

**Preliminary**

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

**TAR5SB15, TAR5SB18, TAR5SB23, TAR5SB24, TAR5SB25,  
TAR5SB27, TAR5SB28, TAR5SB29, TAR5SB30, TAR5SB33**

Point Regulators (Low-Dropout Regulator)

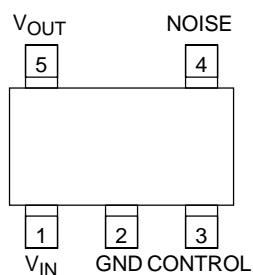
The TAR5SBxx Series is comprised of general-purpose bipolar single-power-supply devices incorporating a control pin which can be used to turn them ON/OFF.

Overtemperature and overcurrent protection circuits are built into the devices' output circuit.

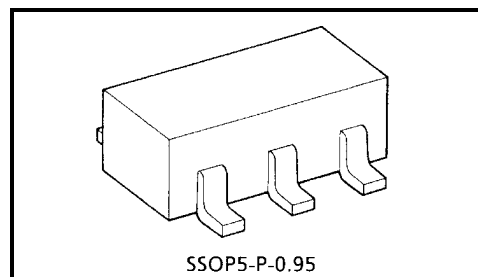
## Features

- Low stand-by current
- Over-temperature/over-current protection
- Operation voltage range is wide.
- Maximum output current is high.
- Low dropout voltage
- Small package (SOT-23 5 pin)
- Ceramic capacitors can be used.

## Pin Assignments (top view)



Over-temperature/over-current protection functions are NOT guarantee maximum-ratings of these devices. Do not use devices under conditions in which their maximum ratings will be exceeded.



Weight: 0.014 g (typ.)

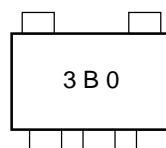
## Preliminary

### List of Products Number and Marking

Products No.	Marking
TAR5SB15	1B5
TAR5SB18	1B8
TAR5SB23	2B3
TAR5SB24	2B4
TAR5SB25	2B5
TAR5SB27	2B7
TAR5SB28	2B8
TAR5SB29	2B9
TAR5SB30	3B0
TAR5SB33	3B3

### Marking on the Product

Example: TAR5SB30 (3.0 V output)



### Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	$V_{IN}$	15	V
Output current	$I_{OUT}$	200	mA
Power dissipation	$P_D$	200 (Note 1)	mW
		380 (Note 2)	
Operation temperature range	$T_{opr}$	-40 to 85	°C
Storage temperature range	$T_{stg}$	-55 to 150	°C

Note 1: Unit Rating

Note 2: Mounted on a glass epoxy circuit board of 30 × 30 mm. Pad dimension of 50 mm<sup>2</sup>

**Preliminary****TAR5SB15, TAR5SB18**

**Electrical Characteristic (unless otherwise specified,  $V_{IN} = V_{OUT} + 1$  V,  $I_{OUT} = 50$  mA,  $C_{IN} = 1$   $\mu$ F,  $C_{OUT} = 10$   $\mu$ F,  $C_{NOISE} = 0.01$   $\mu$ F,  $T_j = 25^\circ\text{C}$ )**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	$V_{OUT}$	Please refer to the Output Voltage Accuracy table.				
Line regulation	Reg·line	$V_{OUT} + 1 \text{ V} \leq V_{IN} \leq 15 \text{ V}$ , $I_{OUT} = 1 \text{ mA}$	—	3	15	mV
Load regulation	Reg·load	$1 \text{ mA} \leq I_{OUT} \leq 150 \text{ mA}$	—	25	75	mV
Quiescent current	$I_{B1}$	$I_{OUT} = 0 \text{ mA}$	—	170	—	$\mu\text{A}$
	$I_{B2}$	$I_{OUT} = 50 \text{ mA}$	—	550	850	
Stand-by current	$I_B$ (OFF)	$V_{CT} = 0 \text{ V}$	—	—	0.1	$\mu\text{A}$
Output noise voltage	$V_{NO}$	$I_{OUT} = 10 \text{ mA}$ , $10 \text{ Hz} \leq f \leq 100 \text{ kHz}$ , $T_a = 25^\circ\text{C}$	—	30	—	$\mu\text{V}_{\text{rms}}$
Temperature coefficient	$T_{CVO}$	$-40^\circ\text{C} \leq T_{opr} \leq 85^\circ\text{C}$	—	100	—	ppm/ $^\circ\text{C}$
Input voltage	$V_{IN}$	—	2.4	—	15	V
Ripple rejection	R.R.	$I_{OUT} = 10 \text{ mA}$ , $f = 1 \text{ kHz}$ , $V_{\text{Ripple}} = 500 \text{ mV}_{\text{p-p}}$ , $T_a = 25^\circ\text{C}$	—	70	—	dB
Control voltage (ON)	$V_{CT}$ (ON)	—	1.5	—	$V_{IN}$	V
Control voltage (OFF)	$V_{CT}$ (OFF)	—	—	—	0.4	V
Control current (ON)	$I_{CT}$ (ON)	$V_{CT}$ (ON) = 1.5 V	—	3	10	$\mu\text{A}$
Control current (OFF)	$I_{CT}$ (OFF)	$V_{CT}$ (OFF) = 0 V	—	0	0.1	$\mu\text{A}$

