Low Dropout Voltage Regulator   TJ62FPXX

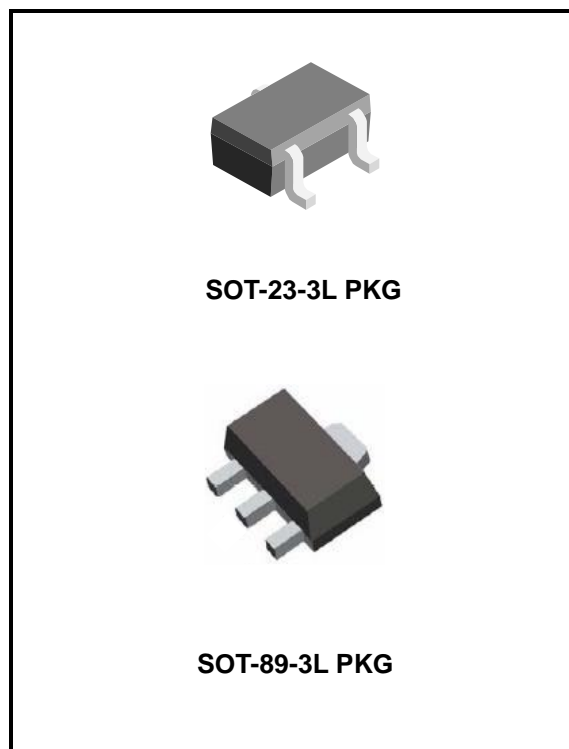## FEATURES

- Input Operating Voltage Range : 2.5V to 10V
- 1uA Typical Quiescent Current
- $\pm$2% Output Voltage Accuracy
- Stable with 1uF MLCC
- Output Current up to 250mA
- Over Current Protection
- Moisture Sensitivity Level 3

APPLICATION

- Battery-Powered Equipment
- Palmtops
- Portable Cameras and Video Recorders
- Reference voltage source

SOT-23-3L PKG

SOT-89-3L PKG

ORDERING INFORMATION

Device	Package
TJ62FPXXGSF	SOT-23-3L
TJ62FPXXGF	SOT-89-3L

X.X = Output Voltage = 2.8 / 3.0 / 3.3

DESCRIPTION

The TJ62FPXX series is a group of positive voltage output, three-pin regulators that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and programmable fuse technologies. The output voltage is 1.0V to 6.0V in 0.1V increments. The TJ62FPXX consists of a high-precision voltage reference, an error correction circuit, and a current-limited output driver. The transient response to load variations has improved in comparison to the existing series of positive voltage regulators.
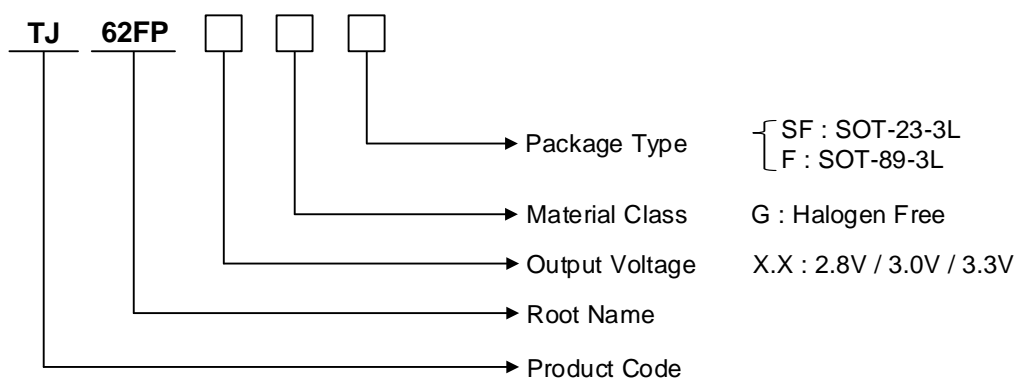
ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Supply Voltage	V_{IN}	-	12	V
Maximum Output Current	I_{OUT}	-	500	mA
Storage Temperature Range	T_{STG}	-60	125	ºC
Maximum Operating Junction Temperature	T_J	-40	125	ºC
Operating Ambient Temperature Range	T_{OPR}	-40	85	ºC

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Voltage	V_{IN}	2.5	10	V
Output Current	I_{OUT}		250	mA
Operating Ambient Temperature Range	T_{OPR}	0	70	ºC

