Winbond
Bus Termination Regulator
W83310S-R/N

Date: April 13, 2005 Revision: 1.0

Winbond Electronics Corp.

Table of Content-

1. GENERAL DESCRIPTION

The W83310S-R/N is a linear regulator which provides achieves 1.5Amp bi-directional sinking and driving capability for DDR SDRAM bus terminator application. The chip simply implement a stable power supply which can track half of input power dynamically for bus terminator with a single chip; that is the chip integrates two power MOSFETs. There is no any external power device needed. The W83310S-R/N is promoted with small footprint 8-SOP 150mil package. With W83301S-R/N 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 1.5Amp driving and sinking current
- ❖ Power MOSFET integrated
- ❖ Low external component count
- ❖ Low output voltage offset
- ❖ Operates with +5V,+3.3V and +2.5V power
- ❖ Small package
- ❖ Low cost and easy to use

3. APPLICATIONS

- ❖ DDR Bus Termination Regulator
- ❖ Active Termination Bus
- ❖ SSTL-2
- ❖ SSTL-3

Publication Release Date: April 13, 2005
Revision 1.0

4. PIN CONFIGURATION AND DESCRIPTION

- W83310S-R

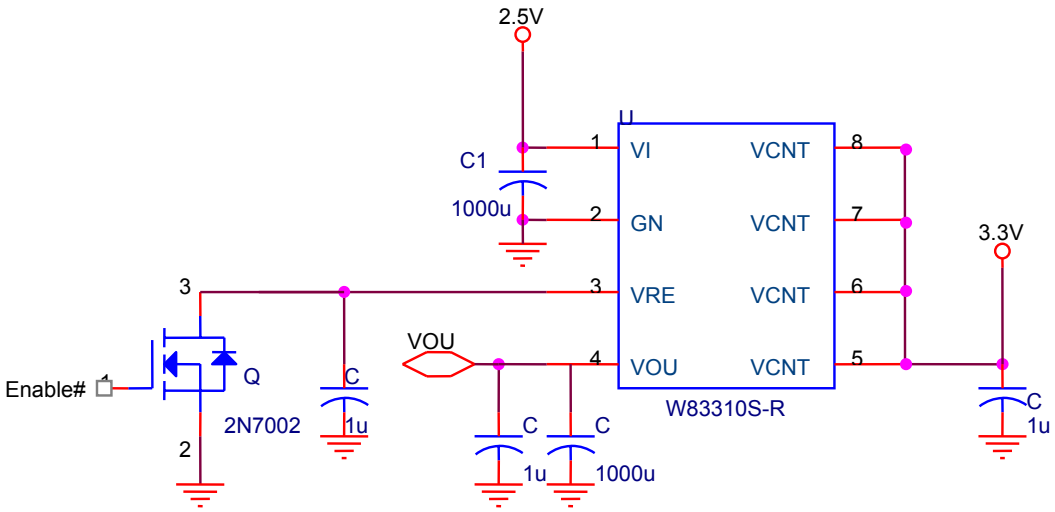
SYMBOL	PIN	FUNCTION
VIN	1	Power input pin.
GND	2	Ground.
VREF	3	Reference voltage and Chip enable.
VOUT	4	Output voltage.
VCNTL	5	Gate drive voltage.
VCNTL	6	Gate drive voltage.
VCNTL	7	Gate drive voltage.
VCNTL	8	Gate drive voltage.

- W83310S-N

SYMBOL	PIN	FUNCTION
N/C	1	No internal connection.
GND	2	Ground.
VSENSE	3	Feedback pin for regulating VTT.
VREF	4	Internal reference voltage of VDDQ/2.
VDDQ	5	Input for internal reference equal to VDDQ/2.
AVIN	6	Analog input pin.
PVIN	7	Power input pin.
VTT	8	Output voltage for connection to termination resistors.

