SK6018B Low Power Consumption, High PSRR CMOS LDO

GENERAL DESCRIPTION

The SK6018B is a high accuracy, low quiescent current, low noise, high speed, low dropout CMOS Linear regulator with high ripple rejection and fast load transient response function. The device offers a new level of cost-effective performance in portable, Battery powered equipment.

SK6018B can provide product selections of output value in the range of 1.2V~3.3V by every 0.1V step.

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

The SK6018B are available in standard SOT23-5L and DFN1x1-4L packages. Standard products are Pb-free and Halogen-free.

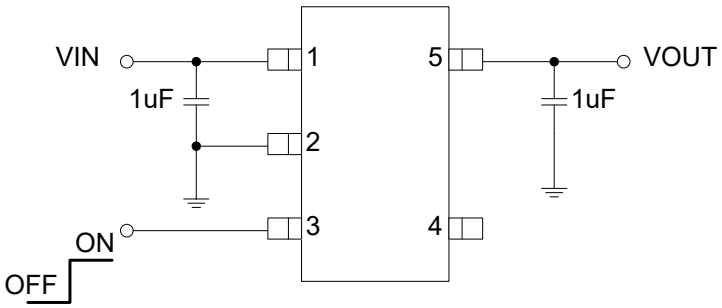
FEATURES

- Input voltage : 2.5V~5.5V
- Output range: 1.2V~3.3V
  (Customized by every 0.1V step)
- Maximum output current: 300mA @ V_{IN}-V_{OUT}=1V
- PSRR: 75dB @1KHz
- Dropout voltage: 55mV @ I_{OUT}=50mA when V_{OUT}=3.3V
- Quiescent current : 3μA Typ.
- Shut-down current: < 0.5μA
- Recommend capacitor: 1μF

APPLICATIONS

- Portable, Battery powered equipment
- Ultra-low power microcontrollers
- Bluetooth and wireless handsets
- Notebook computers

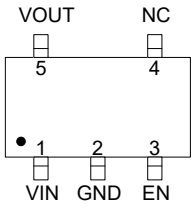
TYPICAL APPLICATION CIRCUIT



PIN ASSIGNMENT



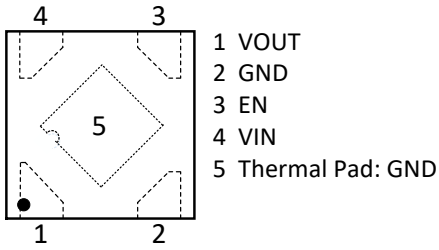
SOT23-5L



SOT23-5L (TOP VIEW)



DFN1x1-4L



DFN1x1-4L (TOP VIEW)

PIN DESCRIPTION

PIN NO	PIN NO	SYMBOL	I/O	DESCRIPTTION
SOT23-5L	DFN1x1-4L			
1	4	VIN	Power	Input
2	2	GND	Ground	Ground
3	3	EN	I	Enable (active high, do not float)
4	/	NC	/	Not connected
5	1	VOUT	O	Output

ORDER INFORMATION

PART NO	PACKAGE	VOUT DISCHARGE	TEMPERATURE	TAPE & REEL
SK6018BS5-XX Note	SOT23-5L	No	-40 ~ +85℃	3000/REEL
SK6018BD4-XXNote	DFN1x1-4L	No	-40 ~ +85℃	10000/REEL

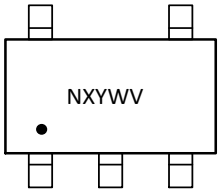
Note: *XX indicates 1.2V~3.3V by 0.1V step. For example, 33 means product outputs 3.3V*

PART NUMBER RULES

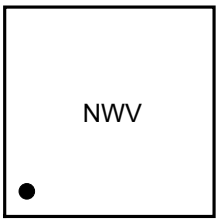
SK6018B[1]-[2]

Code	Description
[1]	Package: S5: SOT23-5L D4: DFN1x1-4L
[2]	Voltage version: XX: 1.2V~3.3V by 0.1V step Example: 33: 3.3V

MARKING DESCRIPTION:



SOT23-5L



DFN1x1-4L

"N": Product code, here use "J" stand for "SK6018B"
"X": Internal Control Code
"Y": Internal Control Code
"W": The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "a" stands for week 27, "z" stands for week 52.
"V": Output voltage code.

