

Winbond
Bus Termination Regulator
W83310DS/DG

W83310DS
Datasheet Revision History

	Pages	Dates	Version	Version on Web	Main Contents
1		May/03	0.5	N.A.	All versions before 0.5 are only for internal use.
2	1	May/03	0.51	N.A.	Typo corrected.
3	5	May/03	0.60	N.A.	Electrical characteristics update.
4	5	Jul./03	0.61	N.A.	Electrical characteristics update.
5	10,11	Feb./04	0.70	N.A.	Package dimension outline and Thermal data.
6	11	Mar./04	0.71	N.A.	Thermal data update.
7	All	Sep./04	0.8	N.A.	Add Pb-free part W83310DG.
8	1	May/05	0.9	N.A.	Add DDR II support spec

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LIFE SUPPORT APPLICATIONS

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1. General Description

The W83310DS/DG is a linear regulator provides a power achieves continuous 2.0Amp bi-directional sinking and driving capability for a high speed bus terminator application. The chip simply implements a stable power supply which tracks half of input power dynamically for bus terminator with a single chip; it's also can be fixed with the input of V_{REF1} and V_{REF2} pins following with setting of pin BOOT_SEL. The W83310DS/DG is promoted with small footprint 8-SOP 150mil power package. With W83310DS/DG design, a high integration, high performance, and cost-effective solution is promoted.

2. Features

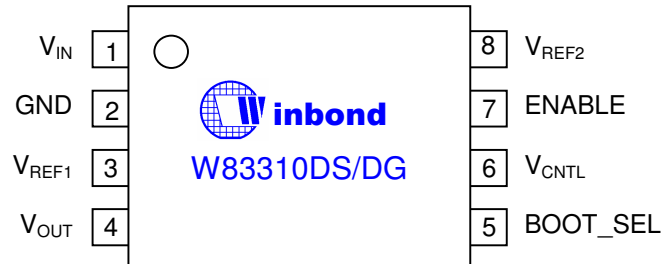
- ❖ Regulates a bi-directional power with driving and sinking capability
- ❖ Provides achieve continuous 2.0Amp driving and sinking current
- ❖ Power MOSFET integrated
- ❖ Low external component count
- ❖ Low output voltage offset
- ❖ VCNTL Operates with +3.3V & 2.5 V power
- ❖ 8-SOP 150mil small power package
- ❖ Low cost and easy to use

3. Applications

- ❖ DDR/DDRII Bus Termination Regulator
- ❖ Active Termination Bus
- ❖ Intel® Springdale GMCH- V_{TT} Support
- ❖ SSTL-2
- ❖ SSTL-3

