

SANYO

No. 5009

STK73904

Self-Excitation Type Feedback Control Switching Regulator (210W Output)

Overview

The STK73904 incorporates on-chip all the power switching, amplifier, overcurrent protection and driver circuits required in a self-excitation type feedback control off-line switching regulator. As a result, it can be used in the design of switching power supplies with minimal number of external components. Furthermore, the adoption of MOSFET power switching elements supports a higher oscillator frequency than that possible with bipolar transistors. This allows smaller pulse transformers and capacitors to be used, making it possible to construct miniature power supply systems.

Applications

- CRT/CTV power supplies
- Office automation equipment power supplies

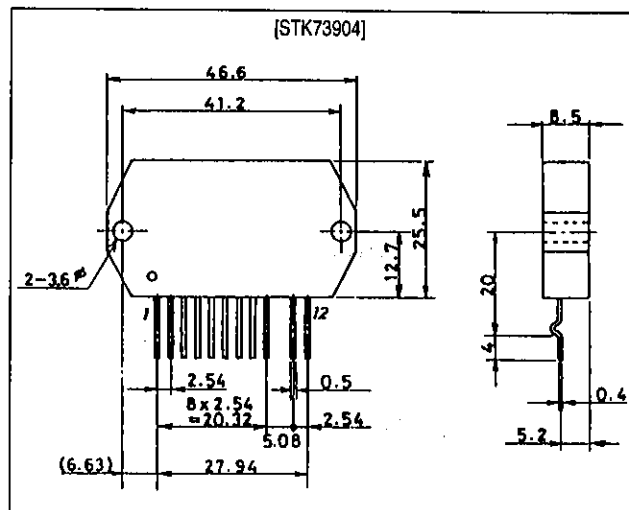
Features

- Power MOSFET devices
- Feedback control for high output voltage precision
- Driver circuit on-chip
- Overcurrent protection circuit on-chip
- Pin compatible with all other devices in the same series of devices with 110 to 280W power ratings
- Higher oscillator frequency allows the use of smaller pulse transformers
- IMST substrate acts as an electromagnetic shield, making low-noise designs possible

Package Dimensions

unit: mm

4121



Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$, $T_c = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Ratings	Unit
Operating substrate temperature	$T_c \text{ max}$	Recommended value is 105°C .	115	$^\circ\text{C}$
AC input voltage	V_{AC}	Specified test circuit	140	Vrms
Operating temperature	T_{opr}		-10 to $+85$	$^\circ\text{C}$
Storage temperature	T_{stg}		-30 to $+115$	$^\circ\text{C}$
Maximum output power	$W_o \text{ max}$	Specified test circuit, $V_O = 115\text{V}$	210	W
[TR1]				
Drain current	I_D	Refer to ASO characteristics for overcurrent condition.	12	A
Pulse drain current	$I_{D(pulse)}$		48	A
Drain reverse current	I_{DR}		12	A
Gate-source voltage	V_{GSS}		± 30	V
Allowable power dissipation	P_D		100	W
Chip junction temperature	$T_J \text{ max}$		150	$^\circ\text{C}$
[ZD1]				
Allowable power dissipation	P_{ZD1}		500	mW
Chip junction temperature	$T_{J(ZD1)} \text{ max}$		125	$^\circ\text{C}$

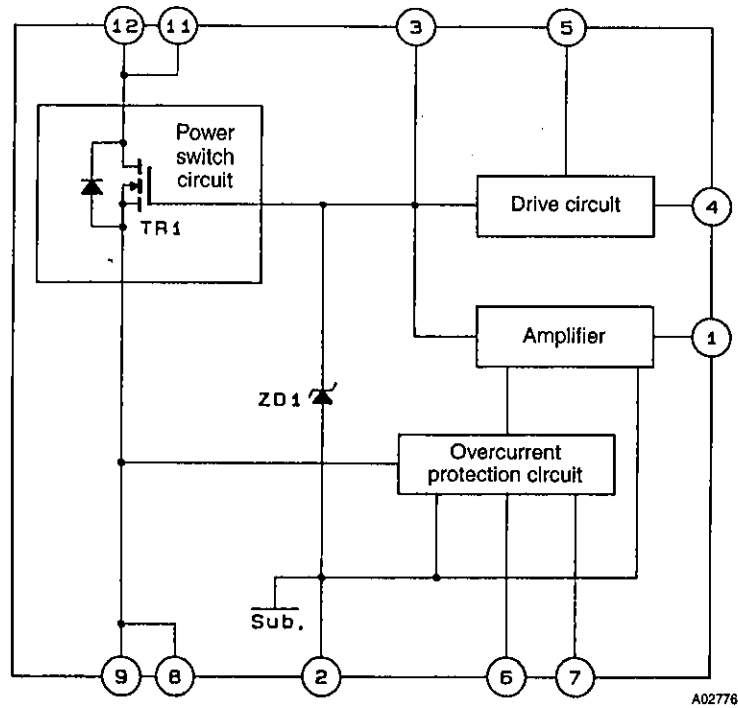
Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Pin 4 input voltage	V_4		± 8 to ± 24	V
Oscillator frequency	f_{osc}		20 to 120	kHz

