

NCP1251

Current-Mode PWM Controller for Off-line Power Supplies

The NCP1251 is a highly integrated PWM controller capable of delivering a rugged and high performance offline power supply in a tiny TSOP-6 package. With a supply range up to 28 V, the controller hosts a jittered 65 kHz or 100 kHz switching circuitry operated in peak current mode control. When the power on the secondary side starts to decrease, the controller automatically folds back its switching frequency down to a minimum level of 26 kHz. As the power further goes down, the part enters skip cycle while limiting the peak current.

Over Power Protection (OPP) is a difficult exercise especially when no-load standby requirements drive the converter specifications. The ON proprietary integrated OPP lets you harness the maximum delivered power without affecting your standby performance simply via two external resistors. A latched Over Voltage Protection (OVP) is combined on the same pin. For ease of implementation, a latched OVP also monitors the V_{CC} line. They offer an efficient protection in case of optocoupler destruction or adverse open loop operation.

Finally, a timer-based short-circuit protection offers the best protection scheme, letting you precisely select the protection trip point irrespective of a loose coupling between the auxiliary and the power windings.

Features

- Fixed-Frequency 65 or 100 kHz Current-Mode Control Operation
- Internal and Adjustable Over Power Protection (OPP) Circuit
- Frequency Foldback Down to 26 kHz and Skip-Cycle in Light Load Conditions
- Internal Ramp Compensation
- Internal Fixed 4 ms Soft-Start
- 100 ms Timer-Based Auto-Recovery Short-Circuit Protection
- Frequency Jittering in Normal and Frequency Foldback Modes
- Option for Auto-Recovery or Latched Short-Circuit Protection
- OVP Input for Improved Robustness
- Up to 28 V V_{CC} Operation
- Latched or Auto-Recovery OVP Protection on V_{CC}
- +300 mA / -500 mA Source/Sink Drive Capability
- Less than 100 mW Standby Power at High Line
- EPS 2.0 Compliant
- These are Pb-Free Devices

Typical Applications

- ac-dc Converters for TVs, Set-top Boxes and Printers
- Offline Adapters for Notebooks and Netbooks



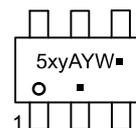
ON Semiconductor®

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TSOP-6
(SOT23-6)
SN SUFFIX
CASE 318G
STYLE 13

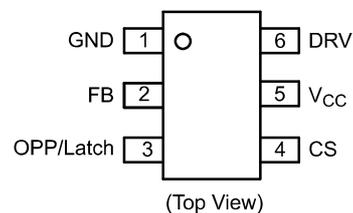
MARKING DIAGRAM



5xy = Specific Device Code
x = A or U
y = A, 2, C, D, or F
A = Assembly Location
Y = Year
W = Work Week
■ = Pb-Free Package

(Note: Microdot may be in either location)

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 2 of this data sheet.

NCP1251

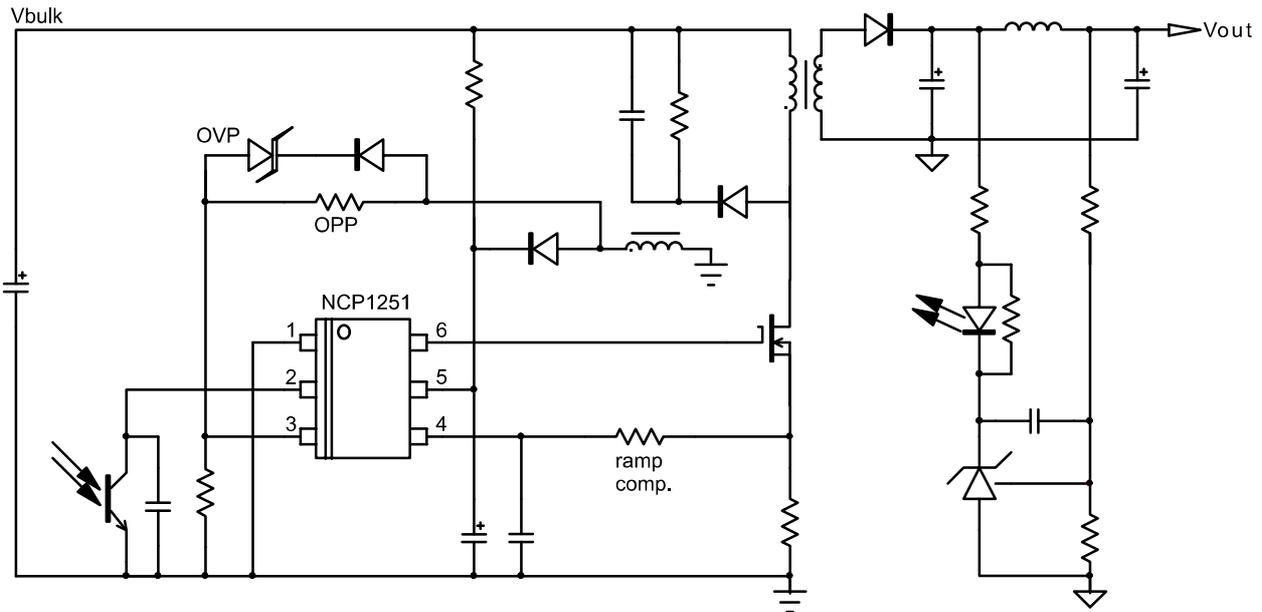


Figure 1. Typical Application Example

Pin N°	Pin Name	Function	Pin Description
1	GND	-	The controller ground.
2	FB	Feedback pin	Hooking an optocoupler collector to this pin will allow regulation.
3	OPP/OVP	Adjust the Over Power Protection Latches off the part	A resistive divider from the auxiliary winding to this pin sets the OPP compensation level. When brought above 3 V, the part is fully latched off.
4	CS	Current sense + ramp compensation	This pin monitors the primary peak current but also offers a means to introduce ramp compensation.
5	V _{CC}	Supplies the controller	This pin is connected to an external auxiliary voltage and supplies the controller. When the V _{CC} exceeds a certain level, the part permanently latches off.
6	DRV	Driver output	The driver's output to an external MOSFET gate.