4. Pin Configuration and Description

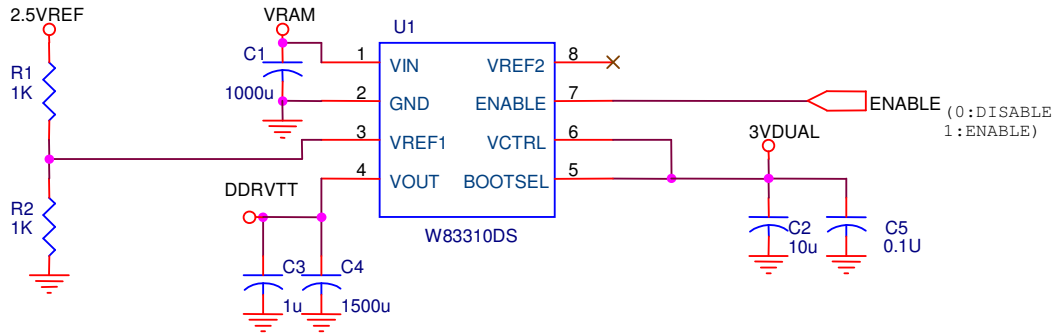
- W83310DS/DG



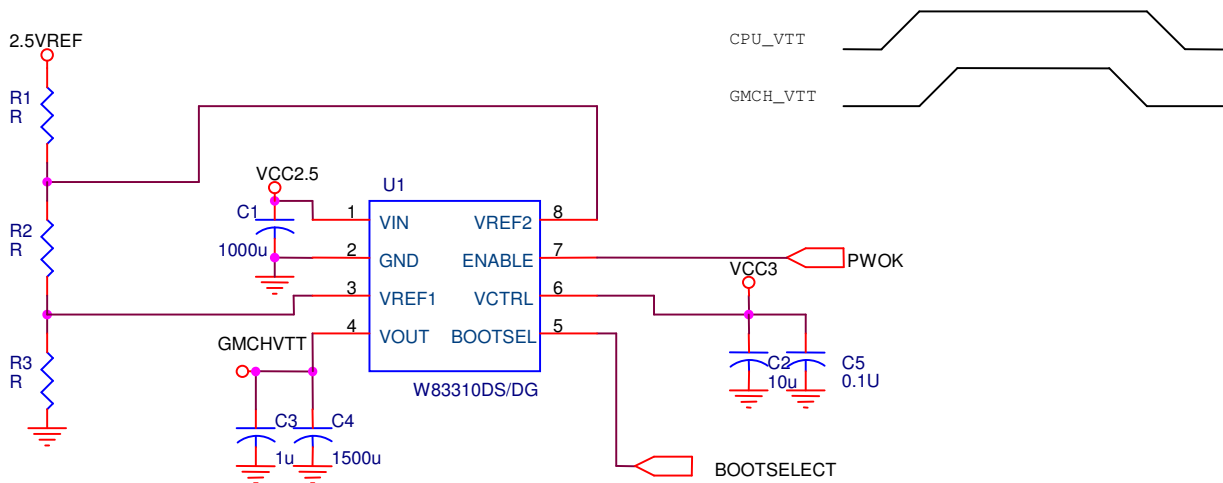
SYMBOL	PIN	FUNCTION
V _{IN}	1	Main power input pin.
GND	2	Power ground.
V _{REF1}	3	Internal reference voltage source 1. Reference voltage on the pin will be referred with the value of pin BOOT_SEL set high.
V _{OUT}	4	Voltage output pin.
BOOT_SEL	5	A signal for the chip reference voltage source selection. The function is designed for Intel® Springdale chipset GMCH_V _{TT} application.
V _{cntl}	6	Power for internal control logic use
ENABLE	7	Chip function enable pin. 1: Enable; 0: Disable
V _{REF2}	8	Internal reference voltage source 2. Reference voltage of the pin will be referred with the value of pin BOOT_SEL set low.

5. Application Circuit

- W83310DS/DG for DDR SDRAM Application



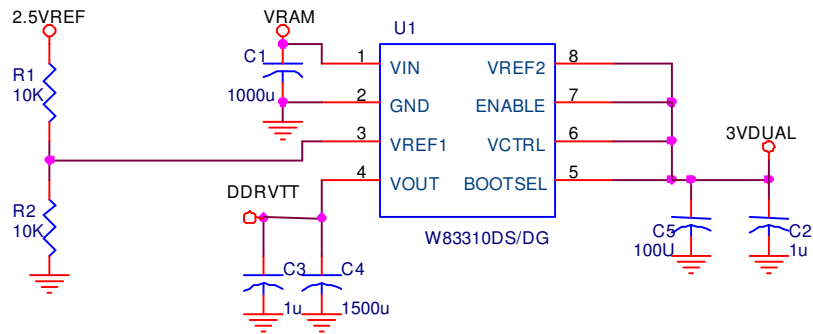
- W83310DS/DG for Intel® Springdale GMCH_VTT Application



