

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

Please note that all data and specifications are subject to change without notice. All the trademarks of products and companies mentioned in this datasheet belong to their respective owners.

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Winbond customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Winbond for any damages resulting from such improper use or sales.

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

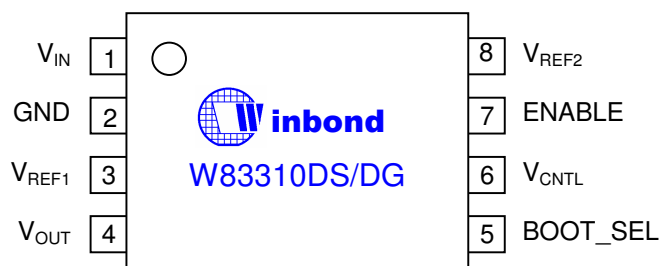
- ❖ Regulates a bi-directional power with driving and sinking capability
- ❖ Provides achieve continuous 2.0Amp driving and sinking current
- ❖ Power MOSFET integrated
- ❖ Low external component count
- ❖ Low output voltage offset
- ❖ VCNTL Operates with +3.3V & 2.5 V power
- ❖ 8-SOP 150mil small power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

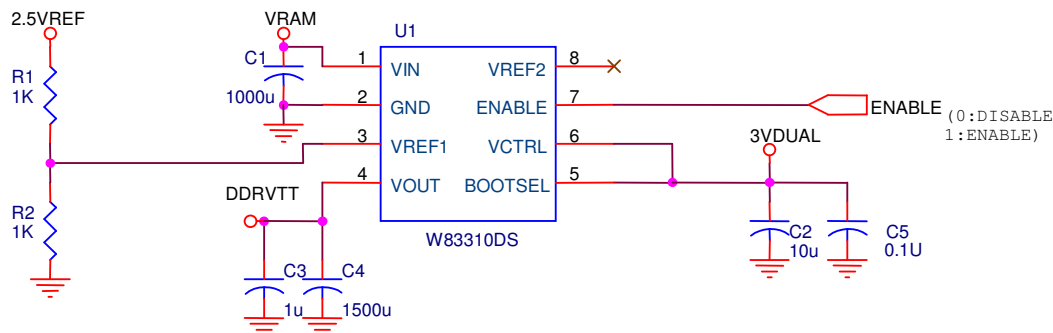
- W83310DS/DG



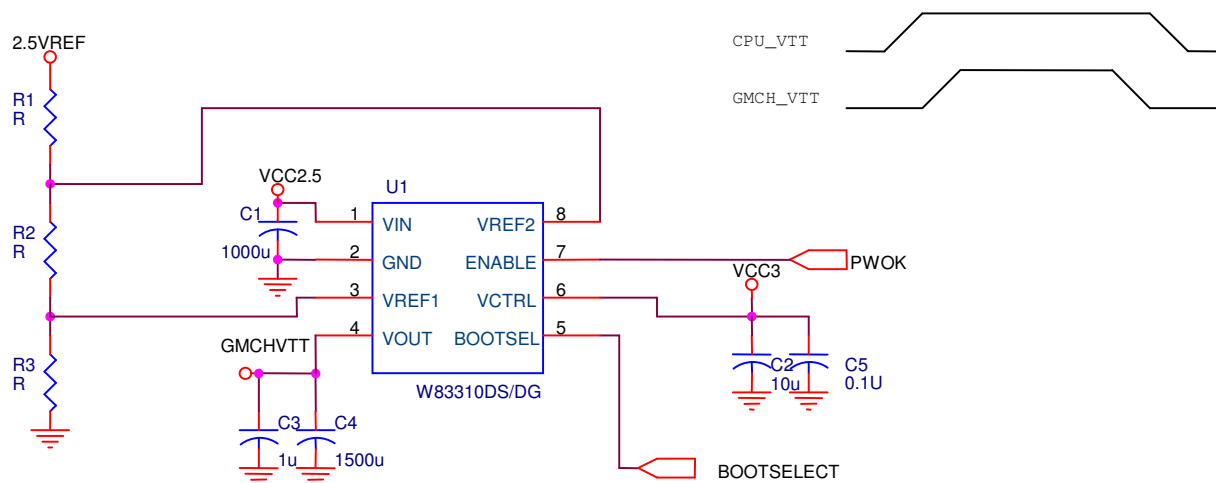
SYMBOL	PIN	FUNCTION
V_{IN}	1	Main power input pin.
GND	2	Power ground.
V_{REF1}	3	Internal reference voltage source 1. Reference voltage on the pin will be referred with the value of pin BOOT_SEL set high.
V_{OUT}	4	Voltage output pin.
BOOT_SEL	5	A signal for the chip reference voltage source selection. The function is designed for Intel® Springdale chipset GMCH_ V_{TT} application.
V_{CNTRL}	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

