

GS2823 Series

300mA High PSRR Low Dropout Voltage Linear Regulator

Product Description

The GS2823 is a low dropout and low noise linear regulator with high ripple rejection ratio and fast turn-on time. GS2823 is fixed output voltage type. It has fixed output voltage ranging from 1.2V to 4V.

The GS2823 includes a voltage reference unit, an error amplifier, resistor net for voltage setting, a current limit circuit and a chip enable circuit.

The GS2823 works well with low ESR ceramic capacitors, suitable for portable RF and wireless battery-powered applications with stringent space requirements and demanding performance. It also offers ultra low noise output and has low quiescent current.

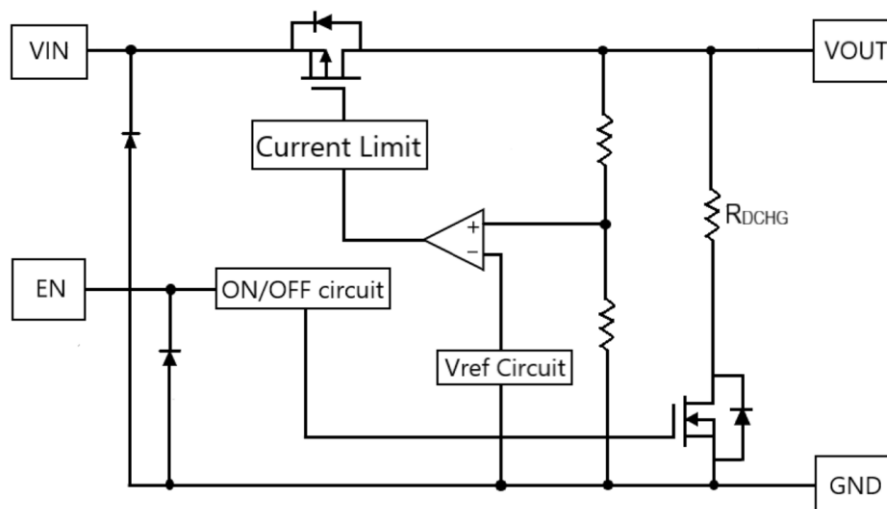
Features

- Output Current: 300mA
- High Ripple Rejection: 80dB (Typ) ($f=1\text{kHz}$)
- Output Voltage:
Vout \geq 2V (Accuracy $\pm 1.0\%$)
Vout < 2V (Accuracy $\pm 20\text{mV}$)
- Low Supply Current: 150 μA (Typ)
- Standby Current: 0.1 μA (Typ)
- EN Function: Active High
- Operating Ambient Temperature: $-40\sim+85^{\circ}\text{C}$
- Current Limit and Short Circuit Protection
- Fixed Output Voltage: 1.2V to 4.0V
- Low ESR Capacitors: C_{in}=1 μF , C_L=1 μF
- Small Packages: SOT-23, SOT-23-5L, DFN1x1-4L
- RoHS Compliant & Halogen Free

Applications

- Mobile Devices
- Portable Communication Equipment
- Modules
- Hand-Held Instruments
- Wireless Communications

Functional Block Diagram



Packages & Pin Assignments

SOT-23	SOT-23-5L	DFN1X1-4L
Terminal Name	Function	
V _{IN}	Power Supply Input.	
V _{OUT}	The pin is the power output of the device.	
GND	Ground Pin.	
EN	Enable Input. Pulling this pin below 0.3V turn the regulator off, reducing the quiescent current to a fraction of its operating value. The device will be enabled if this pin is left open. Connect to V _{IN} if not being used.	
NC	No Connect.	

Ordering and Marking Information

Ordering Information					
SOT-23	SOT-23-5L	Marking	DFN1x1-4L	Marking	Output Voltage
GS2823Z12F	GS2823L12F	CXD□□□	GS2823F12F GS2823F12F1	XD □□	1.2V
GS2823Z15F	GS2823L15F	CXG□□□	GS2823F15F GS2823F15F1	XG □□	1.5V
GS2823Z18F	GS2823L18F	CXF□□□	GS2823F18F GS2823F18F1	XF □□	1.8V
GS2823Z25F	GS2823L25F	CXH□□□	GS2823F25F GS2823F25F1	XH □□	2.5V
GS2823Z28F	GS2823L28F	CXJ□□□	GS2823F28F GS2823F28F1	XJ □□	2.8V
GS2823Z29F	GS2823L29F	CXP□□□	GS2823F29F GS2823F29F1	XP □□	2.9V
GS2823Z33F	GS2823L33F	CXR□□□	GS2823F33F GS2823F33F1	XR □□	3.3V
GS2823Z40F	GS2823L40F	CXU□□□	GS2823F40F GS2823F40F1	XU □□	4.0V

GS2823 1 2 2 3 4

Product Name:

GS2823

Package Code:

- 1 is Z, L and F
- Z for SOT-23
 - L for SOT-23-5L
 - F for DFN1x1-4L

Voltage Code:

- 2 2 is 12, 15, 18 and so on.
- 12 for 1.2V, 15 for 1.5V, 18 for 1.8V and so on.