OPTIONS

Controller	Frequency	OCF	V _{CC} OVP	OVP/OTP
NCP1251ASN65T1G	65 kHz	Latched	Latched	Latched
NCP1251BSN65T1G	65 kHz	Autorecovery	Latched	Latched
NCP1251CSN65T1G	65 kHz	Autorecovery	Autorecovery	Latched
NCP1251FSN65T1G	65 kHz	Autorecovery	Latched	Latched
NCP1251ASN100T1G	100 kHz	Latched	Latched	Latched
NCP1251BSN100T1G	100 kHz	Autorecovery	Latched	Latched

NOTE: F version has a different foldback scheme for improved efficiency.

ORDERING INFORMATION

Device	Package Marking	OCF Protection	V _{CC} OVP Protection	Switching Frequency	Package	Shipping†
NCP1251ASN65T1G	5AA	Latch	Latch	65 kHz	TSOP-6 (Pb-Free)	3000 / Tape & Reel
NCP1251BSN65T1G	5A2	Autorecovery	Latch	65 kHz		
NCP1251CSN65T1G	5AE	Autorecovery	Autorecovery	65 kHz		
NCP1251FSN65T1G	5AF	Autorecovery	Latch	65 kHz		
NCP1251ASN100T1G	5AC	Latch	Latch	100 kHz		
NCP1251BSN100T1G	5AD	Autorecovery	Latch	100 kHz		

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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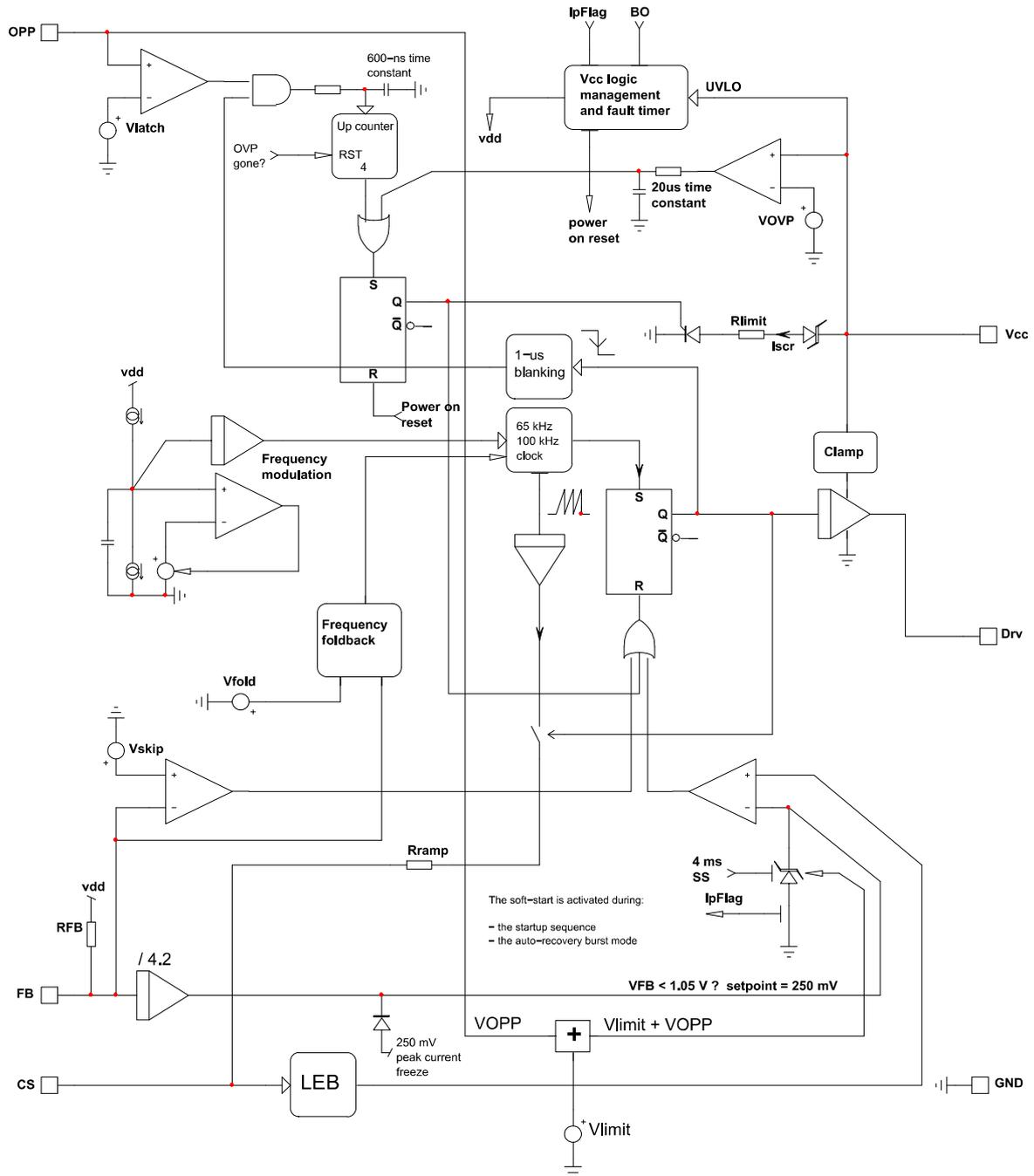


Figure 2. Internal Circuit Architecture