GS2710 Series

70V Low-Power CMOS LDO

Product Description

The GS2710 series is a group 70V high accuracy LDO regulator. The 3.0μA power consumption makes it ideal for most HV power-saving systems. The maximum operating voltage can be as high as 70V. The GS2710 can deliver 100mA output current.

The other features include the current limiting protection, short circuit protection and thermal shutdown protection.

The GS2710 is available in PSOP-8, DFN2x2-6L(A), SOT89-3L and TO-252-2L packages.

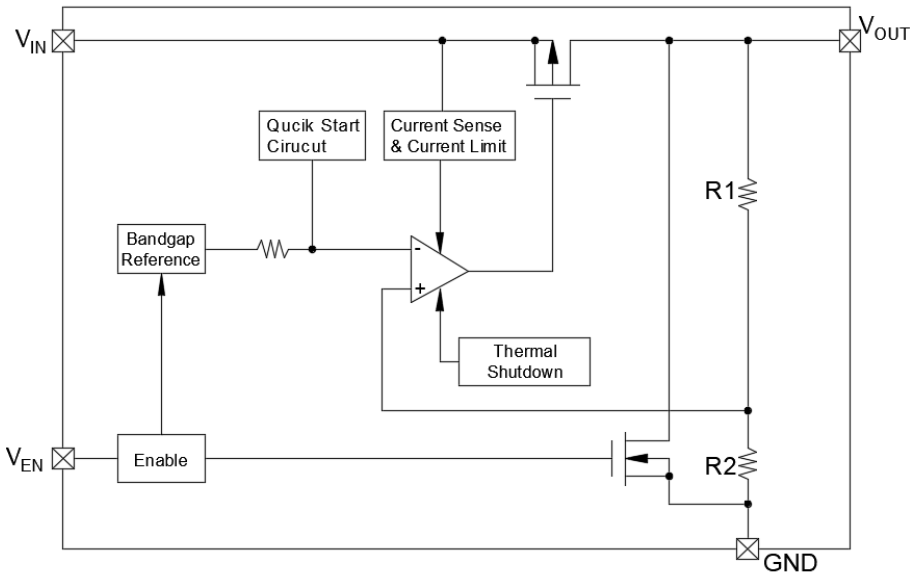
Features

- Low Power Consumption: 3.0μA
- Operating Voltage Range: from 3.5V to 70V
- Output Voltage Range: from 1.5V to 18V
- Output Current: 100mA
- Output Accuracy: ±1.0%
- High PSRR: 80dB@1kHz
- ESD Rating(HBM): ±2KV
- Low Temperature Coefficient
- Built-in Current Limiting, Short-Circuit and Over-Temperature Protection
- RoHS Compliant and Halogen Free

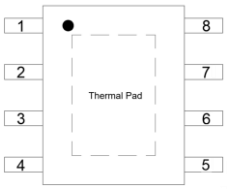
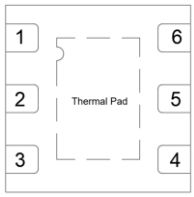
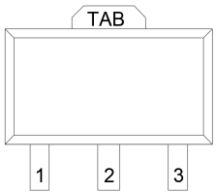
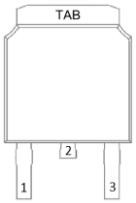
Applications

- Battery Supplied Systems
- Telecom Systems
- Portable Audio & Video Equipment
- Ultra-Low Power Microcontroller

Functional Block Diagram



Packages & Pin Assignments

PSOP-8L	DFN2x2-6L (A)	SOT-89-3L	TO-252-2L
 Top View	 Top View	 Top View	 Top View

Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol
1	V_{OUT}	**1**	V_{OUT}	**1**	V_{IN}	**1**	V_{IN}
2	NC	**2**	NC	**2**	GND	**2**	GND
3	NC	**3**	GND	**3**	V_{OUT}	**3**	V_{OUT}
4	GND	**4**	EN	**TAB**	GND	**TAB**	GND
5	EN	**5**	NC				
6	NC	6	V_{IN}				
7	NC						
8	V_{IN}						

Pin Name	Description
NC	No Connect.
EN	Chip Enable w/ High Voltage
GND	Ground Pin.
V_{IN}	Power Supply Input.
V_{OUT}	Output Pin.
Thermal Pad	Connecting the thermal pad underneath the package of PSOP-8L or DFN2x2-6L (A) to a large area ground plane for improving thermal characteristic.