TYPICAL OUTPUT VOLTAGE CODE TABLE

V_{OUT}	CODE	V_{OUT}	CODE
1.0V	A	1.2V	B
1.5V	C	1.8V	D
2.5V	E	2.6V	F
2.7V	L	2.8V	M
2.9V	N	3.0V	G
3.3V	H		

ABSOLUTE MAXIMUM RATINGS (Note)

SYMBOL	ITEMS		VALUE	UNIT
V_{IN}	Input Voltage		-0.3~7	V
I_{OUT}	Continues Output Current		300	mA
P_{DMAX}	Power Dissipation	SOT23-5L	0.3	W
		DFN1x1-4L	0.6	
T_J	Junction Temperature		-40~125	℃
T_A	Ambient Temperature		-40~85	℃
T_{STG}	Storage Temperature		-55 to 150	℃
T_{SOLDER}	Package Lead Soldering Temperature		260℃, 10s	

Note: *Exceed these limits could damage the device potentially. Exposure to absolute maximum rating conditions may affect device reliability.*

RECOMMENDED OPERATING RANGE

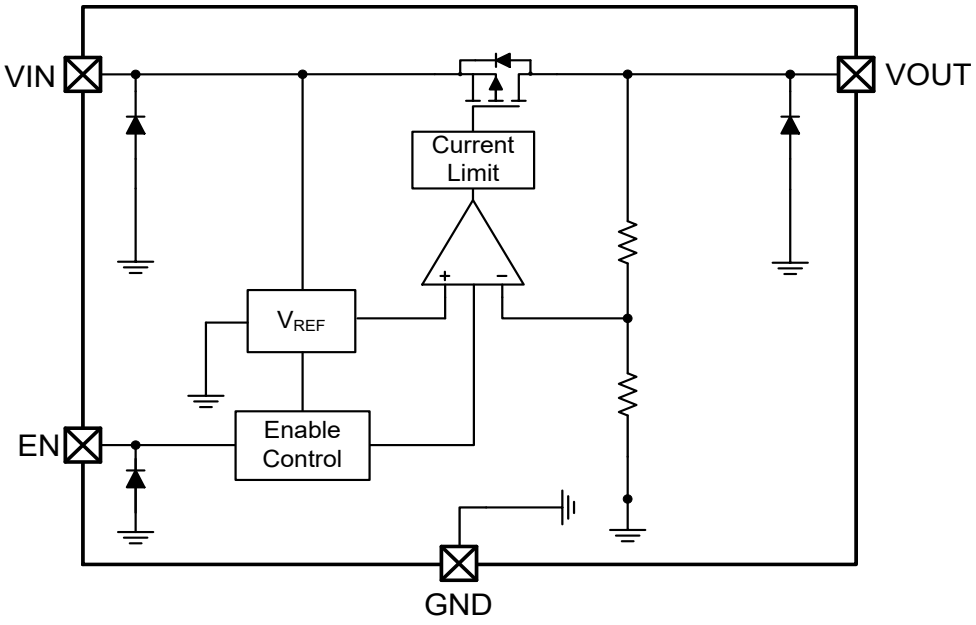
SYMBOL	ITEMS	VALUE	UNIT
V_{IN}	Supply Voltage	2.5 to 5.5	V
I_{OUT}	Output Current	<250	mA
T_{OPT}	Operating Temperature	-40 to +85	℃

ELECTRICAL CHARACTERISTICS

The following specifications apply for T_A=25℃, unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS	MIN	TYP	MAX	UNIT
V_{IN}	Input Voltage		2.5		5.5	V
V_{OUT}	Output Range	V_{OUT} <1.5V, I_{OUT}=1mA	-30	V_{OUT}	+30	mV
		V_{OUT} ≥1.5V, I_{OUT}=1mA	-2	V_{OUT}	+2	%
I_Q	Quiescent Current	Vin=5.0V, I_{OUT}=0		3	5	μA
I_{LIMIT}	Current Limit	V_{IN}=4.2V~5.5V, peak current		480		mA
V_{DROP}	Dropout Voltage	V_{OUT}>=2.5V, I_{OUT}=50mA		55		mV
$\triangle V_{LINE}$	Line Regulation $\triangle V_{OUT}$ / ($\triangle V_{IN} \cdot V_{OUT}$)	V_{IN}=3.3~5.5V, I_{OUT}=1mA		0.02	0.15	%/V
$\triangle V_{LOAD}$	Load Regulation $\triangle V_{OUT}$	V_{OUT}>1.8V, I_{OUT}=1~300mA		40	70	mV
		V_{OUT}<=1.8V, I_{OUT}=1~200mA		40	70	mV
I_{SHORT}	Short Current	V_{EN}=V_{IN}, V_{OUT} Short to GND with 1Ω		100		mA
I_{SHDN}	Shut-down Current	V_{EN}=0V			0.5	μA
PSRR	Power Supply Rejection Rate	V_{IN}=5V_{DC}+0.5V_{P-P} F=1KHz, I_{OUT}=30mA		75		dB
		V_{IN}=5V_{DC}+0.5V_{P-P} F=1MHz, I_{OUT}=30mA		47		
V_{ENH}	EN logic high voltage	V_{IN}=5.5V, I_{OUT}=1mA	1.5		V_{IN}	V
V_{ENL}	EN logic low voltage	V_{IN}=5.5V, V_{OUT}=0V			0.4	V
I_{EN}	EN Input Current	V_{EN}= 0 to 5.5V			0.5	μA