BOOTSELECT=0 GMCHVTT=1.45V for Intel® NORTHWOOD CPU
 BOOTSELECT=1 GMCHVTT=1.225V for Intel® PRESCOTT CPU

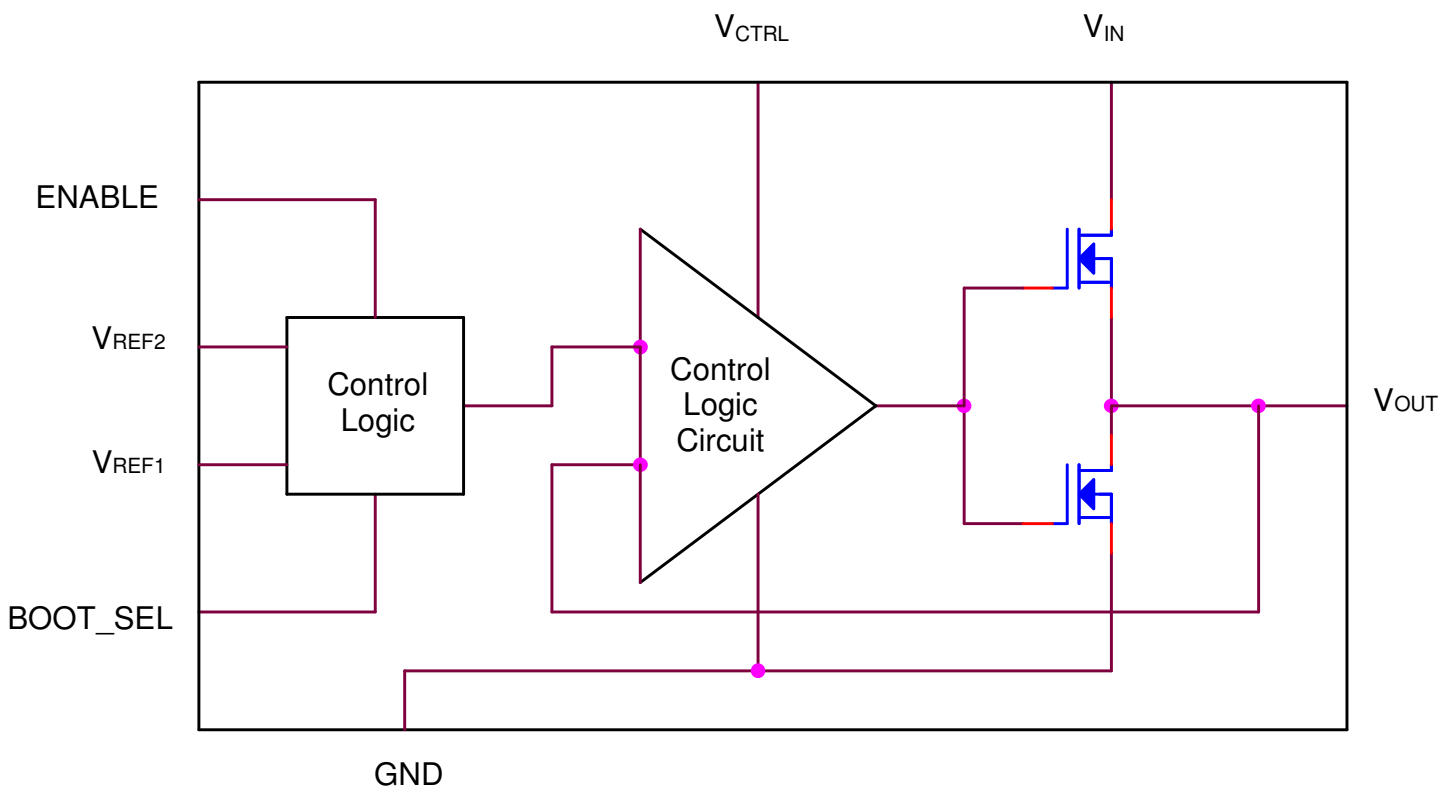
R1: R2: R3 = 4.66: 1.00: 5.44
 Recommend resistor R1=23.2KΩ, R2=4.99KΩ, R3=27.4KΩ

- Dual Layout of W83310DS/DG and W83310S-R2 for DDR V_{TT} Application



W83310S-R2, W83310DS/DG
DUAL LAYOUT

6. Internal Block Diagram



7. Electrical Characteristics

AC CHARACTERISTICS

<i>C_{out}=1000uF, T_A = 0°C to +70°C</i>						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	V _{os}	-5	0	+5	mV	I _{out} =0A
Load Regulation			0.8		%	Loading: 0A→2.0A
			0.8			Loading: 0A→-2.0A
Input Voltage Range	V _{IN}	1.62		3.63	V	
	V _{CNTL}		3.3	3.63		
Operating Current of VCNTL	ICNTL		0.5	1	mA	No Load(I _{out} =0A)
Short Current Limit	ILMT		4.0		A	

Note: Load regulation is tested by using a 1ms current pulse and V_{OUT} measuring.

