

GENERAL DESCRIPTION

The HP6020 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.

HP6020 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 HP6020 are available in standard SOT23-5L and DFN1x1-4L packages. Standard products are Pb-free and Halogen-free.

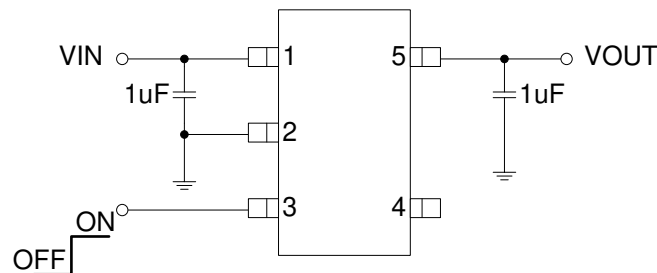
FEATURES

- 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 : 3 μ A Typ.
- Shut-down current: < 0.5 μ A
- Recommend capacitor: 1 μ F

APPLICATIONS

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

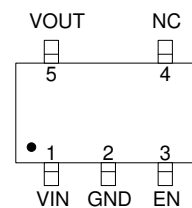
TYPICAL APPLICATION CIRCUIT



PIN ASSIGNMENT



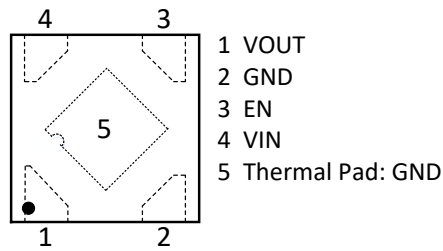
SOT23-5L



SOT23-5L (TOP VIEW)



DFN1x1-4L



DFN1x1-4L (TOP VIEW)

ORDER INFORMATION

PART NO	PACAKGE	VOUT DISCHARGE	TEMPERATURE	TAPE & REEL
HP6020S5-XX ^{Note}	SOT23-5L	Yes	-40 ~ +85°C	3000/REEL
HP6020D4-XX ^{Note}	DFN1x1-4L	Yes	-40 ~ +85°C	10000/REEL

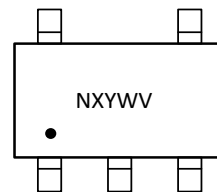
Note: XX indicates 1.2V~3.3V by 0.1V step. For example, 33 means product outputs 3.3V

PART NUMBER RULES

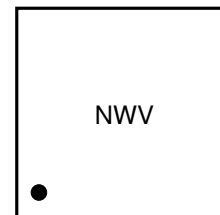
HP6020 [1] - [2]

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 “HP6020”
 “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.

PIN DESCRIPTION

PIN NO	PIN NO	SYMBOL	I/O	DESCRIPTION
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

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
		DFN1x1-4L	0.6
T _J	Junction Temperature	-40~125	°C
T _A	Ambient Temperature	-40~85	°C
T _{STG}	Storage Temperature	-55 to 150	°C
T _{SOLDER}	Package Lead Soldering Temperature	260°C, 10s	

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

RECOMMENDED OPERATING RANGE

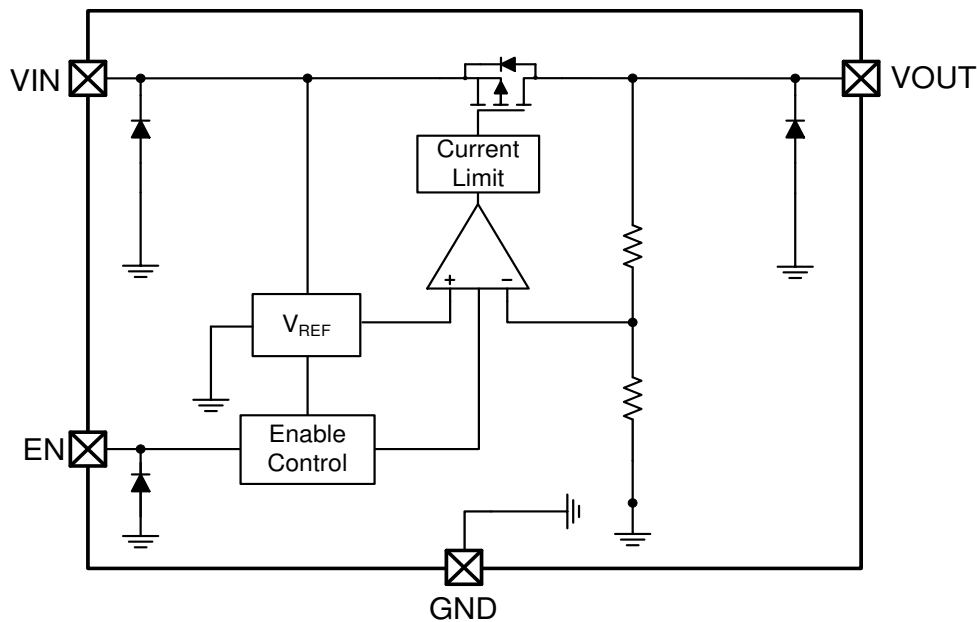
SYMBOL	ITEMS	VALUE	UNIT
V _{IN}	Supply Voltage	2.5 to 5.5	V
I _{OUT}	Output Current	<250	mA
T _{OPT}	Operating Temperature	-40 to +85	°C

