3.3V 2A Low-Dropout Regulator with Disable

Features

- **Dropout-voltage 0.5V @ I_o = 2A**
- **Output current in excess of 2A**
- **Output voltage accuracy ±2.5%**
- **Quiescent current typically 5mA**
- **Internal short-circuit current limit**
- **Internal over-temperature protection**
- **TO-220 4pin Full-Mold package**
- **ON/OFF control**

General Description

The SS8046 positive 3.3V voltage regulator features the ability to source 2A of output current. The dropout voltage is 0.5V at 2A output current. The typical quiescent current is 5mA. Furthermore, the quiescent current is smaller when the regulator is in the dropout mode (V_{IN} < 3.3V).

Familiar regulator features such as over-temperature and over-current protection circuits are provided to prevent the device from being damaged by abnormal operating conditions. A V_{dis} pin is provided to disable the output when needed.

Ordering Information

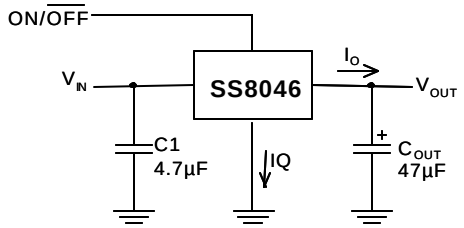
SS8046XX1TB

- Packing type
  - TB: Tubes
- Package Type
  - TF : TO 220F-4L (short lead)
  - TH : TO 220F-4L (long lead)

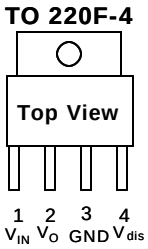
Example: SS8046TF1TB

→ SS8046 in TO 220F-4L (short lead) shipped in tubes

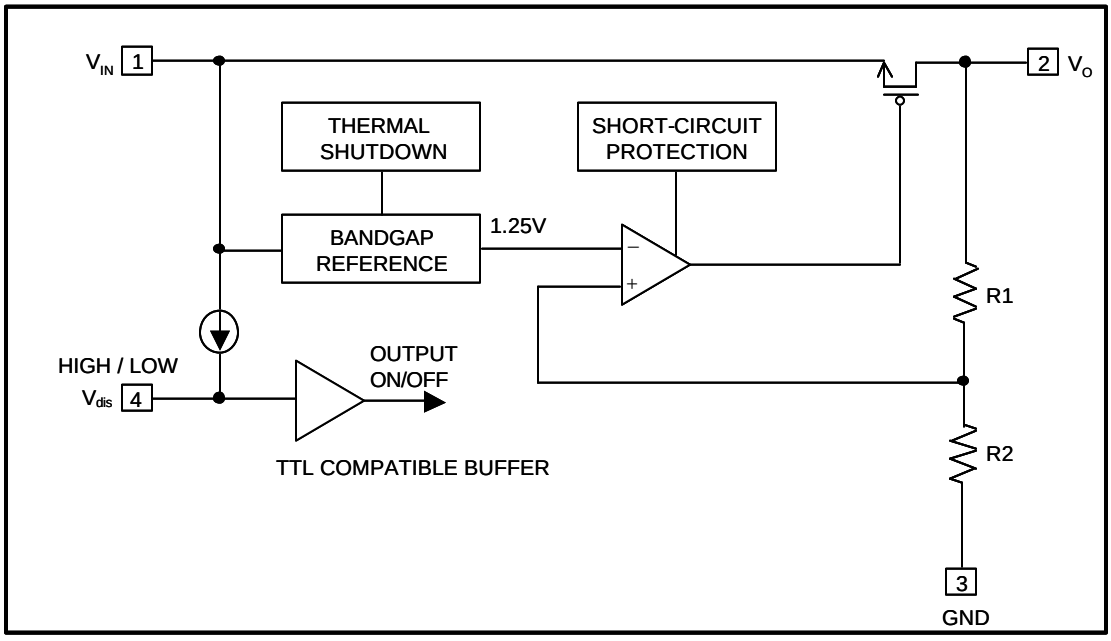
Typical Application



Pin Configuration



Block Diagram



Absolute Maximum Ratings (Note 1)