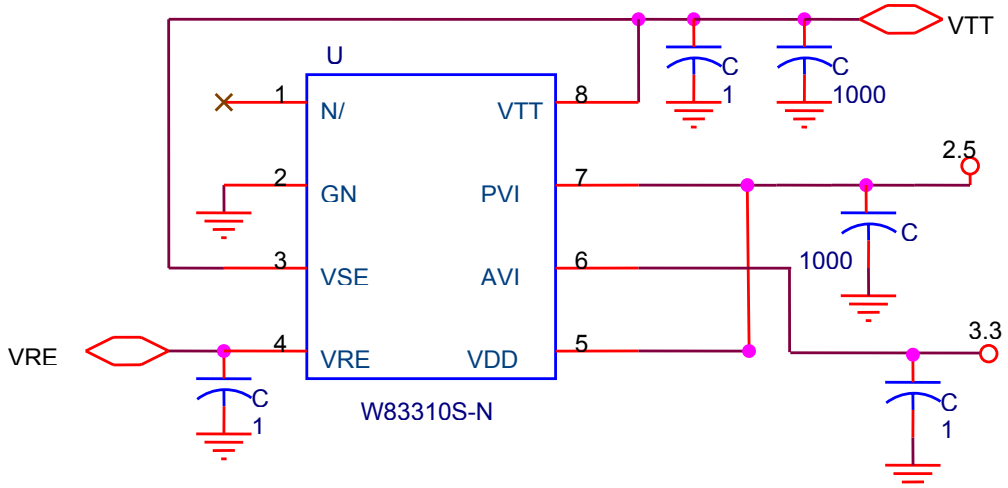
5. APPLICATION CIRCUIT

- W83310S-R



Publication Release Date: April 13, 2005
Revision 1.0

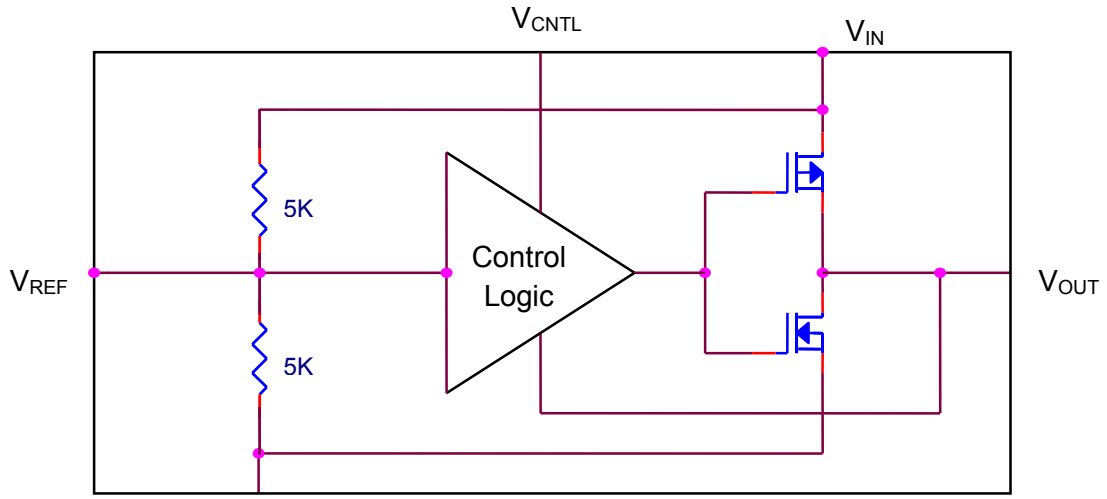
- W83310S-N



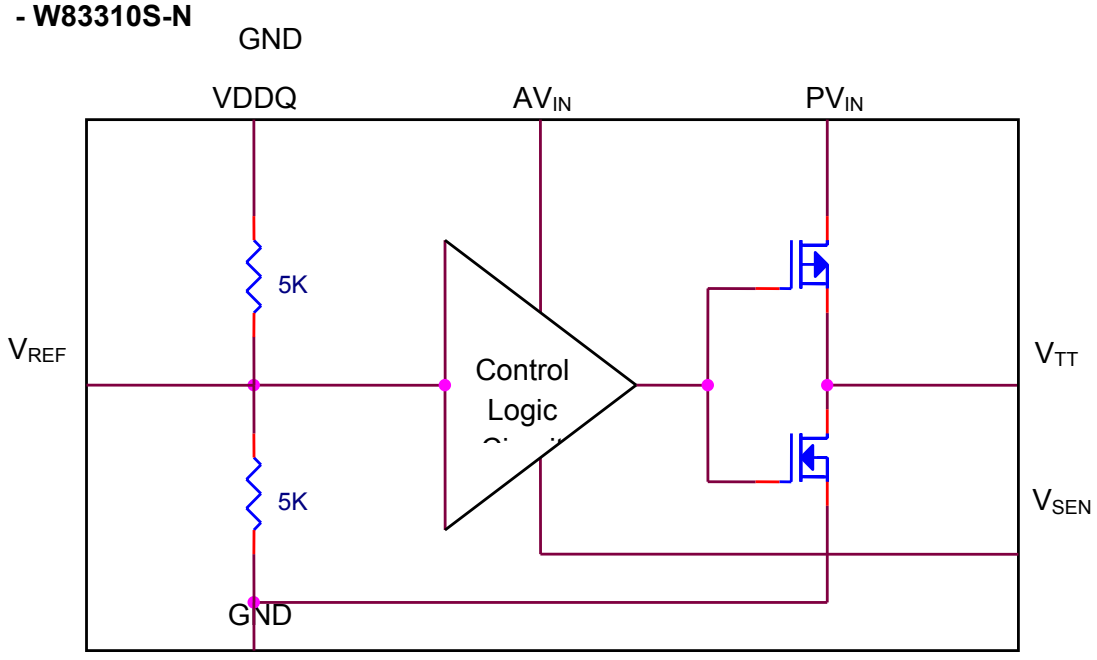
Publication Release Date: April 13, 2005
Revision 1.0

6. INTERNAL BLOCK DIAGRAM

- W83310S-R



- W83310S-N



7. ELECTRICAL CHARACTERISTICS

AC CHARACTERISTICS

W83310S-R						
VIN=2.5V,VCNTL=3.3V,VREF=1.25V,Cout=100uF, T_A = 0℃ to +70℃						