Green Level:

3 is F stands for RoHS Compliant and Halogen Free

Dedicated Code (Only for DFN1x1-4L Package) :

- 4 is Blank or 1
- Blank for 10KPCS/Reel
 - 1 for 3KPCS/Reel

Marking Information

CX 1 2 2 2

X 1
2 2

Product Code:

- CX for SOT-23 and SOT-23-5L package
- X for DFN1x1-4L

Voltage Code:

- 1 is D, G, F and so on.
- D for 1.2V
 - G for 1.5V
 - F for 1.8V
 - H for 2.5V
 - J for 2.8V
 - P for 2.9V
 - R for 3.3V
 - U for 4.0V

GS Code:

- 2 2 2 / 2 2 is GS Code
- 2 2 2 for SOT-23 and SOT-23-5L package
 - 2 2 for DFN1x1-4L

Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units	
V_{IN}	Power Supply Voltage	7.0	V	
V_{EN}	Enable Voltage	7.0	V	
V_{OUT}	Output Voltage	-0.3 to V_{IN}	V	
I_{OUT}	Output Current	500	mA	
P_D	Total Power Dissipation	SOT-23	560	mW
		SOT-23-5L	600	
		DFN1x1-4L	340	
T_{STG}	Storage Temperature Range	-55 to +125	$^\circ\text{C}$	
T_A	Operating Ambient Temperature	-40 to +85	$^\circ\text{C}$	
T_J	Operating Junction Temperature	+125	$^\circ\text{C}$	
T_{LEAD}	Lead Temperature(soldering) 5sec.	260	$^\circ\text{C}$	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	SOT-23	179	$^\circ\text{C/W}$
		SOT-23-5L	166	
		DFN1x1-4L	294	

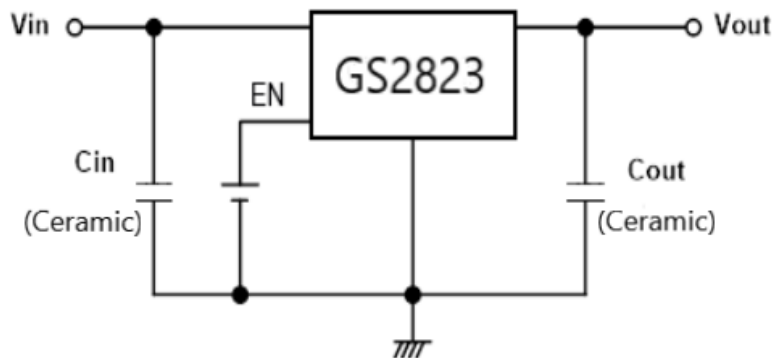
Electrical Characteristics

(Unless otherwise specified $V_{IN}=V_{OUT}+1\text{V}$, $T_A=25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
I_{SS}	Supply Current	$V_{IN}=V_{OUT}+1.0\text{V}$, En pin=ON, No Load	-	150	-	μA	
$I_{stand-by}$	Standby Current	$V_{IN}=V_{OUT}+1.0\text{V}$, En pin=OFF, No Load	-	0.01	0.4	μA	
V_{IN}	Input Voltage	-	-	-	5.5	V	
V_{OUT}	Output Voltage	$V_{IN}=V_{OUT}+1.0\text{V}$, $I_{OUT} = 10\text{mA}$	$V_{OUT} < 2.0\text{V}$	$V_{OUT} - 0.02$	V_{OUT}	$V_{OUT} + 0.02$	V
			$V_{OUT} \geq 2.0\text{V}$	$V_{OUT} \times 0.99$	V_{OUT}	$V_{OUT} \times 1.01$	
I_{OUTMAX}	Max Output Current	$V_{IN} \geq V_{OUT}+1.0\text{V}$	$1.2\text{V} \leq V_{OUT} \leq 4.0\text{V}$	300	-	-	mA
ΔV_{LINE}	Line regulation	$V_{OUT}+0.5\text{V} \leq V_{IN} \leq 5.5\text{V}$ $I_{OUT} = 50\text{mA}$	$1.2\text{V} \leq V_{OUT} \leq 4.0\text{V}$	-	0.01	0.1	%/V
ΔV_{LOAD}	Load Regulation	$V_{IN}=V_{OUT}+1\text{V}$ $0.1\text{mA} \leq I_{OUT} \leq 300\text{mA}$	$1.2\text{V} \leq V_{OUT} \leq 4.0\text{V}$	-	25	45	mV
V_{DROP}	Dropout Voltage	$I_{OUT} = 300\text{mA}$	$1.2\text{V} \leq V_{OUT} < 1.3\text{V}$	-	0.48	0.63	V
			$1.3\text{V} \leq V_{OUT} < 1.4\text{V}$	-	0.44	0.58	
			$1.4\text{V} \leq V_{OUT} < 1.5\text{V}$	-	0.42	0.52	
			$1.5\text{V} \leq V_{OUT} < 1.6\text{V}$	-	0.42	0.46	
			$1.6\text{V} \leq V_{OUT} < 1.8\text{V}$	-	0.40	0.44	
			$1.8\text{V} \leq V_{OUT} < 2.0\text{V}$	-	0.30	0.41	
			$2.0\text{V} \leq V_{OUT} < 2.5\text{V}$	-	0.27	0.38	
			$2.5\text{V} \leq V_{OUT} < 3.0\text{V}$	-	0.24	0.35	
			$3.0\text{V} \leq V_{OUT} \leq 4.0\text{V}$	-	0.20	0.31	

$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	$V_{IN}=V_{OUT}+1V, I_{OUT}=10mA, -40^{\circ}C \leq T_A \leq 85^{\circ}C$	-	± 100	-	ppm/ $^{\circ}C$
PSRR	Power Supply Rejection Ratio	$V_{IN}=V_{OUT}+1V, I_{OUT}=30mA, f=1KHZ$	-	80	-	dB
$V_{EN(HI)}$	EN Input High Voltage	$V_{IN}=V_{OUT}+1V$	1.0	-	-	V
$V_{EN(LO)}$	EN Input Low Voltage	$V_{IN}=V_{OUT}+1V$	-	-	0.3	V
$I_{EN(HI)}$	EN Input High Current	$V_{IN}=V_{EN}=5.5V$	3.0	5.5	9.0	μA
$I_{EN(LO)}$	EN Input Low Current	$V_{EN}=0V$	-0.1	-	0.1	μA
I_{short}	Short-Circuit Current	$V_{IN}=V_{OUT}+1.0V, En\ Pin=ON, V_{OUT}=0V$	-	50	-	mA
I_{LIM}	Current Limit	$V_{IN}=V_{EN}$	310	400	-	mA
I_{RUSH}	Inrush Current	$V_{IN}=5.5V, V_{EN}=0 \sim 5.5V$	-	150	-	mA
R_{DCHG}	On Resistance for Discharge	$V_{IN}=5.5V, V_{OUT}=2V, V_{EN}=0V$	-	280	-	Ω

