LM5050 High Side OR-ing FET Controller

TI reference design number: PMP20096 Rev A

Input: 5V – 75V

DC – DC Test Results

Table of Contents

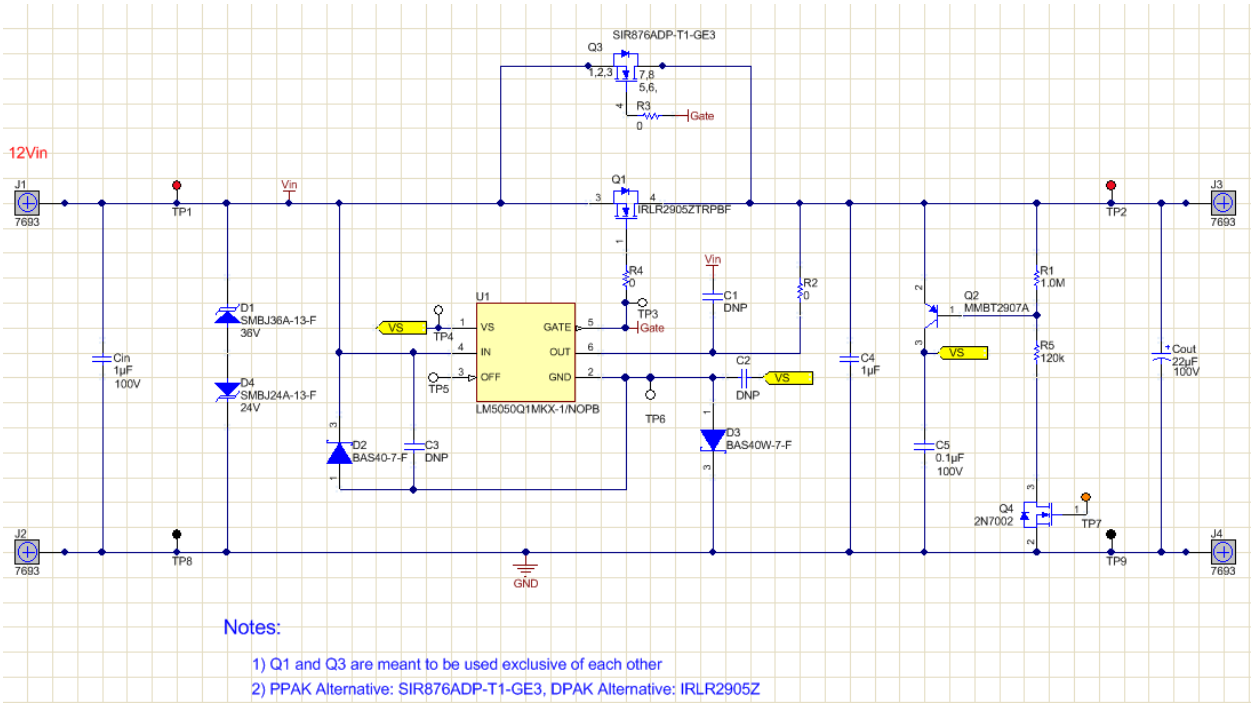
Contents

1 Circuit Description

PMP20096 is an OR-ing FET controller targeted for automotive applications. This design uses the LM5050 OR-ing FET controller, and adds reverse polarity protection and a low quiescent current mode. In this implementation, mosfet Q2 was removed from the original PNP20096 and a PNP BJT based circuit was soldered on to achieve the low-quiescent effect.

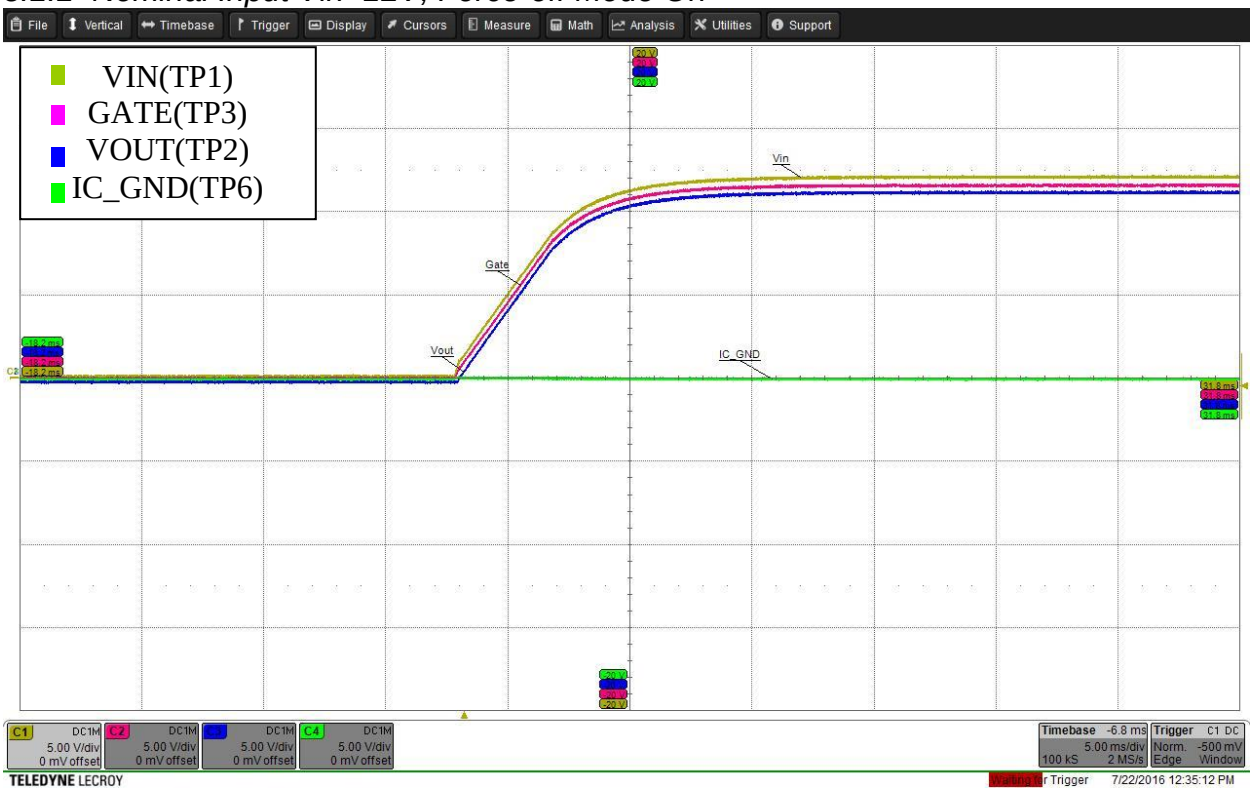
All tests were performed at room temperature on an open bench, unless otherwise specified.

