

■ General Description

JY1105A series are CMOS positive voltage linear regulators with low current consumption, high accuracy output, output high speed, low dropout voltage and 500mA(Maximum) output. High accuracy output voltage $\pm 1.5\%$ is realized by using laser trimming technology. The charged output capacitor can be discharged with an internal switch by making $EN=VSS$, as a result V_{out} quickly returns to the V_{ss} level. JY1105A have both Thermal Shutdown, and Current limit to prevent device damage under the worst of operating conditions. Low ESR capacitors are available for input and output capacitor.

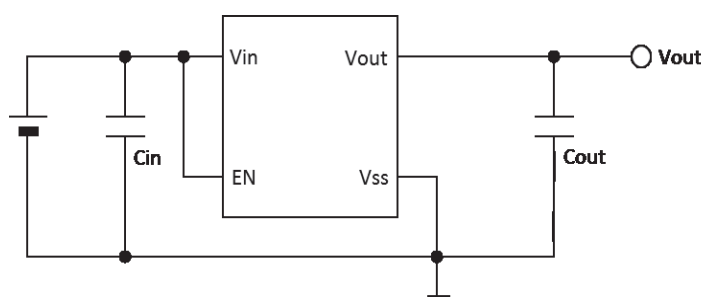
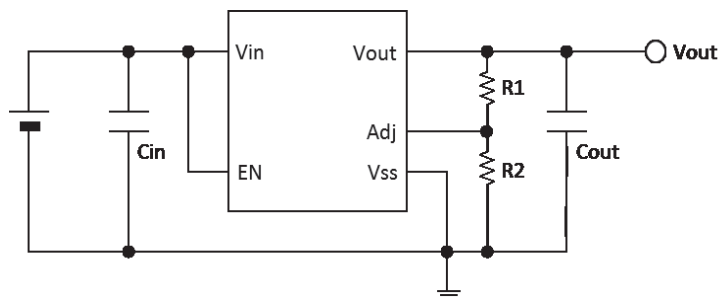
■ Features

- Fixed output voltage version.....0.8V~5.0V (selectable with a step of 0.05V)
- Adjustable output voltage version.....ADJ Reference Voltage= $0.6V \pm 1.2\%$, (Available $V_{out}=0.8V \sim 5.0V$)
- Operating input voltage.....1.7V~6.0V
- High accuracy output voltage..... $\pm 1.5\%$ ($1.35V \leq V_{out}$), $\pm 20mV$ ($V_{out} < 1.35V$) at $+25^{\circ}C$
- Maximum output current500mA
- Low dropout voltage.....Typ. 220mV (output=3.0V, $I_{out}=300mA$)
- Low quiescent current.....Typ. 60 μA
- High ripple rejection.....Typ. 75dB at 1KHz
- Low ESR output capacitor.....1.0 μF ($1.2V \leq V_{out}$), 3.3 μF ($V_{out} < 1.2V$)
- Low ESR input capacitor.....1.0 μF
- Operating temperature range..... $-40^{\circ}C$ to $+85^{\circ}C$
- Built-in over-current protector.....Limit current : 600mA (Typical)
- Built-in thermal shutdown circuit
- C_{out} high-speed auto-discharge
- Built-in On/Off circuit (EN)

■ Applications

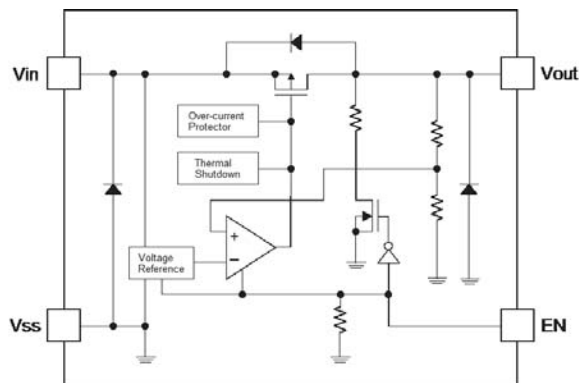
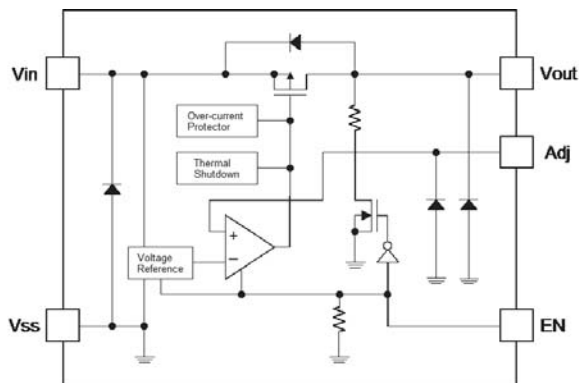
- Battery powered devices
- Cellular phone
- Digital / Video cameras
- Portable games
- Handheld instruments

■ Typical Application

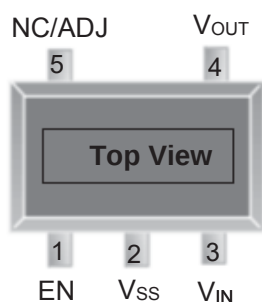


High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

■ Functional Block Diagram(After molding)



■ Pin Configuration

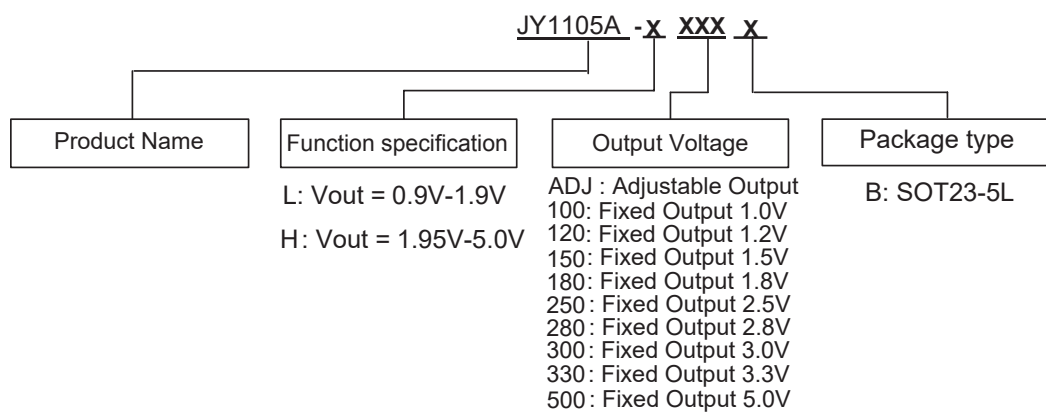


SOT23-5L

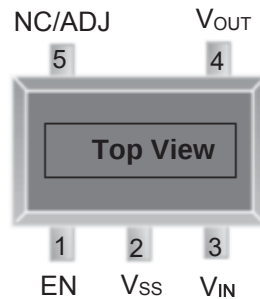
SOT23-6L Pin No.	Symbol	Description
1	EN	Chip enable
2	V _{SS}	Power ground
3	V _{IN}	Voltage input
4	V _{OUT}	Output
5	NC/ADJ	Non connection or adjustable



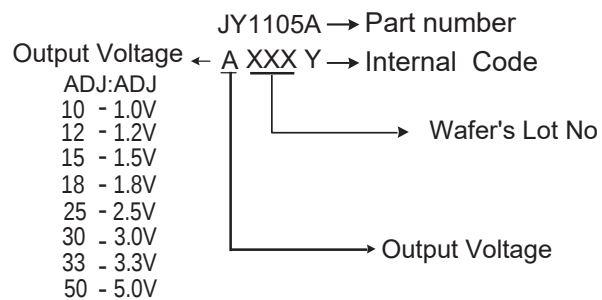
Ordering Information



Marking Information



SOT23-5L





Absolute Maximum Rating

Items		Symbol	Ratings	Unit
Input voltage range		Vin	-0.3 to +7.0	V
EN voltage range		VEN	-0.3 to +7.0	V
Adj voltage range		Vadj	-0.3 to +7.0	V
Output current		Iout	Pd/(Vin-Vout)	mA
Output voltage range		Vout	Vss-0.3 to Vin+0.3	V
Power dissipation	SOT-25	Pd	400 (on PCB)	mW
Operating temperature range		Topr	-40 to +85	°C
Storage temperature range		Tstg	-55 to +125	°C

Electrical Specifications(1)

(Ta = 25°C, unless otherwise noted.)