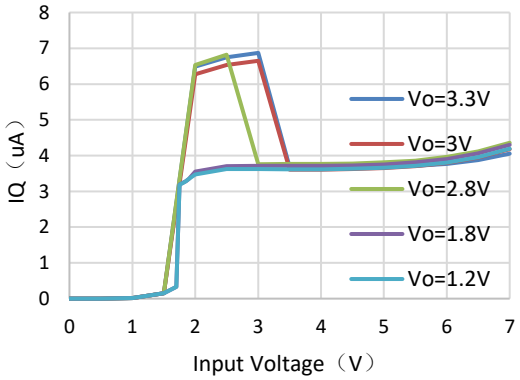
BLOCK DIAGRAM



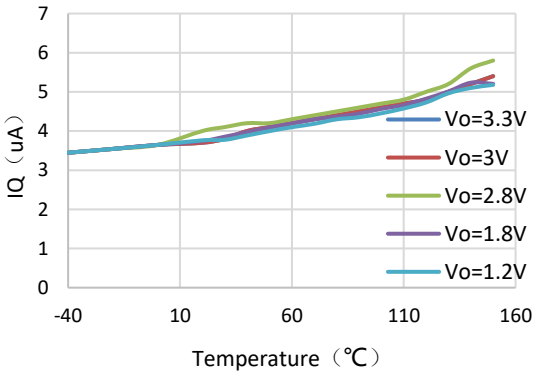
TYPICAL PERFORMANCE CHARACTERISTICS

C_{IN}=1uF, C_{OUT}=1uF, V_{IN}=V_{OUT} +1V, T_A=25℃, unless specified otherwise. (Package: SOT23-5L)

