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**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 |
| | | | | | |
| | | | | | |

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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.

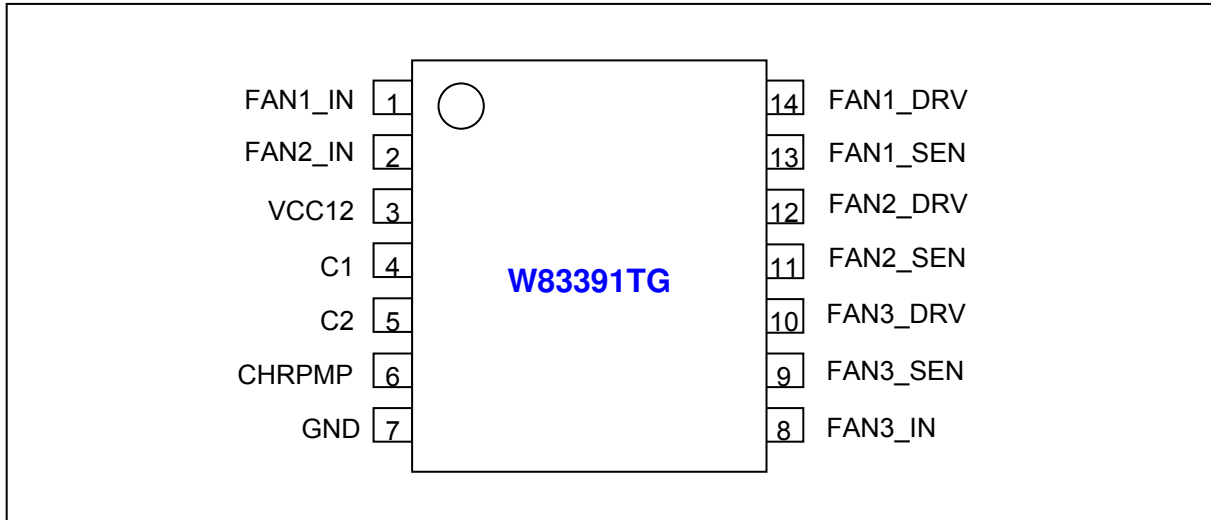
2. FEATURES

- 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

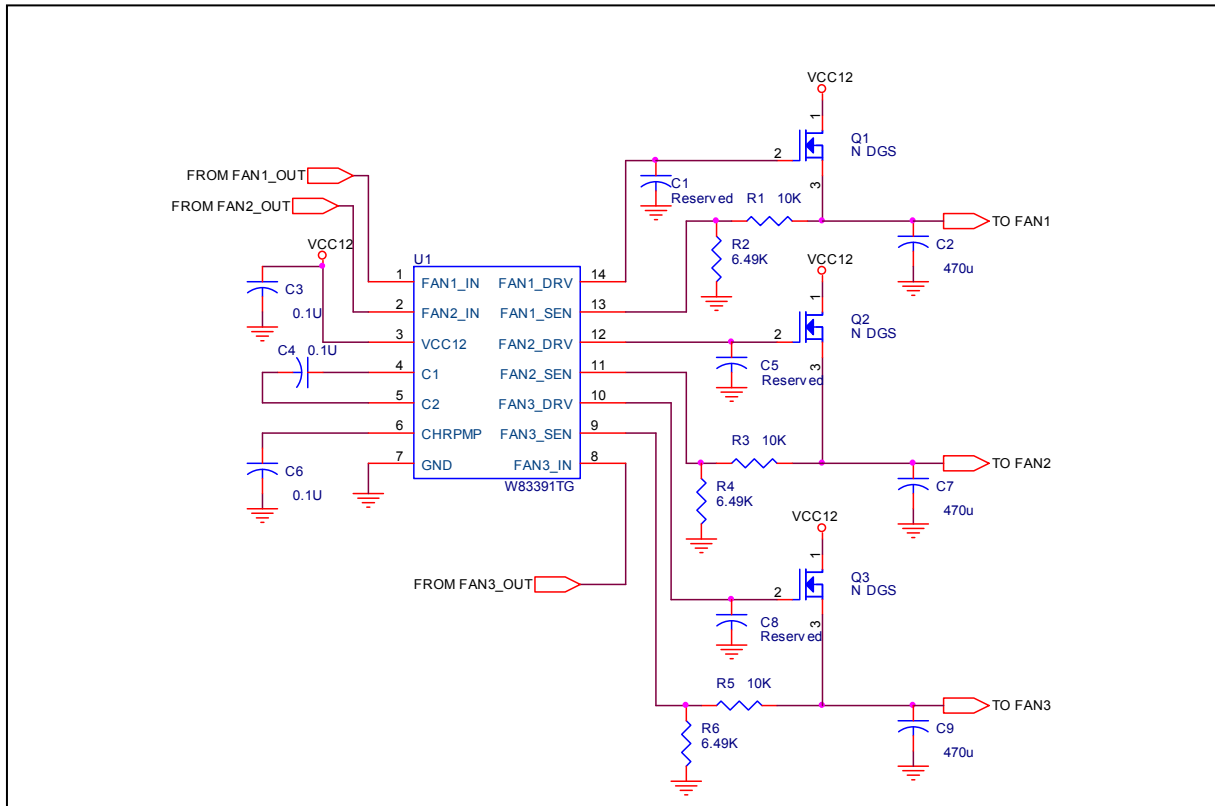
4. PIN CONFIGURATION AND DESCRIPTION



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 | CHRPMP | |
| 7 | GND | Power Ground. |
| 8 | FAN3_IN | DC FAN3 Voltage Input Ranging from 0V~8V |
| 9 | FAN3_SEN | Voltage FB Sensing Pin for 3 rd Fan Voltage Regulation |
| 10 | FAN3_DRV | Voltage Driving Pin for 3 rd Fan Voltage Regulation |
| 11 | FAN2_SEN | Voltage FB Sensing Pin for 2 nd Fan Voltage Regulation |
| 12 | FAN2_DRV | Voltage Driving Pin for 2 nd Fan Voltage Regulation |
| 13 | FAN1_SEN | Voltage FB Sensing Pin for 1 st Fan Voltage Regulation |
| 14 | FAN1_DRV | Voltage Driving Pin for 1 st Fan Voltage Regulation |

5. APPLICATION CIRCUIT



Note.