Items	Symbol	Conditions		Min.	Typ.	Max.	Unit	Test Circuit
Output voltage	Vout	Vin=Vout+1.0V, Iout=30mA JY1105A	Vout ≥ 1.35V	Vout ×0.985	Vout	Vout ×1.015	V	1
			Vout < 1.35V	Vout -20	Vout	Vout +20	mV	1
ADJ Reference Voltage	Vadj	JY1105A-ADJ		0.593	0.600	0.607	V	2
Output current	Iout	Vin=Vout+1.0V	0.8V ≤ Vout ≤ 1.15V	300	-	-	mA	1
			1.2V ≤ Vout ≤ 1.65V	300	-	-		
			1.7V ≤ Vout ≤ 2.25V	300	-	-		
			2.3V ≤ Vout ≤ 2.85V	300	-	-		
			2.9V ≤ Vout ≤ 3.45V	300	-	-		
			3.5V ≤ Vout ≤ 4.05V	300	-	-		
			4.0V ≤ Vout ≤ 5.00V	300	-	-		
Dropout voltage (Note1)	Vdif	Iout=300mA (Vin ≥ 1.7V)	0.8V ≤ Vout ≤ 1.15V	-	-	900	mV	1
			1.2V ≤ Vout ≤ 1.65V	-	-	500		
			1.7V ≤ Vout ≤ 2.25V	-	305	400		
			2.3V ≤ Vout ≤ 2.85V	-	250	340		
			2.9V ≤ Vout ≤ 3.45V	-	220	300		
			3.5V ≤ Vout ≤ 4.05V	-	210	290		
			4.0V ≤ Vout ≤ 5.00V	-	205	285		

Note1: Dropout Voltage is measured at Vout=Vout(nominal)×0.98, { Vout(nominal) is measured at Vin=Vout+1.0V }



High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

■ Electrical Specifications (2)

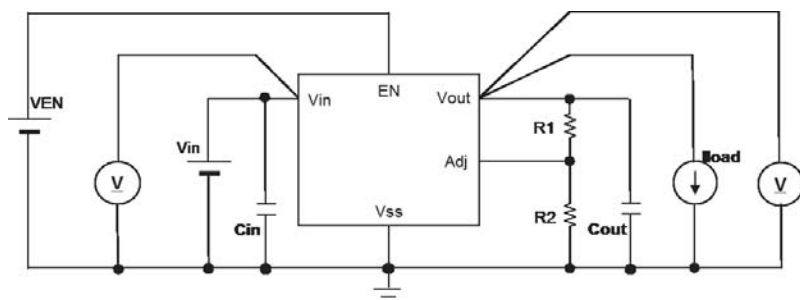
(Ta = 25°C, unless otherwise noted.)

Items	Symbol	Conditions		Min.	Typ.	Max.	Unit	Test Circuit
Current consumption	Iopr	Vin=Vout+1.0V, Iout=0mA		-	60	90	μA	3
Standby current	Istb	EN=Vss		-	0.02	0.2	μA	3
Input voltage	Vin			1.7	-	6.0	V	-
Load regulation	ΔVout/Vout	Vin=Vout+1.0V, Iout=0.1mA to 300mA	Vout<1.35V	-	0.1	0.7	abs(%)	1
			1.35V≤Vout<2.30V	-	0.1	0.6		
			2.30V≤Vout	-	0.1	0.5		
Line regulation	ΔVout / (ΔVin•Vout)	Vout+1.0V≤Vin≤6.0V, Iout=30mA		-	0.01	0.1	abs(%/V)	1
Ripple rejection	Rr	Vin=Vout+1.0V, f=1KHz, ΔVrip=0.5Vp-p, Iout=30mA		-	75	-	dB	4
Limit current	Ilimit	Vin=Vout+1.0V		450	600	-	mA	1
Short circuit current	Ishort	Vin=Vout+1.0V, Vout=0V		-	100	-	mA	5
Output voltage temperature coefficient	ΔVout / ΔTa•Vout	Iout=30mA, Ta= -40°C to +85°C		-	±20	-	ppm/°C	1
Adj input bias current	Iadj	Adj=0.6V, JY1105A		-0.1	-	0.1	uA	6
EN high level voltage	Venh			1.2	-	6	V	1
EN low level voltage	Venl			-	-	0.3	V	1
EN high level current	Ienh	EN= Vin= 6.0V		0.3	-	5	μA	7
EN low level current	Ienl	EN= Vss		-0.1	-	0.1	μA	7
Cout auto-discharge resistance	Rdis	Vin=6.0V, Vout=4.0V, EN= Vss		-	100	-	Ω	5
Thermal Shutdown Temperature	Ttsd	Shutdown, temperature increasing		-	150	-	°C	1
Thermal Shutdown Release Temperature	Ttsr	Release, temperature decreasing		-	120	-	°C	1

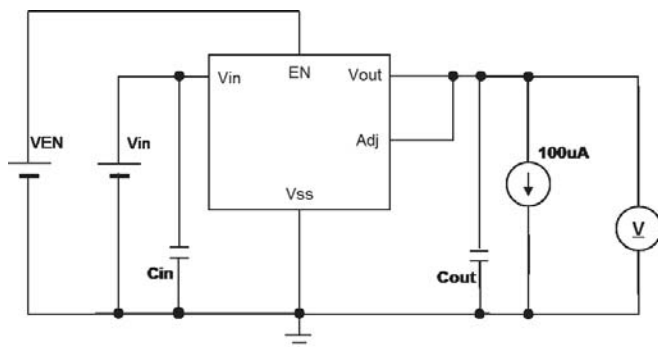


■ Test Circuits

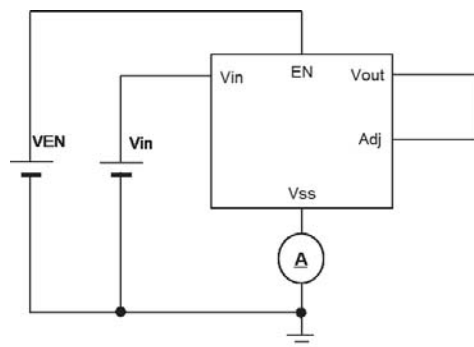
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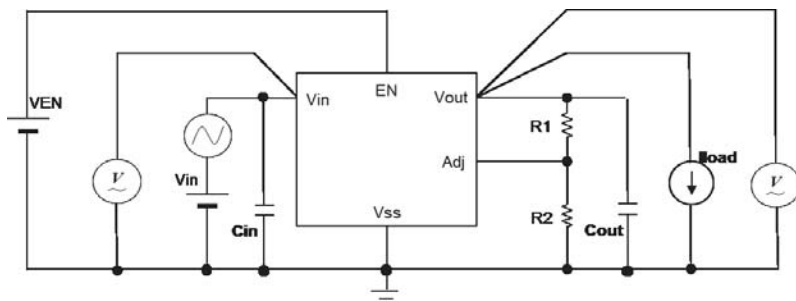
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3



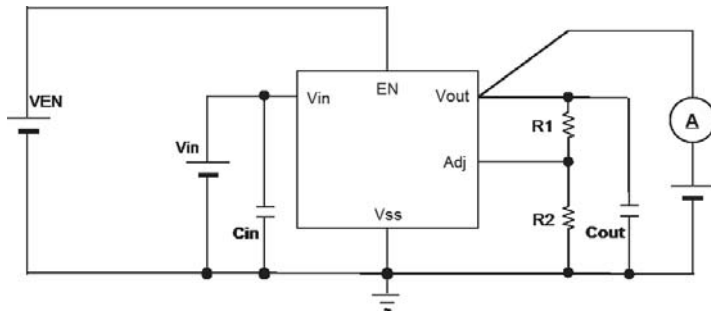
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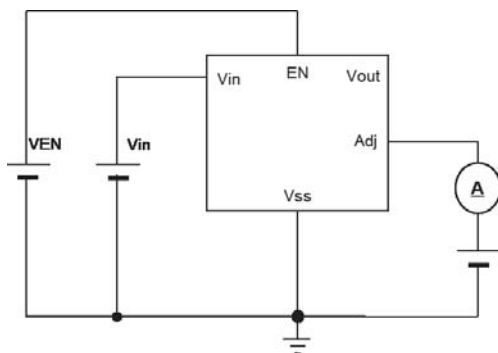