ELECTRICAL CHARACTERISTICS

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

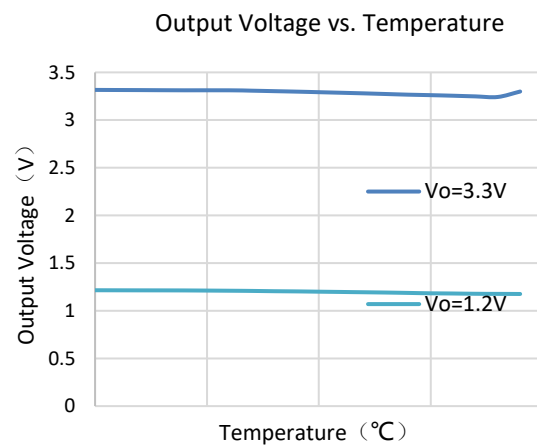
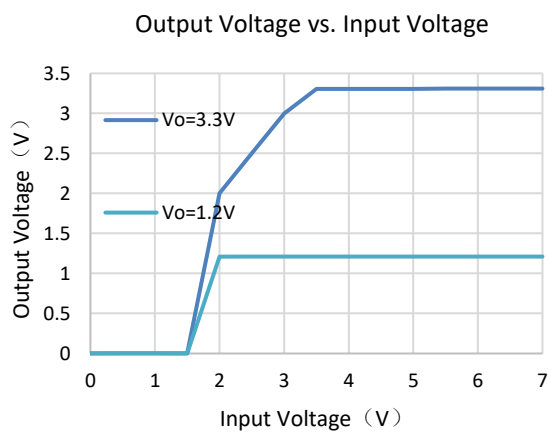
SYMBOL	ITEMS	CONDITIONS	MIN	TYP	MAX	UNIT
V _{IN}	Input Voltage		2.5		5.5	V
V _{OUT}	Output Range	V _{OUT} < 1.5V, I _{OUT} = 1mA	-30	V _{OUT}	+30	mV
		V _{OUT} ≥ 1.5V, I _{OUT} = 1mA	-2	V _{OUT}	+2	%
I _Q	Quiescent Current	V _{IN} = 5.0V, I _{OUT} = 0		3	5	μA
I _{LIMIT}	Current Limit	V _{IN} = 4.2V ~ 5.5V, peak current		480		mA
V _{DROP}	Dropout Voltage	V _{OUT} > = 2.5V, I _{OUT} = 50mA		55		mV
ΔV _{LINE}	Line Regulation ΔV _{OUT} / (ΔV _{IN} · V _{OUT})	V _{IN} = 3.3 ~ 5.5V, I _{OUT} = 1mA		0.02	0.15	%/V
ΔV _{LOAD}	Load Regulation ΔV _{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

