GS2803 Series

Low Current Consumption and Low Dropout Voltage LDO

Product Description

The GS2803 series, developed by using the CMOS technology, is a positive voltage regulator IC which has the super low current consumption and the low dropout voltage. Current consumption is as low as 1μA typ., and a ceramic capacitor of 0.1μF or more can be used as the input and output capacitors. It also has high-accuracy output voltage of ±1.0% typical / ±1.5% Maximum.

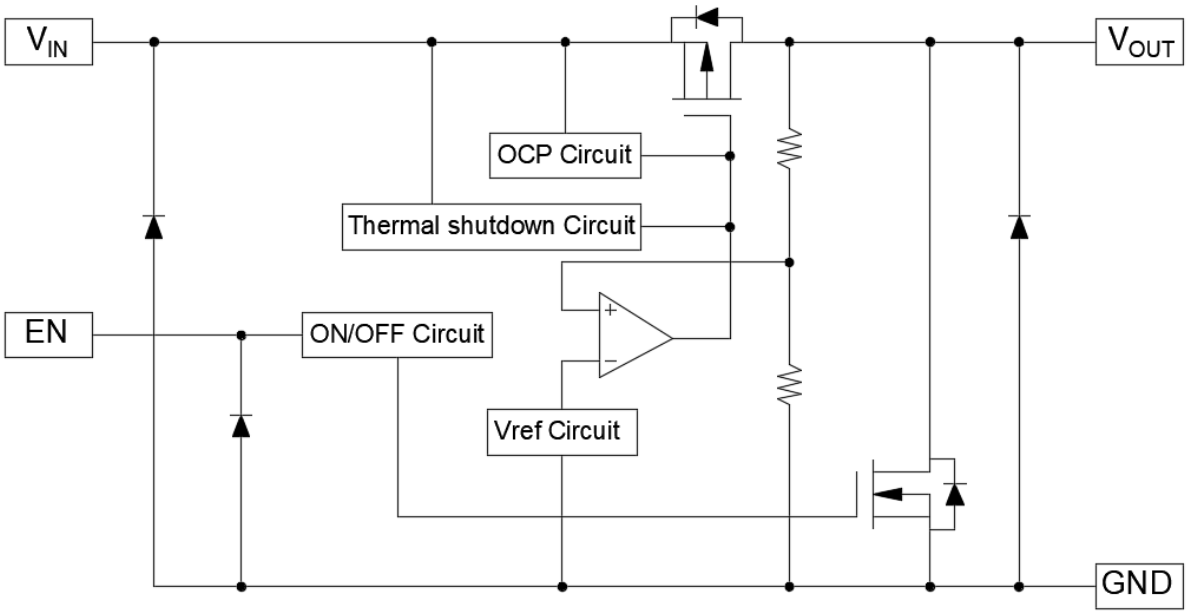
Features

- Output voltage 1.0 V to 3.5 V, selectable in 0.05 V step.
- Input voltage: 1.5 V to 5.5 V
- Dropout Voltage 170 mV typ. (2.8 V output product, IOUT = 100 mA)
- Current consumption:
  During operation: 1μA typ., 1.35 μA max.
  During power-off: 0.01μA typ., 0.1 μA max.
- Output current: Possible to output 200 mA (VOUT ≥1.4 V, VIN≥ VOUT+1.0 V)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor
- Built-in thermal shutdown circuit: Prevents damage caused by heat
- Built-in ON / OFF circuit: Ensures long battery life
- Lead-free(Sn 100%), halogen-free

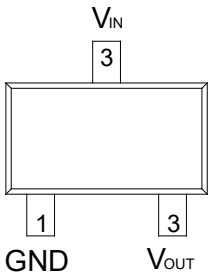
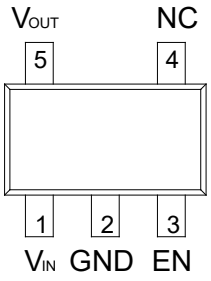
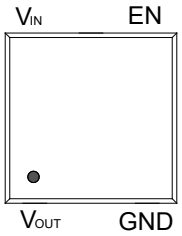
Applications

- Portable communication device, digital camera, and digital audio player
- Battery-powered device
- Home electric / electronic appliance

Block Diagram

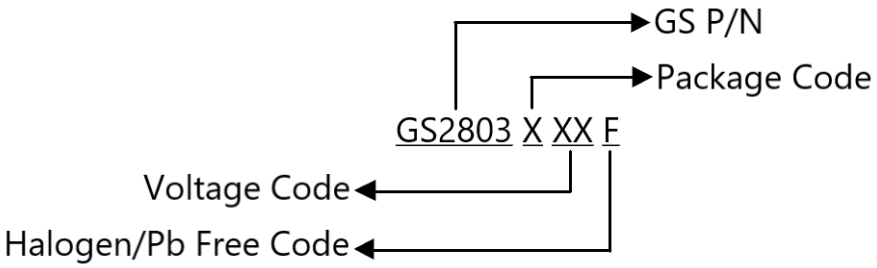


Packages & Pin Assignments

SOT-23	SOT-23-5L	DFN1X1-4L
		

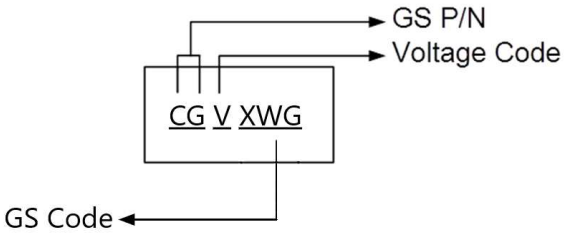
Pin Name	Function
NC	No Connect.
EN	Enable Input. Pulling this pin below 0.3V turn the regulator off, reducing the quiescent current to a fraction of its operating value. The device will be enabled if this pin is left open. Connect to V_{IN} if not being used.
GND	Ground Pin.
V_{IN}	Power Supply Input.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

