

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

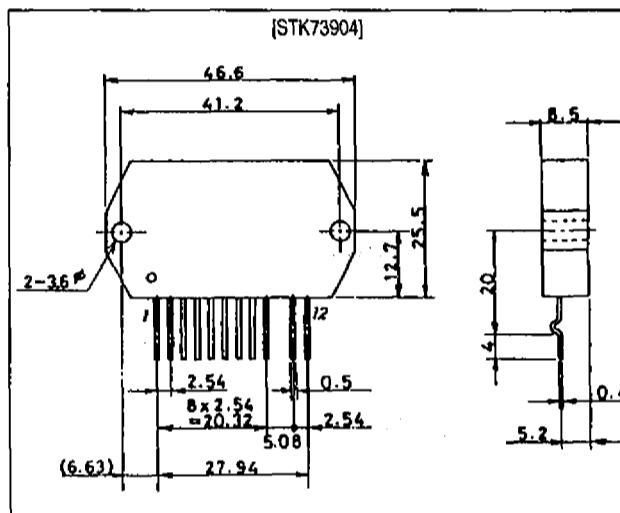
Features

- 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



STK73904

Specifications

Maximum Ratings at Ta = 25°C, Tc = 25°C unless otherwise specified

Parameter	Symbol	Conditions	Ratings	Unit
Operating substrate temperature	Tc max	Recommended value is 105°C.	115	°C
AC input voltage	V _{AC}	Specified test circuit	140	V _{rms}
Operating temperature	T _{opr}		-10 to +85	°C
Storage temperature	T _{stg}		-30 to +115	°C
Maximum output power	W _{o max}	Specified test circuit, V _O = 115V	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 max}		150	°C
[ZD1]				
Allowable power dissipation	P _{ZD1}		500	mW
Chip junction temperature	T _{J(ZD1) max}		125	°C

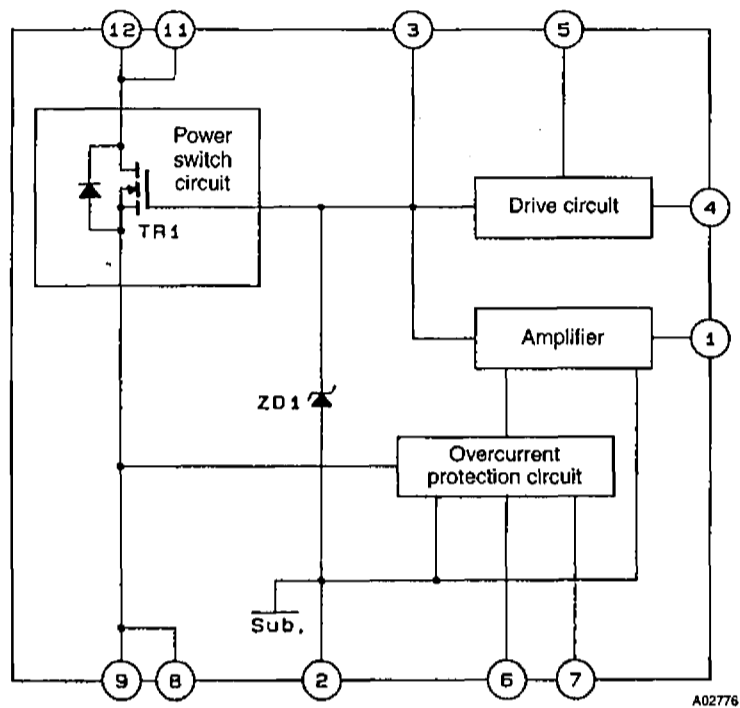
Recommended Operating Conditions at Ta = 25°C

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 Ta = 25°C, Tc = 25°C unless otherwise specified, specified test circuit

Parameter	Symbol	Conditions	min	typ	max	Unit
[TR1]						
Drain-source breakdown voltage	V _{(BR)DSS}	I _D = 10mA, V _{GS} = 0V	500	-	-	V
Gate-source cutoff voltage	V _{GS(off)}	I _D = 1mA, V _{DS} = 10V	2.0	-	3.0	V
ON resistance	R _{DS(on)}	I _D = 6A, V _{GS} = 10V	-	0.45	0.7	Ω
Input capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz	-	1450	-	pF
[ZD1]						
Zener voltage	V _Z	I _Z = 5mA	23.7	-	26.3	V