SIMPLIFIED BLOCK DIAGRAM

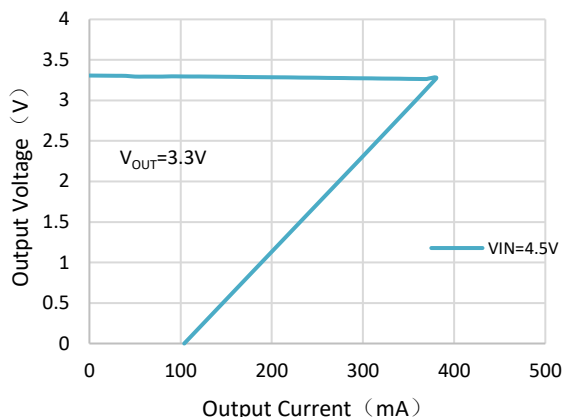


TYPICAL PERFORMANCE CHARACTERISTICS

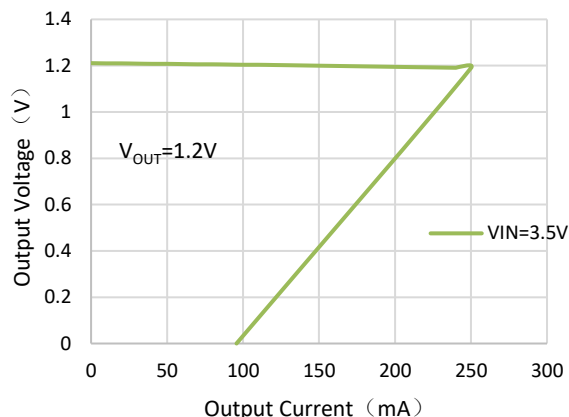
$C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, $V_{IN}=V_{OUT} + 1V$, $T_A=25^\circ C$, unless specified otherwise. (Package: SOT23-5L)



