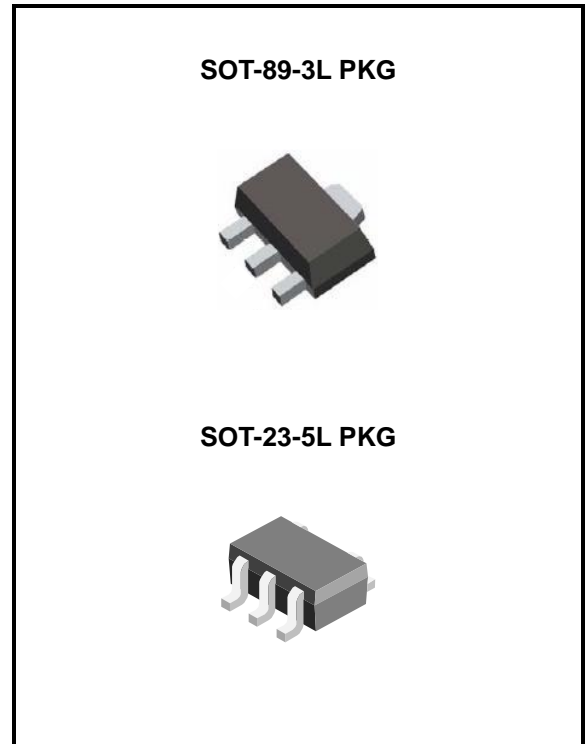


## FEATURES

- Input Operating Voltage Range : 2.7V to 30V
- 1uA Typical Quiescent Current
- 2% Output Voltage Accuracy
- Stable with 1uF MLCC
- Output Current up to 100mA
- Over Current Protection
- Moisture Sensitivity Level 3

## APPLICATION

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



## ORDERING INFORMATION

DEVICE	PACKAGE
TJ75XXAGF	SOT-89-3L
TJ75XXAGSF5	SOT-23-5L

X.X = Output Voltage = 3.3 / 5.0

## DESCRIPTION

The TJ75XXA is family of CMOS low dropout Regulator with high input voltage  $V_{IN\_MAX}=30V$ . The load current is up to 100mA. The quiescent current (typical) is only 1uA. The TJ75XXA can operate with low cost ceramic capacitors, 1uF MLCC capacitors.

## ABSOLUTE MAXIMUM RATINGS

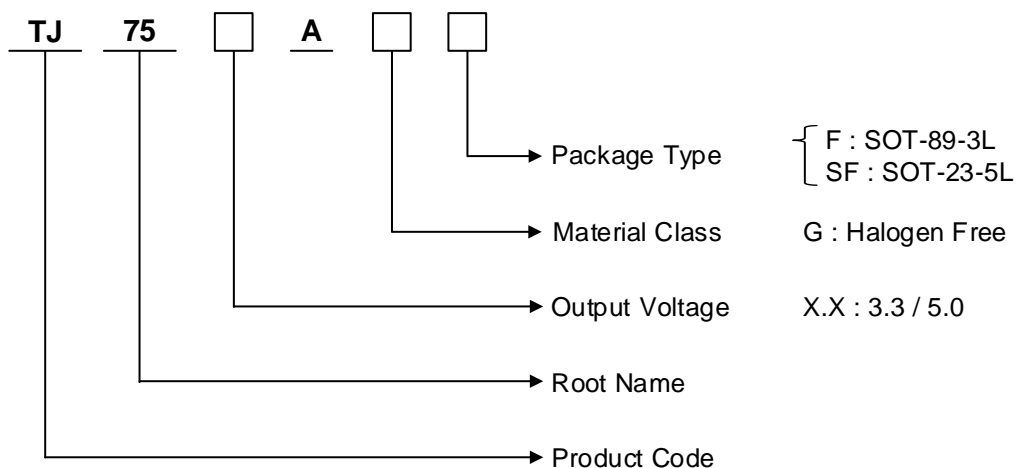
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Supply Voltage	$V_{IN}$	-	33	V
Maximum Output Current	$I_{OUT}$	-	100	mA
Lead Temperature (Soldering, 10 sec)	$T_{SOL}$		260	°C
Storage Temperature Range	$T_{STG}$	-65	150	°C
Maximum Operating Junction Temperature	$T_J$	-40	125	°C
Operating Ambient Temperature Range	$T_{OPR}$	-40	85	°C

