

■ General Description

JY1105 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 Vout quickly returns to the Vss level. JY1105 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.

Adjustable output voltage version JY1105AF and Fixed output voltage version JY1105NF are available.

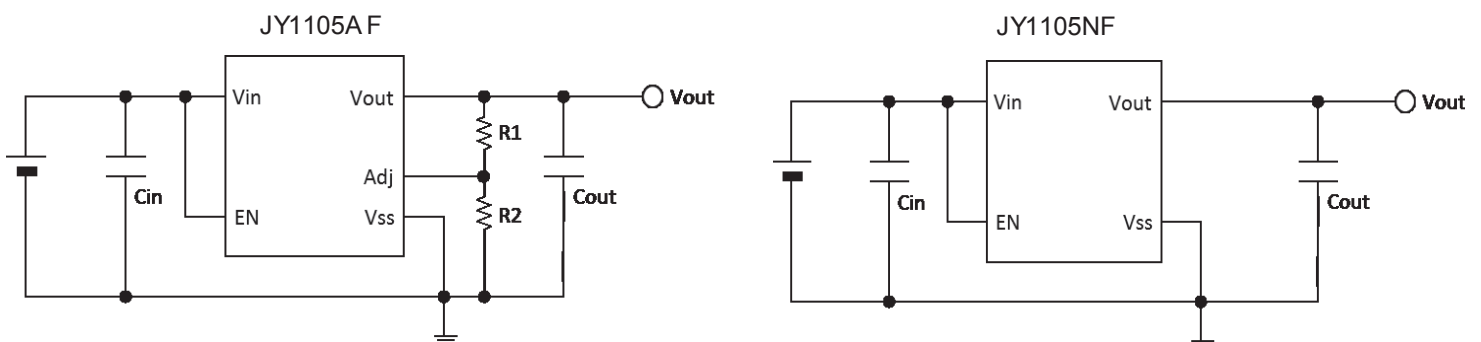
■ Features

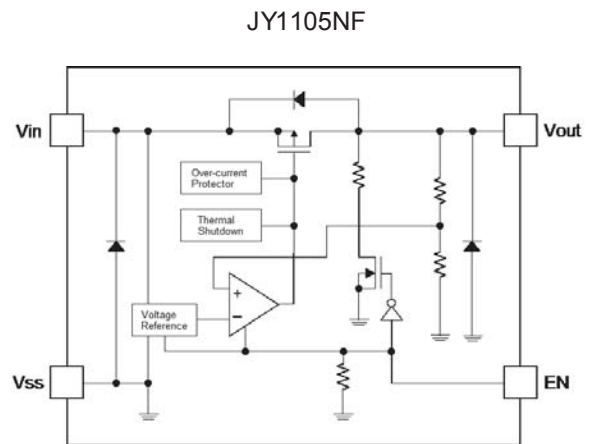
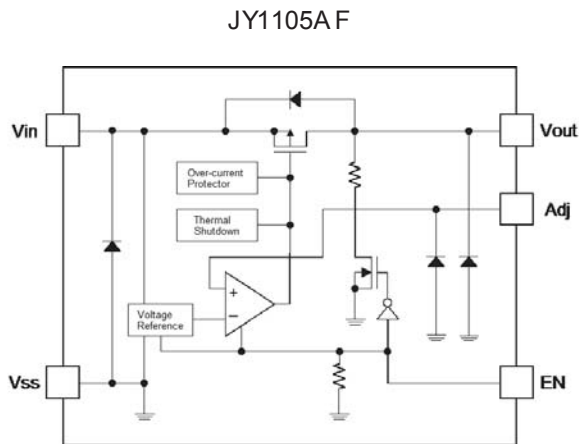
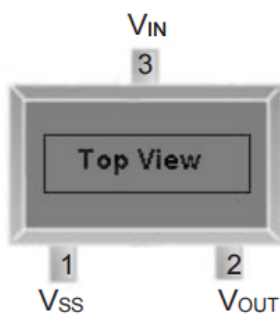
- Fixed output voltage version.....0.8V~5.0V (selectable with a step of 0.05V)
- Adjustable output voltage version.....ADJ Reference Voltage=0.6V \pm 1.2%, (Available Vout=0.8V~5.0V)
- Operating input voltage.....1.7V~6.0V
- High accuracy output voltage..... $\pm 1.5\%$ (1.35V \leq Vout), ± 20 mV (Vout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

■ Applications

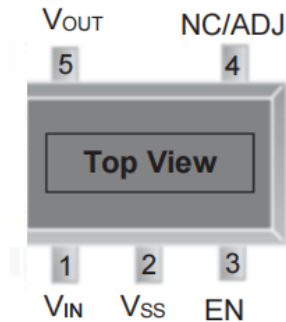
- Battery powered devices
- Cellular phone
- Digital / Video cameras
- Portable games
- Handheld instruments

■ Typical Application

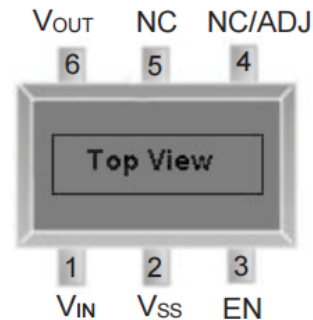


Functional Block Diagram(After molding)

Pin Configuration


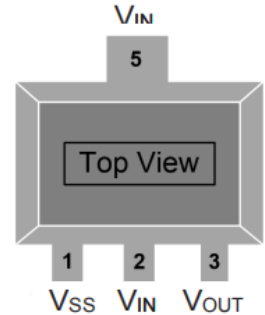
SOT23-3L



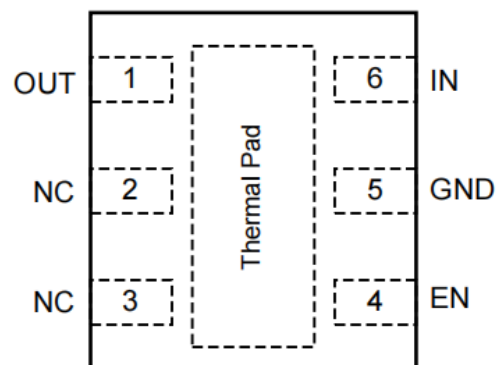
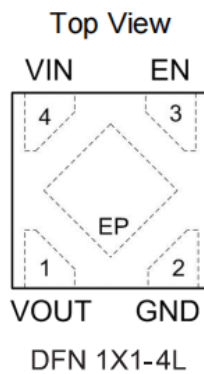
SOT23-5L



SOT23-6L



SOT89-3L



Exposed Pad, connect to ground or leave floating

Top view

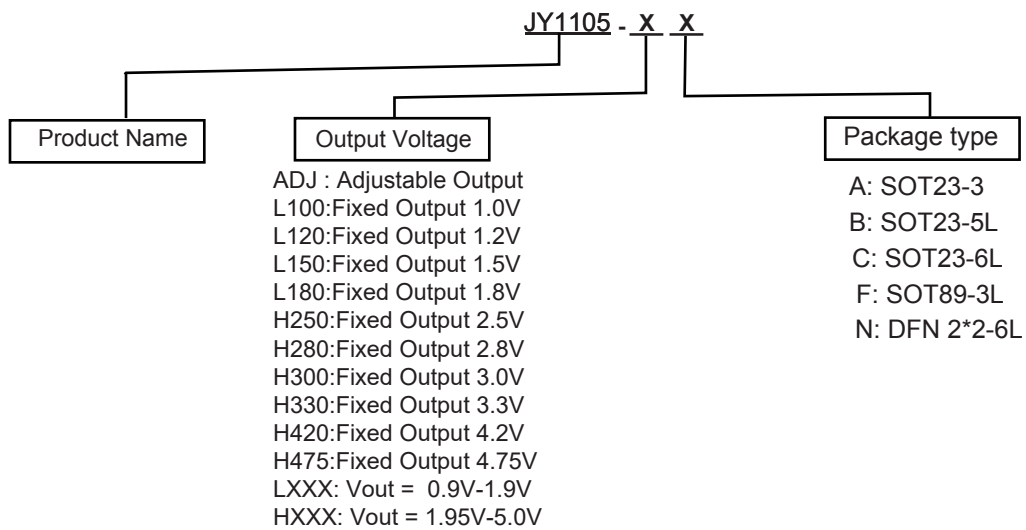
DFN 2X2-6L



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

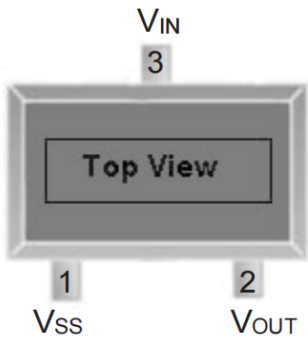
SOT23 Pin No.	SOT23-5L Pin No.	SOT23-6L Pin No.	SOT89-3L Pin No.	DFN 2X2 Pin No.	Symbol	Description
3	1	1	2、4	6	VIN	Voltage input
1	2	2	1	5	VSS	Power ground
	3	3		4	EN	Chip enable
	4	4		2	NC/ADJ	Nc or adjustable
		5		3	NC	NC
2	5	6	3	1	OUT	Output

Ordering Information

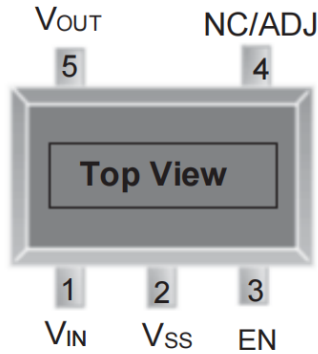


Part name	Packing	Quantity Per Reel
JY1105	SOT23-3L	3000
	SOT23-5/6L	3000
	SOT89-3L	3000
	DFN 2*2	3000

