

GS2803

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 $1\mu\text{A}$ typ., and a ceramic capacitor of $0.1\mu\text{F}$ or more can be used as the input and output capacitors. It also has high-accuracy output voltage of $\pm 1.0\%$ typical / $\pm 1.5\%$ Maximum.

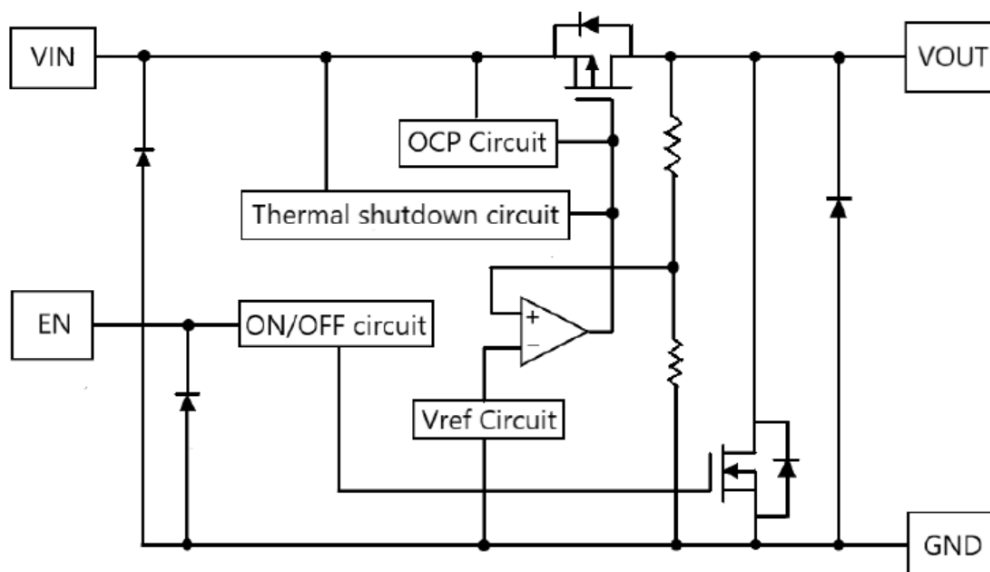
Features

- 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, $I_{\text{OUT}} = 100\text{ mA}$)
- Current consumption:
During operation: $1\mu\text{A}$ typ., $1.35\mu\text{A}$ max.
During power-off: $0.01\mu\text{A}$ typ., $0.1\mu\text{A}$ max.
- Output current: Possible to output 200 mA ($V_{\text{OUT}} \geq 1.4\text{ V}$, $V_{\text{IN}} \geq V_{\text{OUT}} + 1.0\text{ V}$)
- 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

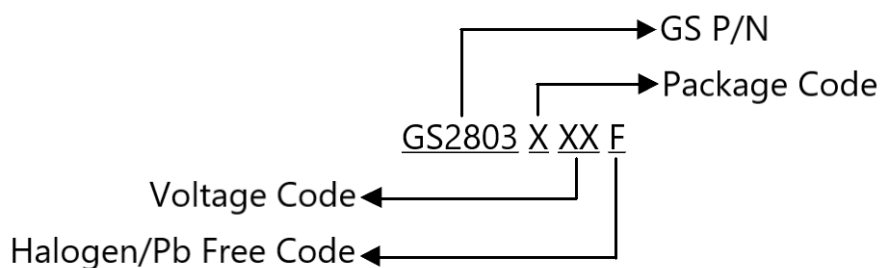
Block Diagram



Packages & Pin Assignments

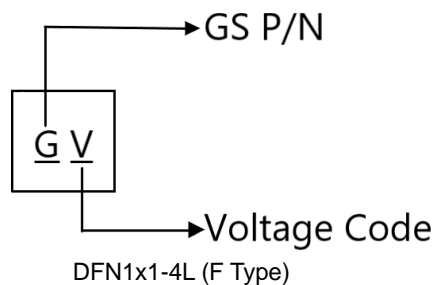
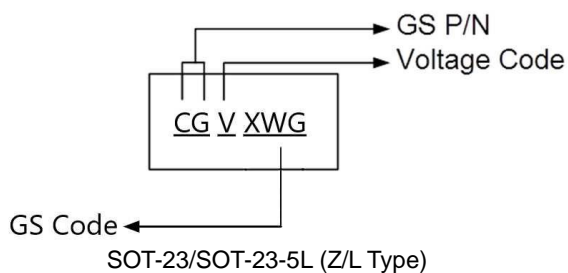
SOT-23	SOT-23-5L	DFN1X1-4L
Pin Name	Function	
NC	No Connect.	
EN	Enable Input. Pulling this pin below 0.3V turn the regulator off, reducing the quiescent current to a fraction of its operating value. The device will be enabled if this pin is left open. Connect to V_{IN} if not being used.	
GND	Ground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

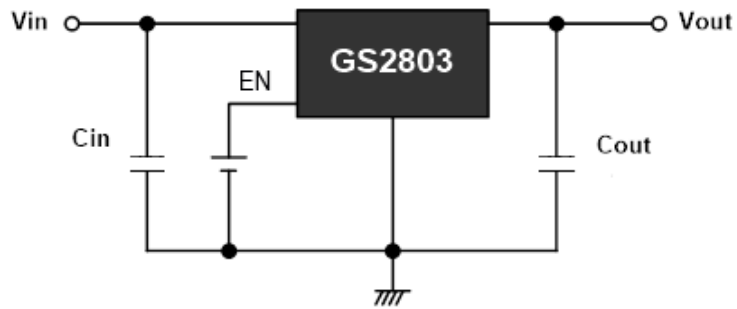
(T_A=25°C unless otherwise specified)

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
		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
		SOT-23	179
		DFN1x1-4L	294
HBM	ESD Rating(Human Body Model)	4	KV