Operating Characteristics at $T_a = 25^\circ\text{C}$, $T_c = 25^\circ\text{C}$ unless otherwise specified, specified test circuit

Parameter	Symbol	Conditions	min	typ	max	Unit
[TR1]						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10\text{mA}$, $V_{GS} = 0\text{V}$	500	—	—	V
Gate-source cutoff voltage	$V_{GS(off)}$	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$	2.0	—	3.0	V
ON resistance	$R_{DS(on)}$	$I_D = 6\text{A}$, $V_{GS} = 10\text{V}$	—	0.45	0.7	Ω
Input capacitance	C_{iss}	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	1450	—	pF
[ZD1]						
Zener voltage	V_Z	$I_Z = 5\text{mA}$	23.7	—	26.3	V

Block Diagram

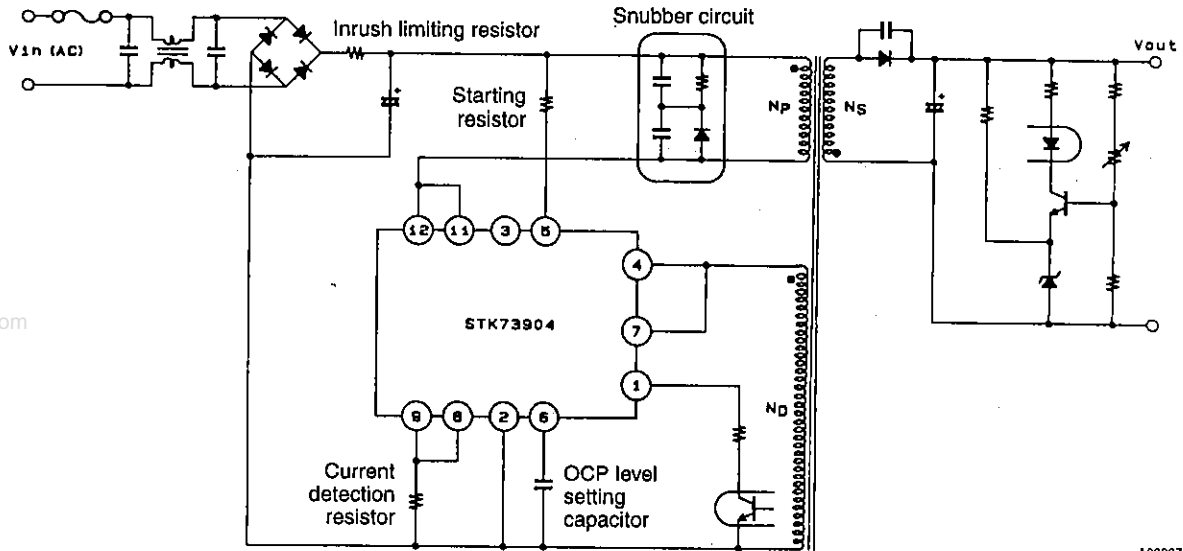


The back surface of the IC is not an insulator, and is effectively at pin 2 potential.