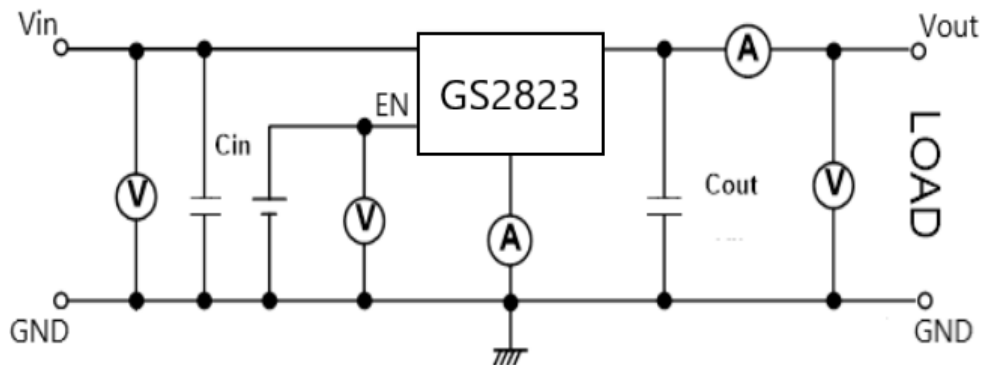
Typical Applications



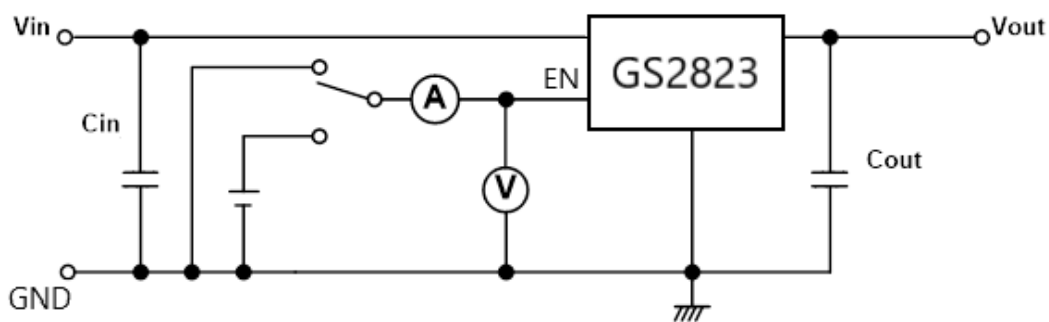
$C_{IN} : 1\mu F$ or more. $C_{OUT} : 1\mu F$ or more

