PDF TEA1733 Data sheet (Hoja de datos)

Número de pieza	TEA1733
Descripción	GreenChip SMPS control IC
Fabricantes	NXP Semiconductors
Logotipo	

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TEA1733(L)

GreenChip SMPS control IC

Rev. 01.11 — 10 July 2009 Objective specification

1. General description

The TEA1733 is a low cost Switched Mode Power Supply (SMPS) controller IC intended for flyback topologies.

The TEA1733 operates in fixed frequency mode. To reduce EMI, frequency jitter has been implemented. For Continuous Conduction Mode (CCM) operation, slope compensation is integrated. The controller can be set to accept an over-power situation for a limited amount of time.

Two pins are reserved for protection purposes. Input under and over voltage protection, output over voltage protection and overtemperature protection can be implemented with 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 the 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 TEA1733 enable 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

2.1 Features

- SMPS controller IC enabling low cost applications
- Large input voltage range (12V up to 30V)
- Very low supply current during start-up and restart (typ. 10µA)
- Low supply current during normal operation (typ. 500µA without load)
- Over-power compensation
- Adjustable over-power time-out
- Adjustable over-power restart timer
- Fixed switching frequency with frequency jitter to reduce EMI
- Frequency reduction with fixed minimum peak current at low power operation to maintain high efficiency at low output power levels
- Slope compensation for CCM operation
- Low and adjustable over current protection (OCP) trip level
- Soft start

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7. Functional description

7.1 General control

The TEA1733 contains a controller for a flyback circuit. A typical configuration is shown in Figure 3.

Fig 3. Typical configuration

7.2 Start-up and under voltage lock-out

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

As long as V_{VCC} is below $V_{startup}$ the IC current consumption is low (typ. 10µA). When V_{VCC} reaches $V_{startup}$ the IC first starts for the VINSENSE pin to reach the $V_{VINSENSE(H)}$ voltage and for the PROTECT pin to reach the $V_{PROTECT(H)}$ voltage. When both are also reached, the IC charges the ISENSE pin to the $V_{ISENSE(H)}$ level and then 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 will stop switching. Dependent on which protection is triggered and dependent on the version of the IC (TEA1733 or TEA1733L) the protection will cause a re-start or will latch the converter in an off-state.

A re-start caused by a protection will charge the OPTIMER pin to 4.5V (typ.) rapidly. The TEA1733 will then enter the power-down mode until the OPTIMER pin is discharged to 1.2V (typ.). During the power-down mode, the IC consumes a very low supply current (10µA typ.) and the VCC pin will be clamped to 22V (typ) by an internal clamp circuit. A restart will be made when the voltage on pin OPTIMER drops below 1.2V (typ.) and the VCC pin voltage is above the VCC start-up voltage.

When a latched protection is triggered, the TEA1733 will enter the power-down mode immediately. The VCC pin will be clamped to a voltage just above the latch protection reset voltage ($V_{reset(LatchOff)}$ +1V) (See Figure 4.)

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9. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; JEDEC test board	100	K/W
$R_{th(j-c)}$	thermal resistance from junction to case	in free air; JEDEC test board	79	K/W

10. Characteristics

Table 5. Characteristics

T_j = 25 °C; V_{VCC} = 20 V; all voltages are measured with respect to ground (pin 6); currents are positive when flowing into the IC, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Supply voltage management (pin VCC)						
$V_{startup}$	start-up voltage		18.6	20.6	22.6	V
$V_{uvlo(VCC)}$	under voltage lockout threshold voltage		11.2	12.2	13.2	V
$V_{clamp(VCC)}$	Clamp voltage on pin VCC	Activated during restart	$V_{startup}$ +1			V
		Activated during latched protection	$V_{reset(LatchOff)}$ +1			V
V_{hys}	hysteresis voltage	$V_{hys} = V_{startup} - V_{uvlo(VCC)}$	891	0	V	
$V_{startup(rel)}$	startup supply current	$V_{VCC} = V_{startup}$ - 0.1 V	5.1	10.15	µA	
$I_{VCC(latch)}$	operating supply current latched protection reset voltage	no load on pin DRIVER	0.4	0.5	0.6	mA
$V_{reset(LatchOff)}$			4.56	V		
Input Voltage Sensing (pin VINSENSE)						
$V_{uvp(VINSENSE)}$	Input voltage detection level		0.89	0.94	0.99	V
$V_{lpf(VINSENSE)}$	Low input voltage detection level		0.68	0.72	0.76	V
$V_{hpf(VINSENSE)}$	High input voltage detection level		3.39	3.52	3.65	V
$I_{O(VINSENSE)}$	output current on pin VINSENSE			-20	nA	
$V_{clamp(VINSENSE)}$	Clamp voltage on pin VINSENSE	$I_{VINSENSE}$ =50µA+4		-5	V	
Protection input (pin PROTECT)						
$V_{lpf(PROTECT)}$	low protection voltage		0.47	0.50	0.53	V
$V_{hpf(PROTECT)}$	high protection voltage		0.75	0.8	0.85	V
$I_{O(PROTECT)}$	output current on pin PROTECT	$V_{VINSENSE}$ =4V $V_{PROTECT(H)}$	-34	-32	-30	µA
$V_{clamp(PROTECT)}$	Clamp voltage on pin PROTECT	$V_{VINSENSE}$ =4V $V_{PROTECT(H)}$ +200µA	57	107	127	µA
			3.5	4.1	4.7	V

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Número de pieza	Descripción	Fabricantes
TEA1731LTS	GreenChip SMPS control IC	NXP Semiconductors
TEA1731TS	GreenChip SMPS control IC	NXP Semiconductors
TEA1732CTS	GreenChip SMPS control IC	NXP Semiconductors
TEA1732LTS	GreenChip SMPS control IC	NXP Semiconductors

Número de pieza	Descripción	Fabricantes
SLA6805M	High Voltage 3 phase Motor Driver IC.	Sanken
SDC1742	12- and 14-Bit Hybrid Synchro / Resolver-to-Digital Converters.	Analog Devices