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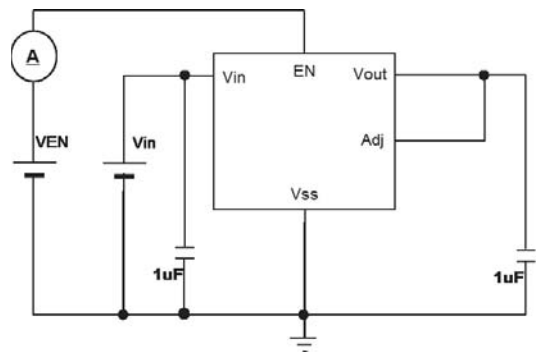
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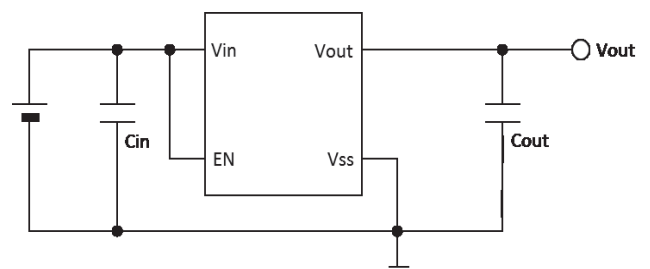
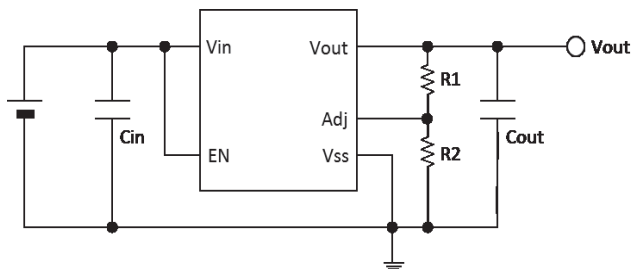
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7



■ Detailed Description



Input and Output Capacitor Requirements

Minimum Capacitance	$V_{out} < 1.2V$	$1.2V \leq V_{out}$
C_{in}	$\geq 1\mu F$	$\geq 1\mu F$
C_{out}	$\geq 3.3\mu F$	$\geq 1\mu F$

X5R- and X7R-type ceramic capacitors are recommended because these components have minimal variation in value and equivalent series resistance (ESR) over temperature and will offer the best AC performance.

JY1105A is stable with an output capacitor to ground. 3.3 μF or greater in case of $V_{out} < 1.2V$.

1 μF or greater in case of $V_{out} \geq 1.2V$.

And an input capacitor is also important for the stability of JY1105A. Place 1 μF or greater between V_{in} and ground. Input and output capacitors should be placed as close to JY1105A as possible.

Vout setting of Adjustable Version

Adjustable version uses external feedback resistors to generate an output voltage. The output voltage from 0.8V to 5V are available. V_{adj} is trimmed to 0.6V and V_{out} is given by the following equation.

$$V_{out} = V_{adj} * (1 + R1 / R2)$$

Feedback resistors $R1$ and $R2$ should be high enough to keep quiescent current low, but increasing $R1 + R2$ will reduce stability. In general, $R1$ and $R2$ in the tens of kohm will produce adequate stability. In the same way as capacitors, place $R1$ and $R2$ close to JY1105A. Because these form the negative feedback loop of LDO, The distance from resistances to JY1105A influences the stability and other characteristics.

To improve stability characteristics, keep parasitics on the Adj pin to a minimum, and lower $R1$ and $R2$ values.

EN pin

EN pin is Active high. When EN pin is opened or is forced to be low, the Pch MOS pass transistor shuts off, and all internal circuits are powered down. In this standby state, the current consumption decreases to 0.2 μA maximum at room temperature. EN pin is pulled down by 4M Ω resistance internally.

Internal Current Limit

JY1105A has internal over load current limit protection circuit. This limits the Pch MOS pass transistor current to 600mA. So, against excessive load, JY1105A limits it internally and the output voltage falls down.

Finally, when the output is shorted to GND level, the Pch MOS pass transistor current is limited to 100mA.

This is Short circuit current (I_{short}).

Thermal Shutdown

JY1105A has thermal shutdown circuit internally. This limits total power dissipation in JY1105A.

When the junction temperature T_j reaches approximately 150 $^{\circ}C$, the Pch MOS pass transistor shuts off the load current and allows JY1105A to cool. When the junction temperature T_j falls to approximately 120 $^{\circ}C$, JY1105A restart the regulation.

(Note)

Internal current limit circuit or Thermal shutdown circuit cannot completely protect JY1105A from the thermal fault conditions. The maximum output power of JY1105A is limited by the maximum power dissipation of the package. The maximum power dissipation should not exceed the package's maximum power rating.

And for reliable operation, junction temperature should be limited to +125 $^{\circ}C$ maximum.

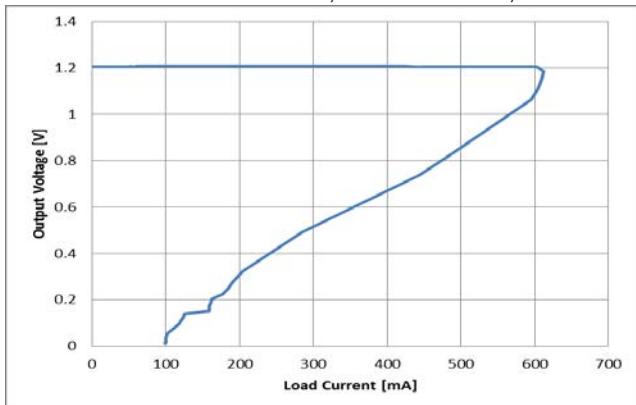
Power dissipation 'P' :

$$P = (V_{in} - V_{out}) * I_{out}$$

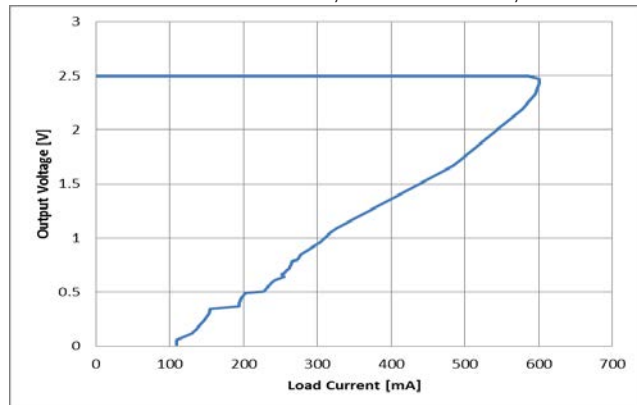
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Output Voltage vs. Load Current

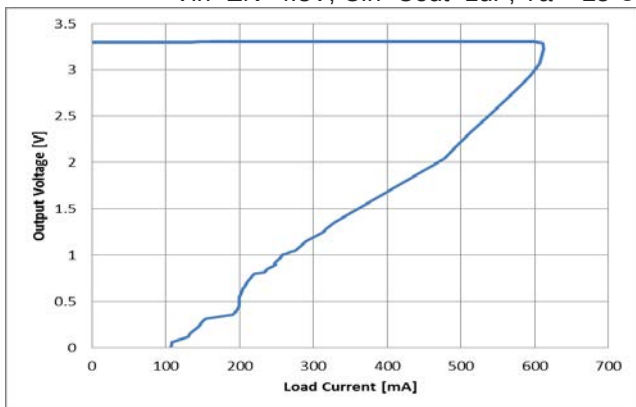
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C