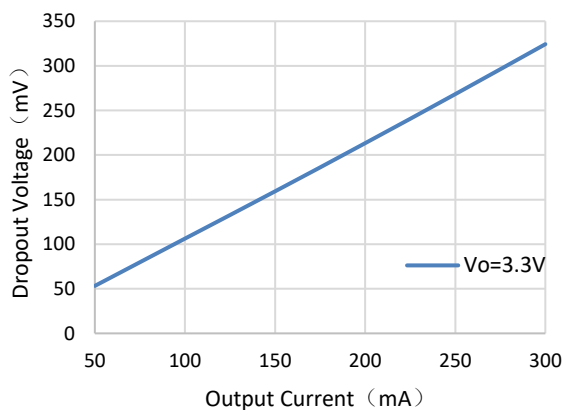
Output Voltage vs. Output Current



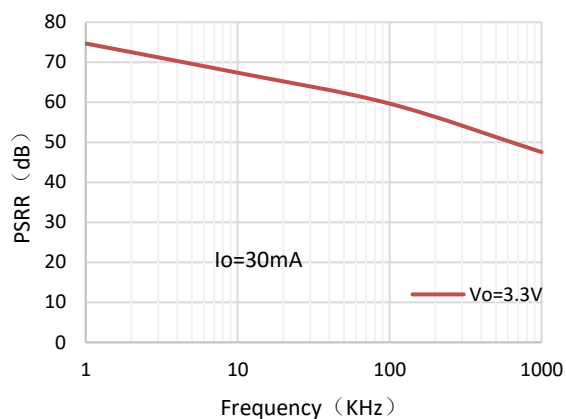
Output Voltage vs. Output Current



Dropout Voltage vs. Output Current



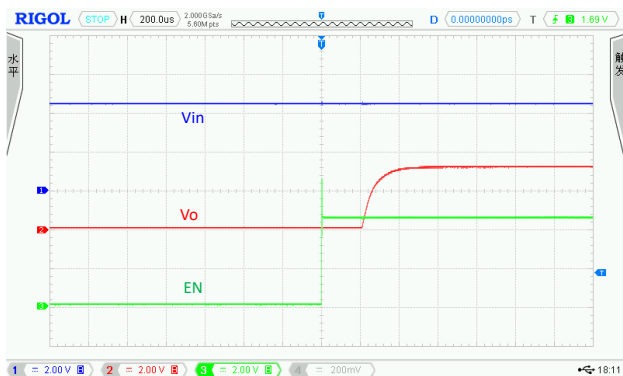
PSRR vs. Frequency



EN ON / OFF

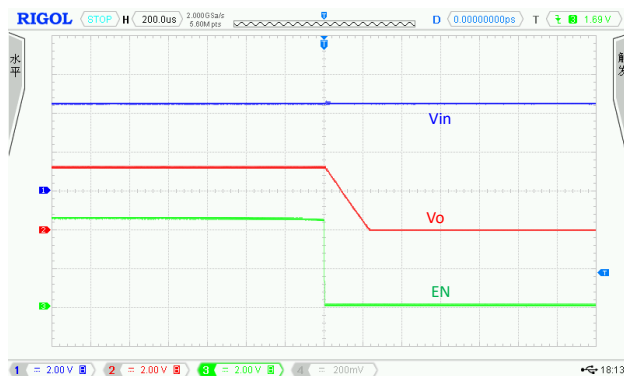