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

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	$V_{IN}=V_{OUT}+1.0V$ $I_{OUT} = 30mA$	$1.0V \leq V_{OUT} < 1.5V$	$V_{OUT} - 0.015$	$V_{OUT} + 0.015$	V	
			$1.5V \leq V_{OUT} \leq 3.5V$	$V_{OUT} \times 0.99$	$V_{OUT} \times 1.01$		
I_{OUT}	Output Current	$V_{IN} \geq V_{OUT} + 1.0V$	$1.0V \leq V_{OUT} < 1.1V$	100	-	mA	
			$1.1V \leq V_{OUT} < 1.2V$	125	-		
			$1.2V \leq V_{OUT} < 1.3V$	150	-		
			$1.3V \leq V_{OUT} < 1.4V$	175	-		
			$1.4V \leq V_{OUT} \leq 3.5V$	200	-		
ΔV_{LINE}	Line regulation	$V_{OUT} + 0.5V \leq V_{IN} \leq 5.5V$ $I_{OUT} = 1\mu A$	$1.0V \leq V_{OUT} \leq 3.5V$	-	0.05	0.2	%/V
			$1.0V \leq V_{OUT} < 1.1V$	-	0.07	2.0	%/V
		$V_{OUT} + 0.5V \leq V_{IN} \leq 5.5V$ $I_{OUT} = 30mA$	$1.1V \leq V_{OUT} < 1.2V$	-	0.06	1.0	%/V
			$1.2V \leq V_{OUT} \leq 3.5V$	-	0.05	0.2	%/V
ΔV_{LOAD}	Load Regulation	$V_{IN}=V_{OUT}+1.0V$ $1\mu A \leq I_{OUT} \leq 100mA$	$1.0V \leq V_{OUT} \leq 3.5V$	-	20	40	mV
			$V_{IN}=V_{OUT}+1.0V$ $0.1mA \leq I_{OUT} \leq 200mA$	$1.0V \leq V_{OUT} < 1.1V$	-	40	640
		$1.1V \leq V_{OUT} < 1.2V$		-	40	400	mV
		$1.2V \leq V_{OUT} < 1.3V$		-	40	160	mV
		$1.3V \leq V_{OUT} < 1.4V$		-	40	80	mV
		$1.4V \leq V_{OUT} \leq 3.5V$	-	40	80	mV	
V_{DROP}	Dropout Voltage	$I_{OUT} = 100mA$	$1.0V \leq V_{OUT} < 1.1V$	0.50	0.76	1.55	V
			$1.1V \leq V_{OUT} < 1.2V$	-	0.67	1.39	
			$1.2V \leq V_{OUT} < 1.3V$	-	0.58	1.25	
			$1.3V \leq V_{OUT} < 1.4V$	-	0.49	1.11	
			$1.4V \leq V_{OUT} < 1.5V$	-	0.43	0.99	
			$1.5V \leq V_{OUT} < 1.7V$	-	0.37	0.85	
			$1.7V \leq V_{OUT} < 1.8V$	-	0.31	0.68	
			$1.8V \leq V_{OUT} < 2.0V$	-	0.27	0.58	
			$2.0V \leq V_{OUT} < 2.5V$	-	0.23	0.49	
			$2.5V \leq V_{OUT} < 2.8V$	-	0.18	0.38	
			$2.8V \leq V_{OUT} < 3.0V$	-	0.17	0.33	
			$3.0V \leq V_{OUT} \leq 3.5V$	-	0.16	0.32	
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	$V_{IN}=V_{OUT}+1.0V$, $I_{OUT}=30mA$, $-40^{\circ}C \leq T_A \leq 85^{\circ}C$	-	± 130	-	ppm/ $^{\circ}C$	
$V_{EN(HI)}$	EN Input High Voltage	$V_{IN}=V_{OUT}+1.0V$, $R_L=1.0K\Omega$	-	-	0.65	V	
$V_{EN(LO)}$	EN Input Low Voltage	$V_{IN}=V_{OUT}+1.0V$, $R_L=1.0K\Omega$	-	-	0.3	V	
I_{short}	Short-Circuit Current	$V_{IN}=V_{OUT}+1.0V$, En Pin=ON, $V_{OUT}=0V$	-	50	-	mA	
R_{LOW}	On Resistance for Discharge	$V_{EN}=0V$	-	35	-	Ω	