2 Schematic

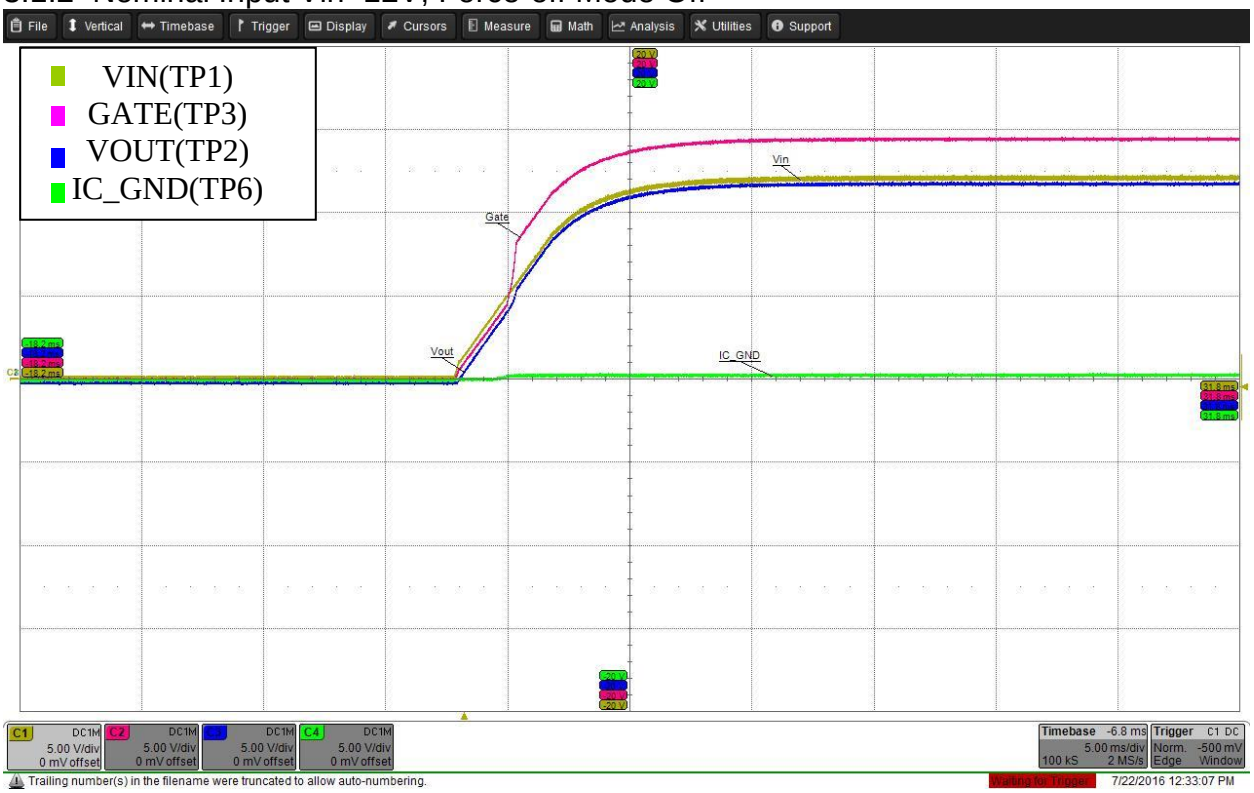


3 Basic Startup

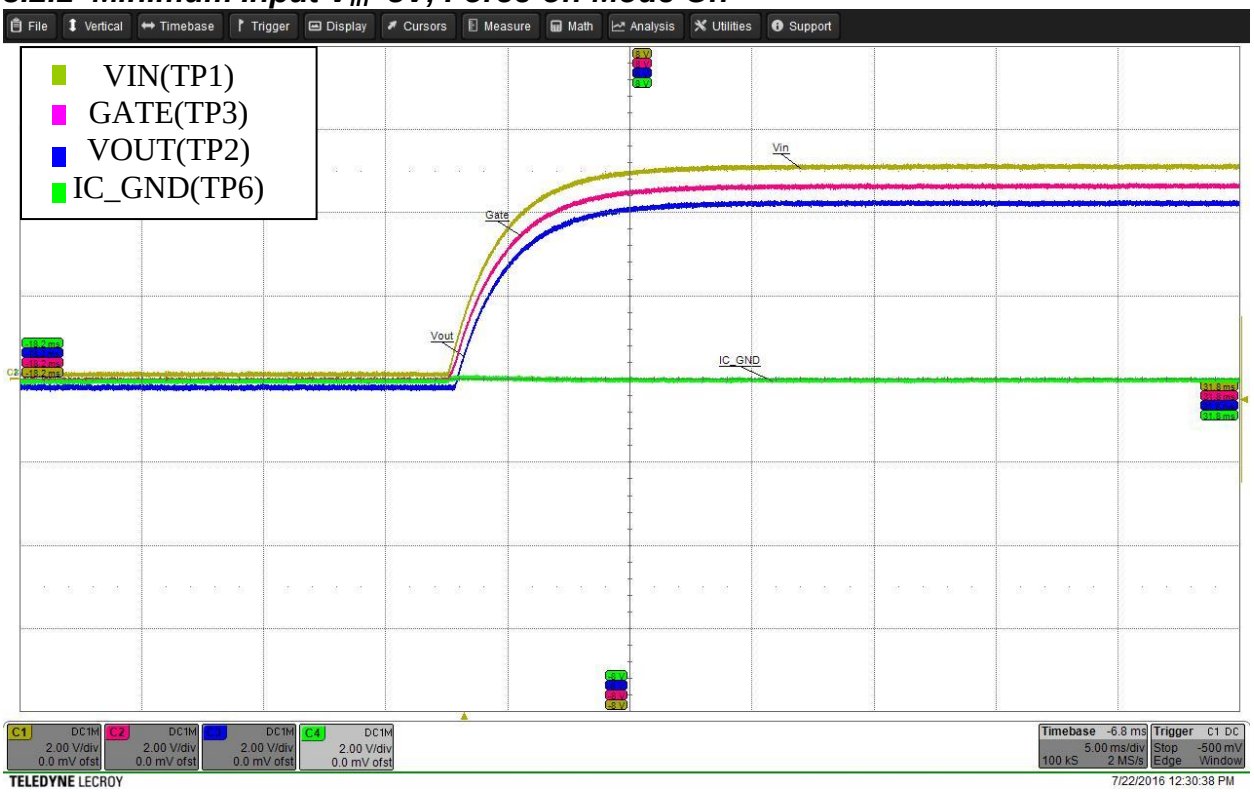
3.1.1 Nominal Input Vin=12V, Force-off Mode On



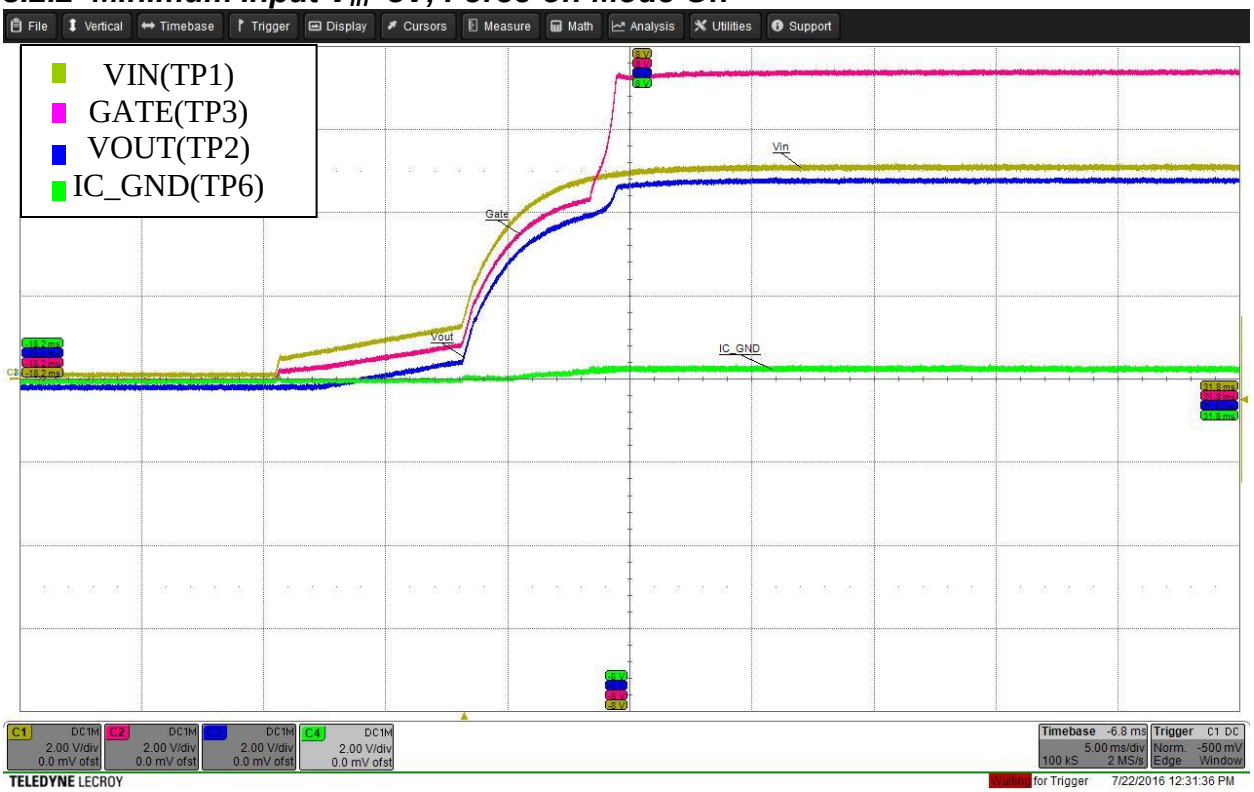
3.1.2 Nominal Input Vin=12V, Force-off Mode Off



