

Ultra Low Current Consumption CMOS Voltage Regulator RC6239 series

Features

- Vin Range up to 30V
- Output range: 2.6V~5.0V
- Maximum output current: 300mA
- PSRR: 70dB @1KHz
- Dropout voltage: 320mV @ IOUT=100mA
- Ultra low quiescent current: 1.5μA Typ.
- Output voltage tolerances of ±2% Over the temperature range
- Internal thermal overload protection
- Built-in Short-Circuit Protection, Current Limiter

Applications

- E-meters, Water Meters and Gas Meters
- Cellphones, radiophone, digital cameras
- Fire Alarm, Smoke Detector
- Appliances and White Goods

General Description

The RC6239 is ultra-low quiescent current regulator features and low dropout voltage. With 2μA quiescent current at no load. The RC6239 retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

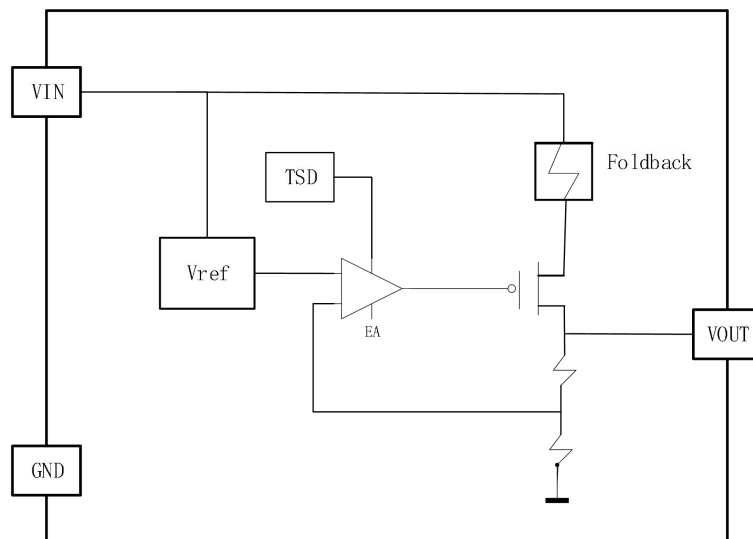
The RC6239 has 30V maximum operating

voltage limit, excellent load transient response, and -40°C to 125°C operating temperature range, and ±2% output voltage tolerance over the entire output current, input voltage, and temperature range.

The RC6239 regulators are available in standard SOT23-3, SOT89 and TO92 packages.

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Block Diagram



Pin Assignment

SOT23-3 (Top View)

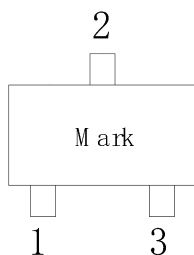


Table1: RC6239A-XXseries (SOT23-3 PKG)

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

SOT89 (Top View)

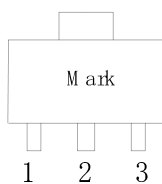


Table2: RC6239D-XX series (SOT89 PKG)

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

TO92 (Top View)

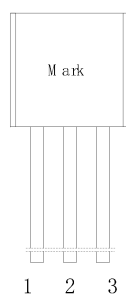


Table3: RC6239T-XXseries (TO92 PKG)

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

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Absolute Maximum Ratings

Input Voltage.....-0.3V to 36V Storage Temperature-65°C to 150°C
 V_{EN}-0.3V to V_{IN} Lead Temperature(Soldering, 10 sec.) 260°C
 V_{OUT}-0.3V to 6V Junction Temperature..... -40°C to 125°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.