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→1.5A
			0.8			Loading: 0A→-1.5A
Input Voltage Range	V_{IN}		2.5		V	
	V_{CNTL}		3.3			
Operating Current of VCNTL	I_{CNTL}		0.5	1	mA	No Load(I_{OUT}=0A)
Shutdown Threshold Trigger		0.4			V	Output=High
				0.1	V	Output=Low
Shutdown Current	I_{SHDN}		10		uA	VREF<0.2V Loading=0.7A

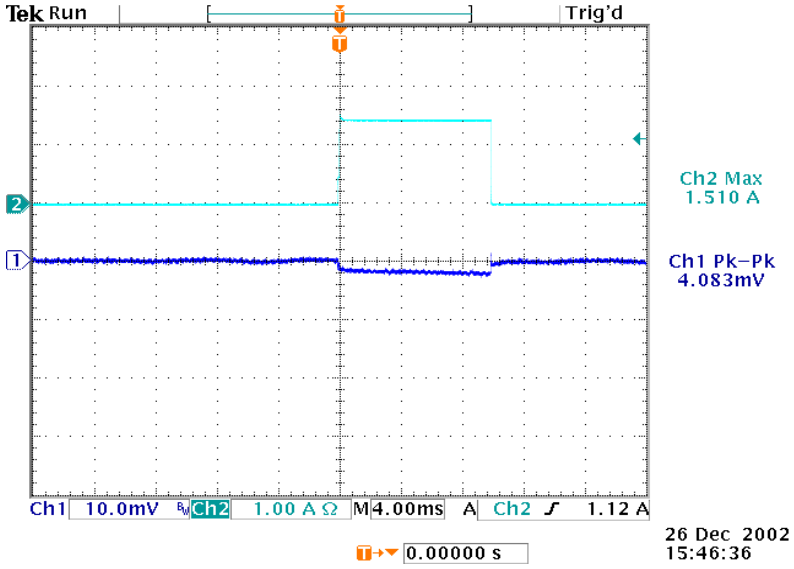
Note: **Load regulation is tested with a 10ms pulse current and measuring V_{OUT}.**