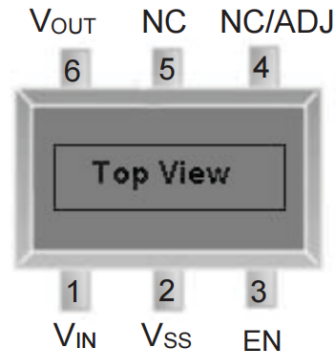
Marking Information



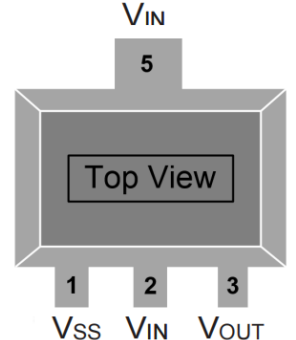
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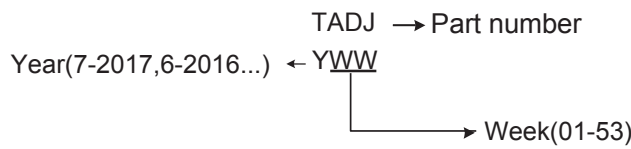
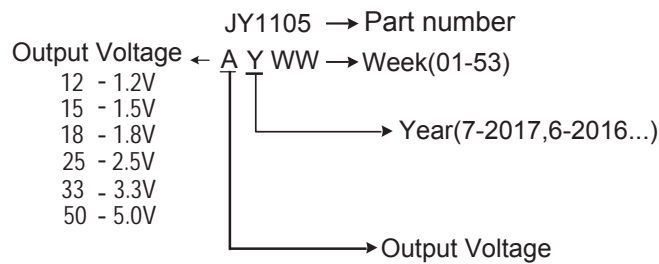
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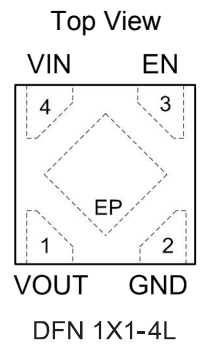
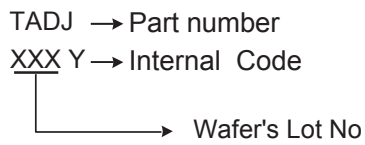
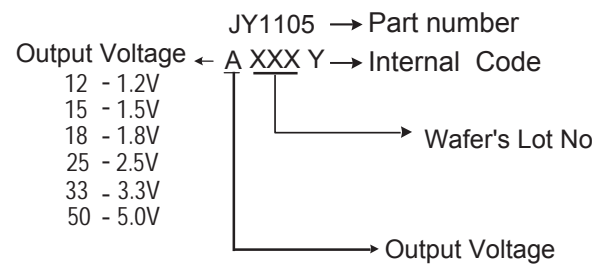
SOT23-6L



SOT89-3L

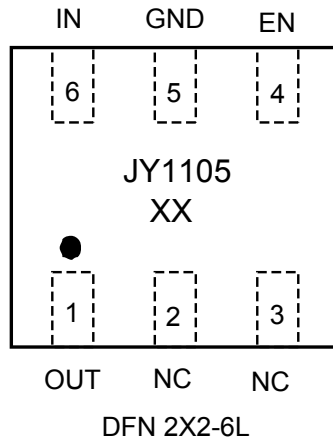
ADJ

FIX


(1)

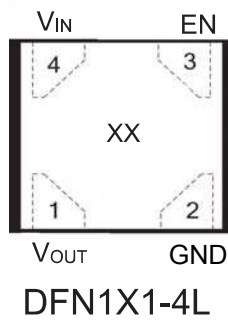

ADJ

FIX


(2)

Marking Information



XX: 08-50 output voltage
 08:0.8V,12:1.2V,18:1.8V,50:5.0V



XX: 08-50 output voltage
 08:0.8V,12:1.2V,18:1.8V,50:5.0V

■ 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)
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 JY1105NF	Vout ≥ 1.35V	Vout ×0.985	Vout ×1.015	V	1	
			Vout < 1.35V	Vout -20	Vout +20	mV	1	
ADJ Reference Voltage	Vadj	JY1105AF	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	-	-		
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(nomal)×0.98, { Vout(nomal) is measured at Vin=Vout+1.0V }

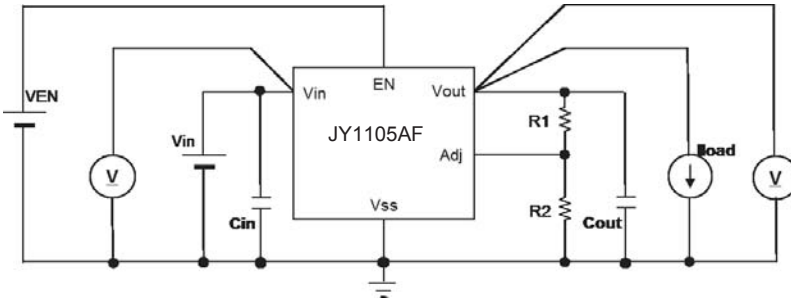
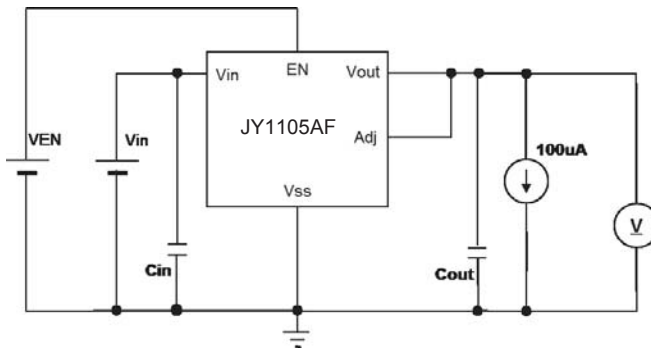
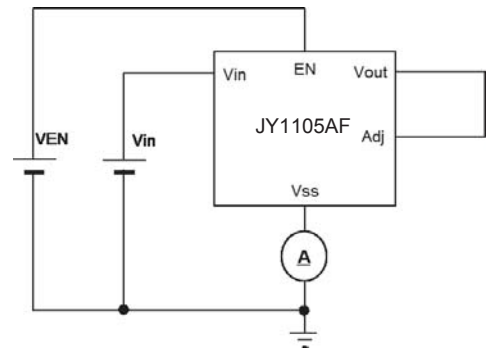
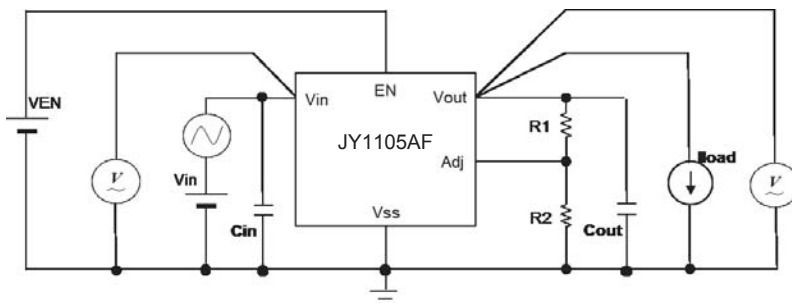
■Electrical Specifications (2)

(Ta = 25°C, unless otherwise noted.)

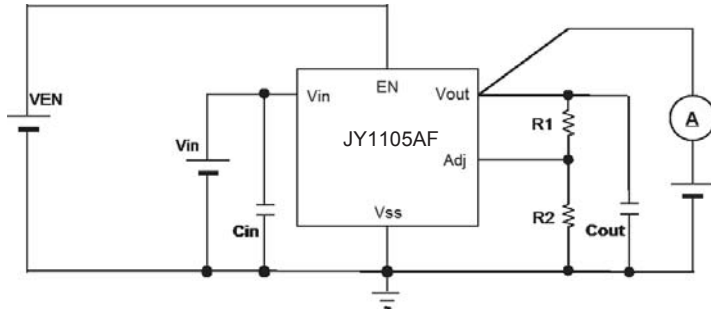
Items	Symbol	Conditions	Min.	Typ.	Max.	Unit	Test Circuit	
Current consumption	Iopr	Vin=Vout+1.0V, Iout=0mA	-	60	90	uA	3	
Standby current	Istb	EN=Vss	-	0.02	0.2	uA	3	
Input voltage	Vin		1.7	-	6.0	V	-	
Load regulation	$\Delta V_{out}/V_{out}$	Vin=Vout+1.0V, Iout=0.1mA to 300mA	Vout<1.35V	-	0.1	0.7	abs(%)	1
			1.35V≤Vout<2.30V	-	0.1	0.6		
			2.30V≤Vout	-	0.1	0.5		
Line regulation	$\Delta V_{out} / (\Delta V_{in} \cdot V_{out})$	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	$\Delta V_{out} / \Delta T_a \cdot V_{out}$	Iout=30mA, Ta= -40°C to +85°C	-	±20	-	ppm/°C	1	
Adj input bias current	Iadj	Adj=0.6V, JY1105AF	-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	uA	7	
EN low level current	Ienl	EN= Vss	-0.1	-	0.1	uA	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

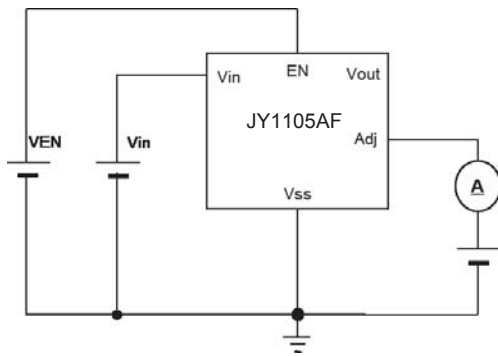
(Note) Apply Adj pin, R1 and R2 to only JY1105AF (Adjustable output voltage version).