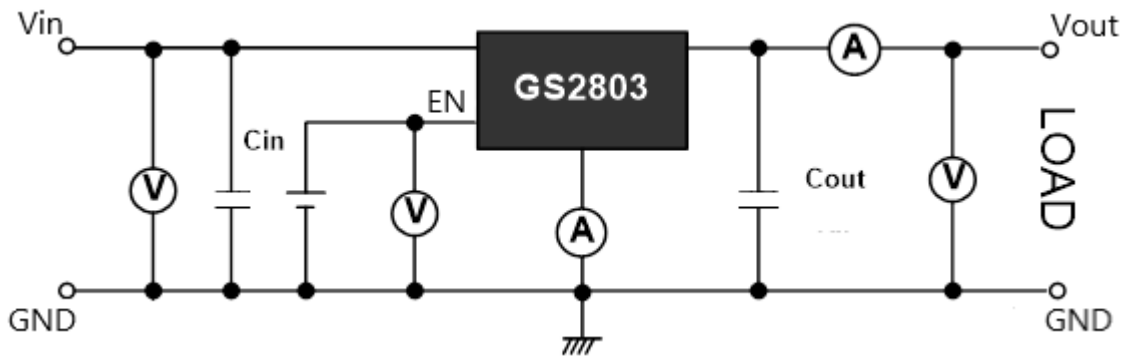
Typical Applications



C_{IN} : $0.1\mu F$ or more. C_{OUT} : $0.1\mu F$ or more

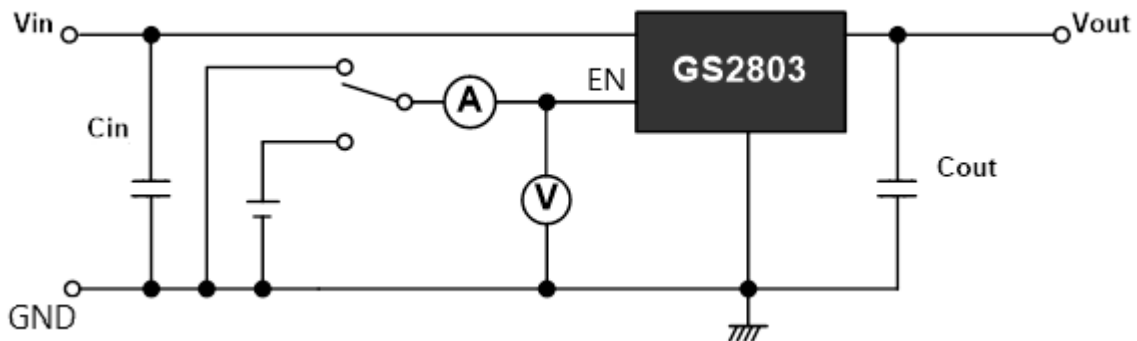
Test Circuit

Operating Function Test



C_{IN} : $0.1\mu F$ or more. C_{OUT} : $0.1\mu F$ or more

Enable Function Test



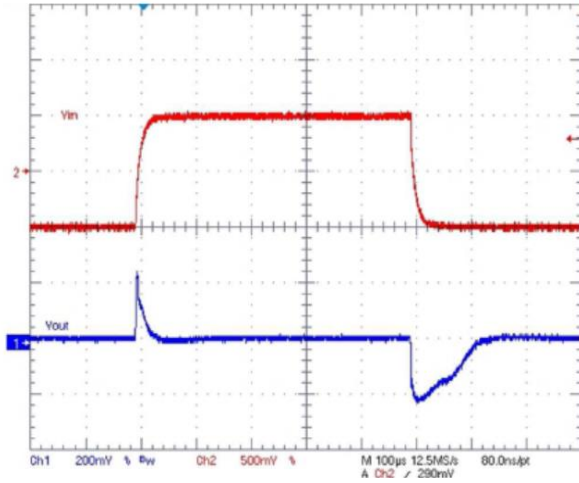
C_{IN} : $0.1\mu F$ or more. C_{OUT} : $0.1\mu F$ or more

Typical Performance Characteristics

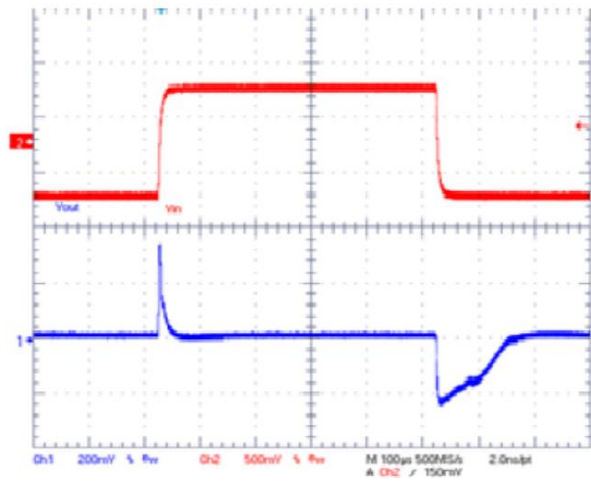
Line Transient response characteristics ($T_A=25^\circ\text{C}$)

$V_{out} = 1.0\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=3\text{mA}$, $V_{in}=2\text{V}\rightarrow 3\text{V}$

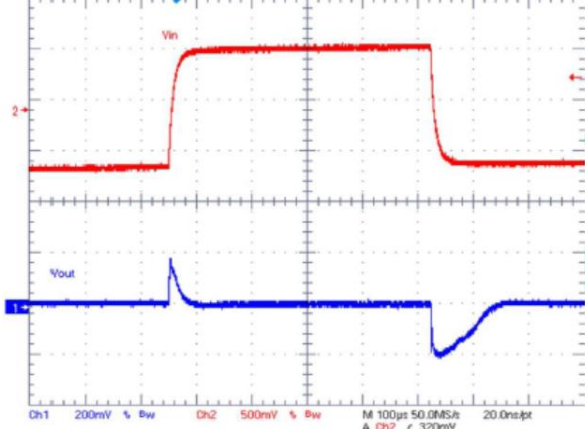


$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=100\text{mA}$, $V_{in}=2\text{V}\rightarrow 3\text{V}$

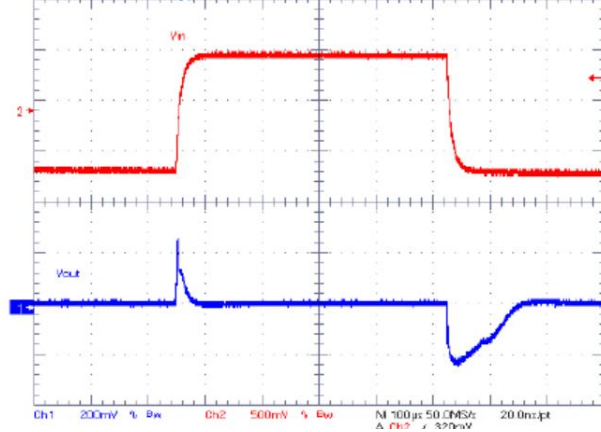


$V_{out} = 2.5\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=3\text{mA}$, $V_{in}=3.5\text{V}\rightarrow 4.5\text{V}$

