NCP1397A/B, NCV1397A/B

High Performance Resonant Mode Controller with Integrated High-Voltage Drivers

The NCP1397 is a high performance controller that can be utilized in half bridge resonant topologies such as series resonant, parallel resonant and LLC resonant converters. It integrates 600 V gate drivers, simplifying layout and reducing external component count. With its unique architecture, including a 500 kHz Voltage Controlled Oscillator whose control mode permits flexibility when an ORing function is required, the NCP1397 delivers everything needed to build a reliable and rugged resonant mode power supply.

The NCP1397 provides a suite of protection features with configurable settings to optimize any application. These include: auto−recovery or fault latch−off, brown−out, open optocoupler, soft−start and short−circuit protection. Deadtime is also adjustable to overcome shoot through current.

Features

- High−Frequency Operation from 50 kHz up to 500 kHz
- 600 V High−Voltage Floating Driver
- Adjustable Minimum Switching Frequency with ±3% Accuracy
- Adjustable Deadtime from 100 ns to 2 μs.
- Startup Sequence Via an Externally Adjustable Soft−Start
- Brown−Out Protection for a Simpler PFC Association
- Latched Input for Severe Fault Conditions, e.g. Over Temperature or OVP
- Timer−Based Input with Auto−Recovery Operation for Delayed Event Reaction
- Latched Overcurrent Protection
- Disable Input for Immediate Event Reaction or Simple ON/OFF Control
- V_{CC} Operation up to 20 V
- Low Startup Current of 300 μA
- 1 A/0.5 A Peak Current Sink/Source Drive Capability
- Common Collector Optocoupler Connection for Easier ORing
- Optional Common Emitter Optocoupler Connection
- Internal Temperature Shutdown
- NCV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q100 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Flat Panel Display Power Converters
- High Power ac−dc Adapters for Notebooks
- Computing Power Supplies
- Industrial and Medical Power Sources
- Offline Battery Chargers

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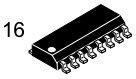
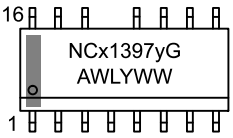


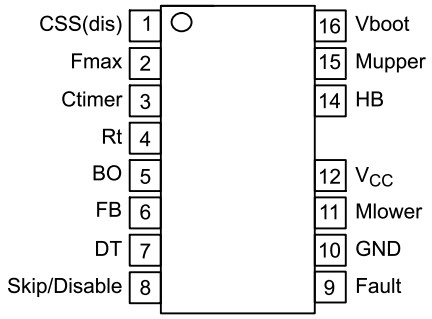
SO−16, LESS PIN 13
D SUFFIX
CASE 751AM

MARKING DIAGRAMS



x	= P (standard) or V (automotive)
y	= A or B
A	= Assembly Location
WL	= Wafer Lot
Y	= Year
WW	= Work Week
G	= Pb−Free Package

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 26 of this data sheet.