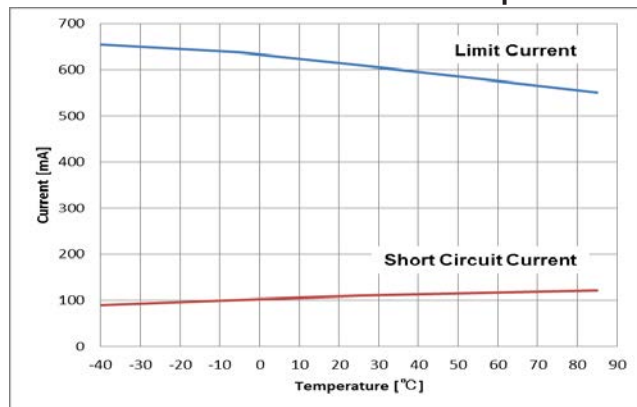
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C

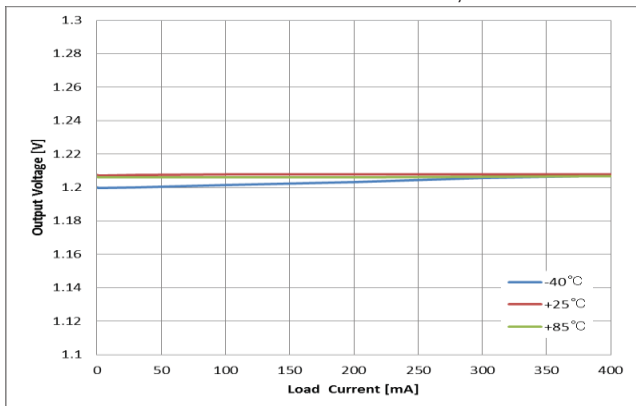


Limit Current, Short Circuit Current vs. Temperature

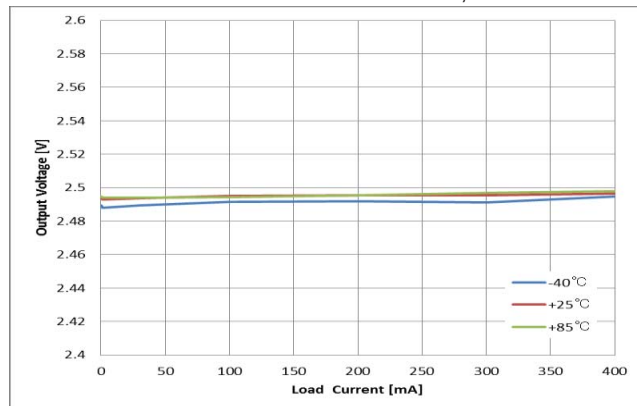


Load Regulation

Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF



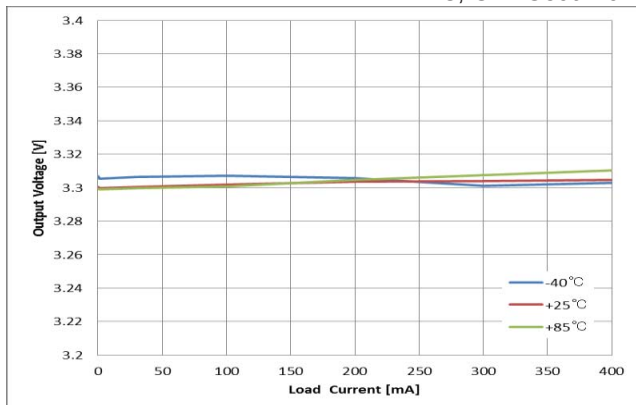
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF



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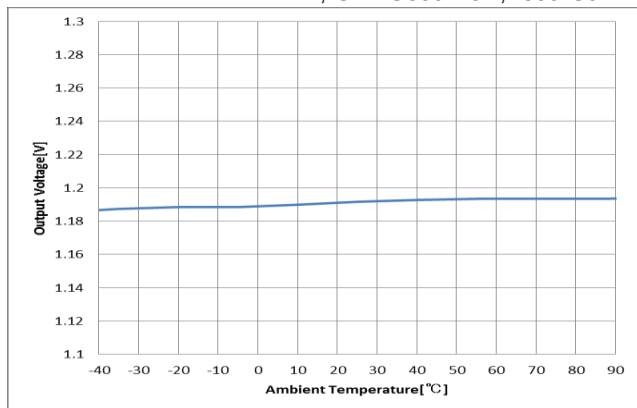
Vout=3.3V

Vin=EN=4.3, Cin=Cout=1uF

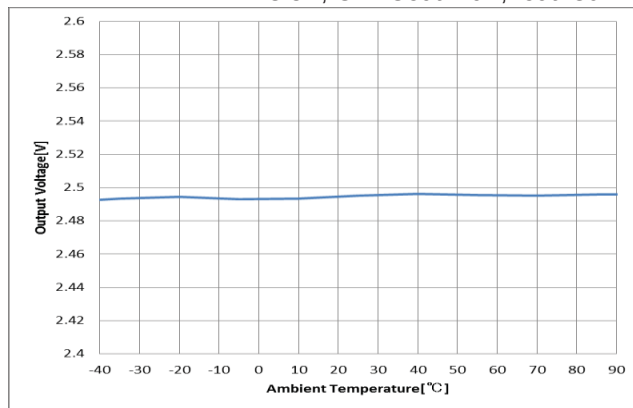


Output Voltage vs. Temperature

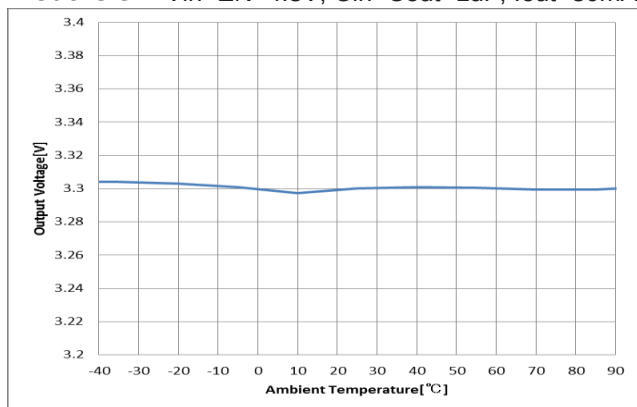
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Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Iout=30mA



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Iout=30mA



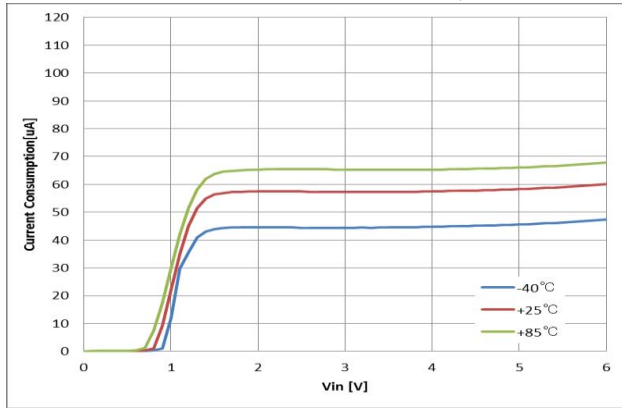


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Current Consumption vs. Input Voltage

