FEATURES

- Input Operating Voltage Range up to 20V
- 1.0μA Typical Quiescent Current
- 2% Output Voltage Accuracy
- Stable with 2.2μF MLCC
- Output Current up to 250mA
- Short Circuit Protection
- Available in TO-92 and SOT-89 Packages

APPLICATIONS

- Battery Powered Equipment
- Battery-Powered Alarm Circuits
- Portable Cameras and Video Recorders
- Microcontroller Power
- PDAs
- Reference Voltage Sources
- Consumer Products

DESCRIPTION

The TJ75xx is family of CMOS low dropout Regulator with high input voltage maximum 20V.
The load current is up to 250mA. The typical quiescent current is only 1μA.
The TJ75xx can operate with low cost ceramic capacitors, 2.2μF MLCCs.


TO-92 (Straight)


TO-92 (Bent)


SOT-89-3

ORDERING INFORMATION

Device	Package
TJ75xxG	TO-92 (Straight)
TJ75xxGTA	TO-92 (Bent)
TJ75xxGF	SOT-89-3L

xx: Output Voltage

ABSOLUTE MAXIMUM RATINGS (Note 1)

CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
Input Supply Voltage	V_{IN}	−0.3	28	V
Operating Junction Temperature	T_J	−40	125	°C
Lead Temperature (Soldering, 10 seconds)	T_{SOL}	-	260	°C
Storage Temperature Range	T_{STG}	−65	150	°C

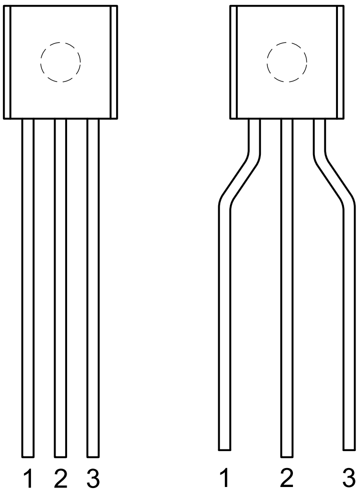
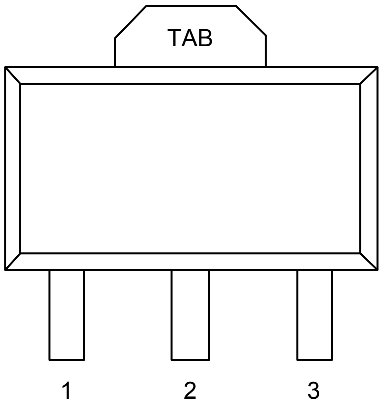
RECOMMENDED OPERATING RATINGS (Note 2)

CHARACTERISTIC	SYMBOL	MIN	MAX	UNIT
Input Supply Voltage	V_{IN}	-	20	V
Output Current	I_{OUT}	-	250	mA

ORDERING INFORMATION

VOUT	Package	Order No.	Description	Supplied As	Status
3.3V	TO-92 (Straight)	TJ7533G	Straight Lead	Bulk	Contact Us
	TO-92 (Bent)	TJ7533GTA	Bend Lead (0.2 In Line Spacing)	Tape & Ammo Pack	Contact Us
	SOT-89-3L	TJ7533GF		Tape & Reel	Active
5.0V	TO-92 (Straight)	TJ7550G	Straight Lead	Bulk	Active
	TO-92 (Bent)	TJ7550GTA	Bend Lead (0.2 In Line Spacing)	Tape & Ammo Pack	Contact Us
	SOT-89-3L	TJ7550GF		Tape & Reel	Active