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Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
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			0.8			Loading: 0A→-2.0A
Input Voltage Range	V _{IN}	1.62		3.63	V	
	V _{CNTL}		3.3	3.63		
Operating Current of VCNTL	ICNTL		0.5	1	mA	No Load(I _{out} =0A)
VREF1 Threshold trigger		0.8			V	Output=High
				0.2	V	Output=Low
BOOT_SEL Threshold Trigger		1			V	BOOT_SEL=High
				0.2	V	BOOT_SEL=Low
Short Current Limit	ILMT		4.0		A	

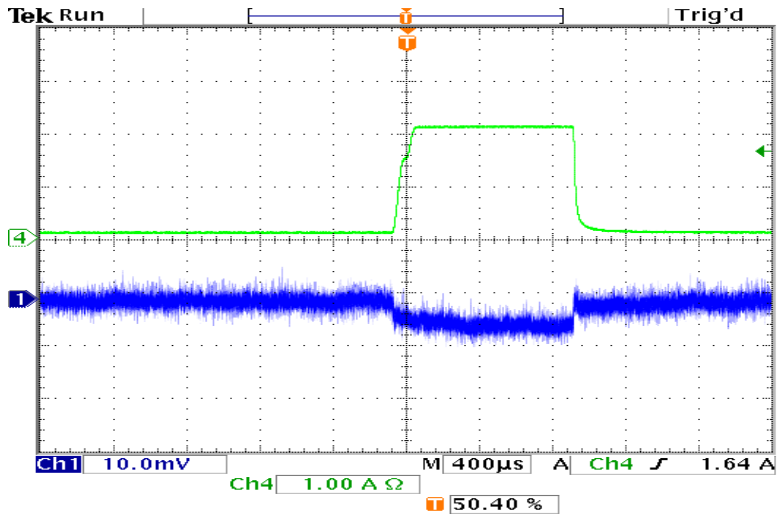
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			0.8			Loading: 0A→-2.0A
Input Voltage Range	V _{IN}	1.62		3.63	V	
	V _{CNTL}		3.3	3.63		
Operating Current of VCNTL	ICNTL		0.5	1	mA	No Load(I _{out} =0A)
VREF2 Threshold trigger		0.8			V	Output=High
				0.2	V	Output=Low
BOOT_SEL Threshold Trigger		1			V	BOOT_SEL=High
				0.2	V	BOOT_SEL=Low
Short Current Limit	ILMT		4.0		A	

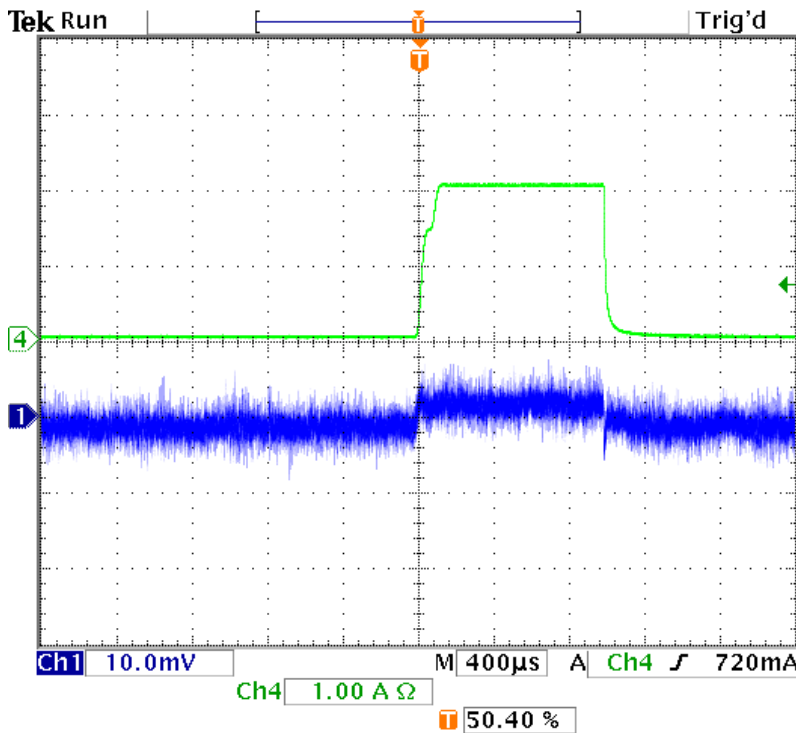
Note: Load regulation is tested by using a 1ms current pulse and V_{OUT} measuring.

