

## Features

- Output voltage range: 1.2V to 3.6V
- $I_{OUT(max)}$  : 300mA
- PSRR: 70dB at 1KHz
- Standby current: 70 $\mu$ A (typ.)
- Shutdown current: 1 $\mu$ A (max)
- ESD Protected up to 2KV(HBM),200V(CDM)

## Applications

- CDMA / GSM
- PDAs/MP3
- WLAN, Bluetooth
- Cordless phone
- Battery-powered system

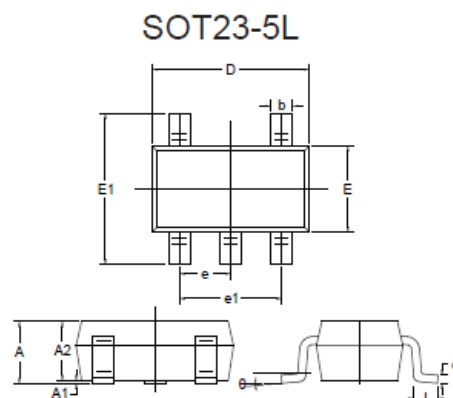
## Description

The MCL9193K5 series are high ripple rejection, low-power consumption, low-dropout CMOS step-down voltage regulators with over-current and short circuit protection. These devices have very low quiescent bias current (70 $\mu$ A typ.), they can delivery 300mA of output current with very small input and output voltage differences, and still maintain good regulation. Due to the small voltage difference between the input and output and the low quiescent bias current, these devices are especially suitable for battery-operated products such as computers, consumer products and industrial equipment, which want to prolong the useful battery life.

## Part Number and Marking Code

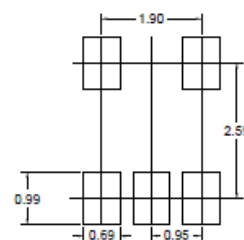
Part No	Package	Marking
MCL9193K512	SOT23-5L	DA=G3K
MCL9193K515	SOT23-5L	DS=J2T
MCL9193K518	SOT23-5L	DC=E2H
MCL9193K530	SOT23-5L	DK=06L
MCL9193K533	SOT23-5L	DE=A1D

# 300mA Low Drop-out Voltage Regulators

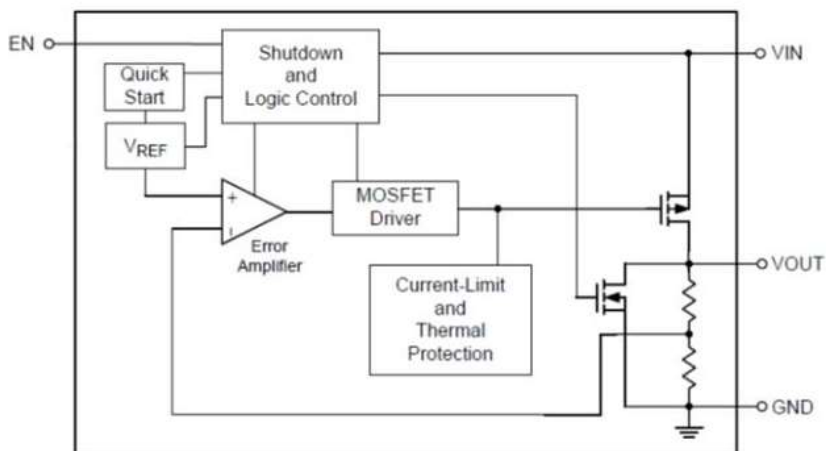


DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.041	0.049	1.05	1.25	
A1	0.000	0.004	0.00	0.10	
A2	0.041	0.045	1.05	1.15	
b	0.012	0.020	0.30	0.50	
c	0.004	0.008	0.10	0.20	
D	0.111	0.119	2.82	3.02	
E	0.059	0.067	1.50	1.70	
E1	0.104	0.116	2.65	2.95	
e	0.037(BSC)		0.950(BSC)		
e1	0.071	0.079	1.80	2.00	
L	0.012	0.024	0.30	0.60	
$\theta$	0°	8°	0°	8°	

### Suggested Solder Pad Layout

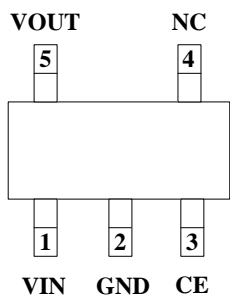


### Functional Block Diagram



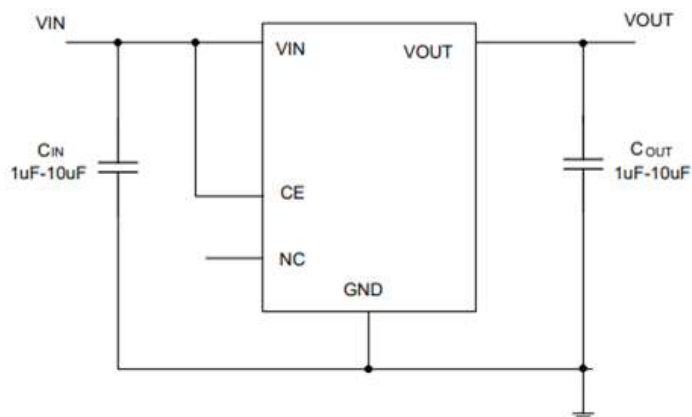
### Pin Configuration and Functions (Top View)

## SOT-23-5L



Pin No	Name	Description
1	VIN	Power supply.
2	GND	Ground.
3	CE	Enable.
4	NC	No connection.
5	VOUT	Output pin.

