ISL80510EVAL1Z Evaluation Board User Guide

Description

The ISL80510EVAL1Z provides a simple platform to evaluate performances of the ISL80510 and ISL80505. It comes with jumpers to provide an easy way to set popular output voltages.

The ISL80510 is a high performance, low voltage, high current, low dropout linear regulator specified at 1A. Rated for input voltages from 2.2V to 6V, the LDO can provide output voltages from 0.8V to 5.5V.

Specifications

This board has been configured and optimized for the following operating conditions:

- V_{IN} = 2.2 to 6V (ISL80510), 1.8V to 6V (ISL80505)
- V_{OUT} = 1V, 1.2V, 1.8V, 2.5V, 3.3V, or 5V (Jumper selectable)
- I_{MAX} = 1A (ISL80510), 500mA (ISL80505)

Key Features

- Small, compact design
- V_{IN} range of 2.2V to 6V (ISL80510), 1.8V to 6V (ISL80505)
- V_{OUT} adjustable from 0.8V to 5.5V
- Convenient power connection

References

ISL80510 datasheet

ISL80505 datasheet

Ordering Information

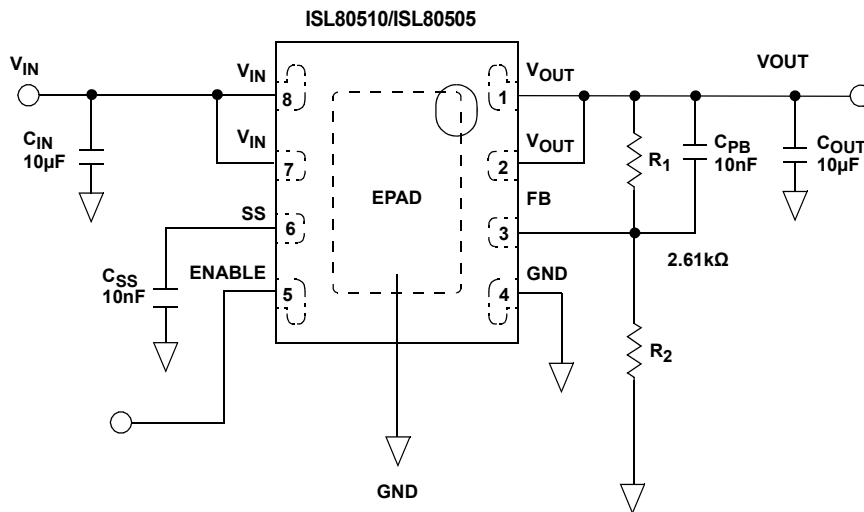| PART NUMBER	DESCRIPTION
ISL80510EVAL1Z	ISL80510 evaluation board

FIGURE 1. ISL80510EVAL1Z BLOCK DIAGRAM

NOTE: The ISL80505 is another high performance, low dropout linear regulator specified at 500mA in the same family as ISL80510. The ISL80505 is rated for input voltage from 1.8V to 6V and can provide output voltages from 0.8V to 5.5V. The ISL80505 is pin-to-pin compatible with ISL80510 and can simply replace ISL80510 on ISL80510EVAL1Z for evaluation. (For ISL80505 samples, please contact Intersil.)

Functional Description

The ISL80510EVAL1Z evaluation board provides a simple platform to demonstrate the features of the ISL80510 and ISL80505. The ISL80510EVAL1Z has a functionally optimized ISL80510/ISL80505 circuit layout that allows efficient operation up to the maximum output current.

The ISL80510EVAL1Z evaluation board is shown in Figures 2 and 3. The "ISL80510EVAL1Z Circuit Schematic" on page 4 shows the schematic, bill of materials and PCB layers for reference. Figure 7 through 16 show performance data taken using this hardware.

Operating Range

The board V_{IN} range is 2.2V to 6V (ISL80510) or 1.8V to 6V (ISL80505). The board V_{OUT} setting is set to 1.8V out of the box. The output voltage can be set be an external resistor divider network. The values of resistors R_1 and R_2 can be calculated by using Equation 1.

$$R_1 = R_2 \times \left(\frac{V_{OUT}}{0.5} - 1 \right)$$
(EQ. 1)

The output voltage can be easily changed to different voltage setting by jumpers from J1 through J6. Table 1 lists the output voltage options included in the ISL80510EVAL along with the corresponding jumper.

TABLE 1.