**TAR5SB23~TAR5SB33**

**Electrical Characteristic (unless otherwise specified,  $V_{IN} = V_{OUT} + 1$  V,  $I_{OUT} = 50$  mA,  $C_{IN} = 1$   $\mu$ F,  $C_{OUT} = 10$   $\mu$ F,  $C_{NOISE} = 0.01$   $\mu$ F,  $T_j = 25^\circ\text{C}$ )**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output voltage	$V_{OUT}$	Please refer to the Output Voltage Accuracy table.				
Line regulation	Reg·line	$V_{OUT} + 1 \text{ V} \leq V_{IN} \leq 15 \text{ V}$ , $I_{OUT} = 1 \text{ mA}$	—	3	15	mV
Load regulation	Reg·load	$1 \text{ mA} \leq I_{OUT} \leq 150 \text{ mA}$	—	25	75	mV
Quiescent current	$I_{B1}$	$I_{OUT} = 0 \text{ mA}$	—	170	—	$\mu\text{A}$
	$I_{B2}$	$I_{OUT} = 50 \text{ mA}$	—	550	850	
Stand-by current	$I_B$ (OFF)	$V_{CT} = 0 \text{ V}$	—	—	0.1	$\mu\text{A}$
Output noise voltage	$V_{NO}$	$I_{OUT} = 10 \text{ mA}$ , $10 \text{ Hz} \leq f \leq 100 \text{ kHz}$ , $T_a = 25^\circ\text{C}$	—	30	—	$\mu\text{V}_{\text{rms}}$
Dropout voltage	$V_{IN}-V_{OUT}$	$I_{OUT} = 50 \text{ mA}$	—	130	200	mV
Temperature coefficient	$T_{CVO}$	$-40^\circ\text{C} \leq T_{opr} \leq 85^\circ\text{C}$	—	100	—	ppm/ $^\circ\text{C}$
Input voltage	$V_{IN}$	—	$V_{OUT} + 0.2 \text{ V}$	—	15	V
Ripple rejection	R.R.	$I_{OUT} = 10 \text{ mA}$ , $f = 1 \text{ kHz}$ , $V_{\text{Ripple}} = 500 \text{ mV}_{\text{p-p}}$ , $T_a = 25^\circ\text{C}$	—	70	—	dB
Control voltage (ON)	$V_{CT}$ (ON)	—	1.5	—	$V_{IN}$	V
Control voltage (OFF)	$V_{CT}$ (OFF)	—	—	—	0.4	V
Control current (ON)	$I_{CT}$ (ON)	$V_{CT}$ (ON) = 1.5 V	—	3	10	$\mu\text{A}$
Control current (OFF)	$I_{CT}$ (OFF)	$V_{CT}$ (OFF) = 0 V	—	0	0.1	$\mu\text{A}$

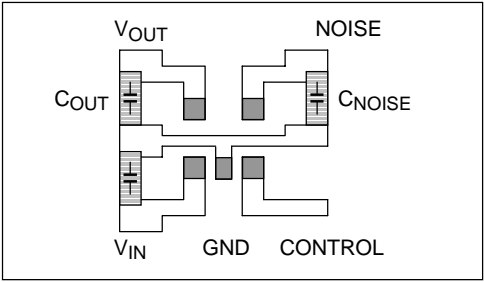
**Preliminary****Output Voltage Accuracy**

