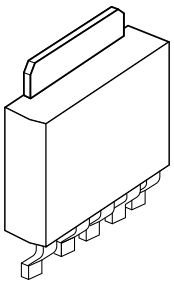
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA4800AF

1A Output Current Low Dropout Voltage Regulator

The TA4800AF consists of small-surface mount type low-dropout regulators with an output current of 1 A (maximum). The output voltage can be arbitrarily set by external resistance.



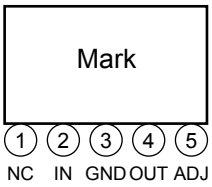
HSIP5-P-1.27B

Weight : 0.36 g (Typ.)

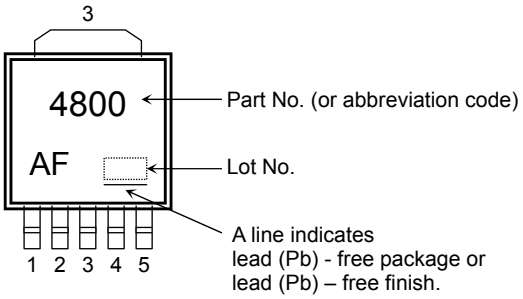
Features

- Maximum output current : 1 A
- Output voltage : V_{OUT} = 1.5 V ~ 9.0 V
- Reference voltage accuracy : V_{REF} ± 2.5% (@Tj = 25°C)
- Low quiescent current : 850 μA (Typ.) (@V_{OUT} = 3.3 V ,I_{OUT} = 0 A)
- Low standby current (output OFF mode): 0.5 μA (Typ.)
- Low-dropout voltage : V_D = 0.5 V (Max) (@V_{OUT} = 3.3 V, I_{OUT} = 500 mA)
- Protection function : Over current protection / thermal shutdown
- Package type : Surface-mount New PW-Mold5pin

Pin Assignment



Marking



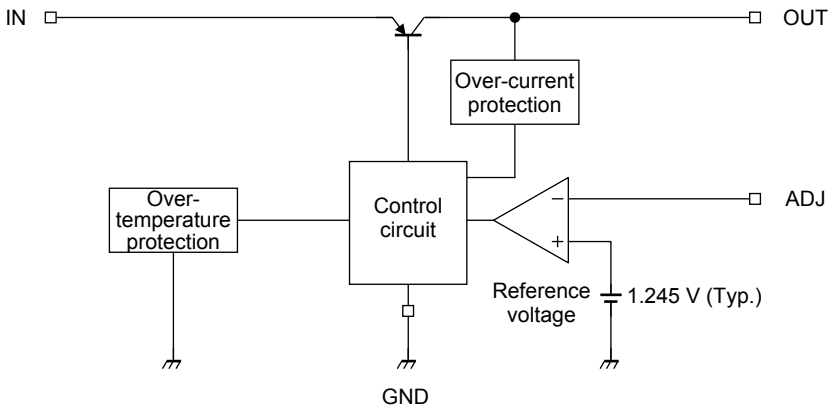
Pin Description

Pin No.	Symbol	Description
1	NC	Non-connection
2	IN	Input terminal. Connected by capacitor (C_{IN}) to GND.
3	GND	Ground terminal
4	OUT	Output terminal. Connected by capacitor (C_{OUT}) to GND.
5	ADJ	Output voltage feedback to regulator. It is connected to an error amplifier with V_{REF}=1.245 V (Typ.).

How to Order

Product No.	Package	Package Type and Capacity
TA4800AF (T6L1,Q)	New PW-Mold5pin : Surface-mount	Tape (2000 pcs/reel)

Block Diagram



Absolute Maximum Rating (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Input voltage		V_{IN}	16	V
Output current		I_{OUT}	1	A
Operating junction temperature		$T_{j(opr)}$	-40~135	°C
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	−55~150	°C
Power dissipation	Ta = 25°C	P_D	1	W
	Tc= 25°C		10	
Thermal resistance	junction-ambient	$R_{th(j-a)}$	125	°C/W
	junction-case	$R_{th(j-c)}$	12.5	

Note 1: Do not apply current and voltage (including reverse polarity) to any pin that is not specified.

Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Operating Input Voltage Range

Characteristic	Symbol	Min	Typ.	Max	Unit
Input voltage	V_{IN}	2.5(Note2)	—	16.0	V

Note 3: This is the voltage at which the IC begins operating. V_D must be considered when determining the best input voltage for the application.

Output Voltage Range

Characteristic	Symbol	Min	Typ.	Max	Unit
Output voltage	V_{OUT}	1.5	—	9.0	V

Protection Function (Reference)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Thermal shutdown	T_{SD}	V_{IN} = 4.3 V	150	170	—	°C
Thermal shutdown hysteresis width	$T_{SD(hys)}$		—	15	—	°C
Peak circuit current	I_{PEAK}	V_{IN} = 5.3 V, T_j = 25°C	—	1.7	—	A
		V_{IN} = 8.3 V, T_j = 25°C	—	2.0	—	
Short circuit current	I_{SC}	V_{IN} = 5.3 V, T_j = 25°C	—	1.1	—	A
		V_{IN} = 16V , T_j = 25°C	—	0.7	—	

Note 4: Ensure that the devices operate within the limits of the maximum rating when in actual use.

Electrical Characteristics

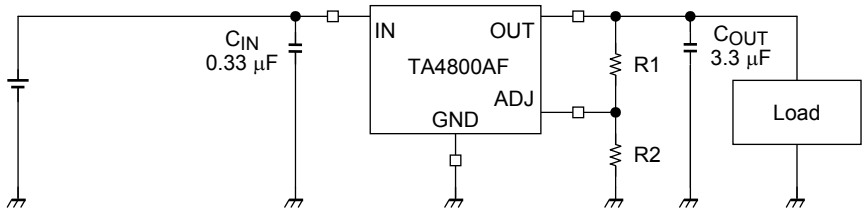
(Unless otherwise specified, $V_{EN} = V_{IN}$, $V_{OUT} = 3.3$ V, $C_{IN} = 0.33$ μF, $C_{OUT} = 3.3$ μF, $T_j = 25°C$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Reference voltage	V_{REF}	V_{IN} = 4.3 V	1.214	1.245	1.276	V
Line regulation	Reg·line	4.3 V ≦ V_{IN} ≦ 8.3 V, I_{OUT} = 500 mA	—	8	24	mV
Load regulation	Reg·load	V_{IN} = 4.3 V, 5 mA ≦ I_{OUT} ≦ 1 A	—	5	20	mV
Quiescent current	I_B	4.3 V ≦ V_{IN} ≦ 8.3 V, I_{OUT} = 0 A	—	0.85	1.70	mA
		4.3 V ≦ V_{IN} ≦ 8.3 V, I_{OUT} = 1 A	—	10	20	
Starting quiescent current	I_{Bstart}	V_{IN} = 2.1 V, I_{OUT} = 0 A	—	3.3	4.0	mA
		V_{IN} = 3.5 V, I_{OUT} = 1 A	—	17.0	28.5	
Output noise voltage	V_{NO}	V_{IN} = 5.3 V, I_{OUT} = 50 mA, 10 Hz ≦ f ≦ 100 kHz	—	100	—	μV_{rms}
Ripple rejection	R.R.	V_{IN} = 5.3 V, I_{OUT} = 50 mA, f = 120 Hz	—	63	—	dB
Dropout voltage	V_D	I_{OUT} = 500 mA	—	0.32	0.50	V
		I_{OUT} = 1 A	—	0.69	—	
Average temperature coefficient of output voltage	T_{CVO}	V_{IN} = 5.3 V, I_{OUT} = 5 mA, 0°C ≦ T_j ≦ 125°C	—	0.3	—	mV/°C

Electrical Characteristics Common to All Products

- T_j = 25°C in the measurement conditions of each item is the standard condition when a pulse test is carried out, and any drift in the electrical characteristic due to a rise in the junction temperature of the chip may be disregarded.