Input Voltage.....8V
V_{dis} Voltage.....8V
Power Dissipation Internally Limited (Note 2)
Maximum Junction Temperature.....150°C
Storage Temperature Range.....-65°C ≤ T_J ≤+150°C
Lead Temperature, Time for Wave Soldering
TO 220 Package.....260°C, 10s
Continuous Power Dissipation (T_A = +25°C)
TO 220 No heatsink.....1.5W
TO 220 with infinite heatsink.....15W

Operating Conditions (Note 1)

Input Voltage.....3.6V~7V
Temperature Range.....-20°C ≤ T_A ≤85°C

Electrical Characteristics

V_{IN} =5V, I_O = 0.5A, C_{IN} = 4.7µF, C_{OUT} =47µF, T_A = T_J = 25°C unless otherwise specified [Note 3]

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage		I_O =0.5A	3.22	3.3	3.38	V
Line Regulation		4V ≤ V_{IN} ≤ 7V, I_O = 10mA		0.5	2	%
Load Regulation		50mA ≤ I_O ≤ 2A		0.5	2	%
Quiescent Current		V_{IN} = 5V		5	10	mA
Ripple Rejection		fi = 120Hz, 1VP-P, I_O = 100mA		45		dB
Dropout Voltage		I_O = 2A			0.5	V
Short Circuit Current				3.8		A
Over Temperature				150		°C
Disable Voltage High	V_{disH}	Output Active	2.0			V
Disable Voltage Low	V_{disL}	Output Disabled			0.8	V
Disable Bias Current High	I_{disH}	V_{dis} = 2.7V			20	µA
Disable Bias Current Low	I_{disL}	V_{dis} = 0.4V			20	µA

Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Conditions are conditions under which the device functions but the specifications might not be guaranteed. For guaranteed specifications and test conditions see the Electrical Characteristics.

Note 2: The maximum power dissipation is a function of the maximum junction temperature, T_{Jmax}, total thermal resistance, θ_{JA}, and ambient temperature T_A. The maximum allowable power dissipation at any ambient temperature is T_{jmax}-T_A / θ_{JA}. If this dissipation is exceeded, the die temperature will rise above 150°C and the device will go into thermal shutdown. For the TO 220 package, θ_{JA} is 60°C/W (No heat sink).

Note3: Low duty pulse techniques are used during test to maintain junction temperature as close to ambient as possible.

Note4: The output capacitor should be a tantalum or aluminum type.

Definitions

Dropout Voltage

The input/output voltage differential at which the regulator output no longer maintains regulation against further reductions in input voltage. Measured when the output drops 2% below its nominal value, dropout voltage is affected by junction temperature, load current and minimum input supply requirements.

Line Regulation

The change in output voltage for a change in input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

Load Regulation

The change in output voltage for a change in load current at constant chip temperature. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

Maximum Power Dissipation

The maximum total device dissipation for which the regulator will operate within specifications.

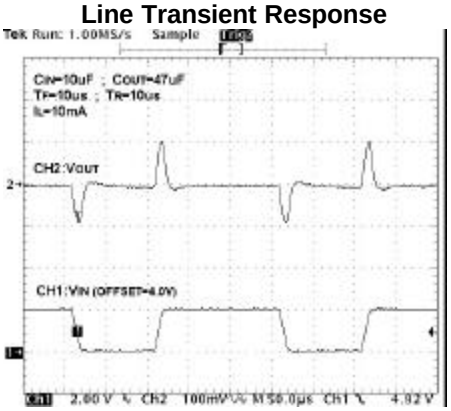
Quiescent Bias Current

Current which is used to operate the regulator chip and is not delivered to the load.