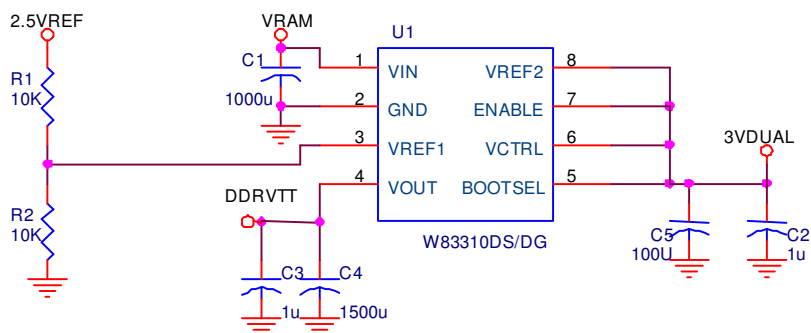


BOOTSELECT=0 GMCHVTT=1.45V for Intel® NORTHWOOD CPU
BOOTSELECT=1 GMCHVTT=1.225V for Intel® PRESCOTT CPU

R1: R2: R3 = 4.66: 1.00: 5.44

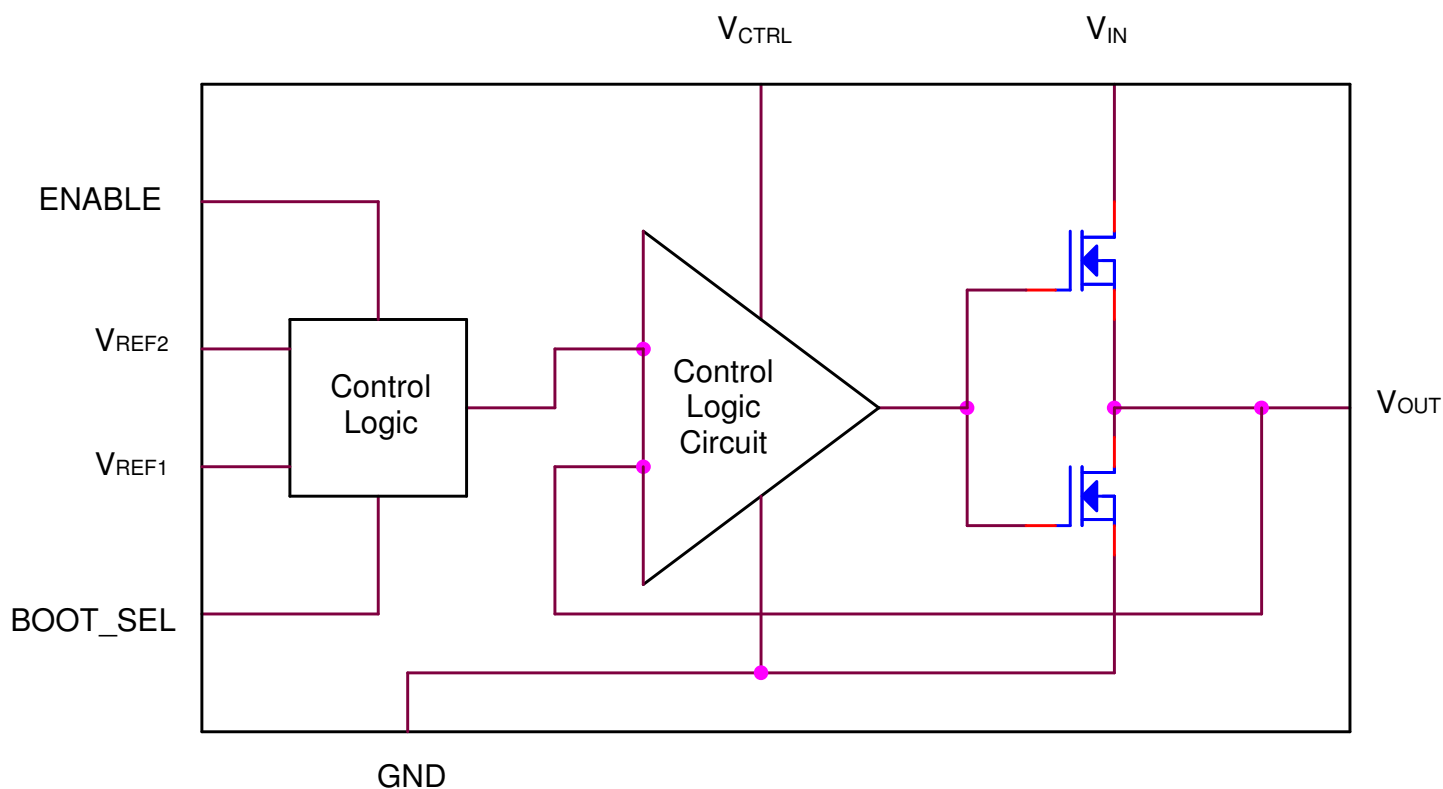
Recommend resistor R1=23.2KΩ, R2=4.99KΩ, R3=27.4KΩ

- 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>Cout=1000uF, T_A = 0°C to +70°C</i>						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	Vos	-5	0	+5	mV	I _{out} =0A
Load Regulation			0.8		%	Loading: 0A→2.0A
			0.8			Loading: 0A→-2.0A