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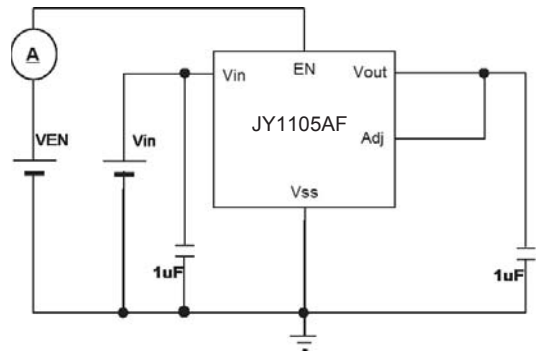
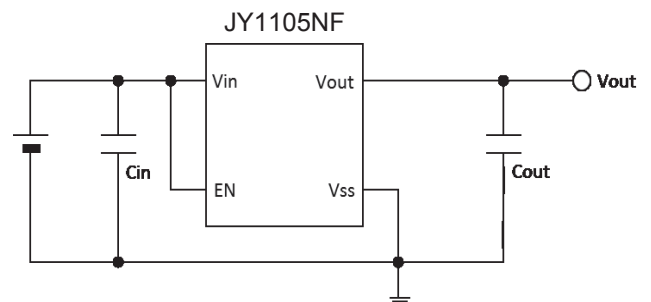
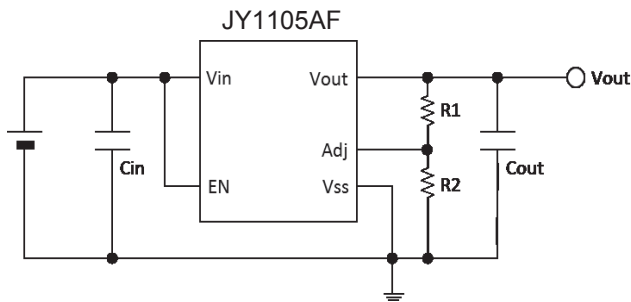
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7


■ 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.

JY1105 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 JY1105. Place 1 μF or greater between V_{in} and ground. Input and output capacitors should be placed as close to JY1105 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 JY1105. Because these form the negative feedback loop of LDO, The distance from resistances to JY1105 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

JY1105 has internal over load current limit protection circuit. This limits the Pch MOS pass transistor current to 600mA. So, against excessive load, JY1105 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

JY1105 has thermal shutdown circuit internally. This limits total power dissipation in JY1105.

When the junction temperature T_j reaches approximately 150 $^{\circ}C$, the Pch MOS pass transistor shuts off the load current and allows JY1105 to cool. When the junction temperature T_j falls to approximately 120 $^{\circ}C$, JY1105 restart the regulation.

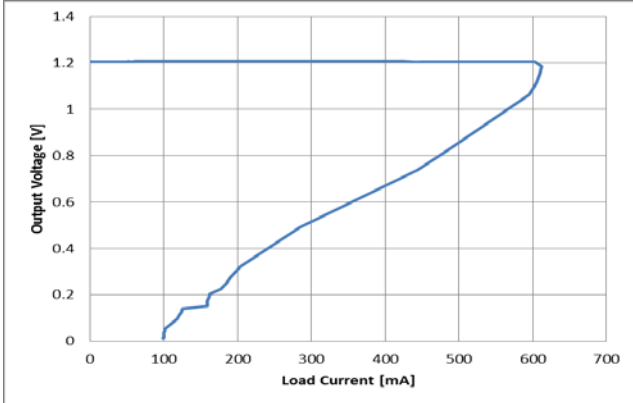
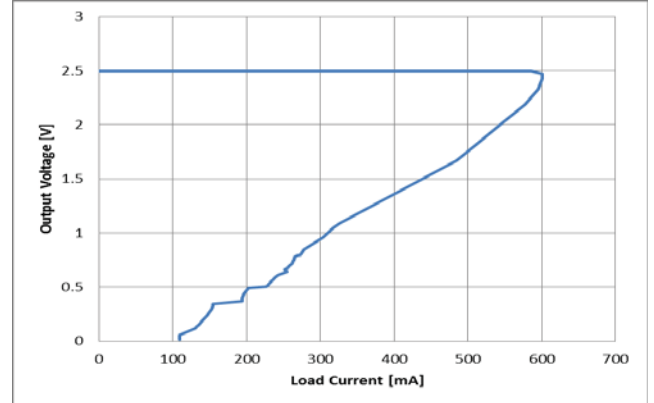
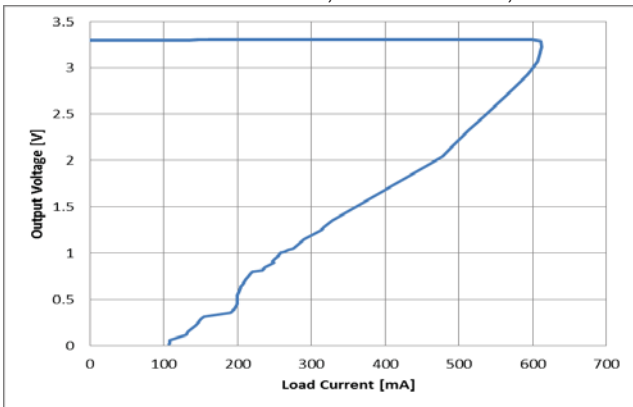
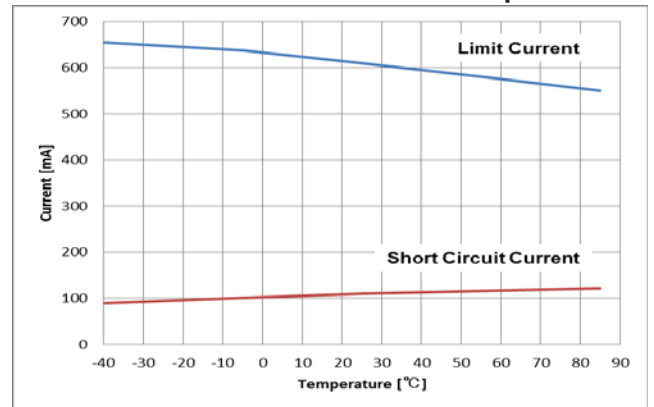
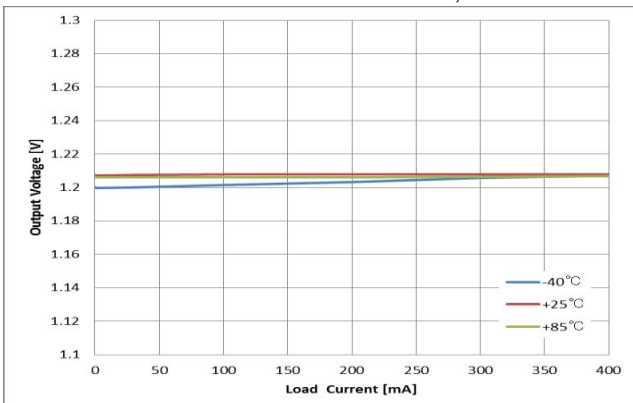
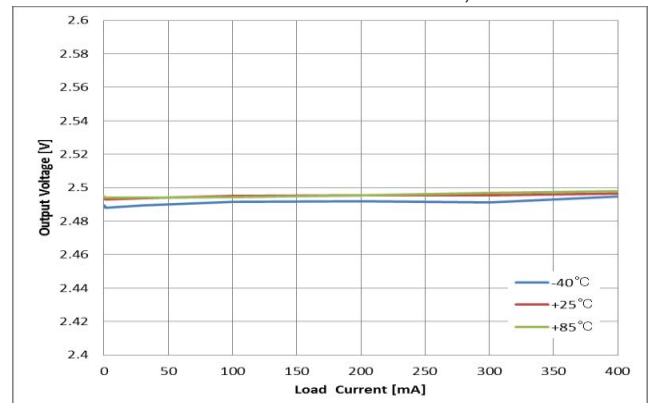
(Note)

Internal current limit circuit or Thermal shutdown circuit cannot completely protect JY1105 from the thermal fault conditions. The maximum output power of JY1105 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' :

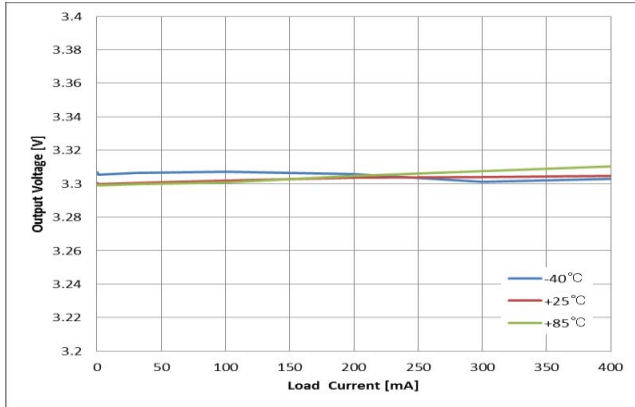
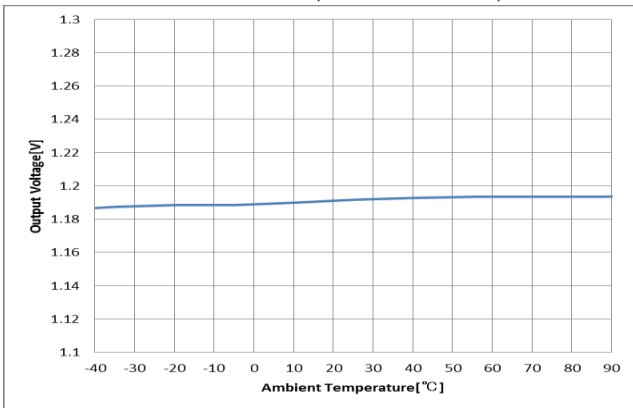
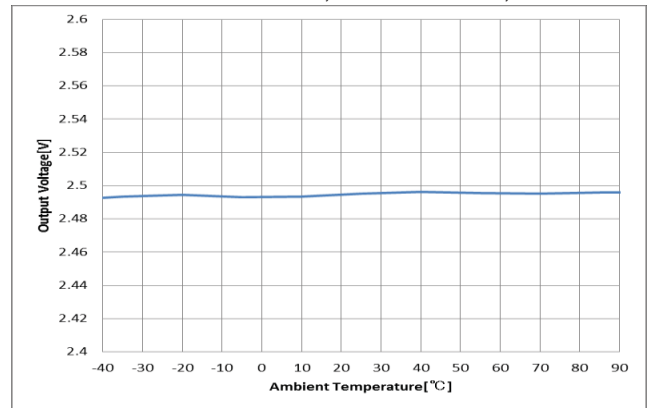
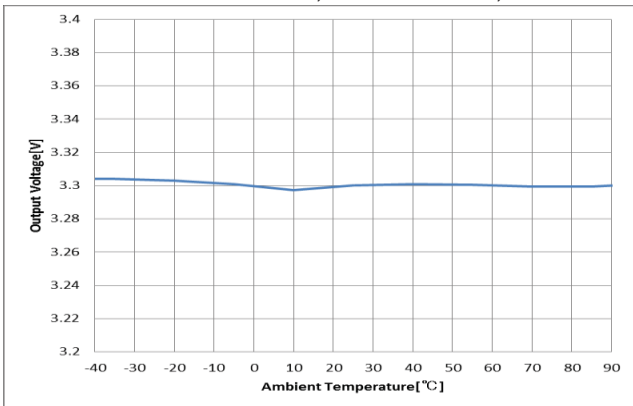
$$P = (V_{in} - V_{out}) * I_{out}$$