V_{OUT} (V)	R_1 (kΩ)	R_2 (kΩ)	JUMPER
1.0	2.61	2.61	J1
1.2	2.61	1.87	J2
1.8	2.61	1.00	J3
2.5	2.61	0.649	J4
3.3	2.61	0.464	J5
5.0	2.61	0.287	J6

PCB Layout Guidelines

A good PCB layout is important to achieve expected performance. Consideration should be taken when placing the components and routing the trace to minimize the ground impedance, and keep the parasitic inductance low. The input and output capacitors should have a good ground connection and be placed as close to the IC as possible. The 'FB' trace must be away from noisy planes and traces.

The large 2x3 via pattern under the ISL80510/ISL80505 is connected to a large ground copper plane on the bottom layer for effective thermal dissipation.

Quick Start Guide

1. Select the desired output voltage by shorting one of the jumpers from J1 through J6.
2. Connect the input supply to VIN and GND.
3. Connect the load to VOUT and GND.
4. Enable the IC using jumper JP1 and observe the output.
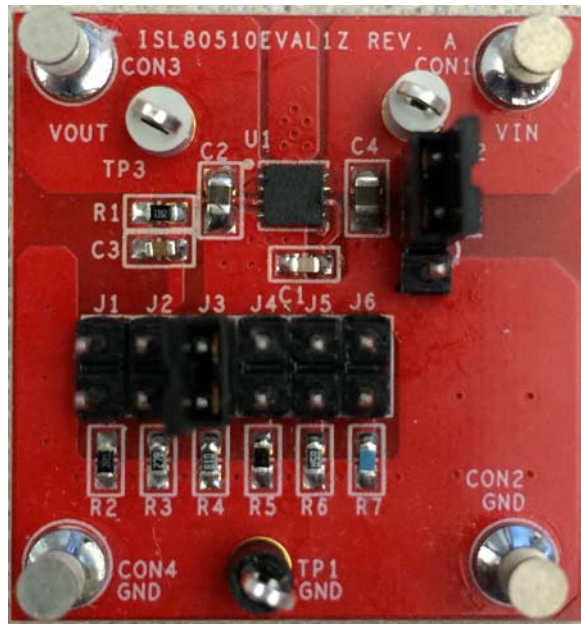
ISL80510EVAL1Z Evaluation Board