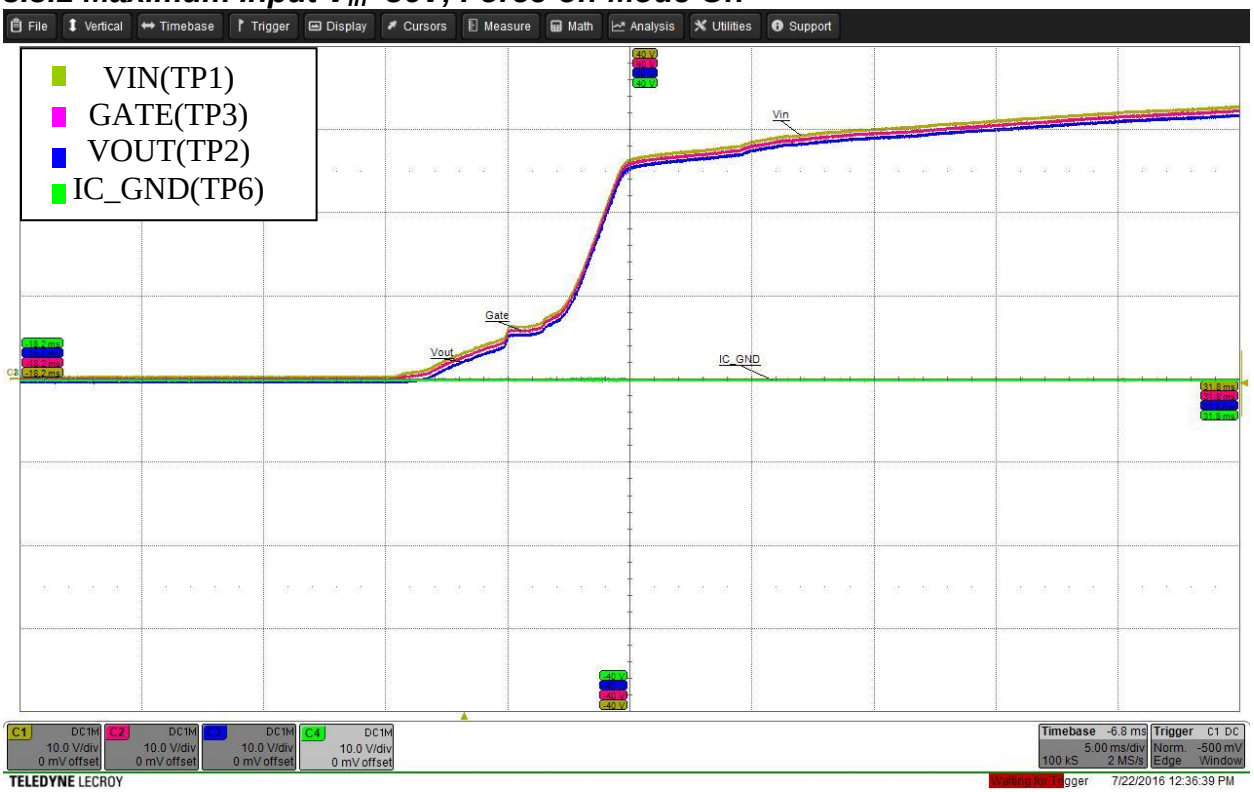
3.2.1 Minimum Input V_{in}=5V, Force-off Mode On



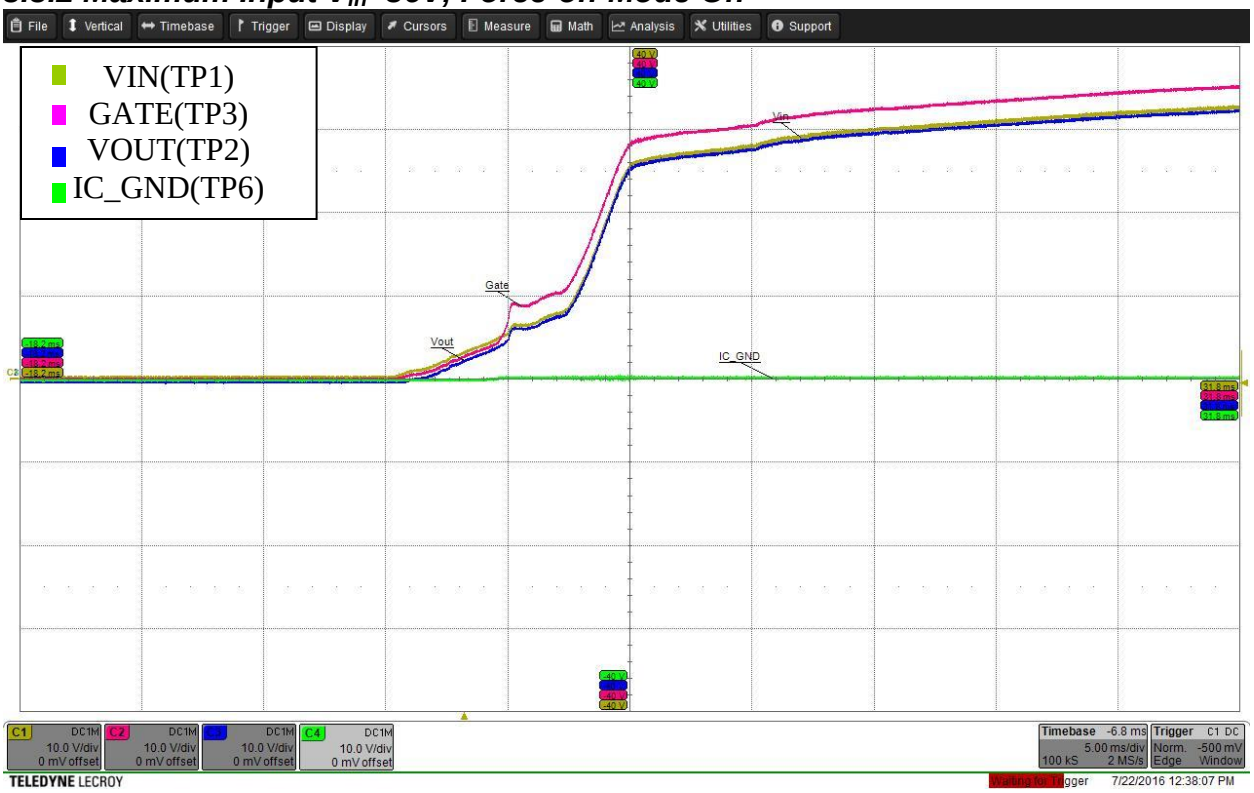
3.2.2 Minimum Input V_{in}=5V, Force-off Mode Off