Ordering and Marking Information

Ordering Information					
PSOP-8L	**DFN2x2-6L(A)**	**SOT-89-3L**	**TO-252-2L**	**Marking**	**Output Voltage**
GS2710PS15F	GS2710NA15F	GS2710Y15F	GS2710D15F	LW6715 □□□□□	1.5V
GS2710PS18F	GS2710NA18F	GS2710Y18F	GS2710D18F	LW6718 □□□□□	1.8V
GS2710PS25F	GS2710NA25F	GS2710Y25F	GS2710D25F	LW6725 □□□□□	2.5V
GS2710PS33F.	GS2710NA33F	GS2710Y33F.	GS2710D33F	LW6733 □□□□□	3.3V
GS2710PS50F	GS2710NA50F	GS2710Y50F.	GS2710D50F	LW6750 □□□□□	5.0V
GS2710PS90F.	GS2710NA90F	GS2710Y90F.	GS2710D90F.	LW6790 □□□□□	9.0V
GS2710PSA2F.	GS2710NAA2F	GS2710YA2F.	GS2710DA2F.	LW67A2 □□□□□	12V
GS2710PSA8F	GS2710NAA8F	GS2710YA8F.	GS2710DA8F	LW67A8 □□□□□	18V

GS2710 1 2 3 4 5

Product Code:
GS2710

Package Code:
1 2 is PS, NA, Y and D
- **PS** is PSOP-8
- **NA** is DFN2x2-6L(A)
- **Y** is SOT-89-3L
- **D** is TO-252-2L

Voltage Code:
3 4 is 15,18, 25 and so on.
- 15 for 1.5V, 18 for 1.8V, 25 for 2,5V and so on.

Green Level:
5 is F stands for RoHS Compliant and Halogen Free

NOTE:
Please contact the sales window if 3.0V, 3.6V and 4.0V are required.

Marking Information

LW67 1 1
2 2 2 2 2

Product Code:
- LW67

Voltage Code:
1 1 is 15, 18, 25 and so on.
- 15 for 1.8V
- 18 for 1.8V
- 25 for 2.5V

GS Code:
2 2 2 2 2 is GS Code

Absolute Maximum Ratings (1)

Symbol	Parameter		Rating	Units
V_{IN}	Supply Voltage		-0.3 ~ 80	V
V_{EN}	EN pin to GND Voltage		-0.3 ~ 80	V
V_{OUT}	V_{OUT} pin to GND Voltage		-0.3 ~ 18	V
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance (3)	PSOP-8L	45	℃/W
		DFN2x2-6L(A)	60	
		SOT-89-3L	53	
		TO-252-2L	35	
T_J	Junction Temperature Range		-40 ~ 150	℃
T_{STG}	Storage Temperature Range		-40 ~ 150	℃
T_{SOLDER}	Lead Temperature (Soldering)		260℃, 10s	
$V_{(ESD)}$	ESD Susceptibility, Human-Body Model (2)		±2000	V

NOTE:

1. Absolute Maximum Ratings are threshold limit values that must not be exceeded even for an instant under any condition. Moreover, such values for any two items must not be reached simultaneously. Operation above these absolute maximum ratings may cause degradation or permanent damage to the device. These are stress ratings only and do not necessarily imply functional operation below these limits.
2. Per ANSI/ESDA/JEDEC JS-001
3. Device mounted on FR-4 PCB

Recommended Operating Range

Symbol	Item	Rating	Unit
V_{IN}	V_{IN} Supply Voltage	3.5 ~ 70	V
V_{EN}	EN Pin Voltage	0 ~ 70	V
V_{OUT}	V_{OUT} Pin Voltage	1.5 ~ 18	V
I_{OUT}	Output Current	0 ~ 100	mA
T_J	Junction Temperature Range	-40 ~ 125	℃

Electrical Characteristics

(V_{IN}=V_{OUT}+1V or 2V, whichever is greater, V_{OUT} =3.3V, C_{IN}=C_{OUT}=1μF, T_A =25℃, unless otherwise specified.)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{IN}	Input Voltage			3.5		70	V
V_{OUT}	Output Accuracy	I_{OUT}= 1mA		-1.0		+1.0	%
I_{LIM}	Current Limit	V_{OUT} =3.3V		100	150		mA
I_Q	Quiescent Current	V_{IN}= V_{EN}= V_{OUT} +1V, No Load			3.0	5.0	μA
I_{SD}	Shutdown Current	V_{EN}=0V			0.35	1.0	μA
V_{DROP}	Dropout Voltage (1)	I_{OUT} =10mA, V_{OUT} =3.3V			70		mV
		I_{OUT} =50mA, V_{OUT} =3.3V			330		
		I_{OUT} =100mA, V_{OUT} 3.3V			700		
R_{LINE}	Line Regulation	V_{IN}= V_{OUT} +1V to 70V, I_{OUT}=1mA			0.01	0.02	%/V
R_{LOAD}	Load Regulation	V_{IN}= V_{OUT} +1V, 1mA ≤ I_{OUT} ≤ 100mA			0.015	0.03	%/mA
I_{SHORT}	Short Current	V_{OUT} =0V			15		mA
V_{ENH}	EN High Voltage	V_{IN}=3.5V to 70V, I_{OUT}=1mA		1.5			V
V_{ENL}	EN Low Voltage					0.5	V
PSRR	Power Supply Rejection Ratio	V_{IN}= 4.3V, V_{PP}=0.5V C_{IN} =None, I_{OUT}=10mA	f=217Hz		81		dB
			f=1KHz		80		
			f=10KHz		77		
			f=100KHz		58		
T_{SD}	Overheat Protection	Temperature rising			160		℃
ΔT_{SD}	T_{SD} Hysteresis	Temperature falling			25		℃
R_{DSCHG}	R_{ON} of V_{OUT} Discharge MOSFET	V_{IN}= 4.3V, V_{EN}=0V			80		Ω