FIGURE 2. TOP SIDE

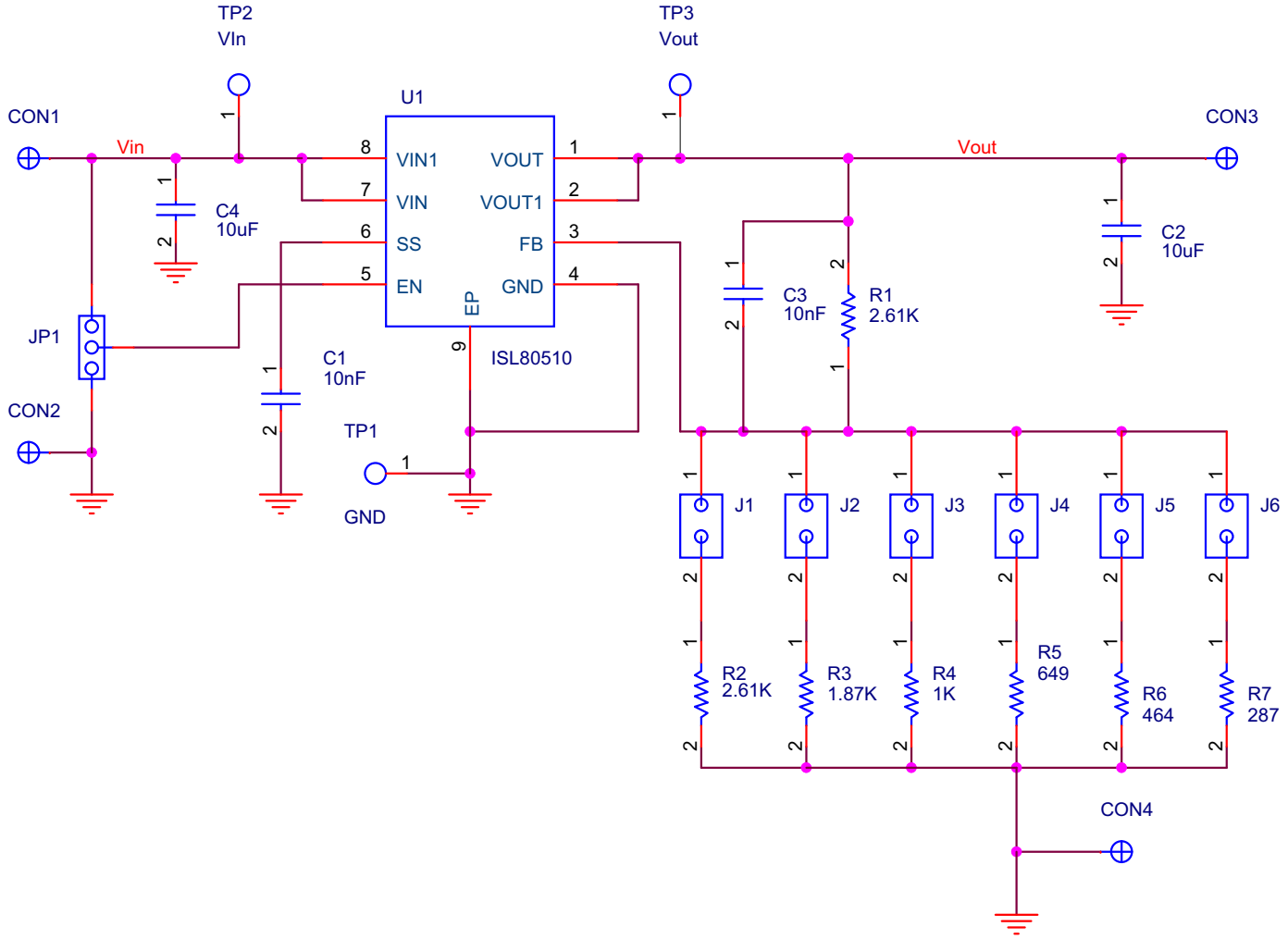**FIGURE 3. BOTTOM SIDE**

ISL80510EVAL1Z Circuit Schematic

FIGURE 4. ISL80510EVAL1Z SCHEMATIC

Bill of Materials

ITEM	QTY	REFERENCE DESIGNATOR	VALUE	TOL (%)	RATING	TYPE	PCB FOOTPRINT	MANUFACTURER	MANUFACTURER PART NUMBER
1	2	C1, C3	10nF	5	25V	NPO	SM0603	Various	
2	2	C4, C2	10µF	10	25V	X5R	SM0805	Various	
3	6	J1, J2, J3, J4, J5, J6	Header 1x2			Header		MOLEX	22-03-2021
4	1	JP1	Header 1x3			Header		MOLEX	22-03-2031
5	2	R1, R2	2.61k	1	100mW	THK FILM	SM0603	Various	
6	1	R3	1.87k	1	100mW	THK FILM	SM0603	Various	
7	1	R4	1k	1	100mW	THK FILM	SM0603	Various	
8	1	R5	649	1	100mW	THK FILM	SM0603	Various	
9	1	R6	464	1	100mW	THK FILM	SM0603	Various	
10	1	R7	287	1	100mW	THK FILM	SM0603	Various	
11	0	TP1, TP2, TP3	Do Not Populated			Test point			
12	1	U1	ISL80510				8 Ld 3x3 DFN	INTERSIL	ISL80510IRAJZ
13	4	CON1, CON2, CON3, CON4				Terminal	Turret	Keystone	1514-2