Ordering Information

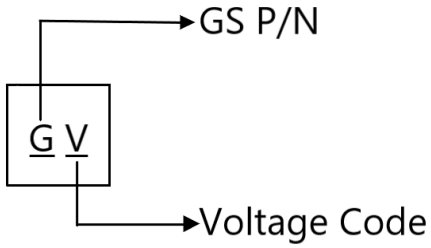


SOT-23	SOT-23-5L	DFN1x1-4L	Output Voltage
GS2803Z10F	GS2803L10F	GS2803F10F	1.0V
GS2803Z12F	GS2803L12F	GS2803F12F	1.2V
GS2803Z15F	GS2803L15F	GS2803F15F	1.5V
GS2803Z18F	GS2803L18F	GS2803F18F	1.8V
GS2803Z20F	GS2803L20F	GS2803F20F	2.0V
GS2803Z22F	GS2803L22F	GS2803F22F	2.2V
GS2803Z25F	GS2803L25F	GS2803F25F	2.5V
GS2803Z28F	GS2803L28F	GS2803F28F	2.8V
GS2803Z30F	GS2803L30F	GS2803F30F	3.0V
GS2803Z33F	GS2803L33F	GS2803F33F	3.3V
GS2803Z35F	GS2803L35F	GS2803F35F	3.5V

Marking Information



SOT-23/SOT-23-5L (Z/L Type)



DFN1x1-4L (F Type)

SOT-23	SOT-23-5L	Marking	DFN1x1-4L	Marking	Output Voltage
GS2803Z10F	GS2803L10F	CGN$_{XWG}$	GS2803F10F	GN	1.0V
GS2803Z12F	GS2803L12F	CGD$_{XWG}$	GS2803F12F	GD	1.2V
GS2803Z15F	GS2803L15F	CGG$_{XWG}$	GS2803F15F	GG	1.5V
GS2803Z18F	GS2803L18F	CGF$_{XWG}$	GS2803F18F	GF	1.8V
GS2803Z20F	GS2803L20F	CGL$_{YWG}$	GS2803F20F	GL	2.0V
GS2803Z22F	GS2803L22F	CGM$_{YWG}$	GS2803F22F	GM	2.2V
GS2803Z25F	GS2803L25F	CGH$_{YWG}$	GS2803F25F	GH	2.5V
GS2803Z28F	GS2803L28F	CGJ$_{XWG}$	GS2803F28F	GJ	2.8V
GS2803Z30F	GS2803L30F	CGQ$_{XWG}$	GS2803F30F	GQ	3.0V
GS2803Z33F	GS2803L33F	CGR$_{XWG}$	GS2803F33F	GR	3.3V
GS2803Z35F	GS2803L35F	CGT$_{XWG}$	GS2803F35F	GT	3.5V

Absolute Maximum Ratings

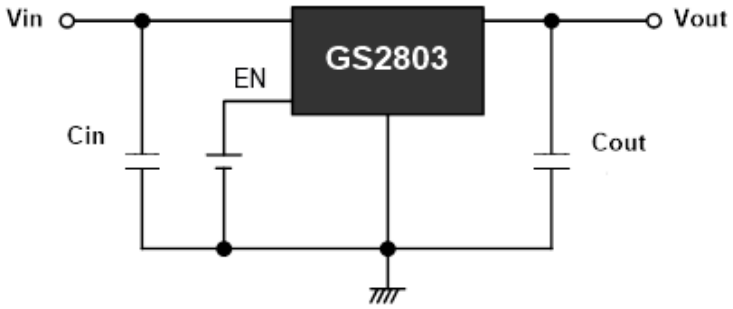
(T_A=25°C unless otherwise specified)

Symbol	Parameter		Max	Units
V_{IN}	Power Supply Voltage		6.0	V
V_{EN}	Enable Voltage		6.0	V
V_{OUT}	Output Voltage		-0.3 to V_{IN}	V
I_{OUT}	Output Current		250	mA
P_D	Power Dissipation	SOT-23-5L	600	mW
		SOT-23	560	
		DFN1x1-4L	340	
T_{STG}	Storage Temperature Accuracy		-40 to 125	°C
T_A	Operating Temperature Range		-40 to 85	°C
T_{OPA}	Operating Ambient Temperature Range		-40 to 85	°C
T_{LEAD}	Lead Temperature(soldering) 5sec.		260	°C
θ_{JA}	Thermal Resistance Junction to Ambient	SOT-23-5L	166	°C/W
		SOT-23	179	
		DFN1x1-4L	294	
HBM	ESD Rating(Human Body Model)		4	KV