Test Circuit

Operating Function Test



Enable Function Test

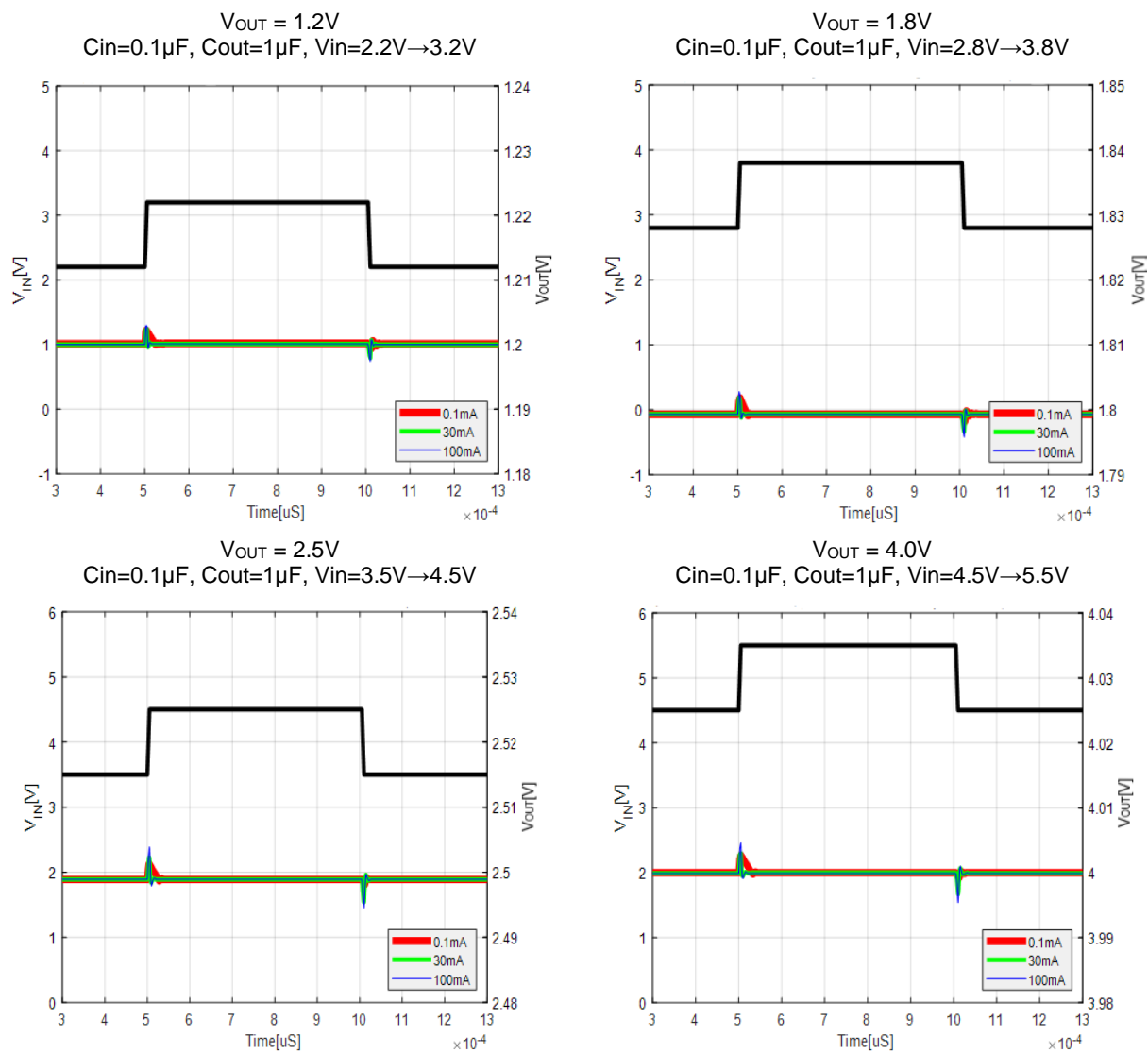


C_{IN} : 1 μ F or more. C_{OUT} : 1 μ F or more

Typical Performance Characteristics

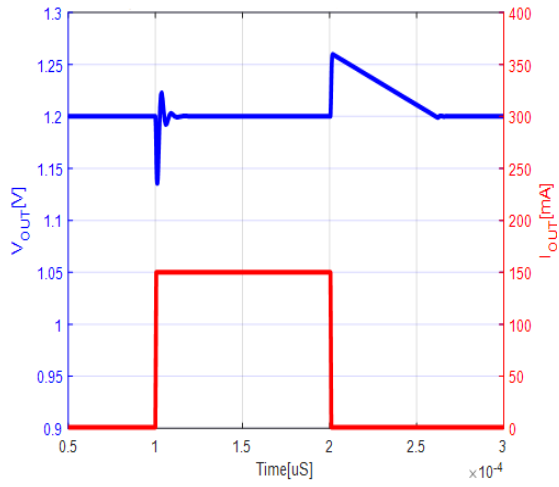
(T_A=25°C, unless otherwise specified)

Line Transient Response Characteristics

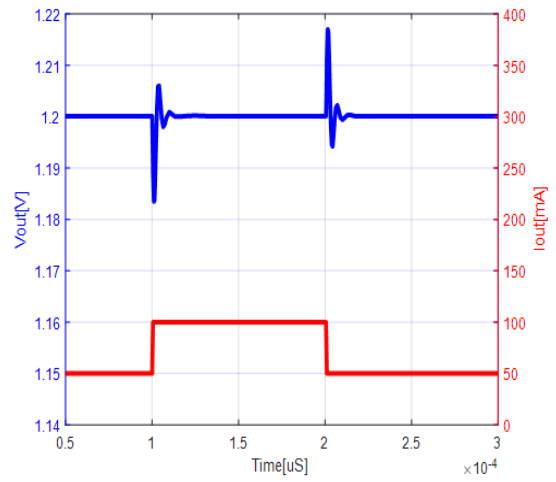


Load Transient Response Characteristics

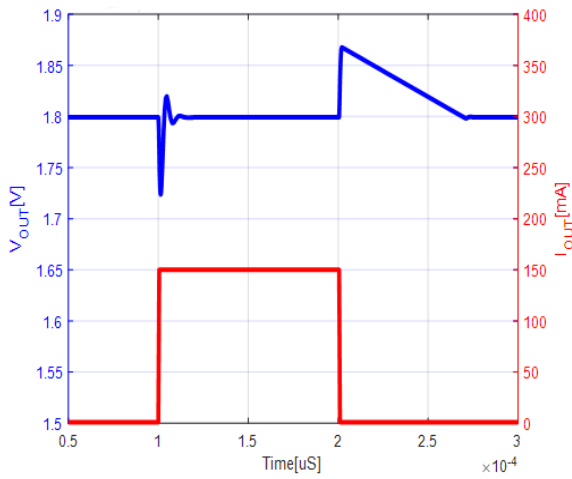
$V_{OUT} = 1.2V$
 $I_{OUT} = 1mA \sim 150mA$, $C_{in} = C_{out} = 1\mu F$



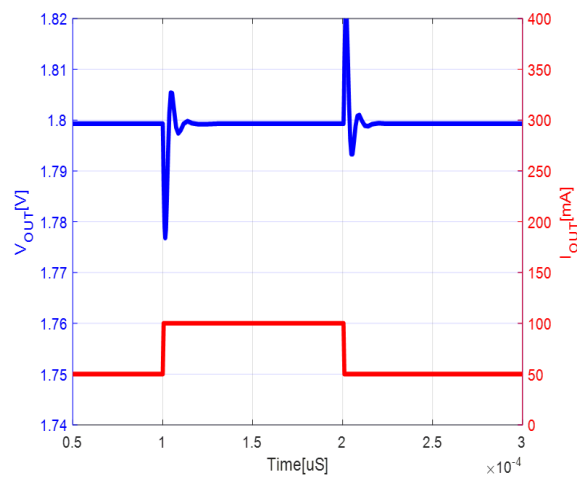
$V_{OUT} = 1.2V$
 $I_{OUT} = 50mA \sim 100mA$, $C_{in} = C_{out} = 1\mu F$



