# Nuvoton Bus Termination Regulator W83310G-R2



# **Data Sheet Revision History**

NO	PAGES	DATES	VERSION	VERSION ON WEB	MAIN CONTENTS
1.	All	June, 2007	1.0	N.A	Remove non Pb-free part no: W83310S-R2
2	All	Nov., 2008	1.1	N.A	1. Change to Nuvoton document format 2. Add performance chart with VIN=1.5V/1.8V/2.5V at VCNTL = 3.0~3.6V
3					
4					
5					
6					

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#### LIFE SUPPORT APPLICATIONS

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## 1. GENERAL DESCRIPTION

The W83310G-R2 is a linear regulator provides power with the capability of continuous 1.8Amp bi-directional sinking and driving capability for a high speed bus terminator application. The chip simply implements a stable power supply which tracks dynamically half of the input power for the bus terminator. The W83310G-R2 is promoted with small footprint 8-SOP 150mil package. The design of the W83310G-R2 provides a high integration, high performance, and cost-effective solution.

#### 2. FEATURES

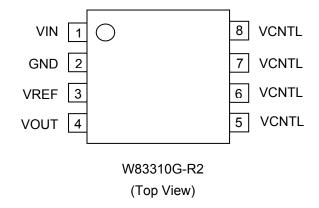
- Support DDRI (1.25VTT), DDRII (0.9VTT) and DDRIII (0.75VTT) Requirements
- Sink and Source 1.8A Continuous Current
- Integrated Power MOSFET
- Adjustable VOUT by External Resistors
- Low External Component Count
- Low Output Voltage Offset
- Short Circuit Protection
- 0°C to 70°C Ambient Operating Temperature Range
- SOP-8 Package, Lead (Pb) Free

#### 3. APPLICATIONS

- Desktop PCs, Notebooks, and Workstations
- Graphics Card Memory Termination
- DDRI, DDRII and DDRIII Memory Systems



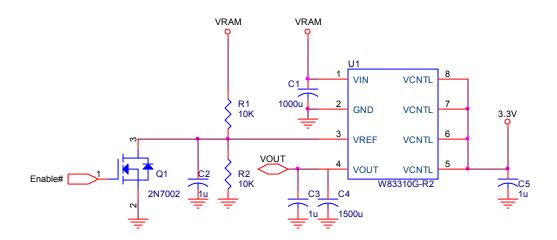
# 4. PIN CONFIGURATION AND DESCRIPTION



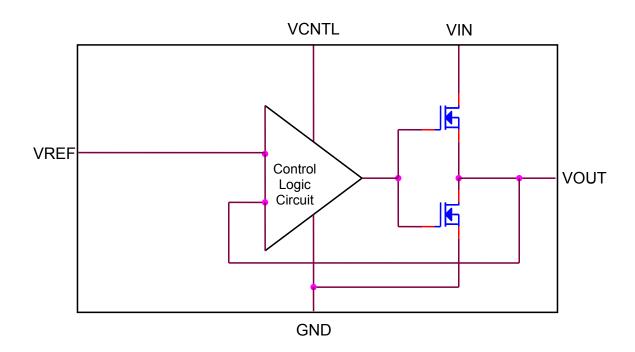
SYMBOL	PIN	I/O	FUNCTION			
VIN	1	I	Main power input pin which supplies current to the output pin.			
VDEE	7055		F.F. 0 1			Internal reference voltage source.
VREF 3		ı	Reference voltage on the pin will be referred with the pin value.			
VOUT	4	0	Voltage output pin which is regulated to the VREF voltage.			
VCNTL	5, 6, 7, 8	I	Power for internal control logic circuitry.			
GND	2		Ground.			



# 5. APPLICATION CIRCUIT



## 6. INTERNAL BLOCK DIAGRAM





## 7. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	RATING	UNIT
Input Voltage	VIN	-0.3 to 5	V
Control Logic Input Voltage	VCNTL	-0.3 to 5	V
	Human Body Mode	±2	kV
Electrostatic discharge protection	Machine Mode	±200	V
	Latch-Up	±100	mA
Package Thermal Resistance	$\theta_{JA}$	160	°C/W
Storage Temperature Range		-65 to 150	°C

Note: Stress listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum ration conditions for extended periods may remain possibility to affect device reliability.