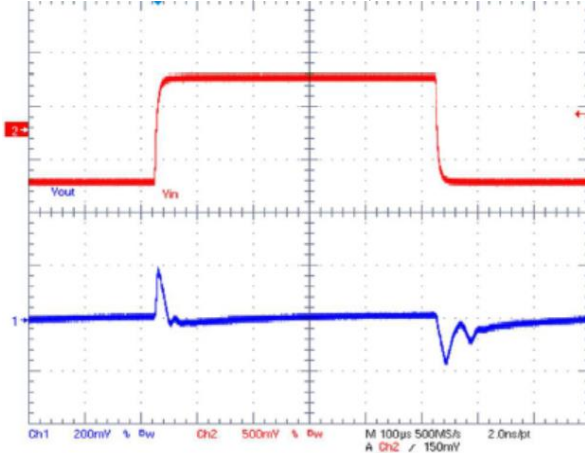


$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=100\text{mA}$, $V_{in}=3.5\text{V}\rightarrow 4.5\text{V}$

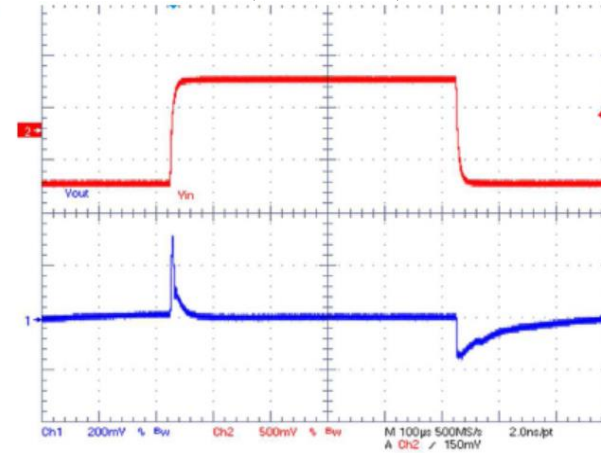


$V_{out} = 3.5\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=3\text{mA}$, $V_{in}=4.5\text{V}\rightarrow 5.5\text{V}$



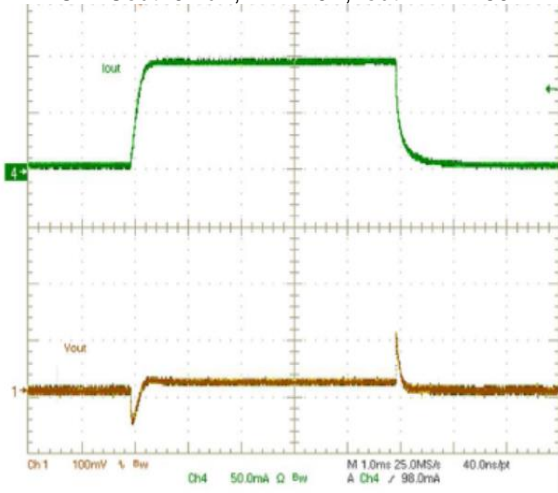
$C_{in}=C_{out}=0.1\mu\text{F}$, $I_{out}=100\text{mA}$, $V_{in}=4.5\text{V}\rightarrow 5.5\text{V}$



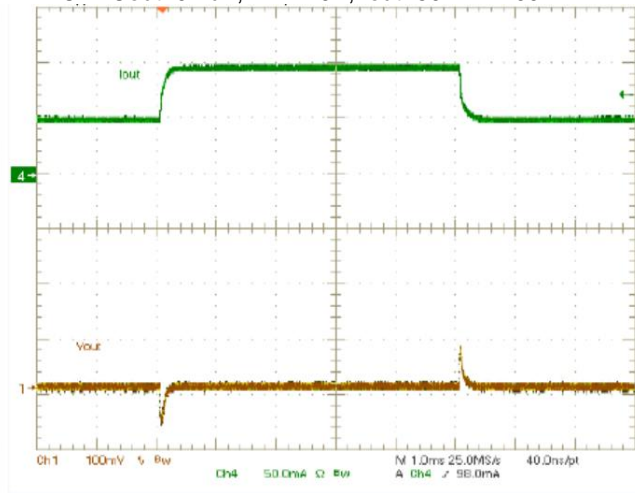
Load Transient response characteristics (T_A=25°C)