Electrical Characteristics

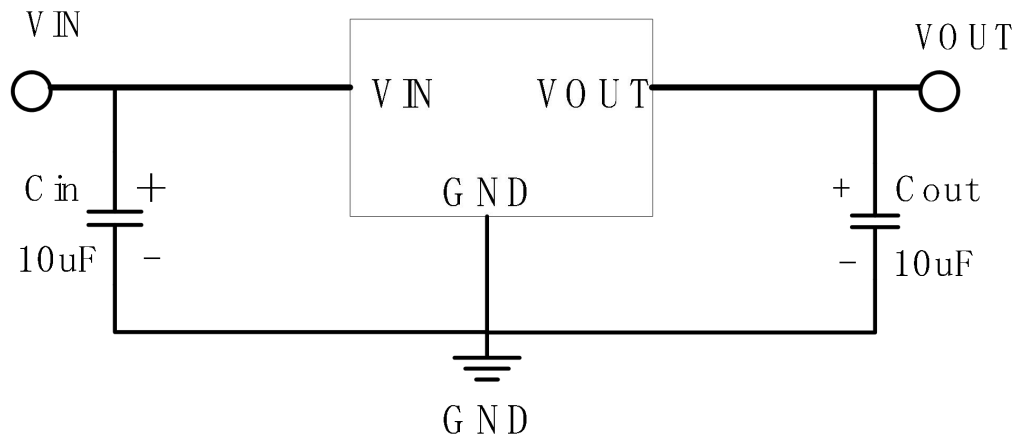
The following specifications apply for $V_{IN}=12V$, $I_{OUT}=1mA$, $C_{IN}=C_{OUT}=10\mu F$, $T_J=25^\circ C$, unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS	MIN	TYP	MAX	UNIT
V_{IN}	Input Voltage		2.7	--	30	V
V_{OUT}	Output Range		2.6	---	5.0	V
ΔV_{OUT}	Output Voltage Accuracy		-2	V_{OUT}	2	%
I_Q	Quiescent Current	$T_J = 25^\circ C$	---	1.5	3	μA
I_{LIMIT}	Current Limit		270	320	---	mA
V_{DROP}	Dropout Voltage	$I_{OUT}=100mA$	---	320	---	mV
		$I_{OUT}=250mA$	---	900	---	
ΔV_{LINE}	Line Regulation	$V_{IN} = V_{OUT} + 1V$ to 40V, or $V_{IN} = 5V$ to 40V, if $V_{OUT} < 4V$	---	10	30	mV
ΔV_{LOAD}	Load Regulation	$I_{OUT} = 1mA$ to 100mA	---	0.4	---	%
		$I_{OUT} = 1mA$ to 250mA	---	1	---	
PSRR	Power Supply Rejection Rate	F=1KHz	---	70	---	dB
		F=10KHz	---	60	---	
T_{SD}	Thermal Shutdown		---	140	---	$^\circ C$
T_{HY}	Thermal Shutdown Hysteresis		---	20	---	$^\circ C$

Note: The parameters of C_{in} and C_{out} must be greater than 10 μF .