## 8. RECOMMENDED OPERATING CONDITIONS

ITEM	SYMBOL	MIN	MAX	UNIT
Input Voltage	VIN	1.5	3.6	V
Input Voltage	VCNTL	3	3.6	V
Operating Temperature Range		0	70	°C
Junction Temperature Range		0	125	°C



## 9. ELECTRICAL CHARACTERISTICS

 $T_A = 25$ °C, VCNTL= 3.3 V, VIN=2.5V/1.8V/1.5V, VREF=1.25V/0.9V/0.75V,  $C_{OUT}$ =1000uF, all voltage outputs unloaded (unless otherwise noted)

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS		
Input							
VCNTL Operating Current	I <sub>CNTL</sub>	I <sub>OUT</sub> =0A		0.5	1	mA	
Shutdown Current (note 1)	I <sub>VIN</sub> (SHDN)	VREF<0.2V, I <sub>OUT</sub> =0.1A		1	10	uA	
Gridita Wil Guillerit (note 1)	I <sub>VCNTL</sub> (SHDN)			230	300	uA	
Output (DDRI / DDRII / DDRIII)	Output (DDRI / DDRII / DDRIII)						
Output Offset Voltage (note 2)	Vos	I <sub>OUT</sub> =0A	-5	0	5	mV	
Load Regulation (note 3)	$\Delta V_1$	$I_{OUT}$ =0 $\rightarrow$ +1.8A	-40		40	mV	
Load Negalation (note 3)	$\Delta V_{L}$	I <sub>OUT</sub> =-0 → -1.8A	-40		40		
Protection							
Short Current Limit I <sub>LIM</sub>		V <sub>OUT</sub> short to ground		4		Α	
VREF Shutdown Mode							
Shutdown Threshold	V <sub>IH</sub>	Enable	0.4			V	
Shutuown miesholu	V <sub>IL</sub>	Disable			0.2	V	

Note 1: Shutdown current is the input current of VIN & VCNTL drawn by a regulator when the output voltage is disabled by a shutdown signal on VREF pin ( $V_{IL}$  < 0.2). It is measured with VIN = 1.5V/1.8V/2.5V & VCNTL = 3.3V.

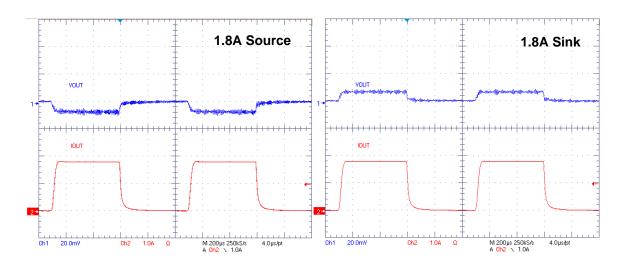
Note 2:  $V_{OS}$  offset is the voltage measurement as  $V_{OUT}$  subtracted from VREF.

Note 3: Regulation is measured at constant junction temperature by using a 5ms current pulse. Devices are tested for load regulation in the load range from 0A to 1.8A peak.