Input Voltage Range	VIN	1.62		3.63	V	
	VCNTL		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.

<i>Cout=1000uF, T_A = 0°C to +70°C</i>						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	Vos	-5	0	+5	mV	I _{out} =0A
Load Regulation			0.8		%	Loading: 0A→2.0A
			0.8			Loading: 0A→-2.0A
Input Voltage Range	VIN	1.62		3.63	V	
	VCNTL		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	

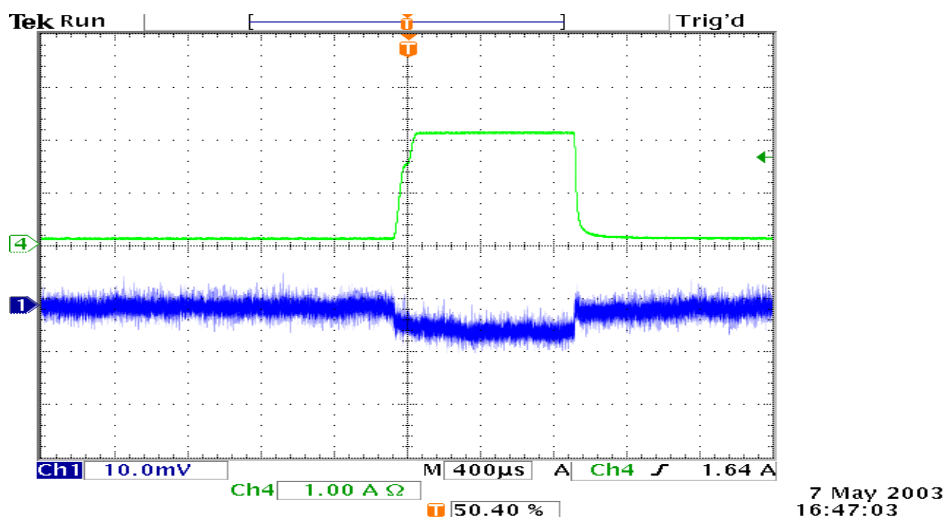
Note: Load regulation is tested by using a 1ms current pulse and V_{OUT} measuring.