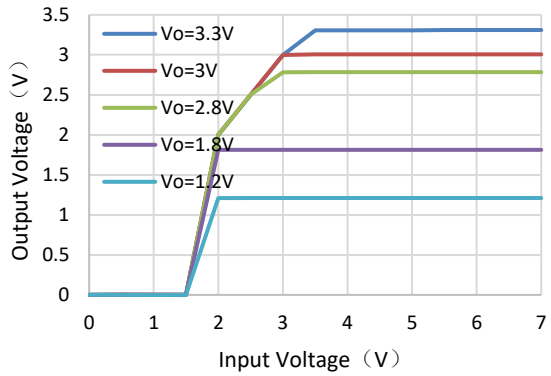
IQ vs. Input Voltage



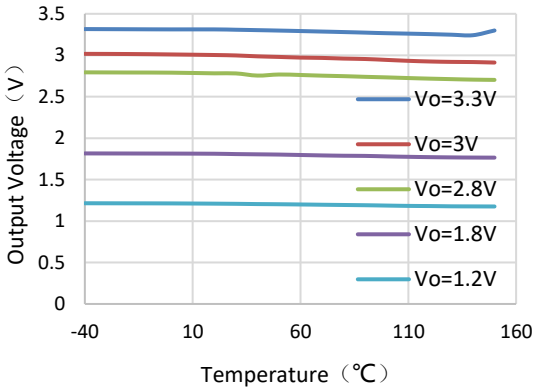
IQ vs. Temperature



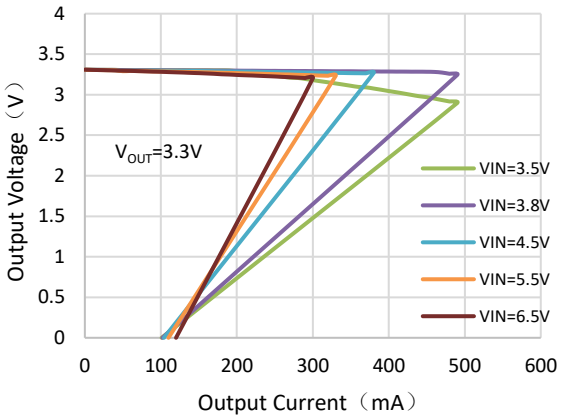
Output Voltage vs. Input Voltage



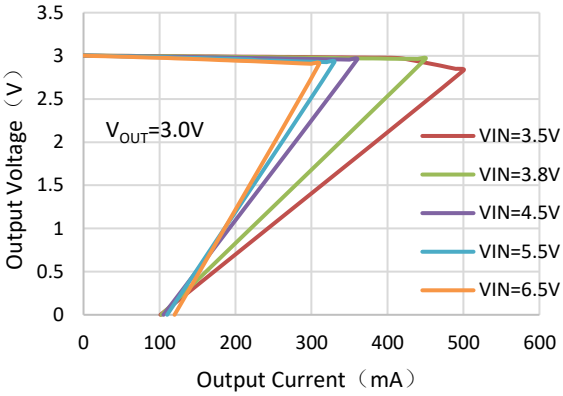
Output Voltage vs. Temperature



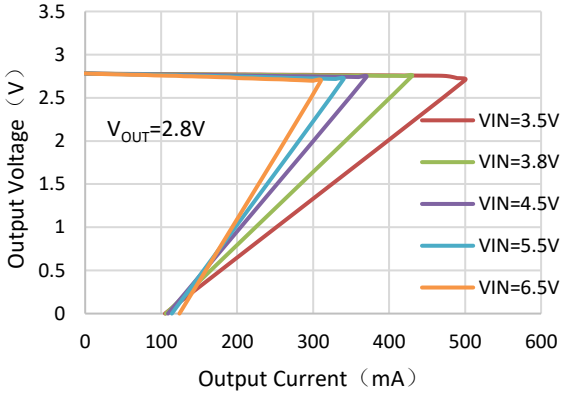
Output Voltage vs. Output Current



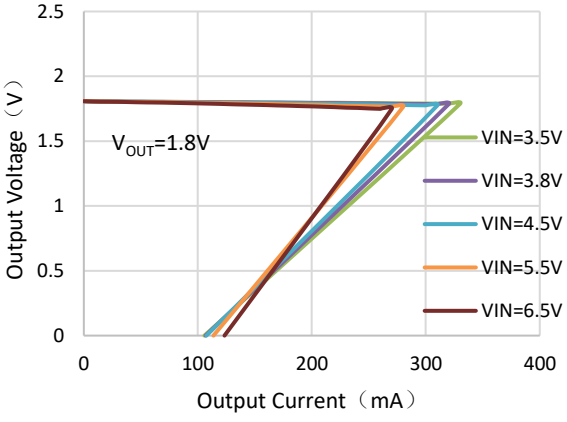
Output Voltage vs. Output Current



Output Voltage vs. Output Current

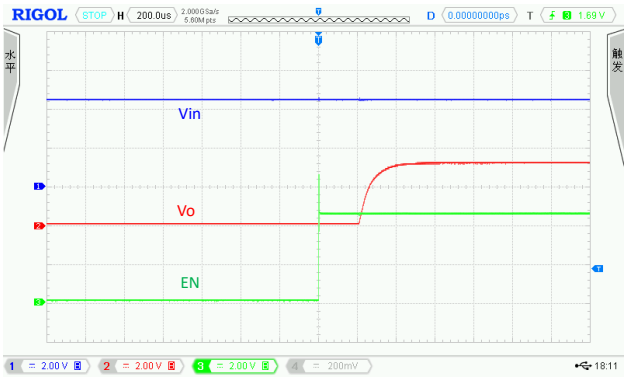


