



# TEA1733P

## GreenChip SMPS control IC

Rev. 7 — 15 July 2013

Product data sheet

## 1. General description

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The TEA1733P is a low cost Switched Mode Power Supply (SMPS) controller IC intended for flyback topologies. It operates in fixed frequency mode. To reduce ElectroMagnetic Interference (EMI), frequency jitter has been implemented. Slope compensation is integrated for Continuous Conduction Mode (CCM) operation.

The TEA1733P includes OverPower Protection (OPP). This enables the controller to operate under overpower situations for a limited amount of time.

Two pins, VINSENSE and PROTECT, are reserved for protection purposes. Input UnderVoltage Protection (UVP) and OverVoltage Protection (OVP), output OVP and OverTemperature Protection (OTP) can be implemented using a minimal number of external components.

At low power levels the primary peak current is set to 25 % of the maximum peak current and the switching frequency is reduced to limit switching losses. The combination of fixed frequency operation at high output power and frequency reduction at low output power provides high-efficiency over the total load range.

The TEA1733P enables low cost, highly efficient and reliable supplies for power requirements up to 75 W to be designed easily and with a minimum number of external components.

## 2. Features and benefits

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### 2.1 Features

- SMPS controller IC enabling low-cost applications
- Large input voltage range (12 V to 30 V)
- Very low supply current during start-up and restart (typically 10  $\mu$ A)
- Low supply current during normal operation (typically 0.5 mA without load)
- Overpower or high/low line compensation
- Adjustable overpower time-out
- Adjustable overpower restart timer
- Fixed switching frequency with frequency jitter to reduce EMI
- Frequency reduction with fixed minimum peak current to maintain high-efficiency at low output power levels
- Slope compensation for CCM operation
- Low and adjustable OverCurrent Protection (OCP) trip level



- Adjustable soft start operation
- Two protection inputs (e.g. for input UVP and OVP, OTP and output OVP)
- IC overtemperature protection

### 3. Applications

- All applications requiring efficient and cost-effective power supply solutions up to 75 W.

### 4. Ordering information

Table 1. Ordering information

Type number	Package		
	Name	Description	Version
TEA1733P	DIP8	plastic dual in-line package; 8 leads (300 mil)	SOT97-1