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Application Circuits

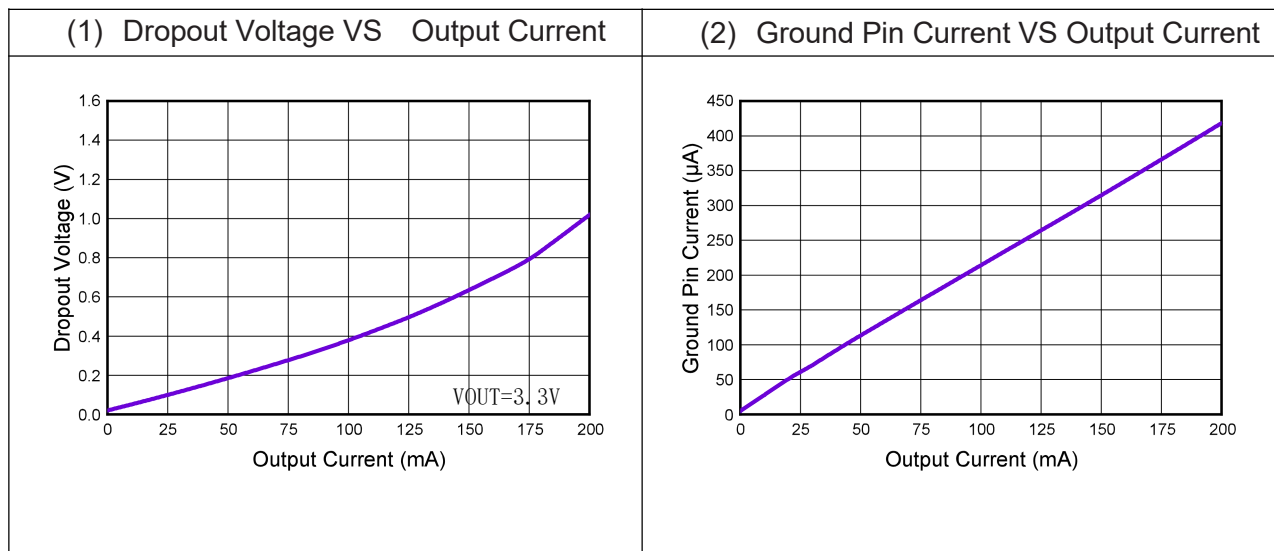
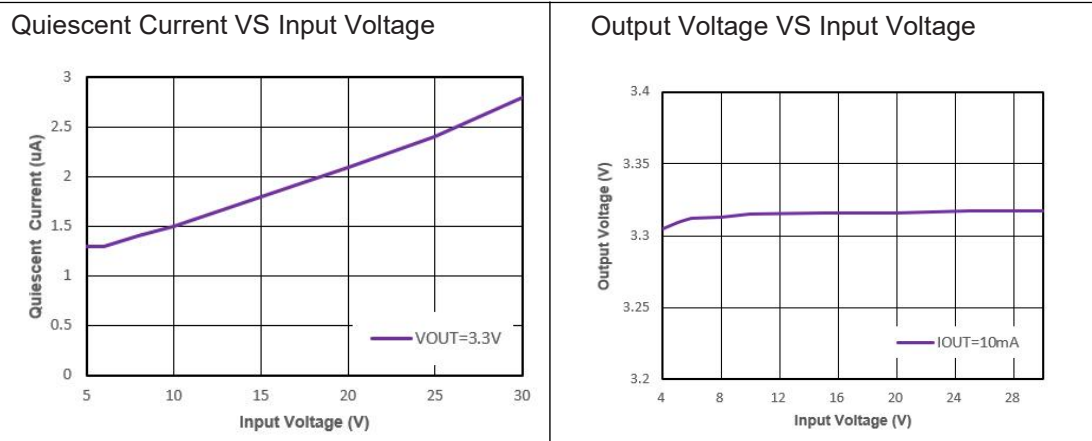


Note: The parameters of C_{in} and C_{out} must be greater than 10uF.

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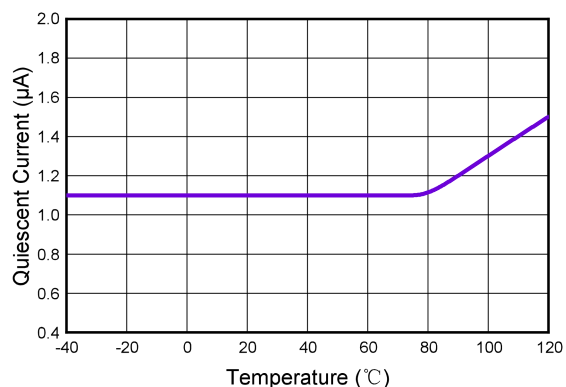
Typical Performance Characteristics

$C_{IN}=10\mu F$, $C_{OUT}=10\mu F$, $V_{IN}=5.3V$, $V_{OUT}=3.3V$ $T_J=25^\circ C$, unless specified otherwise

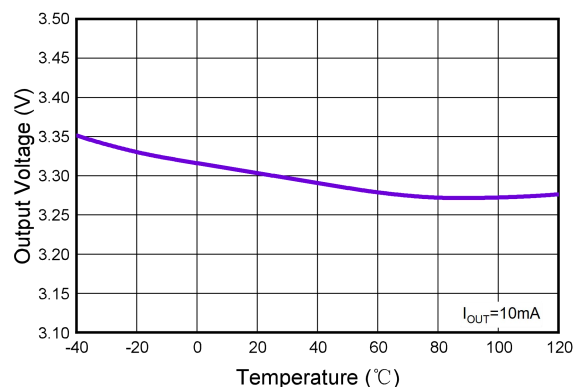


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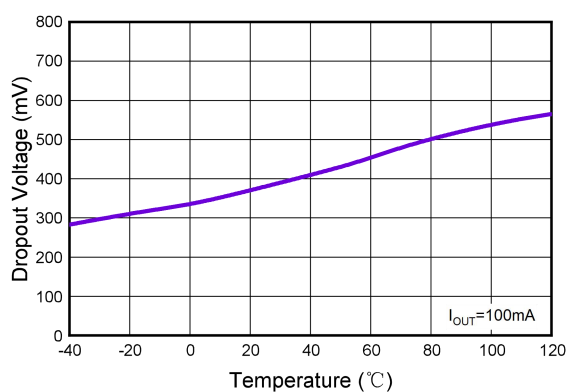
(3) Quiescent Current VS Temperature



