



**Winbond**  
**Bus Termination Regulator**  
**W83310S-R/N**

Date: May 21, 2003    Revision: 0.61



## W83310S-R/N Data Sheet Revision History

	PAGES	DATES	VERSION	WEB VERSION	MAIN CONTENTS
1	N.A.	12/2002	0.51	N.A.	The versions before 0.5 are only for internal reference.
2	3	02/2003	0.60	N.A.	Recommend circuit update
3	5	03/2003	0.61	N.A.	AC specification update

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### LIFE SUPPORT APPLICATIONS

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## 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

## 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.

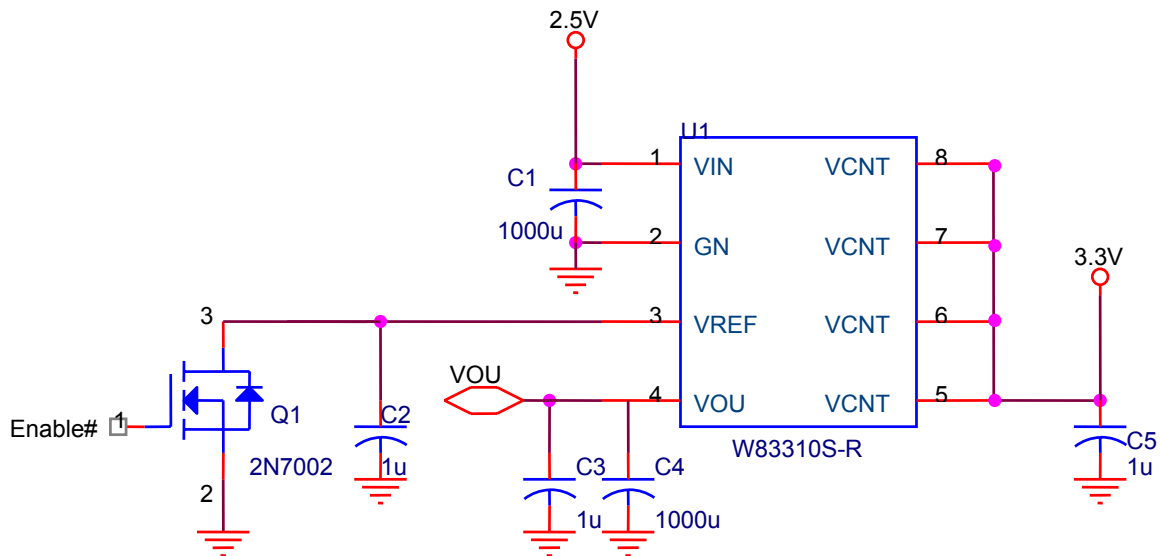
### - W83310S-N



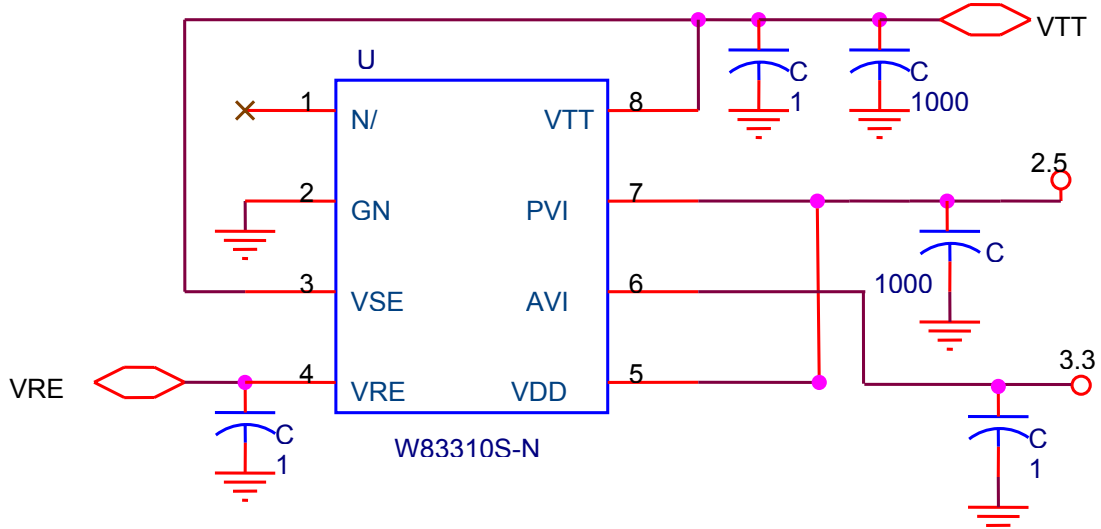
SYMBOL	PIN	FUNCTION
N/C	1	No internal connection.
GND	2	Ground.
VSENSE	3	Feedback pin for regulating VTT.
VREF	4	Internal reference voltage of VDDQ/2.
VDDQ	5	Input for internal reference equal to VDDQ/2.
AVIN	6	Analog input pin.
PVIN	7	Power input pin.
VTT	8	Output voltage for connection to termination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