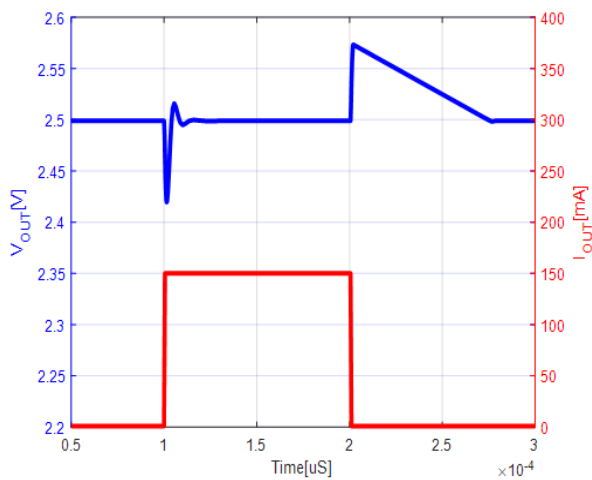
$V_{OUT} = 1.8V$
 $I_{OUT} = 1mA \sim 150mA$, $C_{in} = C_{out} = 1\mu F$



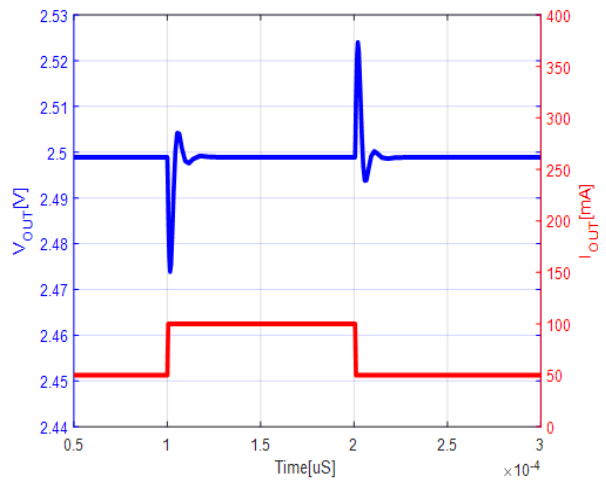
$V_{OUT} = 1.8V$
 $I_{OUT} = 50mA \sim 100mA$, $C_{in} = C_{out} = 1\mu F$

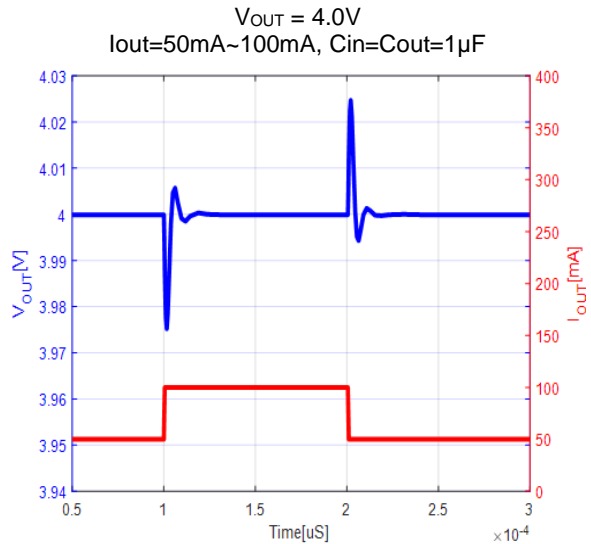
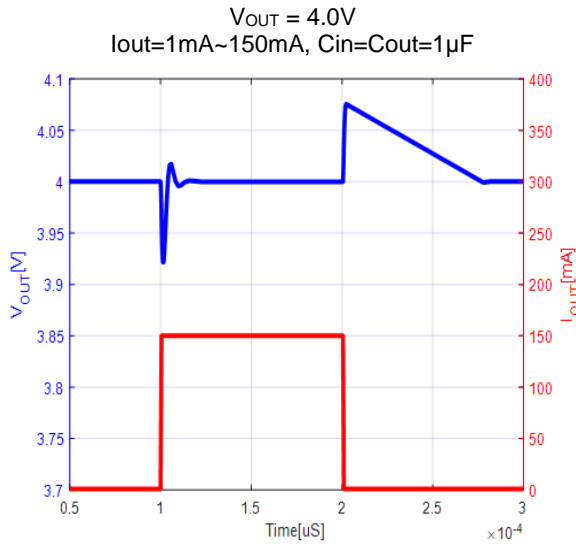


$V_{OUT} = 2.5V$
 $I_{OUT} = 1mA \sim 150mA$, $C_{in} = C_{out} = 1\mu F$



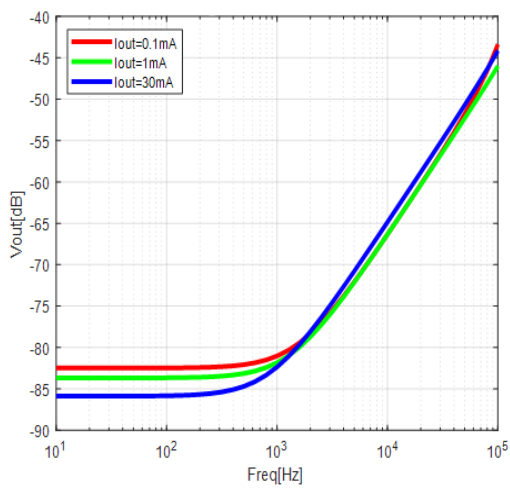
$V_{OUT} = 2.5V$
 $I_{OUT} = 50mA \sim 100mA$, $C_{in} = C_{out} = 1\mu F$