Electrical Characteristics (Unless otherwise specified $V_{IN}=V_{OUT}+1V$, $T_A=25°C$)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_Q	Quiescent Current	$V_{IN}=V_{OUT}+1.0V$, En pin=ON, No Load		-	1.0	1.35	μA
$I_{standby}$	Standby Current	$V_{IN}=V_{OUT}+1.0V$, En pin=OFF, No Load		-	0.01	0.1	μA
V_{IN}	Input Voltage			1.5	-	5.5	V
V_{OUT}	Output Voltage	$V_{IN}=V_{OUT}+1.0V$ I_{OUT} = 30mA	$1.0V\le V_{OUT}<1.5V$	V_{OUT} -0.015	V_{OUT}	V_{OUT} +0.015	V
			$1.5V\le V_{OUT}\le 3.5V$	V_{OUT} x0.99	V_{OUT}	V_{OUT} x1.01	
I_{OUT}	Output Current	$V_{IN}\ge V_{OUT}+1.0V$	$1.0V\le V_{OUT}<1.1V$	100	-	-	mA
			$1.1V\le V_{OUT}<1.2V$	125	-	-	
			$1.2V\le V_{OUT}<1.3V$	150	-	-	
			$1.3V\le V_{OUT}<1.4V$	175	-	-	
			$1.4V\le V_{OUT}\le 3.5V$	200	-	-	
ΔV_{LINE}	Line regulation	$V_{OUT}+0.5V\le V_{IN}\le 5.5V$ I_{OUT} = 1μA	$1.0V\le V_{OUT}\le 3.5V$	-	0.05	0.2	%/V
		$V_{OUT}+0.5V\le V_{IN}\le 5.5V$ I_{OUT} = 30mA	$1.0V\le V_{OUT}<1.1V$	-	0.07	2.0	%/V
			$1.1V\le V_{OUT}<1.2V$	-	0.06	1.0	%/V
			$1.2V\le V_{OUT}\le 3.5V$	-	0.05	0.2	%/V
ΔVL_{OAD}	Load Regulation	$V_{IN}=V_{OUT}+1.0V$ $1\mu A\le I_{OUT}\le 100mA$	$1.0V\le V_{OUT}\le 3.5V$	-	20	40	mV
		$V_{IN}=V_{OUT}+1.0V$ $0.1mA\le I_{OUT}\le 200mA$	$1.0V\le V_{OUT}<1.1V$	-	40	640	mV
			$1.1V\le V_{OUT}<1.2V$	-	40	400	mV
			$1.2V\le V_{OUT}<1.3V$	-	40	160	mV
			$1.3V\le V_{OUT}<1.4V$	-	40	80	mV
			$1.4V\le V_{OUT}\le 3.5V$	-	40	80	mV
V_{DROP}	Dropout Voltage	I_{OUT} = 100mA	$1.0V\le V_{OUT}<1.1V$	0.50	0.76	1.55	V
			$1.1V\le V_{OUT}<1.2V$	-	0.67	1.39	
			$1.2V\le V_{OUT}<1.3V$	-	0.58	1.25	
			$1.3V\le V_{OUT}<1.4V$	-	0.49	1.11	
			$1.4V\le V_{OUT}<1.5V$	-	0.43	0.99	
			$1.5V\le V_{OUT}<1.7V$	-	0.37	0.85	
			$1.7V\le V_{OUT}<1.8V$	-	0.31	0.68	
			$1.8V\le V_{OUT}<2.0V$	-	0.27	0.58	
			$2.0V\le V_{OUT}<2.5V$	-	0.23	0.49	
			$2.5V\le V_{OUT}<2.8V$	-	0.18	0.38	
			$2.8V\le V_{OUT}<3.0V$	-	0.17	0.33	
			$3.0V\le V_{OUT}\le 3.5V$	-	0.16	0.32	
$\triangle V_{OUT}/\triangle T$	Output Voltage Temperature Coefficient	$V_{IN}=V_{OUT}+1.0V$, I_{OUT}=30mA, $-40°C\le TA\le 85°C$		-	±130	-	ppm/°C
$V_{EN}(HI)$	EN Input High Voltage	$V_{IN}=V_{OUT}+1.0V$, RL=1.0KΩ		-	-	0.65	V
$V_{EN}(LO)$	EN Input Low Voltage	$V_{IN}=V_{OUT}+1.0V$, RL=1.0KΩ		-	-	0.3	V
I_{short}	Short-Circuit Current	$V_{IN}=V_{OUT}+1.0V$, En Pin=ON, V_{OUT}= 0V		-	50	-	mA
RLOW	On Resistance for Discharge	V_{EN}=0V		-	35	-	Ω