V_{EN}=0V to 4.5V

I_{OUT}=10mA

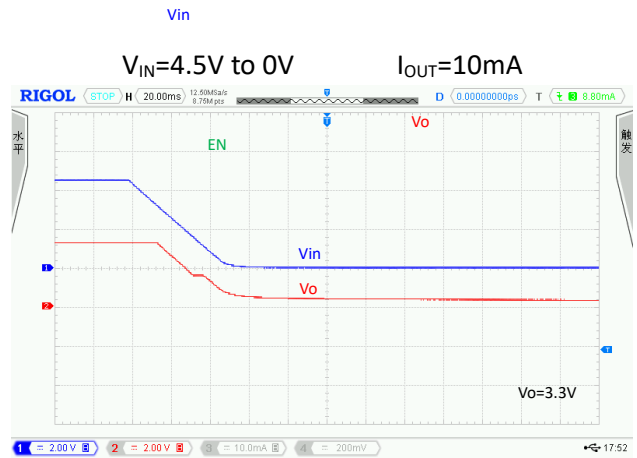
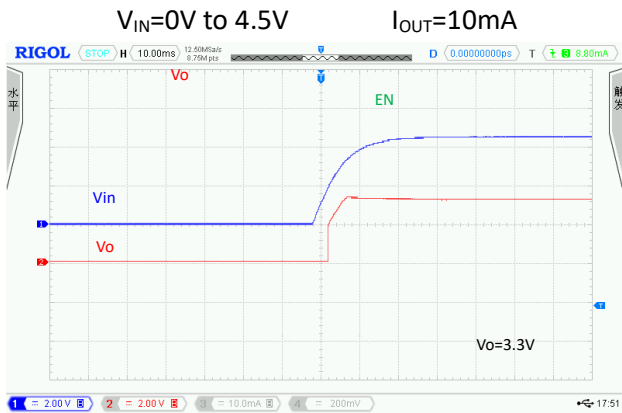


V_{EN}=4.5V to 0V

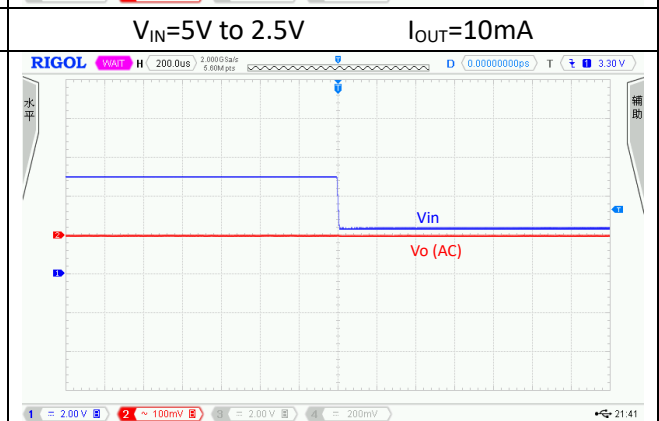
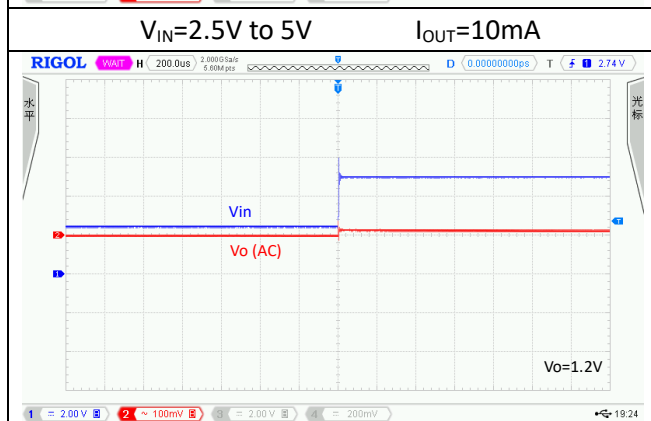
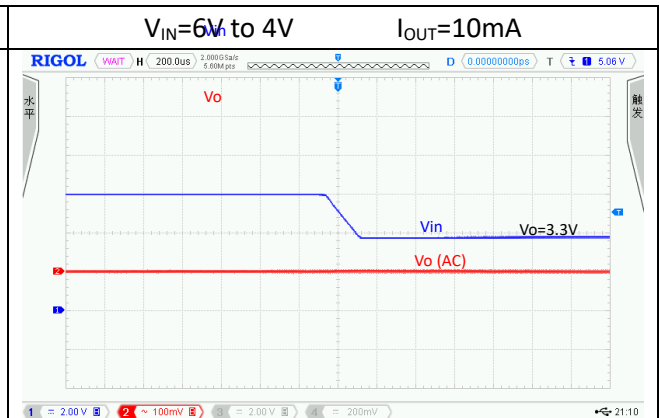
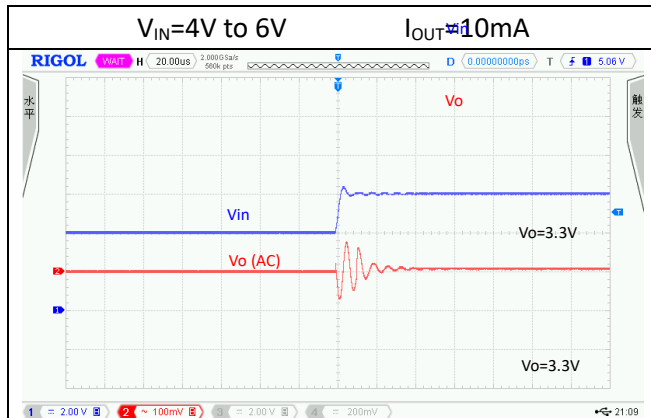
I_{OUT}=10mA