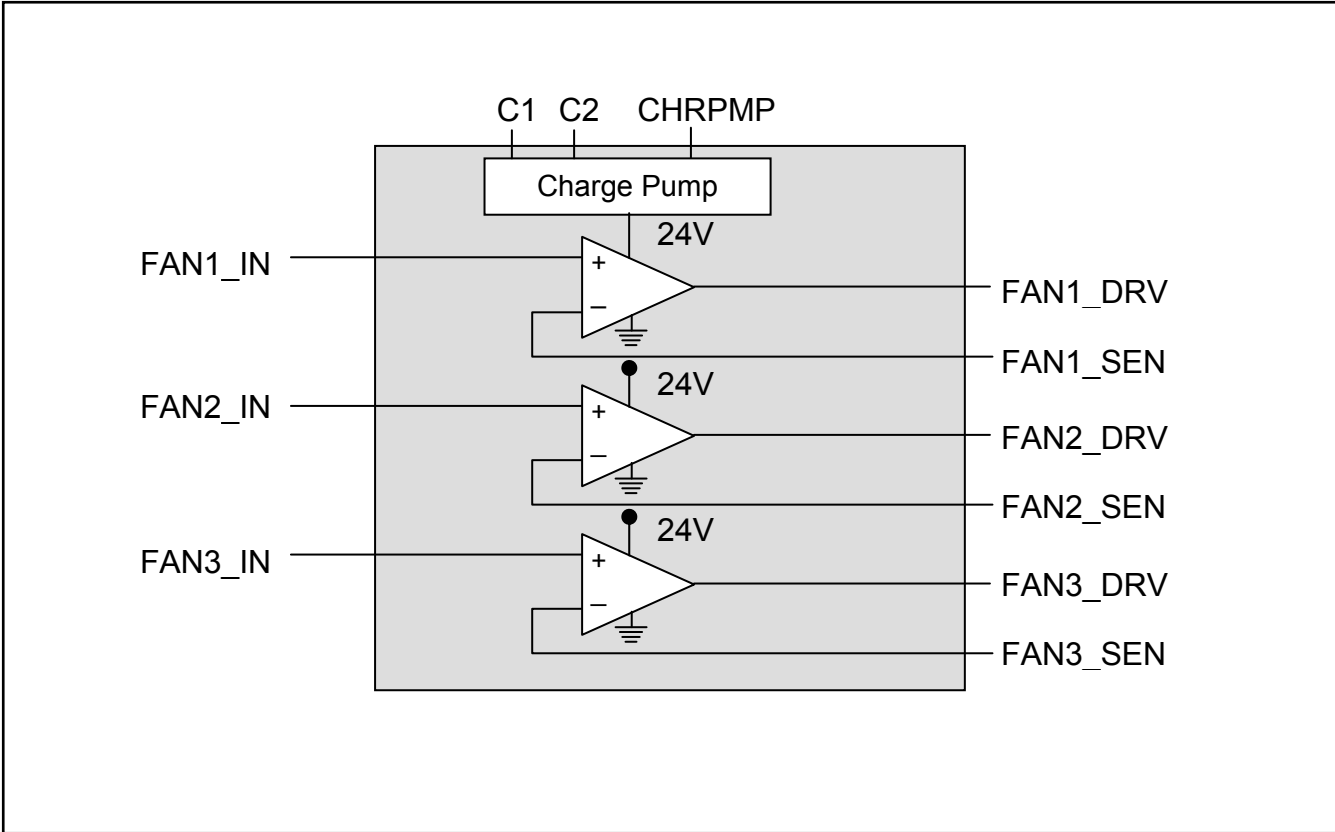
- PCB Layout Guide

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 _{opt} | 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 |