Note：

1. The dropout voltage is defined as V_{IN} - V_{OUT}, when V_{OUT} =95%*$V_{OUT(NOM)}$

Typical Performance Characteristics (T_A =25℃, unless otherwise specified)

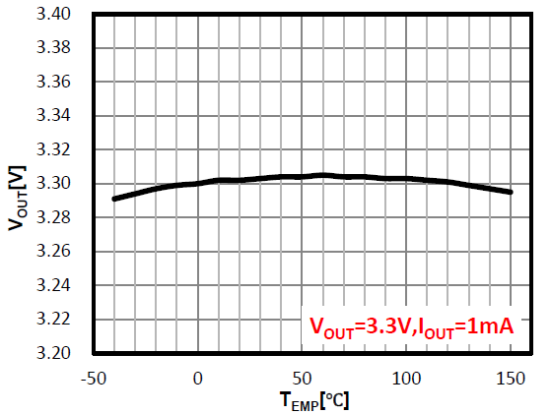


Figure 1. V_{OUT} vs Temperature

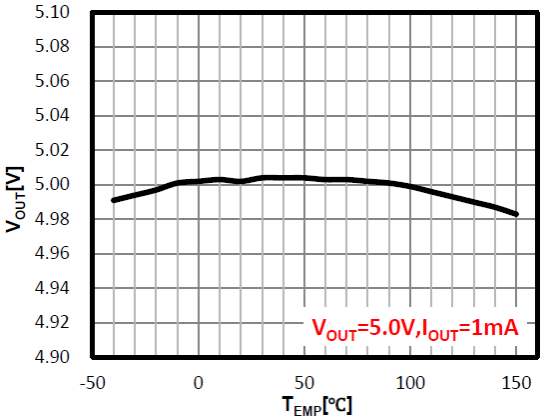


Figure 2. V_{OUT} vs Temperature

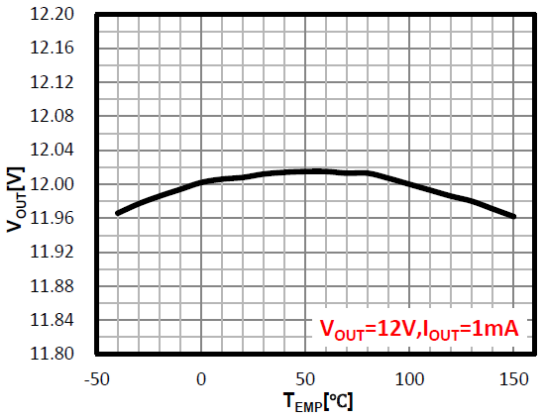


Figure 3. V_{OUT} vs Temperature

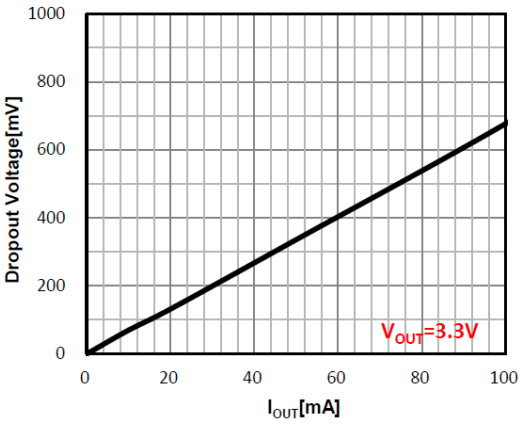


Figure 4. Dropout Voltage VS I_{OUT}

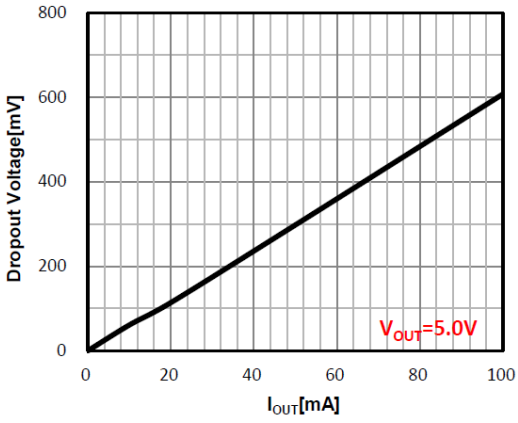


Figure 5. Dropout Voltage VS I_{OUT}

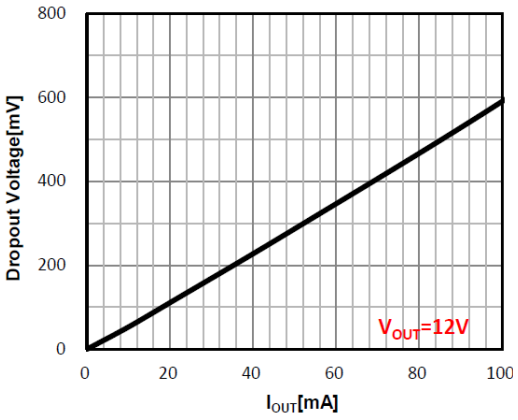


Figure 6. Dropout Voltage VS I_{OUT}

Typical Performance Characteristics (Continued)