3.3.1 Maximum Input V_{in}=36V, Force-off Mode On

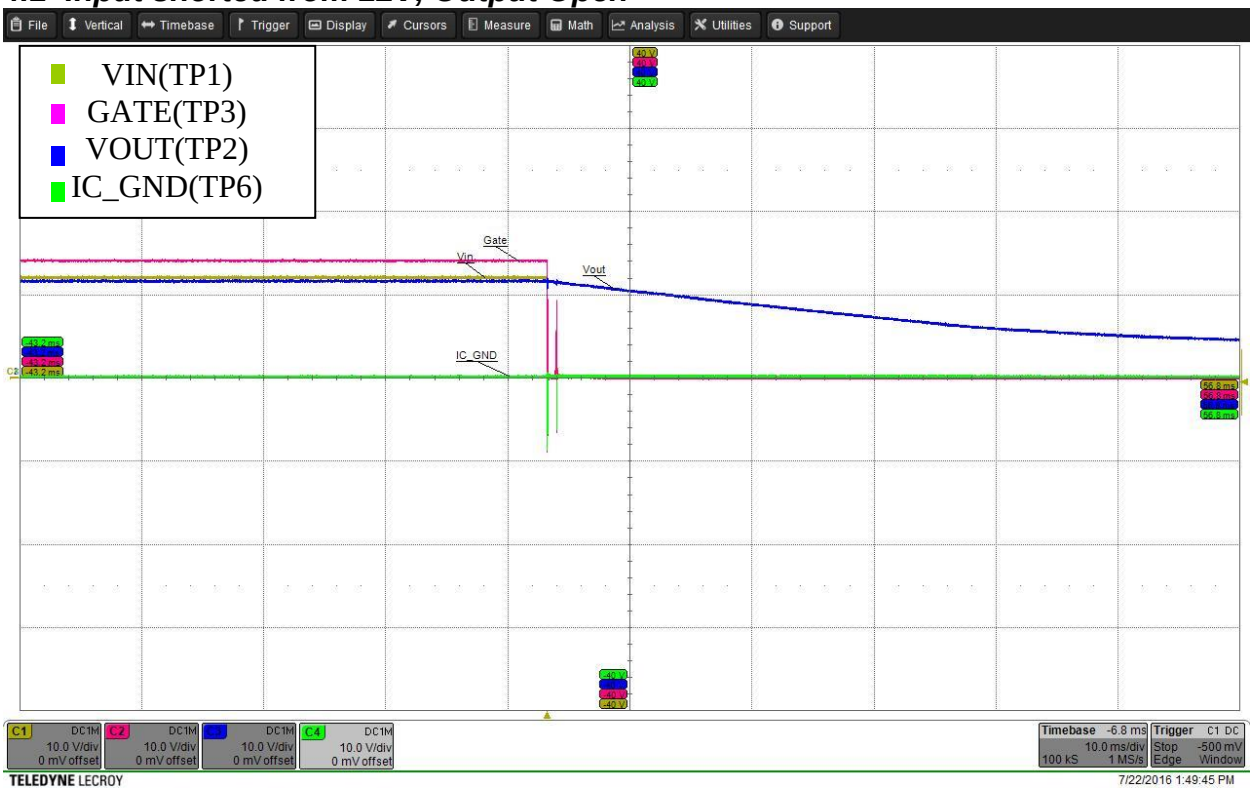


3.3.2 Maximum Input V_{in}=36V, Force-off Mode Off

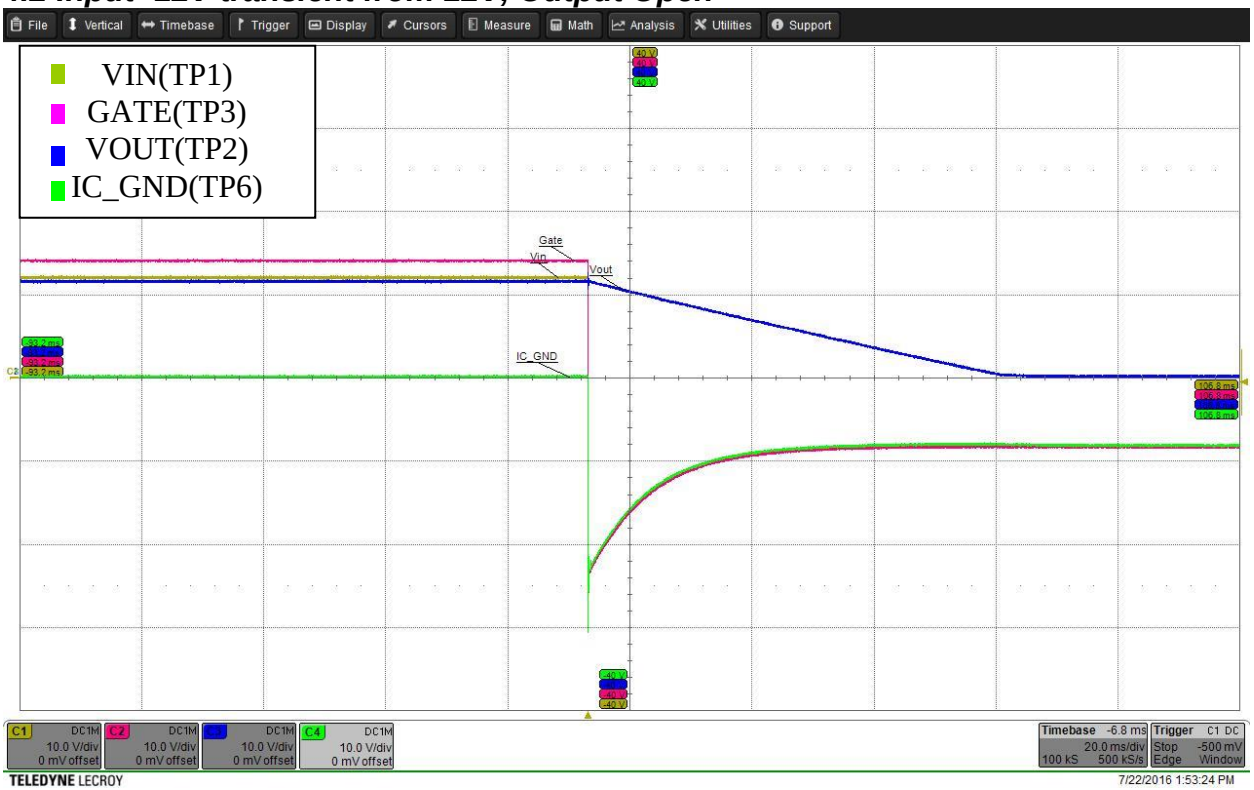


4 OR-ing Function

4.1 Input shorted from 12V, Output Open



4.2 Input -12V transient from 12V, Output Open



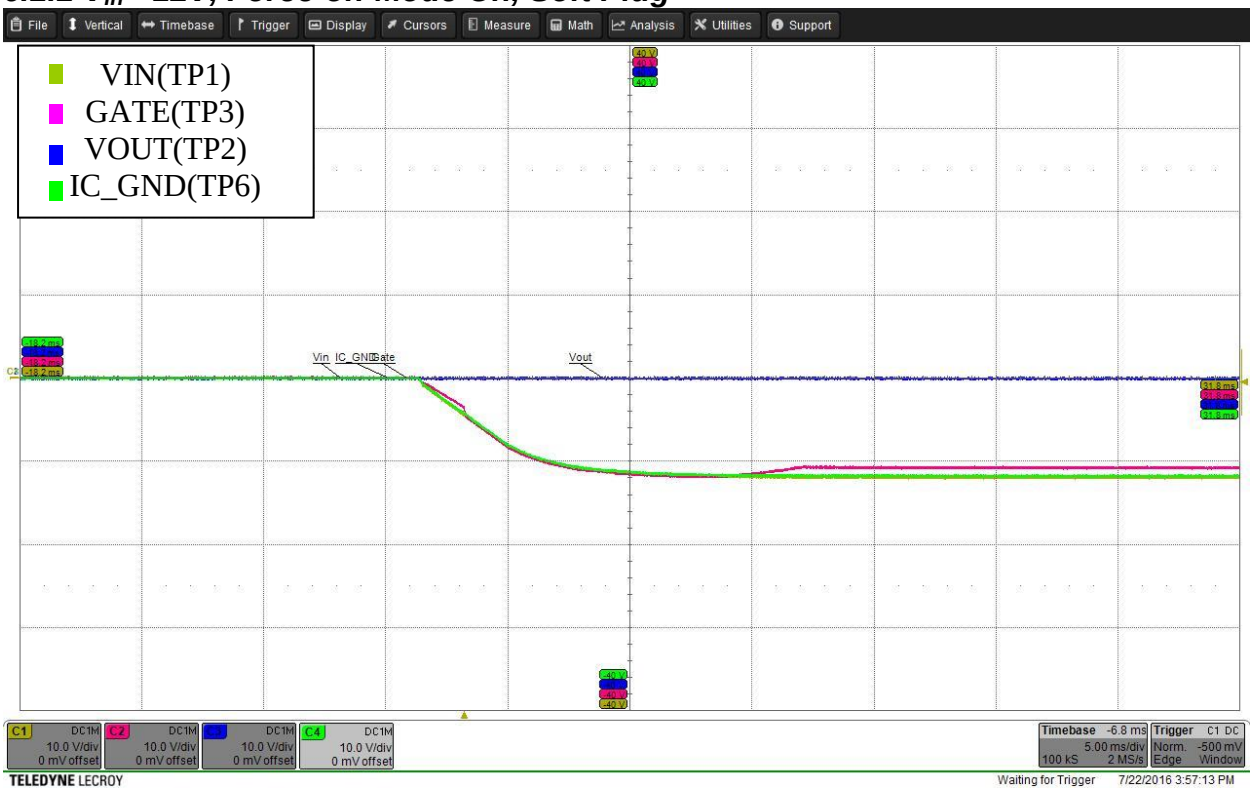
5 Low-I_q Function

5.1 Quiescent Currents

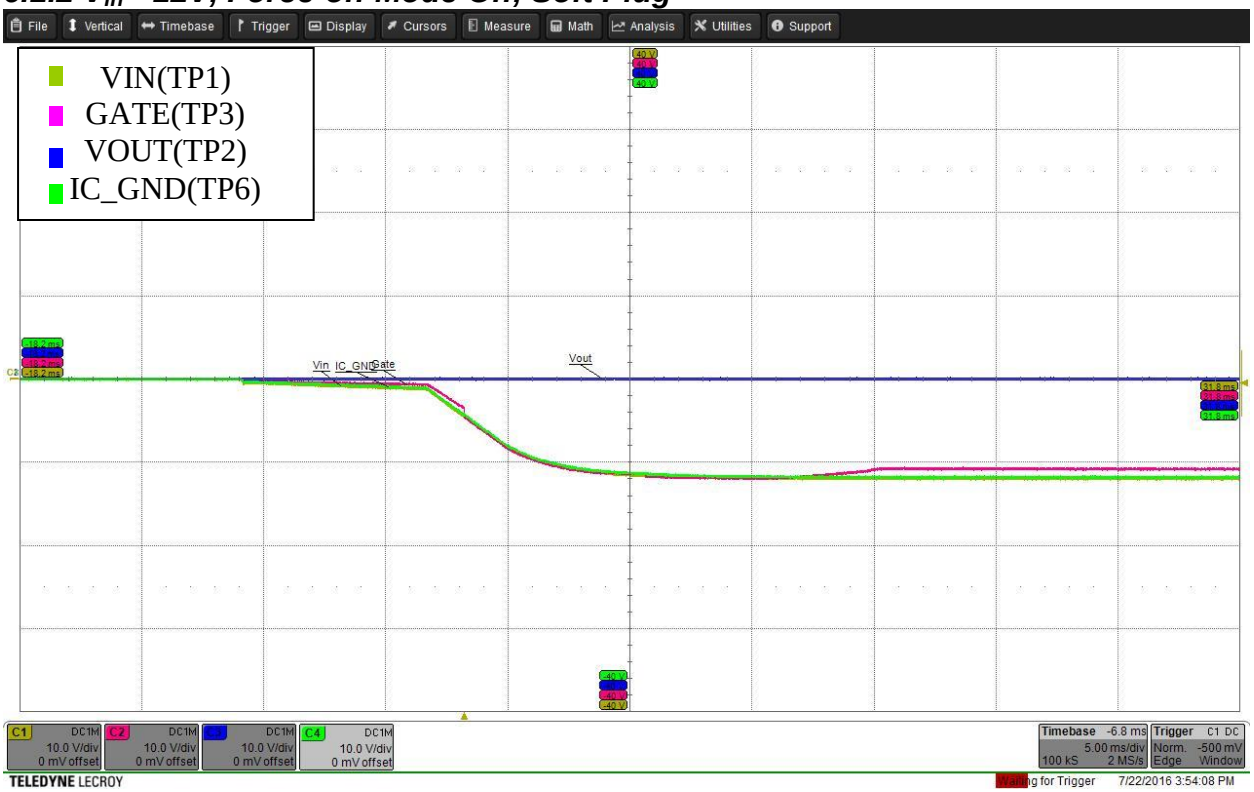
BJT solution R1= 1M R5=130K: Currents taken at Pin outputs					
			Iin	Iout	Ivs
Nominal Voltage	IN=1KΩ, OUT=14V	Low-IQ mode OFF	205.6uA	-2.86mA	-676uA
		Low-IQ mode ON	0	0	0
	IN=12V, OUT=14V	Low-IQ mode OFF	-298.4uA	-1.08mA	-108.8uA
		Low-IQ mode ON	0	0	0