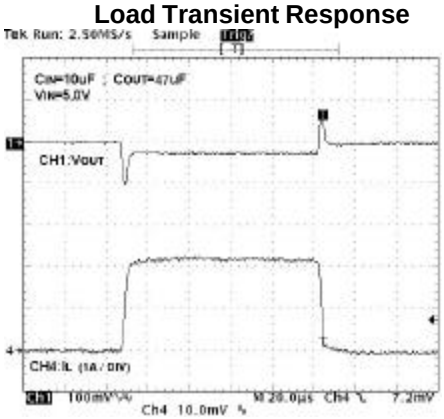
Typical Performance Characteristics

(V_{IN}=5V, C_{IN}=10µF, C_{OUT} =47µF, T_A=25°C, unless otherwise noted.)

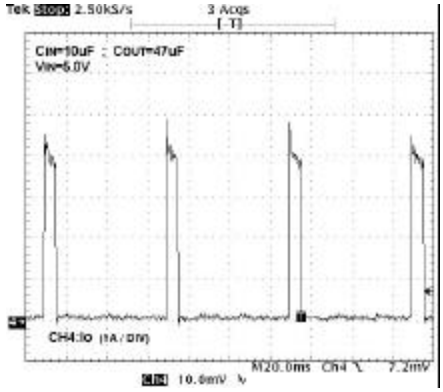
Line Transient Response



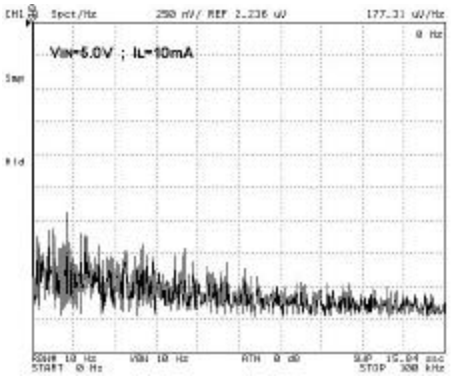
Load Transient Response



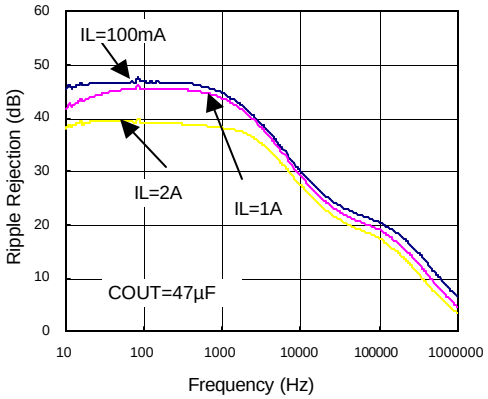
Short Circuit-Current



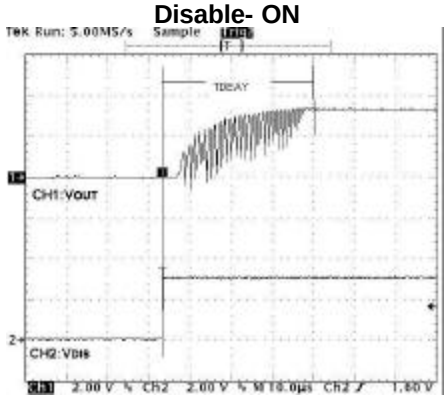
Output Noise



Ripple Rejection

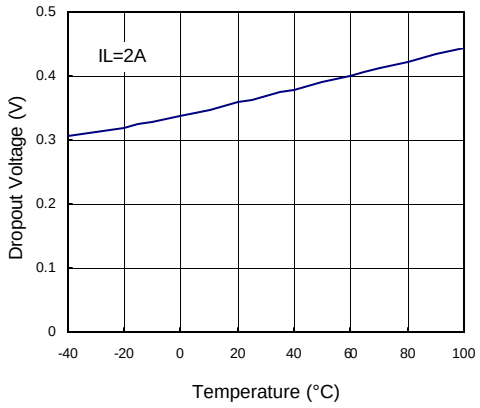


Disable- ON

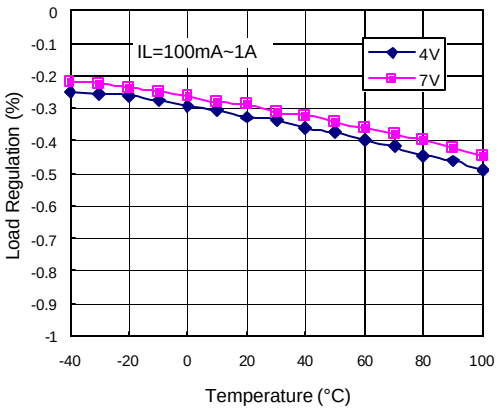


Typical Performance Characteristics (continued)

