

NR887D Current Mode Control, Synchronous Rectifier Step-down Switching Mode

■ Features

- DIP 8 pin package
- Input voltage range (V_{IN}): $V_O + 3$ to 18 V
- Synchronous rectifier mode
- High efficiency: 90%
- Introduction of current mode control method
- A ceramic capacitor can be used for output
- Built-in phase correction component
- Output current: 2 A
- Reference voltage and accuracy of $0.8\text{ V} \pm 2\%$
- Oscillation frequency: 500 kHz
- Output ON/OFF available
- Undervoltage lockout
- Soft start function

■ Applications

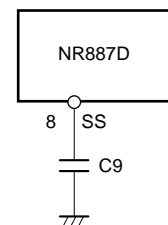
- Power supply for LCDTV and PDP
- Power supply for DVD, BD, and STB
- On-board local power supply
- Power supply for switches

■ Electrical Characteristics

($T_a=25^\circ\text{C}$, $V_{IN}=12\text{V}$, $V_O=3.3\text{V}$, and $I_O=1.0\text{A}$, unless otherwise specified)

| Parameter | Symbol | Ratings | | | Unit | Conditions |
|--|--------------------------------|---------|------------|-------|------------------|--|
| | | min. | typ. | max. | | |
| Reference Voltage | V_{REF} | 0.784 | 0.800 | 0.816 | V | |
| Temperature Coefficient of Reference Voltage | $\Delta V_{REF}/\Delta T$ | | ± 0.05 | | mV/C | $T_a=-40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| Efficiency | η | | 90 | | % | |
| Oscillation Frequency | f_o | 400 | 500 | 600 | kHz | |
| Line Regulation | V_{LINE} | | 50 | | mV | $V_{IN}=6.3\text{V}$ to 18V |
| Load Regulation | V_{Load} | | 50 | | mV | $I_O=0.1$ to 2.0A |
| Overcurrent Protection Starting Current | I_S | 3.1 | | 6.0 | A | |
| Quiescent Circuit Current 1 | I_{IN} | | 6 | | mA | $V_{EN}=10\Omega$ pull up to V_{IN} |
| Quiescent Circuit Current 2 | $I_{IN(off)}$ | | | 10 | μA | $I_O=0\text{A}$, $V_{EN}=0\text{V}$ |
| SS Pin | Outflow Current at Low Voltage | 6 | 10 | 14 | μA | $V_{SS}=0\text{V}$ |
| | Open Voltage | | 3.0 | | V | |
| EN Pin | Inflow Current | | 50 | 100 | μA | $V_{EN}=10\text{V}$ |
| | On Threshold Voltage | 0.7 | 1.4 | 2.1 | V | |
| Maximum ON Duty | $DMAX$ | | 90 | | % | |
| Minimum ON Time | $DMIN$ | | 150 | | nsec | |
| Thermal Protection Start Temperature | TSD | 151 | 165 | | $^\circ\text{C}$ | |
| Thermal Protection Return Hysteresis | TSD_hys | | 20 | | $^\circ\text{C}$ | |

*: Pin 8 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The SS pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited.



■ Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit | Conditions |
|--|----------------|-----------------|---------------------------|---|
| Input Voltage | V_{IN} | 20 | V | |
| Power Dissipation | P_D | 1.50 | W | When mounted on a 70×60 mm glass-epoxy board (with a 1310 mm^2 copper area) |
| Junction Temperature | T_J | -40 to $+150$ | $^\circ\text{C}$ | |
| Storage Temperature | T_{stg} | -40 to $+150$ | $^\circ\text{C}$ | |
| Thermal Resistance (Junction to Lead (4 pins)) | θ_{j-c} | 25 | $^\circ\text{C}/\text{W}$ | |
| Thermal Resistance (Junction to Ambient Air) | θ_{j-a} | 67 | $^\circ\text{C}/\text{W}$ | When mounted on a 70×60 mm glass-epoxy board (with a 1310 mm^2 copper area) |

■ Recommended Operating Conditions

| Parameter | Symbol | Ratings | Unit |
|-----------------------------|----------|------------------------------|------------------|
| Input Voltage Range | V_{IN} | 4.5 or $V_O + 3^*$ to 18 | V |
| Output Current Range | I_O | 0 to 2.0 | A |
| Output Voltage Range | V_O | 0.8 to 14 | V |
| Operating Temperature Range | T_{op} | -40 to $+85$ | $^\circ\text{C}$ |

*: The minimum value of the input voltage range is 4.5 V or $V_O + 3\text{ V}$, whichever is higher.