	IN=12V, OUT=1KΩ	Low-IQ mode OFF	-307.7uA	-3.310mA	-103.2uA
		Low-IQ mode ON	0	0	0
Low Voltage	IN=1KΩ, OUT=6V	Low-IQ mode OFF	111.5uA	-1.51mA	-386.6uA
		Low-IQ mode ON	0	0	0
	IN=5V, OUT=6V	Low-IQ mode OFF	-200.9uA	-241uA	-81uA
		Low-IQ mode ON	0	0	0
	IN=5V, OUT=1KΩ	Low-IQ mode OFF	-144.9uA	-2250uA	-59.2uA
		Low-IQ mode ON	0	0	0
High Voltage	IN=1KΩ, OUT=36V	Low-IQ mode OFF	229.1.4uA	-3.1mA	-798uA
		Low-IQ mode ON	0	0	0
	IN=25V, OUT=36V	Low-IQ mode OFF	-244.7uA	-2.892mA	-130.2uA
		Low-IQ mode ON	0	0	0
	IN=36V, OUT=1KΩ	Low-IQ mode OFF	-340uA	-3.3uA	-133.9uA
		Low-IQ mode ON	0	0	0

6 Reverse Polarity Protection

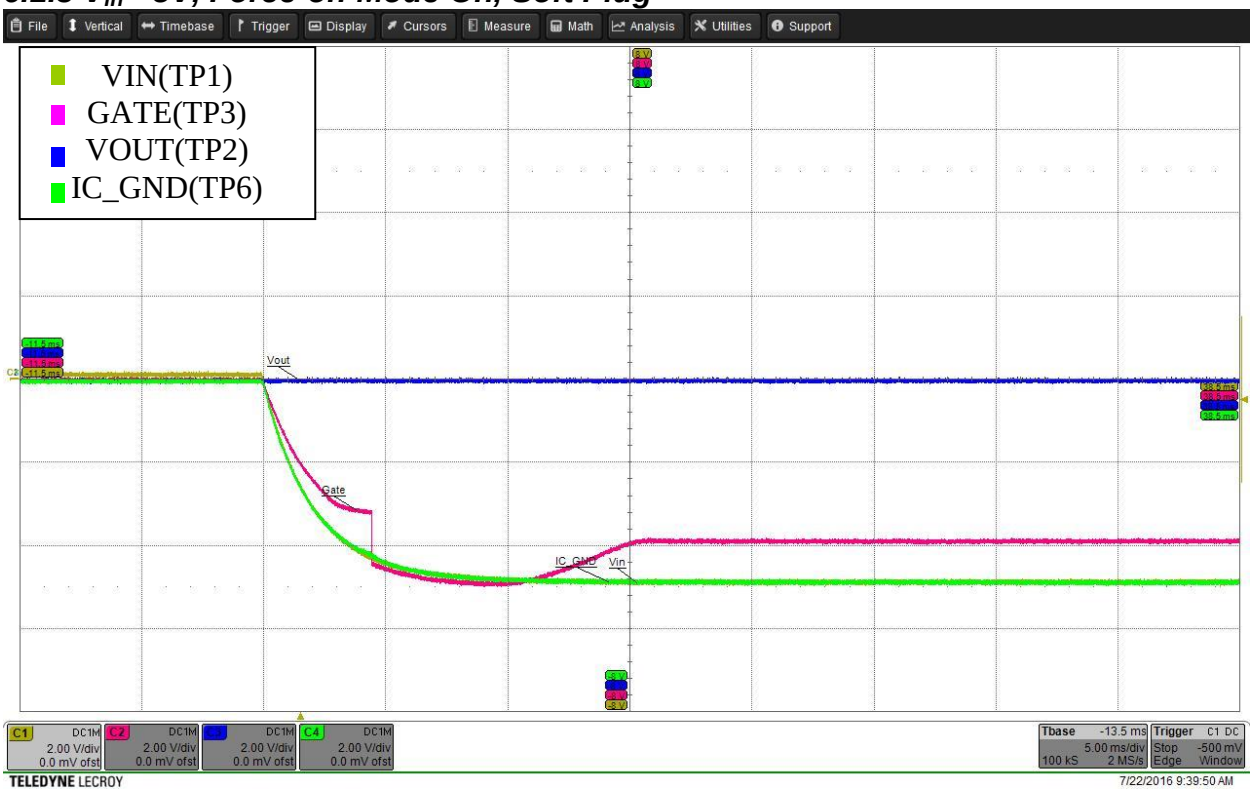
6.1.1 V_{in}=-12V, Force-off Mode On, Soft Plug



