TEA1610P; TEA1610T
Zero-voltage-switching resonant converter controller

Rev. 03 — 26 March 2007 **Product data sheet**

1. General description

The TEA1610 is a monolithic integrated circuit implemented in a high-voltage Diffusion Metal Oxide Semiconductor (DMOS) process. The circuit is a high voltage controller for a zero-voltage switching resonant converter. The IC provides the drive function for two discrete power MOSFETs in a half-bridge configuration. It also includes a level-shift circuit, an oscillator with accurately-programmable frequency range, a latched shut-down function and a transconductance error amplifier.

To guarantee an accurate 50 % switching duty factor, the oscillator signal passes through a divide-by-two flip-flop before being fed to the output drivers.

The circuit is very flexible and enables a broad range of applications for different mains voltages.
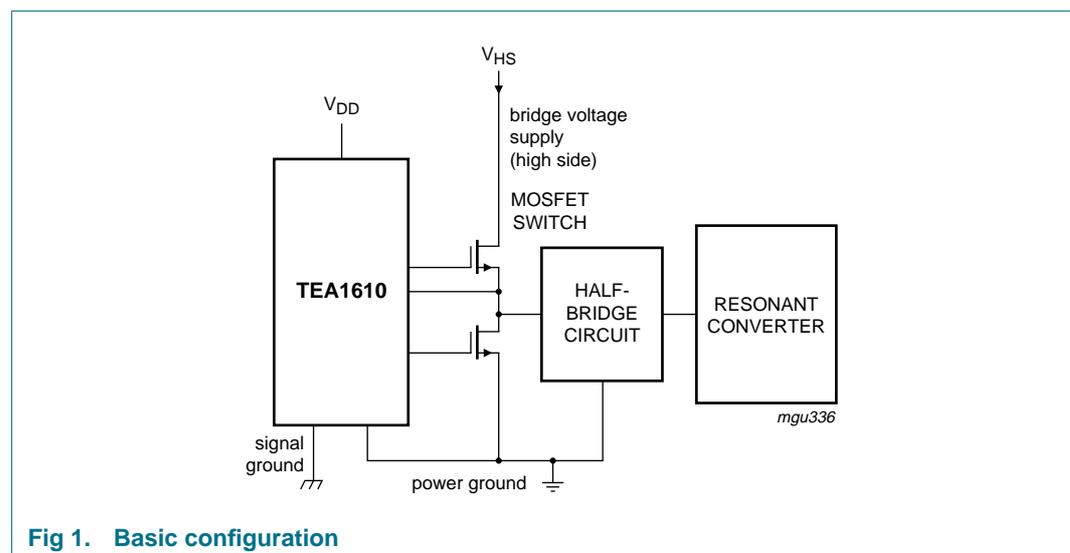

Fig 1.   Basic configuration

2. Features

- Integrated high voltage level-shift function
- Integrated high voltage bootstrap diode
- Low start-up current (green function)
- Adjustable dead time
- Transconductance error amplifier for ultra high-ohmic regulation feedback
- Latched shut-down circuit for overcurrent and overvoltage protection
- Adjustable minimum and maximum frequencies
- Undervoltage lockout

3. Applications

■ TV and monitor power supplies   ■ High voltage power supplies

4. Quick reference data

Table 1.   Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{HS}	high side driver voltage		0	-	600	V
$I_{GH(source)}$	high side output source current	$V_{DD(F)}$ = 13 V; V_{SH} = 0 V; V_{GH} = 0 V	−135	−180	−225	mA
$I_{GL(source)}$	low side output source current	V_{GL} = 0 V	−135	−180	−225	mA
$I_{GH(sink)}$	high side output sink current	$V_{DD(F)}$ = 13 V; V_{SH} = 0 V; V_{GH} = 13 V	-	300	-	mA
$I_{GL(sink)}$	low side output sink current	V_{GL} = 14 V	-	300	-	mA
$f_{bridge(max)}$	maximum bridge frequency	C_F = 100 pF; I_{IFS} = 1 mA; I_{IRS} = 200 µA; $f_{bridge} = \dfrac{f_{OSC}}{2}$	[1] 450	500	550	kHz
$V_{I(CM)}$	common mode input voltage	[2] -	-	-	2.5	V

[1]   The frequency of the oscillator depends on the value of capacitor C_f, the peak-to-peak voltage swing V_{CF}, and the charge/discharge currents $I_{CF(ch)}$ and $I_{CF(dis)}$.

[2]   This parameter applies specifically to the error amplifier.