W83310S-N						
AVIN=3.3V; PVIN=2.5V is recommended, VDDQ =2.5V,VREF=1.25V,Cout=100uF, T_A = 0℃ to +70℃						
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→1.5A
			0.8			Loading: 0A→-1.5A
Input Voltage Range	**VDDQ**		2.5		V	
	PVIN		2.5			
	AVIN		3.3			
Operating Current of AVIN	**IAVIN**		0.5	1	mA	No Load(I_{OUT}=0A)

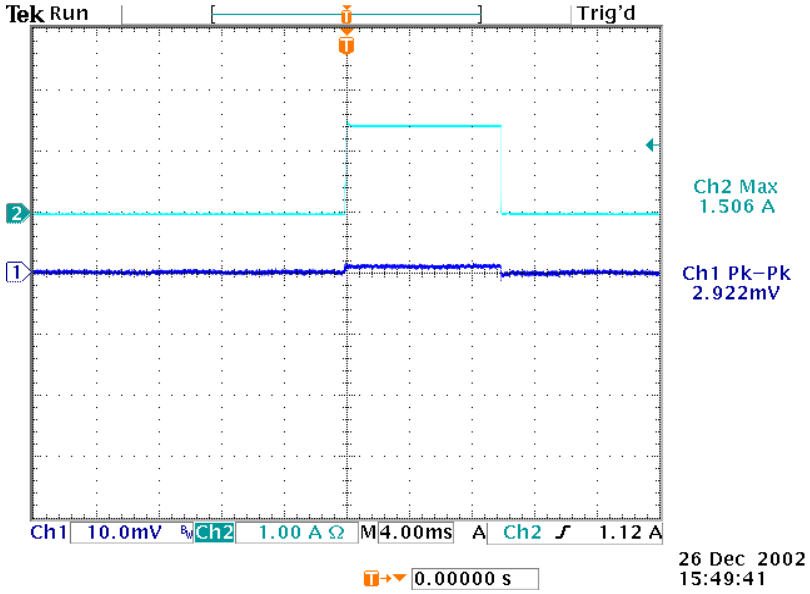
Note: **Load regulation is tested with a 10ms pulse current and measuring V_{TT}.**

8. TYPICAL OPERATING WAVEFORM

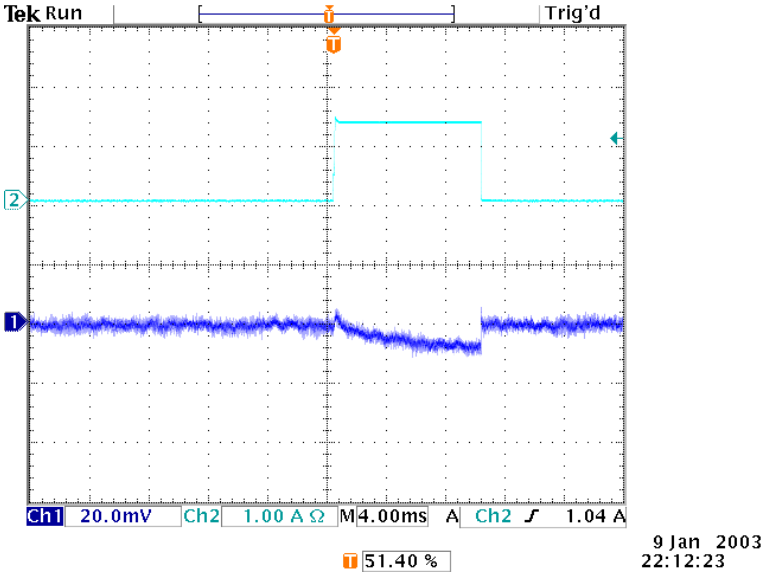
W83310S-R V_{OUT} offset with a 1.5A/10ms driving pulse current.