Board Layout - 2 Layers
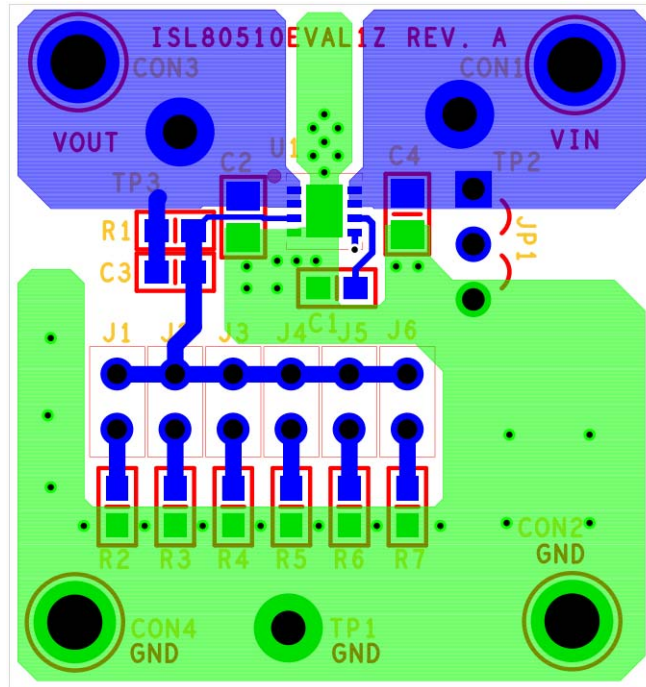
FIGURE 5. TOP LAYER
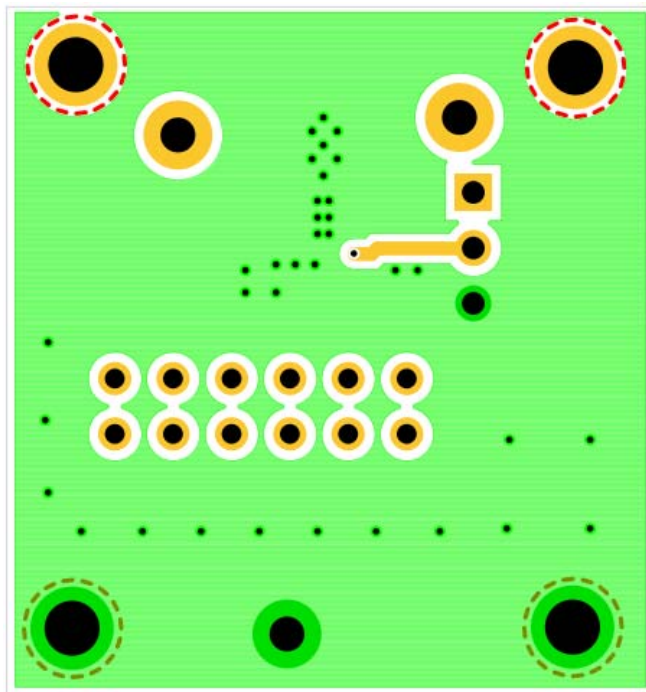
FIGURE 6. PCB – BOTTOM LAYER (VIEWED FROM TOP)

Typical Performance Curves Unless otherwise noted: V_{IN} = 2.2V, V_{OUT} = 1.8V, T_J = +25°C, I_L = 0A.
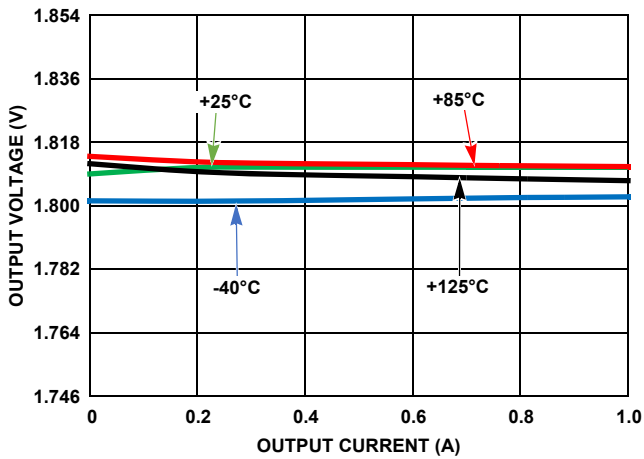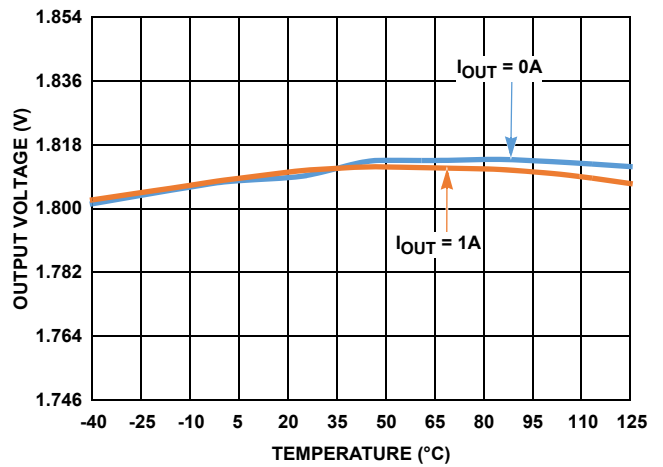