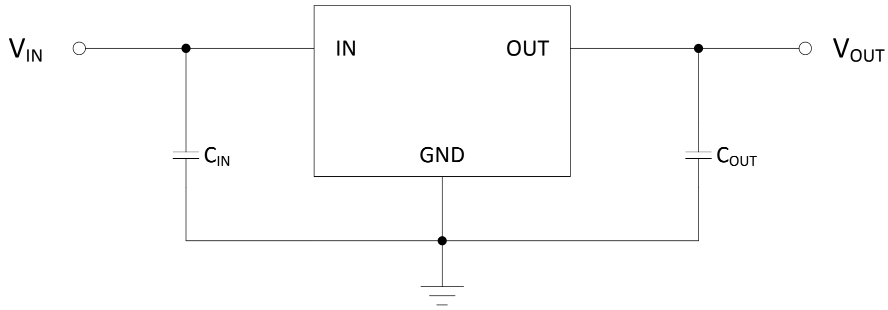
PIN CONFIGURATION

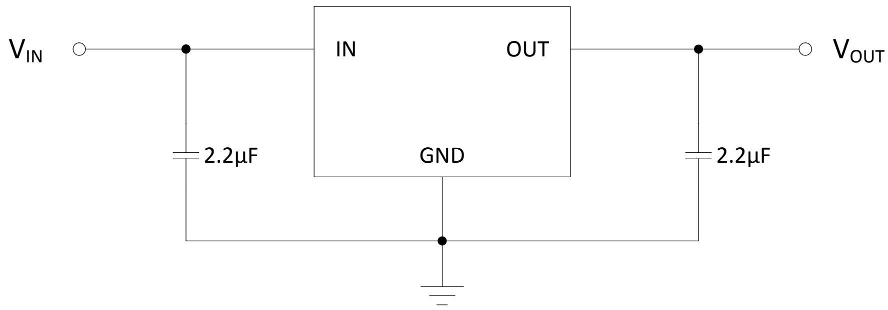
SOT-23	SOT-89-3L
(Top View) 	

PIN DESCRIPTION

Pin No.		Pin Name	Pin Function
TO-92	SOT-89-3L		
1	1	GND	Ground.
2	2	IN	Input Voltage.
3	3	OUT	Output Voltage.
-	TAB	TAB	Connect to IN. Put a copper plane connected to this pin as a thermal relief.

TYPICAL APPLICATION CIRCUIT





ELECTRICAL CHARACTERISTICS

Unless otherwise specified: T_J = 25ºC, V_{IN} = V_{OUT} + 1.0 V, C_{IN} = C_{OUT} = 2.2 µF

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT} = 1.0 mA	–2.0	-	2.0	%
Quiescent Current (Note 3)	I_Q	1.0 mA ≤ I_{OUT} ≤ 250 mA	-	1.0	3.0	µA
Line Regulation	ΔV_{LINE}	V_{OUT} +1.0 V ≤ V_{IN} ≤ 20 V, I_{OUT} = 1.0 mA	-	0.02	0.3	%/V
Load Regulation (Note 4)	ΔV_{LOAD}	1.0 mA ≤ I_{OUT} ≤ 250 mA	-	1.0	3.0	%
Dropout Voltage (Note 5)	V_{DROP}	I_{OUT} = 160 mA, V_{OUT} = 5.0 V	-	400	700	mV
Power Supply Ripple Rejection	PSRR	V_{IN} = 6.0 V, V_{OUT} = 5.0 V, I_{OUT} = 1.0 mA, f = 100 Hz	-	38	-	dB
OCP Threshold Level	I_{OCP}		-	700	-	mA
VOUT Temperature Coefficient	TC_{VOUT}		-	100	-	ppm/°C

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. The device is not guaranteed to function outside its operating ratings.

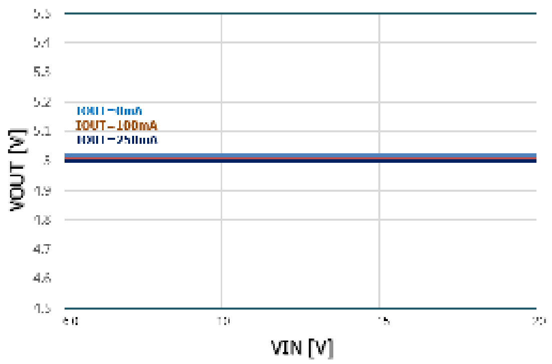
Note 3. Ground current, or quiescent current, is the difference between input and output currents. It's defined by I_{GND} = I_{IN} – I_{OUT} under the given loading condition. The total current drawn from the supply is the sum of the load current plus the ground pin current.