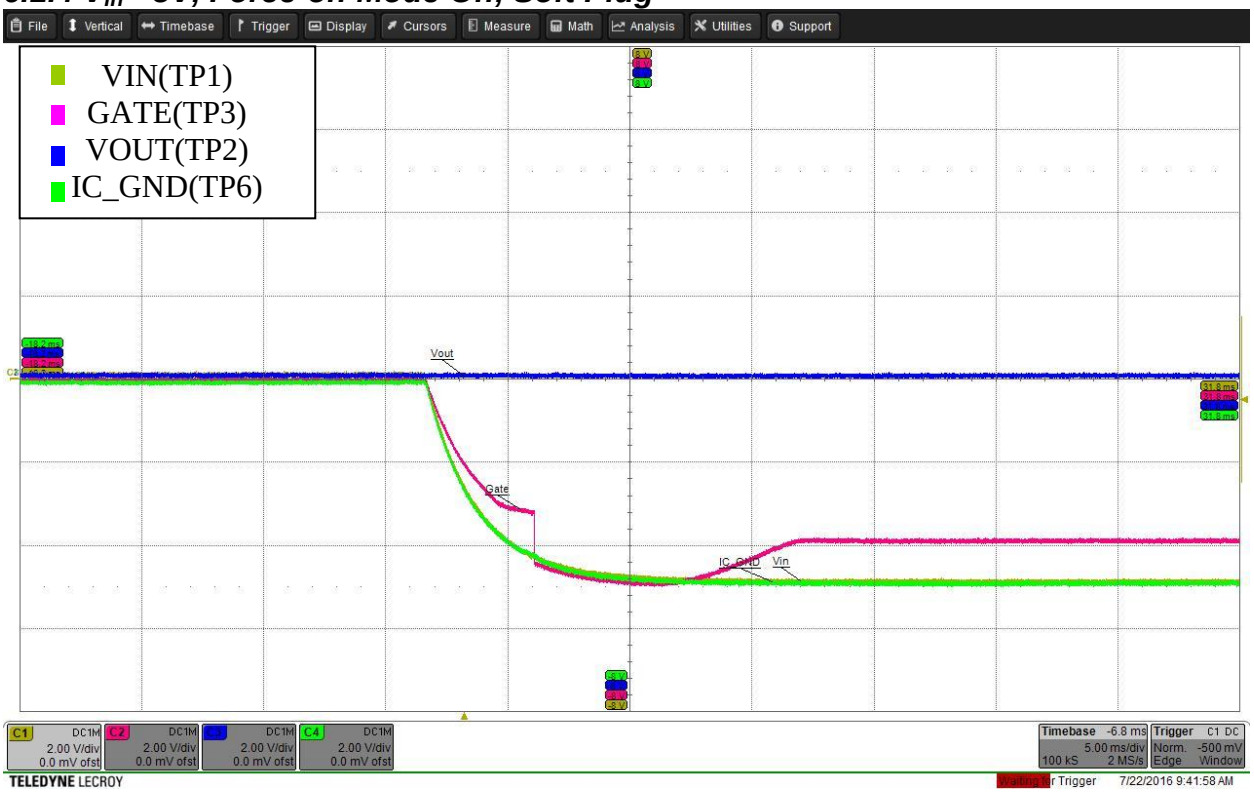
6.1.2 V_{in}=-12V, Force-off Mode Off, Soft Plug



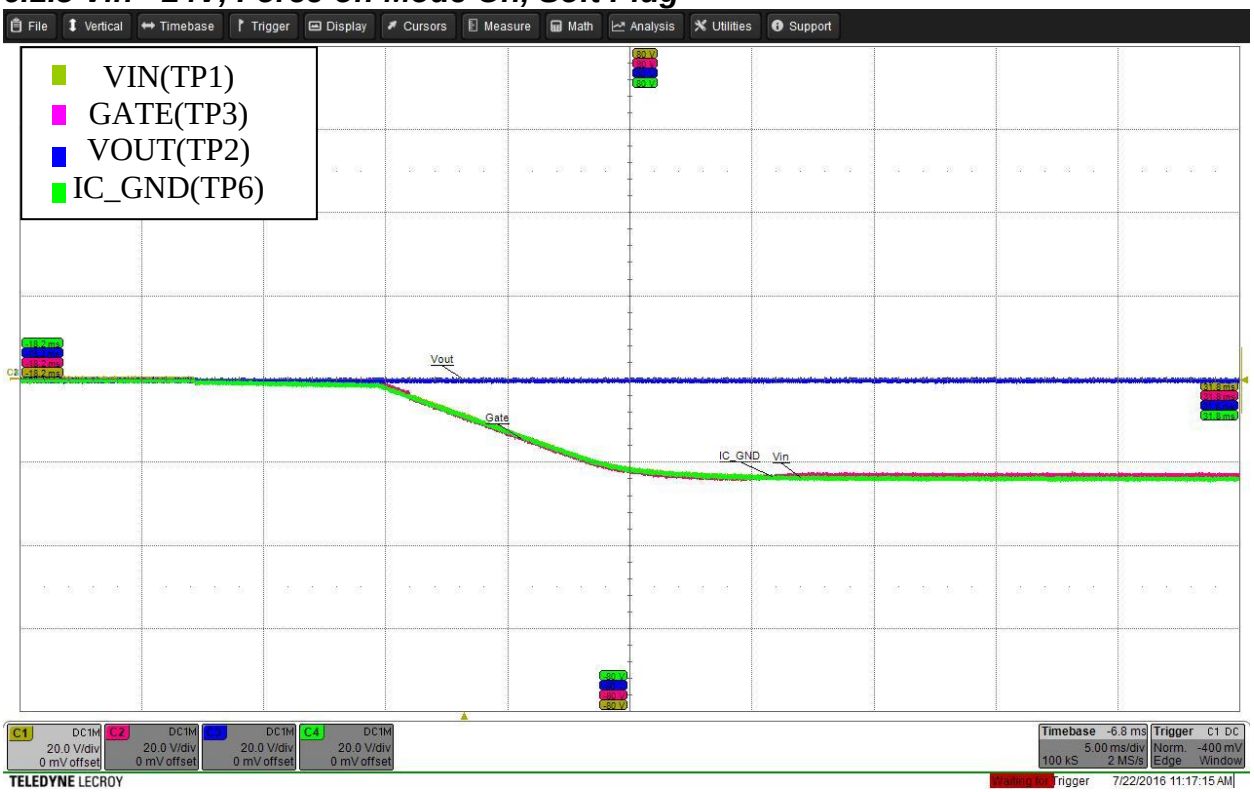
6.1.3 V_{in}=-5V, Force-off Mode On, Soft Plug