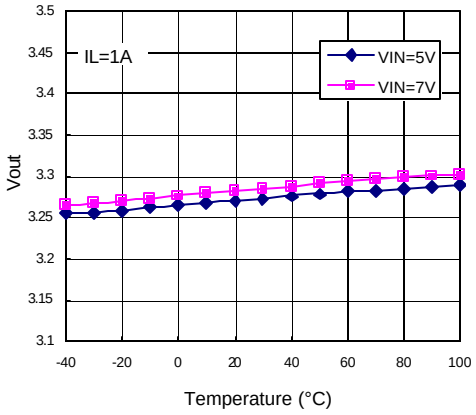
Dropout Voltage vs. Temperature



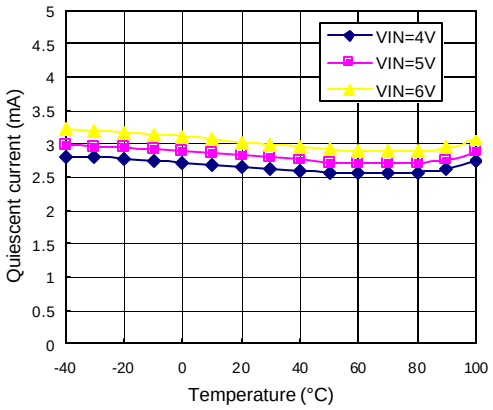
Load Regulation



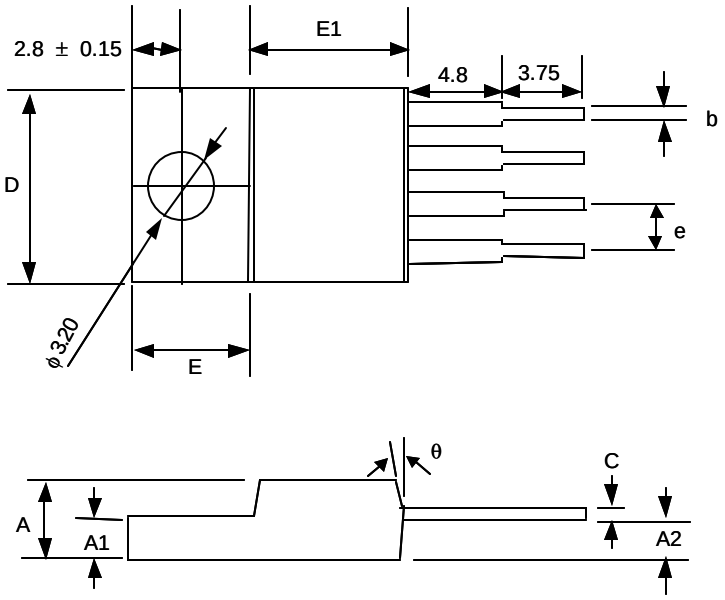
Output Voltage vs. Temperature



Quiescent Current vs. Temperature



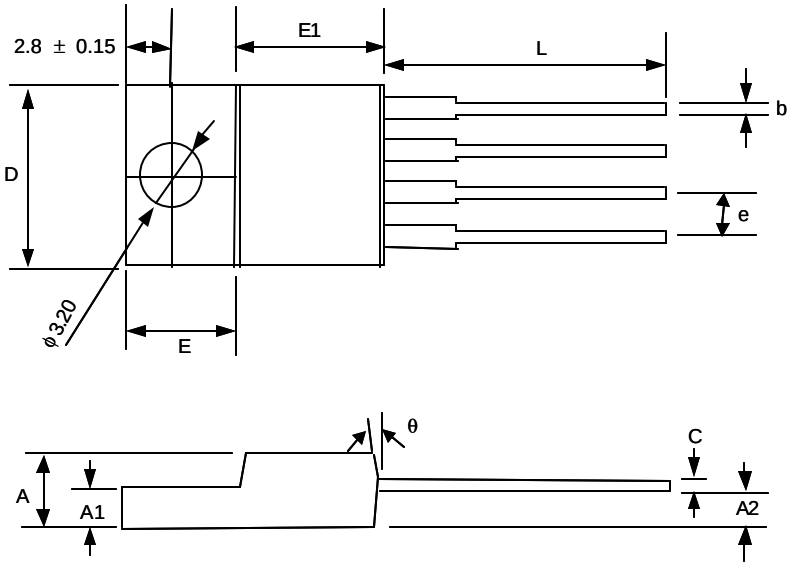
Package Outlines



TO 220F-4 Package (short lead)

Note:
1. Lead frame material: TAMAC-4
2. Solder plating thickness: 10±5μm
3. Package body size include mold flash and gate burr
4. Tolerance±0.1mm unless otherwise specified
5. End flash Max. 0.05mm
6. Mismatch Max. 0.05mm
7. Misalignment Max. 0.05mm
8. Epoxy molding compound: SUMITOMO 6300H or equivalent
9. Matte finish Ra: 0.2μm~0.8μm top and bottom surface

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.42	4.57	4.72	0.174	0.180	0.186
A1	2.69	2.79	2.89	0.106	0.110	0.114
A2	1.68	1.78	1.88	0.066	0.070	0.074
D	10.00	10.10	10.20	0.400	0.404	0.408
E	6.25	6.35	6.45	0.246	0.250	0.254
E1	8.54	8.64	8.74	0.336	0.340	0.344