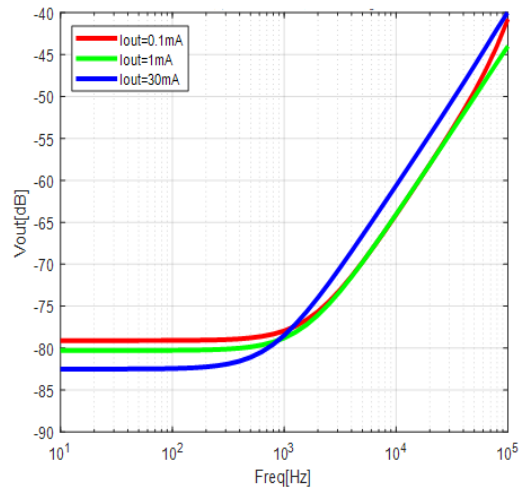


Ripple rejection ($T_A = 25^\circ C$)

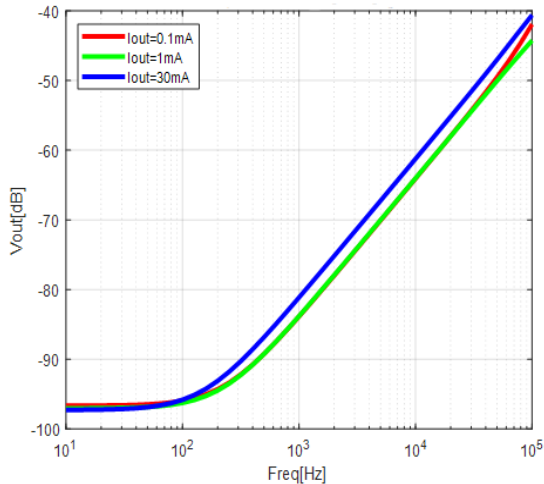
$V_{OUT} = 1.2V$
 $C_{in} = C_{out} = 1\mu F$, $V_{in} = 2.2V$



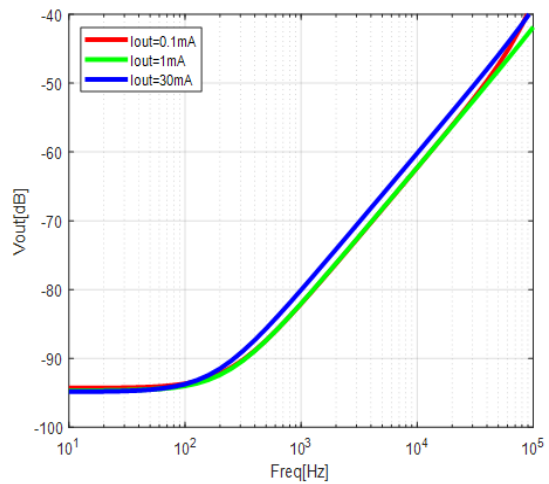
$V_{OUT} = 1.8V$
 $C_{in} = C_{out} = 1\mu F$, $V_{in} = 2.8V$



$V_{OUT} = 2.5V$
 $C_{in} = C_{out} = 1\mu F$, $V_{in} = 3.5V$

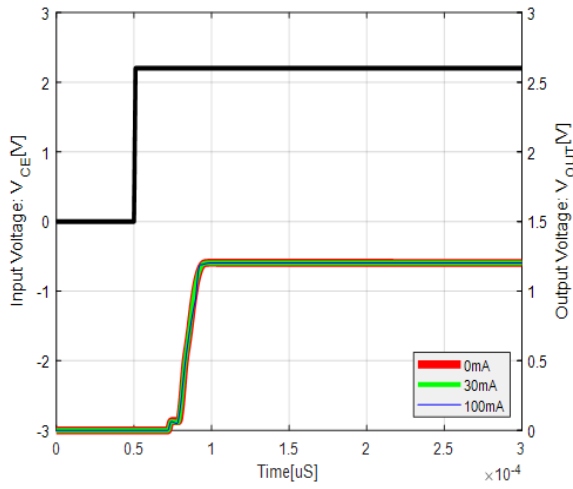


$V_{OUT} = 3.3V$
 $C_{in} = C_{out} = 1\mu F$, $V_{in} = 4.3V$

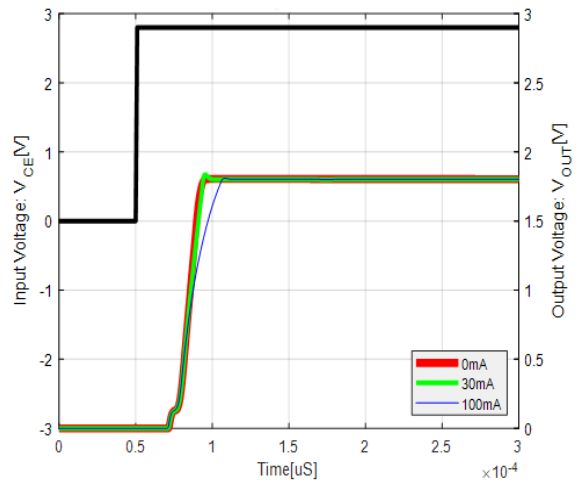


EN Pin rising response characteristics

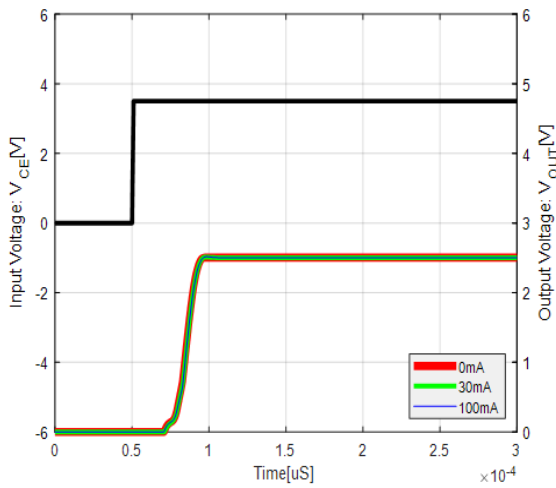
$V_{OUT} = 1.2\text{ V}$
 $C_{in}=0.1\mu\text{F}, C_{out}=1\mu\text{F}, V_{EN}=0\text{V}\rightarrow 2.2\text{V}$