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


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

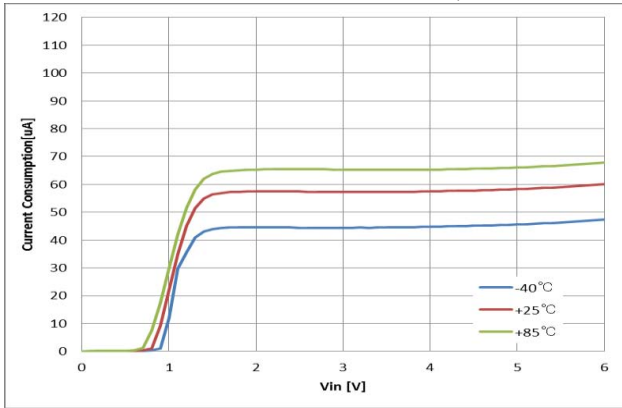
Vout=3.3V

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

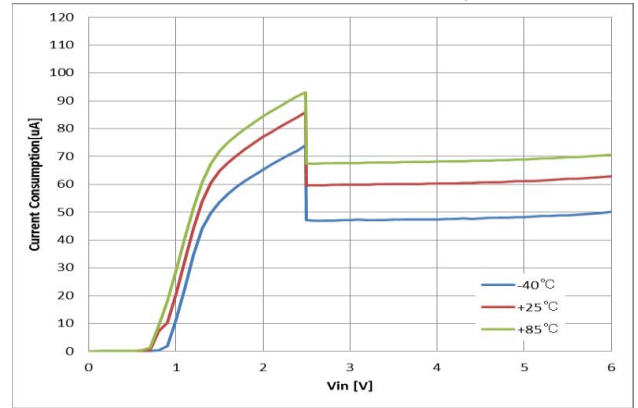

Output Voltage vs. Temperature
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Iout=30mA

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

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


Current Consumption vs. Input Voltage
Vout=1.2V

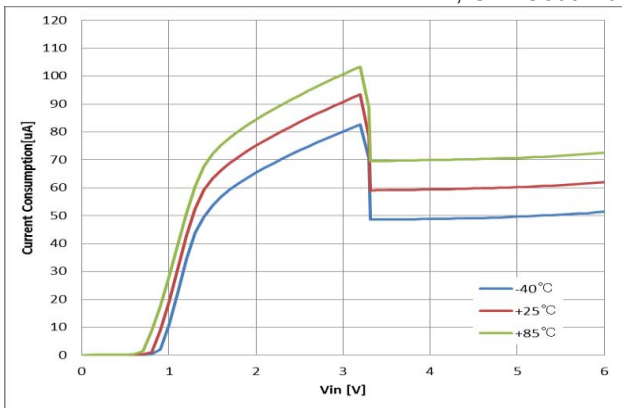
Vin=EN, Cin=Cout=1uF


Vout=2.5V

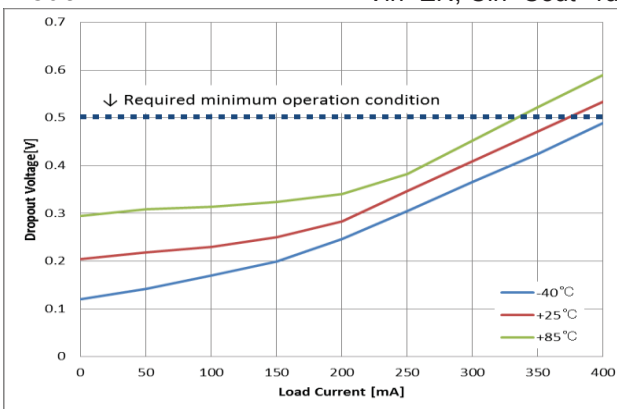
Vin=EN, Cin=Cout=1uF


Vout=3.3V

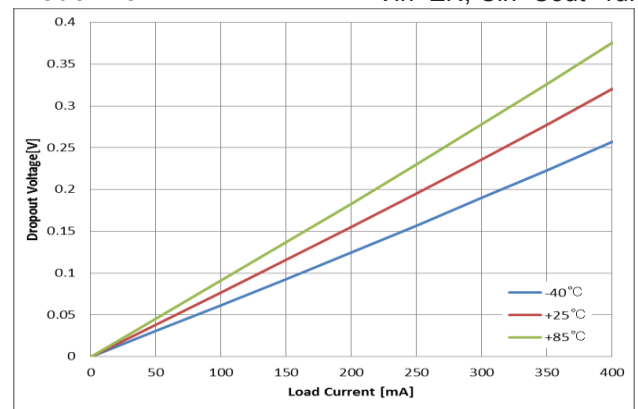
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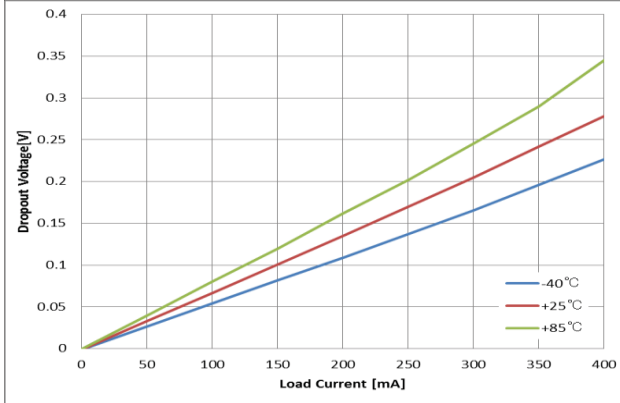
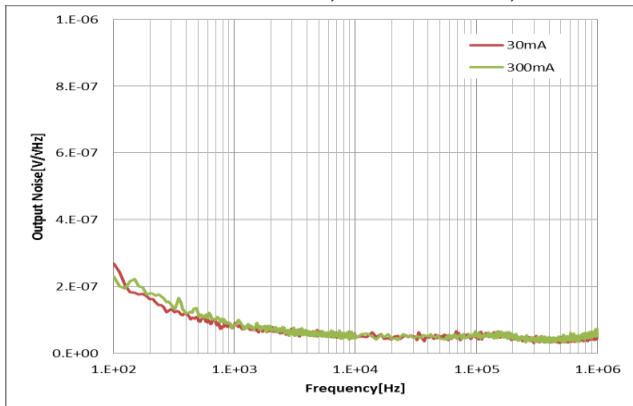
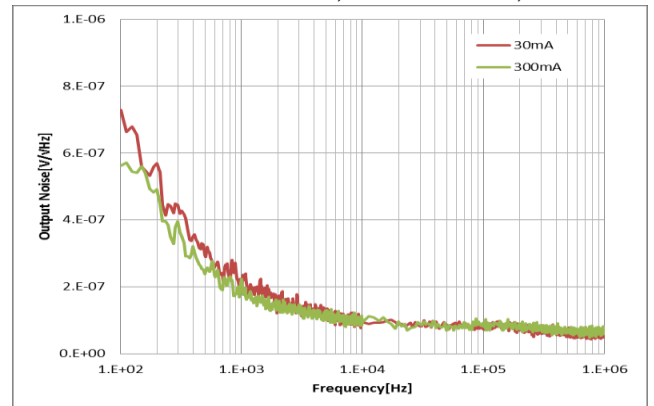
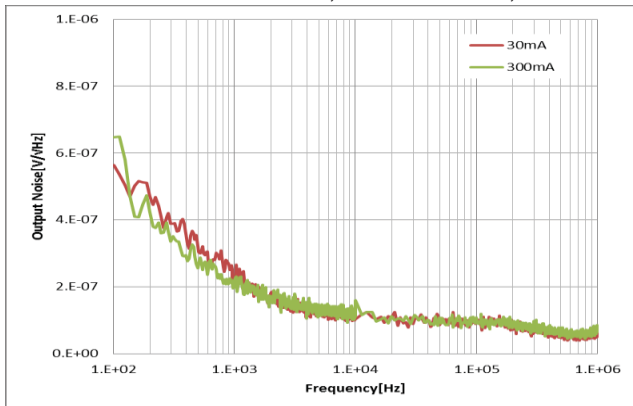

