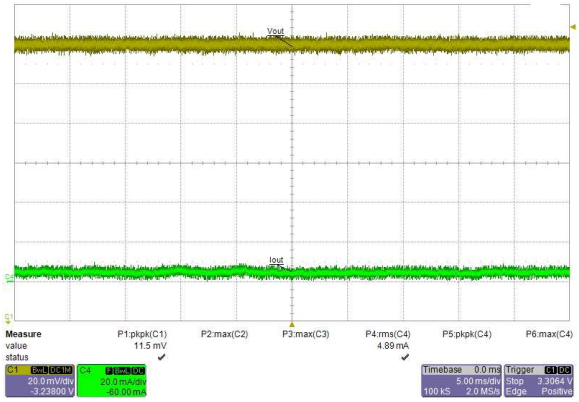


Fig 1. I_{OUT} = 10mA

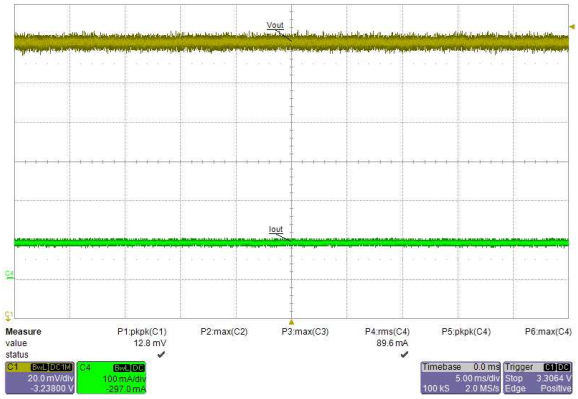


Fig 2. Iout = 100mA

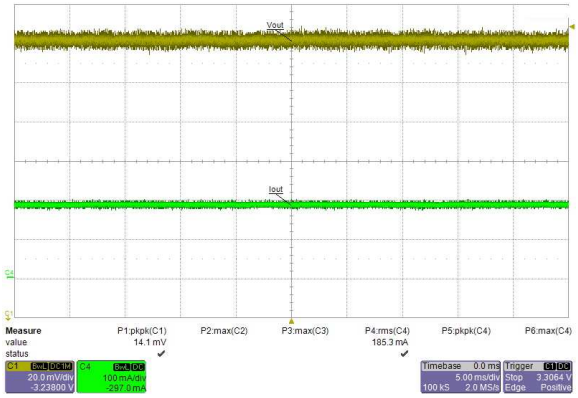


Fig 3. I_{OUT} = 200mA

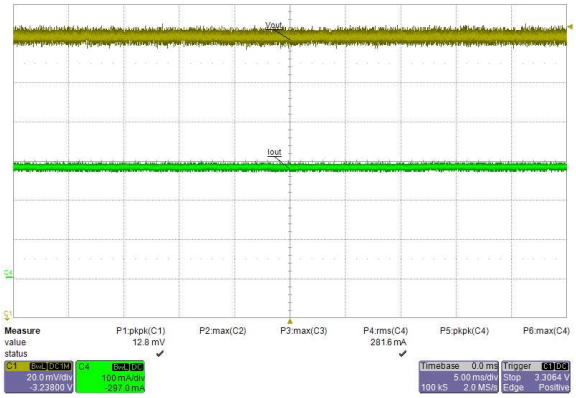


Fig 4. I_{OUT} = 300mA

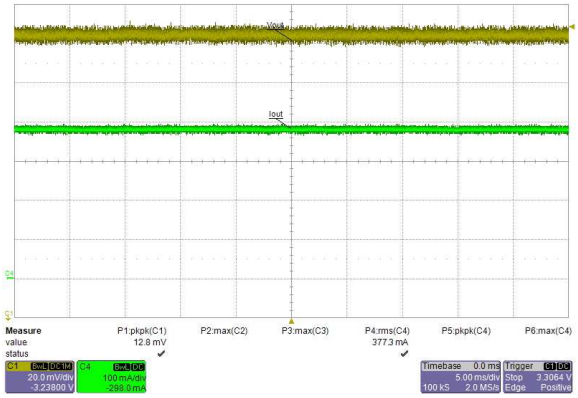


Fig 5. I_{OUT} = 400mA

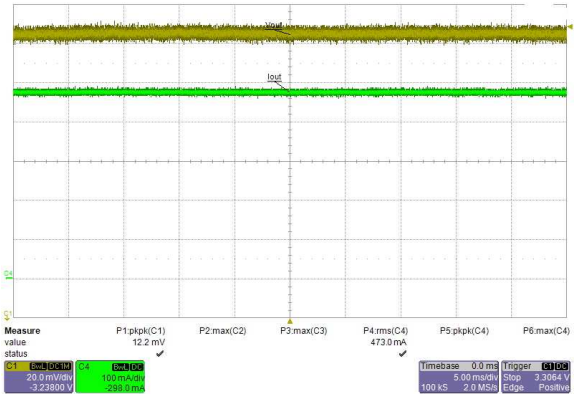


Fig 6. I_{OUT} = 500mA

Application Hints (Continues)

