

## Features

- Input voltage:1.5V~6.5V
- Output range:1.2V~5.0V
- Maximum output current: 400mA @ VOUT=3.3V
- PSRR: 60dB @1KHz

- Dropout voltage:180mV @ IOUT=100mA
- Quiescent current: 0.5µA Typ.
- Shut-down current: <1µA
- Recommend capacitor:1µF

Built-in Short-Circuit Protection, Current
Limiter

## Applications

- Radio control systems
- Cellphones, radiophone, digital cameras
- Bluetooth, wireless handsets
- Others portable consumer equipments

## **General Description**

The TX6214 is a high accuracy, low noise, high speed CMOS Linear regulator with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. The devices offer a new level of cost effective performance in cellular phones, laptop and notebook computers, and other portable devices.

The current limiter's fold-back circuit also operates as a short circuit protection and an output current limiter at the output pin.

The TX6214 regulators are available in standard SOT23-3, SOT23-5 and DFN1\*1-4 packages. Standard products are Pb-free and Halogen-free.

# Selection TablePart No.Package

Part No.	Package	Temperature	Tape & Reel
TX6214-XXMR	SOT23-3	-40 ~ +125℃	3000/REEL
TX6214-XXM5R	SOT23-5	-40 ~ +125 ℃	3000/REEL
TX6214-XXFCR	DFN1*1-4	-40 ~ +125 ℃	10000/REEL
TX6214-XXPR	SOT89-3	-40 ~ +125 ℃	1000/REEL

Note: XX indicates 1.2V~5.0V by 0.1V step. For example, 28 means product outputs 2.8V

# Order Information

TX6214-112345	
---------------	--

0000		
Designator	Symbol	Description
(1)(2)	Output Voltage(1.2~5.0V)	
	М	Package:SOT23-3
$\bigcirc$	M5	Package:SOT23-5
(3)(4)	FC	Package: DFN1*1-4
	Р	Package: SOT89-3
ß	R	RoHS / Pb Free
$(\underline{0})$	G	Halogen Free

1



# **Block Diagram**



# **Pin Assignment**

SOT23-3 (Top View)



SOT23-5 (Top View)

Mark

2

5

1

## Table1: TX6214-XXMR series (SOT23-3 PKG)

PIN NO.	PIN NAME	FUNCTION	
1	GND	GND pin	
2	VOUT	Output voltage pin	
3	VIN	Input voltage pin	

#### Table2: TX6214-XXM5R series (SOT23-5 PKG)

PIN NO	PIN NAME	FUNCTION
1	VIN	Input
2	GND	Ground
3	EN	Enable(Active high, not floating)
4	NC	Not connected
5	VOUT	Output

## DFN1\*1-4L

3

4



## SOT89 (Top View)



#### Table3: TX6214-XXFCR series (DFN1\*1-4PKG)

PIN NO PIN NAME		FUNCTION	
1	VOUT	Output	
2	GND	Ground	
3	EN	Enable(Active high, not floating)	
4	VIN	Input	

#### Table4: TX6214-XXPR series (SOT89 PKG)

PIN NO.	PIN NAME	FUNCTION	
1	GND	GND pin	
2	VIN	Input voltage pin	
3	VOUT	Output voltage pin	



http://www.txsemi.com

### **Absolute Maximum Ratings**

Input Voltage.....0.3V to 8V Output Current.....450mA

Operating Temperature ......-40°C to 125°C

Storage Temperature ......55  $^\circ\!\mathrm{C}$  to 150  $^\circ\!\mathrm{C}$  Package Lead Soldering Temperature.....260  $^\circ\!\mathrm{C}$ 

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

## **Thermal Information**

Symbol	Parameter	Package	Max.	Unit
		SOT23-3	260	°C/W
A.,	Thermal Resistance (Junction to Ambient)	SOT23-5	260	
UJA	(Assume no ambient airflow, no heat sink)	DFN1*1-4	300	
		SOT89	200	
Po		SOT23-3	0.40	W
	Power Dissipation	SOT23-5	0.40	
		DFN1*1-4	0.40	
		SOT89	0.50	

Note:  $P_D$  is measured at Ta=  $25^\circ\!\mathrm{C}$ 

## **Electrical Characteristics**

The following specifications apply for V\_OUT=3.3V,T\_A=25  $^\circ\!\mathrm{C},$  unless specified otherwise