## 5. APPLICATION CIRCUIT

### - W83310S-R

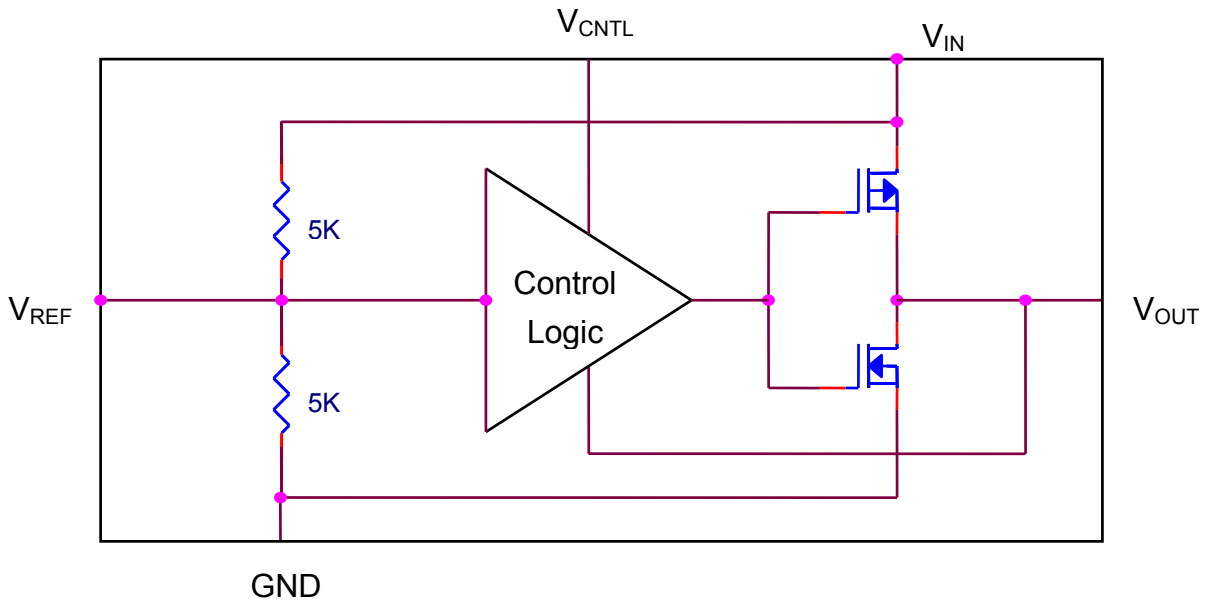


- W83310S-N



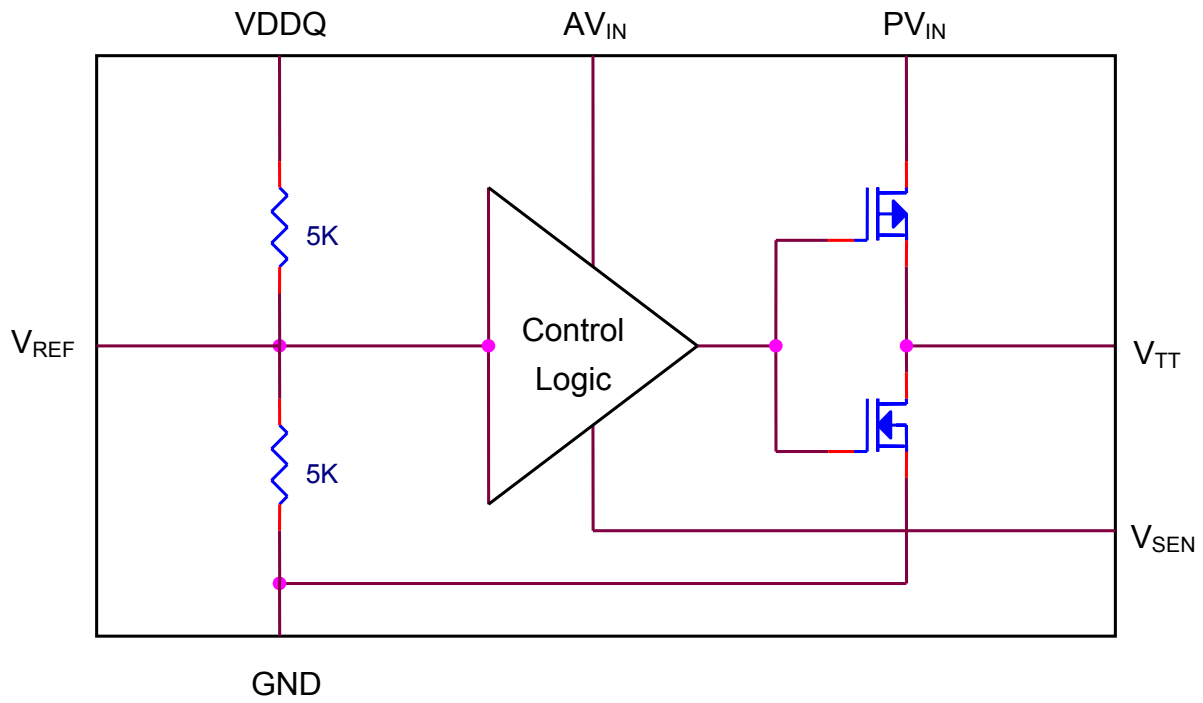
6. INTERNAL BLOCK DIAGRAM

- W83310S-R





## - W83310S-N





7. ELECTRICAL CHARACTERISTICS

AC CHARACTERISTICS

W83310S-R						
VIN=2.5V,VCNTL=3.3V,VREF=1.25V,Cout=100uF, TA = 0°C to +70°C						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	V <sub>OS</sub>	-5	0	+5	mV	I <sub>OUT</sub> =0A
Load Regulation			0.8		%	Loading: 0A→1.5A
			0.8			Loading: 0A→-1.5A
Input Voltage Range	V <sub>IN</sub>		2.5		V	
	V <sub>CNTL</sub>		3.3			
Operating Current of VCNTL	I <sub>CNTL</sub>		0.5	1	mA	No Load(I <sub>OUT</sub> =0A)
Shutdown Threshold Trigger		0.4			V	Output=High
				0.1	V	Output=Low
Shutdown Current	I <sub>SHDN</sub>		10		uA	VREF<0.2V Loading=0.7A