## RECOMMENDED OPERATING CONDITIONS

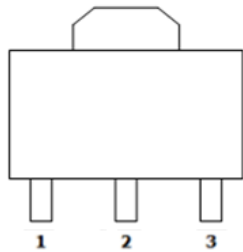
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Voltage	V <sub>IN</sub>	-	30	V
Output Current	I <sub>OUT</sub>	-	100	mA
Operating Ambient Temperature Range	T <sub>OPR</sub>	0	70	°C

## ORDERING INFORMATION

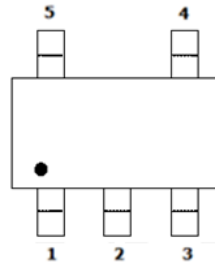
V <sub>OUT</sub>	PACKAGE	ORDER NO.	DESCRIPTION	STATUS
3.3V	SOT-89-3L	TJ7533AGF	100mA, Fixed	Active
	SOT-23-5L	TJ7533AGSF5	100mA, Fixed	Contact Us
5.0V	SOT-89-3L	TJ7550AGF	100mA, Fixed	Active
	SOT-23-5L	TJ7550AGSF5	100mA, Fixed	Contact Us



## PIN CONFIGURATION



SOT-89-3L

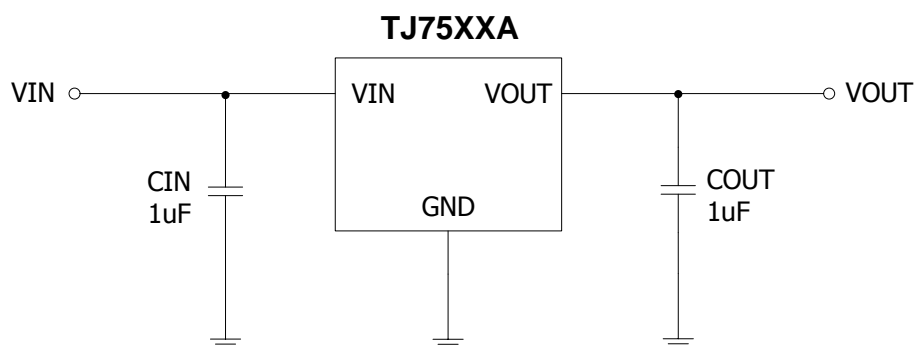


SOT-23-5L

## PIN DESCRIPTION

PACKAGE		NAME	FUNCTION
SOT-89-3L	SOT-23-5L		
1	1	GND	Ground
2	2	VIN	Input Voltage
3	3	VOUT	Output Voltage
-	4	NC	No Connect
-	5	NC	No Connect

## TYPICAL APPLICATION



**ELECTRICAL CHARACTERISTIC**(Note 1)

Unless otherwise specified all limits at  $V_{IN}=V_{OUT}+1V$  (But  $V_{IN} > 2.7V$ ),  $T_J=25^\circ C$ ,  $C_{IN}=C_{OUT}=1\mu F$

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage Range	$V_{IN}$		2.7		30	V
Output Voltage Accuracy	$V_{OUT}$	$I_{OUT}=1mA$	-2		2	%
Quiescent Current (Note2)	$I_Q$	$1mA < I_{OUT} < 50mA$		1	3	$\mu A$
Line Regulation	$\Delta V_{LINE}$	$3V < V_{IN} < 30V$ (For $V_{OUT} < 2V$ ) or $V_{OUT}+1V < V_{IN} < 30V$ , $I_{OUT}=1mA$		0.02	0.2	%/V
Load Regulation (Note3)	$\Delta V_{LOAD}$	$V_{IN}=V_{OUT}+2V$ , $1mA < I_{OUT} < 50mA$		25	60	mV
Dropout Voltage	$V_{DROP}$	$I_{OUT}=50mA$ , $V_{OUT}$ drop 2%, $V_{OUT}=3.3V$		600		mV
OCP Threshold Level	$I_{OCP}$			200		mA
$V_{OUT}$ Temperature Coefficient	$TC_{V_{OUT}}$			100		ppm/ $^\circ C$

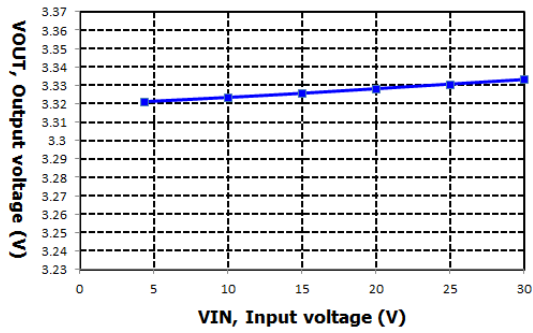
Note 1. Stresses listed as the absolute maximum ratings may cause permanent damage to the device. These are for stress ratings. Functional operating of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibly to affect device reliability.