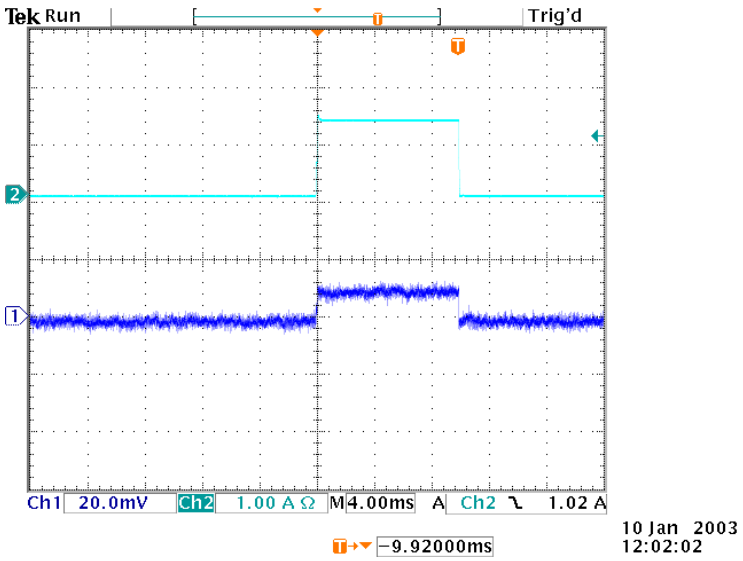
W83310S-R V_{OUT} offset with a 1.5A/10ms sinking pulse current.



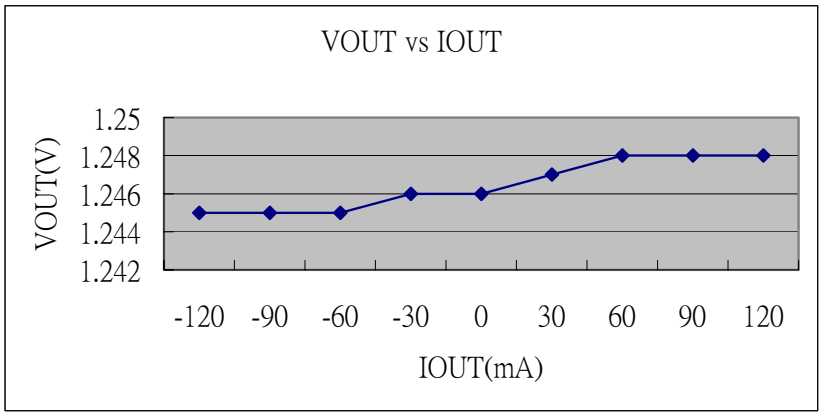
W83310S-N V_{TT} offset with a 1.5A/10ms driving pulse current.



W83310S-N V_{TT} offset with a 1.5A/10ms sinking pulse current.