5. Block diagram

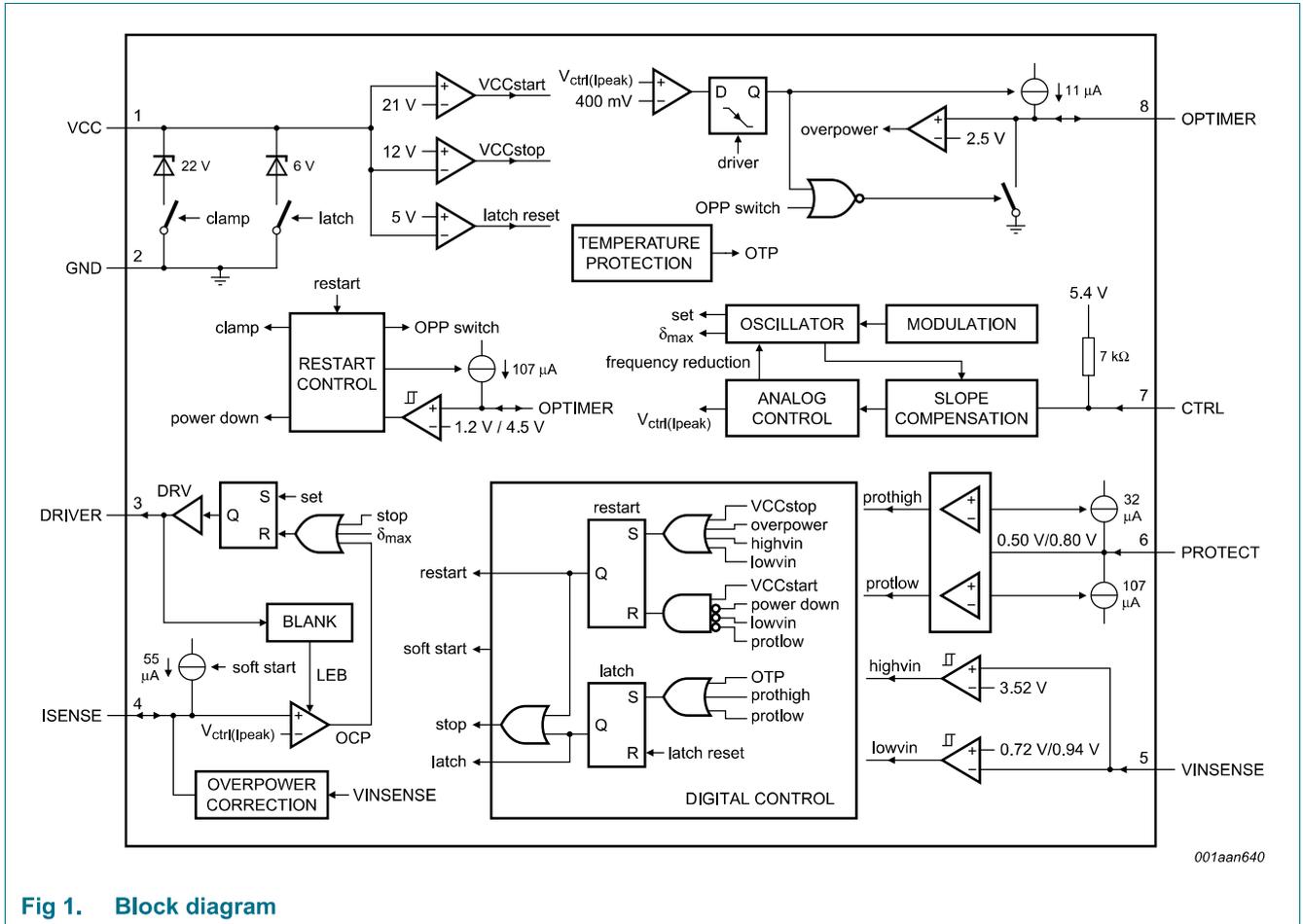
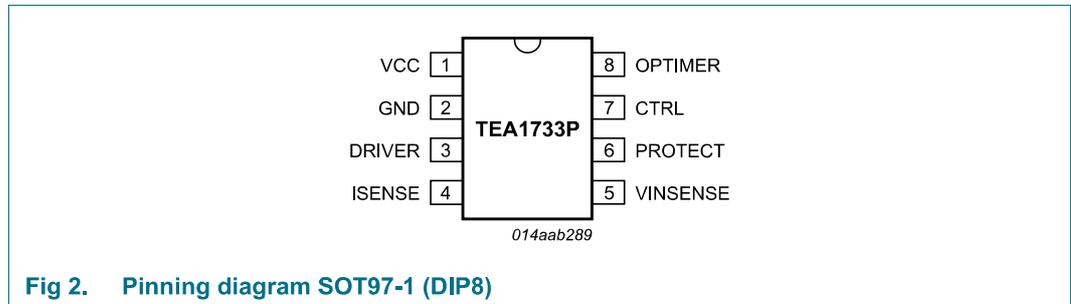


Fig 1. Block diagram

## 6. Pinning information

### 6.1 Pinning



### 6.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
VCC	1	supply voltage
GND	2	ground
DRIVER	3	gate driver output
ISENSE	4	current sense input
VINSENSE	5	input voltage protection input
PROTECT	6	general purpose protection input
CTRL	7	control input
OPTIMER	8	overpower and restart timer

## 7. Functional description

### 7.1 General control

The TEA1733P contains a flyback circuit controller, a typical configuration of which is shown in [Figure 3](#).