Output Voltage vs. Output Current

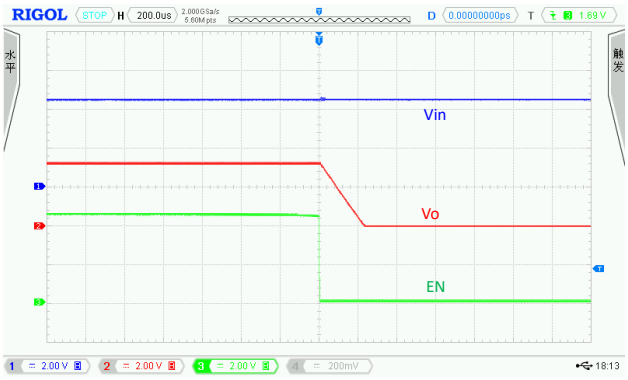


EN ON / OFF

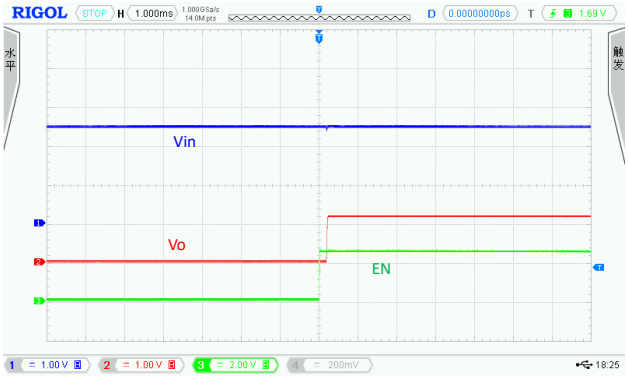
V_{EN}=0V to 4.5V I_{OUT}=10mA



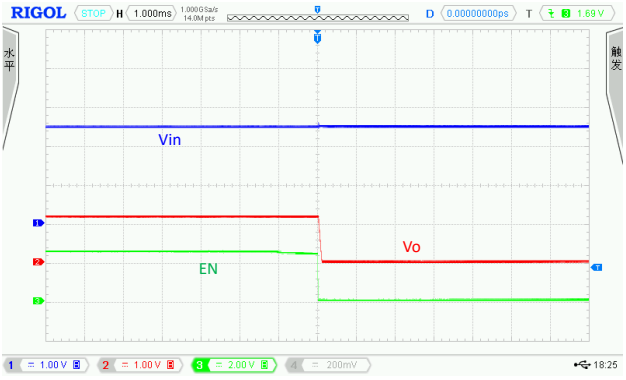
V_{EN}=4.5V to 0V I_{OUT}=10mA



V_{EN}=0V to 2.5V I_{OUT}=10mA

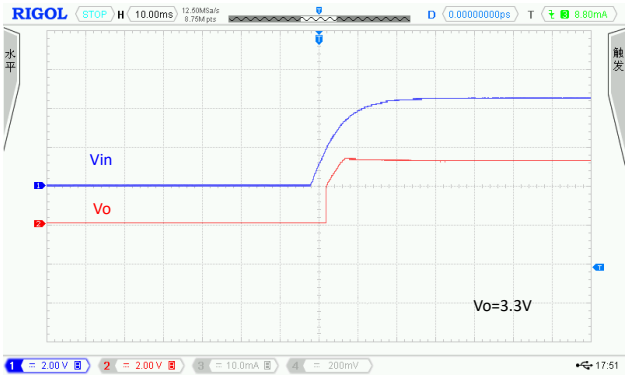


V_{EN}=2.5V to 0V I_{OUT}=10mA



Power ON / OFF

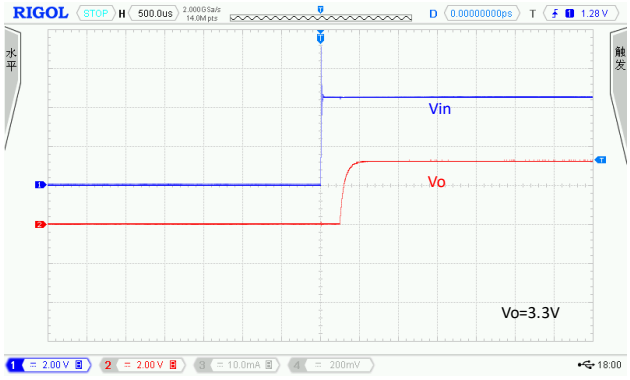
V_{IN}=0V to 4.5V I_{OUT}=10mA



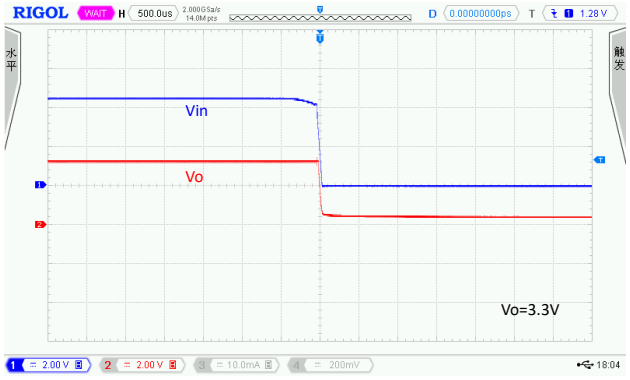
V_{IN}=4.5V to 0V I_{OUT}=10mA



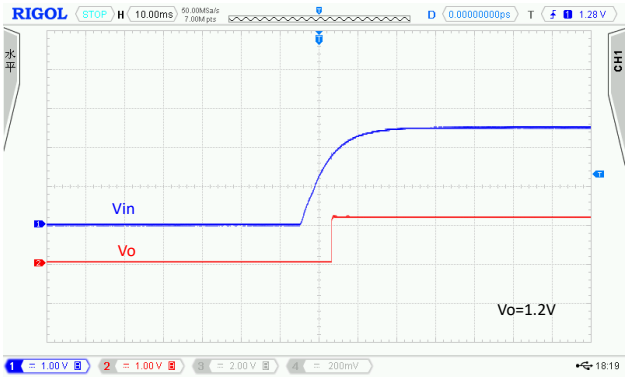