8. Typical Operating Waveform

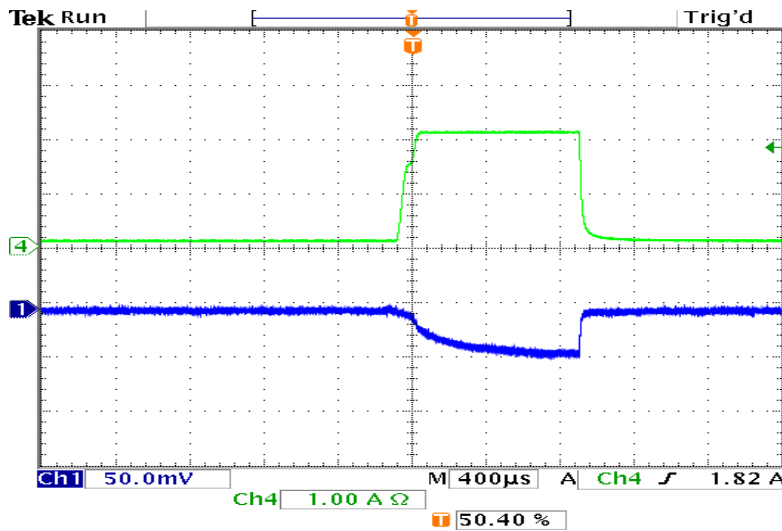
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.225V$; 2.0Amp pulse driving current.



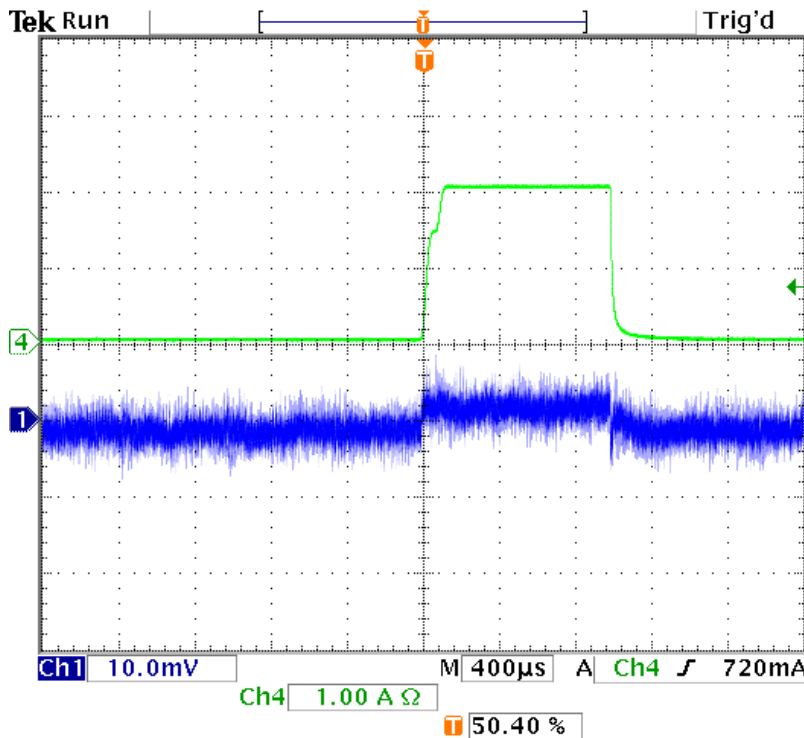
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.225V$; 2.0Amp pulse sinking current.