Standard Application Circuit



- Be sure to connect a capacitor near the input terminal and output terminal between both terminals and GND. The use of a monolithic ceramic capacitor (B Characteristic or X7R) of low ESR (equivalent series resistance) is recommended. The IC may oscillate due to external conditions (output current, temperature, or the type of the capacitor used). The type of capacitor required must be determined by the actual application circuit in which the IC is used.

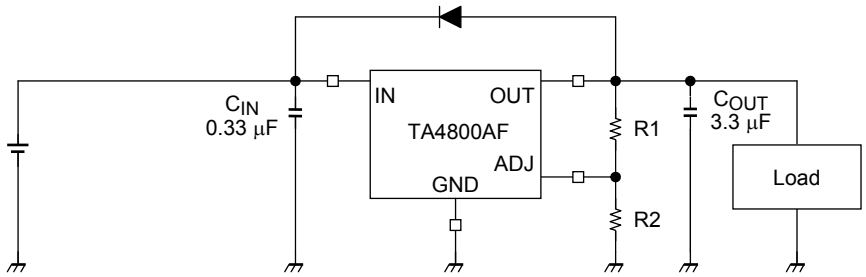
Setting Output Voltage

- The output voltage is determined by the equation shown below. When you control the output voltage with R1, a recommended value to use for R2 is 5 kΩ. R1 and R2must be placed as close as possible to each other, and the board trace to the ADJ terminal must be kept as short as possible.

$$V_{OUT} = V_{REF} \times \left(1 + \frac{R1}{R2} \right)$$

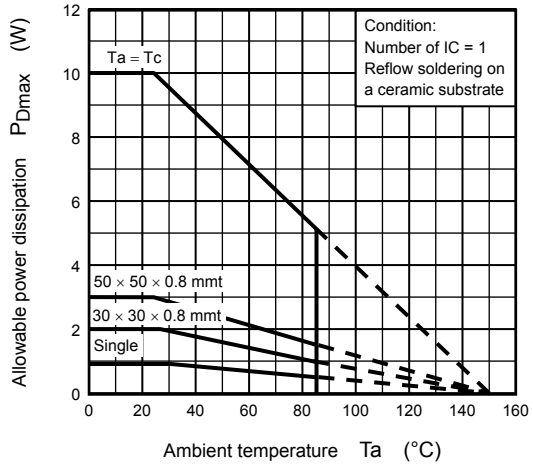
The notice in case of application

- The IC might be destroyed if a voltage greater than the input terminal voltage is applied to the output terminal, or if the input terminal is connected to GND during operation. To prevent such an occurrence, connect a diode as in the following diagram.

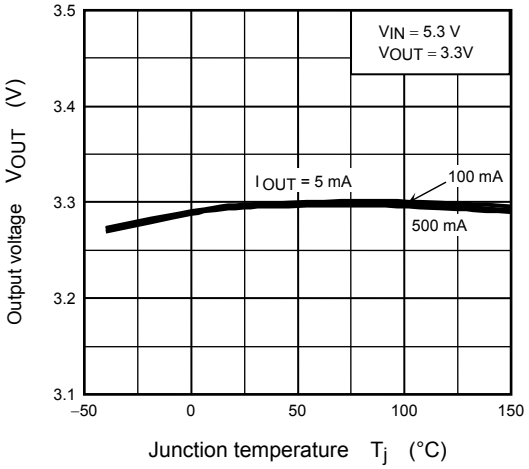


- There is a possibility that internal parasitic devices may be generated when momentary transients cause a terminal's potential to fall below that of the GND terminal. In such case, that the device could be destroyed. The voltage of each terminal and any state must therefore never fall below the GND potential.