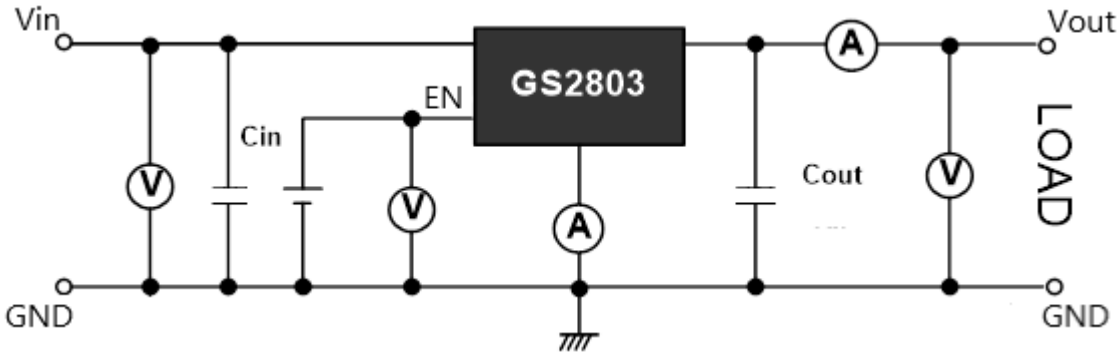
Typical Applications



C_{IN} : 0.1μF or more. C_{OUT} : 0.1μF or more

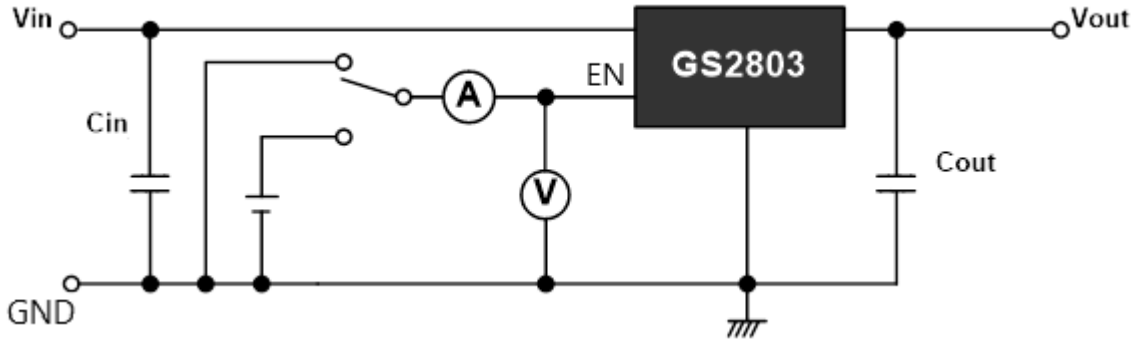
Test Circuit

Operating Function Test



C_{IN} : 0.1μF or more. C_{OUT} : 0.1μF or more

Enable Function Test



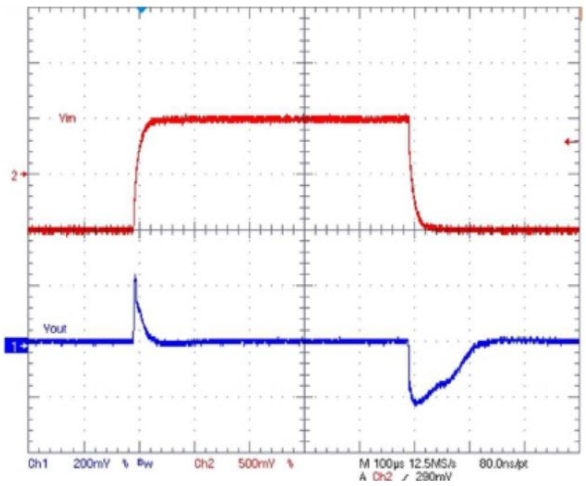
C_{IN} : 0.1μF or more. C_{OUT} : 0.1μF or more

Typical Performance Characteristics

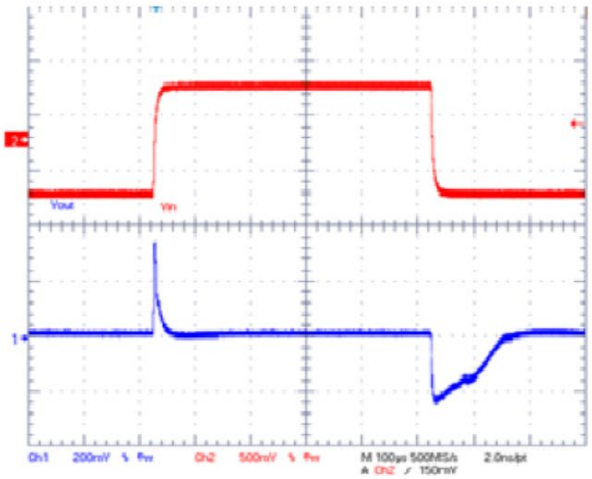
Line Transient response characteristics (T_A=25°C)