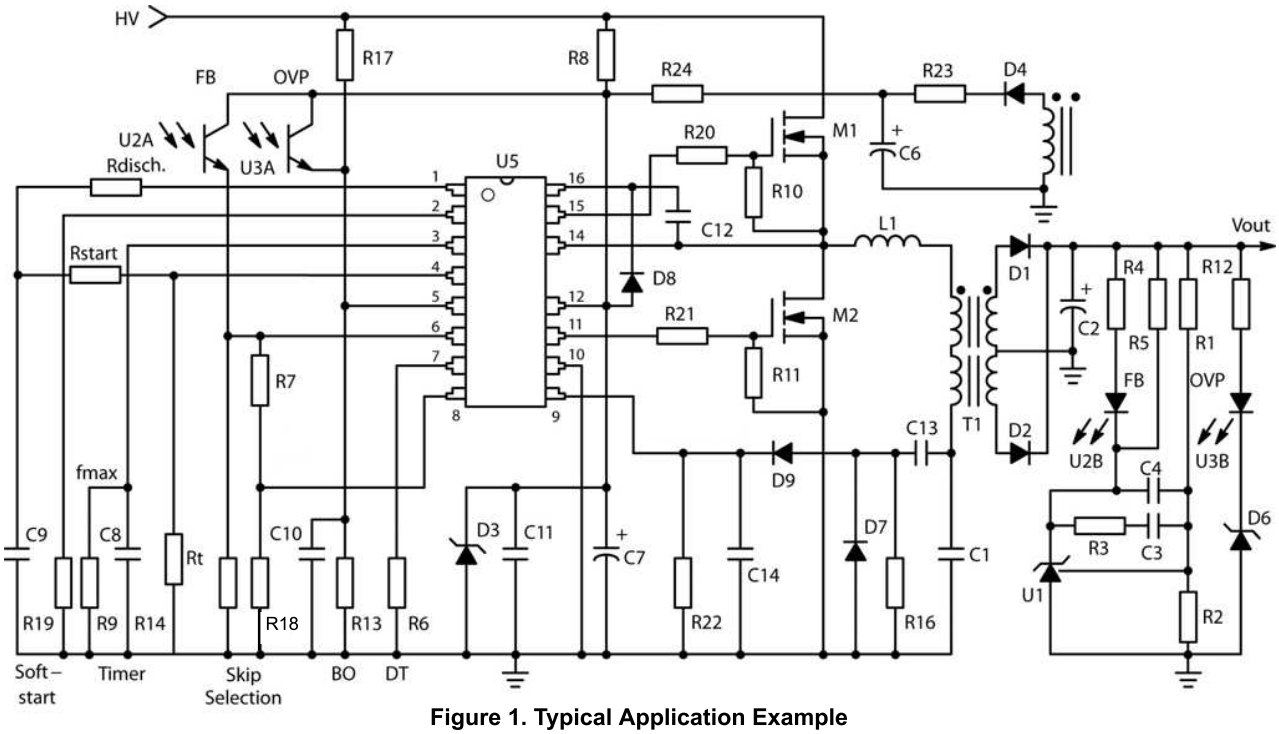


Figure 1. Typical Application Example

PIN FUNCTION DESCRIPTION

Pin #	Pin Name	Function	Pin Description
1	CSS(dis)	Soft−Start Discharge	Soft−start capacitor discharge pin. Connect to the soft−start capacitor to reset it before startup or during overload conditions.
2	Fmax	Maximum frequency clamp	A resistor sets the maximum frequency excursion
3	Ctimer	Timer duration	Sets the timer duration in presence of a fault
4	Rt	Minimum frequency clamp	Connecting a resistor to this pin, sets the minimum oscillator frequency reached for V_{FB} = 1 V.
5	BO	Brown−Out	Detects low input voltage conditions. When brought above V_{latch} (4 V typically), it fully latches off the controller.
6	FB	Feedback	Injecting current into this pin increases the oscillation frequency up to Fmax.
7	DT	Deadtime	A simple resistor adjusts the dead−time width
8	Skip/Disable	Skip or Disable input	Upon release, a clean startup sequence occurs if V_{FB} < 0.3 V. During the skip mode, when FB doesn't drop below 0.3 V, the IC restarts without soft−start sequence.
9	Fault	Fault detection input	When asserted, the external timer starts to countdown and shuts down the controller at the end of its time duration. Simultaneously the Soft−Start discharge switch is activated so the converter operating frequency goes up to protect application power stage. This input features also second fault comparator with higher threshold (1.5 V typically) that: A) Speeds up the timer capacitor charging current 8 times – NCP1397A B) latches off the IC permanently – NCP1397B In both versions the second fault comparator helps to protect application in case of short circuit on the output or transformer secondary winding.
10	GND	Analog ground	−
11	Mlower	Low side output	Drives the lower side MOSFET
12	V_{CC}	Supplies the controller	The controller accepts up to 20 V
13	NC	Not connected	Increases the creepage distance
14	HB	Half−bridge connection	Connects to the half−bridge output
15	Mupper	High side output	Drives the higher side MOSFET
16	Vboot	Bootstrap pin	The floating V_{CC} supply for the upper stage