# Switched-mode power supply controller NE5568

## DESCRIPTION

The NE5568 is a control circuit for use in switched mode power supplies. It contains an internal temperature-compensated supply, PWM, sawtooth oscillator, over-current sense latch, and output stage. The device is intended for low cost SMPS applications where extensive housekeeping functions are not required. The NE5568 is a selected version of the NE5561.

## FEATURES

- Micro-miniature (D) package
- Pulse width modulator
- Current limiting (cycle by cycle)
- Sawtooth generator
- Stabilized power supply
- Double-pulse protection
- Internal temperature-compensated reference

## PIN CONFIGURATION

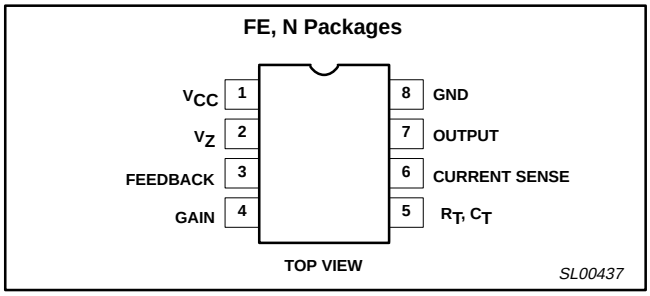


**Figure 1. Pin Configuration**

## APPLICATIONS

- Switch mode power supplies
- DC motor controller inverter
- DC/DC converter

## ORDERING INFORMATION

| DESCRIPTION | TEMPERATURE RANGE | ORDER CODE | DWG # |
|---|---|---|---|
| 8-Pin Plastic Dual In-Line Package (DIP) | 0 to +70°C | NE5568N | SOT97-1 |
| 8-Pin Cerdip Dual In-Line Package (CERDIP) | 0 to +70°C | NE5568FE | 0580A |

## BLOCK DIAGRAM

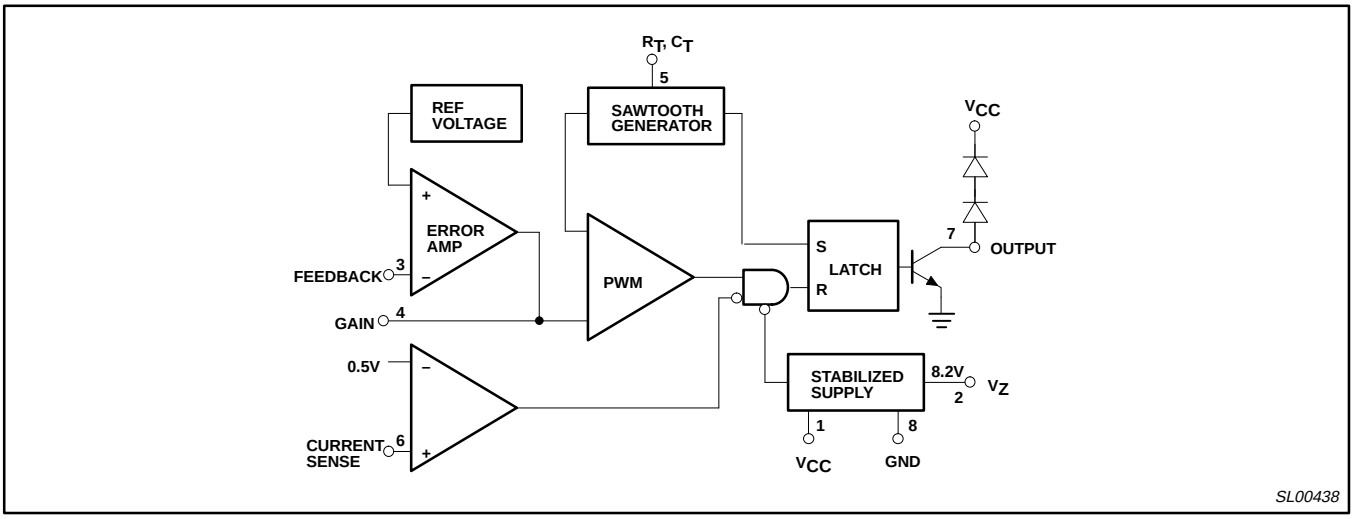


**Figure 2. Block Diagram**

## ABSOLUTE MAXIMUM RATINGS

| SYMBOL | PARAMETER | RATING | UNIT |
|---|---|---|---|
| $V_{CC}$ | Supply voltage | 18 | V |
| $I_{OUT}$ | Output current | 40 | mA |
| | Output duty cycle | 98 | % |
| $P_D$ | Max total power dissipation | 0.75 | W |
| $T_A$ | Operating temperature range | 0 to 70 | °C |

## DC ELECTRICAL CHARACTERISTICS

$V_{CC}$=12V, $T_A$=25°C, unless otherwise specified.

| SYMBOL | PARAMETER | TEST CONDITIONS | | NE5568 | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| **Reference section** | | | | | | | |
| $V_{REF}$ | Internal reference voltage | $T_A$=25°C | | 3.69 | 3.75 | 3.84 | V |
| | | Over temperature | | 3.66 | | 3.87 | V |
| $V_Z$ | Internal zener ref | $I_L$=7mA | | 7.8 | 8.2 | 8.8 | V |
| | Temperature coefficient of $V_{REF}$ | | | | ± 100 | | ppm/°C |
| | Temperature coefficient of $V_Z$ | | | | ± 200 | | ppm/°C |
| **Oscillator section** | | | | | | | |
| f | Frequency range | Over temperature | | 50 | | 100k | Hz |
| | Initial accuracy | $R_T$ and $C_T$ Constant | | | 5 | | % |
| | Duty cycle range | $f_o$=20kHz | | 0 | | 98 | % |
| **Current limiting** | | | | | | | |
| $I_{IN}$ | Input current | Pin 6=250mV | $T_A$=25°C | | -2 | -10 | µA |
| | | | Over temp. | | | -20 | µA |
| | Single pulse inhibit delay | Inhibit delay time for 20% overdrive at | $I_{OUT}$=20mA | | 0.88 | 1.10 | µs |
| | | | $I_{OUT}$=40mA | | 0.7 | 0.8 | µs |
| | Current limit trip level | | | 0.400 | 0.500 | 0.600 | V |
| **Error amplifier** | | | | | | | |
| | Open-loop gain | | | | 60 | | dB |
| | Feedback resistor | | | 10k | | | Ω |
| BW | Small-signal bandwidth | | | | 3 | | MHz |
| $V_{OH}$ | Output voltage swing | | | 6.2 | | | V |
| $V_{OL}$ | Output voltage swing | | | | | 0.7 | V |
| **Output stage** | | | | | | | |
| $I_{OUT}$ | Output current | Over temperature | | 20 | | | mA |
| $V_{CE}$ | Saturation | $I_C$=20mA, over temperature | | | | 0.4 | V |
| | | $I_C$=40mA, over temperature | | | | 0.5 | V |
| **Supply voltage/current** | | | | | | | |
| $I_{CC}$ | Supply current | $I_Z$=0, voltage-fed | $T_A$=25°C | | | 10.0 | mA |
| | | | Over temp. | | | 13.0 | mA |
| $V_{CC}$ | Supply voltage | $I_S$=10mA, current-fed | | 19.0 | 21.0 | 24.0 | V |
| | | $I_{CC}$=30mA, current-fed | | 20.0 | | 30.0 | V |
| **Low supply protection** | | | | | | | |
| | Pin 1 threshold | | | 8.0 | 9.0 | 10.5 | V |

**NOTES:**
All curves and applications of NE5561 apply exactly