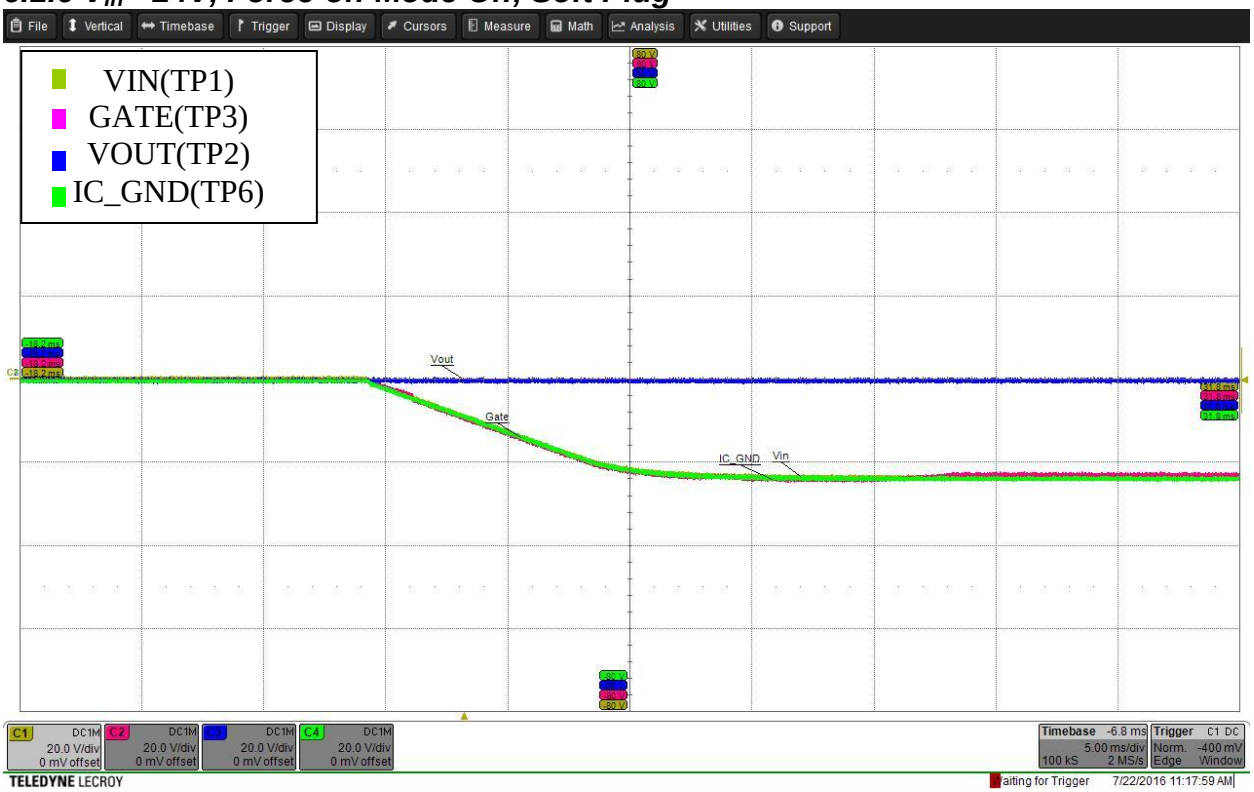
6.1.4 V_{in}=-5V, Force-off Mode Off, Soft Plug



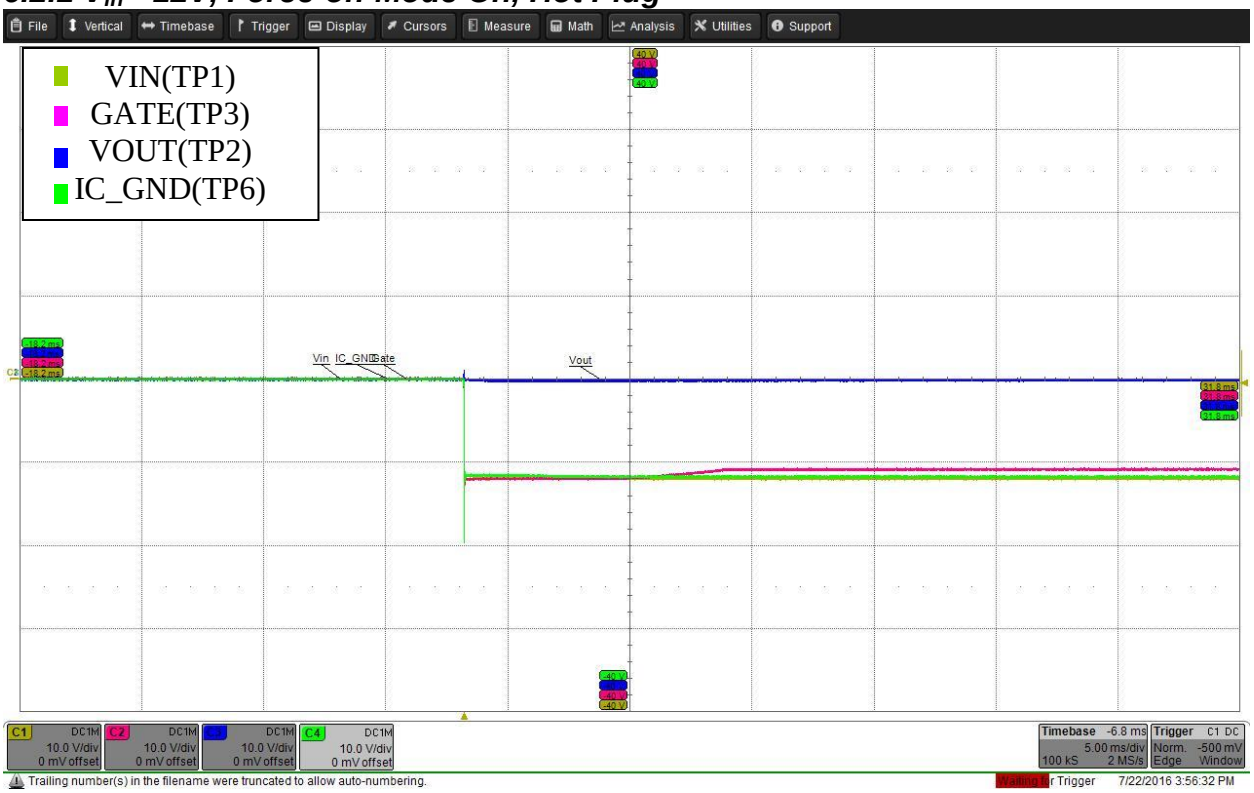
6.1.5 Vin=-24V, Force-off Mode On, Soft Plug



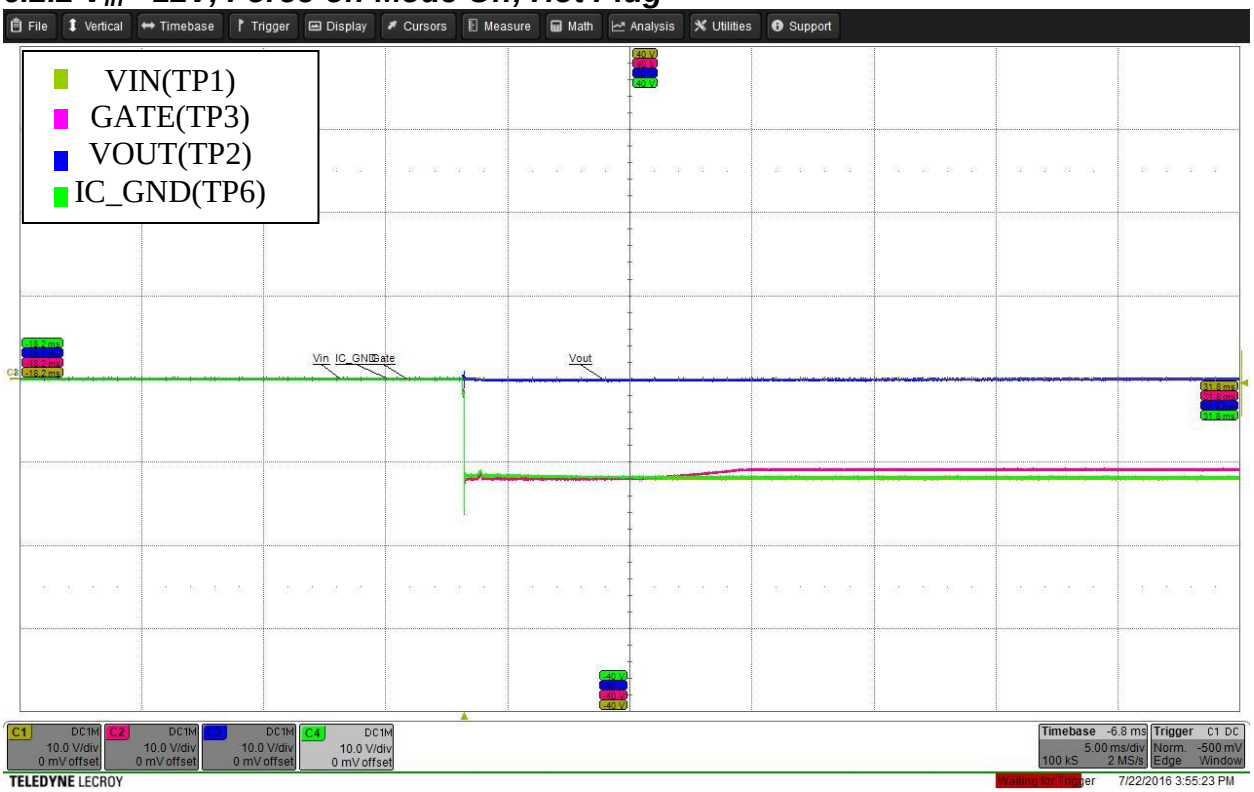
6.1.6 V_{in}=-24V, Force-off Mode Off, Soft Plug