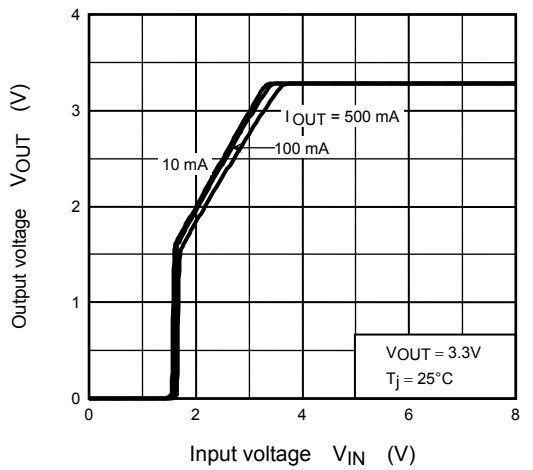
P_{Dmax} – Ta



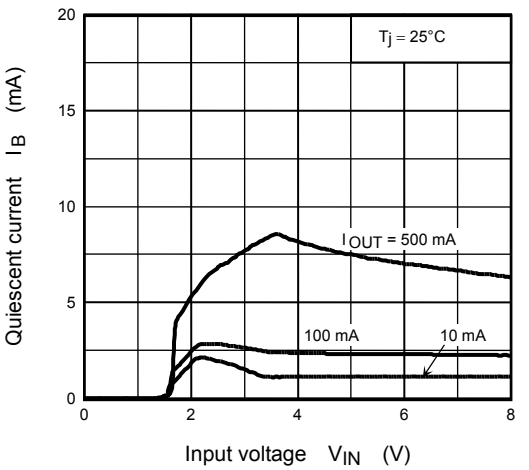
V_{OUT} – T_j



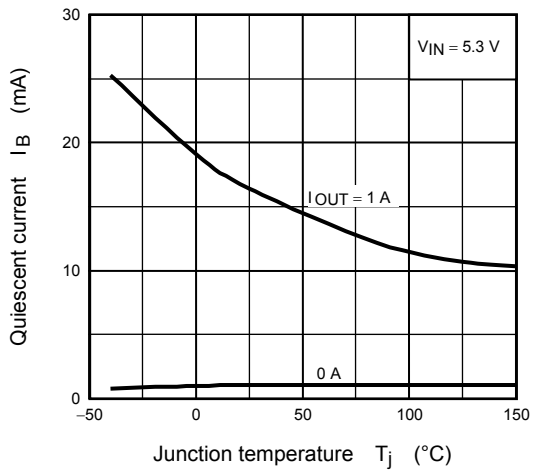
V_{OUT} – V_{IN}



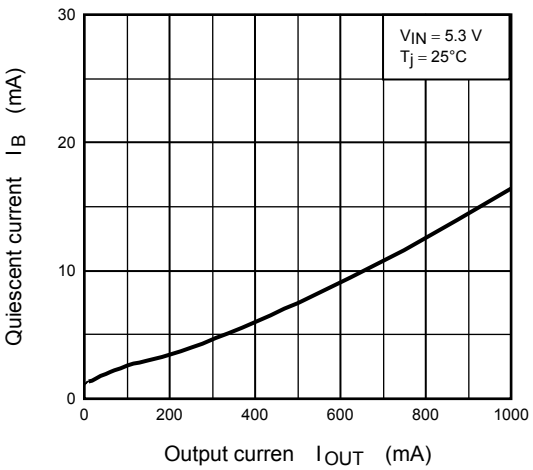
I_B – V_{IN}



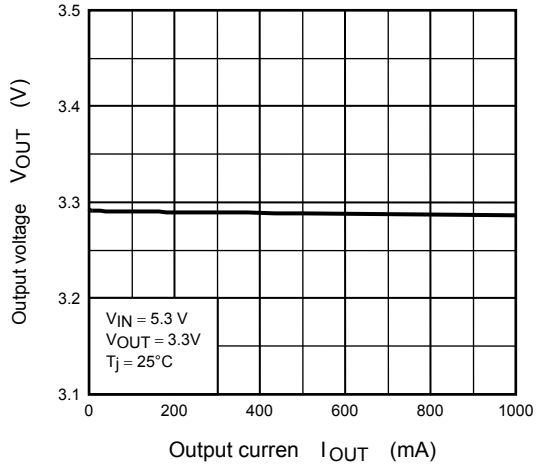