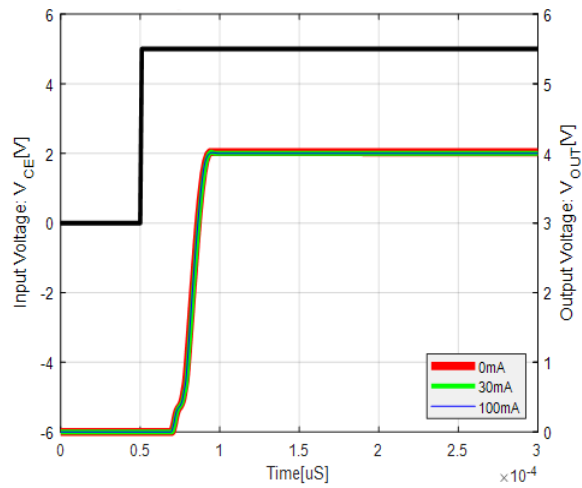
$V_{OUT} = 1.8\text{ V}$
 $C_{in}=0.1\mu\text{F}, C_{out}=1\mu\text{F}, V_{EN}=0\text{V}\rightarrow 2.8\text{V}$



$V_{OUT} = 2.5\text{ V}$
 $C_{in}=0.1\mu\text{F}, C_{out}=1\mu\text{F}, V_{EN}=0\text{V}\rightarrow 3.5\text{V}$

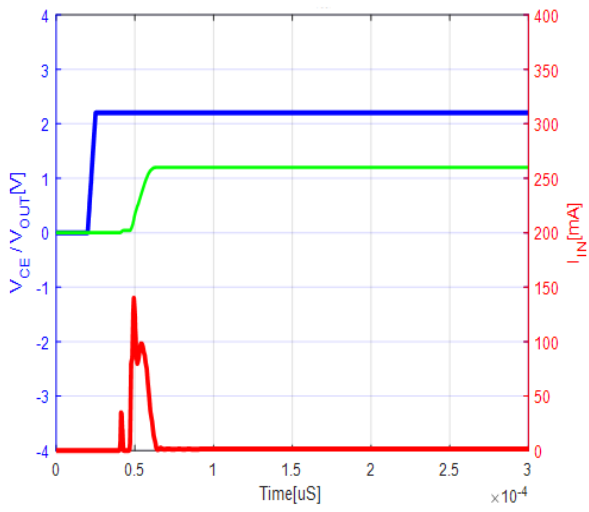


$V_{OUT} = 4.0\text{ V}$
 $C_{in}=0.1\mu\text{F}, C_{out}=1\mu\text{F}, V_{EN}=0\text{V}\rightarrow 5.0\text{V}$

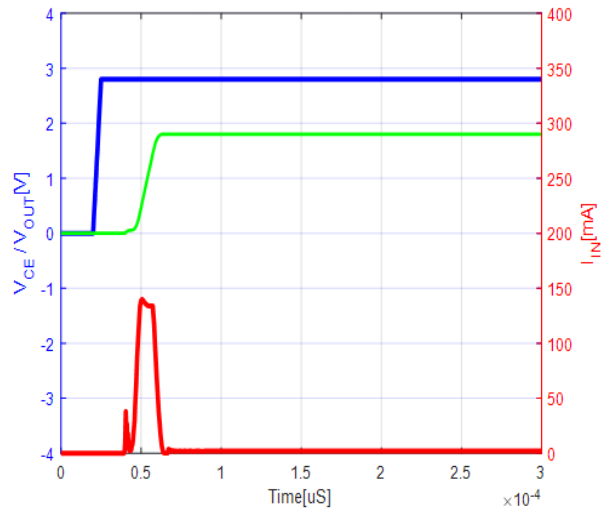


Inrush Current Response Time

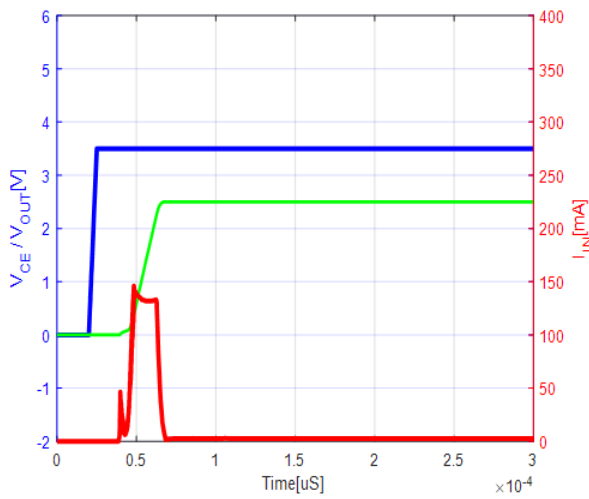
$V_{OUT} = 1.2\text{ V}$
 $V_{EN}=0\text{V} \rightarrow 2.2\text{V}$, $C_{in}=C_{out}=1\mu\text{F}$



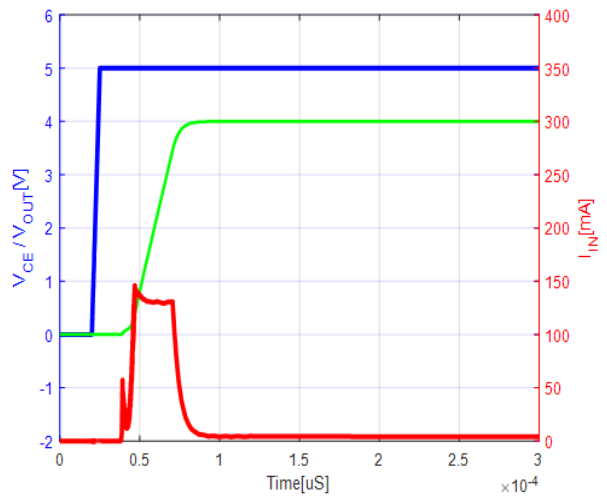
$V_{OUT} = 1.8\text{ V}$
 $V_{EN}=0\text{V} \rightarrow 2.8\text{V}$, $C_{in}=C_{out}=1\mu\text{F}$