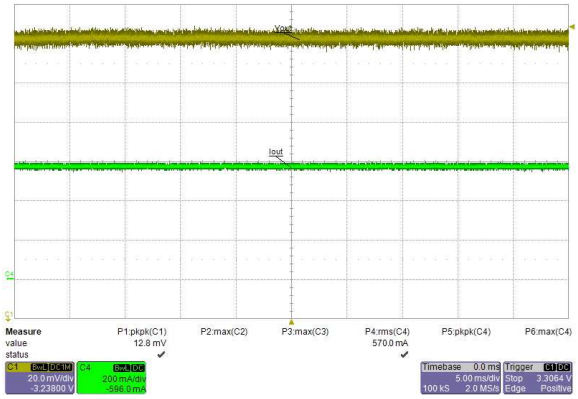


Fig 7. I_{OUT} = 600mA

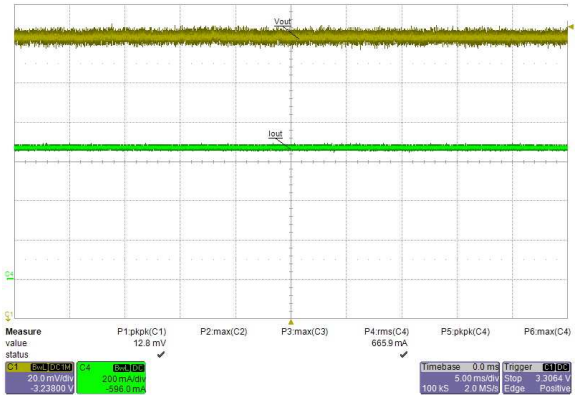


Fig 8. I_{OUT} = 700mA

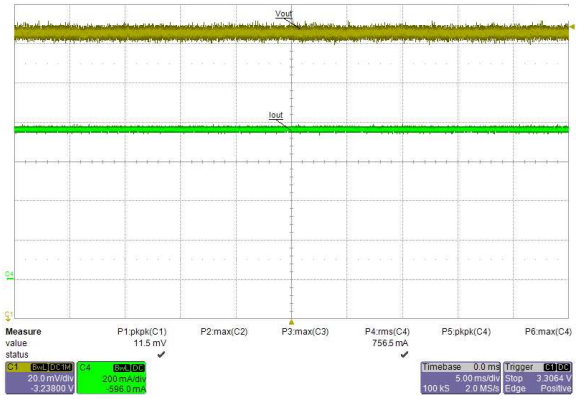


Fig 9. I_{OUT} = 800mA

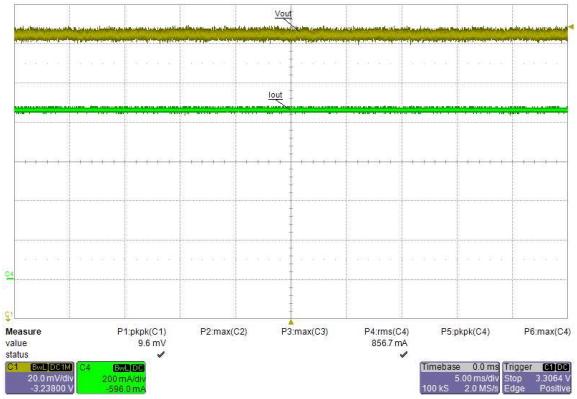


Fig 10. I_{OUT} = 900mA

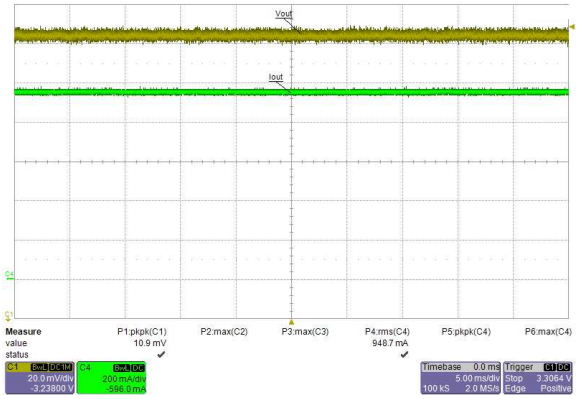
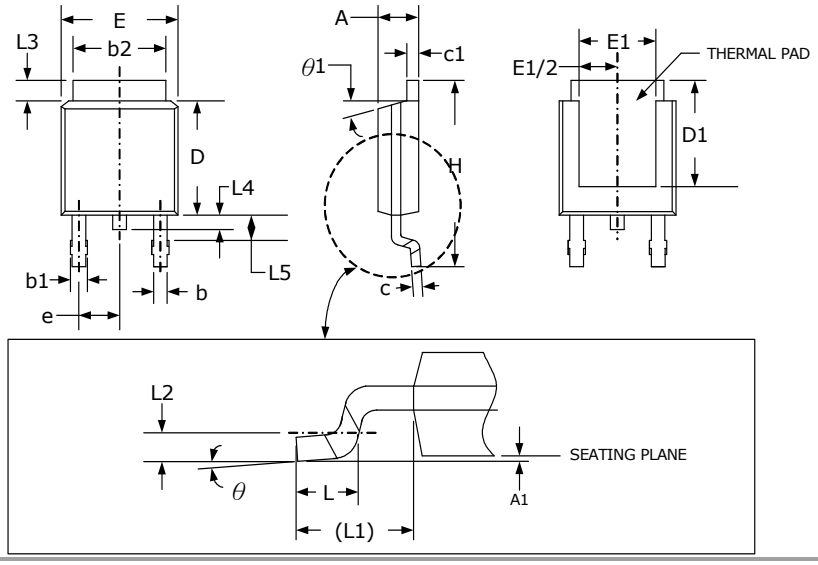