V_{out} = 1.0 V

C_{in}=C_{out}=0.1μF, V_{in}=2.0V, I_{out}=1mA→50mA

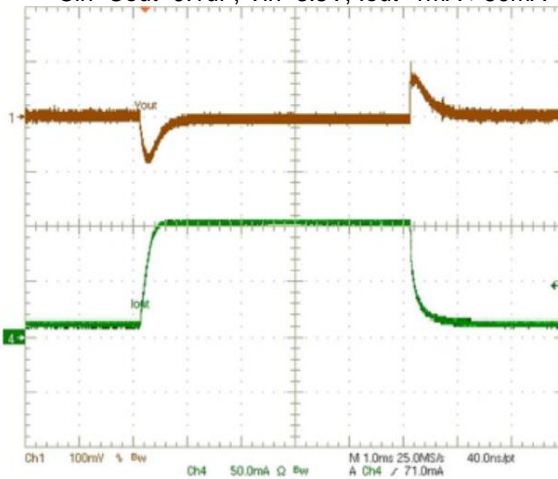


C_{in}=C_{out}=0.1μF, V_{in}=2.0V, I_{out}=50mA→100mA

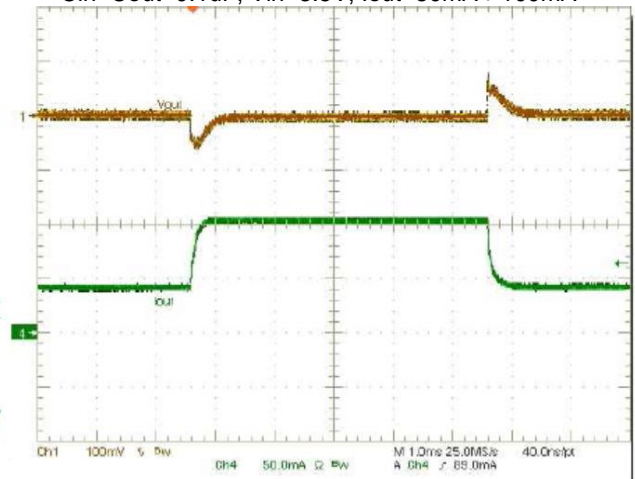


V_{out} = 2.5 V

C_{in}=C_{out}=0.1μF, V_{in}=3.5V, I_{out}=1mA→50mA

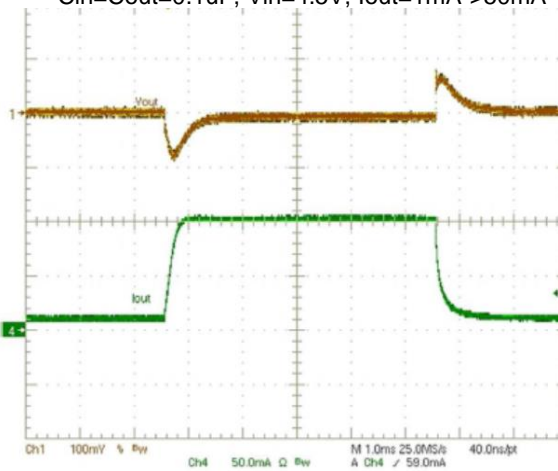


C_{in}=C_{out}=0.1μF, V_{in}=3.5V, I_{out}=50mA→100mA

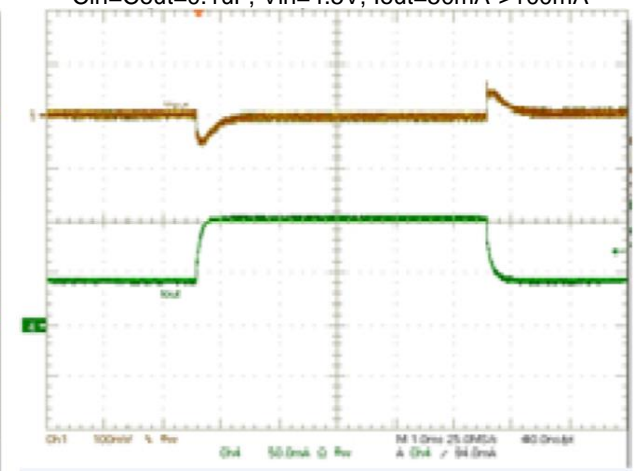


V_{out} = 3.5 V

C_{in}=C_{out}=0.1μF, V_{in}=4.5V, I_{out}=1mA→50mA



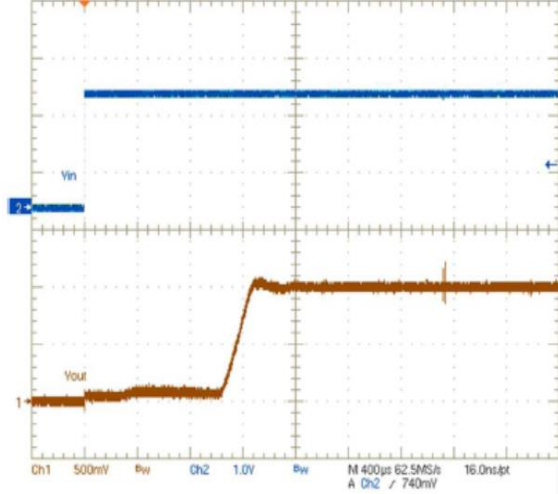
C_{in}=C_{out}=0.1μF, V_{in}=4.5V, I_{out}=50mA→100mA



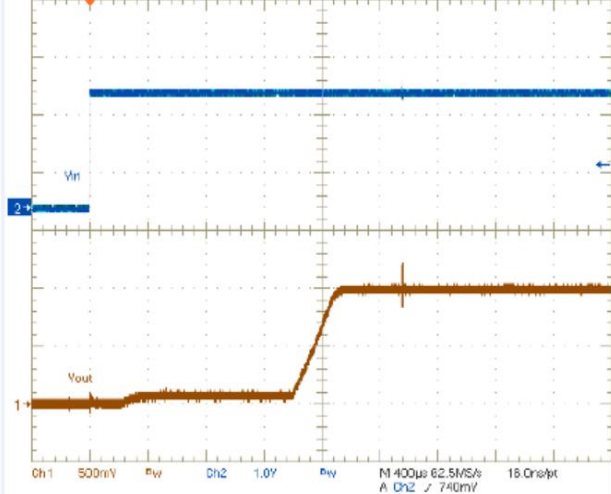
EN PIN Transient response characteristics (T_A=25°C)