Dropout Voltage vs. Load Current
Vout=1.2V

Vin=EN, Cin=Cout=1uF


Vout=2.5V

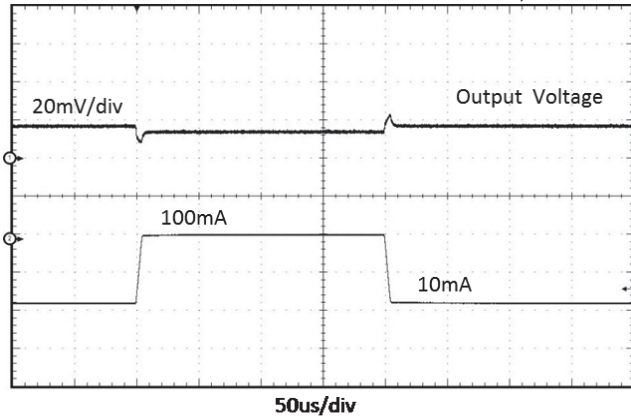
Vin=EN, Cin=Cout=1uF



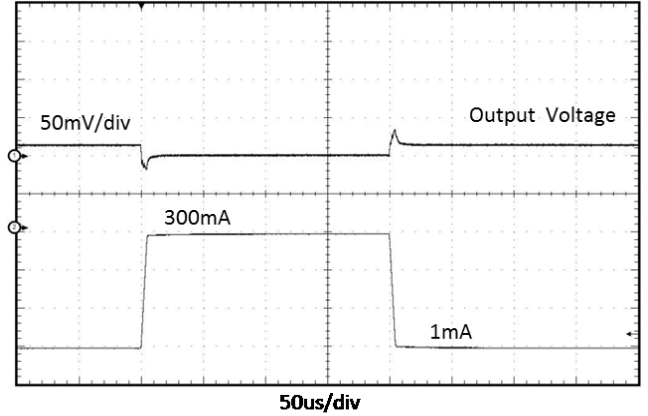
Vout=3.3V Vin=EN, Cin=Cout=1uF

Output Noise 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


Load Transient Response

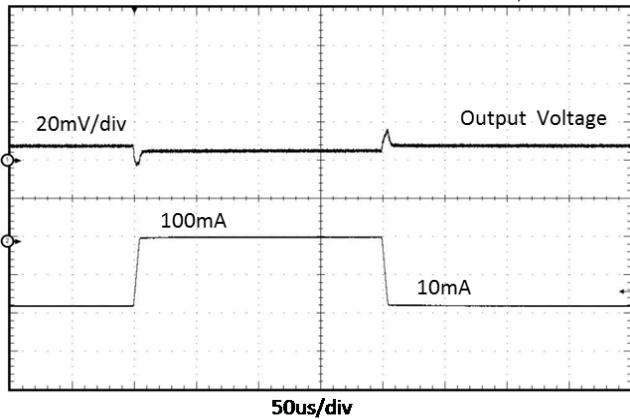
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C
Iout=10mA~100mA, tr=tf=5us



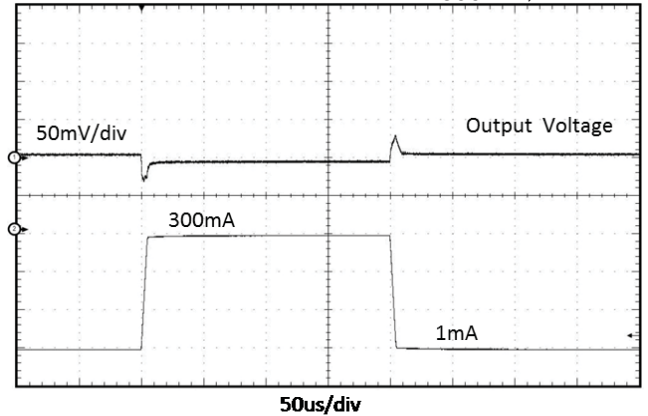
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C
Iout=1mA~300mA, tr=tf=5us



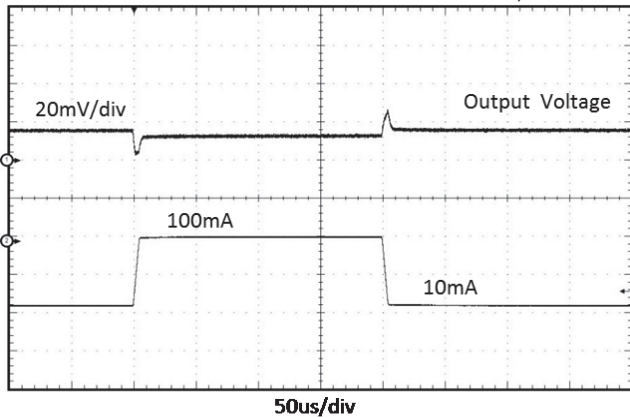
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C
Iout=10mA~100mA, tr=tf=5us



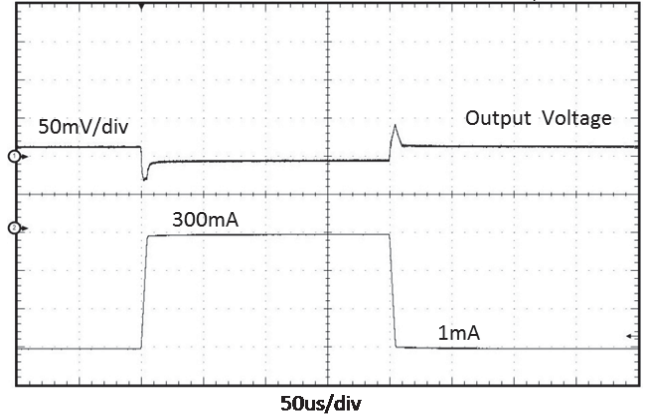
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C
Iout=1mA~300mA, tr=tf=5us



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

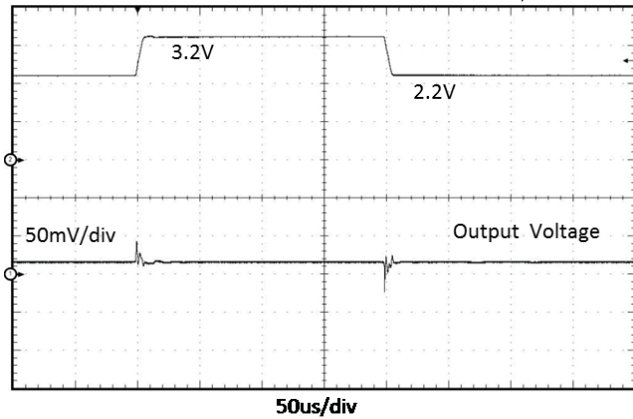


Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C
Iout=1mA~300mA, tr=tf=5us

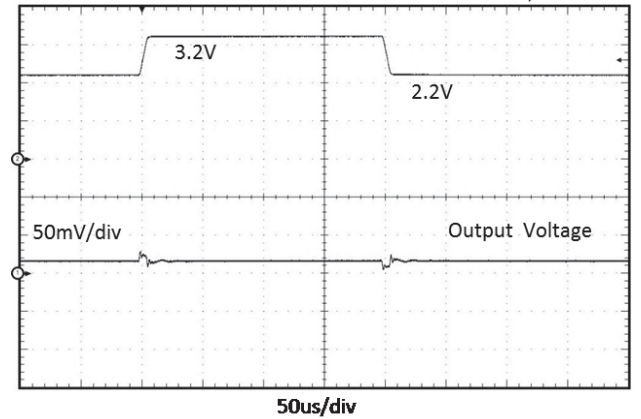


Line Transient Response

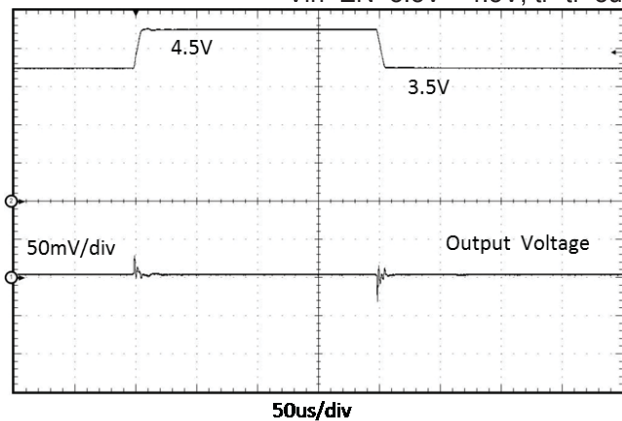
Vout=1.2V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=EN=2.2V\sim 3.2V$, $t_r=t_f=5\mu s$



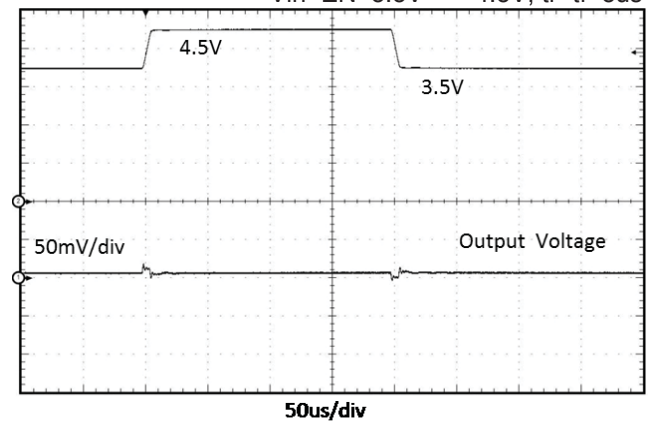
Vout=1.2V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=EN=2.2V\sim 3.2V$, $t_r=t_f=5\mu s$



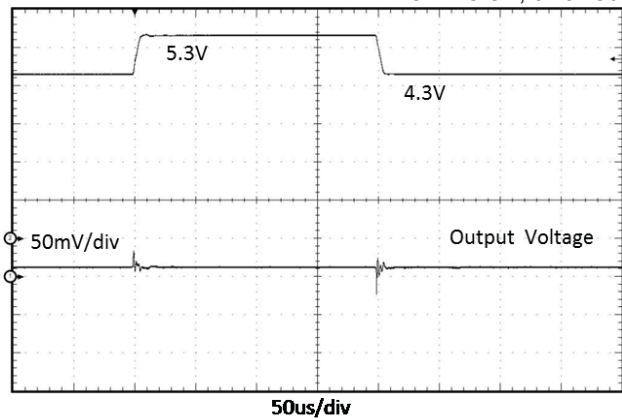
Vout=2.5V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=EN=3.5V\sim 4.5V$, $t_r=t_f=5\mu s$