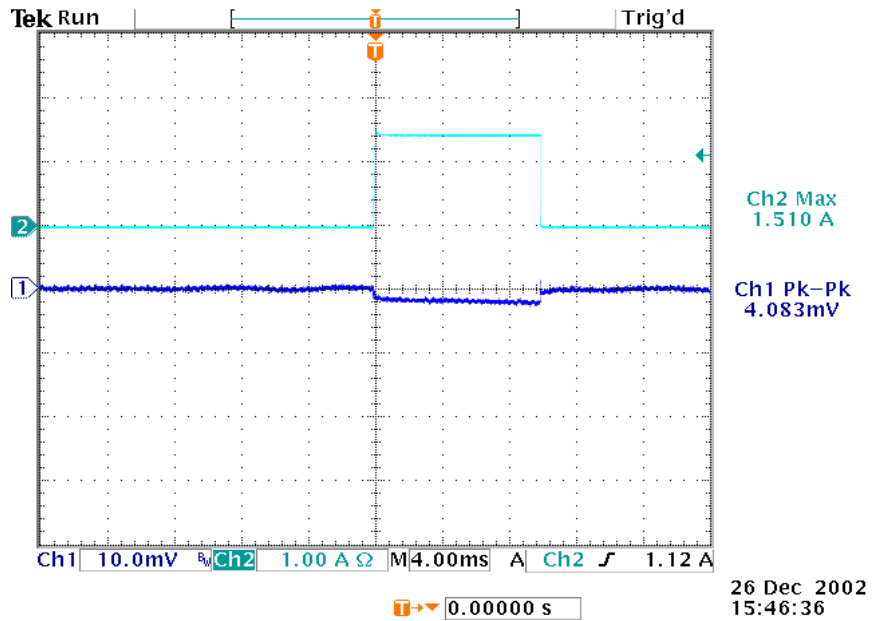
Note: Load regulation is tested with a 10ms pulse current and measuring V<sub>OUT</sub>.

W83310S-N						
AVIN=3.3V; PVIN=2.5V is recommended, VDDQ =2.5V,VREF=1.25V,Cout=100uF, TA = 0°C to +70°C						
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Output Offset Voltage	V <sub>OS</sub>	-5	0	+5	mV	I <sub>OUT</sub> =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	I <sub>AVIN</sub>		0.5	1	mA	No Load(I <sub>OUT</sub> =0A)

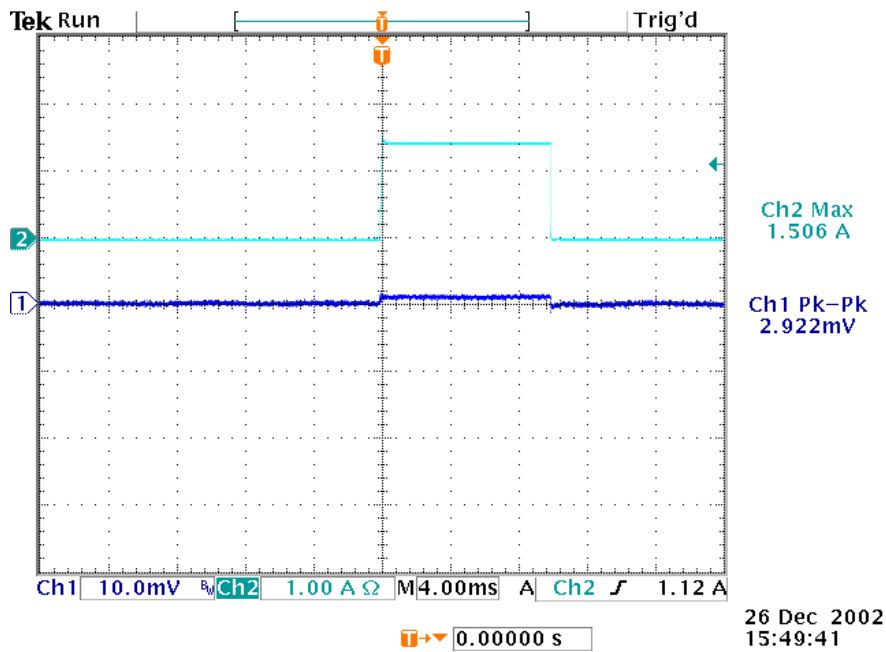
Note: Load regulation is tested with a 10ms pulse current and measuring V<sub>TT</sub>.