Note 2. 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. Load Regulation is measured using pulse techniques with duty cycle = 5%

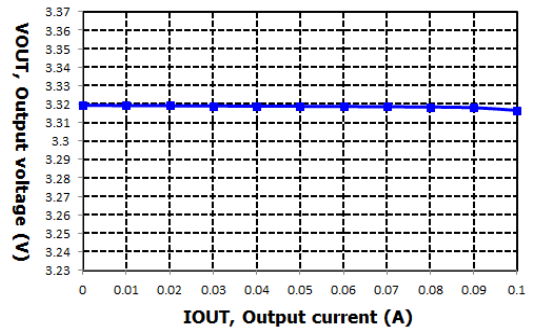
## TYPICAL OPERATING CHARACTERISTICS

### VIN vs. VOUT



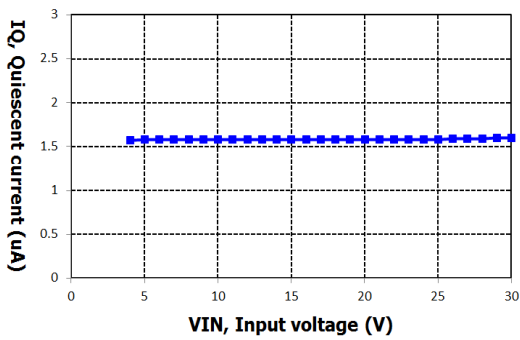
VIN=4.3V to 30V, VOUT=3.3V @ IOU=10mA

### IOU vs. VOUT



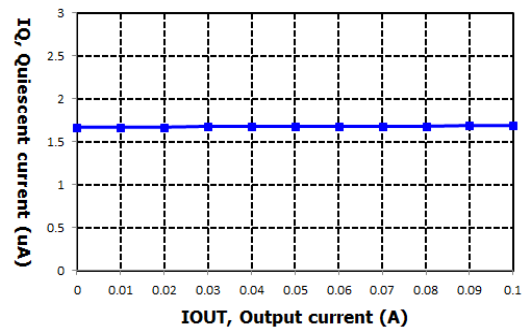
VIN=4.3V, VOUT=3.3V @ IOU=100mA per 10mA step

### VIN vs. IQ



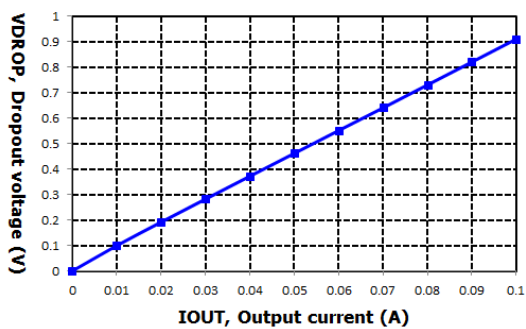
VIN=4.3V to 30V, VOUT=3.3V

### IOU vs. IQ



VIN=4.3V, VOUT=3.3V @ IOU=100mA per 10mA step

### IOU vs. VDROPP



VIN=5V, VOUT=3.3V @ IOU=100mA per 10mA step

## APPLICATION INFORMATION

### Maximum Output Current Capability

The TJ75XXA can deliver a continuous current of 100mA 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 100mA may be still undeliverable due to the restriction of the power dissipation of TJ75XXA. 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,  $\theta_{CA}$  is the thermal resistance of case-to-ambient,  $\theta_{JC}$  is the thermal resistance of junction-to-case, and  $\theta_{JA}$  is the thermal resistance of junction to ambient.

The total power dissipation of the device is given by:

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

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:

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

TJ75XXA is available in TO-92 and SOT-89 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.