Note 4. Load regulation is measured using pulse techniques with 5% duty cycle.

Note 5. The dropout voltage is defined as the input-to-output differential when the output voltage drops to 98% of its nominal value with V_{OUT} to V_{IN}.

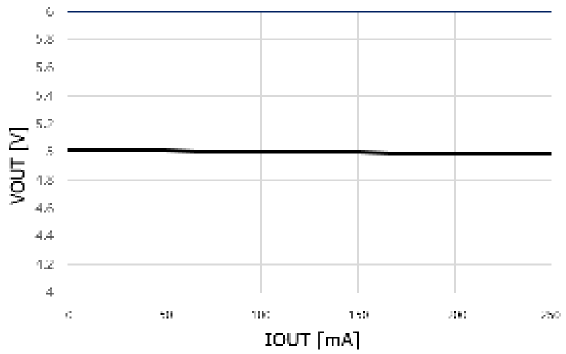
TYPICAL OPERATING CHARACTERISTICS

< VOUT = 5.0V >



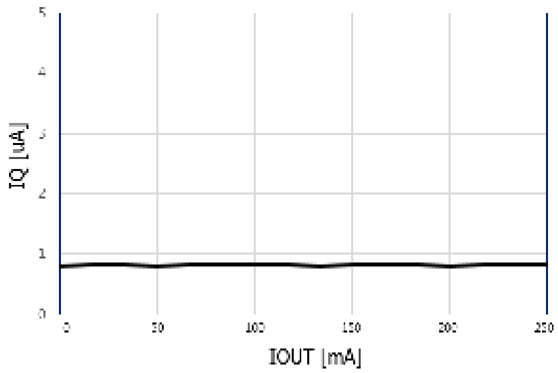
VIN=6.0V to 20V, VOUT=5.0V @ IOUT=0A/100mA/250mA

VIN vs. VOUT



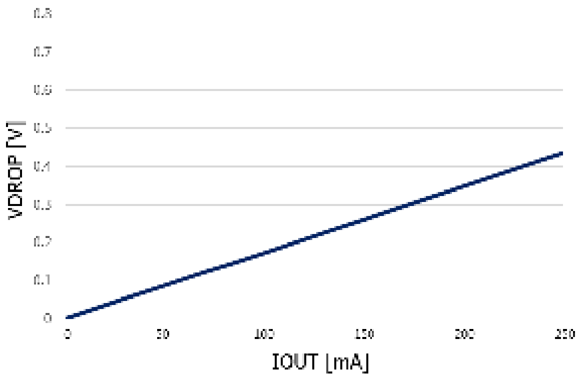
VIN=6.0V, VOUT=5.0V @ IOUT=250mA per 10mA step

IOUT vs. VOUT



VIN=6.0V, VOUT=5.0V @ IOUT=250mA per 10mA step

IOUT vs. IQ



VIN=6.0, VOUT=5.0V @ IOUT=250mA per 10mA step

IOUT vs. VDROP

APPLICATION INFORMATION

MAXIMUM OUPUT CURRENT CAPABILITY

The TJ75xx 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 TJ75xx. Under all possible conditions, the junction temperature must be within the range specified under operating conditions.
The temperatures over the device are given by:

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

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, θ_{JA}, can be calculated using the formula:

$$\theta_{JA} = T_{Rmax} / P_D$$

TJ75xx is available in TO-92 and SOT-89-3L packages. The thermal resistance depends on amount of copper area or heat sink, and on air flow. If proper cooling solution such as copper plane area, heat sink or 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 is subject to change without any notice to describe its electrical characteristics properly.