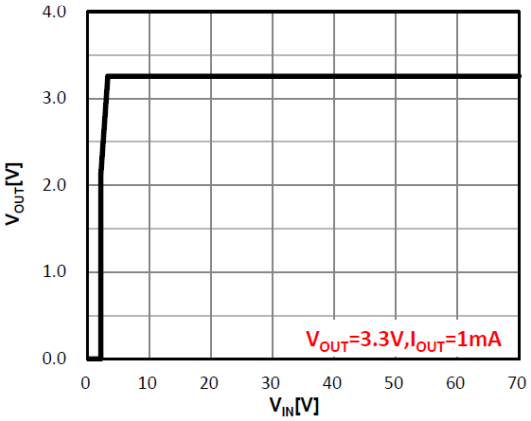


Figure 7. V_{OUT} vs V_{IN}

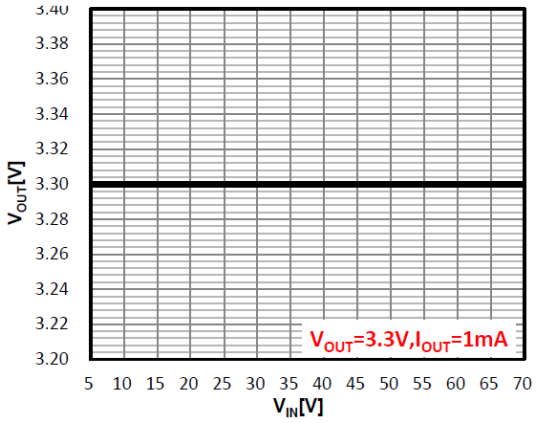


Figure 8. Line Regulation

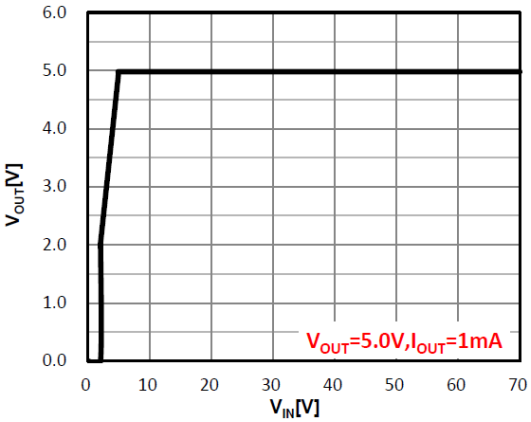


Figure 9. V_{OUT} vs V_{IN}

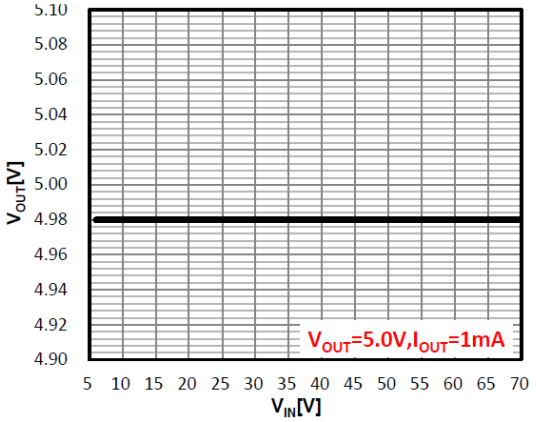


Figure 10. Line Regulation

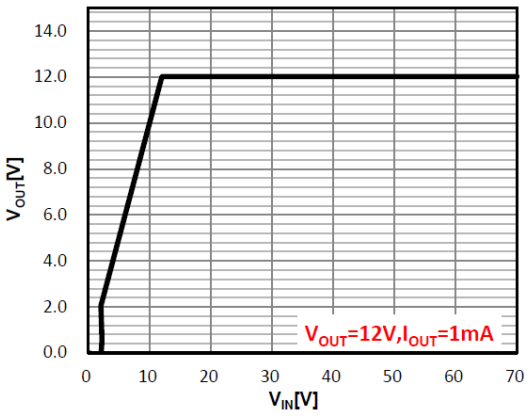


Figure 11. V_{OUT} vs V_{IN}

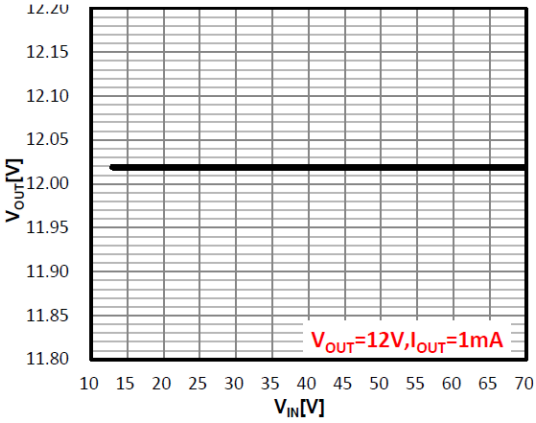
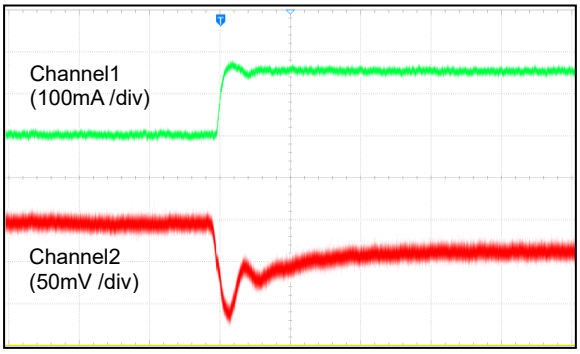