I_B – Tj



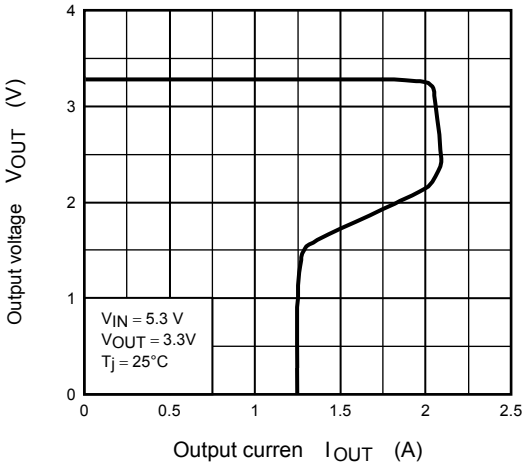
I_B – I_{OUT}



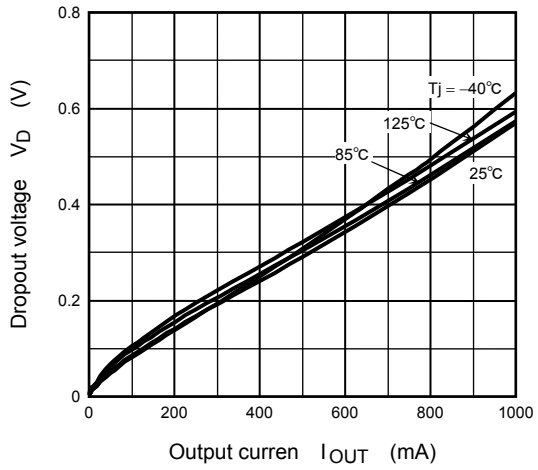
$V_{OUT} - I_{OUT}$



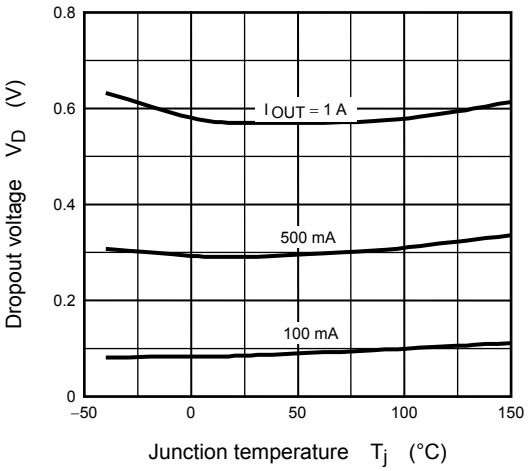
$V_{OUT} - I_{OUT}$



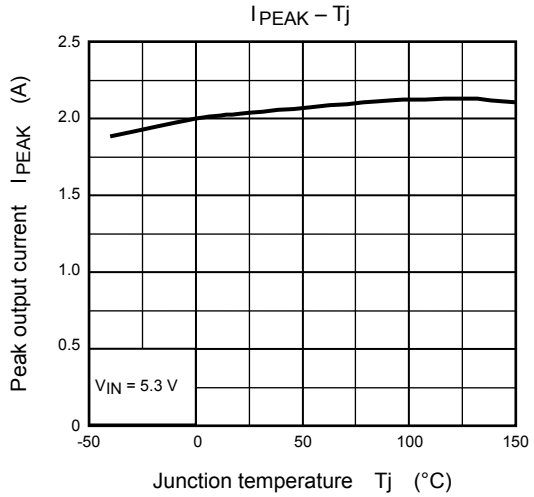
$V_D - I_{OUT}$



