

## FEATURES

- Input Operating Voltage Range : 2.7V to 20V
- 1uA Typical Quiescent Current
- 2% Output Voltage Accuracy
- Stable with 2.2uF MLCC
- Output Current is 250mA
- Short Circuit Protection

## APPLICATION

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

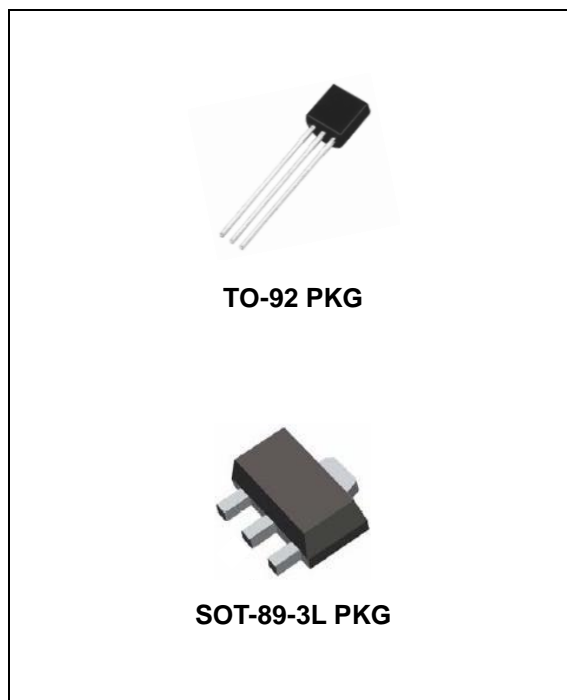
## DESCRIPTION

The TJ75XXG series are family of CMOS low dropout Regulator with high input voltage  $V_{IN\_MAX}=20V$ .

The load current is up to 250mA.

The quiescent current (typical) is only 1uA.

The TJ75XXG series can operate with low cost ceramic capacitor, 2.2uF MLCC capacitors.



TO-92 PKG

SOT-89-3L PKG

## ORDERING INFORMATION

DEVICE	PACKAGE
TJ75XXG	TO-92 (Bulk)
TJ75XXGTA	TO-92 (Tape)
TJ75XXGF	SOT-89-3L

X.X = Output Voltage = 3.3, 5.0

## ABSOLUTE MAXIMUM RATINGS

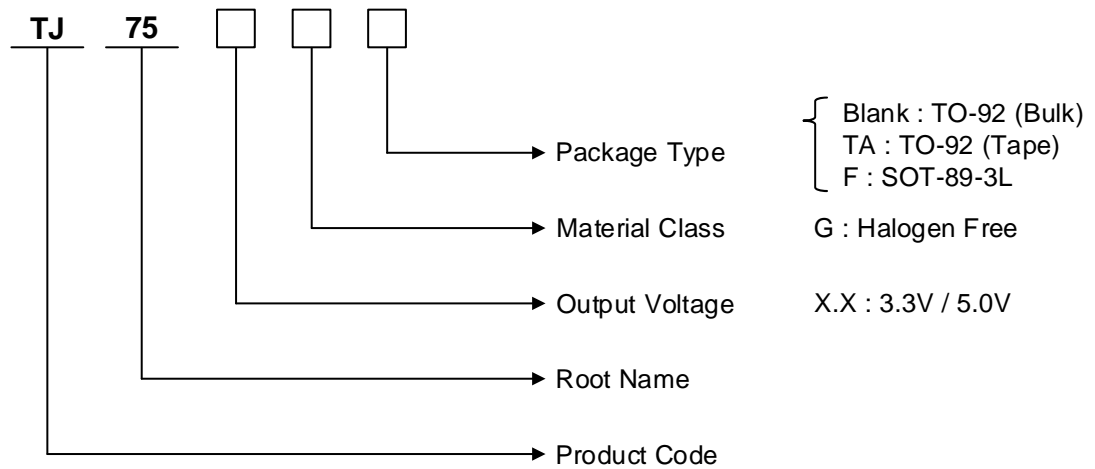
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Input Supply Voltage	$V_{IN}$	-	28	V
Maximum Output Current	$I_{OUT}$	-	500	mA
Lead Temperature (Soldering, 10 sec)	$T_{SOL}$		260	°C
Storage Temperature Range	$T_{STG}$	-65	150	°C
Operating Junction Temperature Range	$T_{JOPR}$	-40	125	°C