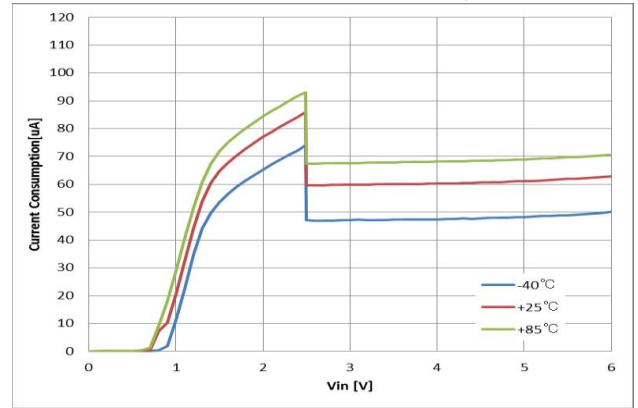
Vout=1.2V

Vin=EN, Cin=Cout=1uF



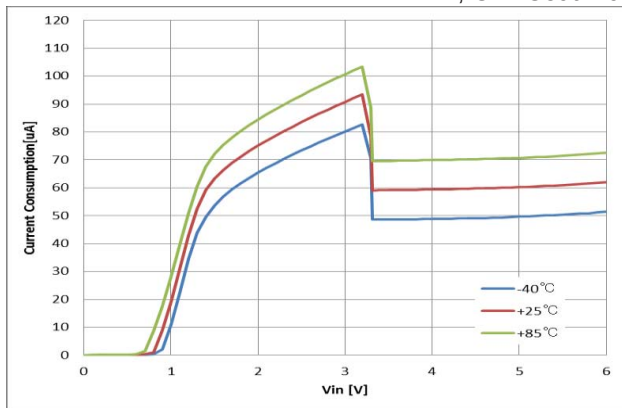
Vout=2.5V

Vin=EN, Cin=Cout=1uF



Vout=3.3V

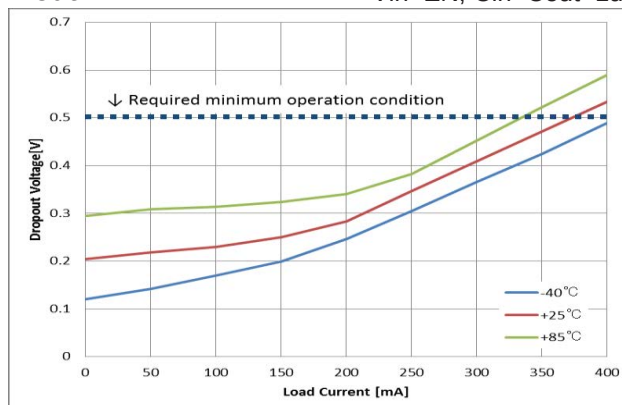
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Dropout Voltage vs. Load Current

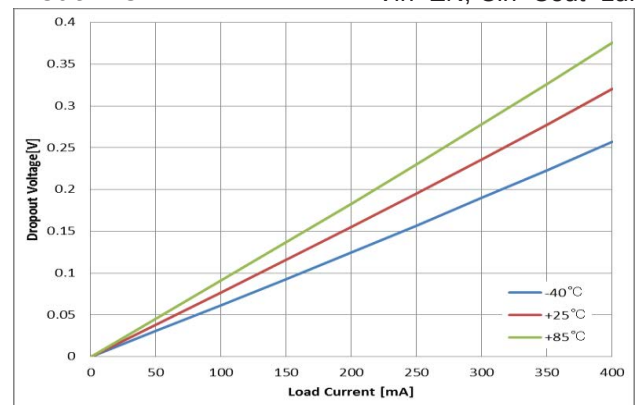
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Vin=EN, Cin=Cout=1uF



Vout=2.5V

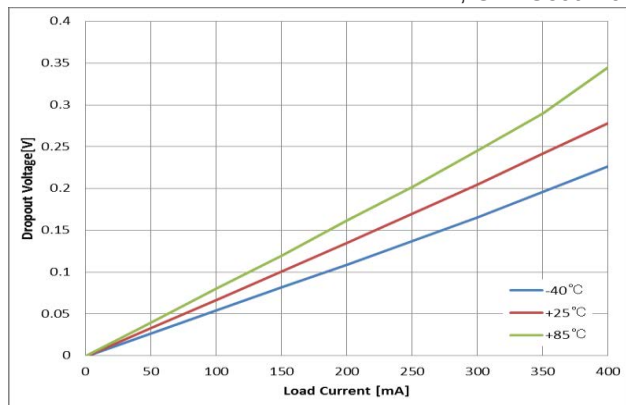
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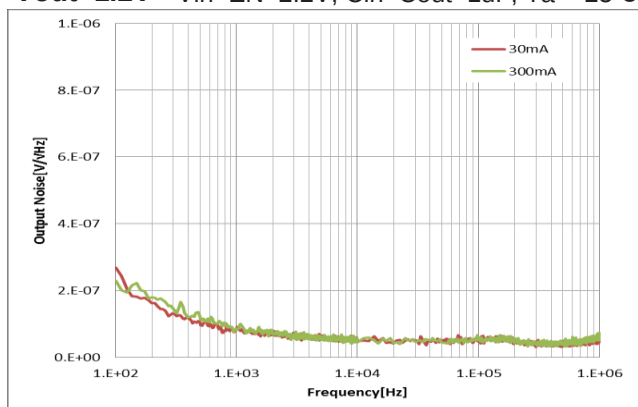
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Vin=EN, Cin=Cout=1uF

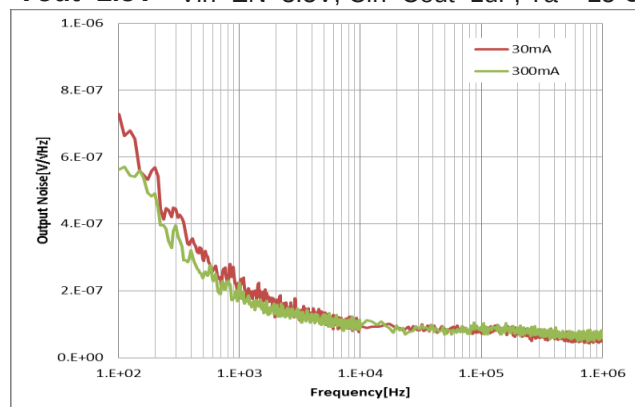


Output Noise vs. Frequency

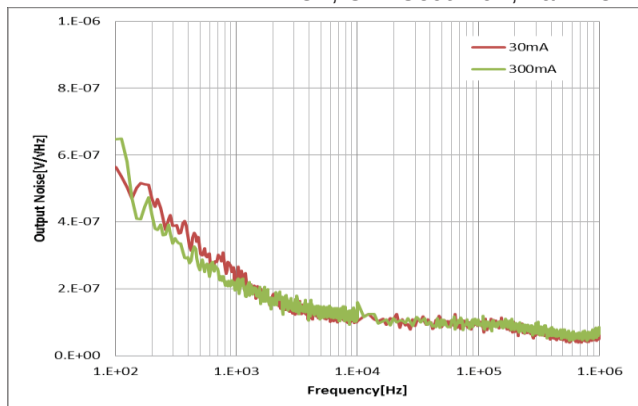
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Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C

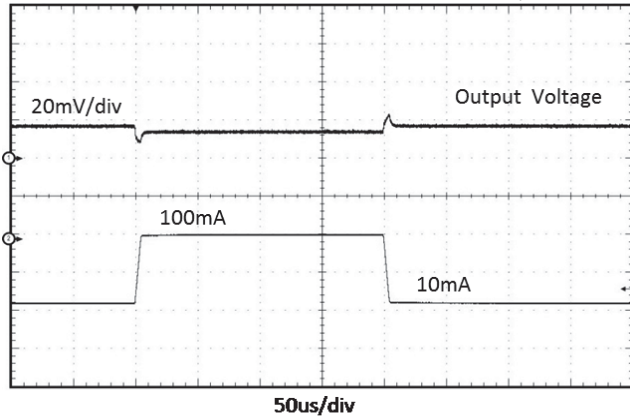




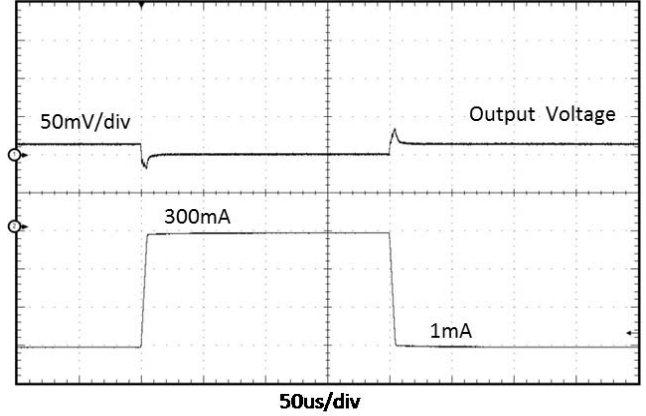
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Load Transient Response