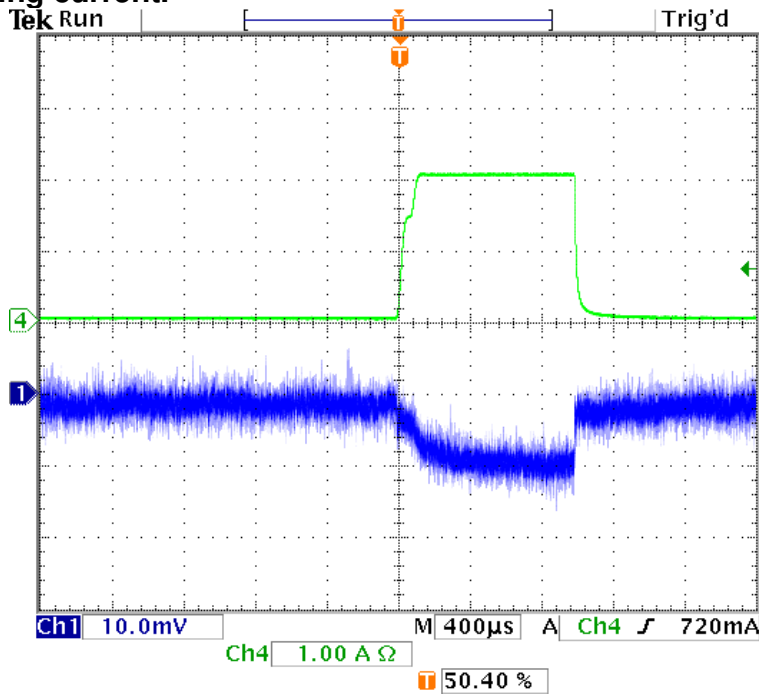
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.45V$; 2.0Amp pulse driving current.



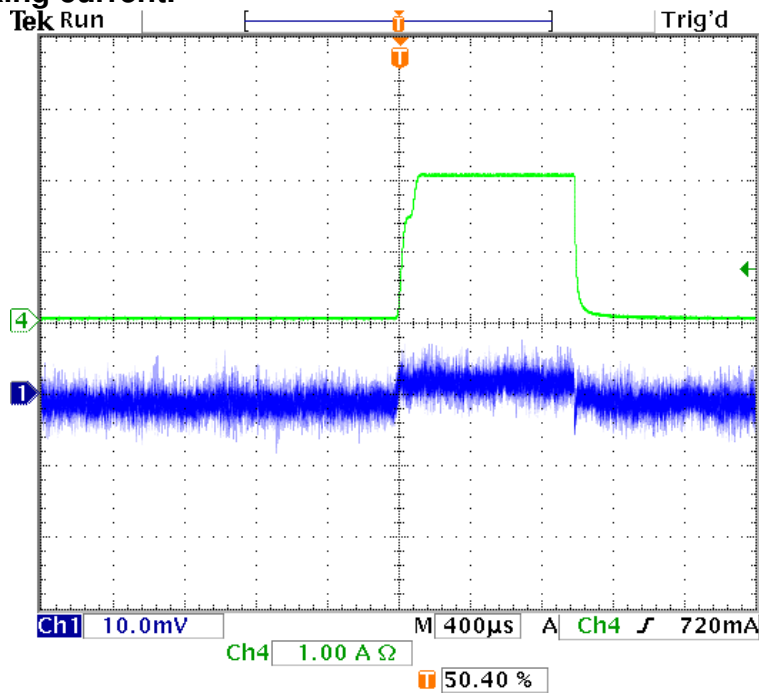
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.45V$; 2.0Amp pulse sinking current.



Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.25V$; 2.0Amp pulse driving current.