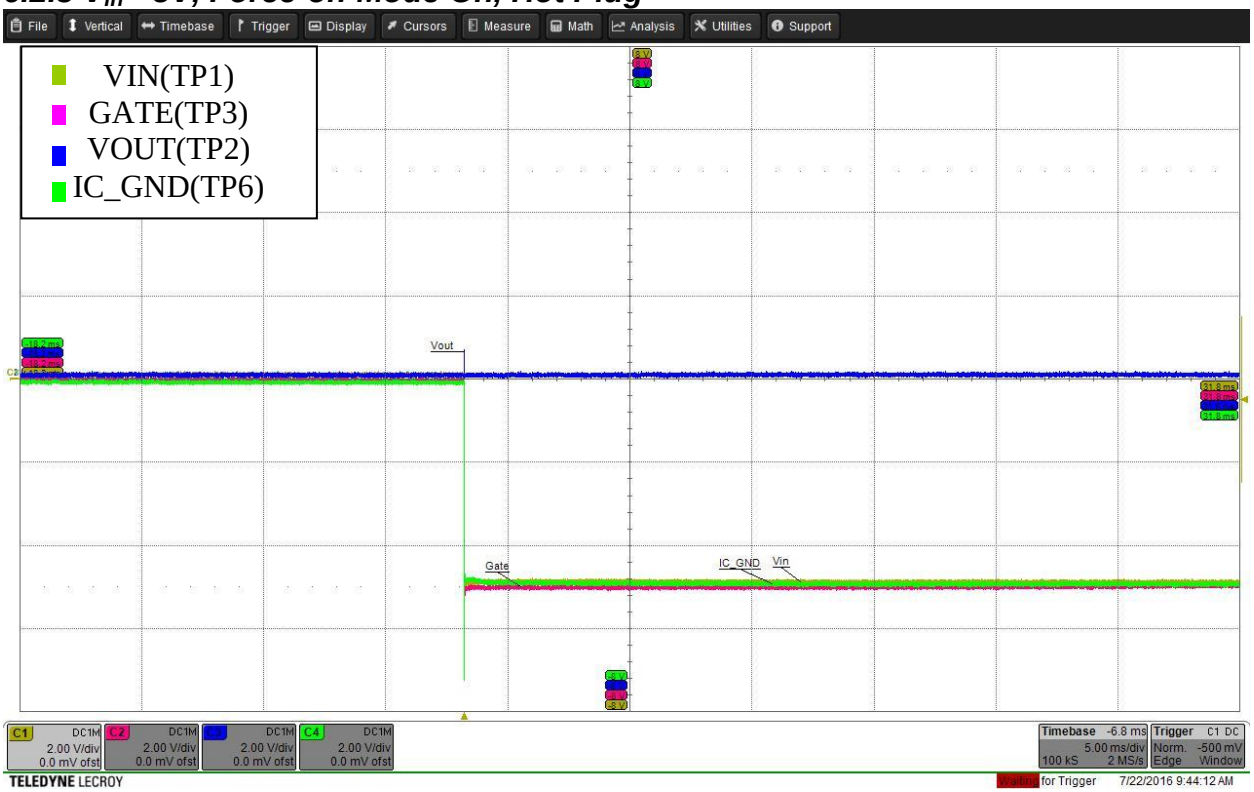
6.2.1 V_{in}=-12V, Force-off Mode On, Hot Plug



6.2.2 V_{in}=-12V, Force-off Mode Off, Hot Plug

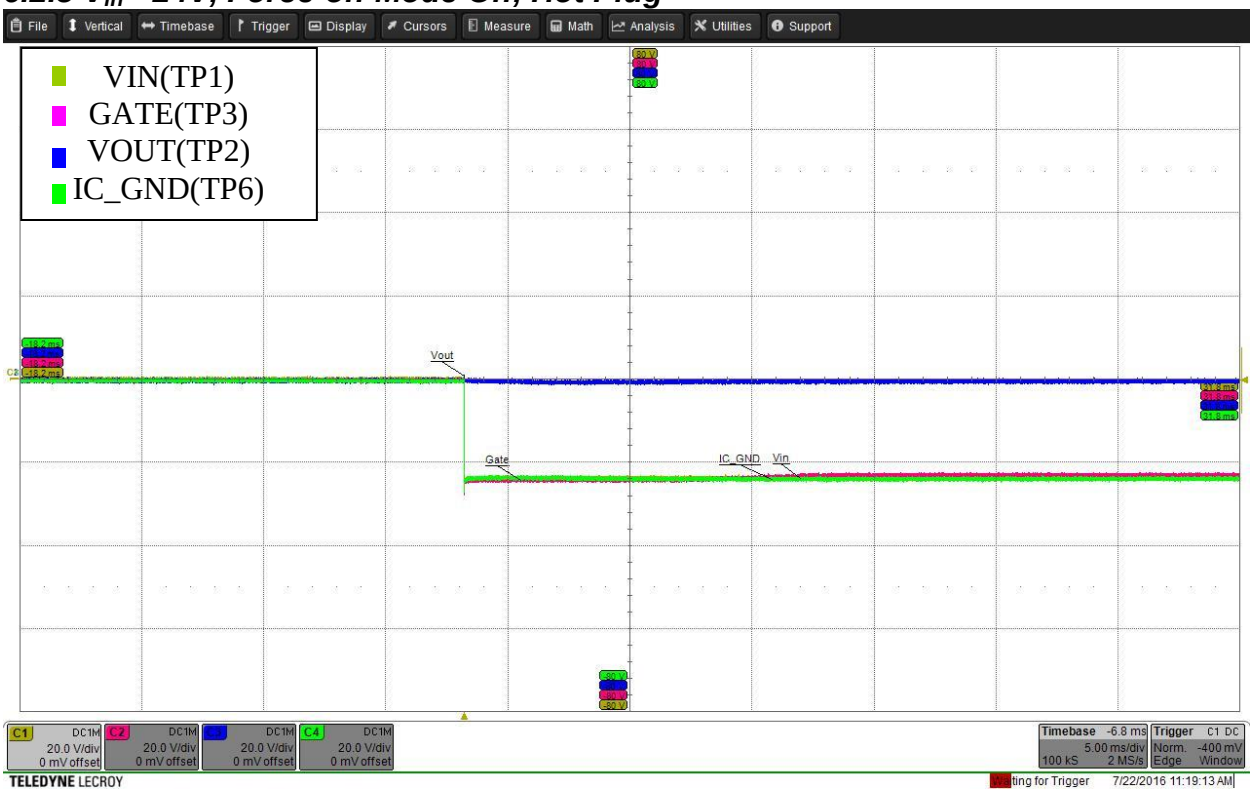


6.2.3 V_{in}=-5V, Force-off Mode On, Hot Plug



6.2.4 V_{in}=-5V, Force-off Mode Off, Hot Plug

6.2.5 V_{in}=-24V, Force-off Mode Off, Hot Plug



6.2.6 V_{in}=-24V, Force-off Mode On, Hot Plug