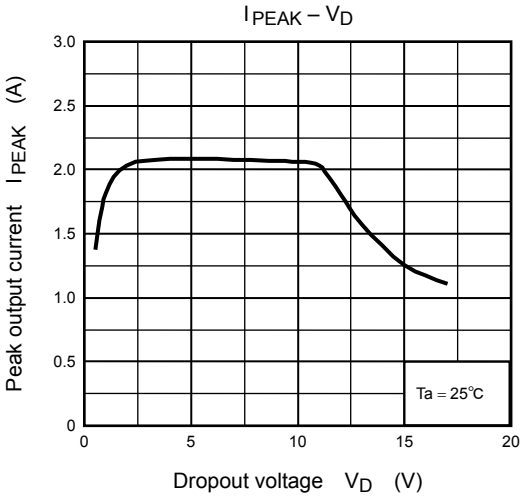
$V_D - T_j$



$I_{PEAK} - Tj$

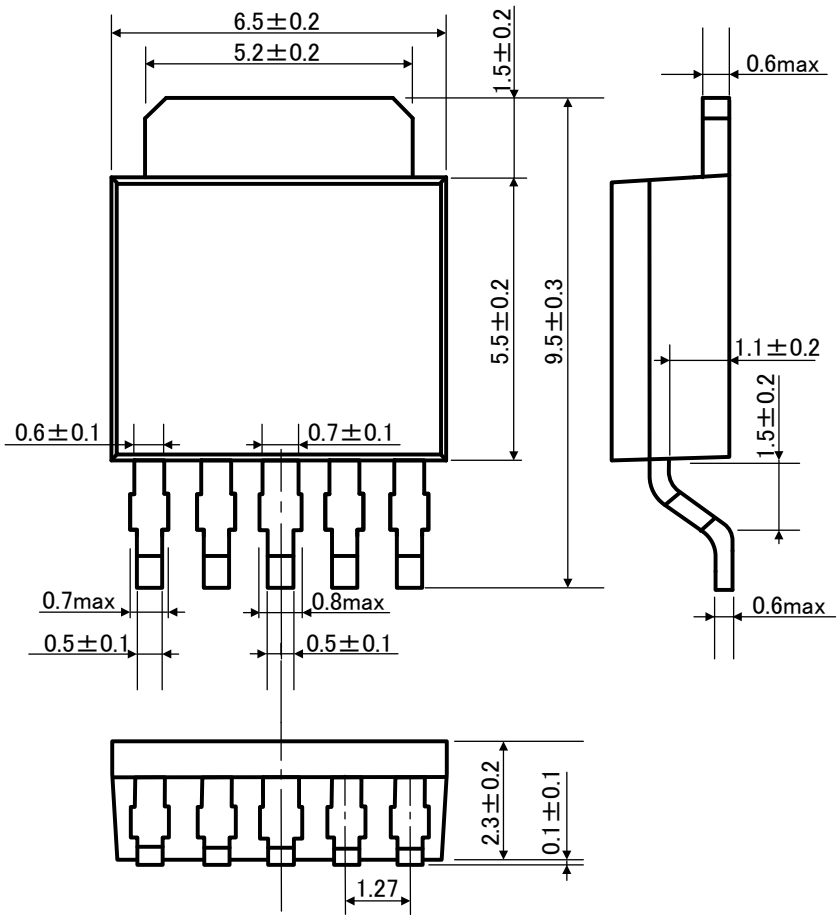


$I_{PEAK} - V_D$



Package Dimensions

HSIP5-P-1.27B Unit : mm



Weight: 0.36 g (Typ.)

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