Figure 12. Line Regulation

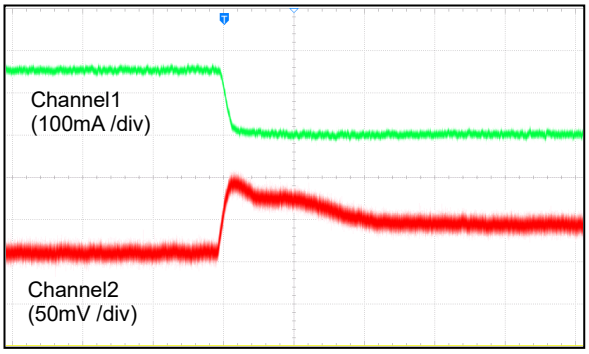
Typical Performance Characteristics (Continued)



Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=4.3V, V_{OUT}=3.3V

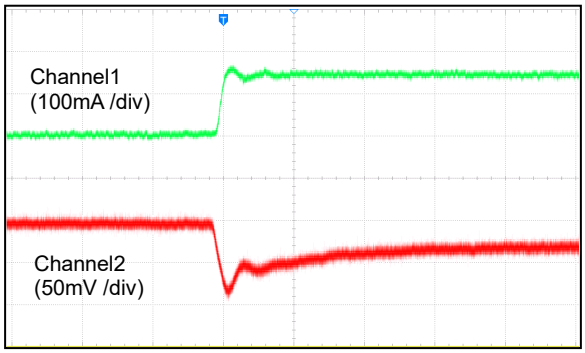
Figure 13. Load Transient (1 mA to 150 mA)



Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=4.3V, V_{OUT}=3.3V

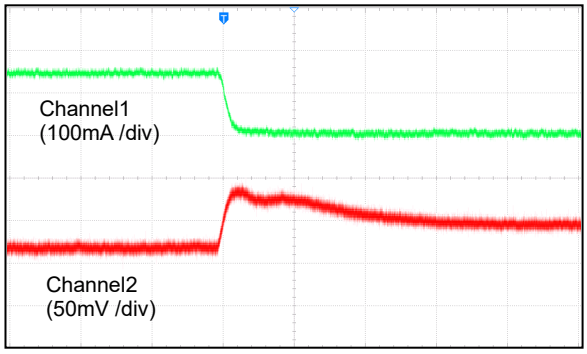
Figure 14. Load Transient (150 mA to 1 mA)



Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=6.0V, V_{OUT}=5.0V

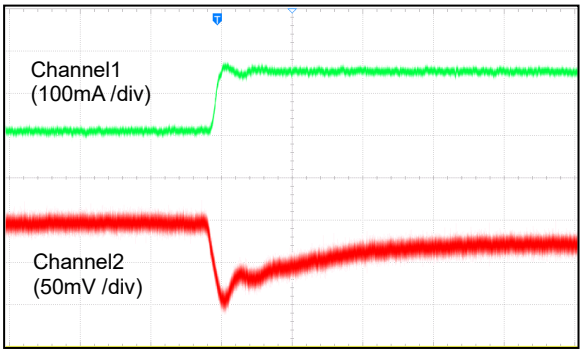
Figure 15. Load Transient (1 mA to 150 mA)



Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=6.0V, V_{OUT}=5.0V

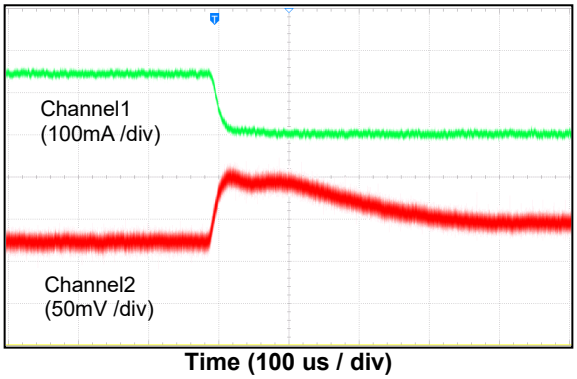
Figure 16. Load Transient (150 mA to 1 mA)



Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=13V, V_{OUT}=12V

Figure 17. Load Transient (1 mA to 150 mA)

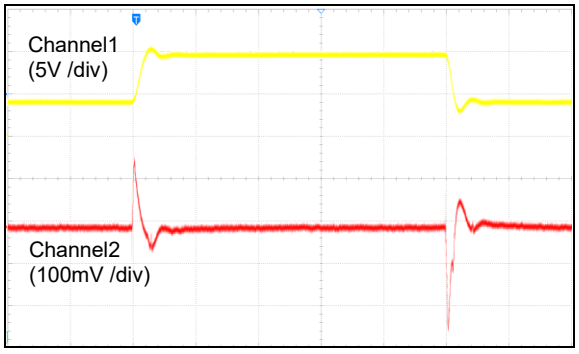


Time (100 us / div)