V_{OUT} = 1.0 V

Cin=Cout=0.1uF, Iout=3mA, Vin=2V->3V

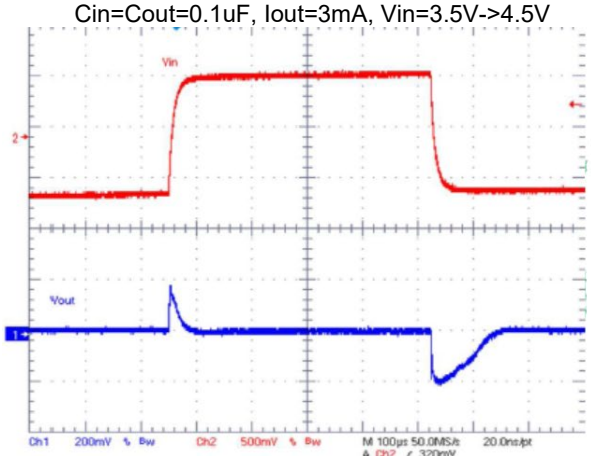


Cin=Cout=0.1uF, Iout=100mA, Vin=2V->3V

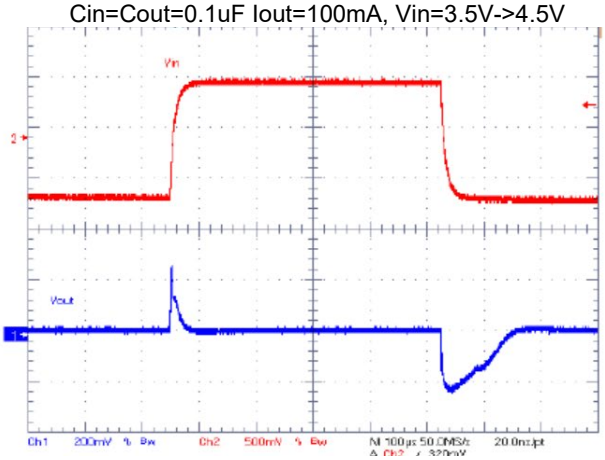


V_{OUT} = 2.5 V

Cin=Cout=0.1uF, Iout=3mA, Vin=3.5V->4.5V

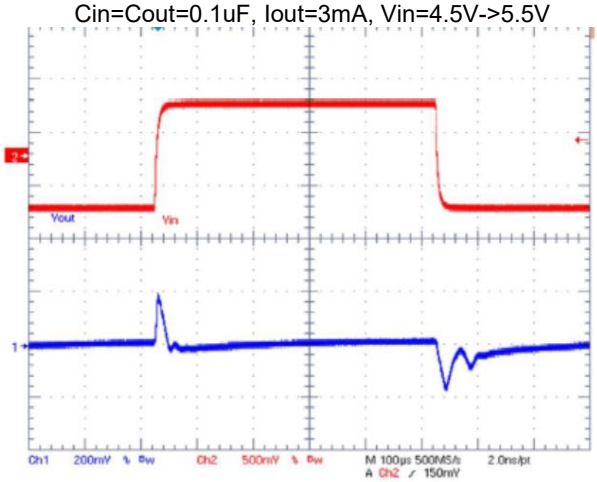


Cin=Cout=0.1uF Iout=100mA, Vin=3.5V->4.5V

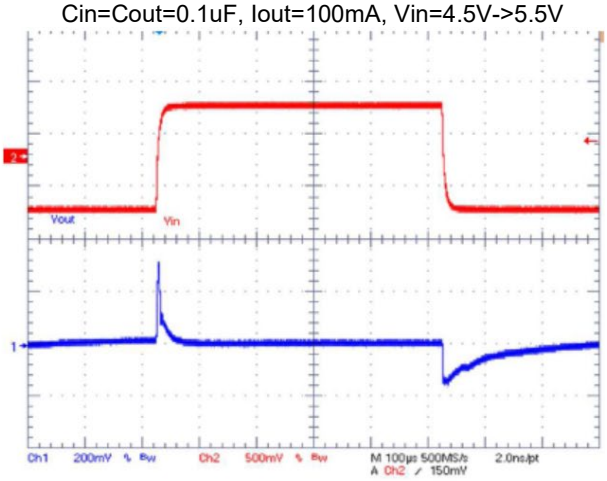


V_{OUT} = 3.5 V

Cin=Cout=0.1uF, Iout=3mA, Vin=4.5V->5.5V



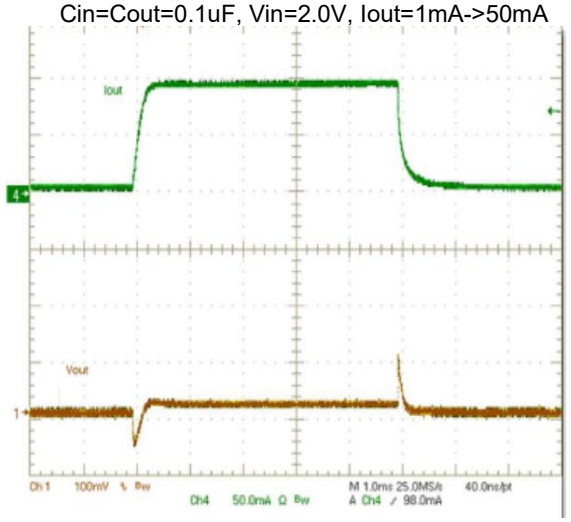
Cin=Cout=0.1uF, Iout=100mA, Vin=4.5V->5.5V



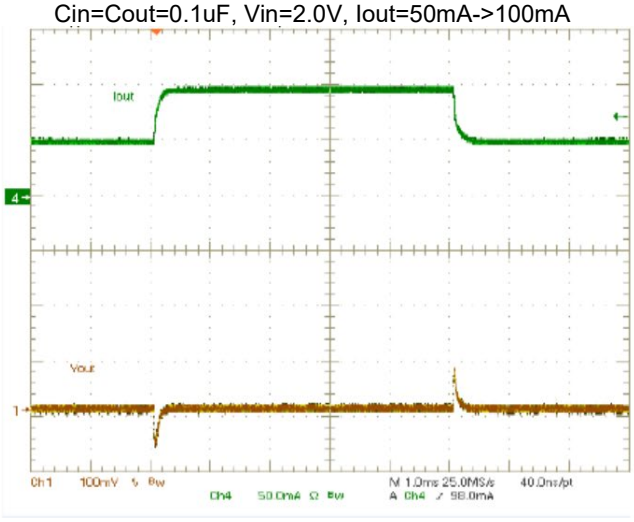
Load Transient response characteristics (T_A=25°C)