V_{out} = 1.0 V

C_{in}=C_{out}=0.1μF, V_{in}=2.0V, V_{EN}=0V->2V, I_{out}=1mA

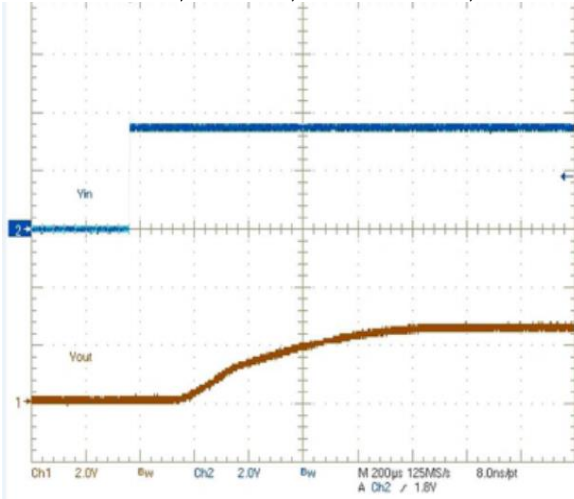


C_{in}=C_{out}=0.1μF, V_{in}=2.0V, V_{EN}=0V->2V, I_{out}=100mA

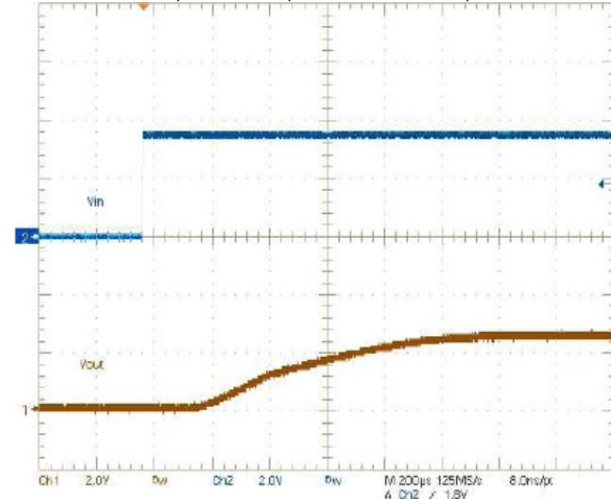


V_{out} = 2.5 V

C_{in}=C_{out}=0.1μF, V_{in}=3.5V, V_{EN}=0V->3.5V, I_{out}=1mA

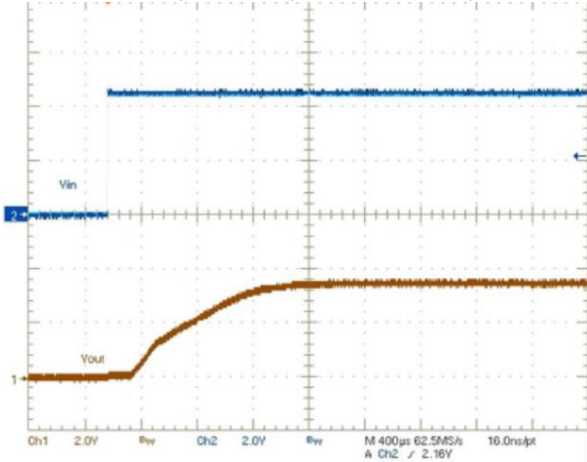


C_{in}=C_{out}=0.1μF, V_{in}=3.5V, V_{EN}=0V->3.5V, I_{out}=100mA

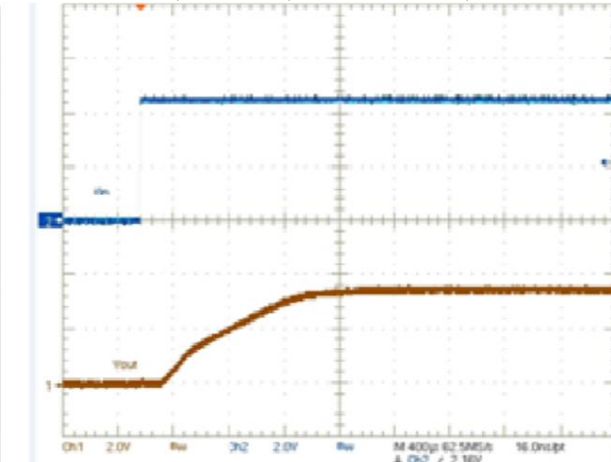


V_{out} = 3.5 V

C_{in}=C_{out}=0.1μF, V_{in}=4.5V, V_{EN}=0V->4.5V, I_{out}=1mA



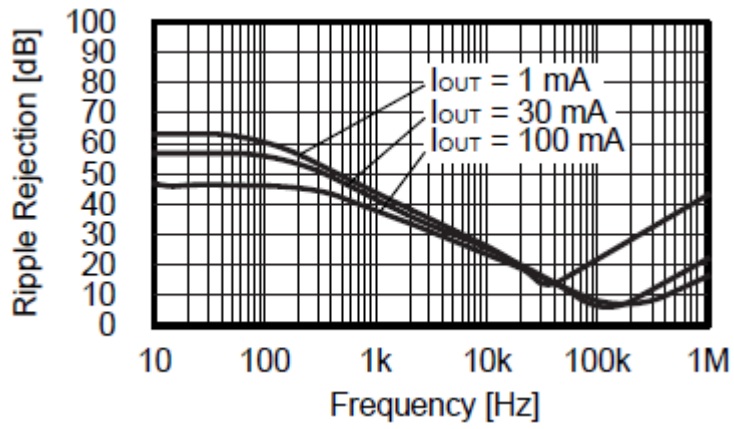
C_{in}=C_{out}=0.1μF, V_{in}=4.5V, V_{EN}=0V->4.5V, I_{out}=100mA



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

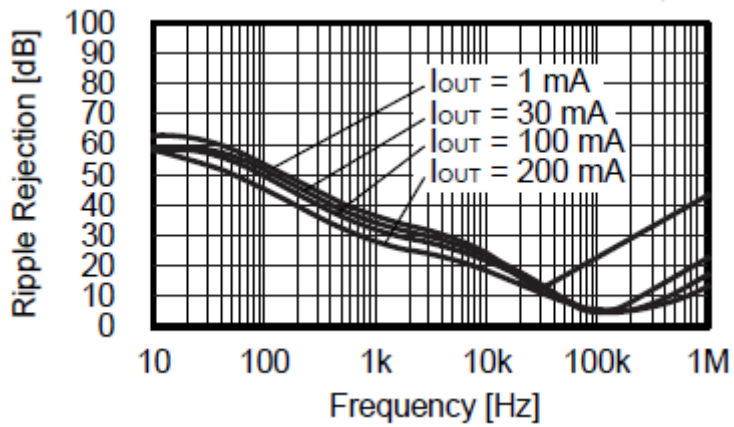
$V_{OUT} = 1.2\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $V_{in}=2.2\text{V}$, $I_{out}=1\text{mA}$, 30mA , 100mA