FIGURE 7. LOAD REGULATION
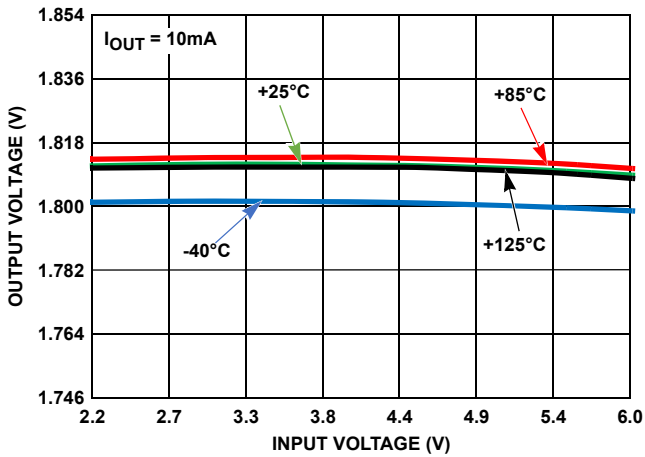

FIGURE 8. OUTPUT VOLTAGE vs TEMPERATURE
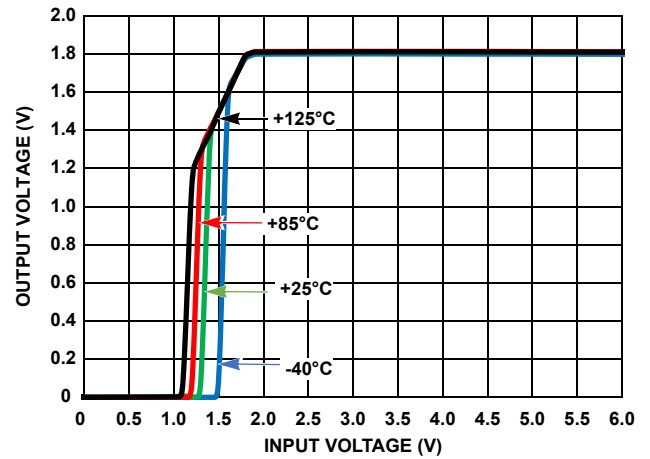

FIGURE 9. LINE REGULATION

FIGURE 10. OUTPUT VOLTAGE vs INPUT VOLTAGE
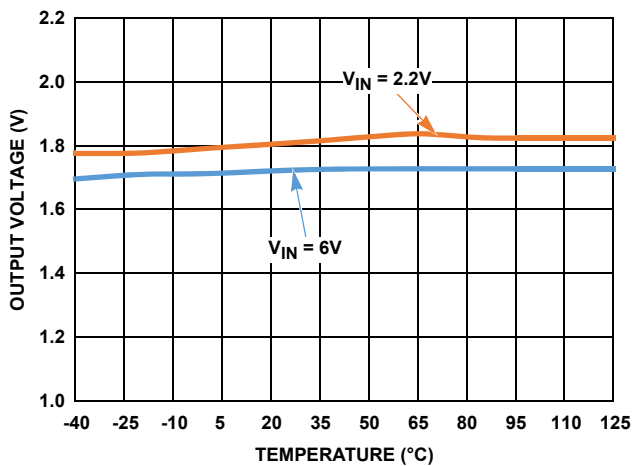
FIGURE 11. CURRENT LIMIT vs TEMPERATURE
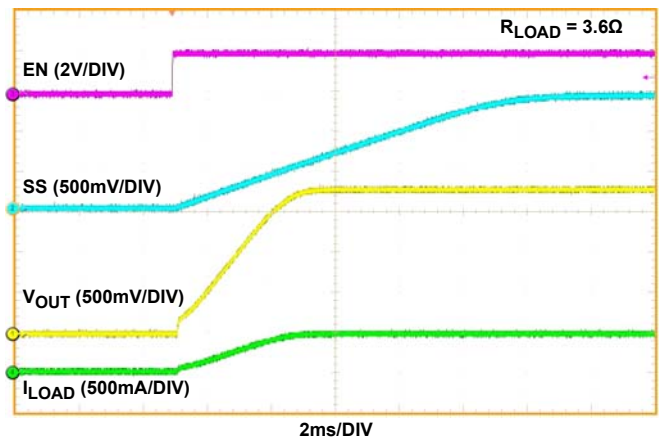
FIGURE 12. ENABLE START-UP (C_{SS} = 10nF)