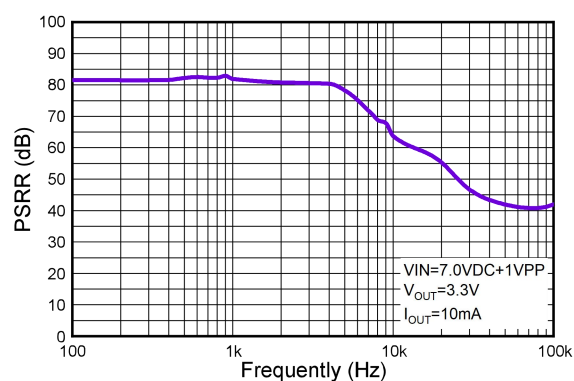
(4) Output Voltage VS Temperature



(5) Dropout Voltage VS Temperature



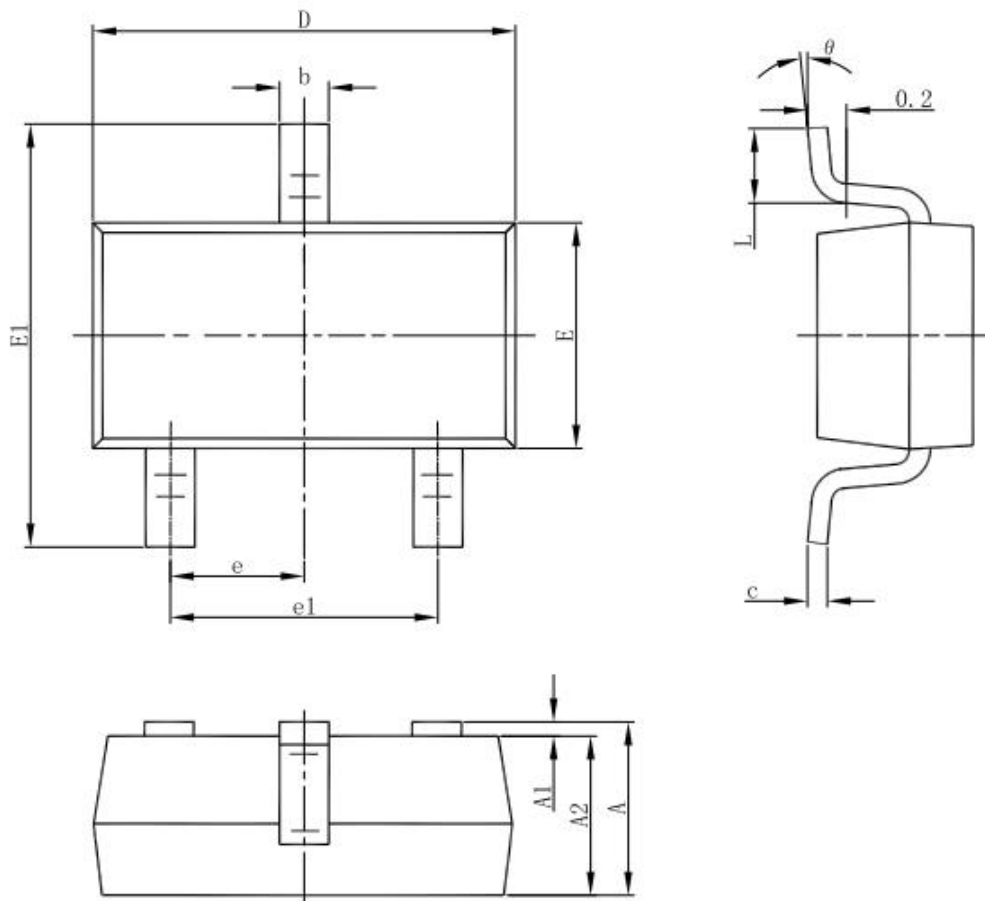
(6) PSRR VS Frequency



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Package Information

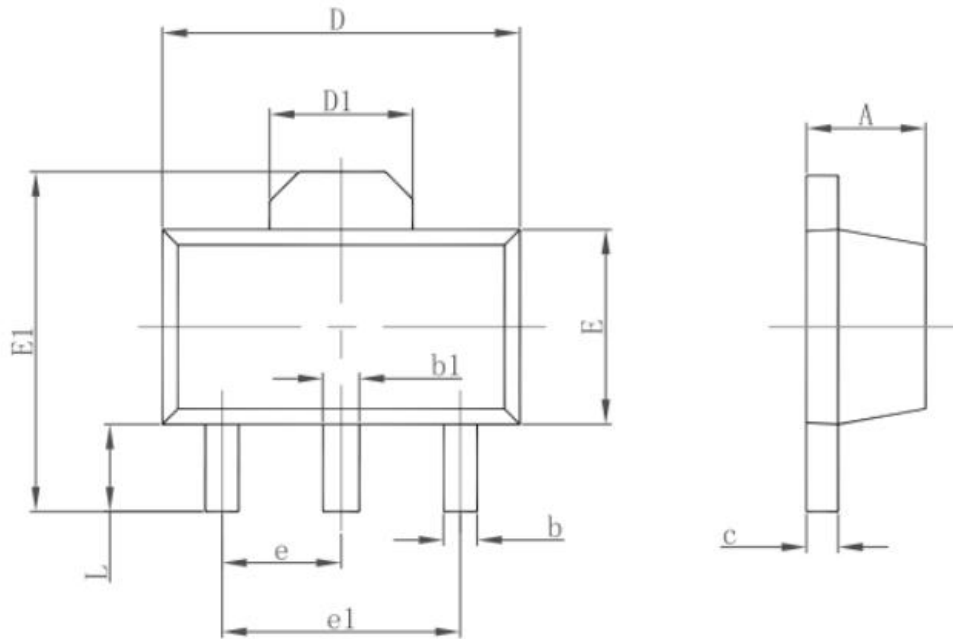
3-pin SOT23-3 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	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
