

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.

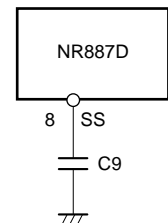
■ Absolute Maximum Ratings

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

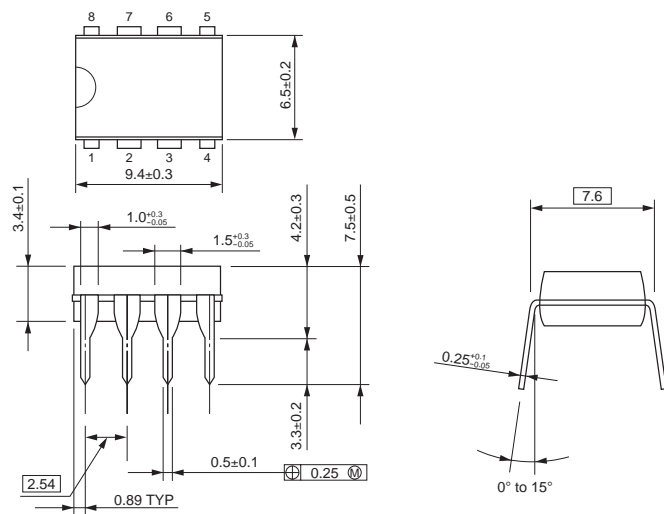
Parameter	Symbol	Ratings	Unit
Input Voltage Range	V_{IN}	4.5 or $V_O + 3^*$ to 18	V
Output Current Range	I_O	0 to 2.0	A
Output Voltage Range	V_O	0.8 to 14	V
Operating Temperature Range	T_{op}	-40 to $+85$	$^\circ\text{C}$

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



External Dimensions (DIP8)

(Unit : mm)

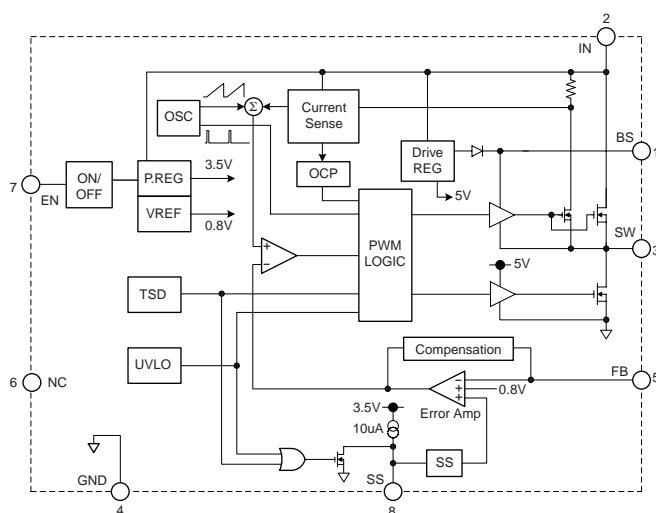


Pin Assignment

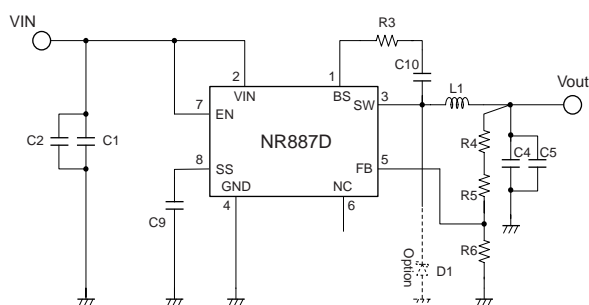
- ① BS
- ② VIN
- ③ SW
- ④ GND
- ⑤ FB
- ⑥ NC
- ⑦ EN
- ⑧ SS

Plastic Mold Package Type
 Flammability: UL 94V-0
 Product Mass: Approx. 0.49g

Block Diagram



Typical Connection Diagram



C1, C2: 10 μ F/25V
 C4, C5: 22 μ F/16V
 C9: 0.1 μ F
 C10: 0.1 μ F
 L1: 10 μ H
 R3: 20 Ω to 47 Ω
 R4+R5: 5k Ω (Vo=3.3V)
 R6: 1.6k Ω