$V_{OUT} = 2.5\text{ V}$
 $V_{EN}=0\text{V} \rightarrow 3.5\text{V}$, $C_{in}=C_{out}=1\mu\text{F}$

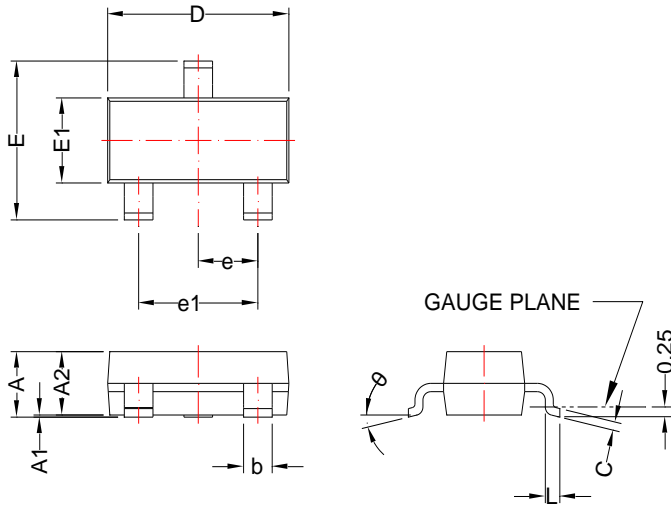


$V_{OUT} = 4.0\text{ V}$
 $V_{EN}=0\text{V} \rightarrow 5.0\text{V}$, $C_{in}=C_{out}=1\mu\text{F}$

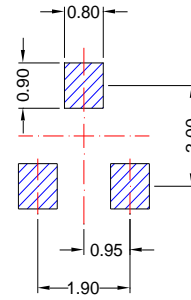


SOT-23

Package Dimension



Recommended Land Pattern



Dimensions

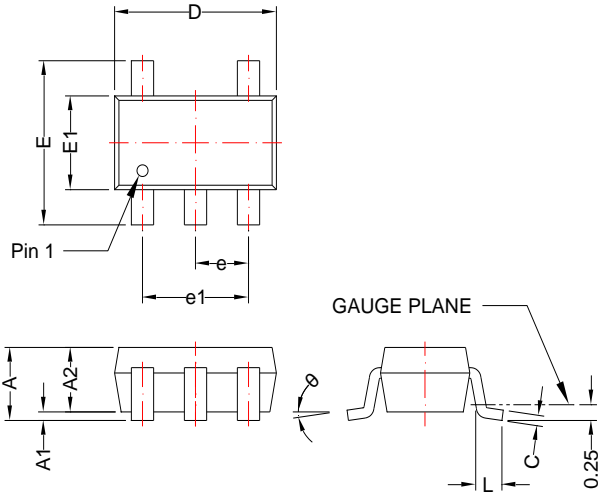
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.17	0.030	0.046
A1	0.01	0.15	0.000	0.006
A2	0.70	1.02	0.028	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

NOTE:

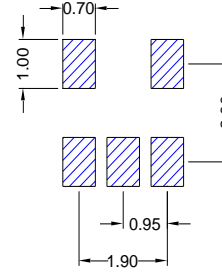
DIMENSION D and E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25mm PER END.

SOT-23-5L

Package Dimension



Recommended Land Pattern



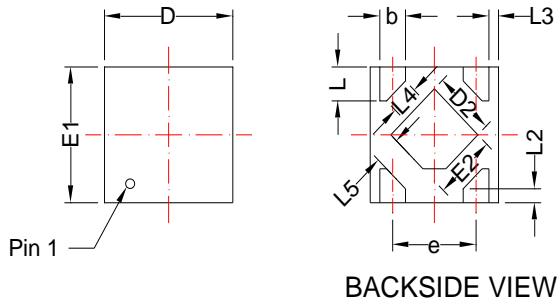
Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

NOTE:

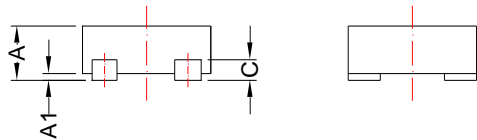
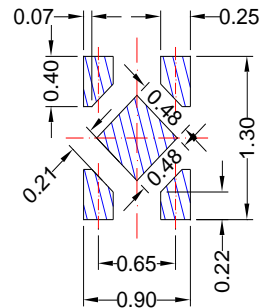
DIMENSION D and E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25mm PER END.

DFN1x1-4L

Package Dimension



Recommended Land Pattern



Dimensions

Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.35	0.40	0.014	0.016
A1	0.00	0.05	0.000	0.002
b	0.17	0.27	0.007	0.011
c	0.127 REF		0.005 REF	
D	0.95	1.05	0.037	0.041
D2	0.43	0.53	0.017	0.021
E1	0.95	1.05	0.037	0.041
E2	0.43	0.53	0.017	0.021
e	0.65 BSC		0.026 BSC	
L	0.20	0.30	0.008	0.012
L2	0.103 REF		0.004 REF	
L3	0.075 REF		0.003 REF	
L4	0.208 REF		0.008 REF	
L5	0.200 REF		0.008 REF	





NOTE:



DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH & TIE BAR EXTRUSIONS.

NOTICE

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