ORDERING INFORMATION

VOUT	Package	Order No.	Description	Status
2.8V	SOT-23-3L	TJ62FP28GSF	250mA, Fixed	Active
	SOT-89-3L	TJ62FP28GF	250mA, Fixed	Contact Us
3.0V	SOT-23-3L	TJ62FP30GSF	250mA, Fixed	Active
	SOT-89-3L	TJ62FP30GF	250mA, Fixed	Active
3.3V	SOT-23-3L	TJ62FP33GSF	250mA, Fixed	Active
	SOT-89-3L	TJ62FP33GF	250mA, Fixed	Active

TJ 62FP ☐ ☐ ☐

Package Type ⌠ SF : SOT-23-3L
              ⌡ F : SOT-89-3L

Material Class   G : Halogen Free

Output Voltage   X.X : 2.8V / 3.0V / 3.3V

Root Name

Product Code

PIN CONFIGURATION
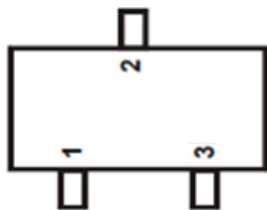
SOT-23-3L
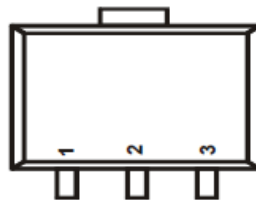
SOT-89-3L

PIN DESCRIPTION

Pin No.	SOT-23-3L / SOT-89-3L PKG	
	Name	**Function**
1	GND	Ground
2	VIN	Input Voltage
3	VOUT	Output Voltage

TYPICAL APPLICATION

TJ62FPXX

VIN ○ ─────────┬───── VIN   VOUT ─────┬───── ○ VOUT

CIN 1uF

GND

COUT 1uF
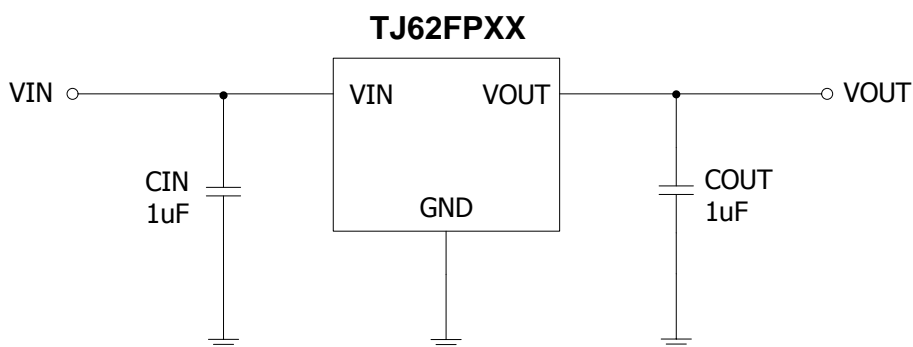
ELECTRICAL CHARACTERISTICS (Note 1)

Unless otherwise specified all limits at VIN=VOUT+1V (But Vin > 2.5V), TA=25℃, CIN=COUT=1uF

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage Range	VIN		2.5		10	V
Output Voltage Accuracy	VOUT	IOUT=40mA, VIN=VOUT+1V(Note3)	-2		2	%
Quiescent Current(Note2)	IQ	VIN=VOUT+1V		1	3	uA
Line Regulation	ΔVLINE	(VOUT+1V) < VIN < 10V(Note3), IOUT=40mA		0.2	0.3	%/V
Load Regulation	ΔVLOAD	1mA < IOUT < 80mA(Note3)		0.02	0.03	%/mA
Dropout Voltage	VDROP	IOUT=160mA, VOUT > 2.5V		0.4	0.7	V
		IOUT=160mA, 2.0V < VOUT < 2.5V		0.55	0.85	
		IOUT=160mA, VOUT ≤ 2.0V		0.9	1.3	

Note 1. Stresses listed as the absolute maximum ratings may cause permanent damage to the device. These are for stress ratings. Functional operating of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibly to affect device reliability.
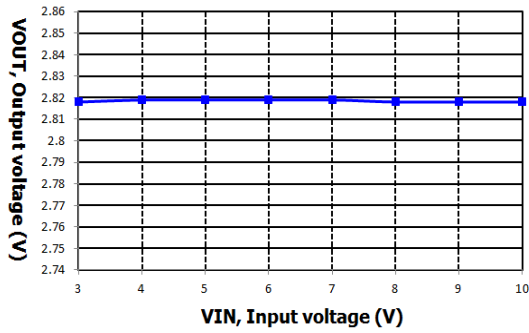
Note 2. Ground current, or quiescent current, is the difference between input and output currents. It's defined by $I_{GND} = I_{IN} - I_{OUT}$ under the given loading condition. The total current drawn from the supply is the sum of the load current plus the ground pin current.