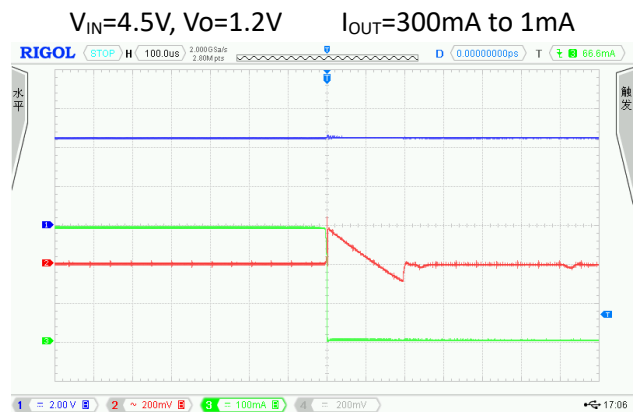
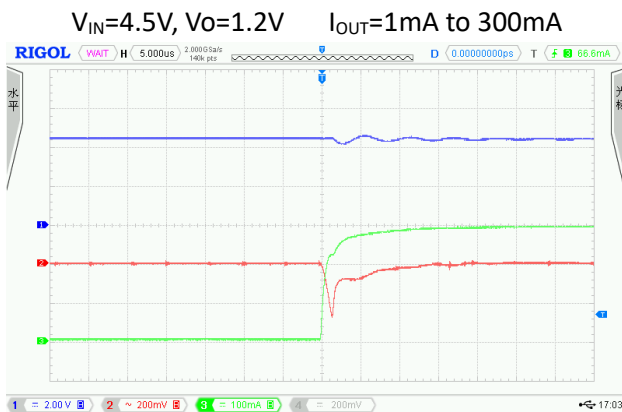
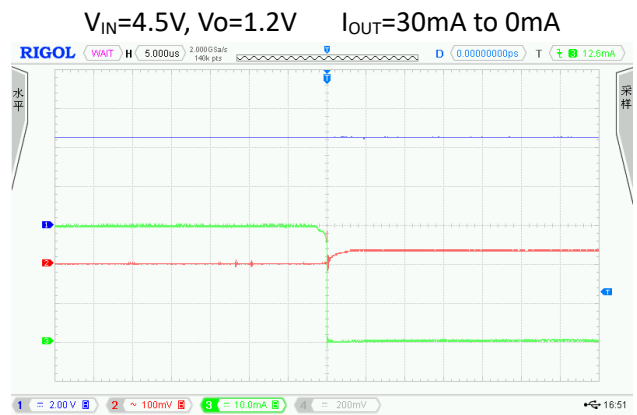
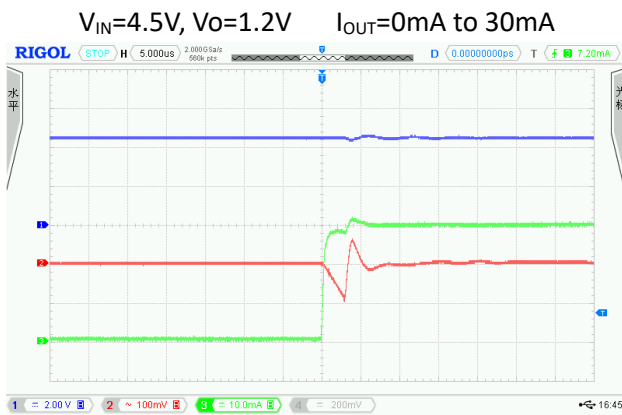
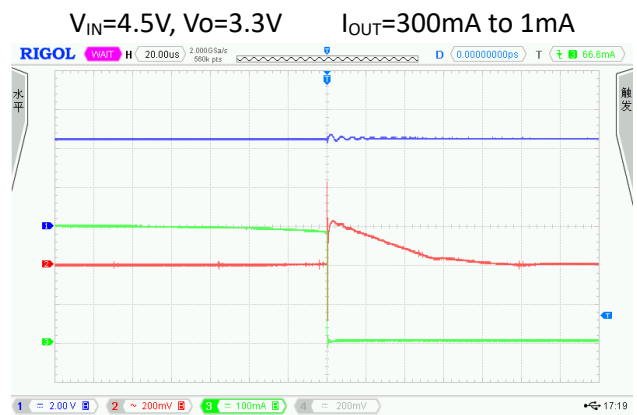
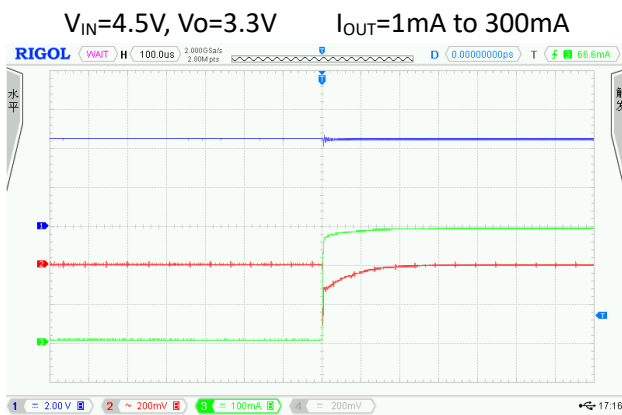
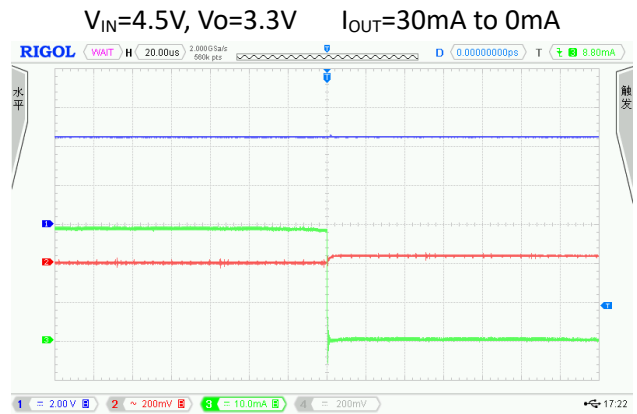
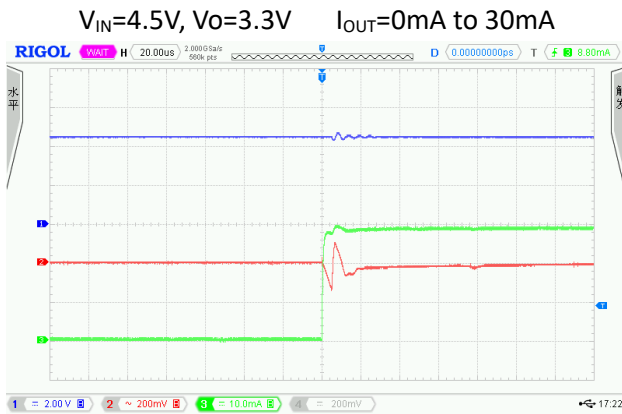
Power ON / OFF



Line Transient



Load Transient



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:					
<p>TOP VIEW</p>		<p>BOTTOM VIEW</p>			
<p>SIDE VIEW</p>		<p>REMARK: LEAD FINISH:NIPDAU</p>			
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				

REVISION HISTORY

Version No.	Date	Description
Preliminary	2021-05-18	- Initial preliminary release
V0.1	2021-09-24	- Update electric and performance characteristics
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		-
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