V_{IN}=0V to 4.5V I_{OUT}=10mA



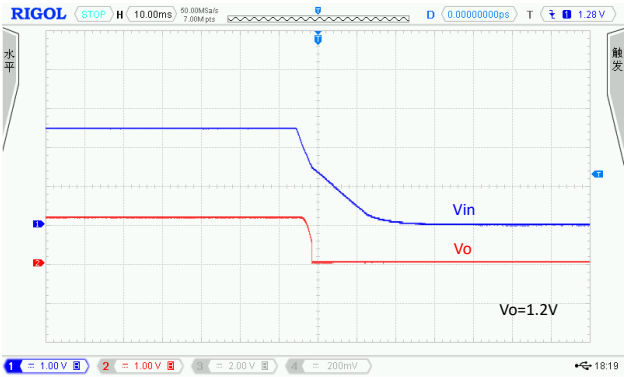
V_{IN}=4.5V to 0V I_{OUT}=10mA



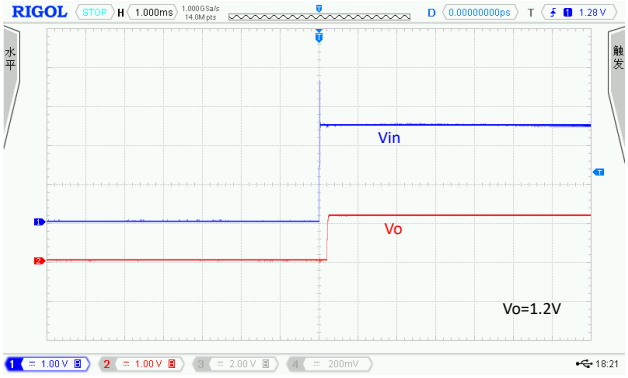
V_{IN}=0V to 2.5V I_{OUT}=10mA



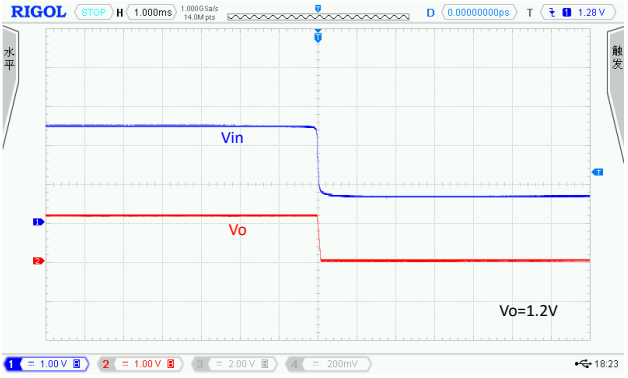
V_{IN}=2.5V to 0V I_{OUT}=10mA



V_{IN}=0V to 2.5V I_{OUT}=10mA

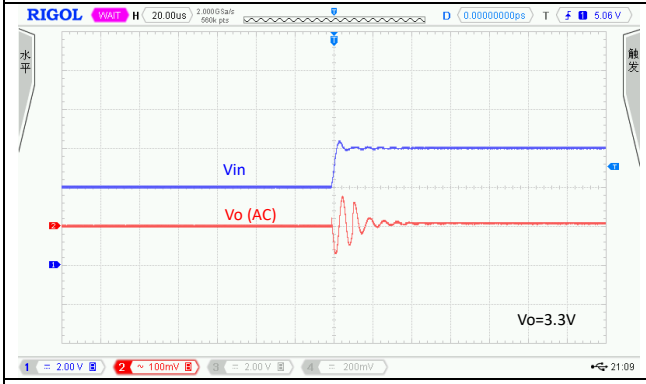


V_{IN}=2.5V to 0V I_{OUT}=10mA

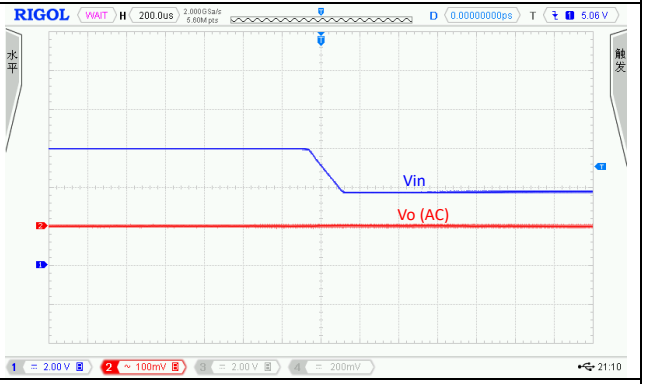


Line Transient

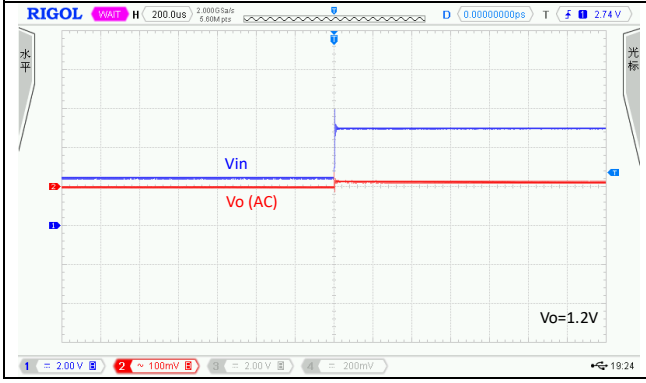
V_{IN}=4V to 6V I_{OUT}=10mA