## OPERATING RATINGS

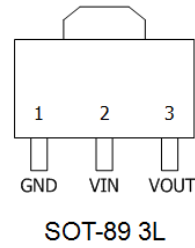
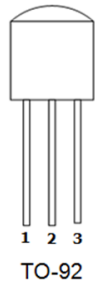
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Recommend Operating Input Voltage	$V_{IN}$	-	20	V

## ORDERING INFORMATION

VOUT	PACKAGE	ORDER NO.	DESCRIPTION	PACKAGE MARKING	STATUS
3.3V	TO-92 (Bulk)	TJ7533G	250mA, Fixed	7533	Contact Us
	TO-92 (Tape)	TJ7533GTA	250mA, Fixed	7533	Contact Us
	SOT-89-3L	TJ7533GF	250mA, Fixed	7533	Active
5.0V	TO-92 (Bulk)	TJ7550G	250mA, Fixed	7550	Active
	TO-92 (Tape)	TJ7550GTA	250mA, Fixed	7550	Contact Us
	SOT-89-3L	TJ7550GF	250mA, Fixed	7550	Active



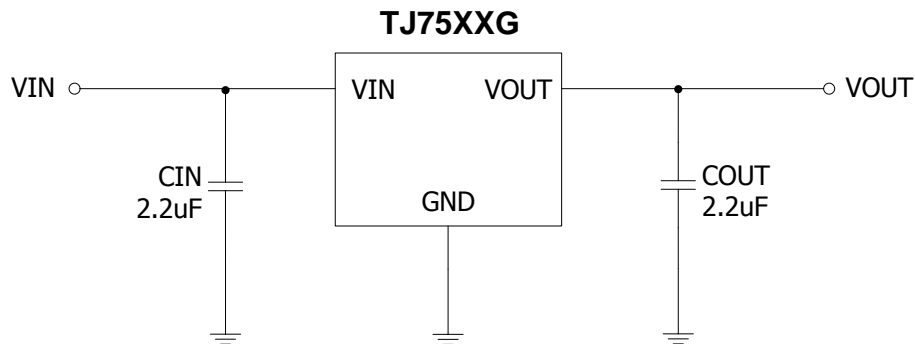
## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	TO-92 / SOT-89-3L	
	NAME	FUNCTION
1	GND	Ground
2	VIN	Input Voltage
3	VOUT	Output Voltage

## TYPICAL APPLICATION



## ELECTRICAL CHARACTERISTICS<sup>(Note 1)</sup>

Unless otherwise specified all limits at  $V_{in}=V_{out}+1V$  (But  $V_{in} > 2.7V$ ),  $T_J=25^{\circ}C$ ,  $C_{IN}=C_{OUT}=2.2\mu F$

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage Range	$V_{IN}$		2.7		20	V
Output Voltage Accuracy	$V_{OUT}$	$I_{OUT}=1mA$	-2		2	%
Quiescent Current <sup>(Note2)</sup>	$I_Q$	$1mA < I_{OUT} < 250mA$		1	3	$\mu A$
Line Regulation	$\Delta V_{LINE}$	$3V < V_{IN} < 20V$ (For $V_{OUT} < 2V$ ) or $V_{OUT}+1V < V_{IN} < 20V$ , $I_{OUT}=1mA$		0.02	0.3	%/V
Load Regulation <sup>(Note3)</sup>	$\Delta V_{LOAD}$	$1mA < I_{OUT} < 250mA$ , DC=5%		1	3	%
Dropout Voltage	$V_{DROP}$	$I_{OUT}=160mA$ , $V_{OUT}$ drop 2%, $V_{OUT}=5V$		400	700	mV
Power Supply Ripple Rejection	PSRR	$V_{IN}=6V$ , $V_{OUT}=5V$ , $I_{OUT}=1mA$ , $f=100Hz$		38		dB
OCP Threshold Level	$I_{OCP}$			700		mA
$V_{OUT}$ Temperature Coefficient	$TC_{V_{OUT}}$			100		ppm/ $^{\circ}C$

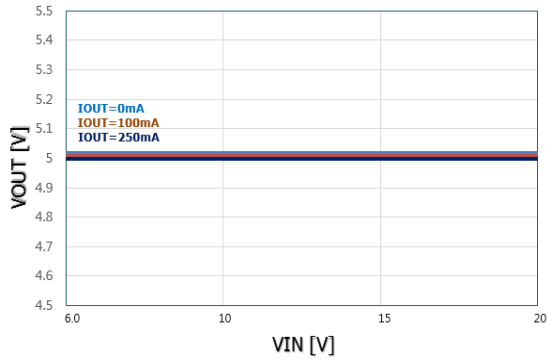
Note 1. Stresses listed as the absolute maximum ratings may cause permanent damage to the device. These are for stress ratings. Functional operating of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute 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  $I_{GND1} = I_{IN} - I_{OUT}$  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%