V_{OUT} = 1.0 V

Cin=Cout=0.1uF, Vin=2.0V, Iout=1mA->50mA

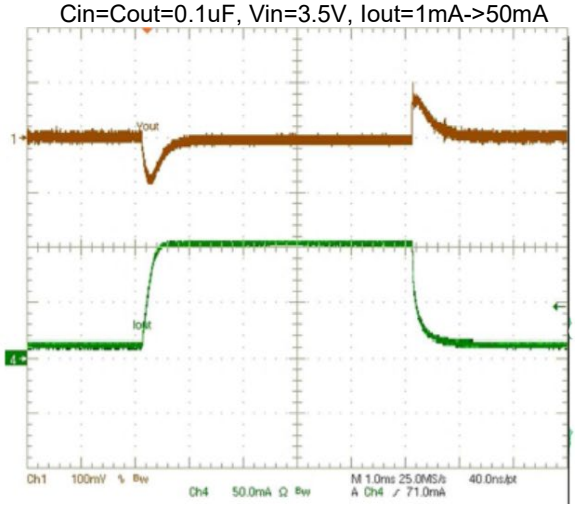


Cin=Cout=0.1uF, Vin=2.0V, Iout=50mA->100mA

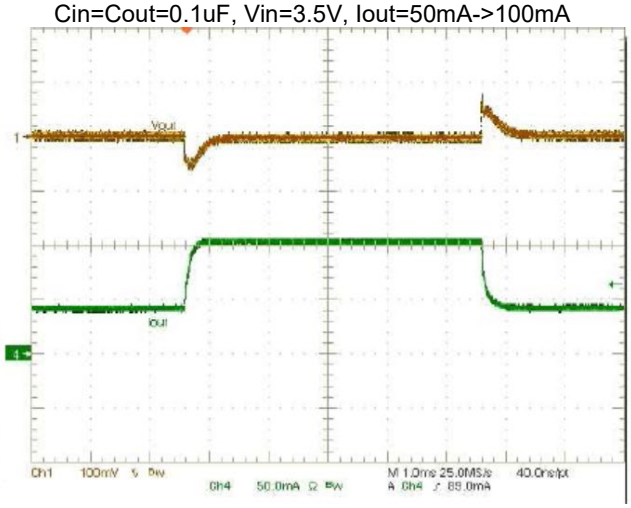


V_{OUT} = 2.5 V

Cin=Cout=0.1uF, Vin=3.5V, Iout=1mA->50mA

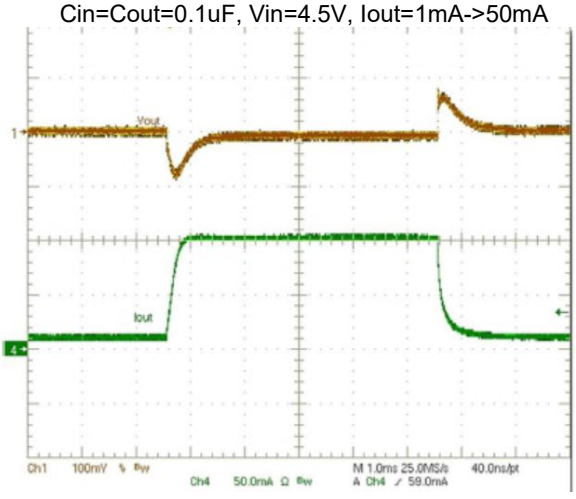


Cin=Cout=0.1uF, Vin=3.5V, Iout=50mA->100mA

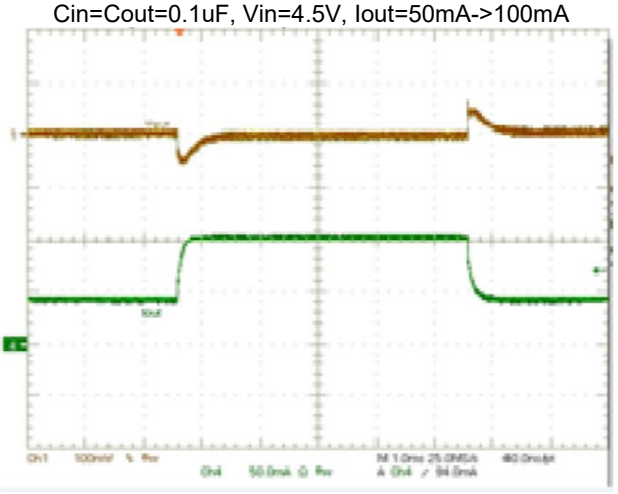


V_{OUT} = 3.5 V

Cin=Cout=0.1uF, Vin=4.5V, Iout=1mA->50mA



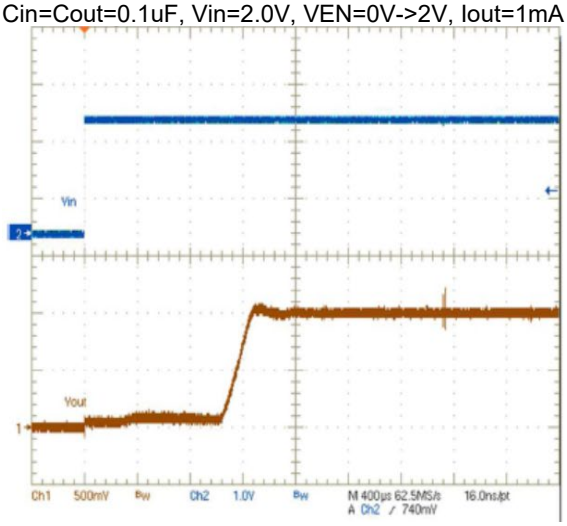
Cin=Cout=0.1uF, Vin=4.5V, Iout=50mA->100mA



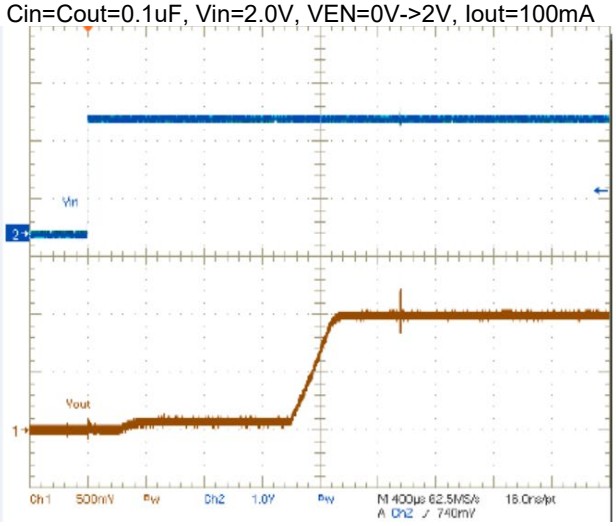
EN PIN Transient response characteristics (T_A=25°C)