SYMBOL	ITEMS	CONDITIONS	MIN	ТҮР	MAX	UNIT	
V <sub>IN</sub>	Input Voltage		1.5		6.5	V	
	Output Dance	Vouт≤2.5V , Iouт=1mA	V <sub>оит</sub> -50	V <sub>OUT</sub>	V <sub>OUT</sub> +50	mV	
VOUT	Ouipul Range	2.5V≤V <sub>OUT</sub> ≤5V , I <sub>OUT</sub> =1mA	-2	V <sub>OUT</sub>	2	%	
lα	Quiescent Current	V <sub>OUT</sub> =3.3V, I <sub>OUT</sub> =0		0.5		μA	
ILIMIT	Current Limit	V <sub>IN</sub> =V <sub>EN</sub> =4.5V		400		mA	
M		V <sub>OUT</sub> =3.3V, I <sub>OUT</sub> =100mA		180			
VDROP	Dropout Voltage	V <sub>OUT</sub> =3.3V, I <sub>OUT</sub> =200mA		400		mv	
$ riangle V_{\text{LINE}}$	Line Regulation	V <sub>IN</sub> =2.7~5.5V, I <sub>OUT</sub> =1mA		0.01	0.15	%/V	
$ riangle V_{LOAD}$	Load Regulation	V <sub>OUT</sub> =3.3V, I <sub>OUT</sub> =1~300mA		40		mV	
ISHORT	Short Current	$V_{\text{EN}}{=}V_{\text{IN}},~V_{\text{OUT}}$ Short to GND with $1\Omega$		35		mA	
I <sub>SHDN</sub>	Shut-down Current	V <sub>EN</sub> =0V			1	μA	
PSRR	Power Supply Rejection Rate	V <sub>IN=</sub> 5V <sub>DC</sub> +0.5V <sub>P-P</sub> F=1KHz, I <sub>OUT</sub> =10mA		60		dB	
V <sub>ENH</sub>	EN logic high voltage	V <sub>IN</sub> =5.5V, I <sub>OUT</sub> =1mA	1.2		Vin	V	
VENL	EN logic low voltage	VIN=5.5V, VOUT=0V			0.4	V	
I <sub>EN</sub>	EN Input Current	V <sub>EN</sub> = 0 to 5.5V			1	μA	



200

250

300

350

**Application Circuits** 



## **Typical Performance Characteristics**

C<sub>IN</sub>=1uF, C<sub>OUT</sub>=1uF, V<sub>IN</sub>=4.5V, V<sub>OUT</sub>=3.3V, SOT23-5, T<sub>A</sub>=25°C

(Unless specified otherwise.Package:SOT23-5L)

(1) Quiescent current vs Input voltage



(2) Output Voltage vs Input voltage



## (3) PSRR vs Frequency





http://www.txsemi.com

#### Power ON / OFF





### **EN ON/OFF**

1 2 1.00V/ 3 2.00V/ 4 1.00V	VIN=4.0V	F 4 1.76V
		<del>采集</del> 标准模式 20.0MSa/s
EN	EN=4.0V	通道 DC BW 1.00.1 DC 10.0.1 DC 10.0.1
3.0°	VOUT=3.3V	(C 8W 1001 税量 最大电平(2) 4、08V 最大电平(3)
VOUT		4.18V 最大电平(4) 3.42V



### **Line Transient**





## Load Transient







## **Application Information**

In general, all the capacitors need to be low leakage. Any leakage the capacitors have will reduce efficiency, increase the quiescent current.

A recent trend in the design of portable devices has been to use ceramic capacitors to filter DC-DC converter inputs. Ceramic capacitors are often chosen because of their small size, low equivalent series resistance (ESR) and high RMS current capability. Also, recently, designers have been looking to ceramic capacitors due to shortages of tantalum capacitors.

Unfortunately, using ceramic capacitors for input filtering can cause problems. Applying a voltage step to a ceramic capacitor causes a large current surge that stores energy in the inductance of the power leads. A large voltage spike is created when the stored energy is transferred from these inductance into the ceramic capacitor. These voltage spikes can easily be twice the amplitude of the input voltage step.

Many types of capacitors can be used for input by-pass, however, caution must be exercised when using multi layer ceramic capacitors (MLCC). Because of the self-resonant be generated under some start-up conditions, such as connecting the LDO input to a live power source.

The LDO also requires an output capacitor for loop stability. Connect a 1uF tantalum capacitor from OUT to GND close to the pins. For improved transient response, this output capacitor may be ceramic.



TX6214 series

Ultra Low Current Consumption 400mA CMOS Voltage Regulator

**Marking Description** 









**SOT89** 

① product code: 4

2	output	voltage	code:
---	--------	---------	-------

Symbol	Voltage(V)	Symbol	Voltage(V)	Symbol	Voltage(V)	Symbol	Voltage(V)
а	0.9	А	3.5	n	2.2	Ν	4.8
b	1.0	В	3.6	0	2.3	0	4.9
С	1.1	С	3.7	Р	2.4	Р	5.0
d	1.2	D	3.8	q	2.5	Q	5.1
е	1.3	E	3.9	r	2.6	R	5.2
f	1.4	F	4.0	S	2.7	S	5.3
g	1.5	G	4.1	t	2.8	Т	5.4
h	1.6	Н	4.2	u	2.9	U	5.5
i	1.7		4.3	V	3.0	V	5.6
j	1.8	J	4.4	W	3.1	W	5.7
k	1.9	K	4.5	Х	3.2	Х	5.8
	2.0	L	4.6	У	3.3	Y	5.9
m	2.1	М	4.7	Z	3.4	Z	6.0

(3)(4): The last two of them are based on the time of this product which is the first time into production, the third is the year of this product first time into production, such as expressed in "1" in 2021, in "2" in 2022 and the forth is the mouth of this product first time into production, it can be in 1 ~ 9, which is expressed in "0" in October, in November with an "A", in December with "B"; For example: 4y16 represents TX6214-33M5R product is first put into production in June in 2021.