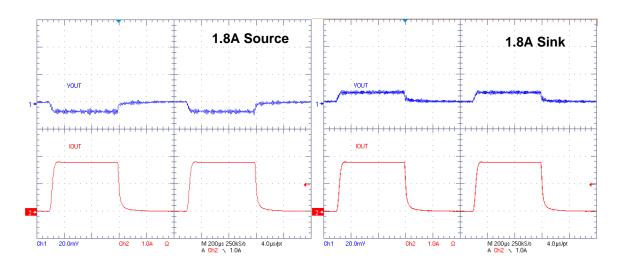


## 10. TYPICAL OPERATING WAVEFORMS

● Transient Response, VCNTL=3.3V, VIN=2.5V, VREF=1.25V, VOUT=1.25V

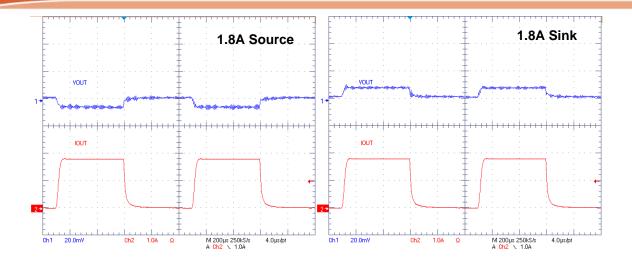


■ Transient Response, VCNTL=3.3V, VIN=1.8V, VREF=0.9V, VOUT=0.9V

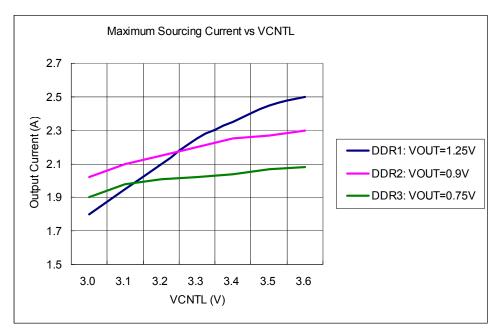


● Transient Response, VCNTL=3.3V, VIN=1.5V, VREF=0.75V, VOUT=0.75V





Maximum Sourcing Current with VCNTL = 3.0V ~ 3.6V

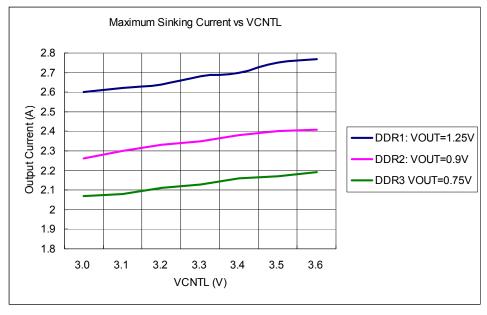


#### Note:

- ➤ DDR1: VIN = 2.5V, VOUT = 1.25V with 10ms current pulse.
- ➤ DDR2: VIN = 1.8V, VOUT = 0.9V with 10ms current pulse.
- DDR3: VIN = 1.5V, VOUT = 0.75V with 10ms current pulse.

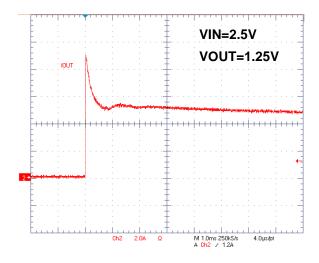




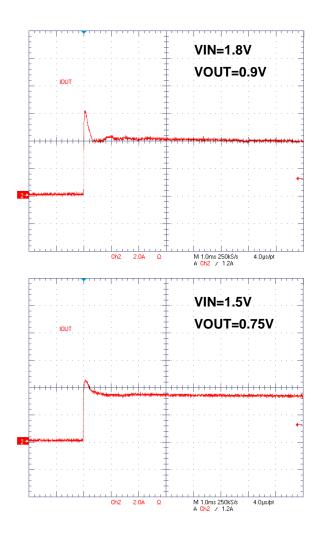


#### Note:

- DDR1: VIN = 2.5V, VOUT = 1.25V with 10ms current pulse.
- > DDR2: VIN = 1.8V, VOUT = 0.9V with 10ms current pulse.
- DDR3: VIN = 1.5V, VOUT = 0.75V with 10ms current pulse.
- Output Short Circuit Protection, VCNTL=3.3V, VOUT shorted to ground

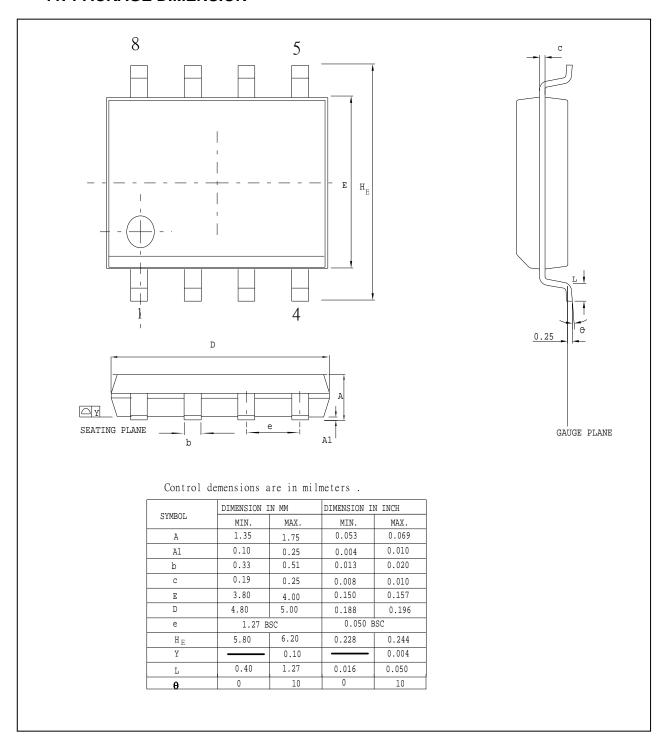






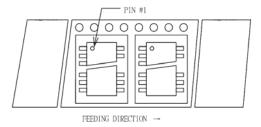


# 11. PACKAGE DIMENSION





#### > TAPING SPECIFICATION



8 Pin SOP Package

## 12. ORDERING INFORMATION

PART NUMBER	UMBER PACKAGE TYPE SUPPLIED AS		PRODUCTION FLOW	
W83310G-R2	8PIN SOP(Pb-free package)	E Shape: 100 units/Tube T Shape: 2,500 units/T&R	Commercial, 0°C to +70 °C	

## 13. TOP MARKING SPECIFICATION



Left line: Winbond logo (Nuvoton)

1<sup>st</sup> & 2<sup>nd</sup> line: W83310G-R2 – the part number

3<sup>rd</sup> line: Tracking code <u>706 X Y</u>

706: Packages assembled in Year 07', week 06

X: Assembly house ID Code

 $\underline{\mathbf{Y}}$ : The IC version Code



## **Important Notice**

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