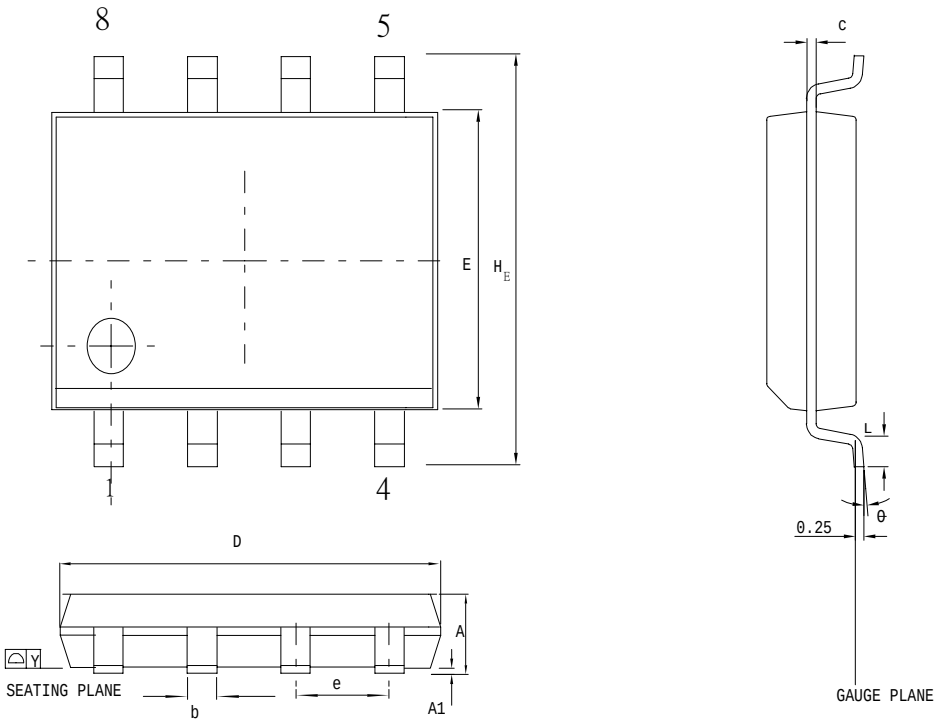
- Load regulation with various sinking/driving loading



9. PACKAGE DIMENSION

8L SOP 150mil

SOP-8 Thermal Resistance θ_{JA} 156.0°C/W with 0m/s airflow
141.8°C/W with 1m/s airflow
135.2°C/W with 2m/s airflow
130.6°C/W with 0m/s airflow



Control demensions are in milmeters .

SYMBOL	DIMENSION IN MM		DIMENSION IN INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
b	0.33	0.51	0.013	0.020
c	0.19	0.25	0.008	0.010
E	3.80	4.00	0.150	0.157
D	4.80	5.00	0.188	0.196
e	1.27 BSC		0.050 BSC	
H_E	5.80	6.20	0.228	0.244
Y	—	0.10	—	0.004
L	0.40	1.27	0.016	0.050
θ	0	10	0	10

10. ORDERING INFORMATION

PART NUMBER	PACKAGE TYPE	PRODUCTION FLOW
W83310S-R	8PIN SOP	Commercial, 0°C to +70°C
W83310S-N	8PIN SOP	Commercial, 0°C to +70°C

11. HOW TO READ THE TOP MARKING

Left line: Winbond logo

1st & 2nd line: W883310S-R/N – the part number

3rd line: Tracking code Tracking code 249 O A

249: packages assembled in Year 02', week 49

O: assembly house ID; O means OSE, G means GR, etc.

B: the IC version

12. REVISION HISTORY

VERSION	DATE	PAGE	DESCRIPTION
0.51	12/2002	N.A.	The versions before 0.5 are only for internal reference.
0.60	02/2003	3	Recommend circuit update
0.61	03/2003	5	AC specification update
1.0	4/13/2005	12	Add disclaimer

Important Notice

Winbond products are not designed, intended, authorized or warranted for use as components in systems or equipment intended for surgical implantation, atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, or for other applications intended to support or sustain life. Further more, Winbond products are not intended for applications wherein failure of Winbond products could result or lead to a situation wherein personal injury, death or severe property or environmental damage could occur.

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