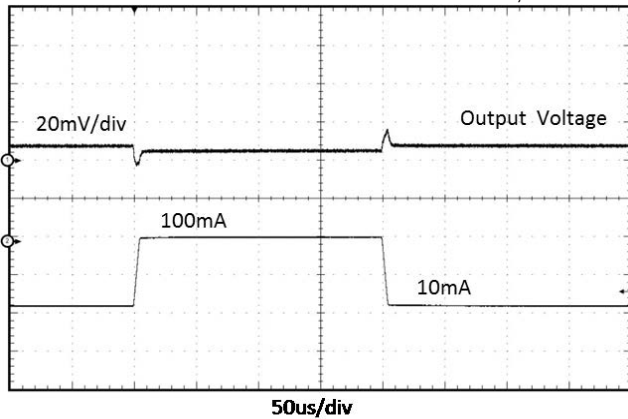
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Iout=10mA~100mA, tr=tf=5us



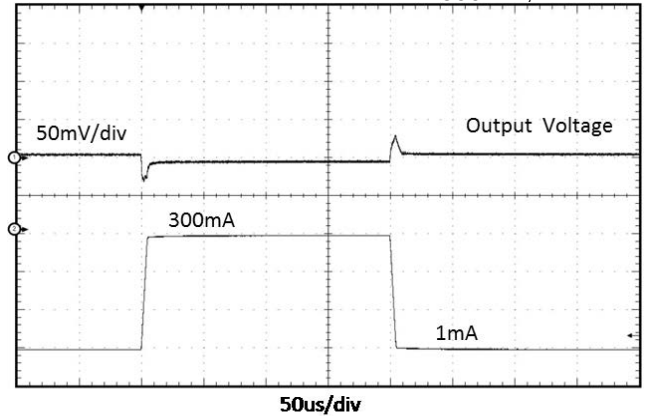
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C
Iout=1mA~300mA, tr=tf=5us



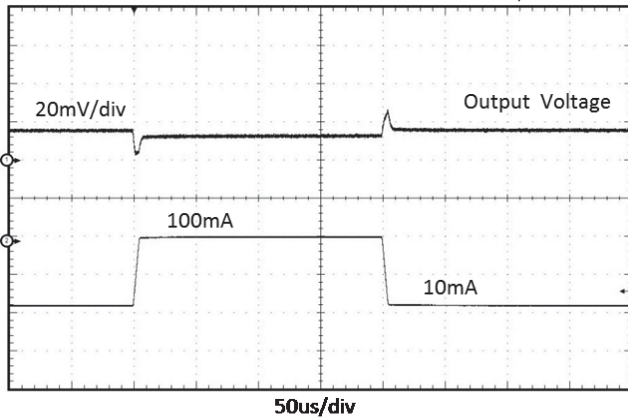
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Iout=10mA~100mA, tr=tf=5us



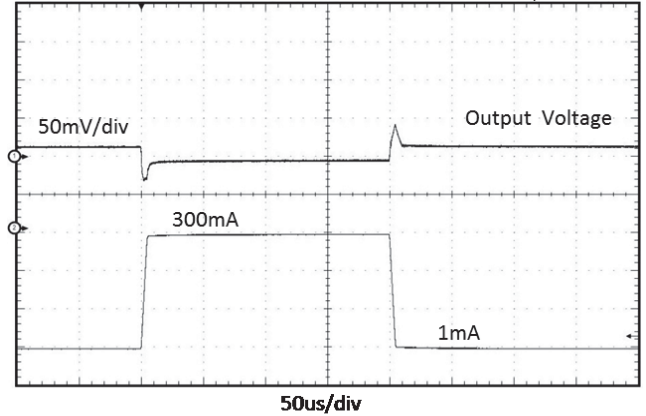
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C
Iout=1mA~300mA, tr=tf=5us



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C
Iout=10mA~100mA, tr=tf=5us



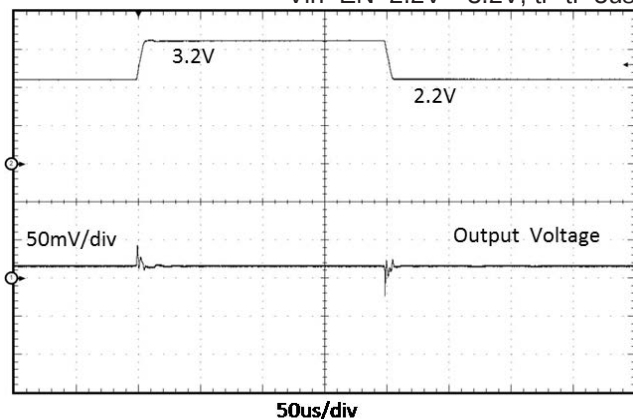
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Iout=1mA~300mA, tr=tf=5us



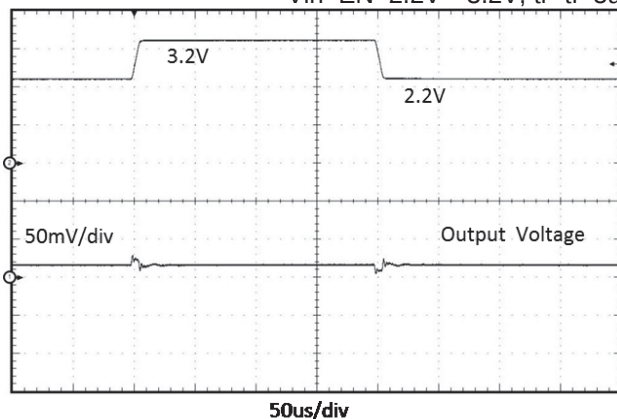
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Line Transient Response

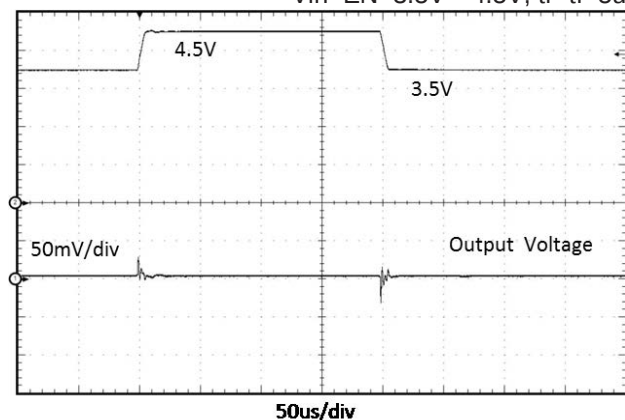
Vout=1.2V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=2.2V \sim 3.2V$, $t_r=t_f=5\mu s$



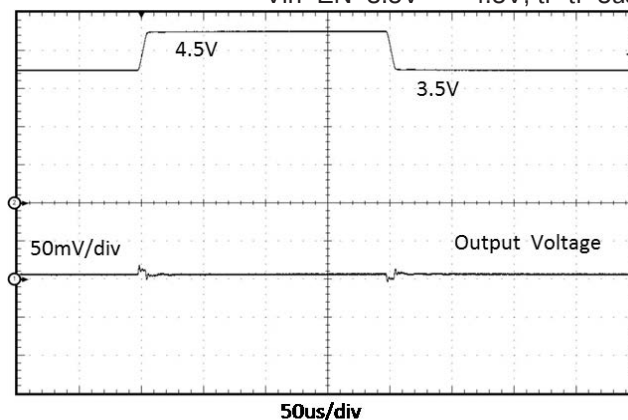
Vout=1.2V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=2.2V \sim 3.2V$, $t_r=t_f=5\mu s$



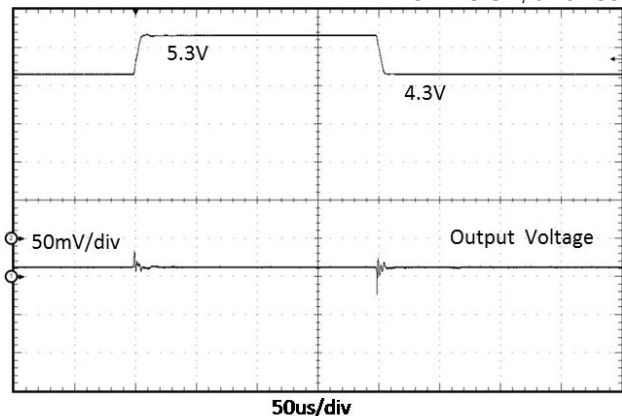
Vout=2.5V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=3.5V \sim 4.5V$, $t_r=t_f=5\mu s$