V_{OUT} = 1.0 V

Cin=Cout=0.1uF, Vin=2.0V, VEN=0V->2V, Iout=1mA

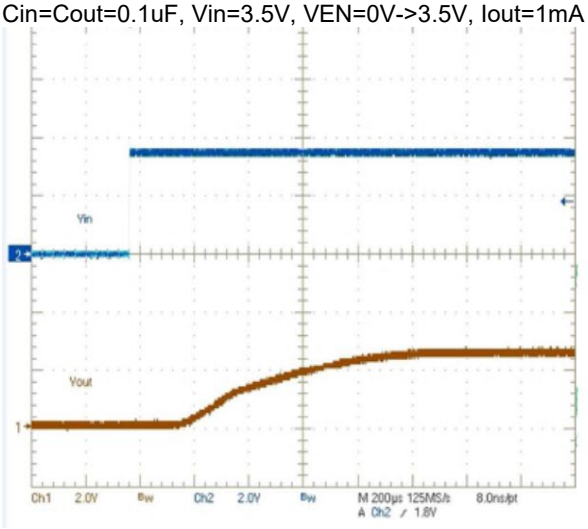


Cin=Cout=0.1uF, Vin=2.0V, VEN=0V->2V, Iout=100mA

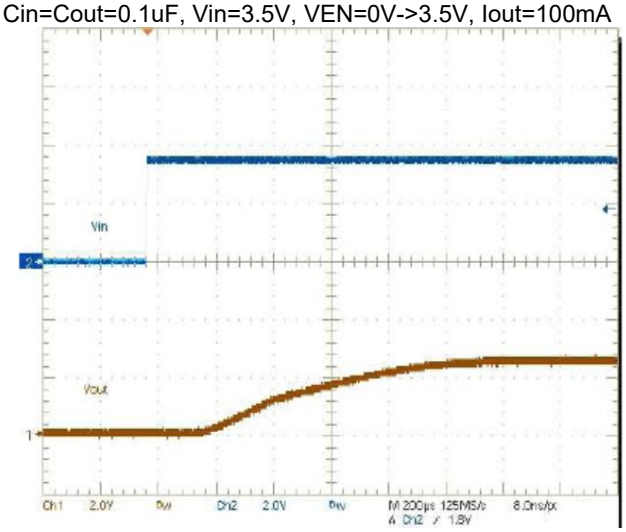


V_{OUT} = 2.5 V

Cin=Cout=0.1uF, Vin=3.5V, VEN=0V->3.5V, Iout=1mA

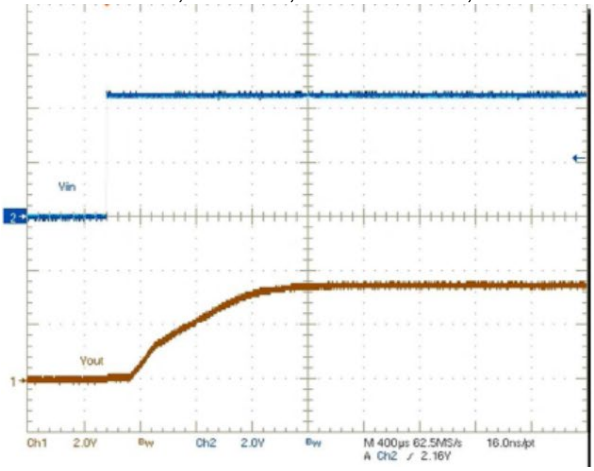


Cin=Cout=0.1uF, Vin=3.5V, VEN=0V->3.5V, Iout=100mA

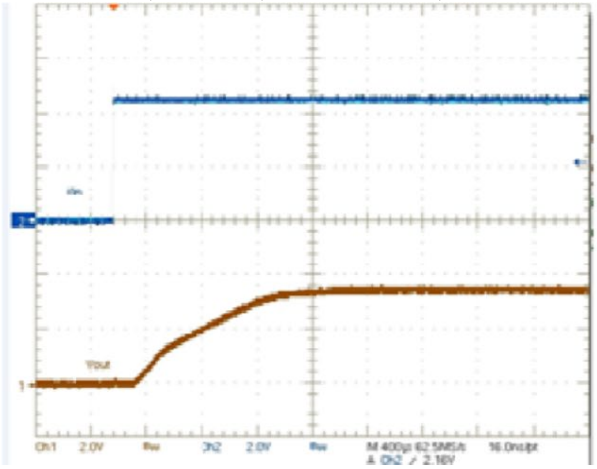


V_{OUT} = 3.5 V

Cin=Cout=0.1uF, Vin=4.5V, VEN=0V->4.5V, Iout=1mA



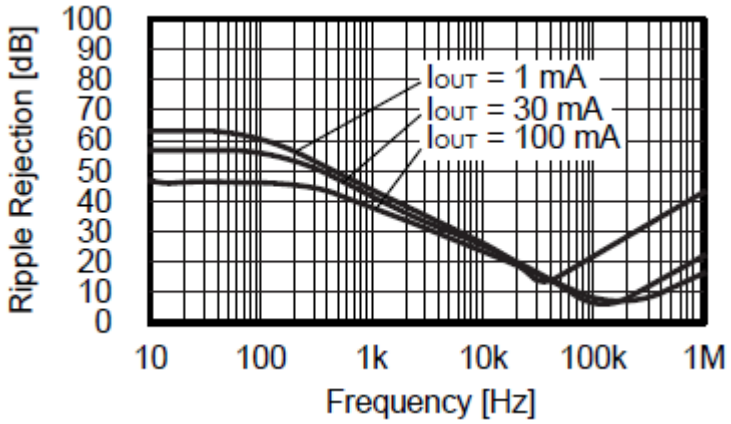
Cin=Cout=0.1uF, Vin=4.5V, VEN=0V->4.5V, Iout=100mA



Ripple rejection (T_A=25°C)