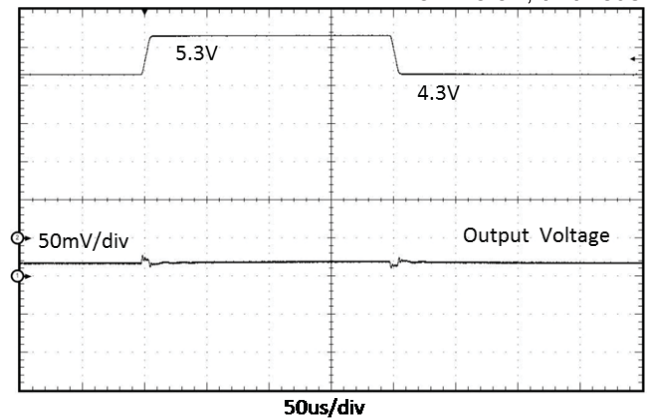
Vout=2.5V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=EN=3.5V\sim 4.5V$, $t_r=t_f=5\mu s$



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

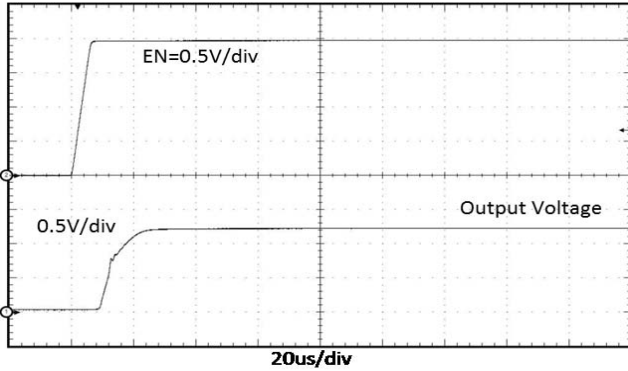


Vout=3.3V $I_{out}=300mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=EN=4.3V\sim 5.3V$, $t_r=t_f=5\mu s$

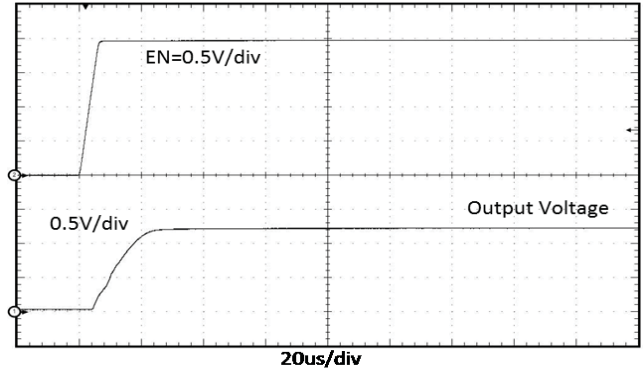


EN Transient Response

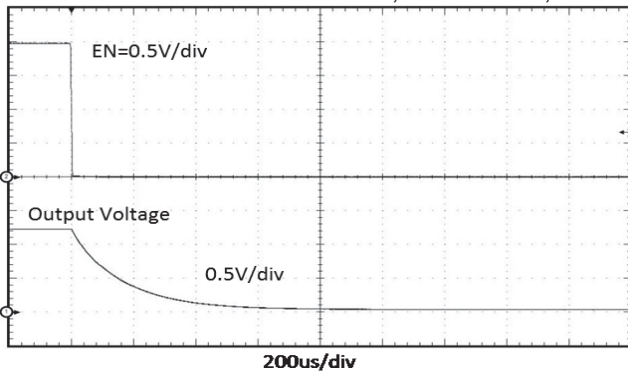
Vout=1.2V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



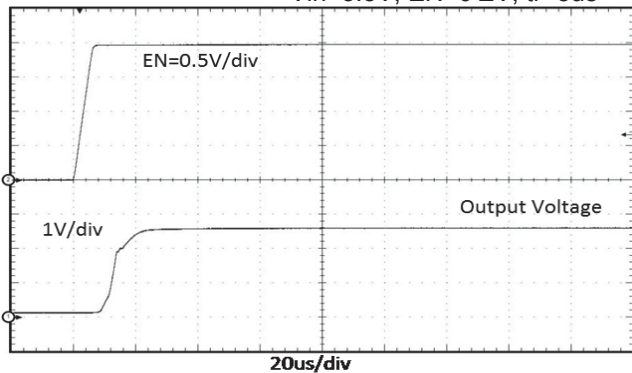
Vout=1.2V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



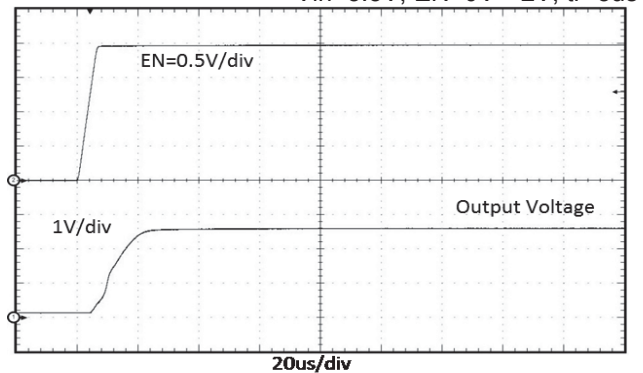
Vout=1.2V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=2V \rightarrow 0V$, $t_r=5\mu s$



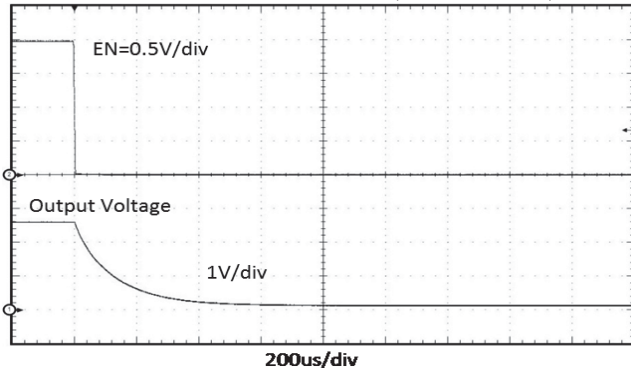
Vout=2.5V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



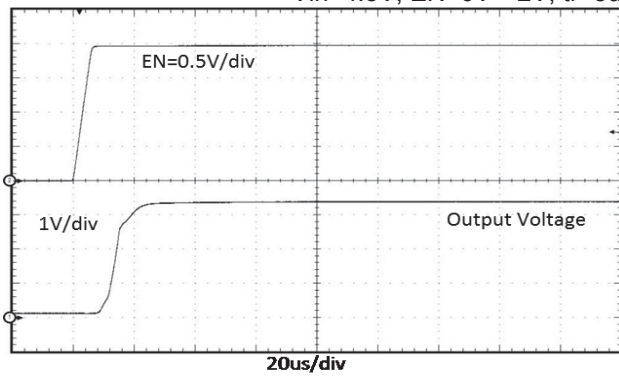
Vout=2.5V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



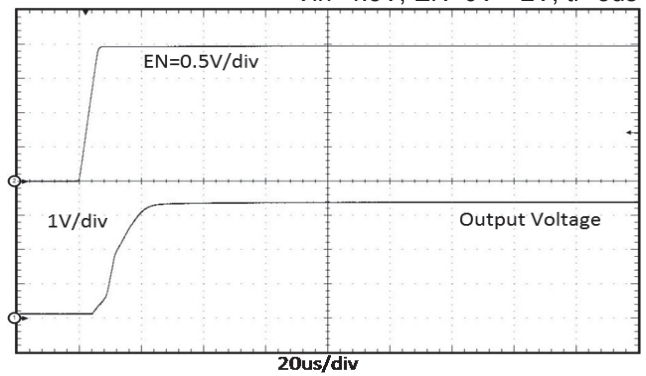
Vout=2.5V Iout=0mA, Cin=Cout=1uF, Ta=+25°C
 Vin=3.5V, EN=2V→0V, tr=5us



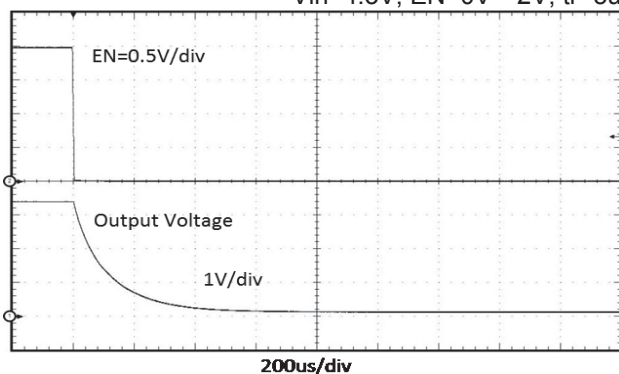
Vout=3.3V Iout=1mA, Cin=Cout=1uF, Ta=+25°C
 Vin=4.3V, EN=0V→2V, tr=5us

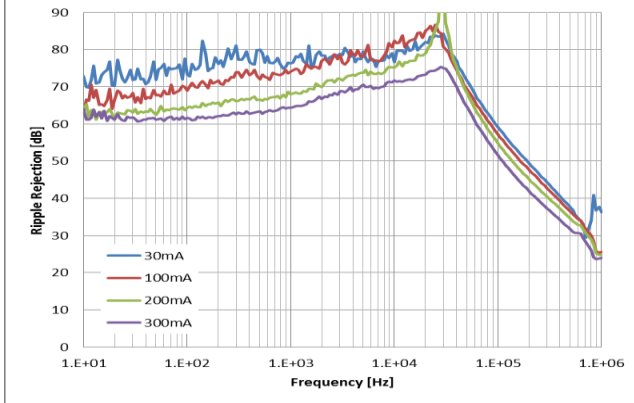
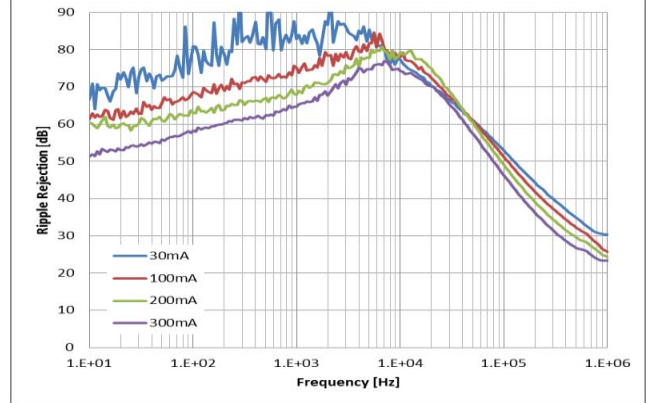
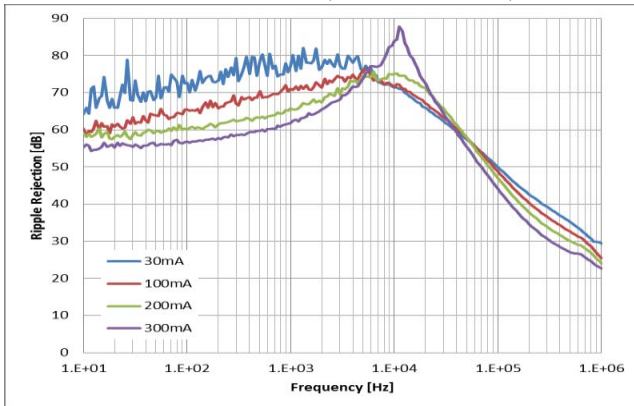