( $V_{IN} = V_{OUT} + 1\text{ V}$ ,  $I_{OUT} = 50\text{ mA}$ ,  $C_{IN} = 1\text{ }\mu\text{F}$ ,  $C_{OUT} = 10\text{ }\mu\text{F}$ ,  $C_{NOISE} = 0.01\text{ }\mu\text{F}$ ,  $T_j = 25^\circ\text{C}$ )

Product No.	Symbol	Min	Typ.	Max	Unit
TAR5SB15	V <sub>OUT</sub>	1.44	1.5	1.56	V
TAR5SB18		1.74	1.8	1.86	
TAR5SB23		2.24	2.3	2.36	
TAR5SB24		2.34	2.4	2.46	
TAR5SB25		2.43	2.5	2.57	
TAR5SB27		2.63	2.7	2.77	
TAR5SB28		2.73	2.8	2.87	
TAR5SB29		2.83	2.9	2.97	
TAR5SB30		2.92	3.0	3.08	
TAR5SB33		3.21	3.3	3.39	

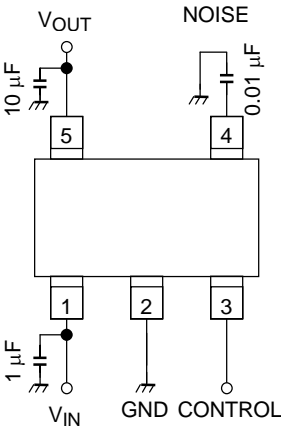
Preliminary

Thermal Resistance Evaluation Board



Circuit board material: glass epoxy,  
Circuit board dimension: 30 mm × 30 mm,  
Copper foil pad area: 50 mm<sup>2</sup> (t = 0.8 mm)

Recommended Application Circuit



Control Level	Operation
HIGH	ON
LOW	OFF

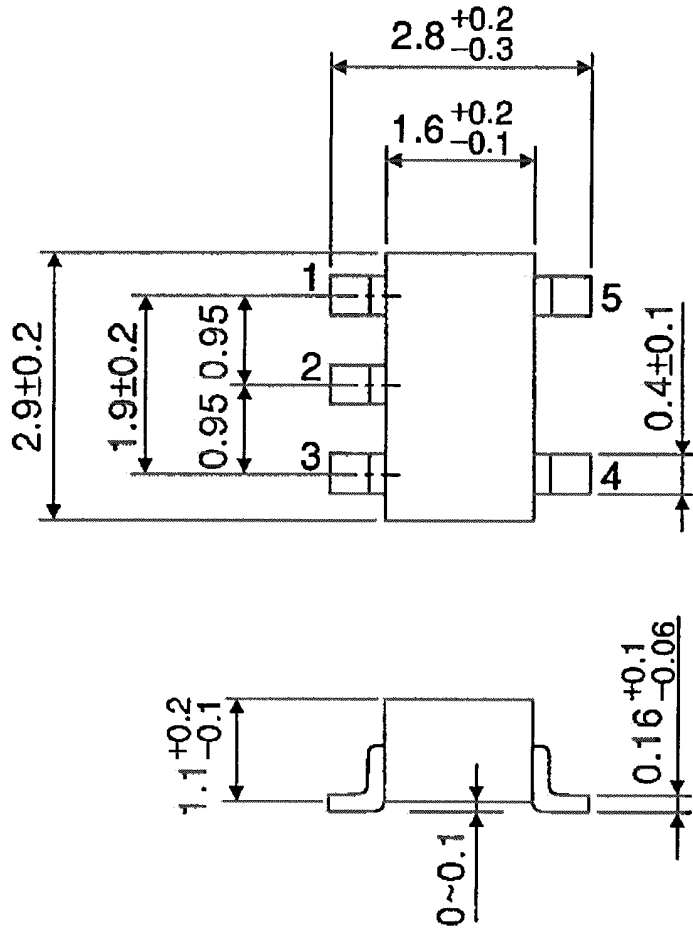
The noise capacitor should be connected to NOISE pin to GND for stable operation.  
The recommended value is higher than 0.0047 µF.

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Package Dimensions

SSOP5-P-0.95

Unit : mm



Weight: 0.014 g (typ.)

**Preliminary****RESTRICTIONS ON PRODUCT USE**

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