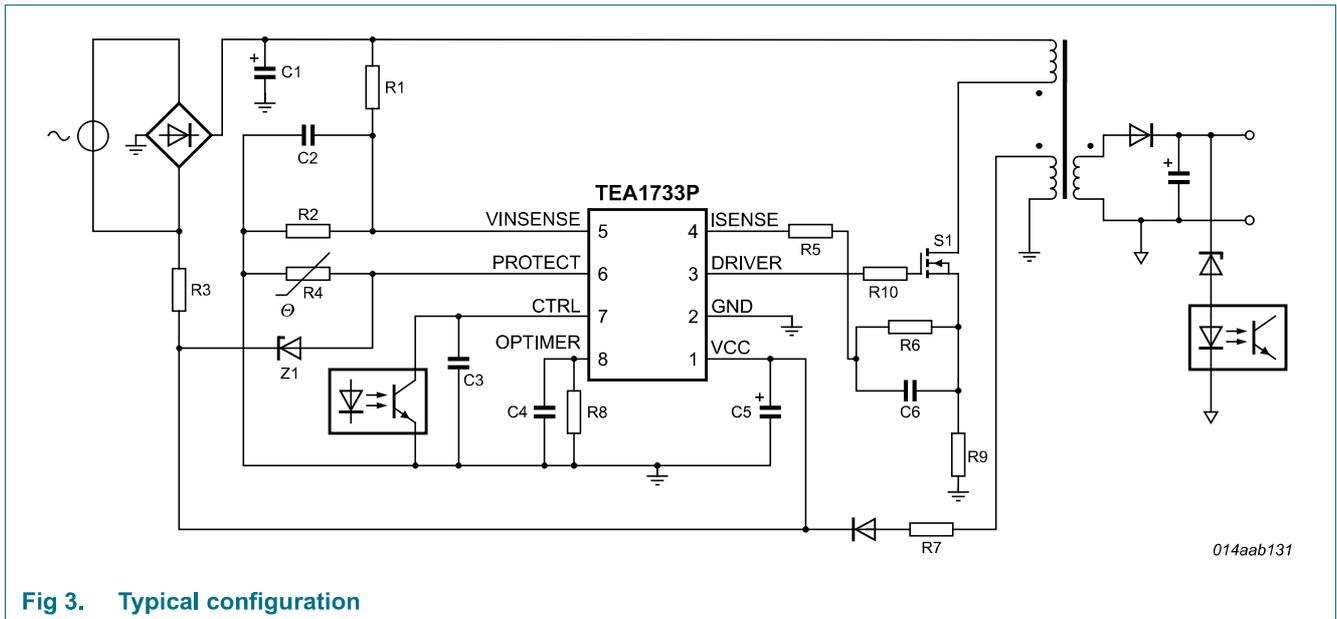


Fig 3. Typical configuration

### 7.2 Start-up and UnderVoltage LockOut (UVLO)

Initially, the capacitor on the VCC pin is charged from the high voltage mains via resistor R3.

If  $V_{CC}$  is lower than  $V_{start-up}$ , the IC current consumption is low (typically 10  $\mu A$ ). When  $V_{CC}$  reaches  $V_{start-up}$ , the IC first waits for the VINSENSE pin to reach the  $V_{start(VINSENSE)}$  voltage and PROTECT pin to reach the  $V_{det(L)(PROTECT)}$  voltage. When both levels are reached, the IC charges the ISENSE pin to the  $V_{start(soft)}$  level and starts switching. In a typical application, the supply voltage is taken over by the auxiliary winding of the transformer.

If a protection is triggered the controller stops switching. Depending on the protection triggered, the protection causes a restart or latches the converter to an off-state.

A restart caused by a protection rapidly charges the OPTIMER pin to 4.5 V (typical). The TEA1733P enters Power-down mode until the OPTIMER pin discharges down to 1.2 V (typical). In Power-down mode, the IC consumes a very low supply current (10  $\mu A$  typical) and the VCC pin is clamped at 22 V (typical) by an internal clamp circuit. When the voltage on pin OPTIMER drops below 1.2 V (typical) and the VCC pin voltage is above the VCC start-up voltage (See [Figure 4](#)), the IC restarts.

When a latched protection is triggered, the TEA1733P immediately enters Power-down mode. The VCC pin is clamped to a voltage just above the latch protection reset voltage ( $V_{rst(latch)} + 1 V$ ).