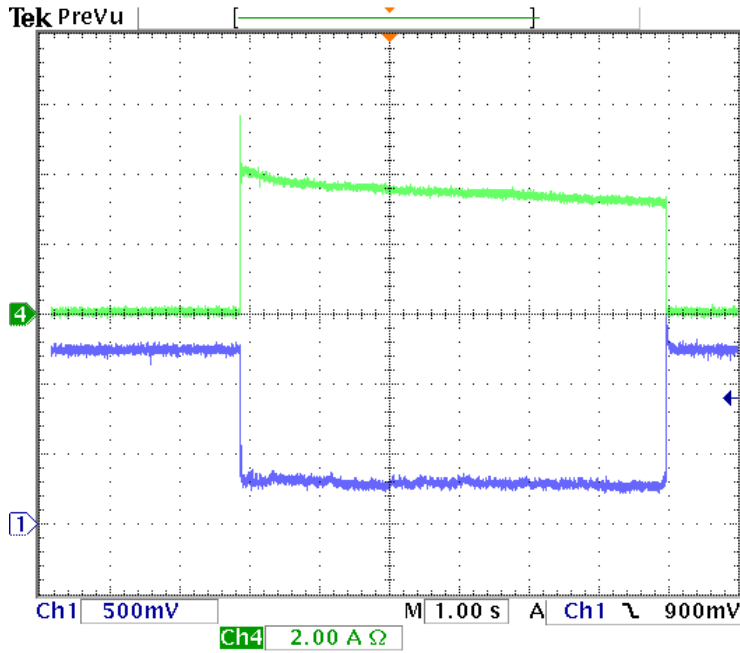


Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.25V$; 2.0Amp pulse sinking current.



