

## Low Quiescent Current LDO Voltage Regulator

### SOT-23



#### Pin Definition:

1. Output
2. Input
3. Ground

### General Description

TS3480 series is an integrated linear voltage regulator. It can be provided the operation from an input as high as 30V and a guaranteed maximum dropout of 1.2V at the full 100mA load. The 1.2V quasi low dropout of TS3480 series is able to makes them a nice fit in many applications where the 2 to 2.5V dropout of TS78LXX series devices precludes their use.

The TS3480 series features a 5V & 3.3V member. The SOT packaging and quasi low dropout features of the TS3480 series converge in this device to provide a very nice, very tiny 5V & 3.3V, 100mA bias supply that regulates directly off the system power supply.

### Features

- 30V maximum input for operation
- 2V guaranteed maximum dropout over full load and temperature ranges
- 100mA guaranteed minimum load current
- $\pm 5\%$  guaranteed output voltage tolerance over full load and temperature ranges
- $-40$  to  $+125^{\circ}\text{C}$  junction temperature range for operation

### Application

- Tiny alternative to TS78LXX series and similar devices
- Tiny  $5\text{V} \pm 5\%$  to 3.3V, 100mA converter
- Post regulator for switching DC/DC converter
- Bias supply for analog circuits

### Ordering Information

Part No.	Package	Packing
TS3480CX $_{xx}$ RF	SOT-23	3Kpcs / 7" Reel

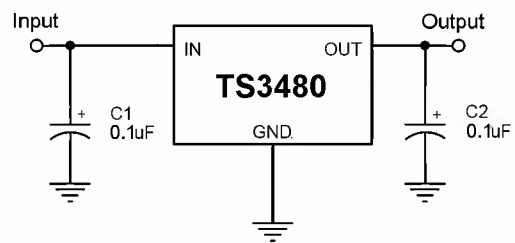
Note: Where  $_{xx}$  denotes voltage option, available are

**50** = 5.0V

**33** = 3.3V

Contact to factory for addition voltage option

### Block Diagram



### Absolute Maximum Rating (Ta = 25°C unless otherwise noted) (Note 1)

Parameter	Symbol	Limit	Unit
Input Voltage	$V_{IN}$	35	V
Operating Input Voltage	$V_{OPER}$	30	V
Output Current Range	$I_{OUT}$	100	mA
Power Dissipation (Note 2)	$P_d$	350	mW
Junction Temperature	$T_J$	+150	$^{\circ}\text{C}$
Operating Temperature Range	$T_{OPER}$	$-40 \sim +125$	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	$-65 \sim +150$	$^{\circ}\text{C}$
Lead Soldering Time (260°C) (Note 3)	$T_{SOLDER}$	4	Sec
ESD (note 4)		2	kV