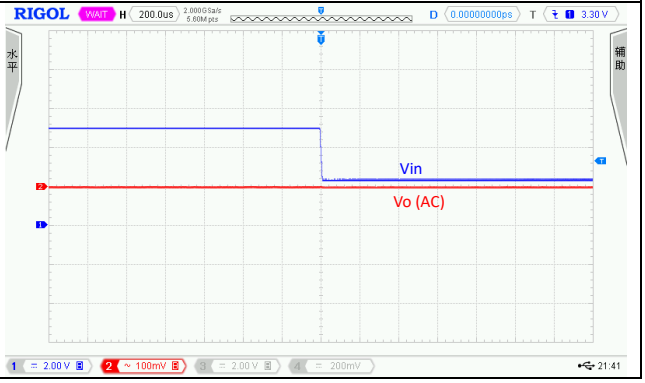
V_{IN}=6V to 4V I_{OUT}=10mA



V_{IN}=2.5V to 5V I_{OUT}=10mA



V_{IN}=5V to 2.5V I_{OUT}=10mA

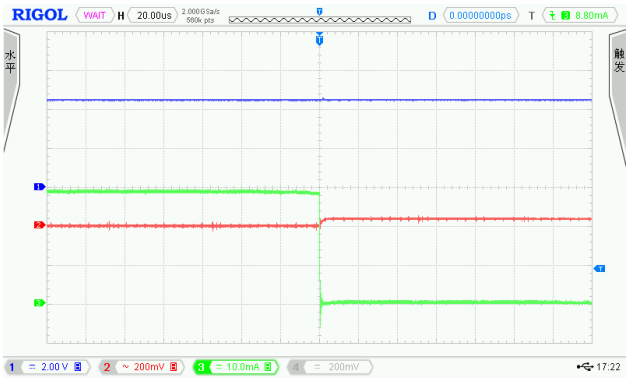


Load Transient

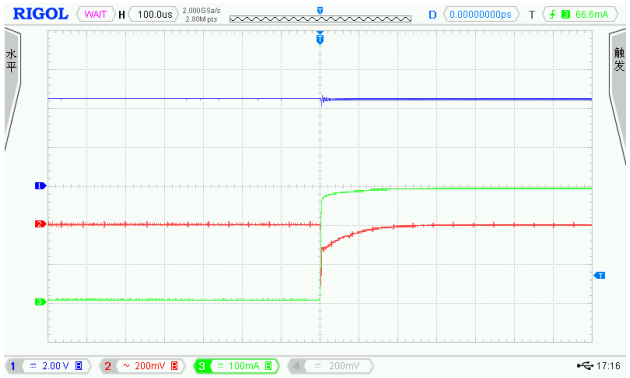
V_{IN}=4.5V, Vo=3.3V I_{OUT}=0mA to 30mA



V_{IN}=4.5V, Vo=3.3V I_{OUT}=30mA to 0mA



V_{IN}=4.5V, Vo=3.3V I_{OUT}=1mA to 300mA



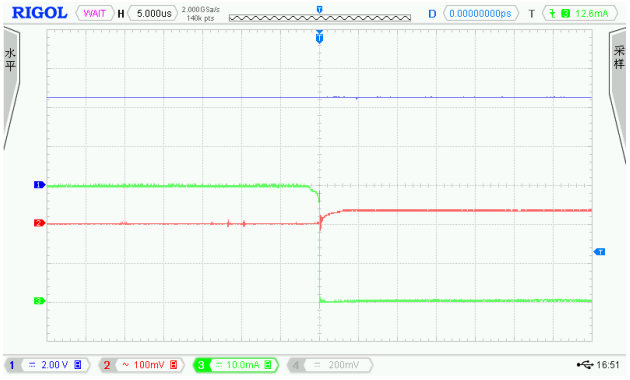
V_{IN}=4.5V, Vo=3.3V I_{OUT}=300mA to 1mA



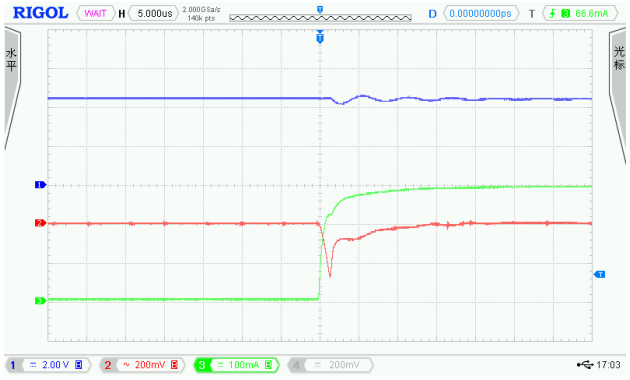
V_{IN}=4.5V, Vo=1.2V I_{OUT}=0mA to 30mA