Typical Performance Curves
Unless otherwise noted: V_{IN} = 2.2V, V_{OUT} = 1.8V, T_J = +25°C, I_L = 0A.
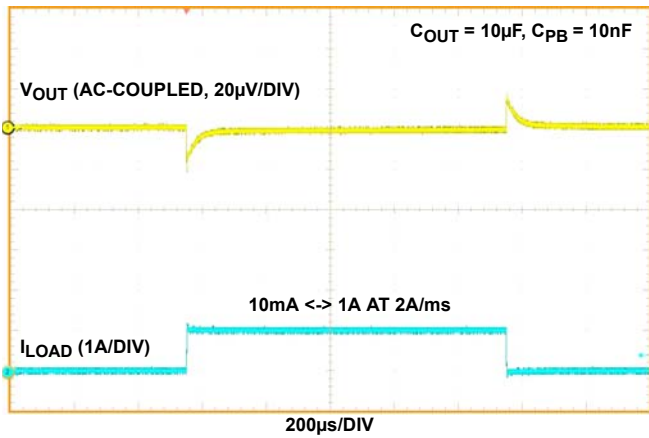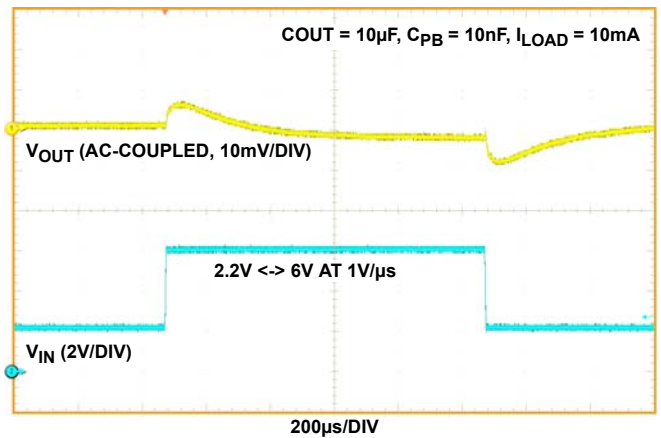

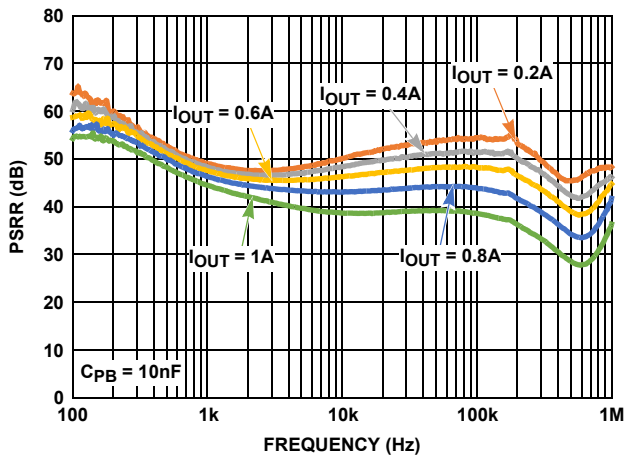FIGURE 13. LOAD TRANSIENT RESPONSE

FIGURE 14. LINE TRANSIENT RESPONSE

FIGURE 15. PSRR vs FREQUENCY
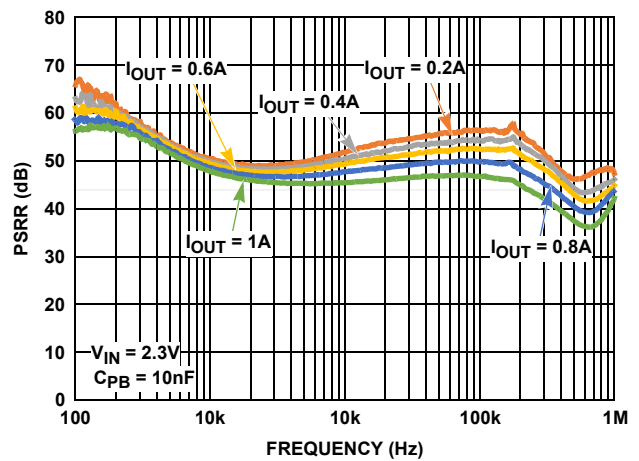
FIGURE 16. PSRR vs FREQUENCY

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