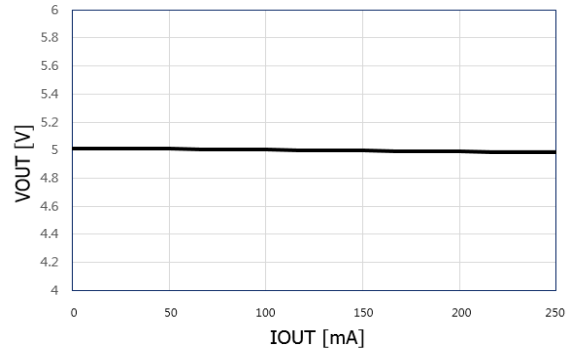
## TYPICAL OPERATING CHARACTERISTIC

- VOUT vs. IOUT, VIN



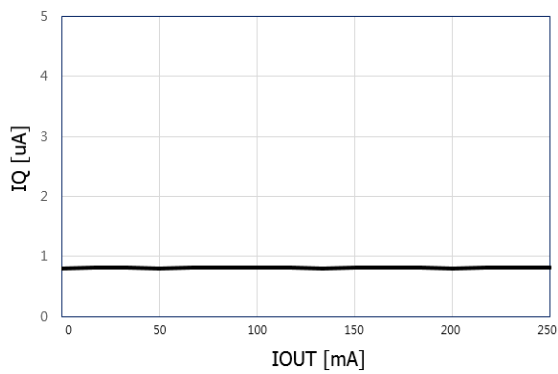
VIN=6.0V to 20V, VOUT=5.0V @ IOUT=0A/100mA/250mA

- VOUT vs. IOUT



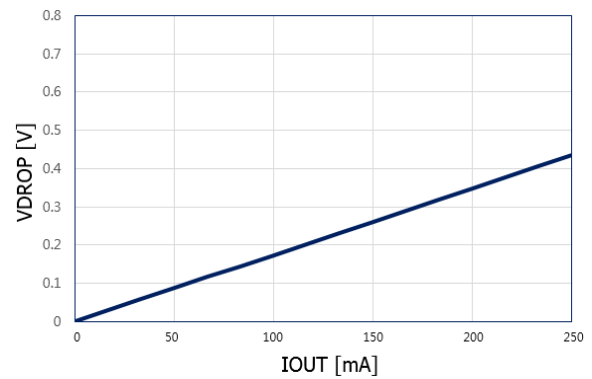
VIN=6.0V, VOUT=5.0V @ IOUT=250mA per 10mA step

- IQ vs. IOUT



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

- VDROPP vs. IOUT



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

## APPLICATION INFORMATION

### Maximum Output Current Capability

The TJ75XXG series 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 TJ75XXG series. 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 ( $T_{Jmax}$ ):

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

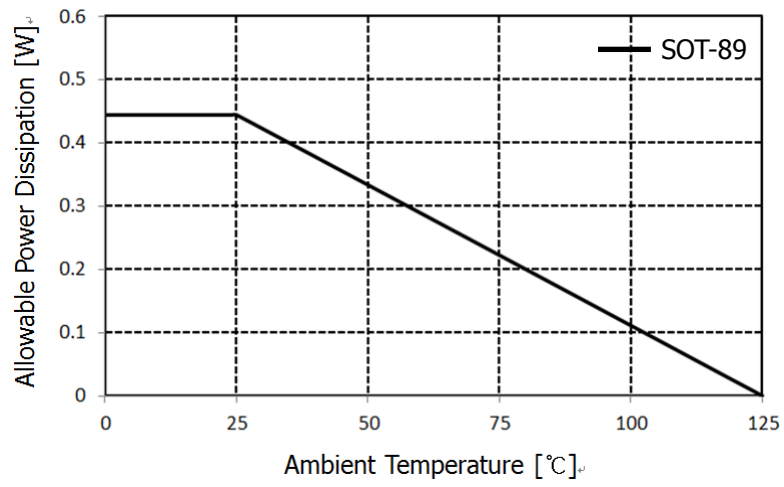
The maximum allowable value for junction-to-ambient thermal resistance,  $\theta_{JA}$ , can be calculated using the formula:

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

TJ75XXG series 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.

Power Dissipation( $P_D$ ) vs. Ambient Temperature( $T_A$ )



## REVISION NOTICE

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