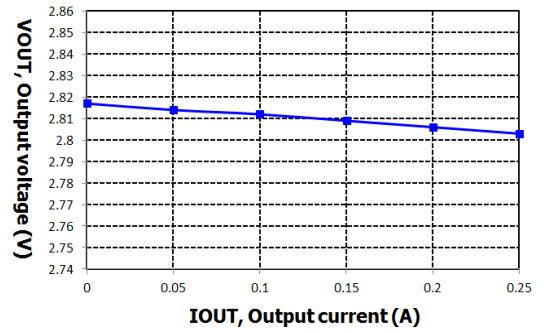Note 3. VIN > 2.5V for any VOUT

TYPICAL OPERATING CHARACTERISTICS
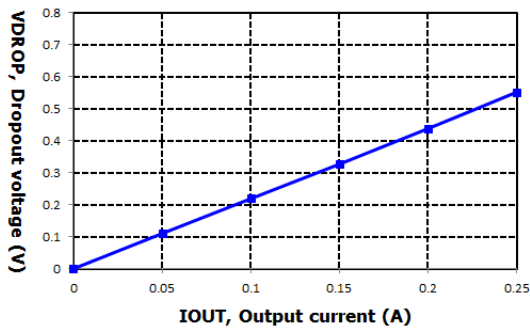
- VOUT=2.8V

VIN vs. VOUT

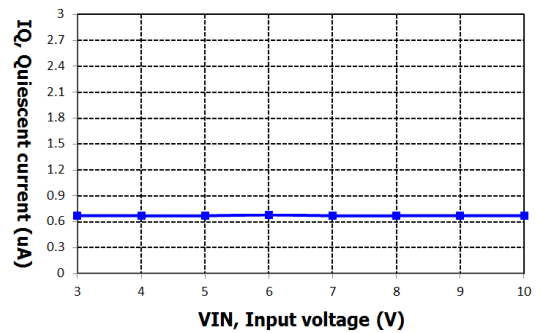VIN=3V to 10V, VOUT=2.8V @ IOUT=10mA

IOUT vs. VOUT

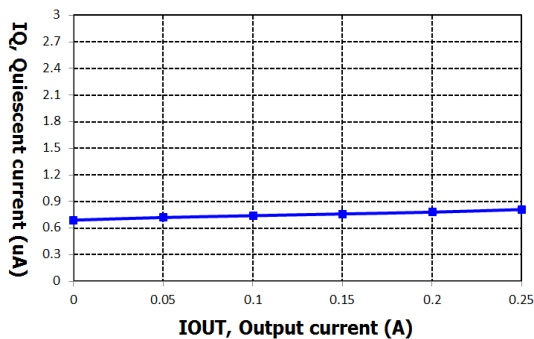VIN=3.8V, VOUT=2.8V @ IOUT=250mA per 50mA step

IOUT vs. VDROP

VIN=3.8V, VOUT=2.8V @ IOUT=250mA per 50mA step
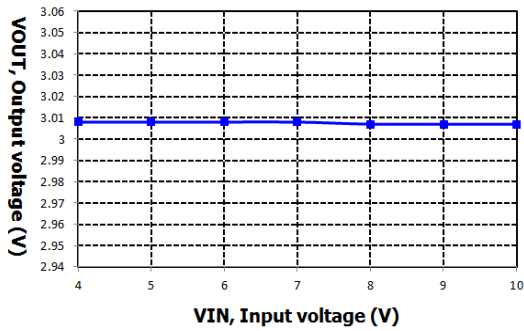
VIN vs. IQ