## 8. TYPICAL OPERATING WAVEFORM

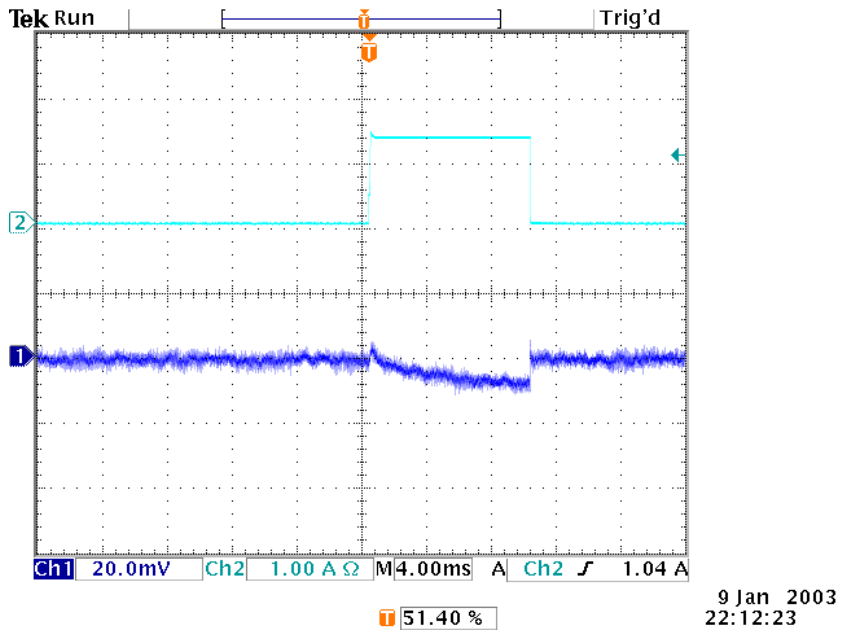
W83310S-R  $V_{OUT}$  offset with a 1.5A/10ms driving pulse current.



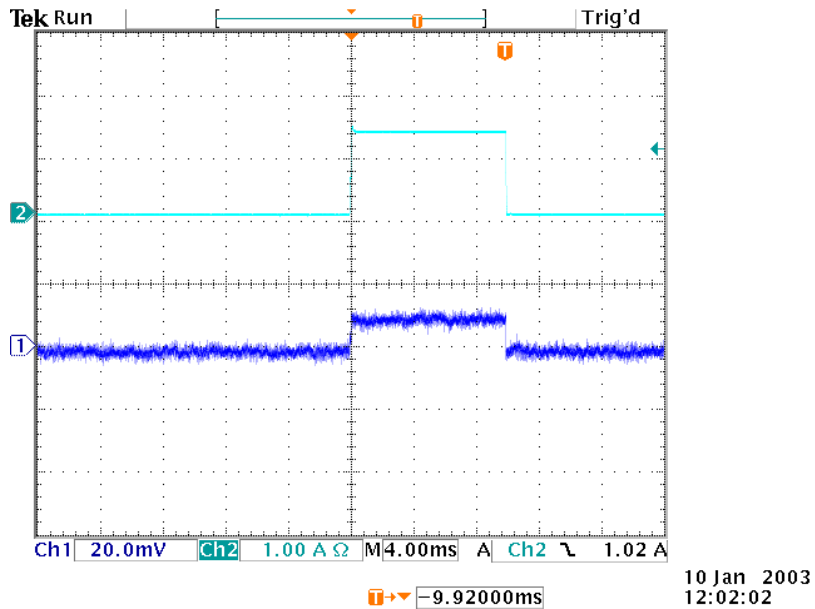
W83310S-R  $V_{OUT}$  offset with a 1.5A/10ms sinking pulse current.



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

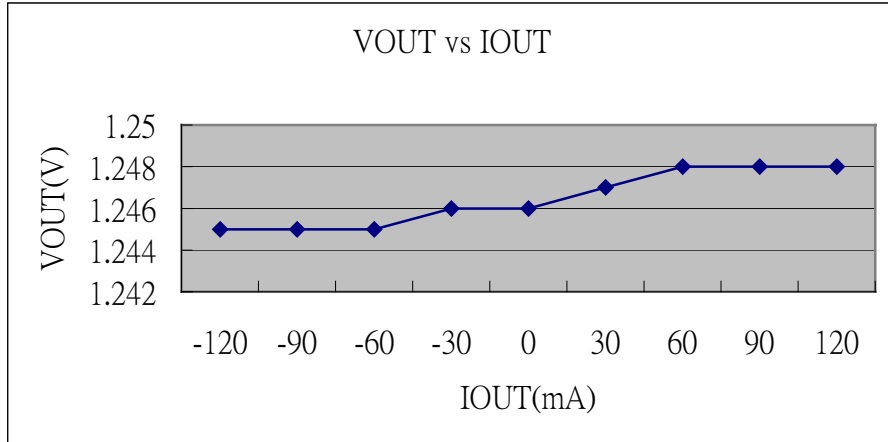


W83310S-N  $V_{TT}$  offset with a 1.5A/10ms sinking pulse current.