<i>Cout=1000uF, T_A = 0°C to +70°C</i>						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	Vos	-5	0	+5	mV	I _{out} =0A
Load Regulation			0.8		%	Loading: 0A→2.0A
			0.8			Loading: 0A→-2.0A
Input Voltage Range	VIN	1.62		3.63	V	
	VCNTL		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	

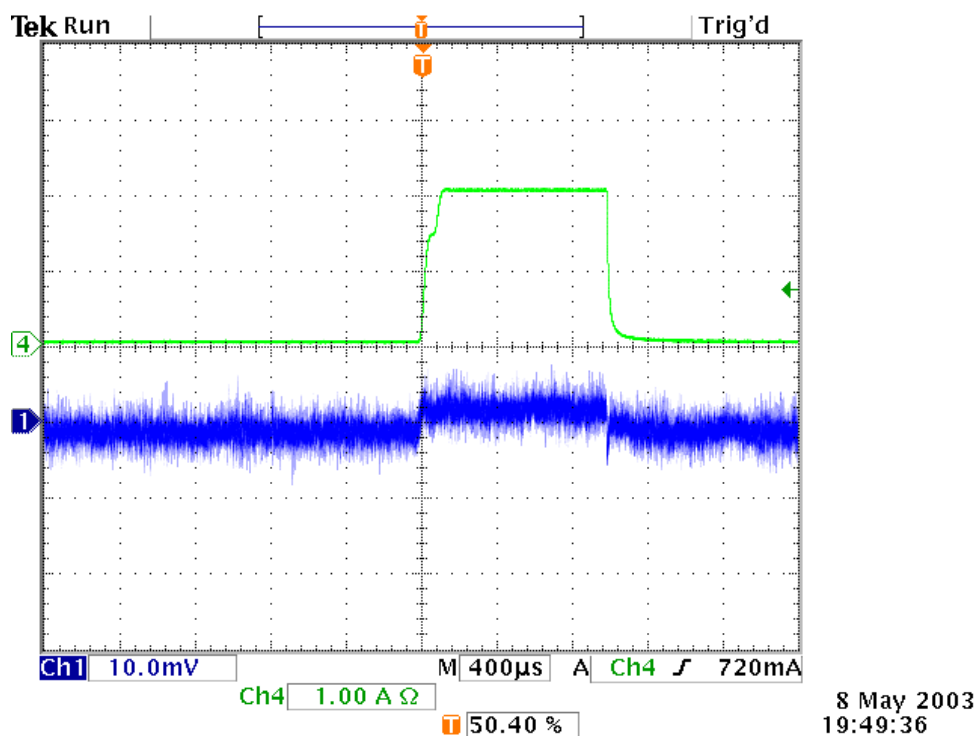
Note: Load regulation is tested by using a 1ms current pulse and V_{OUT} measuring.