VIN=3V to 10V, VOUT=2.8V

IOUT vs. IQ

VIN=3.8V, VOUT=2.8V @ IOUT=250mA per 50mA step
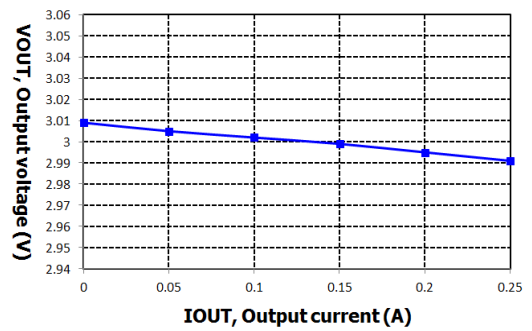
TYPICAL OPERATING CHARACTERISTICS (Continued)
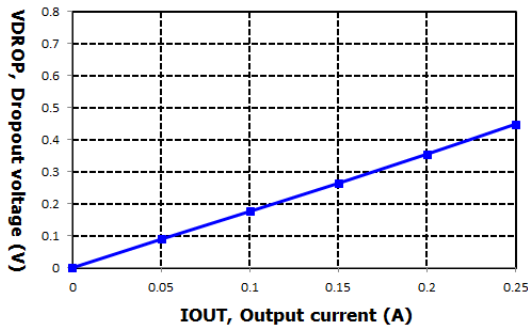
- VOUT=3.0V

VIN vs. VOUT

VIN=4.0V to 10V, VOUT=3.0V @ IOUT=10mA
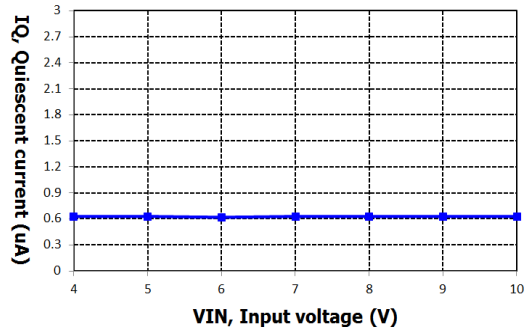
IOUT vs. VOUT

VIN=4.0V, VOUT=3.0V @ IOUT=250mA per 50mA step
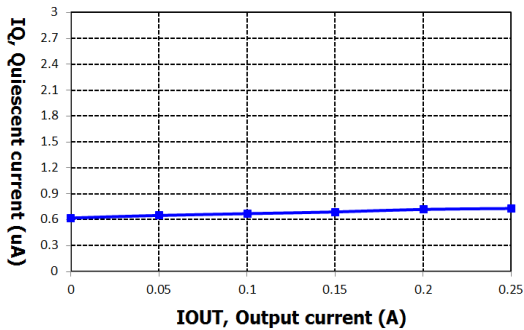
IOUT vs. VDROP

VIN=4.0V, VOUT=3.0V @ IOUT=250mA per 50mA step

VIN vs. IQ
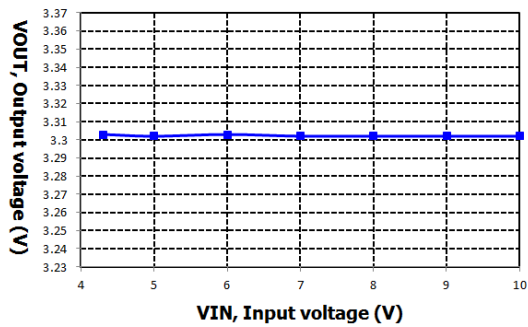
VIN=4.0V to 10V, VOUT=3.0V

IOUT vs. IQ

VIN=4.0V, VOUT=3.0V @ IOUT=250mA per 50mA step
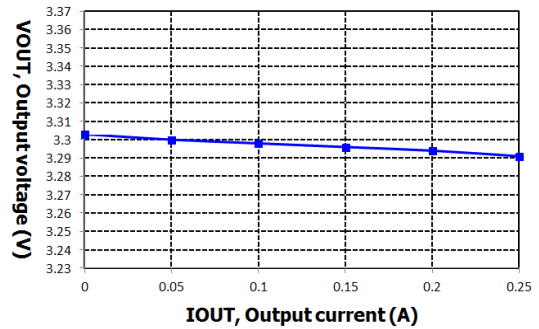
TYPICAL OPERATING CHARACTERISTICS (Continued)
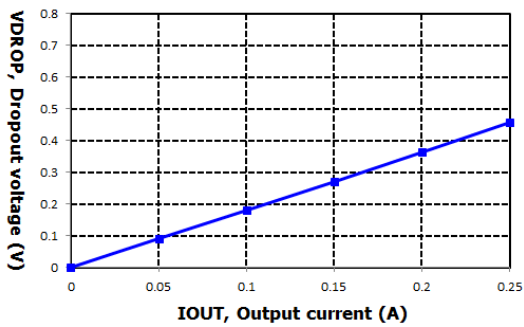
- VOUT=3.3V