5. Ordering information

Table 2.   Ordering information

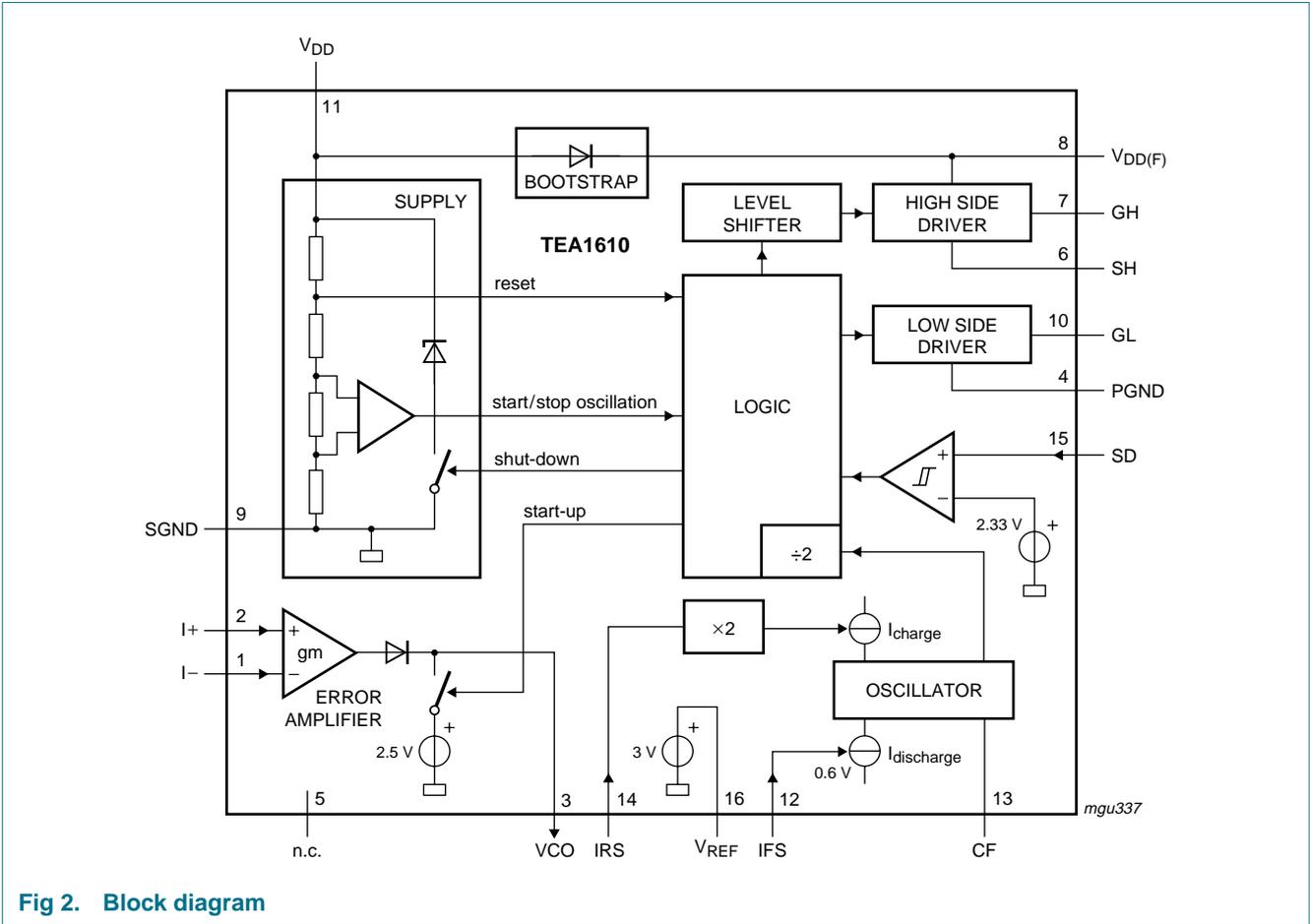| Type number	Package		
	Name	**Description**	**Version**
TEA1610P	DIP16	plastic dual in-line package; 16 leads (300 mil); long body	SOT38-1
TEA1610T	SO16	plastic small outline package; 16 leads; body width 3.9 mm; low stand-off height	SOT109-2

6. Block diagram

Fig 2. Block diagram
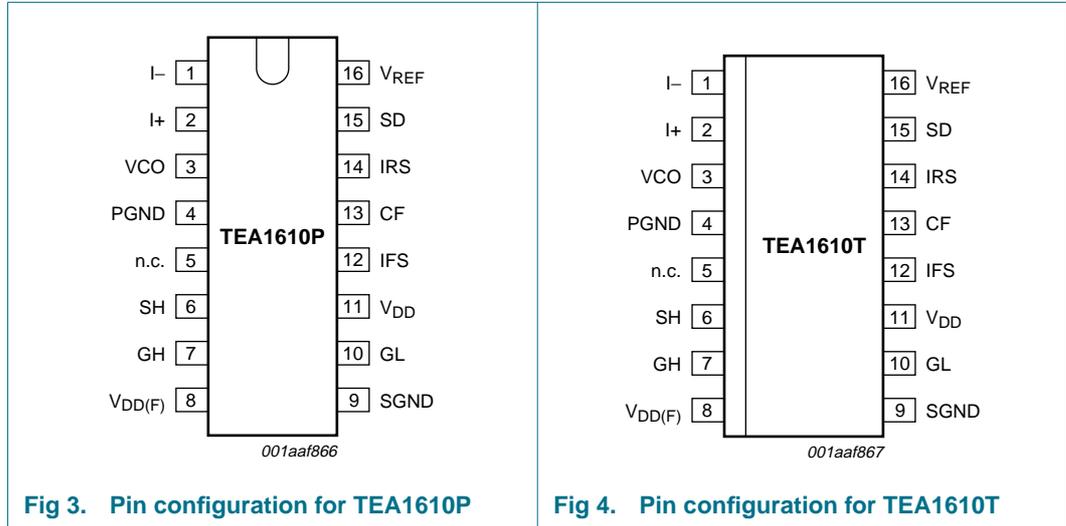
7. Pinning information

7.1 Pinning

Fig 3. Pin configuration for TEA1610P

Fig 4. Pin configuration for TEA1610T

7.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
I-	1	error amplifier inverting input
I+	2	error amplifier non-inverting input
VCO	3	error amplifier output
PGND	4	power ground
n.c.	5	not connected (high voltage spacer)
SH	6	high side switch source
GH	7	gate of the high side switch
$V_{DD(F)}$	8	floating supply voltage for the high side driver
SGND	9	signal ground
GL	10	gate of the low side switch
V_{DD}	11	supply voltage
IFS	12	oscillator discharge current input
CF	13	oscillator capacitor
IRS	14	oscillator charge current input
SD	15	shut-down input
V_{REF}	16	reference voltage