## Typical Application Circuit



## Absolute Maximum Ratings

- Operating Junction Temperature Range: -40~+85°C
- Storage Temperature Range: -55~+125°C

Parameter	Symbol	Value	Unit
Input Voltage	$V_{IN}$	7	V
Output Current	$I_{OUT}$	450	mA
Output Voltage	$V_{OUT}$	$V_{SS}-0.3$ to $V_{OUT}+0.3$	V
Soldering Temperature	$T_{solder}$	260, 10s	°C

Package	$P_d$ (mW)
SOT-23-5L	300

## Electrical Characteristics

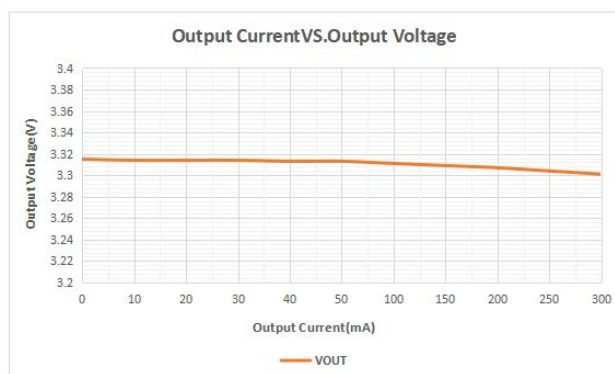
( $V_{IN} = 5V$ ,  $T_A = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 40mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$				5.5	V
Maximum Output Current	$I_{OUT(max)}$	$V_{IN} = V_{OUT} + 1V$		300		mA
EN Starting Voltage	$V_{CE\_ON}$ <sup>(Note 3)</sup>		1.1			V
EN Off Voltage	$V_{CE\_OFF}$				0.4	V
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 100mA$		50		mV
Dropout Voltage <sup>(Note 4)</sup>	$V_{dif1}$	$I_{OUT} = 100mA$		90		mV
	$V_{dif2}$	$I_{OUT} = 200mA$		230		mV
Standby Current	$I_{SS}$	$V_{IN} = V_{OUT}+1V$		70		μA
Shutdown Current	$I_{CEL}$	$V_{ce} = 0V$		1		μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 40mA$ $V_{OUT} + 1V \leq V_{IN} \leq 8V$		0.05		%/V
Output Noise Voltage	en	$I_{OUT} = 40mA$ , 300Hz to 50kHz		50		μVrms
Power Supply Rejection Ratio	PSRR	$V_{in}=[V_{out}+1]V + 1Vp-pAC$ $I_{OUT} = 40mA$ , $f = 1kHz$		70		dB

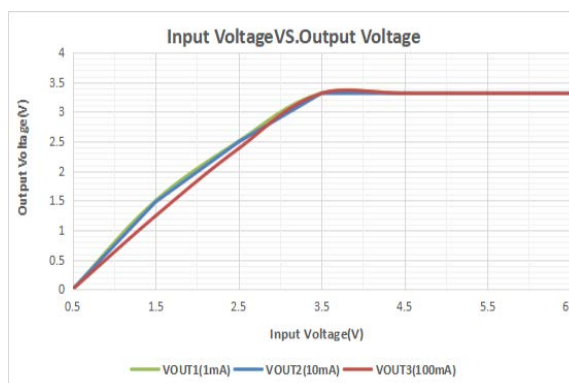
### Note:

- $V_{OUT(T)}$ : Specified output voltage.
- $V_{OUT(E)}$ : Effective output voltage (that is, the output voltage when  $V_{IN} = (V_{OUT(T)}+1.0V)$  when  $I_{OUT}$  remains at a certain value.
- $V_{CE}$ : Considering the high and low temperature and process deviation, it is recommended that customers set the enable voltage of CE pin to 1.1V with a margin. There is a built-in 1MΩ resistor between CE pin and GND pin inside the chip.
- $V_{dif} : V_{IN1} - V_{OUT(E)}$ .  
 $V_{IN1}$ : Gradually reduce the input voltage, the input voltage when the output voltage drops to 98% of  $V_{OUT(E)}$ .  
 $V_{OUT(E)'} = V_{OUT(E)} \times 98\%$ .

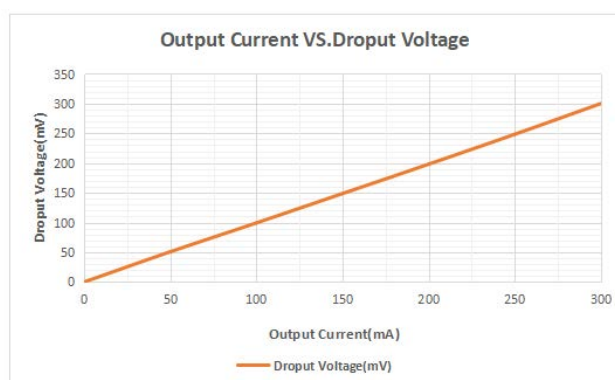
## Curve Characteristics



**Output Current VS Output Voltage**



**Input Voltage VS Output Voltage**



**Output Current VS Dropout Voltage**

## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

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