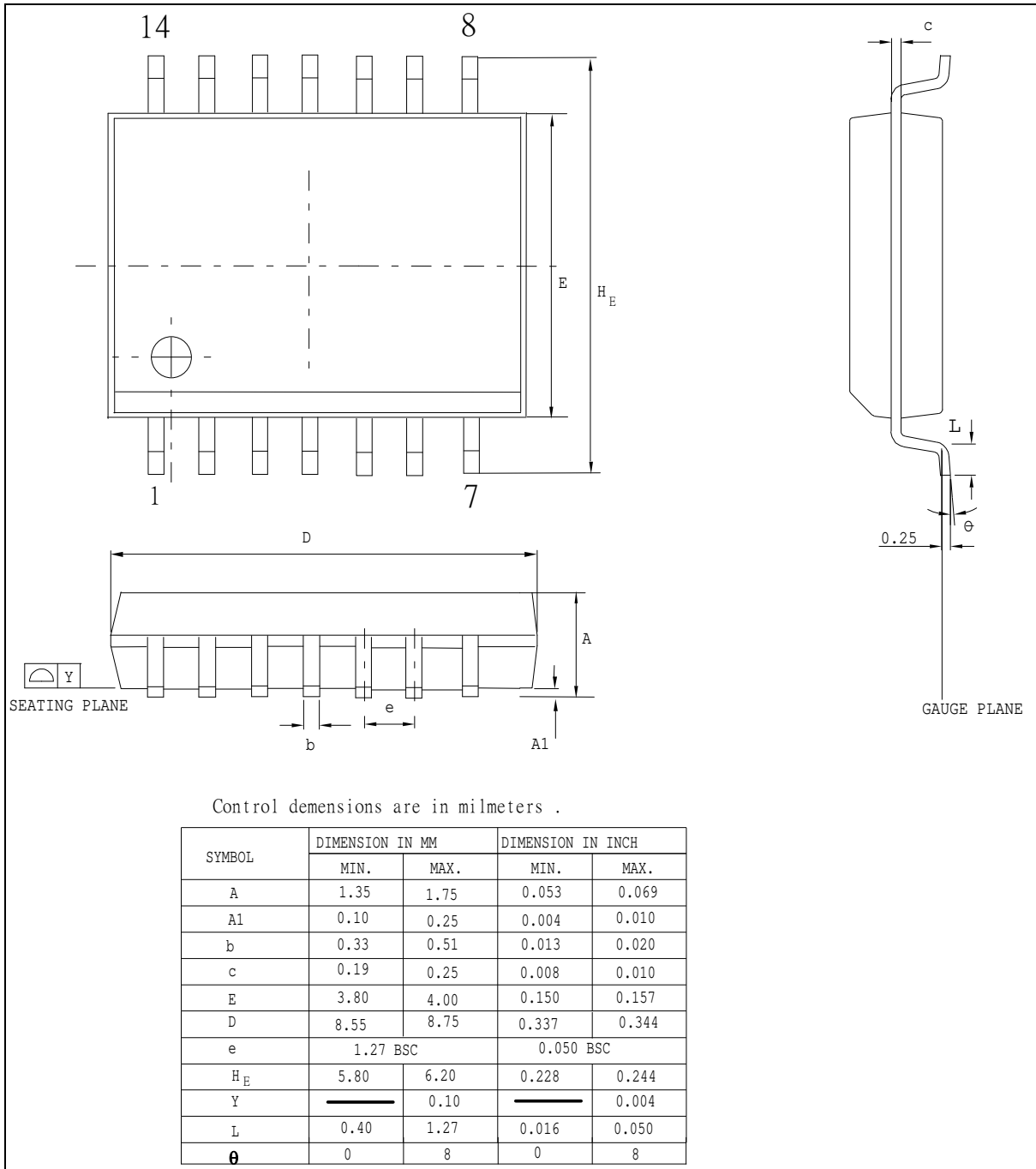
9. ELECTRICAL CHARACTERISTICS

Vcc12=12V ± 5 %, TA = 0°C to +70°C

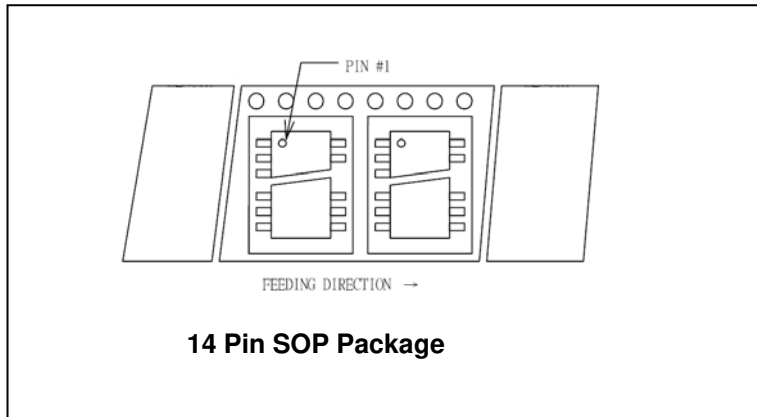
| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|------------------------|----------------------|------|------|-----|-------|-------------------------|
| FAN#_IN Input | | | | | | |
| Input Offset Voltage | V _{Ioffset} | 2 | 5 | 50 | mV | |
| Input Voltage Range | FANX_IN | 0 | -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

10. PACKAGE DIMENSION

- W83391TG (14pin SOP, 150mil)



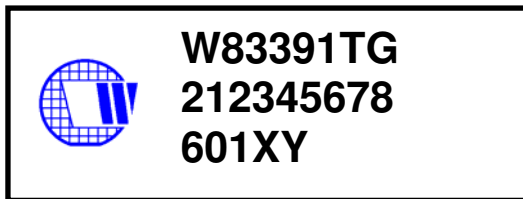
- Taping Specification



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

1st line: W83391TG – the part number

2nd line: Chip lot number

3rd line: Tracking code 649 X Y

601: packages assembled in Year 06th, week 01

X: Assembly house ID

Y: The IC version

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