Channel1=I_{OUT}, Channel2=V_{OUT}, V_{IN}=13V, V_{OUT}=12V

Figure 18. Load Transient (150 mA to 1 mA)

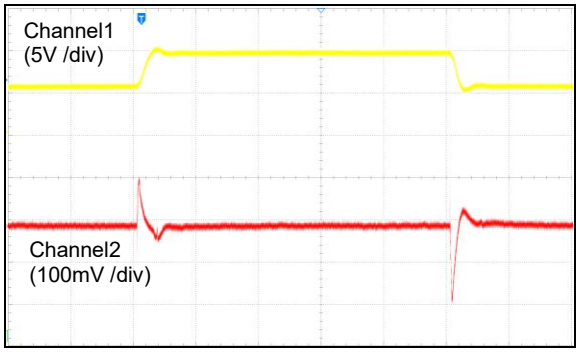
Typical Performance Characteristics (Continued)



Time (20 us / div)

Channel1=V_{IN}, Channel2=V_{OUT}, V_{IN}=4.3V→10V, t_r=t_f=5us, V_{OUT}=3.3V

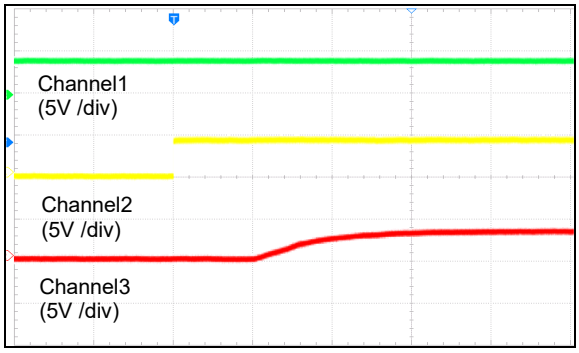
Figure 19. Line Transient



Time (20 us / div)

Channel1=V_{IN},Channel2=V_{OUT},V_{IN}=6.0V→10V, t_r=t_f=5us,V_{OUT}=5.0V

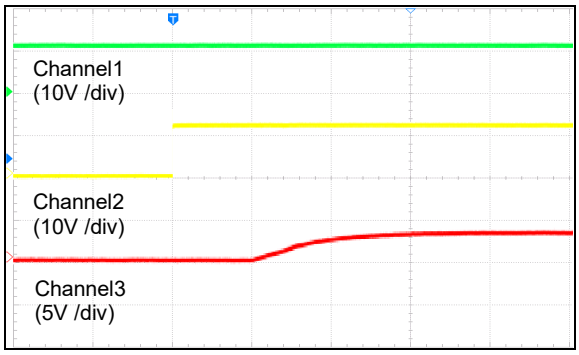
Figure 20. Line Transient



Time (200 us / div)

Channel1=V_{IN}, Channel2=EN, Channel3=V_{OUT}, V_{IN}=4.3V, EN=0→4.3V, V_{OUT}=3.3V, No Load

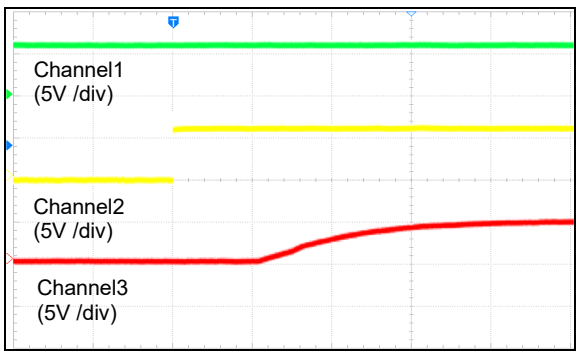
Figure 21. Power-Up with Enable



Time (200 us / div)

Channel1=V_{IN}, Channel2=EN, Channel3=V_{OUT}, V_{IN}=12V, EN=0→12V,V_{OUT}=3.3V,No Load

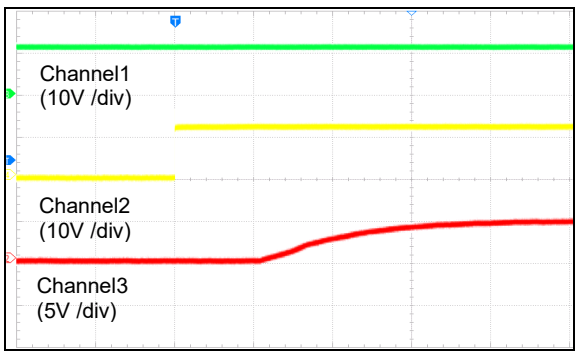
Figure 22. Power-Up with Enable



Time (200 us / div)

Channel1=V_{IN}, Channel2=EN, Channel3=V_{OUT}, V_{IN}=6V,EN=0→6V, V_{OUT}=5.0V, No Load

