

**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.

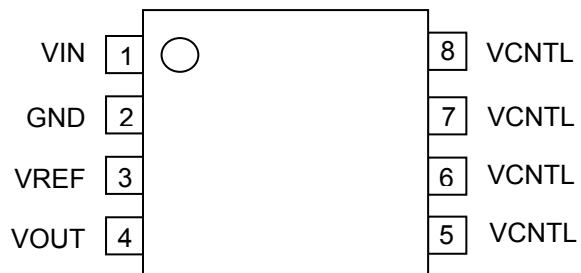
## 2. FEATURES

- 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

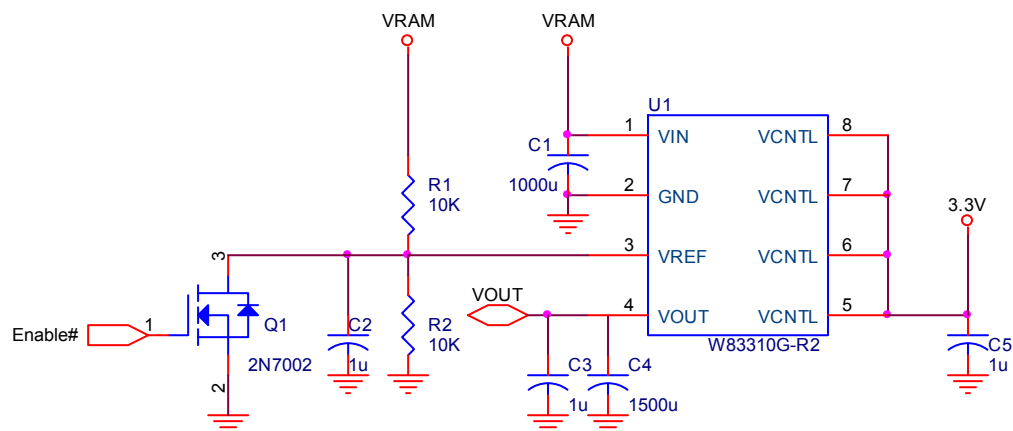
#### 4. PIN CONFIGURATION AND DESCRIPTION



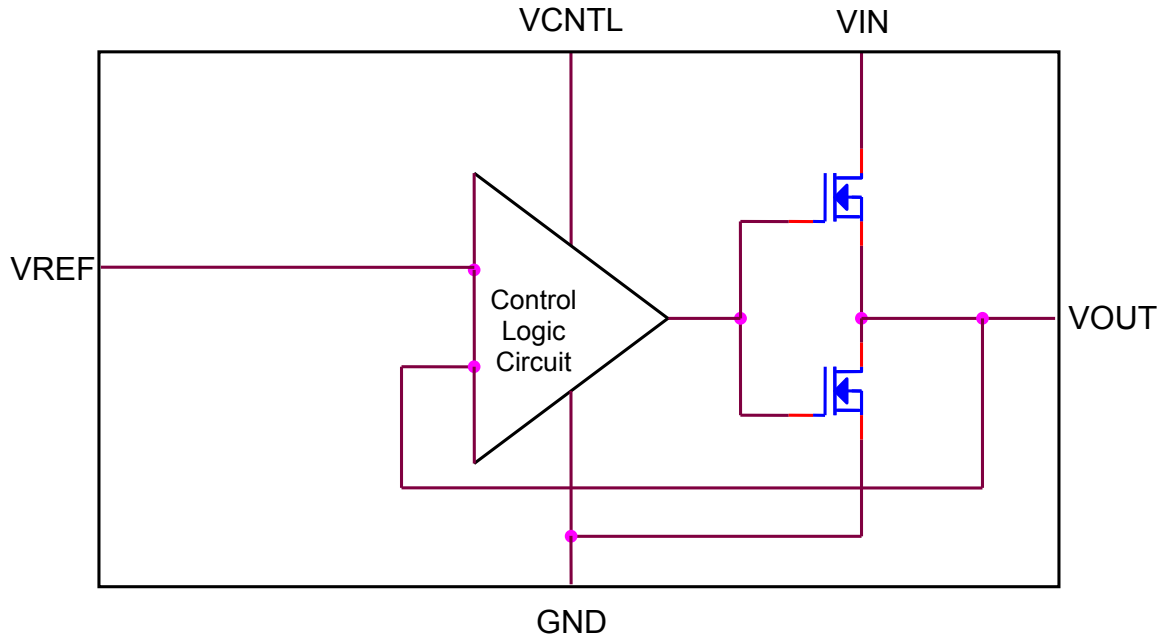
W83310G-R2  
(Top View)

SYMBOL	PIN	I/O	FUNCTION
VIN	1	I	Main power input pin which supplies current to the output pin.
VREF	3	I	Internal reference voltage source. Reference voltage on the pin will be referred with the pin value.
VOUT	4	O	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
Electrostatic discharge protection	Human Body Mode	±2	kV
	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 rating 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
	VCNTL	3	3.6	
Operating Temperature Range		0	70	°C
Junction Temperature Range		0	125	°C

## 9. ELECTRICAL CHARACTERISTICS

$T_A = 25^{\circ}\text{C}$ ,  $V_{\text{CNTL}} = 3.3\text{ V}$ ,  $V_{\text{IN}} = 2.5\text{V}/1.8\text{V}/1.5\text{V}$ ,  $V_{\text{REF}} = 1.25\text{V}/0.9\text{V}/0.75\text{V}$ ,  $C_{\text{OUT}} = 1000\mu\text{F}$ , 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
	I <sub>VCNTL</sub> (SHDN)			230	300	uA
Output (DDRI / DDRII / DDRIII)						
Output Offset Voltage (note 2)	V <sub>OS</sub>	I <sub>OUT</sub> =0A	-5	0	5	mV
Load Regulation (note 3)	ΔV <sub>L</sub>	I <sub>OUT</sub> =0 → +1.8A	-40	--	40	mV
		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	--	A
VREF Shutdown Mode						
Shutdown Threshold	V <sub>IH</sub>	Enable	0.4	--	--	V
	V <sub>IL</sub>	Disable	--	--	0.2	

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 ( $V_{\text{IL}} < 0.2$ ). It is measured with VIN = 1.5V/1.8V/2.5V & VCNTL = 3.3V.

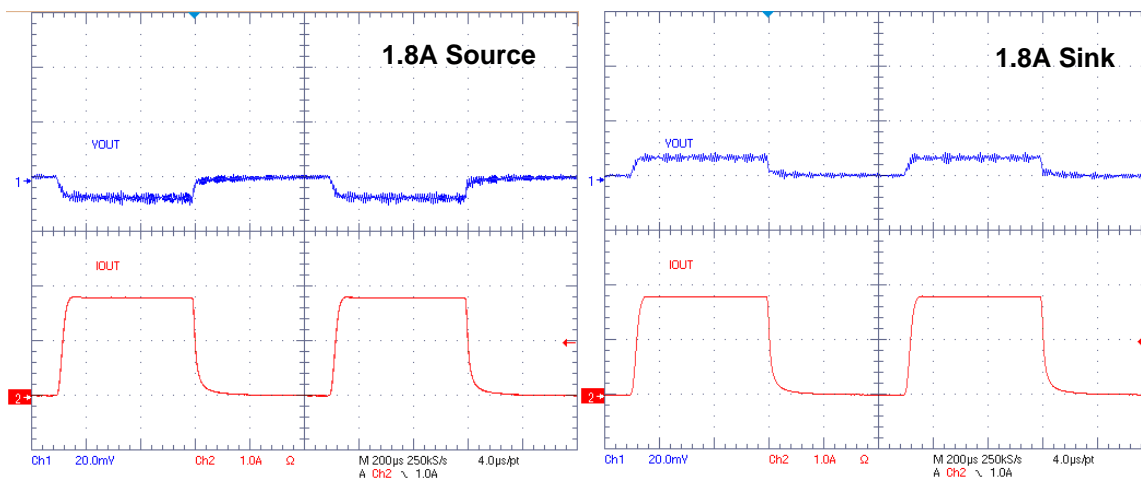
Note 2:  $V_{\text{OS}}$  offset is the voltage measurement as  $V_{\text{OUT}}$  subtracted from VREF.

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.

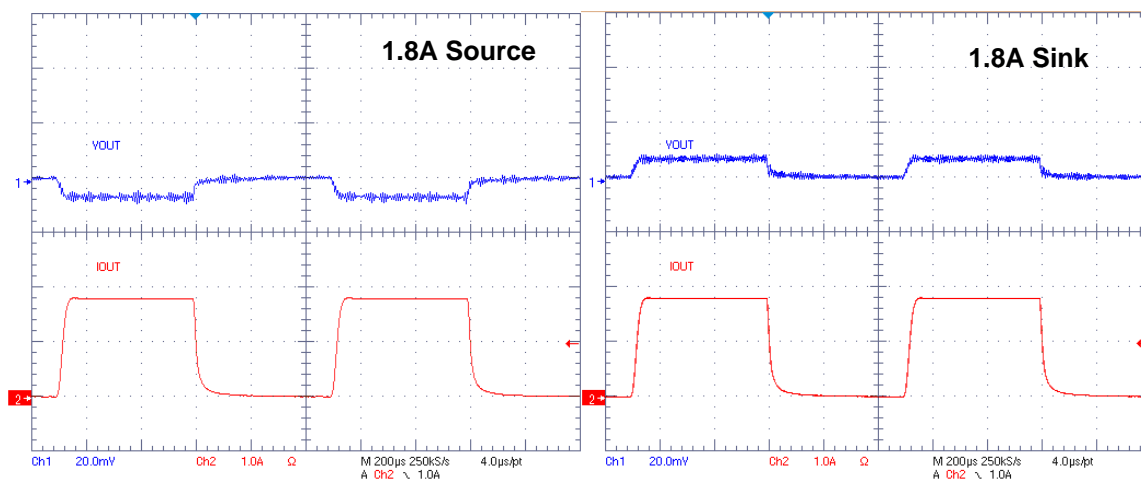


## 10. TYPICAL OPERATING WAVEFORMS

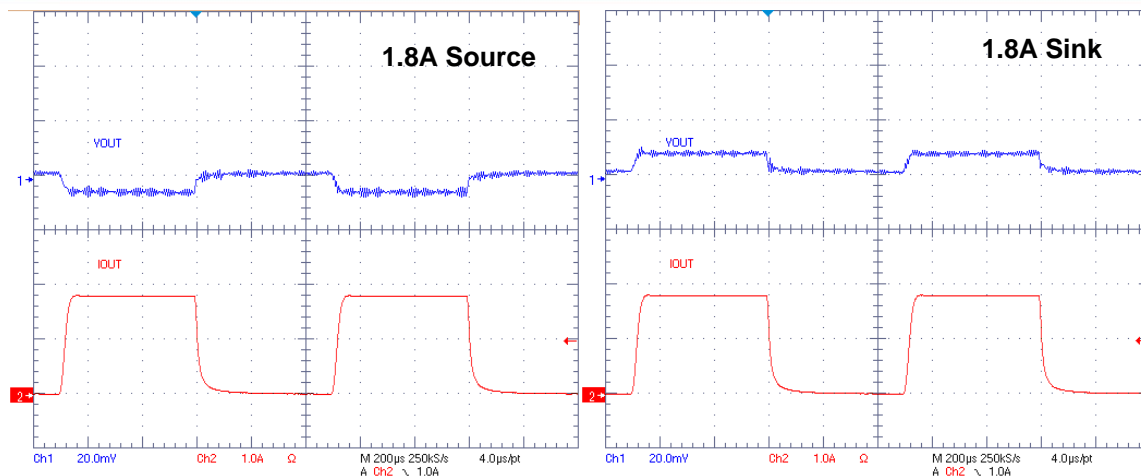
- Transient Response,  $V_{CNTL}=3.3V$ ,  $V_{IN}=2.5V$ ,  $V_{REF}=1.25V$ ,  $V_{OUT}=1.25V$



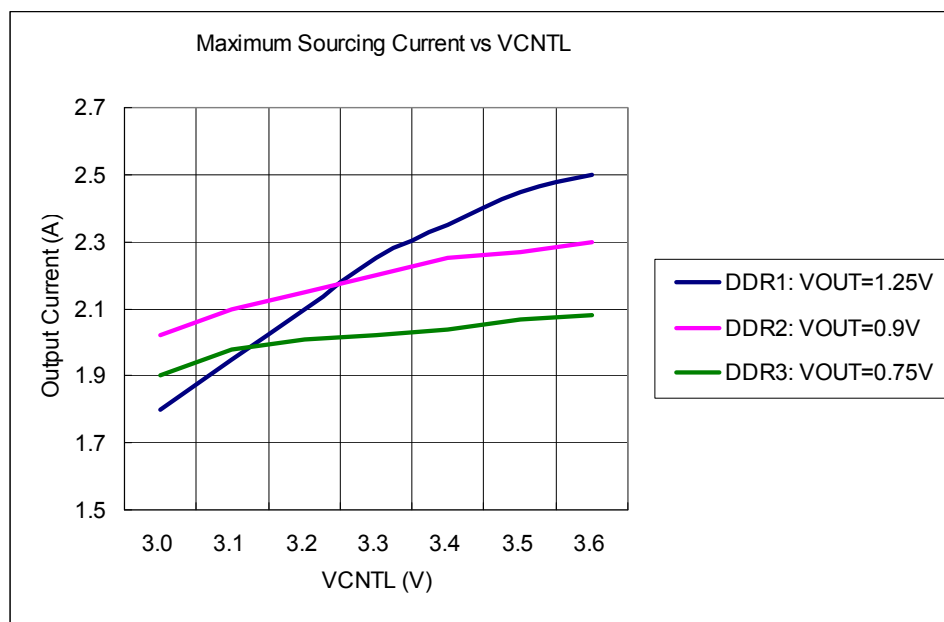
- Transient Response,  $V_{CNTL}=3.3V$ ,  $V_{IN}=1.8V$ ,  $V_{REF}=0.9V$ ,  $V_{OUT}=0.9V$



- Transient Response,  $V_{CNTL}=3.3V$ ,  $V_{IN}=1.5V$ ,  $V_{REF}=0.75V$ ,  $V_{OUT}=0.75V$



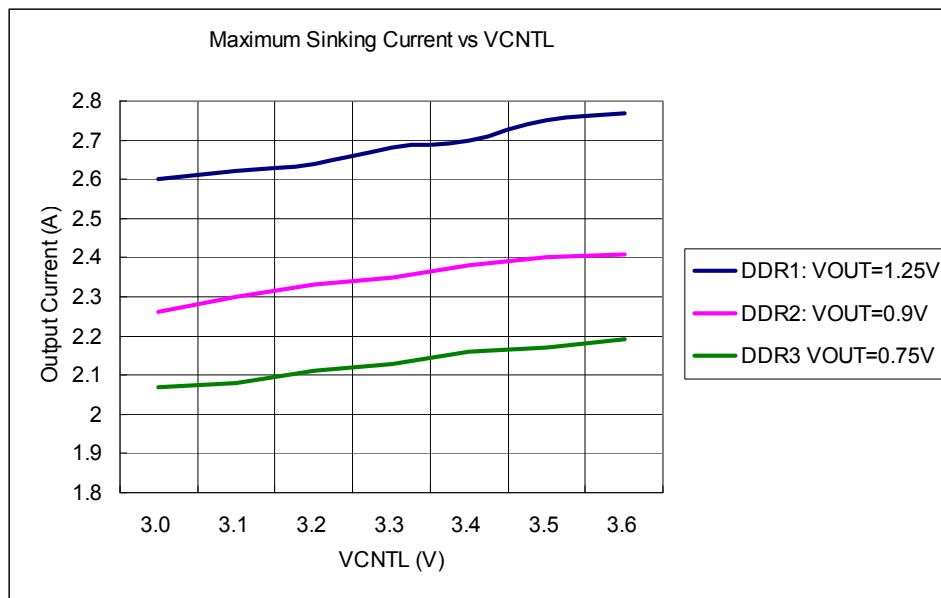
- Maximum Sourcing Current with VCNTL = 3.0V ~ 3.6V



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.

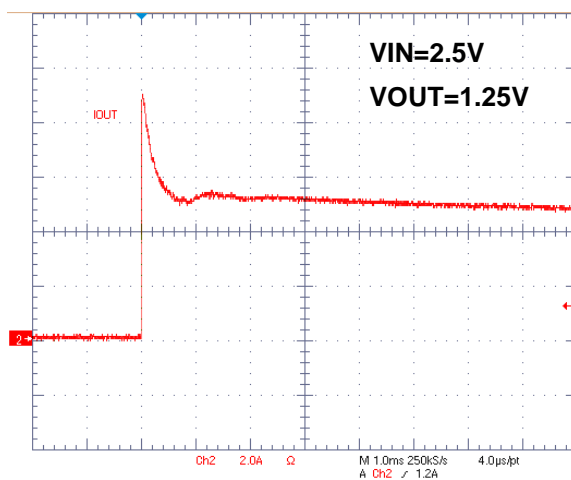
● Maximum Sinking Current with VCNTL = 3.0V ~ 3.6V

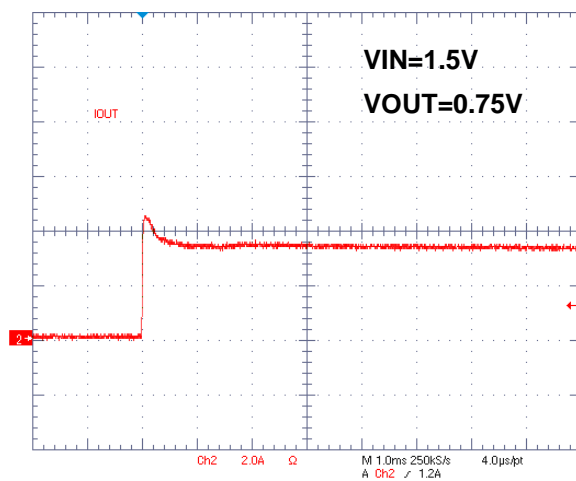
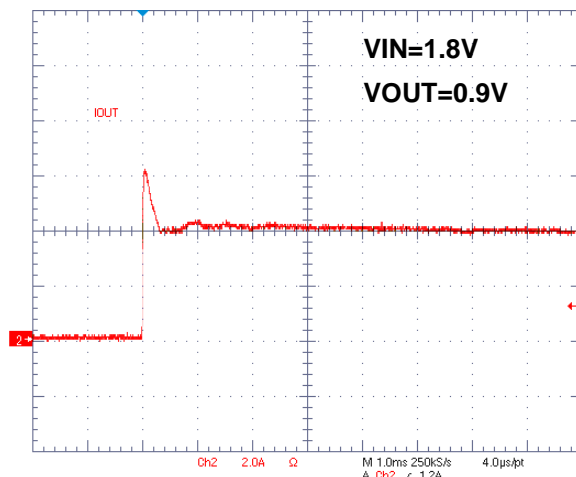


Note:

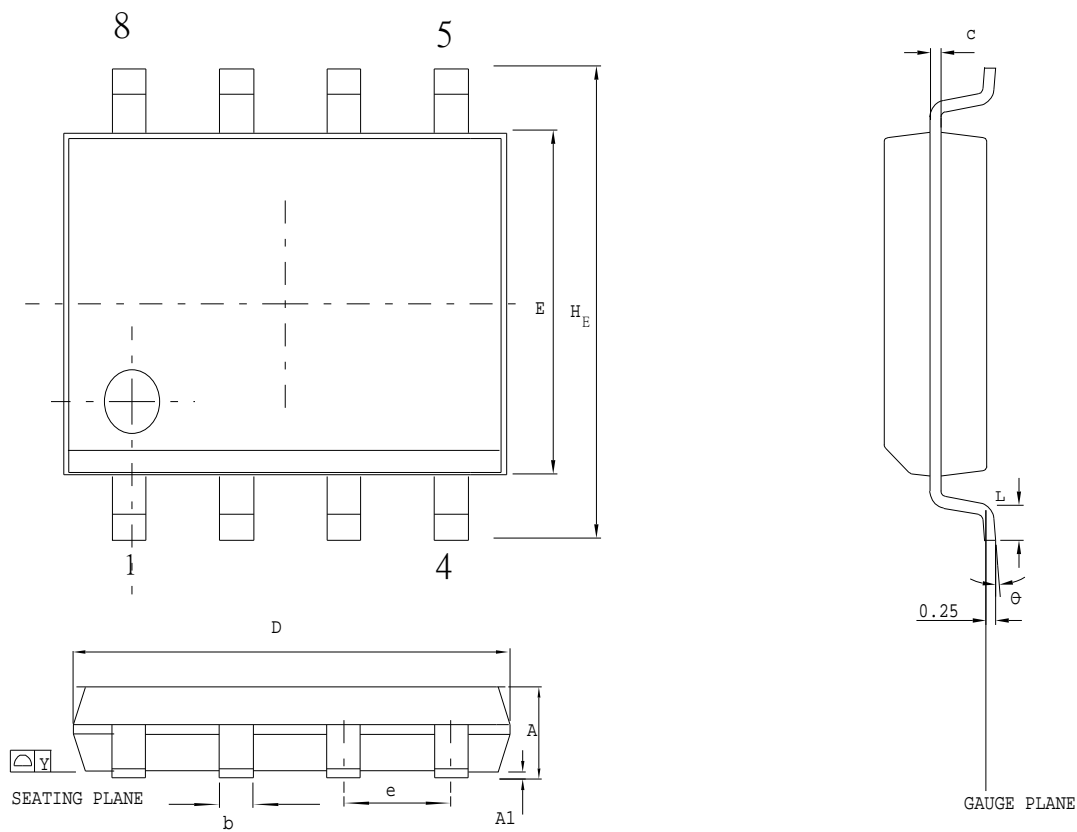
- DDR1: VIN = 2.5V, VOUT = 1.25V with 10ms current pulse.
- DDR2: VIN = 1.8V, VOUT = 0.9V with 10ms current pulse.
- DDR3: VIN = 1.5V, VOUT = 0.75V with 10ms current pulse.

● Output Short Circuit Protection, VCNTL=3.3V, VOUT shorted to ground





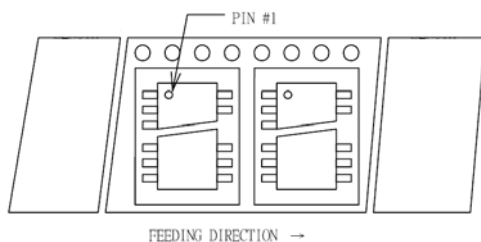
## 11. PACKAGE DIMENSION



Control demensions 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

➤ TAPING SPECIFICATION



8 Pin SOP Package

12. ORDERING INFORMATION

PART NUMBER	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 706 X Y  
706: Packages assembled in Year 07', week 06  
X: Assembly house ID Code  
Y: The IC version Code

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