## Low Quiescent Current LDO Voltage Regulator

### Electrical Specification (Ta = 25°C, unless otherwise specified.)

Parameter	Conditions	Min	Typ	Max	Unit
<b>3.3V output</b>					
Output Voltage	V <sub>IN</sub> = 4.8V, I <sub>o</sub> = 1mA ~ 100mA	3.17	3.3	3.43	V
Line Regulation	4.8V ≤ V <sub>IN</sub> ≤ 30V, I <sub>o</sub> = 1mA	--	10	25	mV
Load Regulation	V <sub>IN</sub> = 4.8V, I <sub>o</sub> = 1mA~100mA	--	20	40	mV
Dropout Voltage	I <sub>o</sub> = 10mA	--	0.75	0.9	V
	I <sub>o</sub> = 100mA	--	0.95	1.1	V
Quiescent Current	V <sub>IN</sub> = 4.8V ≤ V <sub>IN</sub> ≤ 30V, I <sub>o</sub> = 0V	--	3	5	mA
Output Current	V <sub>IN</sub> - V <sub>OUT</sub> = 20V	100	--	--	mA
Ripple Rejection	F = 10Hz ~ 100kHz, I <sub>o</sub> = 0mA, C <sub>OUT</sub> = 0.1uF, V <sub>IN</sub> = 10V	--	100	--	uVrms
<b>5.0V output</b>					
Output Voltage	V <sub>IN</sub> = 6.5V, I <sub>o</sub> = 1mA ~ 100mA	4.80	5.0	5.20	V
Line Regulation	6.5V ≤ V <sub>IN</sub> ≤ 30V, I <sub>o</sub> = 1mA	--	10	25	mV
Load Regulation	V <sub>IN</sub> = 6.5V, I <sub>o</sub> = 10mA~100mA	--	20	40	mV
Dropout Voltage	I <sub>o</sub> = 10mA	--	0.75	0.9	V
	I <sub>o</sub> = 100mA	--	0.95	1.1	V
Quiescent Current	V <sub>IN</sub> = 6.5V ≤ V <sub>IN</sub> ≤ 30V, I <sub>o</sub> = 0V	--	3	5	mA
Output Current	V <sub>IN</sub> - V <sub>OUT</sub> = 20V	100	--	--	mA
Ripple Rejection	F = 10Hz ~ 100kHz, I <sub>o</sub> = 0mA, C <sub>OUT</sub> = 0.1uF, V <sub>IN</sub> = 10V	--	150	--	uVrms

Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating ratings are conditions under which operation of the device is guaranteed. Operating ratings do not imply guaranteed performance limits. For guaranteed performance limits and associated test conditions, see the Electrical Characteristics

Note 2: The Absolute Maximum power dissipation depends on the ambient temperature and can be calculated using  $P = (T_j - T_a) / R_{\theta ja}$  where T<sub>j</sub> is the junction temperature, T<sub>a</sub> is the ambient temperature, and R<sub>θja</sub> is the junction-to-ambient thermal resistance. The 350mW rating results from substituting the absolute maximum junction temperature, 150°C for T<sub>j</sub>, 50°C for T<sub>a</sub>, and 300°C/W for R<sub>θja</sub>. More power can be safely dissipated at lower ambient temperatures, and less power can be safely dissipated at higher ambient temperatures. The absolute maximum power dissipation can be increased by 3.5mW for each °C below 50°C ambient. It must be derated by 3.5mW for each °C above 50°C ambient. A R<sub>θja</sub> of 300°C/W represents the worst-case condition of no heat sinking of the 3-lead plastic SOT-23 package. Heat sinking enables the safe dissipation of more power. The TS3480 actively limits its junction temperature to about 150°C.

Note 3: Times shown are dwell times. Temperatures shown are dwell temperatures.

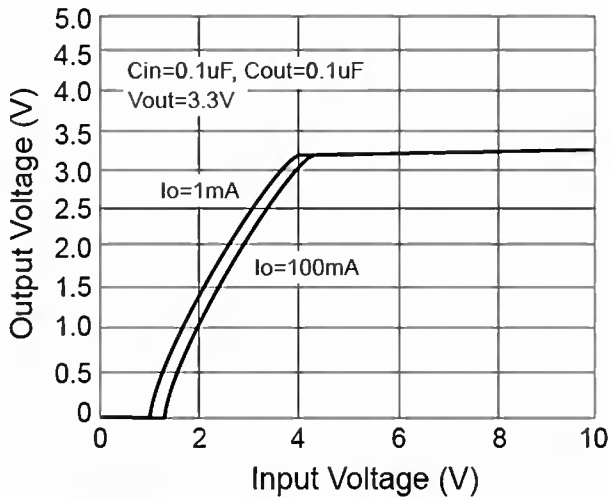
Note 4: For testing purposes, ESD was applied using the Human-Body Model, a 100pF capacitor discharged through a 1.5kΩ resistor.

Note 5: A typical is the center of characterization data taken with T<sub>a</sub> = T<sub>j</sub> = 25°C. Typical are not guaranteed.