Figure 23. Power-Up with Enable

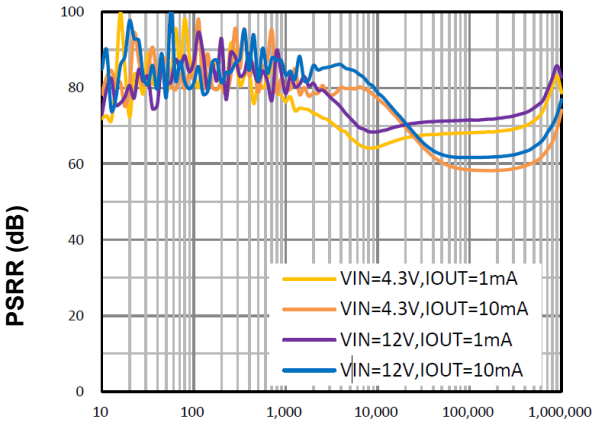


Time (200 us / div)

Channel1=V_{IN}, Channel2=EN, Channel3=V_{OUT}, V_{IN}=12V,EN=0→12V, V_{OUT}=5.0V, No Load

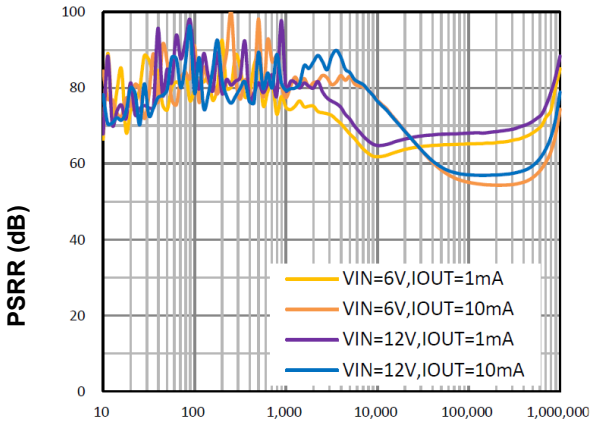
Figure 24. Power-Up with Enable

Typical Performance Characteristics (Continued)



