

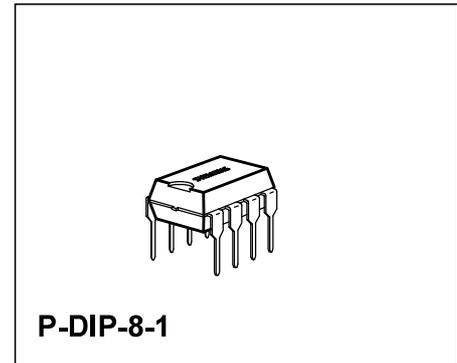
Control IC for Switched-Mode Power Supplies using MOS-Transistor

TDA 4605-3

Bipolar IC

Features

- Fold-back characteristics provides overload protection for external components
- Burst operation under secondary short-circuit condition implemented
- Protection against open or a short of the control loop
- Switch-off if line voltage is too low (undervoltage switch-off)
- Line voltage depending compensation of fold-back point
- Soft-start for quiet start-up without noise generated by the transformer
- Chip-over temperature protection implemented (thermal shutdown)
- On-chip ringing suppression circuit against parasitic oscillations of the transformer
- AGC-voltage reduction at low load



Type	Ordering Code	Package
TDA 4605-3	Q67000-A5066	P-DIP-8-1

The IC TDA 4605-3 controls the MOS-power transistor and performs all necessary control and protection functions in free running flyback converters. Because of the fact that a wide load range is achieved, this IC is applicable for consumer as well as industrial power supplies.

The serial circuit and primary winding of the flyback transformer are connected in series to the input voltage. During the switch-on period of the transistor, energy is stored in the transformer. During the switch-off period the energy is fed to the load via the secondary winding. By varying switch-on time of the power transistor, the IC controls each portion of energy transferred to the secondary side such that the output voltage remains nearly independent of load variations. The required control information is taken from the input voltage during the switch-on period and from a regulation winding during the switch-off period. A new cycle will start if the transformer has transferred the stored energy completely into the load.

In the different load ranges the switched-mode power supply (SMPS) behaves as follows:

No load operation

The power supply is operating in the burst mode at typical 20 to 40 kHz. The output voltage can be a little bit higher or lower than the nominal value depending of the design of the transformer and the resistors of the control voltage divider.

Nominal operation

The switching frequency is reduced with increasing load and decreasing AC-voltage. The output voltage is only dependent on the load.

Overload point

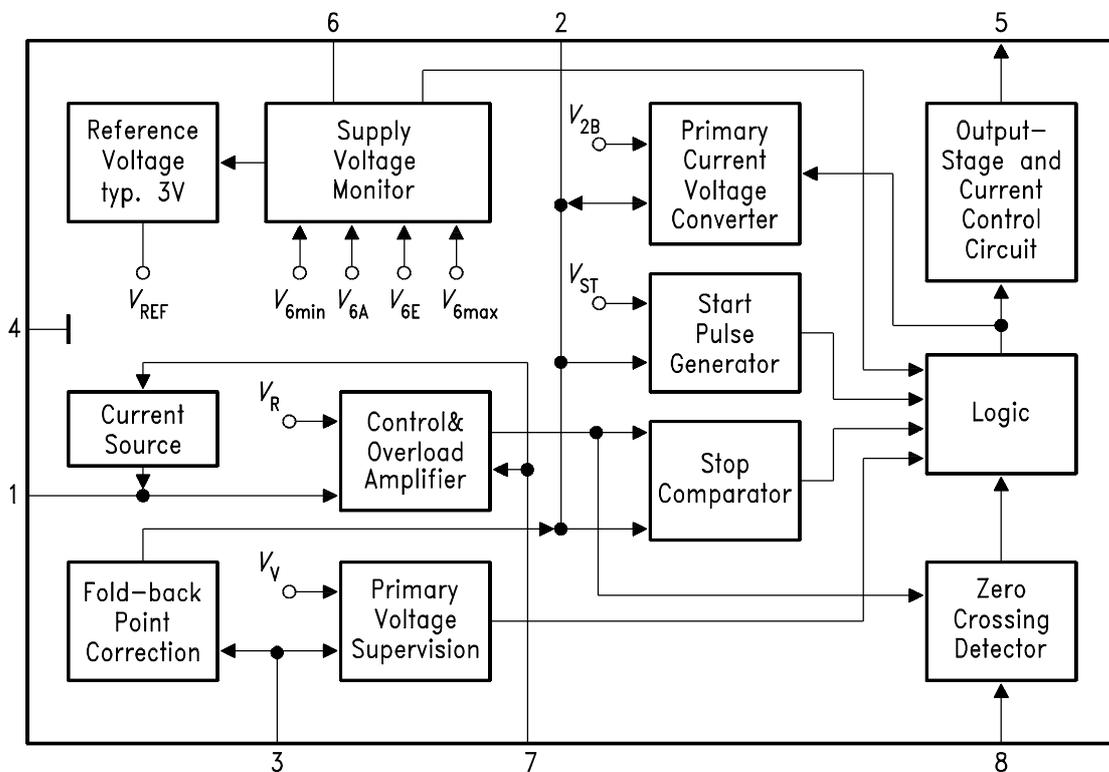
Maximal output power is available at this point of the output characteristic.

Overload

The energy transferred per operation cycle is limited at the top. Therefore the output voltages declines by secondary overloading.

Pin Definitions and Functions

Pin No.	Function
1	Information Input Concerning Secondary Voltage. By comparing the regulating voltage - obtained from the regulating winding of the transformer - with the internal reference voltage, the output impulse width on pin 5 is adjusted to the load of the secondary side (normal, overload, short-circuit, no load).
2	Information Input Regarding the Primary Current. The primary current rise in the primary winding is simulated at pin 2 as a voltage rise by means of external RC-element. When a voltage level is reached that's derived from the regulating voltage at pin 1, the output impulse at pin 5 is terminated. The RC-element serves to set the maximum power at the overload point set.
3	Input for Primary Voltage Monitoring: In the normal operation V_3 is moving between the thresholds V_{3H} and V_{3L} ($V_{3H} > V_3 > V_{3L}$). $V_3 < V_{3L}$: SMPS is switched OFF (line voltage too low). $V_3 > V_{3H}$: Compensation of the overload point regulation (controlled by pin 2) starts at V_{3H} : $V_{3L} = 1.7$.
4	Ground
5	Output: Push-pull output provides ± 1 A for rapid charge and discharge of the gate capacitance of the power MOS-transistor.
6	Supply Voltage Input: A stable internal reference voltage V_{REF} is derived from the supply voltage also the switching thresholds V_{6A} , V_{6E} , $V_{6\max}$ and $V_{6\min}$ for the supply voltage detector. If $V_6 > V_{6E}$ then V_{REF} is switched on and switched off when $V_6 < V_{6A}$. In addition the logic is only enable for $V_{6\min} < V_6 < V_{6\max}$.
7	Input for Soft-Start. Start-up will begin with short pulses by connecting a capacitor from pin 7 to ground.
8	Input for the Oscillation Feedback. After starting oscillation, every zero transition of the feedback voltage (falling edge) through zero (falling edge) triggers an output pulse at pin 5. The trigger threshold is at + 50 mV typical.



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Block Diagram