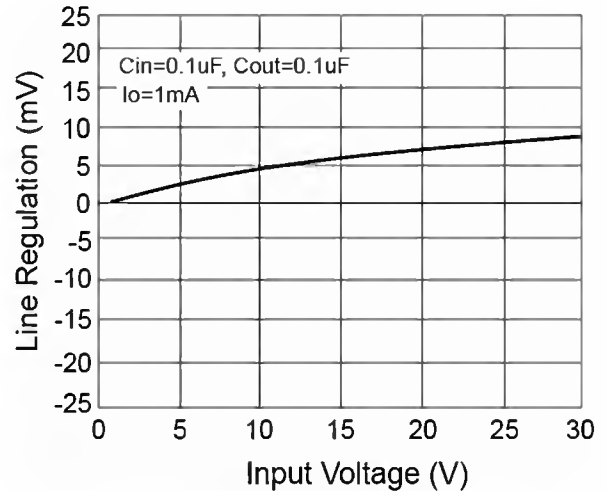
Note 6: All limits are guaranteed. All electrical characteristics having room-temperature limits are tested during production with T<sub>a</sub> = T<sub>j</sub> = 25°C. All hot and cold limits are guaranteed by correlating the electrical characteristics to process and temperature variations and applying statistical process control.

Note 7: All voltages except dropout are with respect to the voltage at the GND pin.

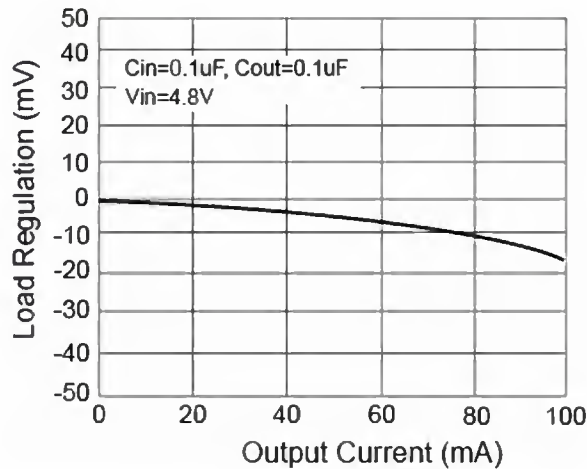
**Electrical Characteristics Curve**



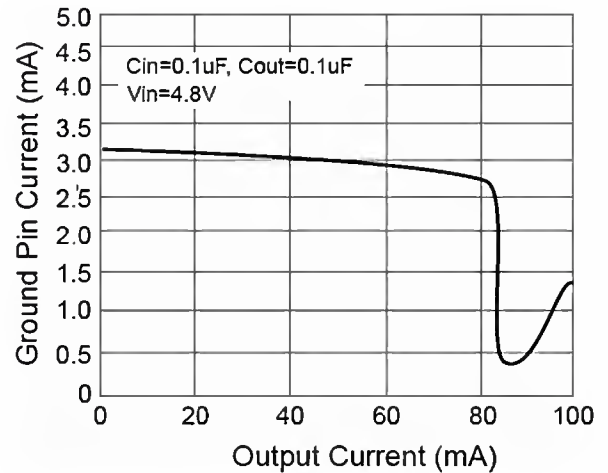
**Figure 1. Output Voltage vs. Input Voltage**