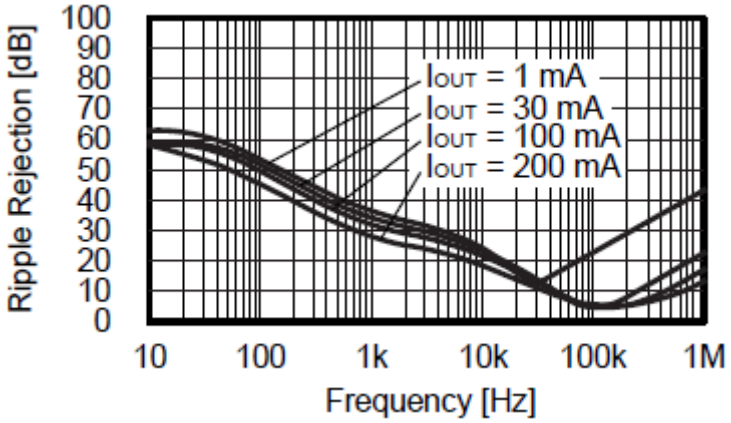
VOUT = 1.2 V

Cin=Cout=0.1uF, Vin=2.2V, Iout=1mA, 30mA, 100mA



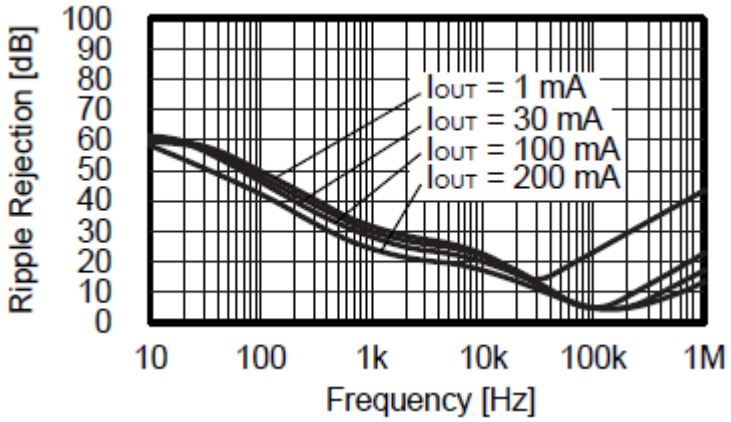
VOUT = 2.8 V

Cin=Cout=0.1uF, Vin=3.8V, Iout=1mA, 30mA, 100mA, 200mA



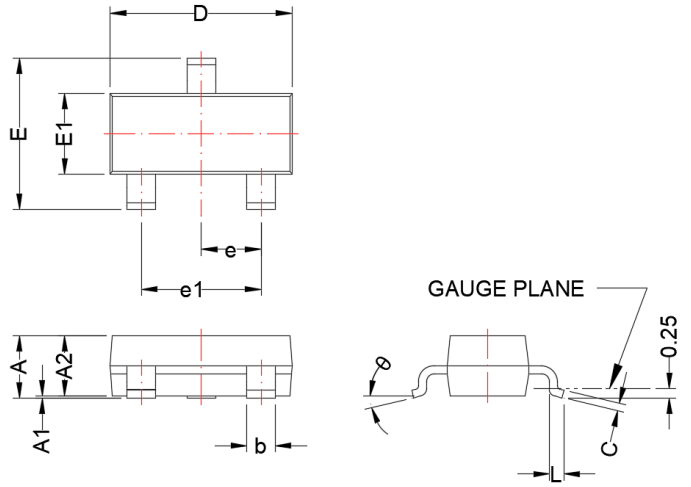
VOUT = 3.3 V

Cin=Cout=0.1uF, Vin=4.3V, Iout=1mA, 30mA, 100mA, 200mA

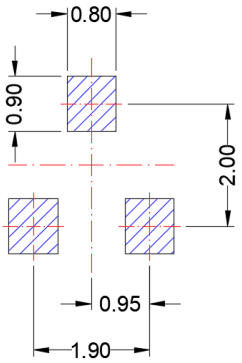


SOT-23

Package Dimension



Recommended Land Pattern



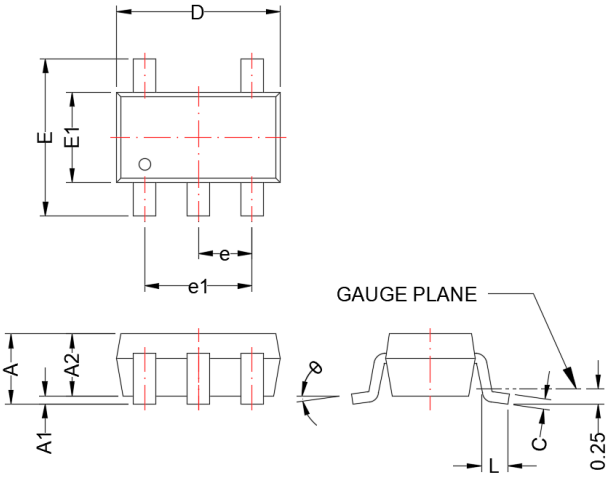
Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.17	0.030	0.046
A1	0.01	0.15	0.000	0.006
A2	0.70	1.02	0.028	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC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

NOTE:

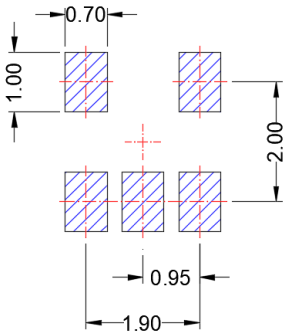
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-23-5L

Package Dimension



Recommended Land Pattern



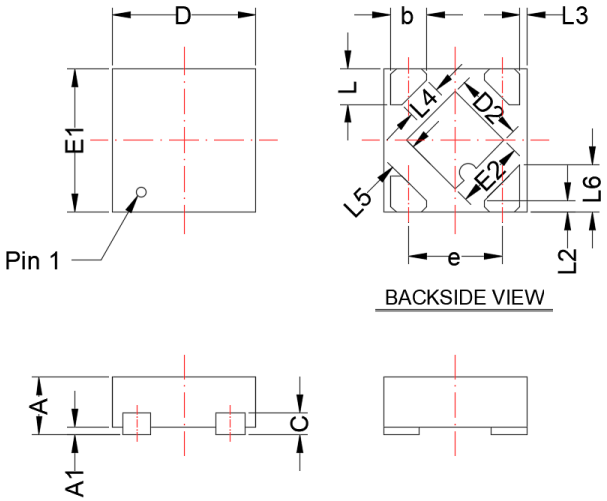
Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC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

NOTE:

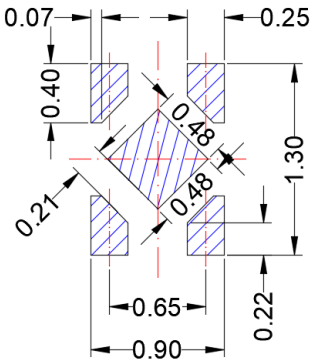
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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	0.20	0.30	0.008	0.012
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	0.078 REF		0.003 REF	
L3	0.050 REF		0.002 REF	
L4	0.243 REF		0.010 REF	
L5	0.200 REF		0.008 REF	
L6	0.328 REF		0.013 REF	

NOTE:

Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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