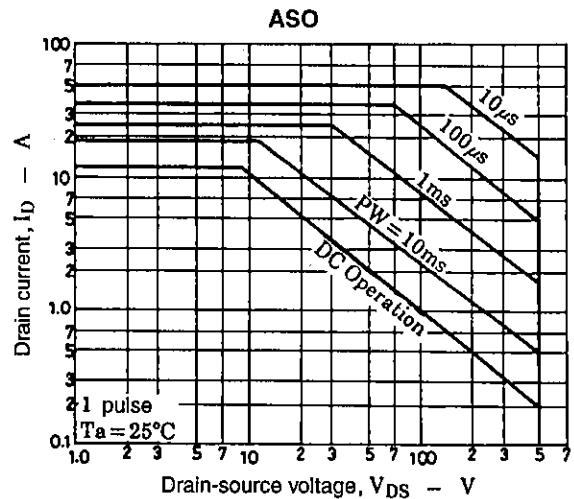
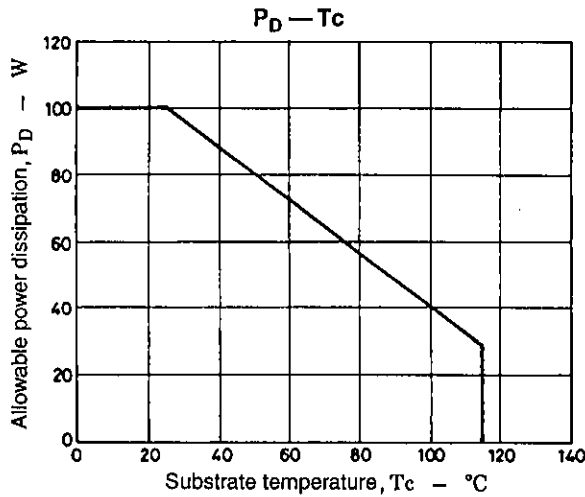
Pin Functions

Pin No.	Function
1	Amplifier circuit control
2	Ground
3	TR1 gate
4	Drive voltage input
5	Starting voltage input
6	OCP setting level input
7	OCP input-voltage dependency detection input
8	TR1 source
9	
11	TR1 drain
12	

Circuit Function Diagram

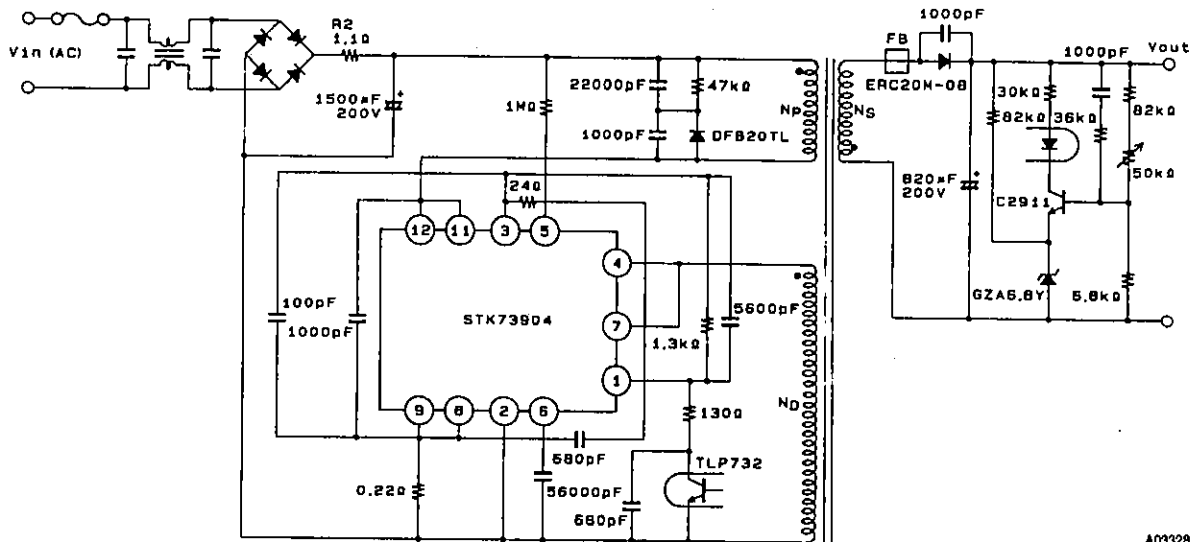


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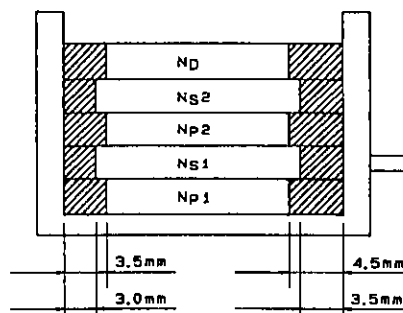
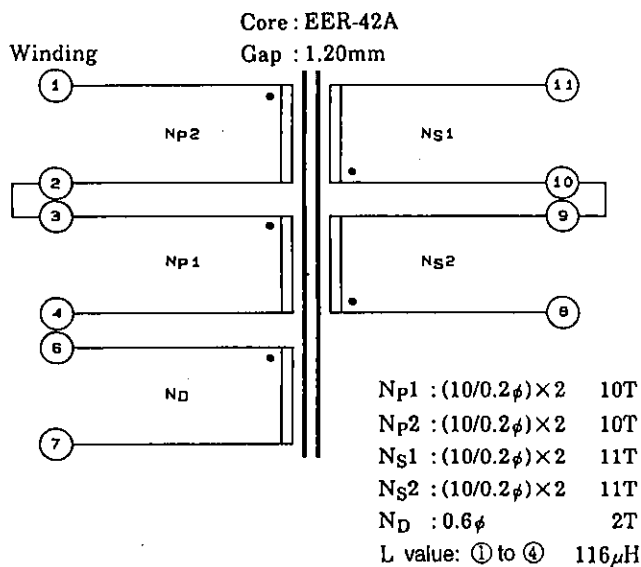
Sample Application Circuit