c	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°	8°	0°	8°

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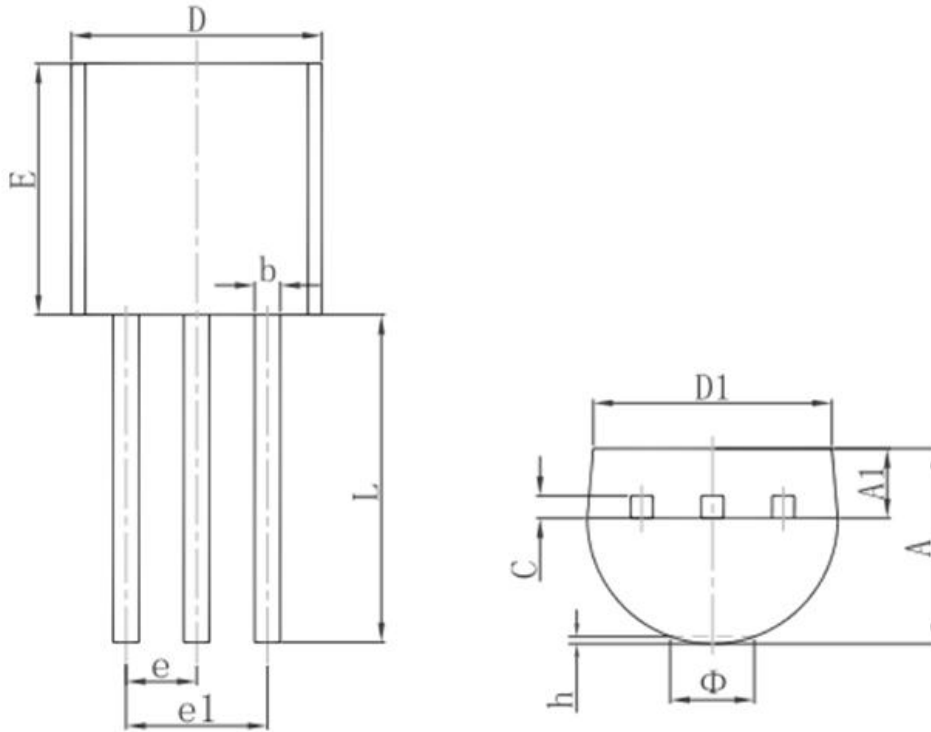
SOT89-3L Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

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3-pin TO92 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015