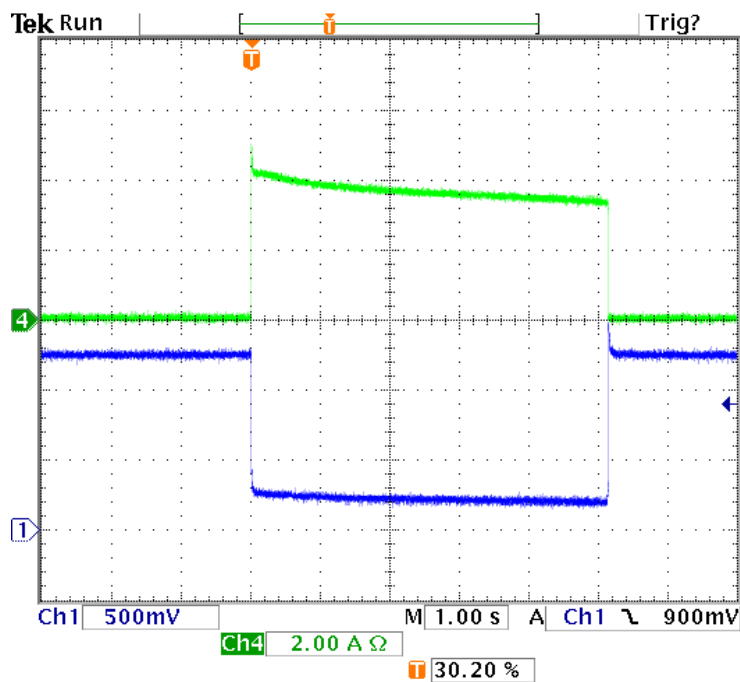
Short Current Limit

- $V_{CTRL} = 3.3V$



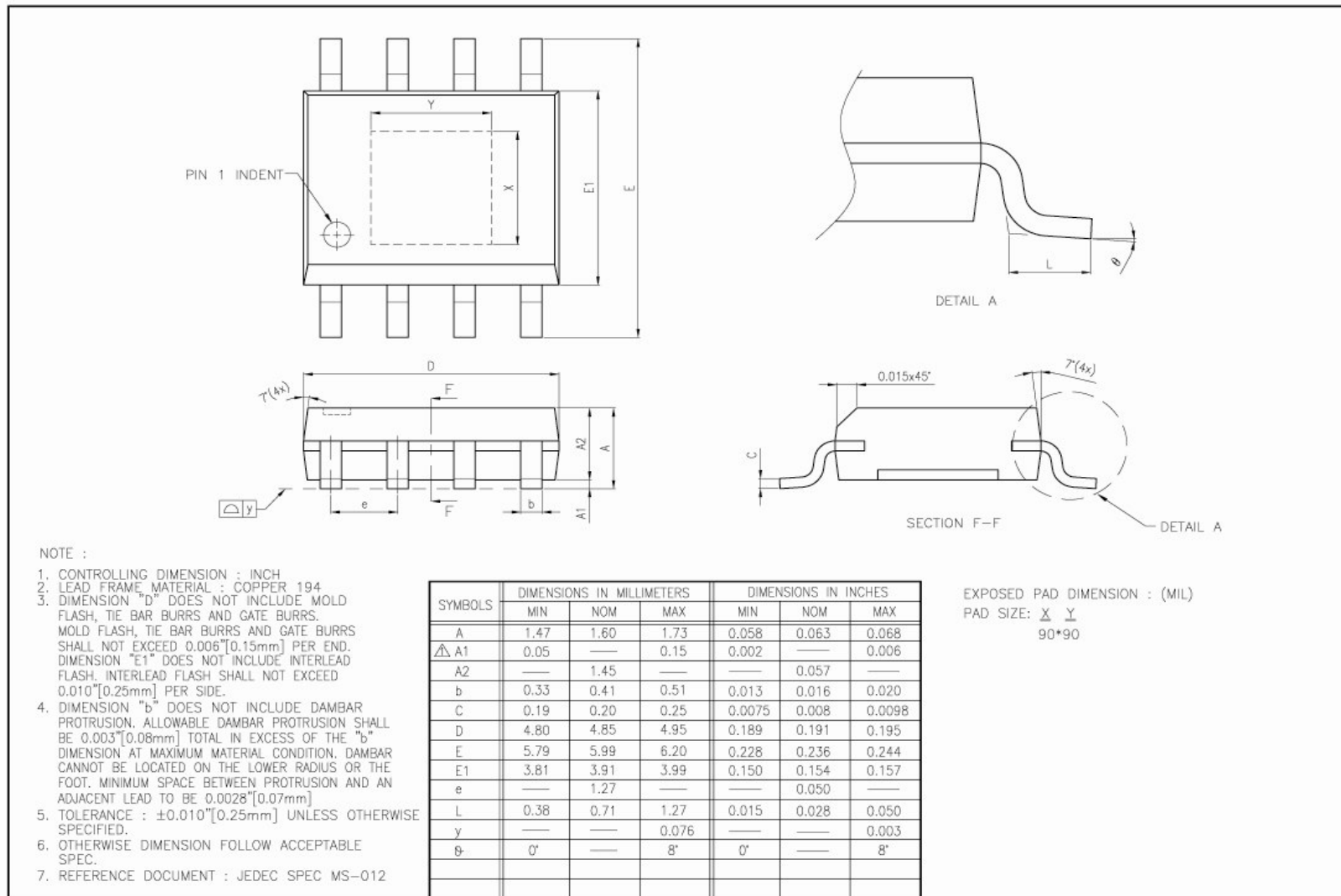
27 May 2003
19:31:21

- $V_{CTRL} = 3.6V$



27 May 2003
19:52:54

9. Package Dimension 8L Power SOP 150mil



10. Thermal Performance

Test on Four-Layer (2S2P) JEDEC Test Board							
Package	Power (W)	Component Temp. (°C)					Θ jc (°C /W)
		Package	Die	Downset	Lead	Ambient	
PSOP-8	3.05	100	145	79	78	25	14.7

An area of 190mil*150mil on the top layer is use as a thermal pad for W83310DS and this is connected to the bottom layer by vias. The Θja of the W83310DS mounted on this demo board is about 39 °C /W. Assuming the TA=25 °C and TJ=160 °C, the maximum power dissipation is calculated as: PD(max)=(160-25)/39=3.46W

11. Ordering Information

Part Number	Package Type	Production Flow
W83310DS	Power SOP-8	

12. How to Read the Top Marking



Left line: Winbond logo
 1st & 2nd line: W83310DS/DG – the part number
 3rd line: Tracking code 318 G A
318: packages assembled in Year 03', week 18
G: assembly house ID; O means OSE, G means GR, etc.
A: the IC version



W83310DS/DG

PRELIMINARY



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