- Load regulation with various sinking/driving loading

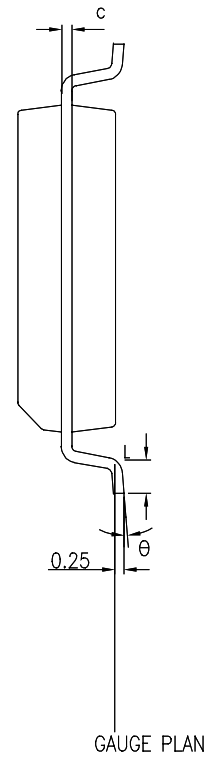
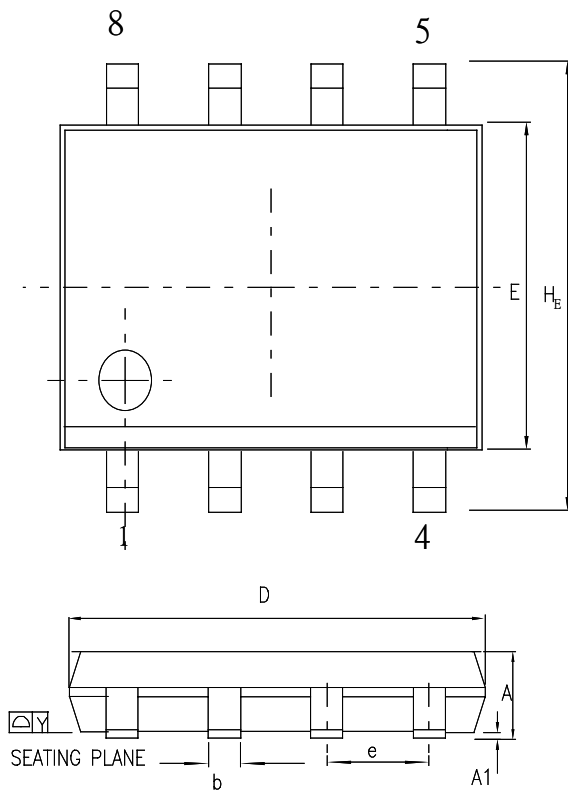


## 9. PACKAGE DIMENSION

### 8L SOP 150mil

SOP-8 Thermal Resistance  $\theta_{JA}$

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 dimensions are in milimeters .

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
$\theta$	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

1<sup>st</sup> & 2<sup>nd</sup> 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



**Headquarters**  
No. 4, Creation Rd. III,  
Science-Based Industrial Park,  
Hsinchu, Taiwan  
TEL: 886-3-5770066  
FAX: 886-3-5665577  
<http://www.winbond.com.tw/>

**Taipei Office**  
9F, No.480, Rueiguang Rd.,  
Neihu District, Taipei, 114,  
Taiwan, R.O.C.  
TEL: 886-2-8177-7168  
FAX: 886-2-8751-3579

**Winbond Electronics Corporation America**  
2727 North First Street, San Jose,  
CA 95134, U.S.A.  
TEL: 1-408-9436666  
FAX: 1-408-5441798

**Winbond Electronics Corporation Japan**  
7F Daini-ueno BLDG, 3-7-18  
Shinyokohama Kohoku-ku,  
Yokohama, 222-0033  
TEL: 81-45-4781881  
FAX: 81-45-4781800

**Winbond Electronics (Shanghai) Ltd.**  
27F, 2299 Yan An W. Rd. Shanghai,  
200336 China  
TEL: 86-21-62365999  
FAX: 86-21-62365998

**Winbond Electronics (H.K.) Ltd.**  
Unit 9-15, 22F, Millennium City,  
No. 378 Kwun Tong Rd.,  
Kowloon, Hong Kong  
TEL: 852-27513100  
FAX: 852-27552064

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