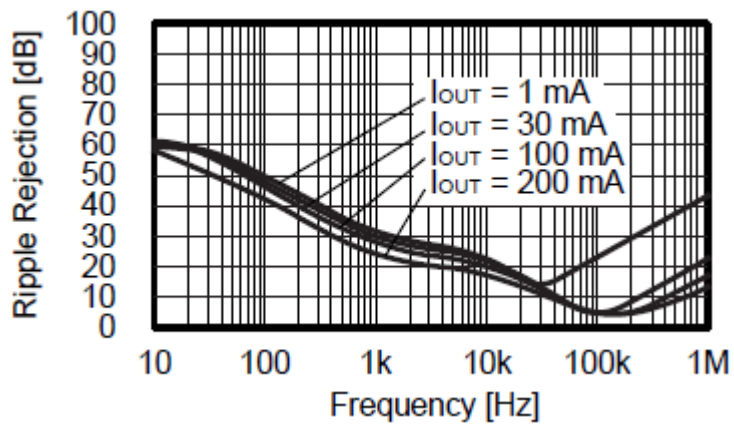
$V_{OUT} = 2.8\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $V_{in}=3.8\text{V}$, $I_{out}=1\text{mA}$, 30mA , 100mA , 200mA



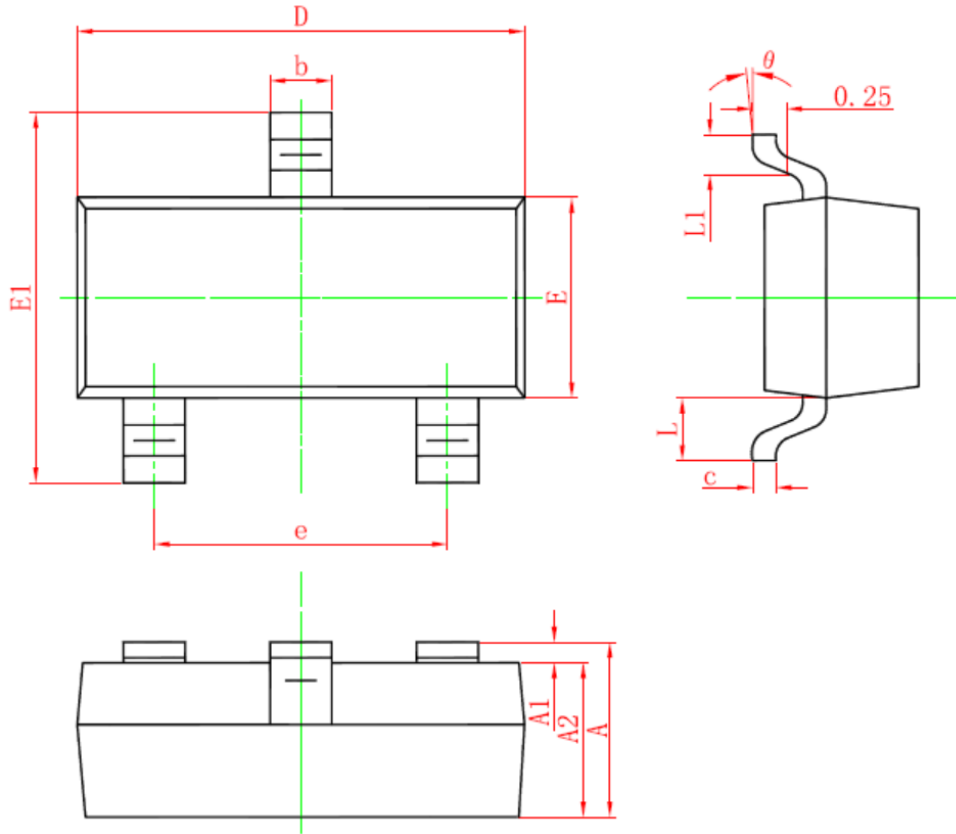
$V_{OUT} = 3.3\text{ V}$

$C_{in}=C_{out}=0.1\mu\text{F}$, $V_{in}=4.3\text{V}$, $I_{out}=1\text{mA}$, 30mA , 100mA , 200mA