**TX6214 Series** Ultra Low Current Consumption 400mA CMOS Voltage Regulator



## ① output voltage code:

Symbol	Voltage(V)	Symbol	Voltage(V)	Symbol	Voltage(V)	Symbol	Voltage(V)
а	0.9	А	3.5	n	2.2	Ν	4.8
b	1.0	В	3.6	0	2.3	0	4.9
С	1.1	С	3.7	Р	2.4	Р	5.0
d	1.2	D	3.8	q	2.5	Q	5.1
е	1.3	E	3.9	r	2.6	R	5.2
f	1.4	F	4.0	S	2.7	S	5.3
g	1.5	G	4.1	t	2.8	Т	5.4
h	1.6	Н	4.2	u	2.9	U	5.5
i	1.7		4.3	V	3.0	V	5.6
j	1.8	J	4.4	W	3.1	W	5.7
k	1.9	K	4.5	Х	3.2	Х	5.8
	2.0	L	4.6	у	3.3	Y	5.9
m	2.1	М	4.7	Z	3.4	Z	6.0

(2)(3): The last two of them are based on the time of this product which is the first time into production, the third is the year of this product first time into production, such as expressed in "1" in 2021, in "2" in 2022 and the forth is the mouth of this product first time into production, it can be in 1  $\sim$  9, which is expressed in "0" in October, in November with an "A", in December with "B"; . For example: 4y16 represents TX6214-33M5R product is first put into production in June in 2021.



TX6214 series Ultra Low Current Consumption 400mA CMOS Voltage Regulator

# Package Information 3-pin SOT23-3 Outline Dimensions





	Dimensions Is	Nillimatana	Dimensione In Inches		
Symbol	Dimensions in Min	h Millimeters Max	Dimensions Nin	In Inches Max	
Α	1.050	1.250	0.041	0.049	
A1	0.000	0.100	0.000	0.004	
A2	1.050	1.150	0.041	0.045	
b	0.300	0.500	0.012	0.020	
С	0.100	0.200	0.004	0.008	
D	2.820	3.020	0.111	0.119	
E	1.500	1.700	0.059	0.067	
E1	2.650	2.950	0.104	0.116	
е	0.950(BSC)		0.037(BSC)		
e1	1.800	2.000	0.071	0.079	
L	0.300	0.600	0.012	0.024	
θ	0°	8°	0°	8°	

₹.



TX6214 series

Ultra Low Current Consumption 400mA CMOS Voltage Regulator

SOT23-5 Outline Dimensions







Cumb al	Dimensions I	n Millimeters	Dimensions In Inches		
Symbol	Min	Max	Min	Max	
A	1.050	1.250	0.041	0.049	
A1	0.000	0.100	0.000	0.004	
A2	1.050	1.150	0.041	0.045	
b	0.300	0.500	0.012	0.020	
С	0.100	0.200	0.004	0.008	
D	2.820	3.020	0.111	0.119	
E	1.500	1.700	0.059	0.067	
E1	2.650	2.950	0.104	0.116	
e	0.950	(BSC)	0.037(BSC)		
e1	1.800	2.000	0.071	0.079	
L	0.300	0.600	0.012	0.024	
θ	0°C	8°C	0°C	8°C	



# **DFN1\*1-4** Outline Dimensions



SYMPOT	MILLIMETER			
SIMBOL	MIN	MID	MAX	
Α	0.45	0. 50	0.55	
A1	0.00	0.02	0.05	
Ъ	0. 15	0.20	0. 25	
c	0. 127REF			
D	0.95	1.00	1.05	
D2	0.38	0.48	0. 58	
D3	0.23	0. 33	0.43	
e	0. 65BSC			
Е	0.95	1.00	1.05	
E2	0.38	0.48	0. 58	
E3	0.23	0. 33	0.43	
L	0.20	0.25	0.30	
L2	0.103REF			
L3	0.075REF			
L4	0.20SREF			
L5	0.200REF			



TX6214 series Ultra Low Current Consumption 400mA CMOS Voltage Regulator

# 3-pin SOT89 Outline Dimensions



Sumbal	Dimensions	In Millimeters	Dimensions In Inches		
Symbol	Min.	Max.	Min.	Max.	
Α	1.400	1.600	0.055	0.063	
b	0.320	0.520	0.013	0.020	
b1	0.400	0.580	0.016	0.023	
С	0.350	0.440	0.014	0.017	
D	4.400	4.600	0.173	0.181	
D1	1.550 REF.		0.061 REF.		
E	2.300	2.600	0.091	0.102	
E1	3.940	4.250	0.155	0.167	
е	1.500 TYP.		0.060 TYP.		
e1	3.000 TYP.		0.118 TYP.		
L	0.900	1.200	0.035	0.047	



#### © Shanghai TX Electronics Sci-Tech Co., Ltd

TX cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a TX product. No circuit patent license, copyrights or other intellectual property rights are implied. TX reserves the right to make changes to their products or specifications without notice. Customers are advised to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete.