

**Nuvoton  
DC Fan Pre-Driver  
W83391TG**

**W83391TG**  
**Data Sheet Revision History**

NO	PAGES	DATES	VERSION	VERSION ON WEB	MAIN CONTENTS
1.	N.A	Sep/04	0.5	N.A.	All versions before 0.5 are for internal use and W83391DG/TG/QG are Pb-free package.
2.	N.A	Jan/06	0.51	N.A	Remove W83391DS/DG
3.	N.A	Jan./06	0.52	N.A	Remove W83391QS/QG
4	All	Jan./06	0.53	N.A	Update the datasheet with new template
5	3	Nov./08	0.54	N.A	Modify application circuit and add application note.
6	1 & 9	Apr./10	0.55	N.A	Update the package information

**Table of Contents-**

1.	GENERAL DESCRIPTION .....	1
2.	FEATURES .....	1
3.	APPLICATIONS .....	1
4.	PIN CONFIGURATION AND DESCRIPTION .....	2
5.	APPLICATION CIRCUIT .....	3
6.	INTERNAL BLOCK DIAGRAM .....	4
7.	ABSOLUTE MAXIMUM RATINGS .....	5
8.	RECOMMENDED OPERATING CONDITIONS .....	6
9.	ELECTRICAL CHARACTERISTICS .....	6
10.	PACKAGE DIMENSION .....	7
11.	ORDERING INFORMATION .....	9
12.	TOP MARKING SPECIFICATION .....	9

## 1. GENERAL DESCRIPTION

The W83391TG is a DC Fan Pre-Driver which was integrated charge pump to drive external N-channel MOSFET instead of P-channel MOSFET/ PNP transistor. The W83391TG provides 3 channels Fan Control and easily couples with Super I/O or hardware monitor to perform the control of DC Fans. W83391TG is available in a SOP-14 Pb Free and Halogen Free package.

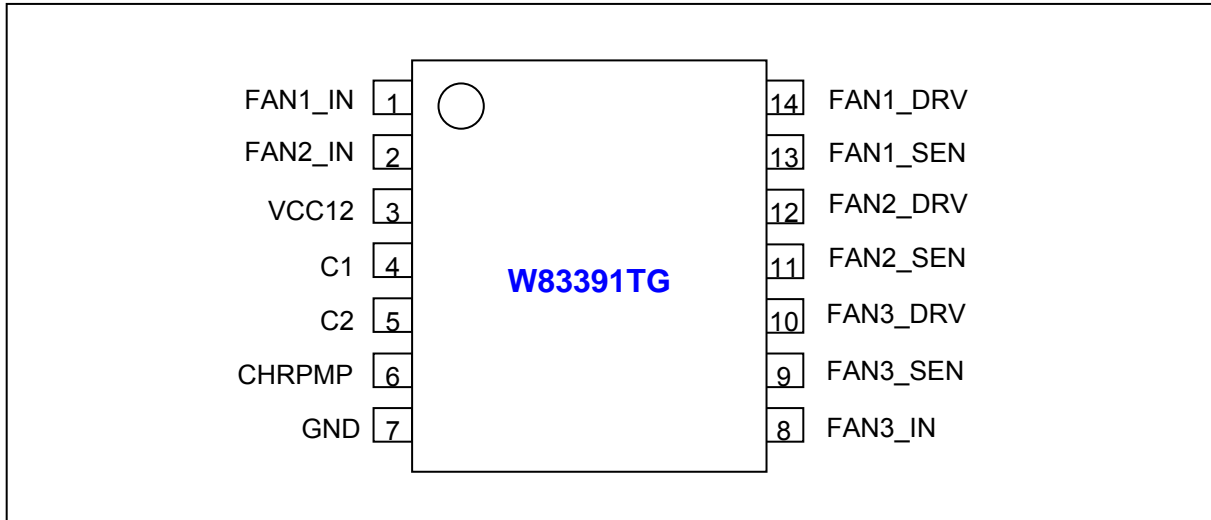
## 2. FEATURES

- Provides 3 channels Fan Control
- Integrated Charge Pump and Can Support Up to 24V Gate Voltage for Driving External N-channel MOSFET
- Pairing with Nuvoton Series Super I/O and Hardware Monitoring IC for DC Fan Voltage Regulation
- External Resistors for Output Voltage Scale Adjustment
- Provides Pb-free and Halogen Free SOP-14 Package

## 3. APPLICATIONS

- Motherboard, IPC relative Applications
- Projector and other DC Fan Control Applications

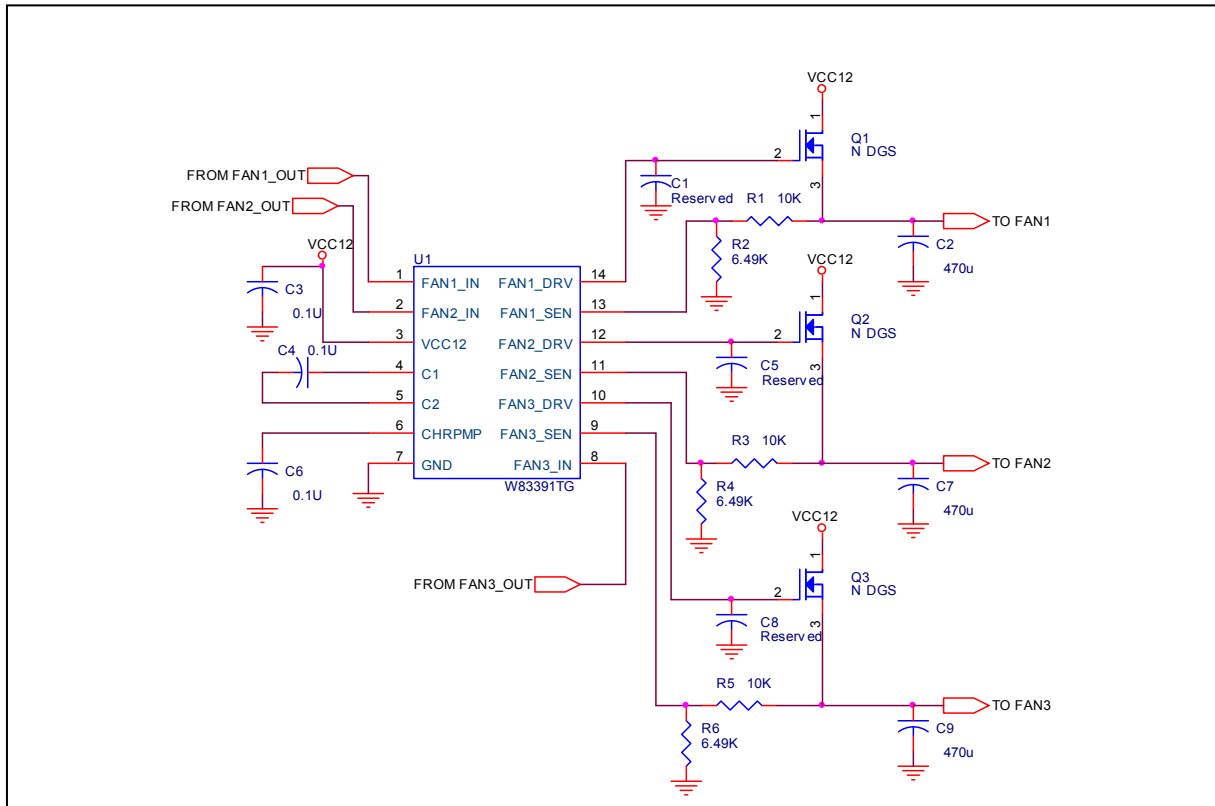
#### 4. PIN CONFIGURATION AND DESCRIPTION



**W83391TG**  
(Top View)

PIN	SYMBOL	FUNCTION
1	FAN1_IN	DC FAN1 Voltage Input Ranging from 0V~8V
2	FAN2_IN	DC FAN2 Voltage Input Ranging from 0V~8V
3	VCC12	12Vcc Input.
4	C1	Charge Pump Pins. To insure the output voltage achieve to 24V.
5	C2	
6	CHRMPM	
7	GND	Power Ground.
8	FAN3_IN	DC FAN3 Voltage Input Ranging from 0V~8V
9	FAN3_SEN	Voltage FB Sensing Pin for 3 <sup>rd</sup> Fan Voltage Regulation
10	FAN3_DRV	Voltage Driving Pin for 3 <sup>rd</sup> Fan Voltage Regulation
11	FAN2_SEN	Voltage FB Sensing Pin for 2 <sup>nd</sup> Fan Voltage Regulation
12	FAN2_DRV	Voltage Driving Pin for 2 <sup>nd</sup> Fan Voltage Regulation
13	FAN1_SEN	Voltage FB Sensing Pin for 1 <sup>st</sup> Fan Voltage Regulation
14	FAN1_DRV	Voltage Driving Pin for 1 <sup>st</sup> Fan Voltage Regulation

## 5. APPLICATION CIRCUIT



### Note.

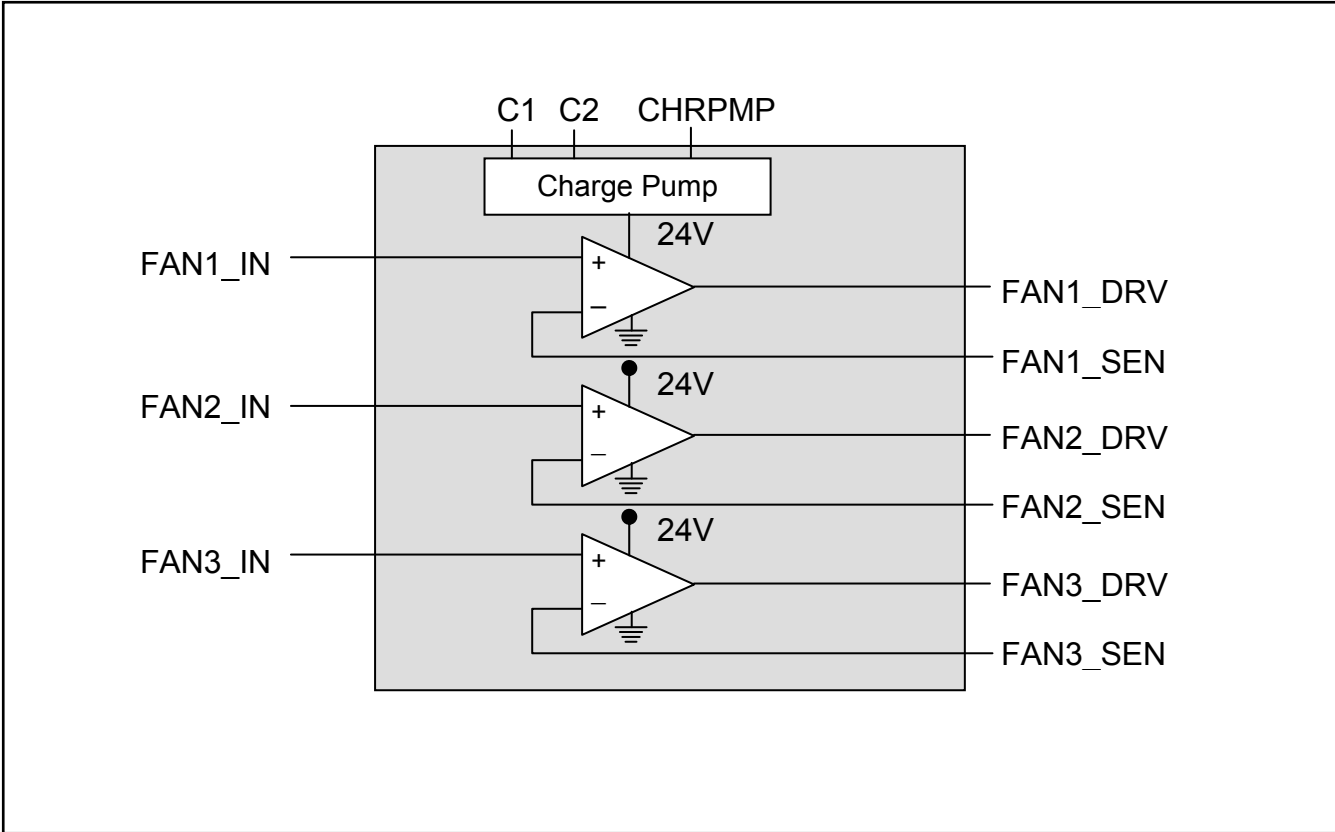
- PCB Layout Guide

The critical IC components (decoupling capacitors, charge pump capacitors, FB resistor dividers) are located next to the IC (or directly under it), with short traces to the IC pins.

- Reserved Component Footprints

For most situations, no external compensation is required for the linear output. As long as the output capacitor is large ( $>100\mu\text{F}$ ) and so is its ESR ( $>20\text{m}\Omega$ ), then it should be stable for loads as low as 10mA up to at least 4A. If a smaller value of capacitance and/or ESR is desired, then special considerations may be required to add external compensation capacitors and next to external power MOSFET.

6. INTERNAL BLOCK DIAGRAM



## 7. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	RATING	UNIT
VCC12 Input Voltage	VCC12	-0.3 to 15	V
FANX_IN Input Voltage	FANX_IN	-0.3 to 15	V
Operating Temperature Range	T <sub>opt</sub>	0 to 70	°C
Electrostatic discharge protection	Human Body Mode	±2	kV
	Machine Mode	±200	V
	Latch-Up	±100	mA

**Note:** Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device and exposure to absolute maximum rating conditions for extended periods may affect device reliability.



## 8. RECOMMENDED OPERATING CONDITIONS

ITEM	DESCRIPTION		MIN	MAX	UNIT
VCC12 Input Voltage	VCC12	Supply Voltage	11.4	12.6	V
FANX_IN Input Voltage	FANX_IN	DC Fan1, 2, 3 Input Voltage	0	8	V

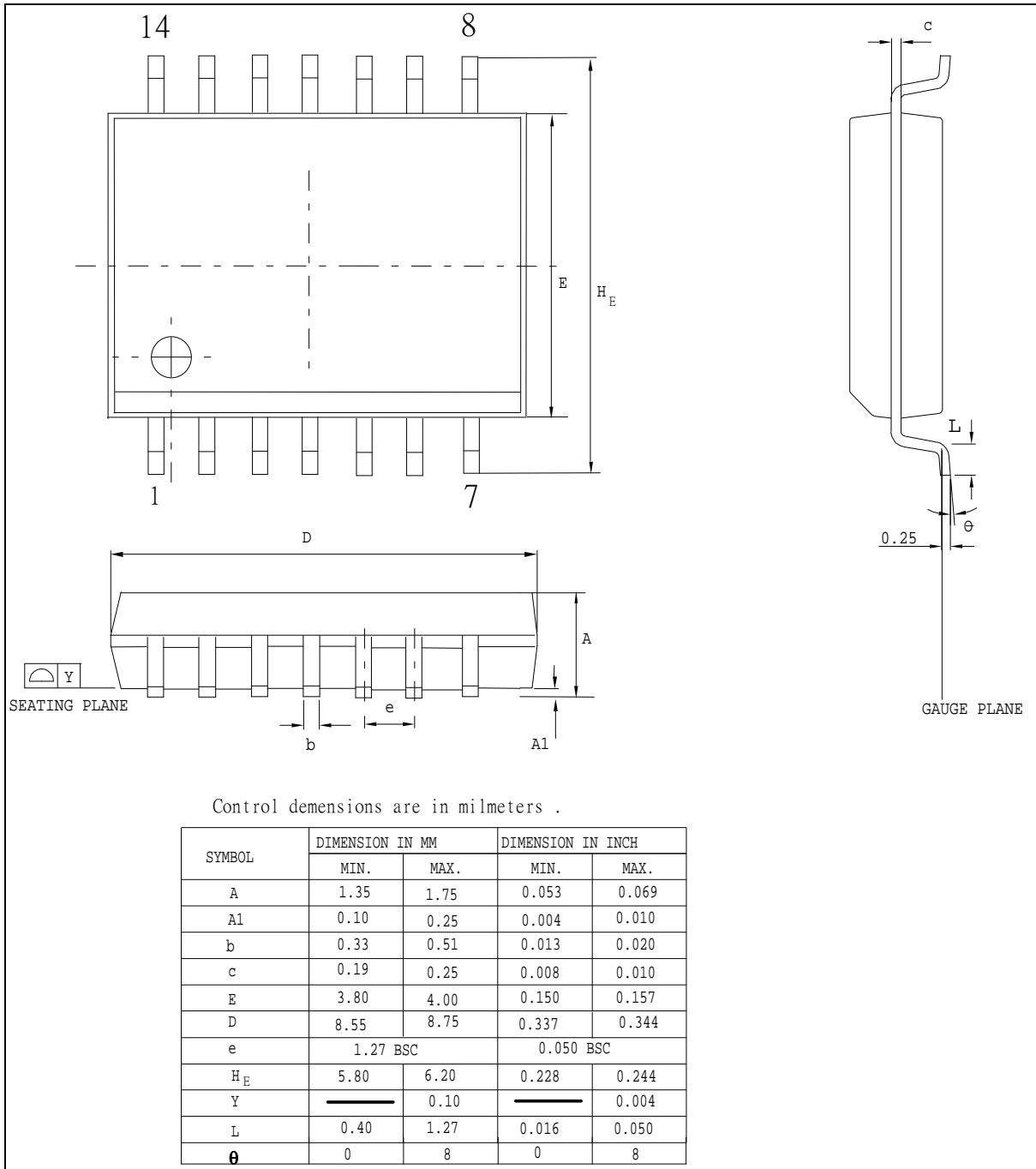
## 9. ELECTRICAL CHARACTERISTICS

Vcc12=12V ± 5 %, TA = 0°C to +70°C

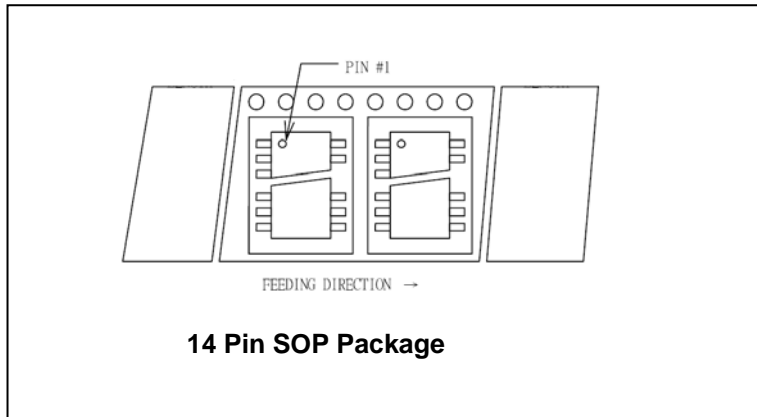
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
<b>FAN#_IN Input</b>						
Input Offset Voltage	V <sub>Ioffset</sub>	2	5	50	mV	
Input Voltage Range	FANX_IN	0	-	8	V	
<b>FAN#_DRV Output</b>						
Output Drive Current		-	45	-	μA	C <sub>OUT</sub> = 10nF
Output Voltage Range		1.5	-	24	V	
<b>Charge Pump</b>						
Charge Pump Frequency		-	180	-	KHz	
Charge Pump Voltage		22.8	23.2	24	V	

10. PACKAGE DIMENSION

- W83391TG (14pin SOP, 150mil)



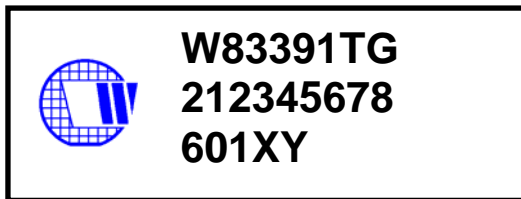
- Taping Specification



## 11. ORDERING INFORMATION

PART NUMBER	SUPPLIED AS	PACKAGE TYPE	PRODUCTION FLOW
W83391TG	T Shape: 2,500 units/T&R	14-pin SOP (Green package)	Commercial, 0°C TO +70°C

## 12. TOP MARKING SPECIFICATION



Left line: Winbond/Nuvoton logo

1<sup>st</sup> line: W83391TG – the part number

2<sup>nd</sup> line: Chip lot number

3<sup>rd</sup> line: Tracking code 649 X Y

**601**: packages assembled in Year 06<sup>th</sup>, week 01

X: Assembly house ID

Y: The IC version

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