Package Dimension

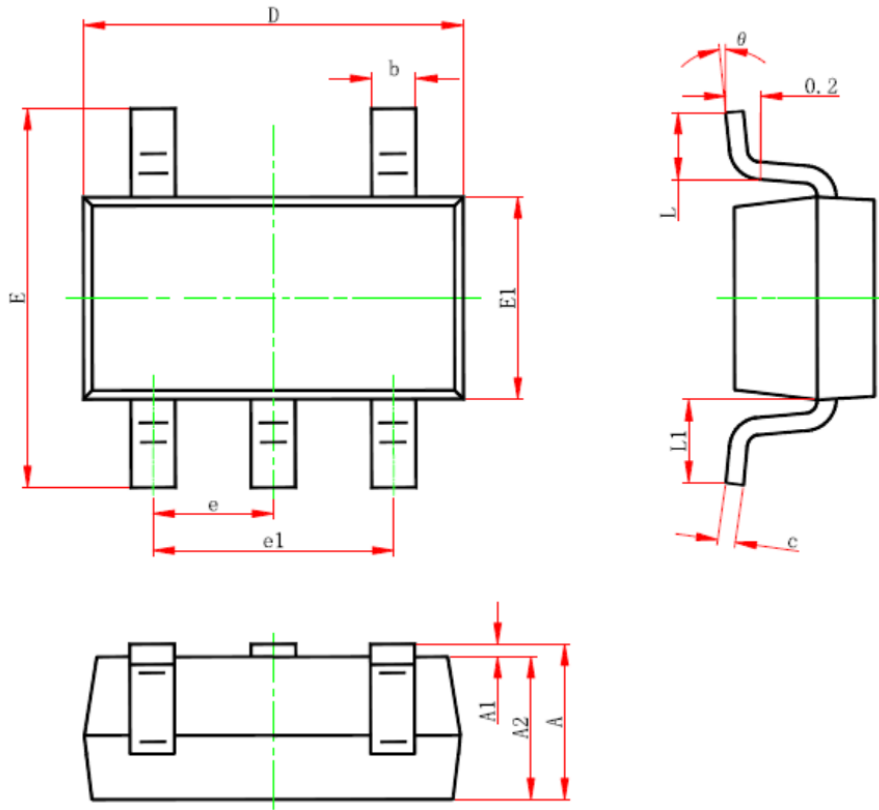
SOT-23



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.15	0.030	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.10	0.035	0.043
b	0.30	0.50	0.012	0.020
c	0.13	0.20	0.005	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	1.90 (TYP)		0.075 (TYP)	
L	0.55 (TYP)		0.022 (TYP)	
L1	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

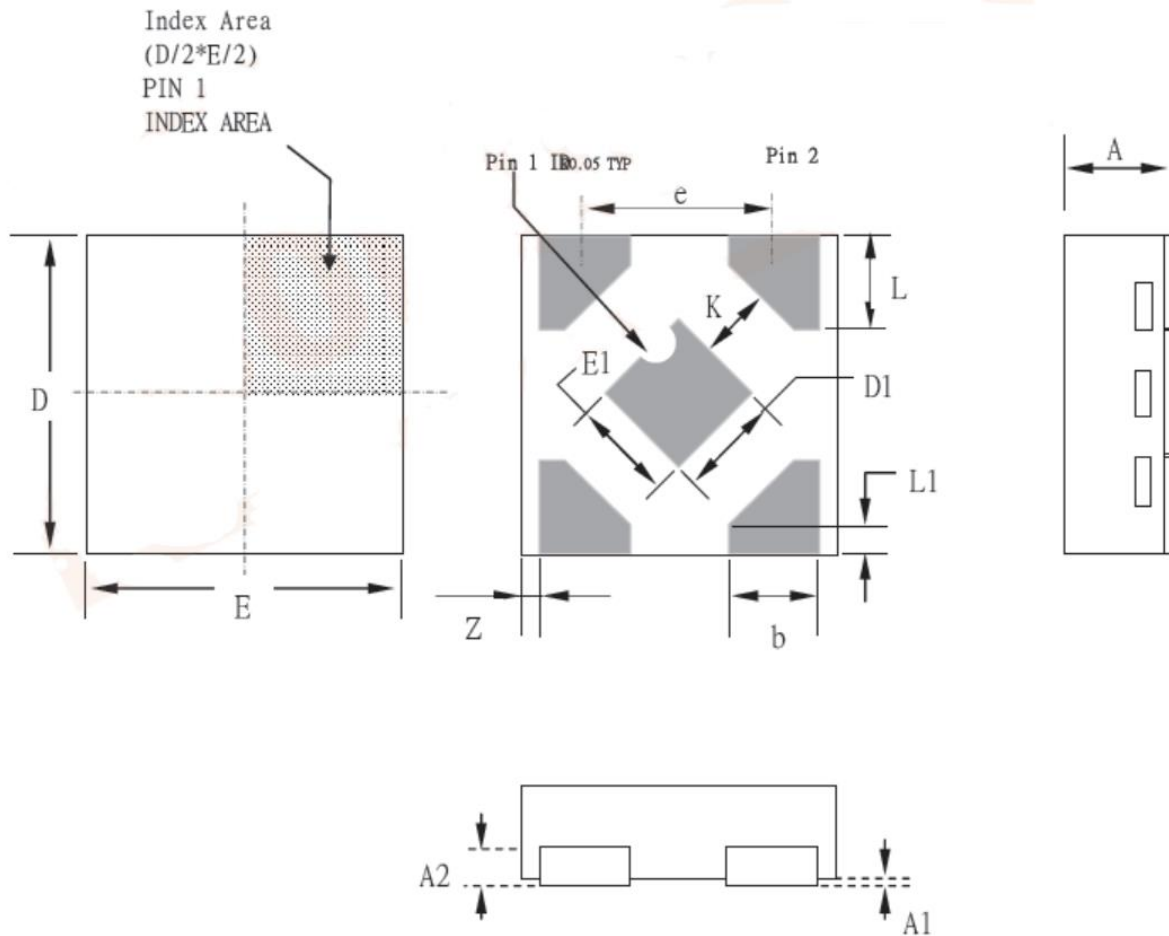
SOT-23-5L



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.05	1.25	0.041	0.049
A1	0.00	0.10	0.000	0.004
A2	1.05	1.15	0.041	0.045
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.82	3.02	0.111	0.119
E	2.65	2.95	0.104	0.116
E1	1.50	1.70	0.059	0.067
e	0.95 (TYP)		0.037 (TYP)	
e1	1.90 (TYP)		0.075 (TYP)	
L	0.30	0.60	0.012	0.024
L1	0.60 (TYP)		0.024 (TYP)	
θ	0°	8°	0°	8°

DFN1x1-4L







Dimensions



SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.400	0.450	0.015	0.018
A1	0.000	0.040	0.000	0.002
A2	0.130MAX.		0.005MAX.	
D	0.950	1.050	0.037	0.041
E	0.950	1.050	0.037	0.041
E1	0.430	0.530	0.017	0.021
D1	0.430	0.530	0.017	0.021
b	0.200	0.300	0.007	0.011
k	0.200MIN.		0.007MIN.	
e	0.650TYP.		0.026TYP.	
L	0.200	0.300	0.007	0.011
L1	0.020	0.120	0.001	0.005
Z	0.05MAX.		0.002MAX.	

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