Fig 11. I_{OUT} = 1A

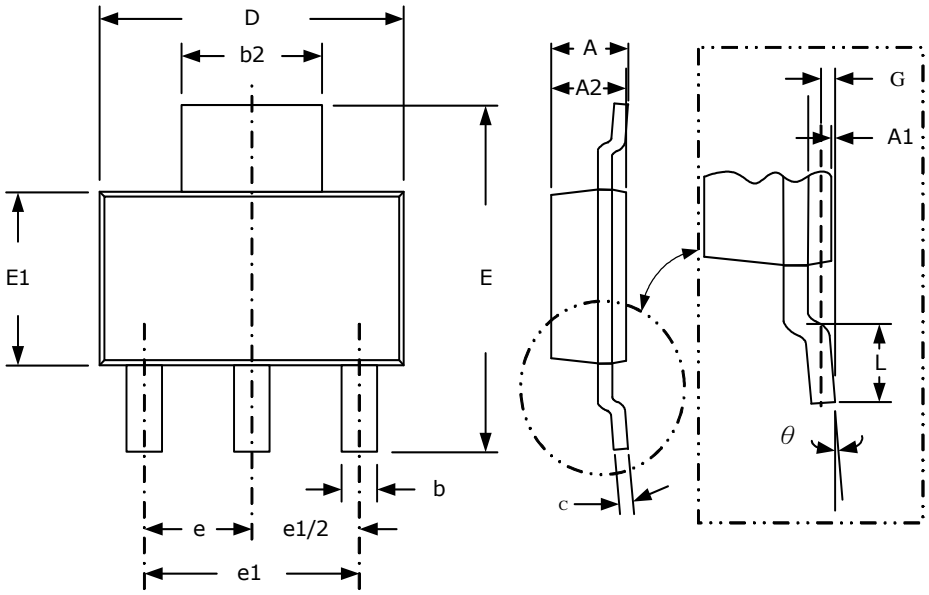
Package Dimension

TO-252



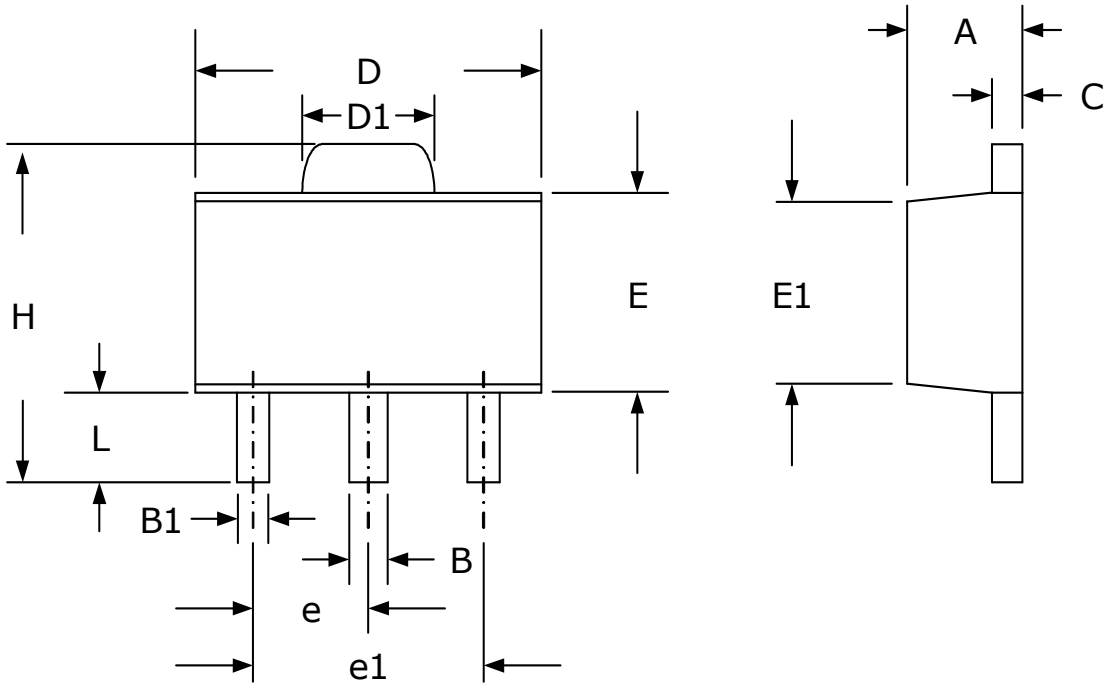
Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.18	2.39	.086	.094
A1	-	0.13	-	.005
b	0.64	0.89	.025	.035
b1	0.76	1.14	.030	.045
b2	4.95	5.46	.195	.215
C	0.46	0.61	.018	.024
C1	0.46	0.89	.018	.035
D	5.97	6.22	.235	.245
D1	5.21	-	.205	-
E	6.35	6.73	.250	.265
E1	4.32	-	.170	-
e	2.29 (TYP)		.090 (TYP)	
H	9.40	10.41	.370	.410
L	1.40	1.78	.055	.070
L1	2.74 (TYP)		.108 (TYP)	
L2	0.51 (TYP)		.020 (TYP)	
L3	0.89	1.27	.035	.050
L4	-	1.02	-	.040
L5	1.14	1.52	.045	.060
θ	0°	10°	0°	10°
θ1	0°	15°	0°	15°

SOT-223



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	-	1.80	-	.071
A1	0.02	0.10	.001	.004
A2	1.55	1.65	.061	.065
b	0.66	0.84	.026	.033
b2	2.90	3.10	.114	.122
c	0.23	0.33	.009	.013
D	6.30	6.70	.248	.264
E	6.70	7.30	.264	.288
E1	3.30	3.70	.130	.146
e	2.30 (TYP)		.091 (TYP)	
e1	4.60 (TYP)		.181 (TYP)	
L	0.90	-	.035	-
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

SOT-89



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.40	1.60	.055	.063
B	0.44	0.56	.017	.022
B1	0.36	0.48	.014	.019
C	0.35	0.44	.014	.017
D	4.40	4.60	.173	.181
D1	1.62	1.83	.064	.072
E	2.29	2.60	.090	.102
E1	2.13	2.29	.084	.090
e	1.50 (TYP)		.059 (TYP)	
e1	3.00 (TYP)		.118 (TYP)	
H	3.94	4.25	.155	.167
L	0.89	1.20	.035	.047

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