8. Typical Operating Waveform

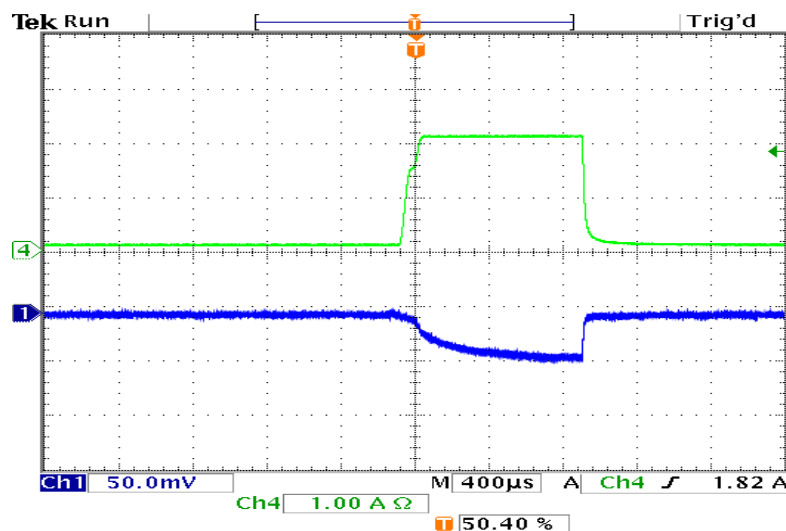
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.225V$; 2.0Amp pulse driving current.



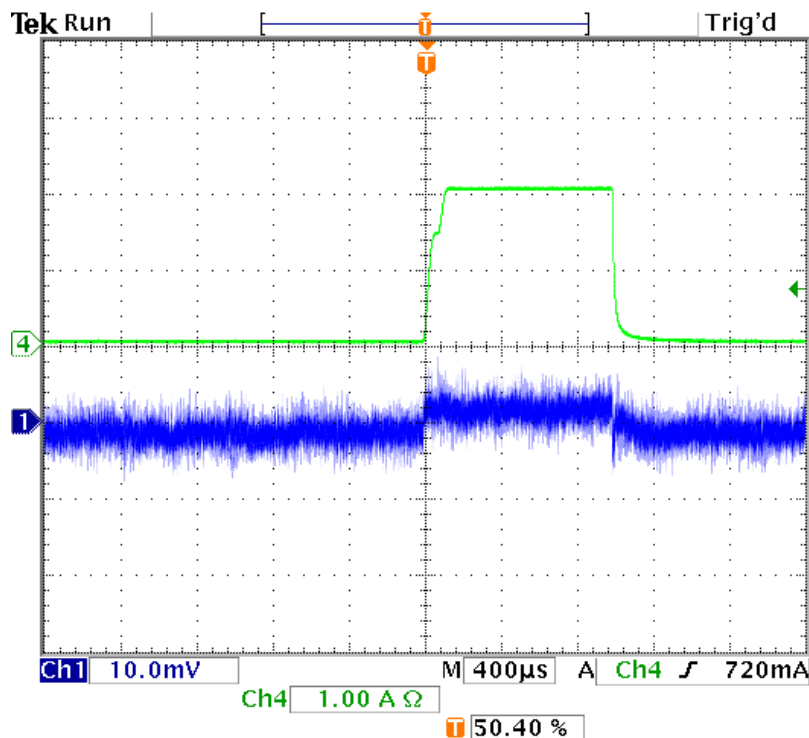
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.225V$; 2.0Amp pulse sinking current.