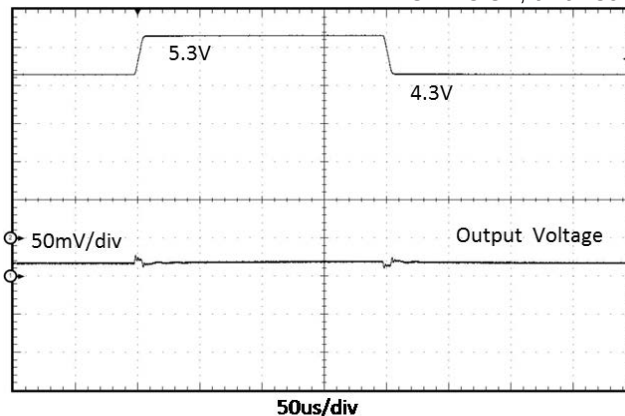
Vout=2.5V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=3.5V \sim 4.5V$, $t_r=t_f=5\mu s$



Vout=3.3V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=4.3V \sim 5.3V$, $t_r=t_f=5\mu s$



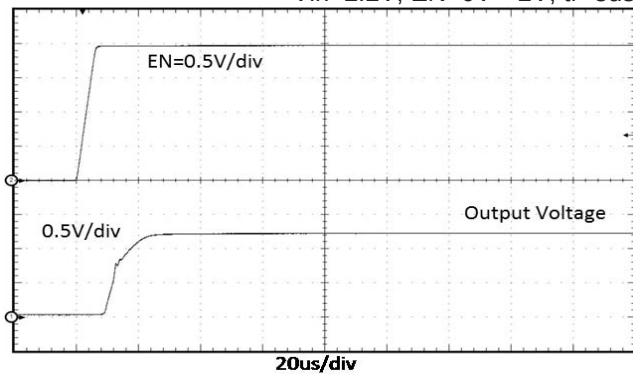
Vout=3.3V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=EN=4.3V \sim 5.3V$, $t_r=t_f=5\mu s$



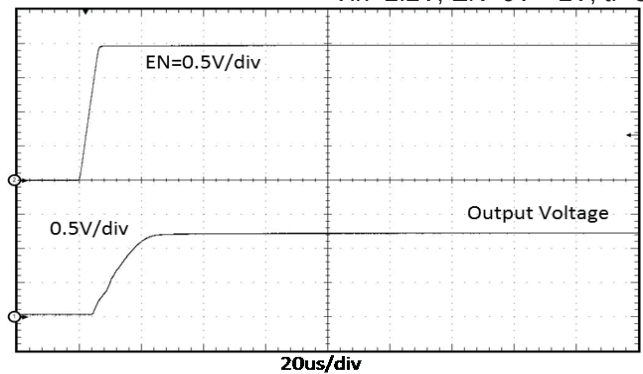
High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

EN Transient Response

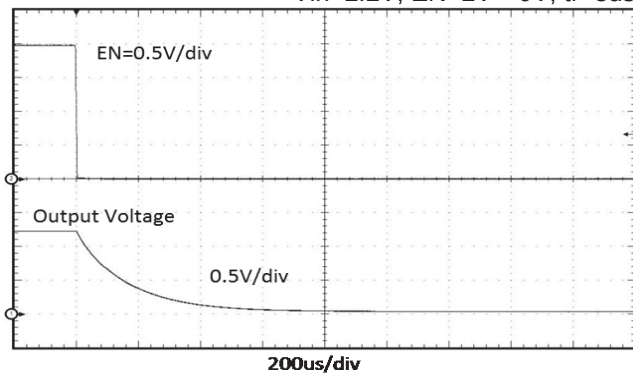
Vout=1.2V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



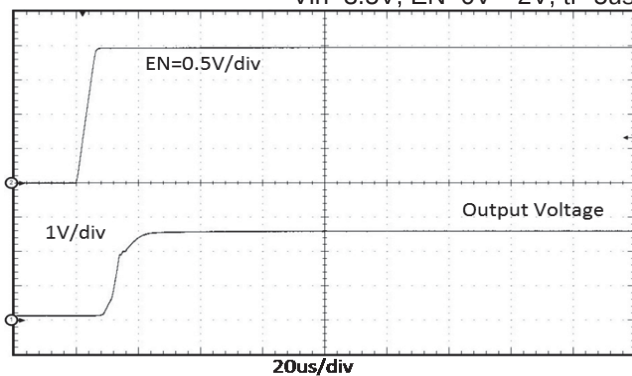
Vout=1.2V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



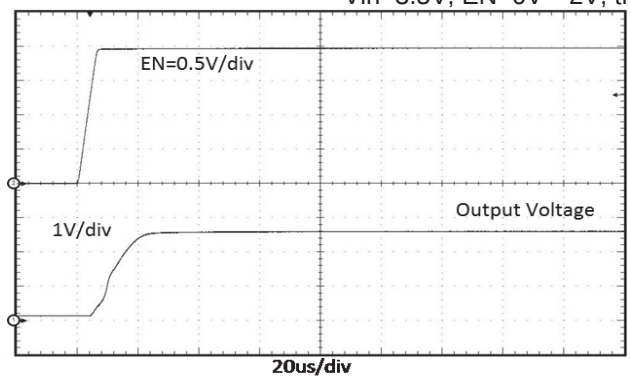
Vout=1.2V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=2.2V$, $EN=2V \rightarrow 0V$, $t_r=5\mu s$



Vout=2.5V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



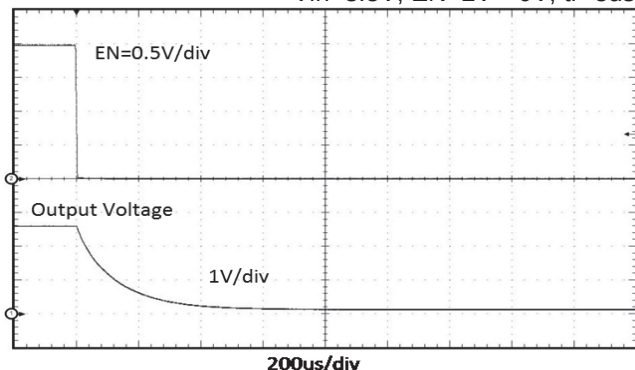
Vout=2.5V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



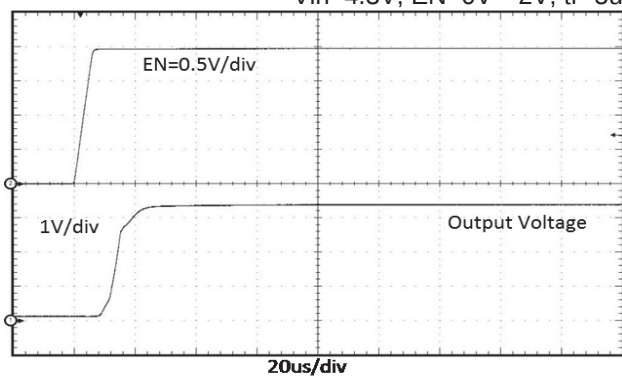


High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

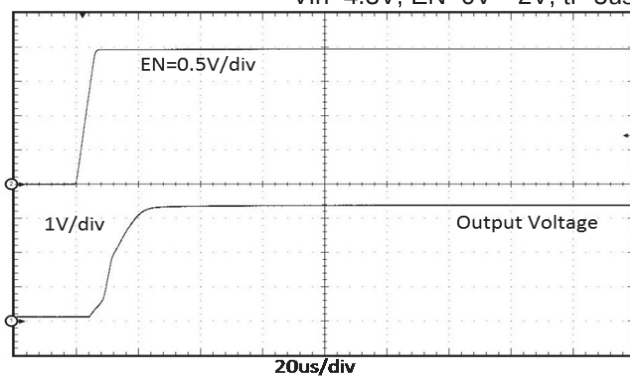
Vout=2.5V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=3.5V$, $EN=2V \rightarrow 0V$, $t_r=5\mu s$