V_{OUT}=3.3V, V_{PP}=0.5V, C_{IN}=non, C_{OUT}=1uF

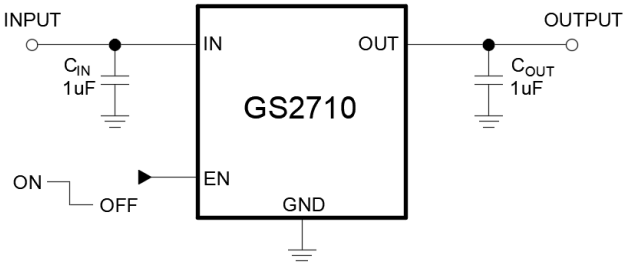
Figure 25. PSRR vs Frequency

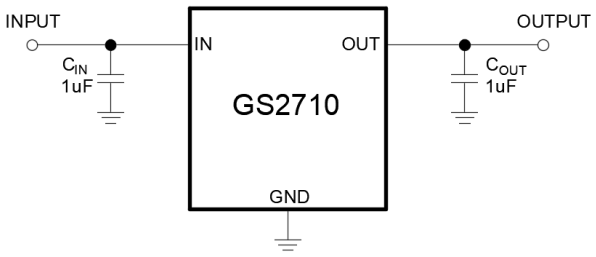


V_{OUT}=5.0V, V_{PP}=0.5V, C_{IN}=non, C_{OUT}=1uF

Figure 26. PSRR vs Frequency

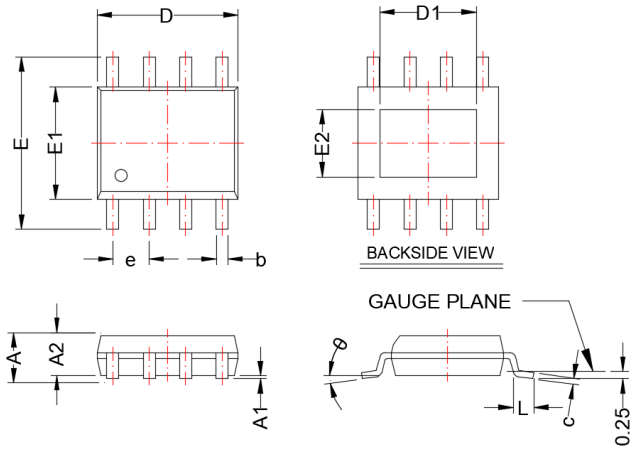
Typical Application Circuit



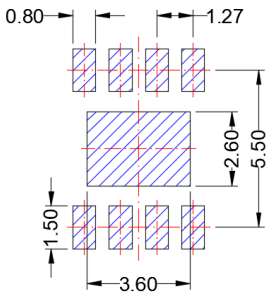


PSOP-8L

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions

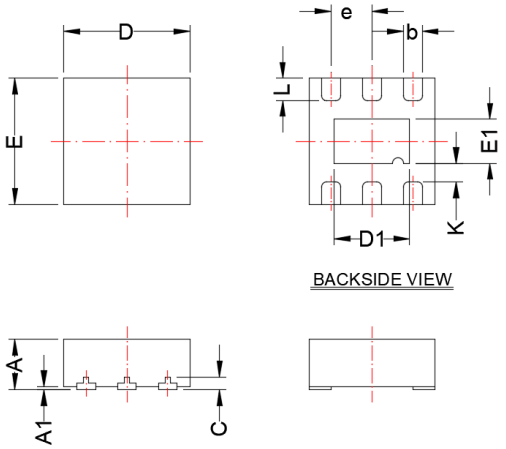
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	---	1.75	---	0.069
A1	0.04	0.18	0.002	0.007
A2	1.25	---	0.049	---
b	0.31	0.51	0.012	0.020
c	0.10	0.25	0.004	0.010
D	4.70	5.10	0.185	0.201
D1	1.50	---	0.059	---
E	5.80	6.20	0.228	0.244
E1	3.70	4.10	0.146	0.161
E2	1.00	---	0.039	---
e	1.27 BSC		0.050 BSC	
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

NOTE:

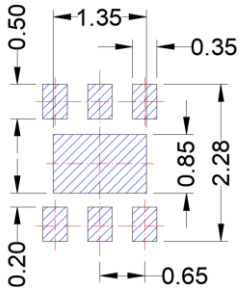
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

DFN2x2-6L(A)

Package Dimension



Recommended Land Pattern



Unit:mm

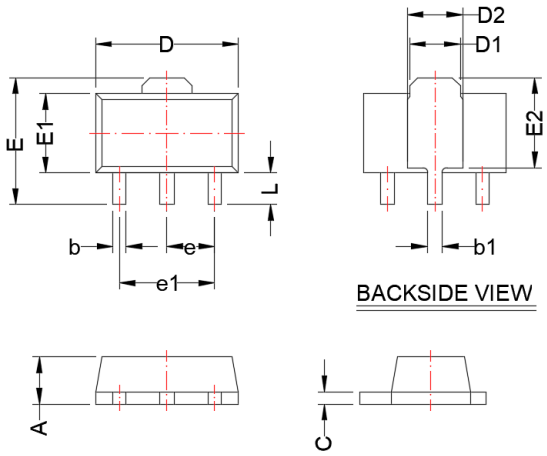
Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.70	0.80	0.028	0.031
A1	0.00	0.05	0.000	0.002
b	0.20	0.30	0.008	0.012
c	0.203 REF		0.008 REF	
D	1.95	2.05	0.077	0.081
D1	1.20	1.40	0.047	0.055
E	1.95	2.05	0.077	0.081
E1	0.70	0.90	0.028	0.035
e	0.65 BSC		0.026 BSC	
L	0.30	0.40	0.012	0.016
K	0.20 Min.		0.008 Min.	

NOTE:

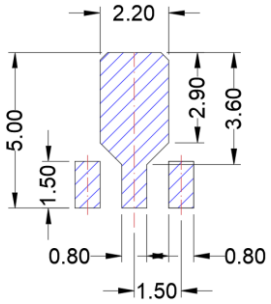
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-89-3L

Package Dimension



Recommended Land Pattern



Unit:mm

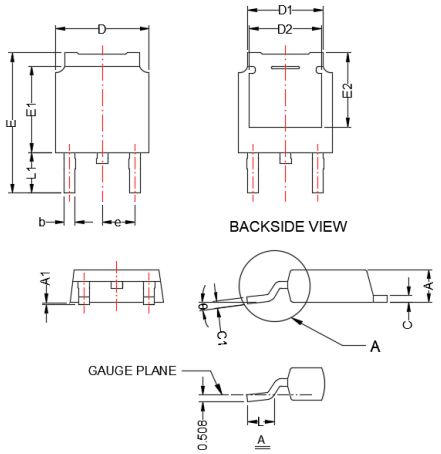
Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.40	1.60	0.055	0.063
b	0.30	0.55	0.012	0.022
b1	0.40	0.60	0.016	0.024
c	0.35	0.44	0.014	0.017
D	4.40	4.60	0.173	0.181
D1	1.40	1.83	0.055	0.072
D2	1.75 REF		0.069 REF	
E	3.94	4.25	0.155	0.167
E1	2.30	2.60	0.091	0.102
E2	2.84 REF		0.112 REF	
e	1.50 BSC		0.059 BSC	
e1	3.00 BSC		0.118 BSC	
L	0.89	1.20	0.035	0.047

NOTE:

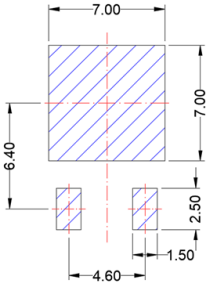
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

TO-252-2L

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.094
A1	0.00	0.15	0.000	0.006
b	0.64	0.90	0.025	0.035
c	0.40	0.89	0.016	0.035
c1	0.40	0.61	0.016	0.024
D	6.35	6.73	0.250	0.265
D1	4.95	5.46	0.195	0.215
D2	4.32	-	0.170	-
E	9.40	10.41	0.370	0.410
E1	5.97	6.22	0.235	0.245
E2	4.95	-	0.195	-
e	2.286 BSC		0.090 BSC	
L	1.40	1.77	0.055	0.070
L1	2.67	3.07	0.105	0.121
θ	0°	8°	0°	8°

NOTE:

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

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