General Description

The RT9193-xxGB series are highly accurate, low noise,CMOS LD O Voltage Regulators. Offering low output noise,high ripple rejection ratio, low dropout and very fast turn-on times, the RT9193-xxGB series is ideal for today's cutting edge mobile phone. Internally the RT9193-xxGB includes a reference voltage source, error amplifiers, driver transistors and phase compensators.

The output voltage is set by current trimming.Voltages are selectable in 100mV steps within a range of 1.2V to 5.0V.

When the CE input pin is low,a built-in pull-down resistor pulls the output voltage low.

The RT9193-xxGB series is also fully compatible with low ESR ceramic capacitors, reducing cost and improving output stability. This high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance and high PSRR achieved across a broad range of frequencies. The CE function allows the output of regulator to be turned off, resulting in greatly reduced power consumption.

Features

- Low voltage drop:0.12V@100mA@VOUT=3.3V(Typ.)
- Standby Mode: 0.1uA
- Low temperature coefficient
- High input voltage (up to 8V)
- Output voltage accuracy: tolerance ±2%
- SOT-23-5L package

Application

- Battery-powered Equipments
- Communication Equipments
- Mobile phones
- Portable games
- Cameras, Video cameras
- Reference voltage sources

Pin Configuration And Descriptions

SOT-23-5L

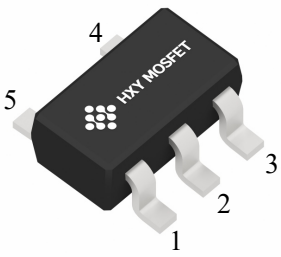


Table1 : RT9193-xxGB series

PIN NUMBER	SYMBOL	FUNCTION
1	V_{IN}	Power Input Pin
2	GND	Ground
3	CE	Chip Enable Pin
4	NC	No Connection
5	V_{OUT}	Output Pin

Order Information

Orderable Device	Package	Output Voltage	Packing Option
RT9193-xxGB	SOT-23-5L	1.2V-5.0V	3000/Reel

xx:From 12-50

Absolute Maximum Ratings

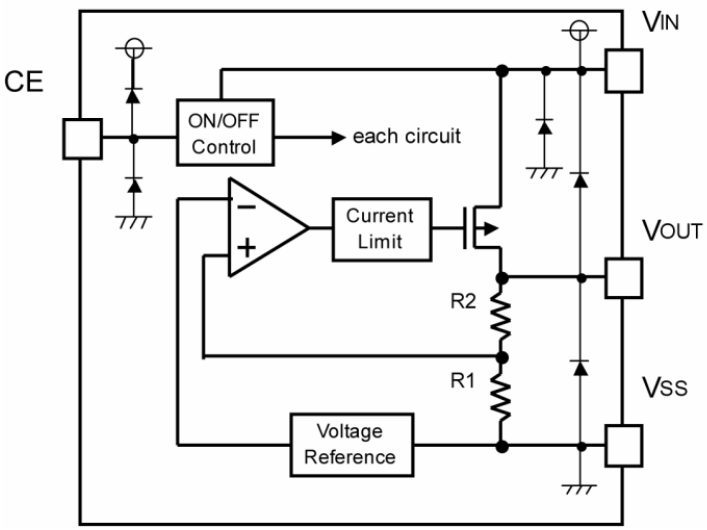
Description	Symbol	Value Range	Unit
Supply Voltage	V_{IN}	-0.3～+8	V
Storage Temperature Range	T_{STG}	-50～+125	°C
Operating Free-air Temperature Range	T_A	-40～+85	°C

Note:Stresses greater than those listed under “Absolute Maximum Ratingsmay” cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditionsis” not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Heat Dissipation

Description	Symbol	Package	Value Range	Unit
Thermal resistance	èJA	SOT-23-5L	500	°C/W
Power dissipation	PW	SOT-23-5L	0.25	W

Block Diagram

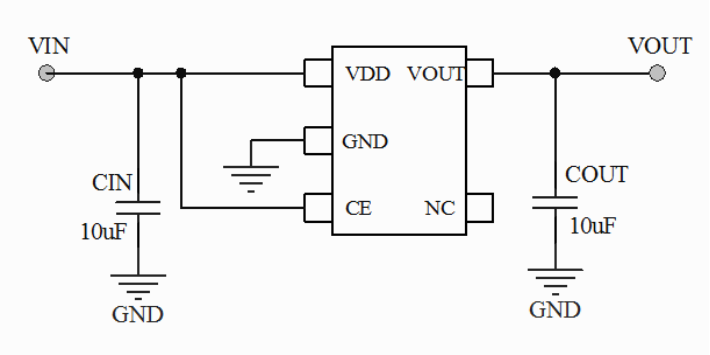


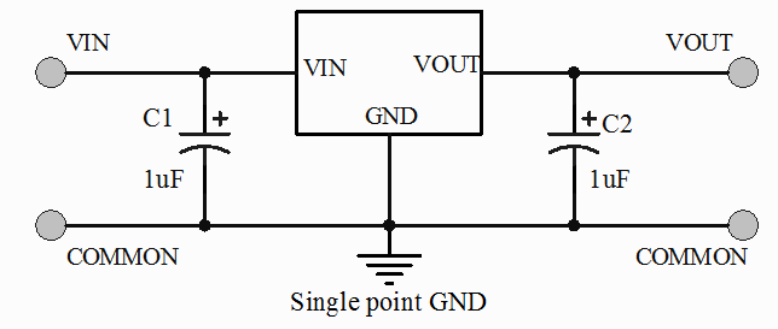
DC Characteristics (unless otherwise noted T_A= 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Vin=Vout+1V 1.0mA≤Iout≤30mA	Vout×0.98	--	Vout×1.02	V
Output Current*1	Iout	Vin-Vout=1V	--	500	--	mA
Line Regulation	△Vout1/ (△Vin·Vout)	4.3V≤Vin≤8V Iout=10mA	--	0.05	0.2	%/V
Load Regulation	△Vout	Vin= 4.3V 1.0mA≤Iout≤100mA	--	10	30	mV
Output voltage Temperature Coefficiency	△Vout/(Ta·Vout)	Iout=30mA 0℃≤Ta≤70℃	--	±100	--	Ppm/℃
Supply Current	Iss	--	5	--	30	uA
Input Voltage	Vin	--	--	--	6	V
PSRR	PSRR	F=100Hz, Vin=4.3Vdc+1Vpp	--	60	--	dB