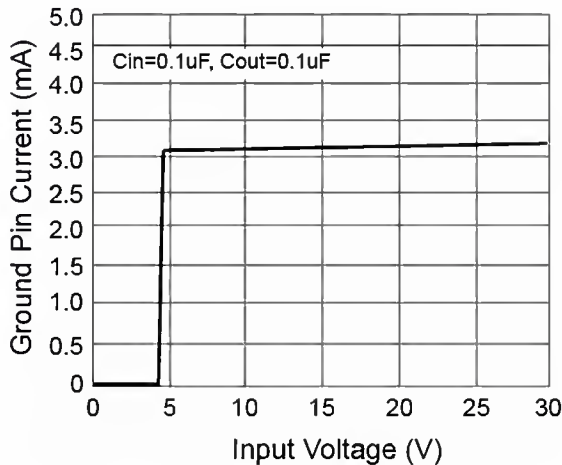
**Figure 2. Line Regulation**



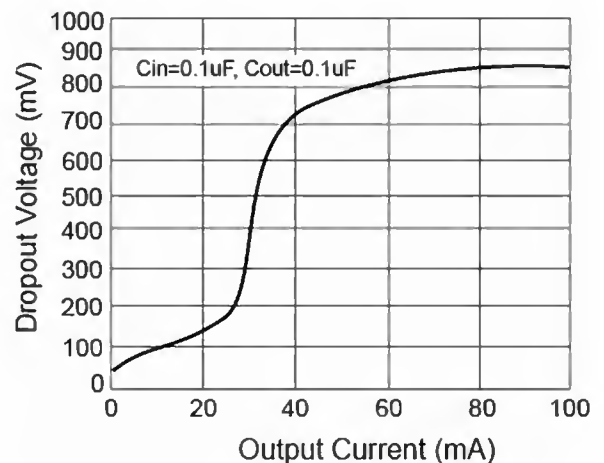
**Figure 3. Load Regulation**



**Figure 4. Ground Pin Current vs. Output Current**

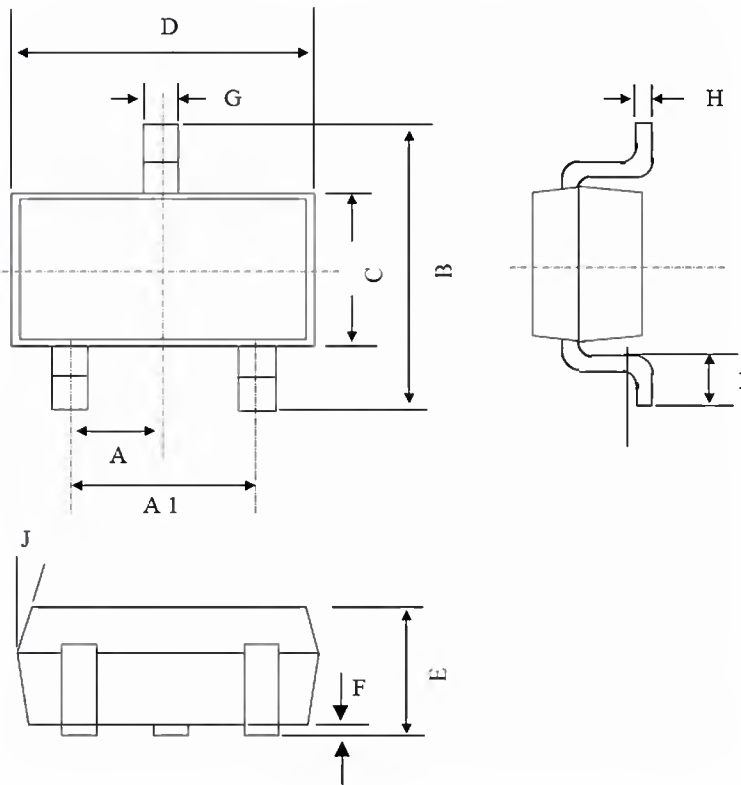


**Figure 5. Ground Pin Current vs. Input Voltage**



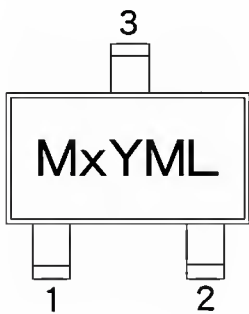
**Figure 6. Dropout Voltage vs. Load Current**

**SOT-23 Mechanical Drawing**



SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	0.95 BSC		0.037 BSC	
A1	1.9 BSC		0.074 BSC	
B	2.60	3.00	0.102	0.118
C	1.40	1.70	0.055	0.067
D	2.80	3.10	0.110	0.122
E	1.00	1.30	0.039	0.051
F	0.00	0.10	0.000	0.004
G	0.35	0.50	0.014	0.020
H	0.10	0.20	0.004	0.008
I	0.30	0.60	0.012	0.024
J	5°	10°	5°	10°

**Marking Diagram**



- M** = Device Code
- x** = Voltage Code (5=5V, S=3.3V)
- Y** = Year Code
- M** = Month Code  
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code

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