V_{IN}=4.5V, Vo=1.2V I_{OUT}=30mA to 0mA



V_{IN}=4.5V, Vo=1.2V I_{OUT}=1mA to 300mA



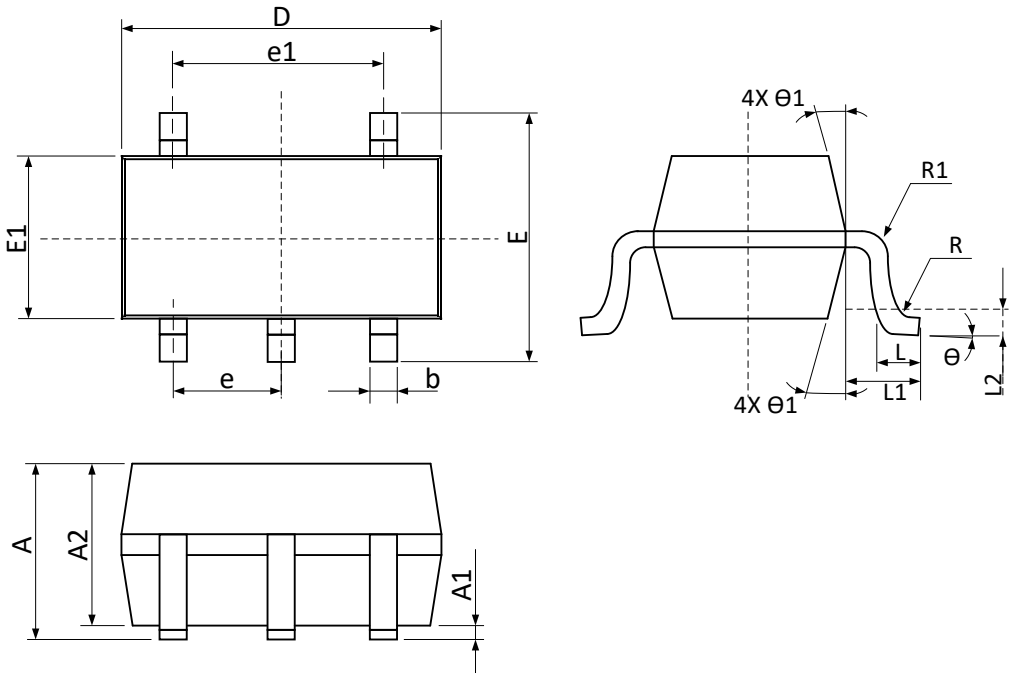
V_{IN}=4.5V, Vo=1.2V I_{OUT}=300mA to 1mA



PACKAGE OUTLINE

Package	SOT23-5L	Devices per reel	3000Pcs	Unit	mm

Package Dimension：

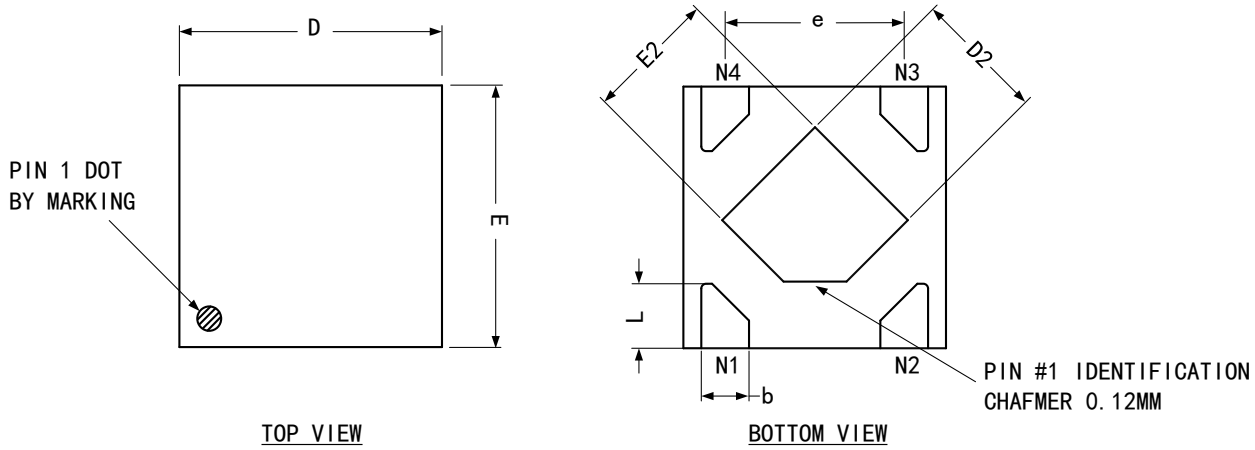


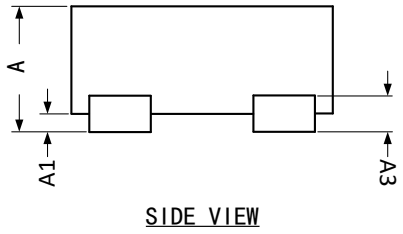
DIMENSIONS IN MILLIMETERS			
SYMBOL	MINIMUM	NOMINAL	MAXIMUM
A	-	-	1.35
A1	0.00	-	0.15
A2	1.00	1.10	1.20
b		0.35 REF	
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e		0.95 REF	
e1		1.90 REF	
L	0.30	0.45	0.60
L1		0.60 REF	
L2		0.25 REF	
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	4°	8°
Θ1	5°	10°	15°

PACKAGE OUTLINE

Package	DFN1x1-4L	Devices per reel	10000Pcs	Unit	mm

Package Dimension：





REMARK:
LEAD FINISH:NIPDAU

DIMENSIONS IN MILLIMETERS			
Symbol	Min.	Nom.	Max.
A	0.40	-	0.50
A1	0.00	-	0.05
A3		0.125REF.	
D	0.95	1.00	1.05
E	0.95	1.00	1.05
b	0.15	0.20	0.25
L	0.15	0.25	0.35
D2	0.38	0.48	0.58
E2	0.38	0.48	0.58
e		0.65 BSC	