C	-----	0.48	-----	-----	0.019	-----
e	-----	2.54(TYP)	-----	-----	0.1(TYP)	-----
b	-----	0.635(TYP)	-----	-----	0.025(TYP)	-----
?	4°	7°	11°	4°	7°	11°



TO 220F-4 Package (long lead)

Note:
1. Lead frame material: TAMAC-4
2. Solder plating thickness: 10±5μm
3. Package body size include mold flash and gate burr
4. Tolerance±0.1mm unless otherwise specified
5. End flash Max. 0.05mm
6. Mismatch Max. 0.05mm
7. Misalignment Max. 0.05mm
8. Epoxy molding compound: SUMITOMO 6300H or equivalent
9. Matte finish Ra: 0.2μm~0.8μm top and bottom surface

SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.42	4.57	4.72	0.174	0.180	0.186
A1	2.69	2.79	2.89	0.106	0.110	0.114
A2	1.68	1.78	1.88	0.066	0.070	0.074
D	10.00	10.10	10.20	0.400	0.404	0.408
E	6.25	6.35	6.45	0.246	0.250	0.254
E1	8.54	8.64	8.74	0.336	0.340	0.344
L	13.70	13.90	14.10	0.539	0.547	0.555
C	-----	0.48	-----	-----	0.019	-----
e	-----	2.54(TYP)	-----	-----	0.1(TYP)	-----
b	-----	0.635(TYP)	-----	-----	0.025(TYP)	-----
?	4°	7°	11°	4°	7°	11°