VIN vs. VOUT

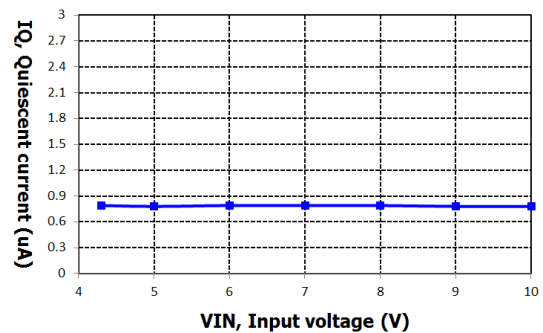VIN=4.3V to 10V, VOUT=3.3V @ IOUT=10mA

IOUT vs. VOUT

VIN=4.3V, VOUT=3.3V @ IOUT=250mA per 50mA step
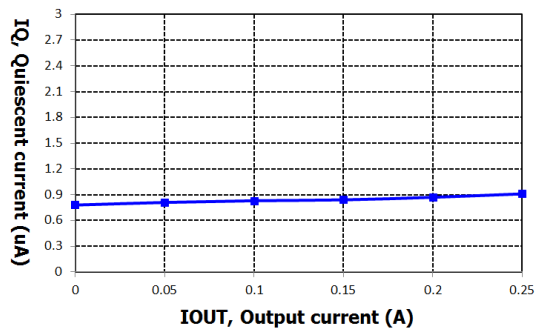
IOUT vs. VDROP

VIN=4.3V, VOUT=3.3V @ IOUT=250mA per 50mA step

VIN vs. IQ

VIN=4.3V to 10V, VOUT=3.3V

IOUT vs. IQ

VIN=4.3V, VOUT=3.3V @ IOUT=250mA per 50mA step

APPLICATION INFORMATION

Maximum Output Current Capability

The TJ62FPXX can deliver a continuous current of 250mA over the full operating junction temperature range. However, the output current is limited by the restriction of power dissipation which differs from packages. A heat sink may be required depending on the maximum power dissipation and maximum ambient temperature of application. With respect to the applied package, the maximum output current of 250mA may be still undeliverable due to the restriction of the power dissipation of TJ62FPXX. Under all possible conditions, the junction temperature must be within the range specified under operating conditions. The temperatures over the device are given by:

$$T_C = T_A + P_D \times \theta_{CA} \quad / \quad T_J = T_C + P_D \times \theta_{JC} \quad / \quad T_J = T_A + P_D \times \theta_{JA}$$

where T_J is the junction temperature, T_C is the case temperature, T_A is the ambient temperature, P_D is the total power dissipation of the device, θ_{CA} is the thermal resistance of case-to-ambient, θ_{JC} is the thermal resistance of junction-to-case, and θ_{JA} is the thermal resistance of junction to ambient.

The total power dissipation of the device is given by:

$$P_D = P_{IN} - P_{OUT} = (V_{IN} \times I_{IN}) - (V_{OUT} \times I_{OUT})$$
$$= (V_{IN} \times (I_{OUT} + I_{GND})) - (V_{OUT} \times I_{OUT}) = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{IN} \times I_{GND}$$

where I_{GND} is the operating ground current of the device which is specified at the Electrical Characteristics. The maximum allowable temperature rise (T_{Rmax}) depends on the maximum ambient temperature (T_{Amax}) of the application, and the maximum allowable junction temperature (T_{Jmax}):

$$T_{Rmax} = T_{Jmax} - T_{Amax}$$

The maximum allowable value for junction-to-ambient thermal resistance, $\theta_{JA,}$ can be calculated using the formula:

$$\theta_{JA} = T_{Rmax} / P_D = (T_{Jmax} - T_{Amax}) / P_D$$

TJ62FPXX is available in SOT-23-3L package. The thermal resistance depends on amount of copper area or heat sink, and on air flow.

If proper cooling solution such as heat sink, copper plane area, air flow is applied, the maximum allowable power dissipation could be increased. However, if the ambient temperature is increased, the allowable power dissipation would be decreased.

REVISION NOTICE

The description in this datasheet can be revised without any notice to describe its electrical characteristics properly.