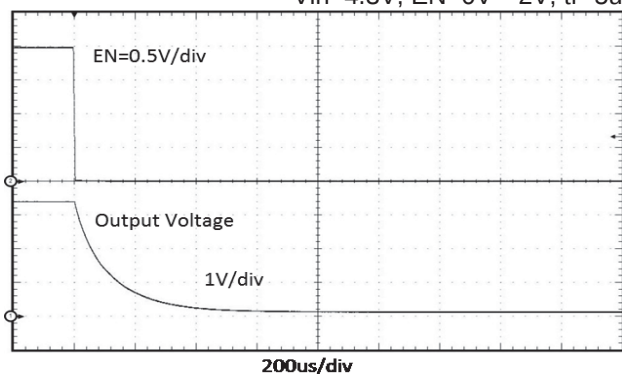
Vout=3.3V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



Vout=3.3V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$

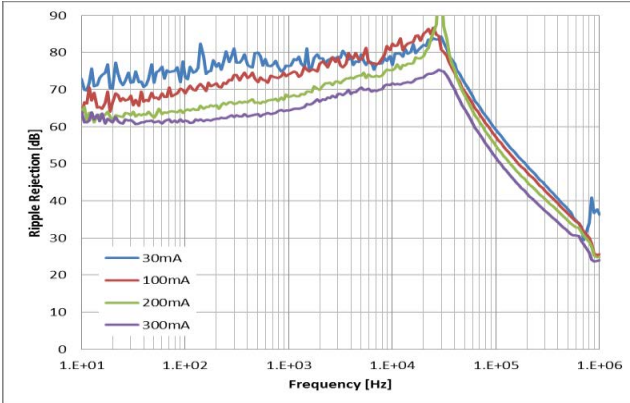


Vout=3.3V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^{\circ}C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$

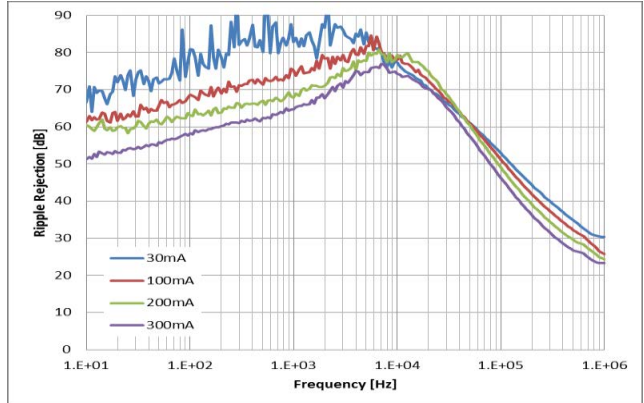


Ripple Rejection vs. Frequency

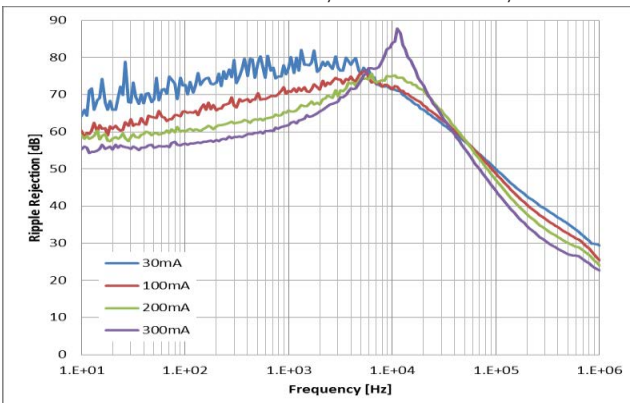
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C



Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C

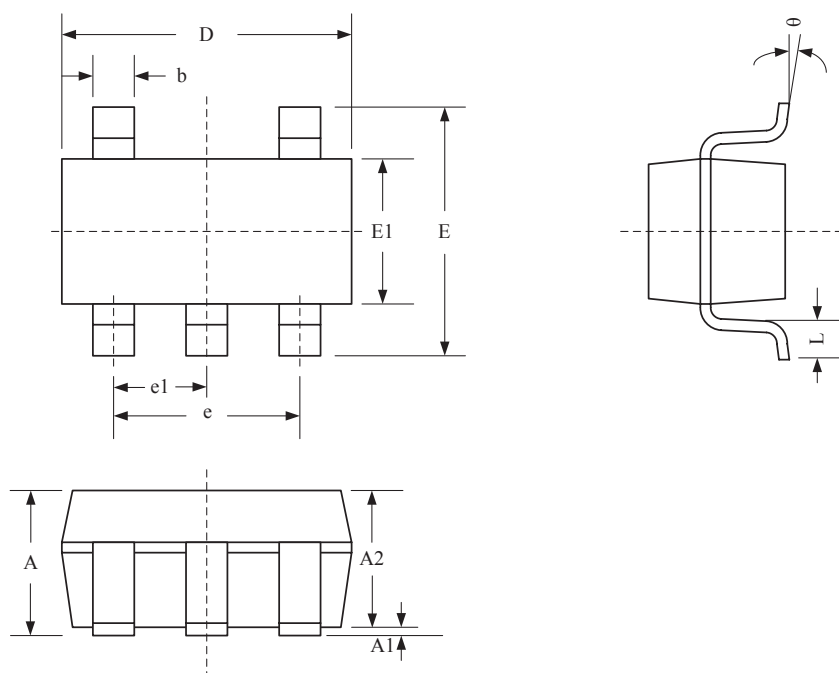


Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C



High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

PACKAGE DIMENSIONS (SOT23-5L)

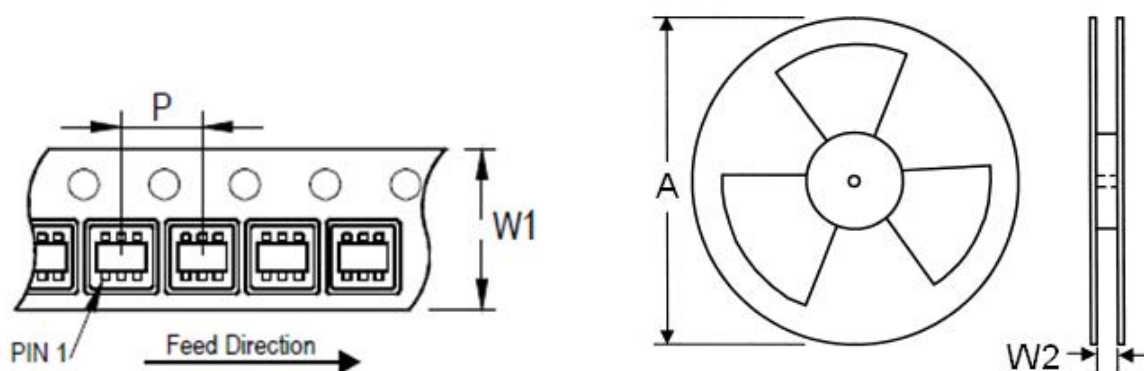


Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	—	—	1.450	—	—	0.057
A1	0.000	—	0.150	0.000	—	0.006
A2	—	—	1.300	—	—	0.012
b	0.300	—	0.500	0.012	—	0.020
D	2.90 BSC			0.114 BSC		
e1	0.95 BSC			0.037 BSC		
e	1.90 BSC			0.075 BSC		
E	2.80 BSC			0.110 BSC		
E1	1.60 BSC			0.063 BSC		
L	0.300	0.450	0.600	0.012	0.018	0.024
θ	0	4	8	0	4	8

Carrier Dimensions

SOT23-5L



Tape Size (W1) mm	Pocket Pitch (P) mm	Reel Size (A)		Reel Width (W2) mm	Empty Cavity Length mm	Units per Reel
		in	mm			
8	4	7	180	8.4	300~1000	3,000