Input voltage: 85 to 135VAC
Output voltage: 115VDC

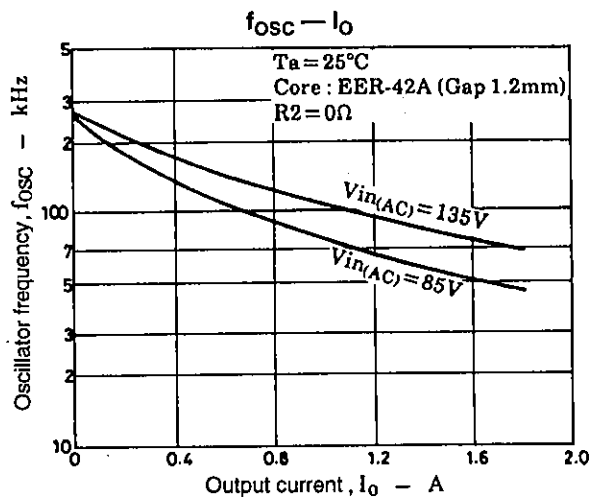
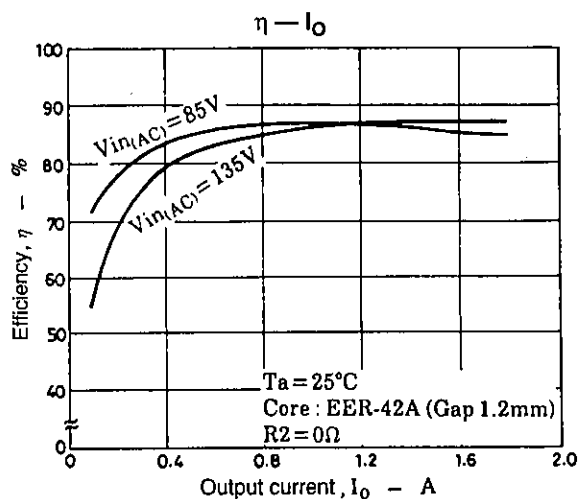
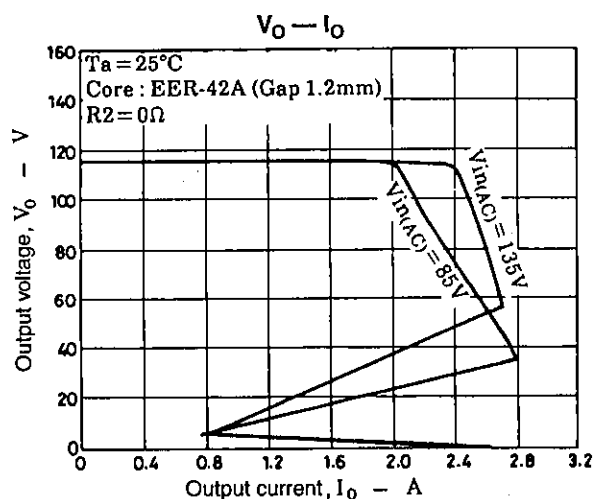


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Pulse Transformer Specifications



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Series Organization

These devices form a series with varying output power ratings.

Type No.	Maximum ratings					Operating characteristics		
	V _{DSS} [V]	T _{stg} [°C]	T _c max [°C]	T _j max [°C]	I _D [A]	Input voltage [V]	Output power [W]	ON resistance [Ω]
STK73902	500	-90 to +115	+115	+150	6.0	85 to 132	110	1.4
STK73903					10.0		180	0.6
STK73904					12.0		210	0.55
STK73905					15.0		280	0.3
STK73906	900	-90 to +115	+115	+150	3.0	170 to 264	110	5.0
STK73907					5.0		180	3.0
STK73908					6.0		210	2.0
STK73909					8.0		280	1.2

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