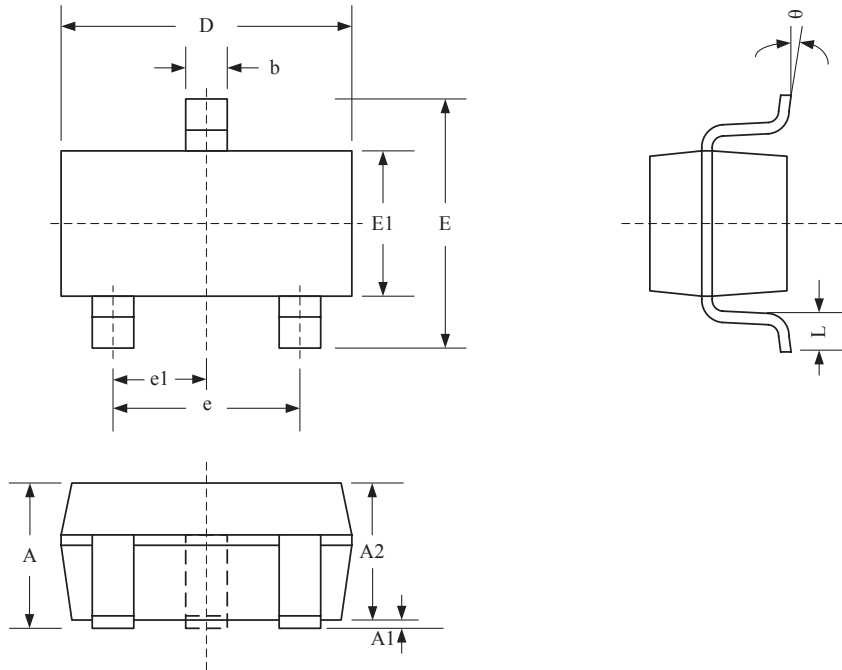
Vout=3.3V Iout=100mA, Cin=Cout=1uF, Ta=+25°C
 Vin=4.3V, EN=0V→2V, tr=5us



Vout=3.3V Iout=0mA, Cin=Cout=1uF, Ta=+25°C
 Vin=4.3V, EN=0V→2V, tr=5us

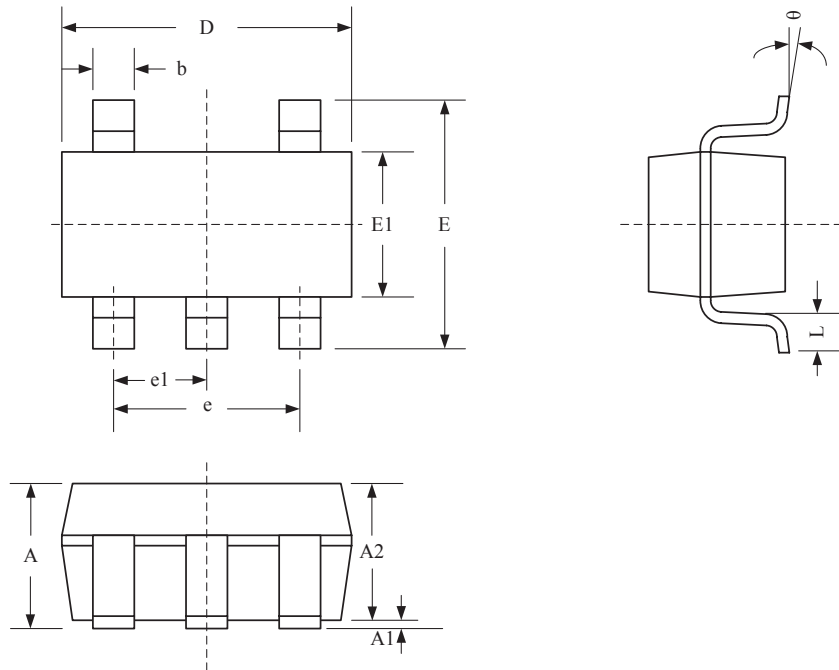


Ripple Rejection vs. Frequency
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C

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


PACKAGE DIMENSIONS
SOT23-3L


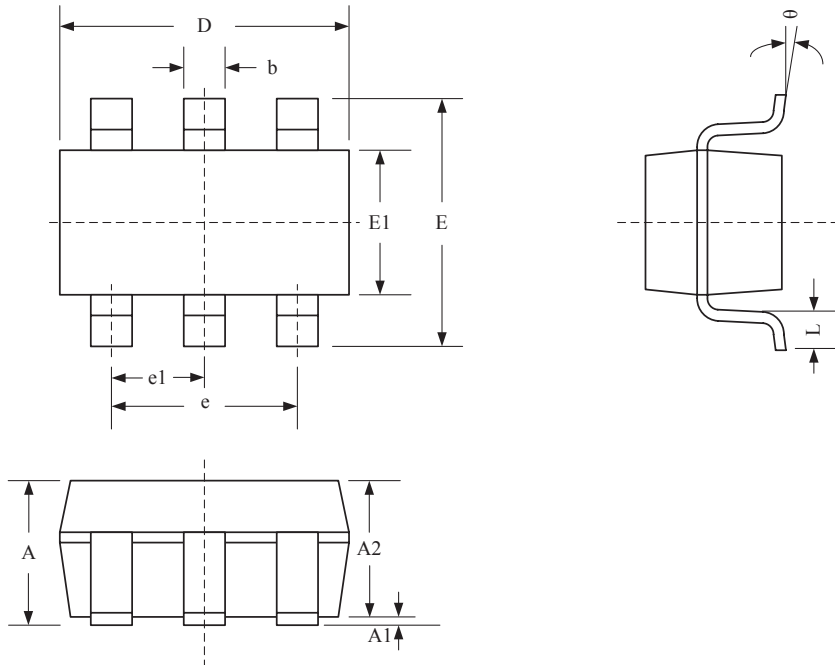
Package Dimensions (Controlling dimensions are in millimeters)

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

PACKAGE DIMENSIONS
SOT23-5L


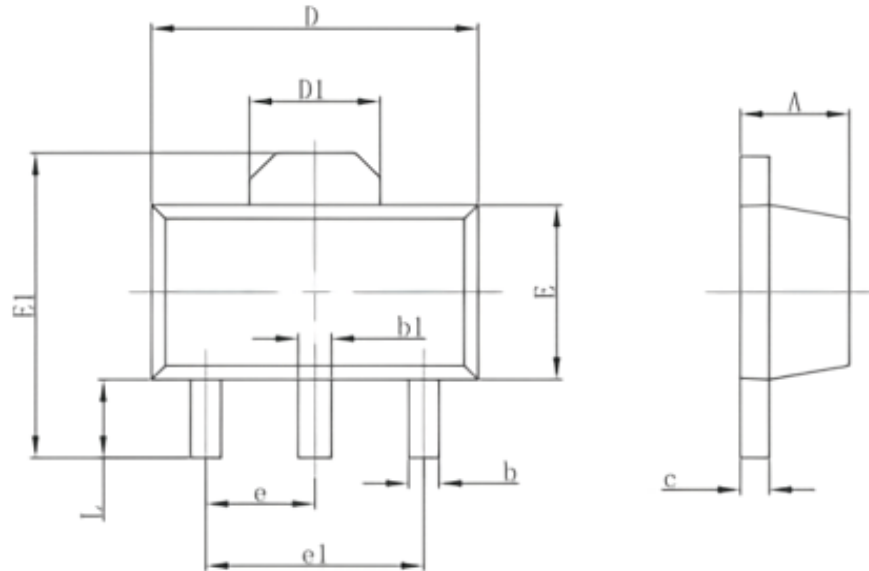
Package Dimensions (Controlling dimensions are in millimeters)

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

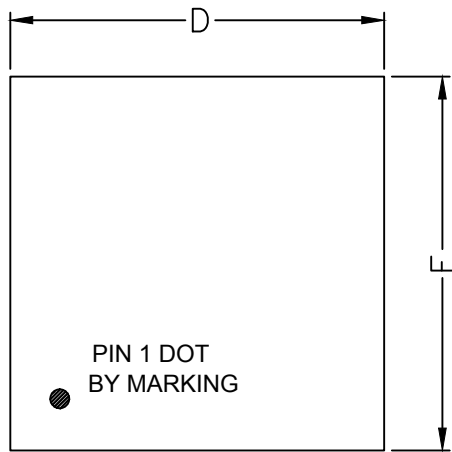
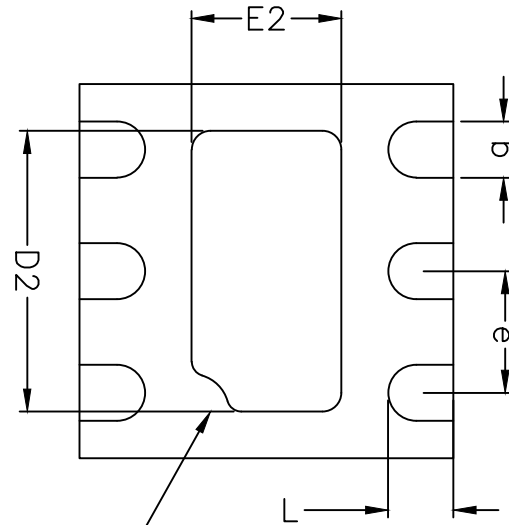
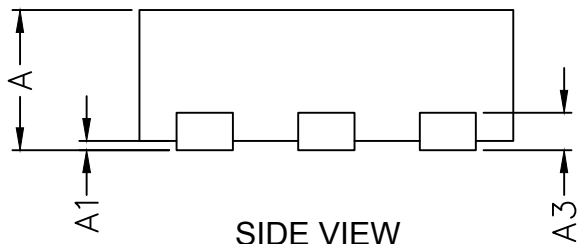
PACKAGE DIMENSIONS
SOT23-6L