Application Circuit

Basic Circuits





Operational Explanation

<Output Voltage Control>

The P-channel MOSFET is connected to the V_{OUT} pin, driven by the subsequent output signal. The output voltage at the V_{OUT} pin is controlled and stabilized by a system of negative feedback.The IC's internal circuitry can shut-down by the CE pin's signal

<Low ESR Capacitors>

With the RT9193-xxGB series, a stable output voltage is achievable even if used with low ESR capacitors as a phase compensation circuit is built-in. In order to ensure the effectiveness of the phase compensation, we suggest that an output capacitor (C_L) is connected as close as possible to the output pin (V_{OUT}) and the GND pin. Please use an output capacitor with a capacitance value of at least 10uF. Also, please connect an input capacitor (C_{IN}) of 10uF between the V_{IN} pin and the GND pin in order to ensure a stable power input. Stable phase compensation may not be ensured if the capacitor runs out capacitance when depending on bias and temperature. In case the capacitor depends on the bias and temperature, please make sure the capacitor can ensure the actual capacitance.

<CE Pin>

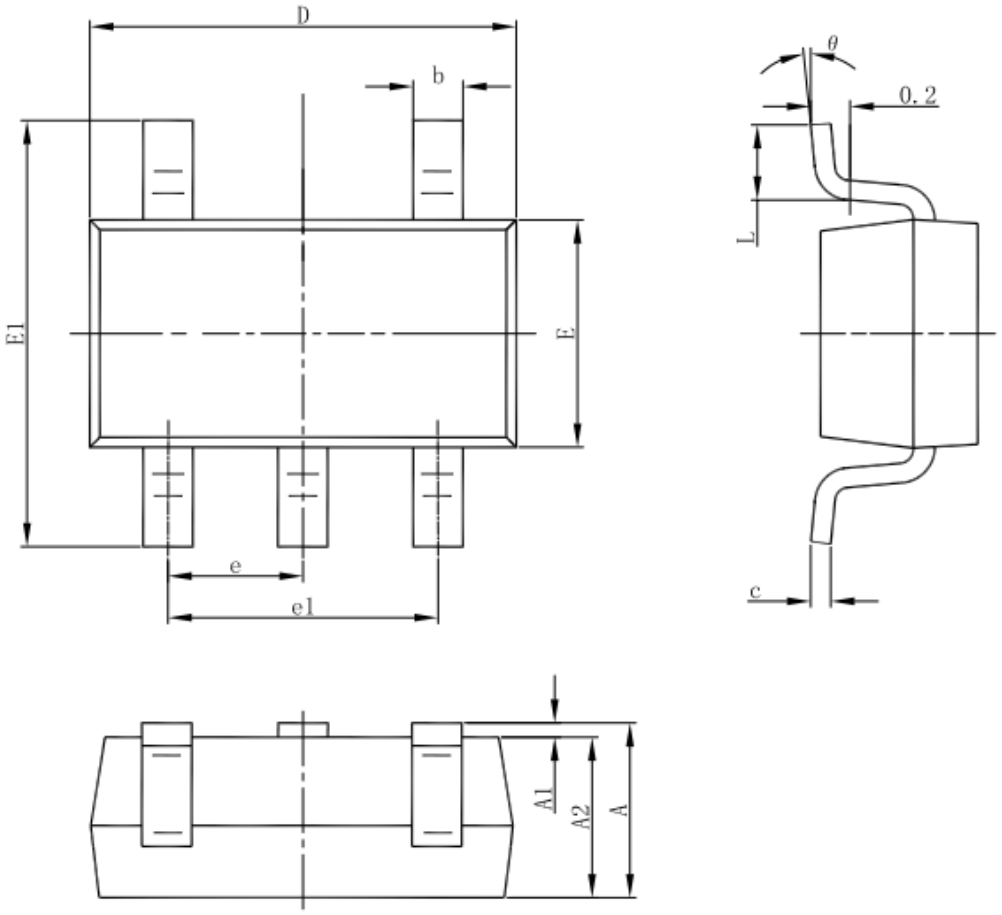
The IC's internal circuitry can be shutdown via the signal from the CE pin with the RT9193-xxGB series. The operational logic of the IC's CE pin is selectable (please refer to the selection guide). Although the CE pin is equal to an inverter input with CMOS hysteresis, with either the pull-up or pull-down options, the CE pin input current will increase when the IC is in operation. We suggest that you use this IC with either a V_{IN} voltage or a V_{SS} voltage input at the CE pin. If this IC is used with the correct specifications for the CE pin, the operational logic is fixed and the IC will operate normally. However, supply current may increase as a result of through current in the IC's internal circuitry.

Notes on Use

1. Please use this IC within the stated absolute maximum ratings. The IC is liable to malfunction should the ratings be exceeded.
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current. Please keep the resistance low between V_{IN} and V_{SS} wiring in particular.
3. Please wire the input capacitor (C_{IN}) and the output capacitor (C_L) as close to the IC as possible.

Package Outline Dimensions

SOT-23-5L(TSOT-23-5)



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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