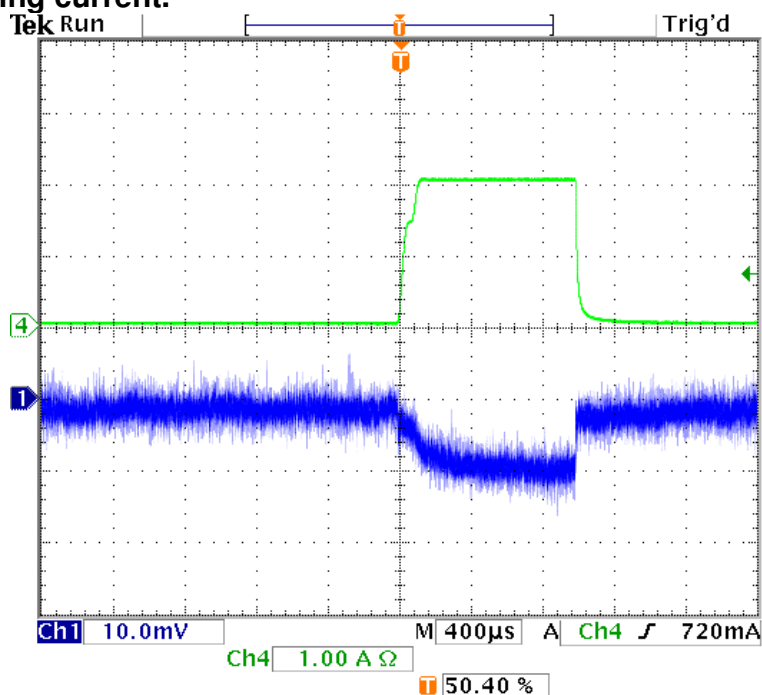
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.45V$; 2.0Amp pulse driving current.



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

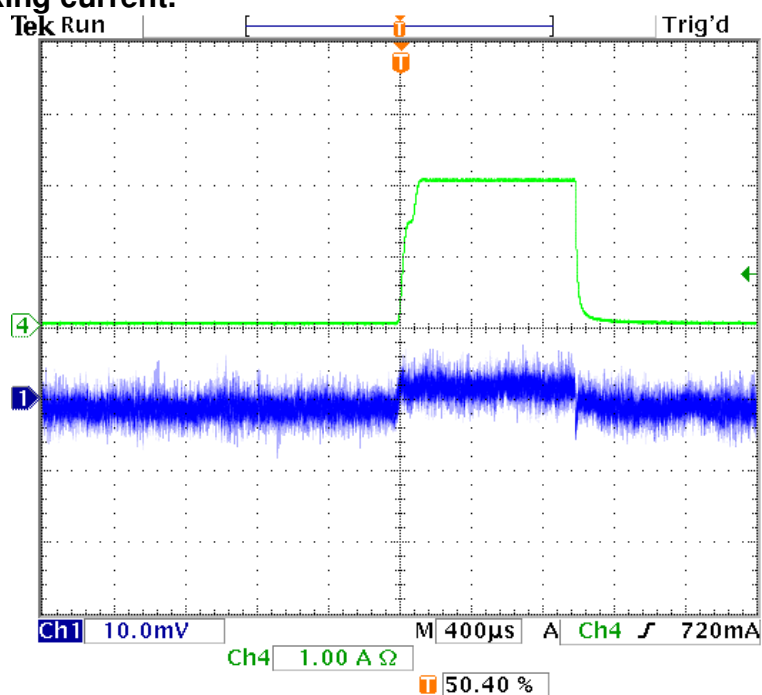


Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.25V$; 2.0Amp pulse driving current.



8 May 2003
19:47:48

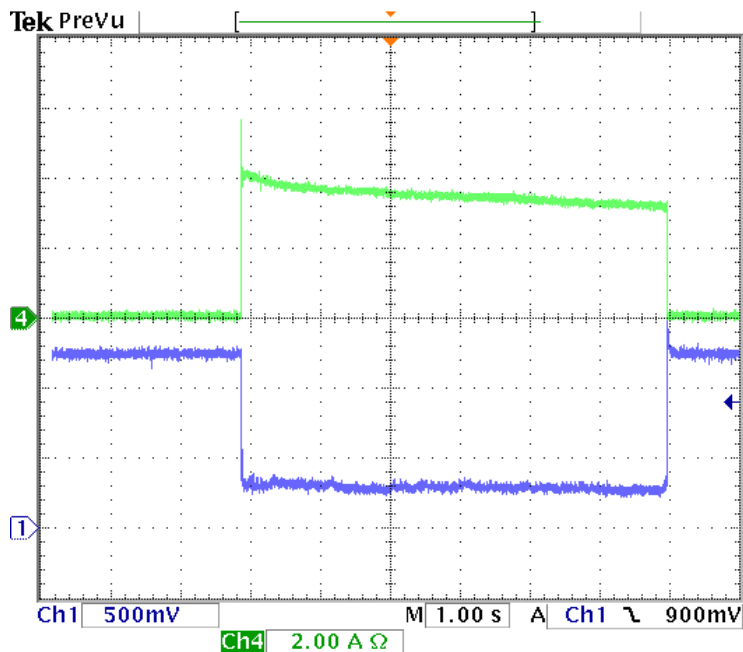
Load regulation with test condition - $V_{CTRL}=3.3V$; $V_{IN}=2.5V$; $V_{OUT}=1.25V$; 2.0Amp pulse sinking current.