Package Dimensions (Controlling dimensions are in millimeters)

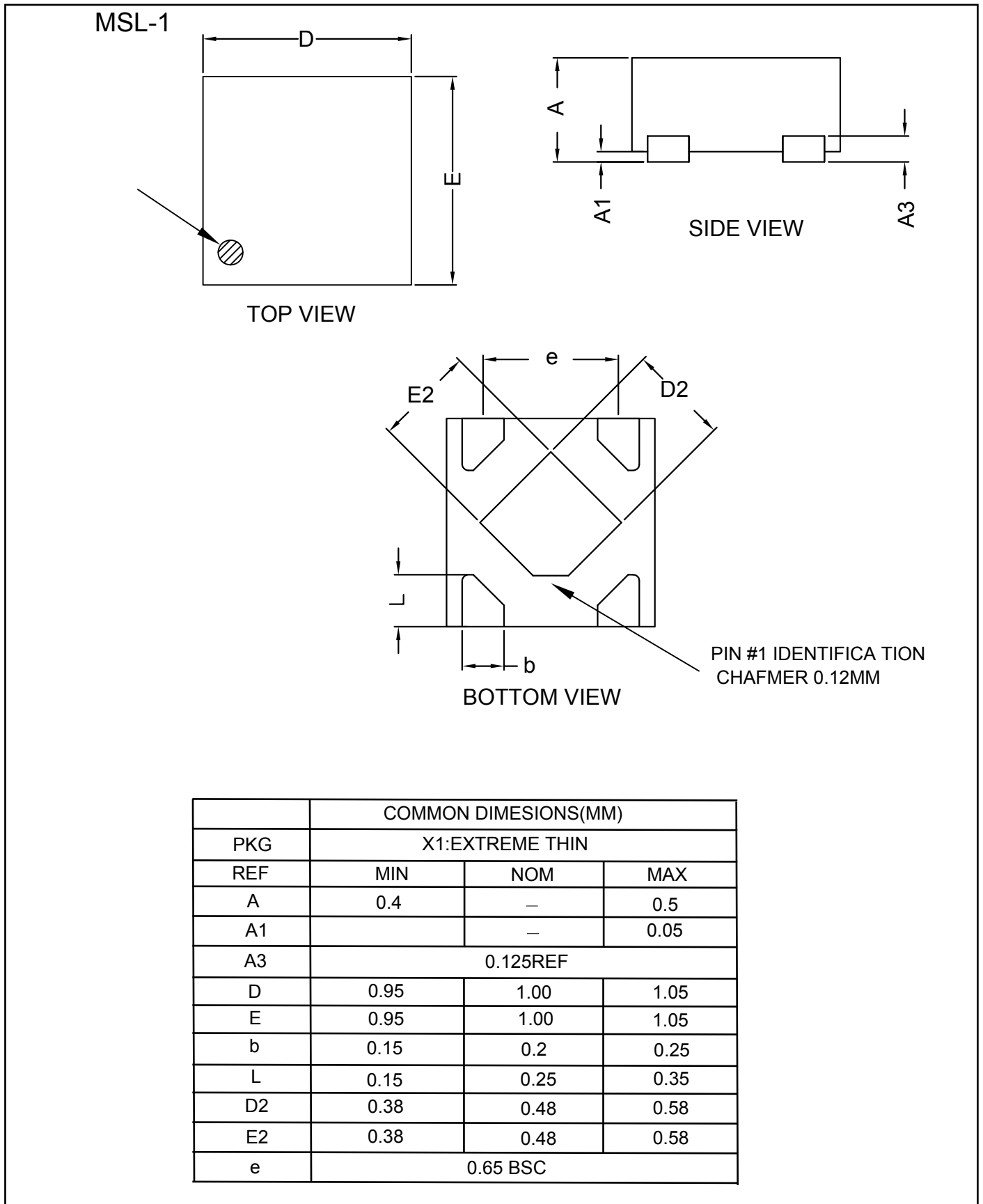
Symbol	Dimensions (mm)			Dimensions (Inches)		
	Minimum	Typical	Maximum	Minimum	Typical	Maximum
A	—	—	1.450	—	—	0.057
A1	0.000	—	0.150	0.000	—	0.006
A2	—	—	1.300	—	—	0.012
b	0.300	—	0.500	0.012	—	0.020
D	2.90 BSC			0.114 BSC		
e1	0.95 BSC			0.037 BSC		
e	1.90 BSC			0.075 BSC		
E	2.80 BSC			0.110 BSC		
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

PACKAGE DIMENSIONS SOT89-3L


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

PACKAGE DIMENSIONS
DFN 2X2-6L

TOP VIEW

**PIN 1 IDENTIFICATION
CHAMFER C 0.3mm
BOTTOM VIEW**

SIDE VIEW

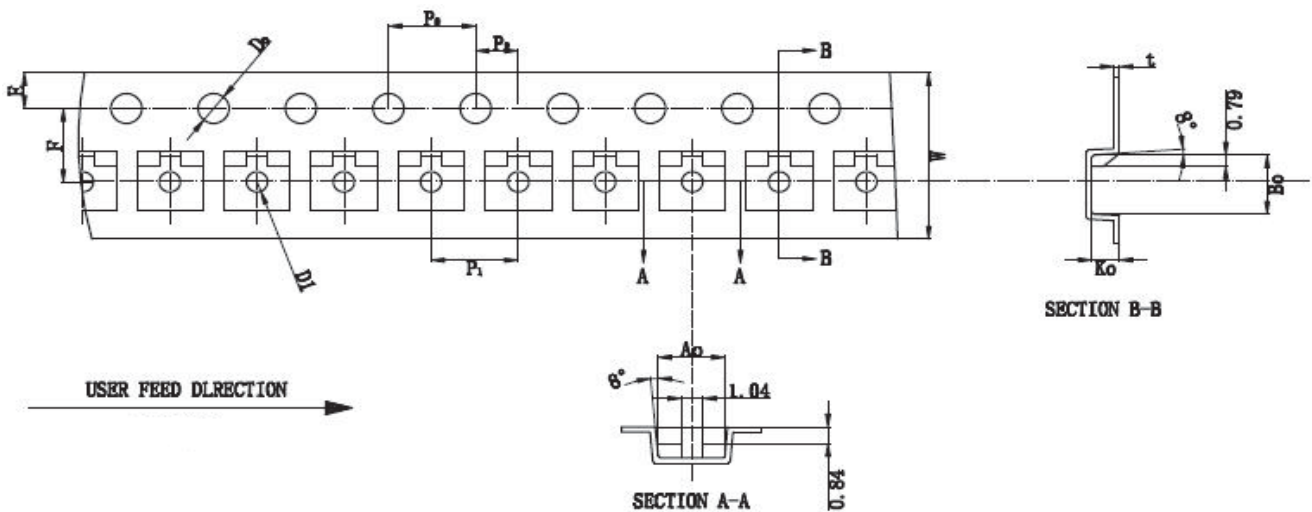
COMMON DIMENSIONS(MM)			
PKG	X1:EXTREME THIN		
REF	MIN	NOM	MAX
A	0.7	0.75	0.8
A1		-	0.05
A3	0.2REF		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
b	0.25	0.3	0.35
L	0.25	0.35	0.45
D2	1.35	1.5	1.6
E2	0.65	0.8	0.9
e	0.65 BSC		

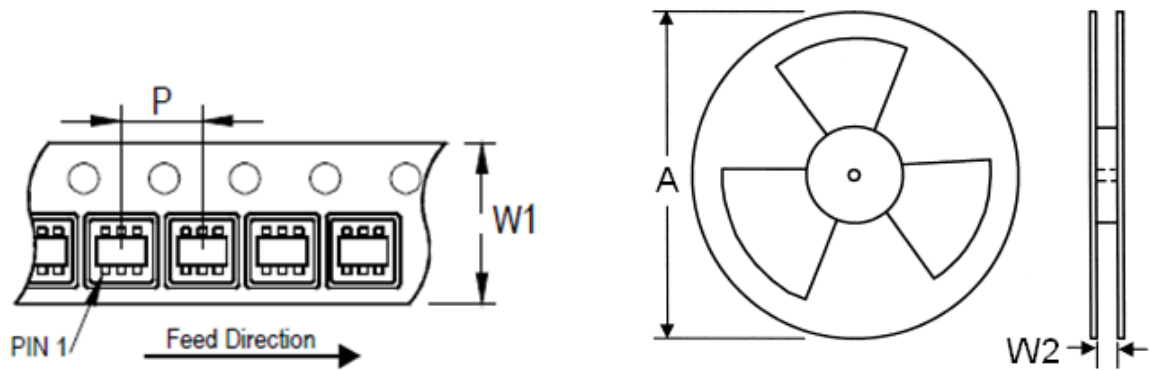
PACKAGE DIMENSIONS
DFN 1X1-4L


Carrier Dimensions
SOT23-3L

PKG TYPE	W	P	E	F	D	D1	Po
SOT-23	8.00	4.00	1.75	3.50	1.50	1.00	4.00
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

Po10	P2	A0	B0	K0	T
40.00	2.00	3.15	2.77	1.22	0.20
±0.2	±0.05	±0.1	±0.1	±0.1	±0.02



Carrier Dimensions
SOT23-5/6L


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