8 May 2003
19:49:36

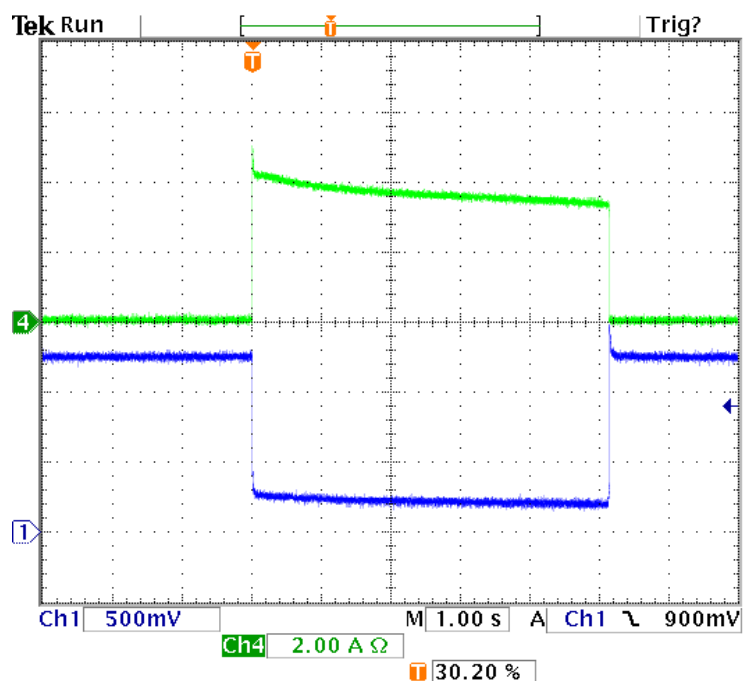
Short Current Limit

- $V_{CTRL} = 3.3V$



27 May 2003
19:31:21

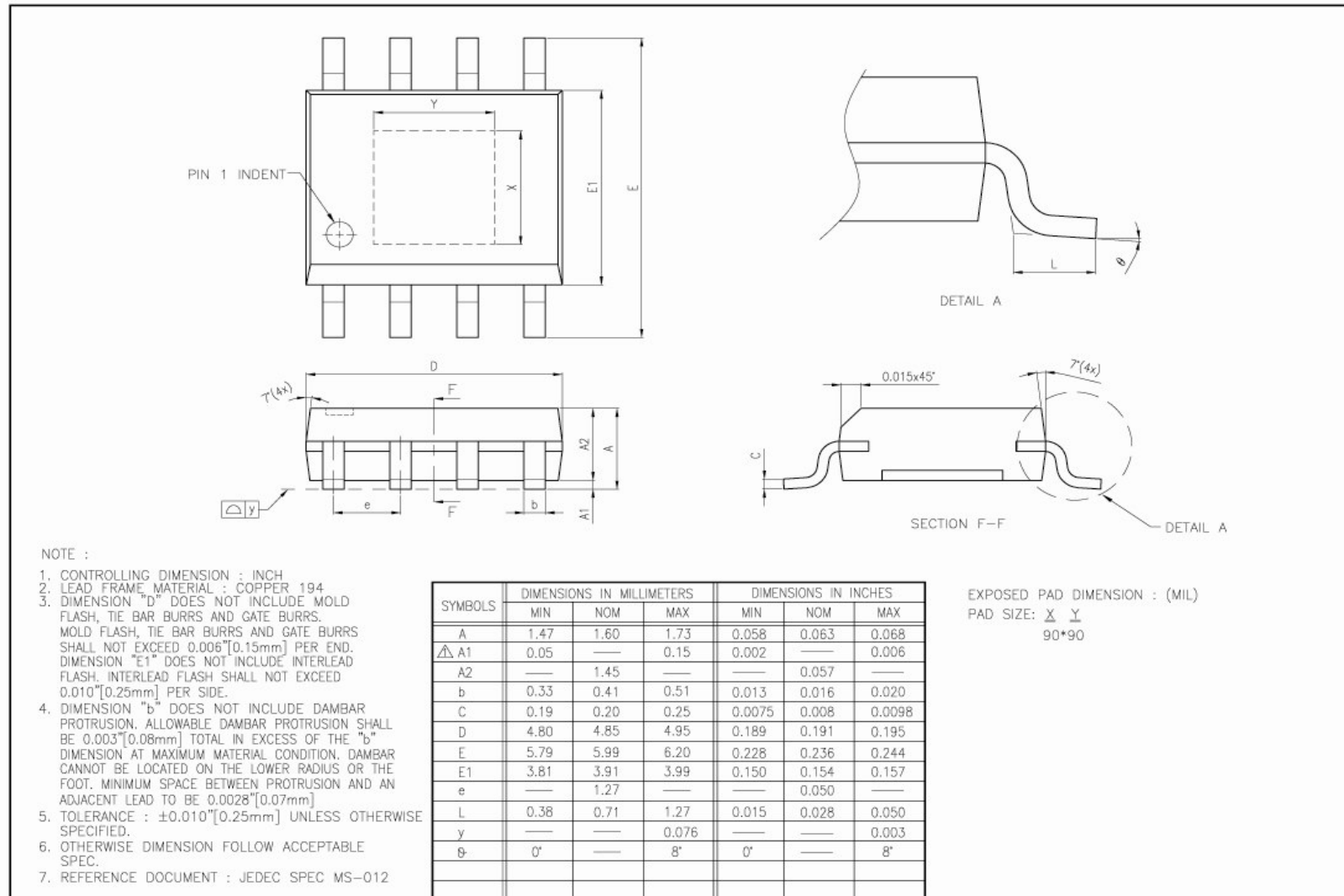
- $V_{CTRL} = 3.6V$



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 Θ_{ja} of the W83310DS mounted on this demo board is about 39 °C /W. Assuming the $T_A=25^{\circ}\text{C}$ and $T_J=160^{\circ}\text{C}$, the maximum power dissipation is calculated as: $P_{D(max)}=(160-25)/39=3.46\text{W}$

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



Headquarters

No. 4, Creation Rd. III
Science-Based Industrial Park
Hsinchu, Taiwan
TEL: 886-35-770066
FAX: 886-35-789467
www: <http://www.winbond.com.tw/>

Winbond Electronics (H.K.) Ltd.

Rm. 803, World Trade Square, Tower II
123 Hoi Bun Rd., Kwun Tong
Kowloon, Hong Kong
TEL: 852-27516023-7
FAX: 852-27552064

Winbond Electronics

(North America) Corp.
2727 North First Street
San Jose, California 95134
TEL: 1-408-9436666
FAX: 1-408-9436668

Taipei Office

9F, No. 480, Rueiguang Road, Neihu District,
Taipei, 114, Taiwan
TEL: 886-2-81777168
FAX: 886-2-87153579

Please note that all data and specifications are subject to change without notice. All the trade marks of products and companies mentioned in this data sheet belong to their respective owners. These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Winbond customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Winbond for any damages resulting from such improper use or sale.

www.s-manuals.com