Block Diagram



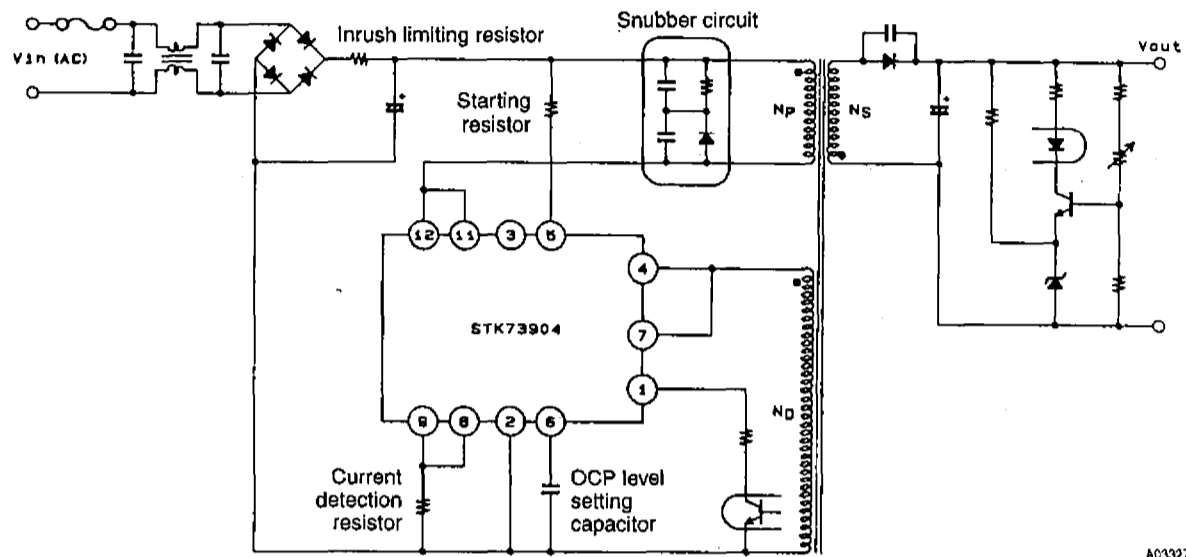
The back surface of the IC is not an insulator, and is effectively at pin 2 potential.

Pin Functions

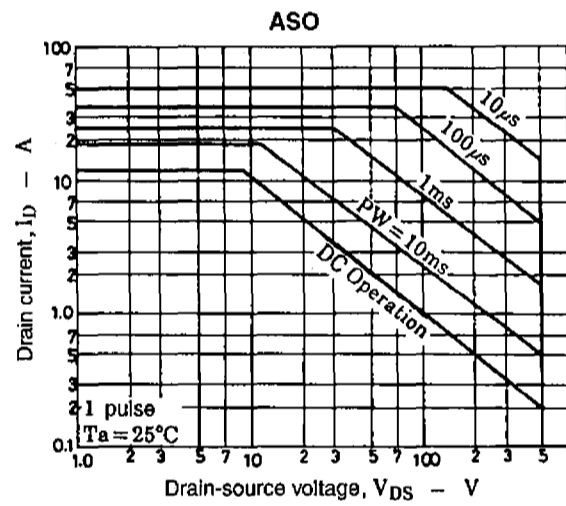
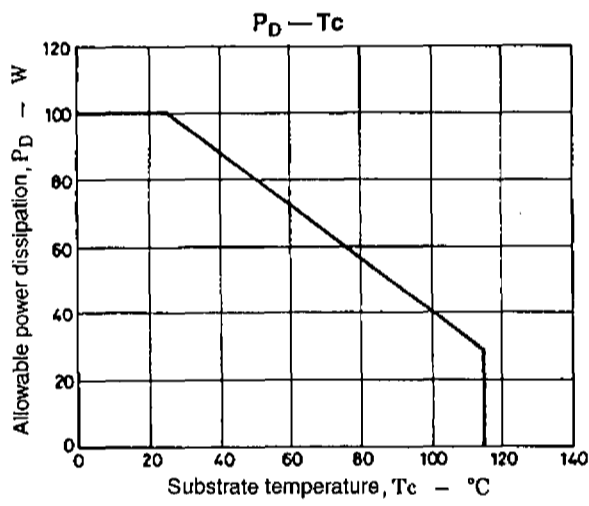
Pin No.	Function
1	Amplifier circuit control
2	Ground
3	TR1 gate
4	Drive voltage input
5	Starting voltage input
6	OCP setting level input
7	OCP input-voltage dependency detection input
8	TR1 source
9	
11	TR1 drain
12	

STK73904

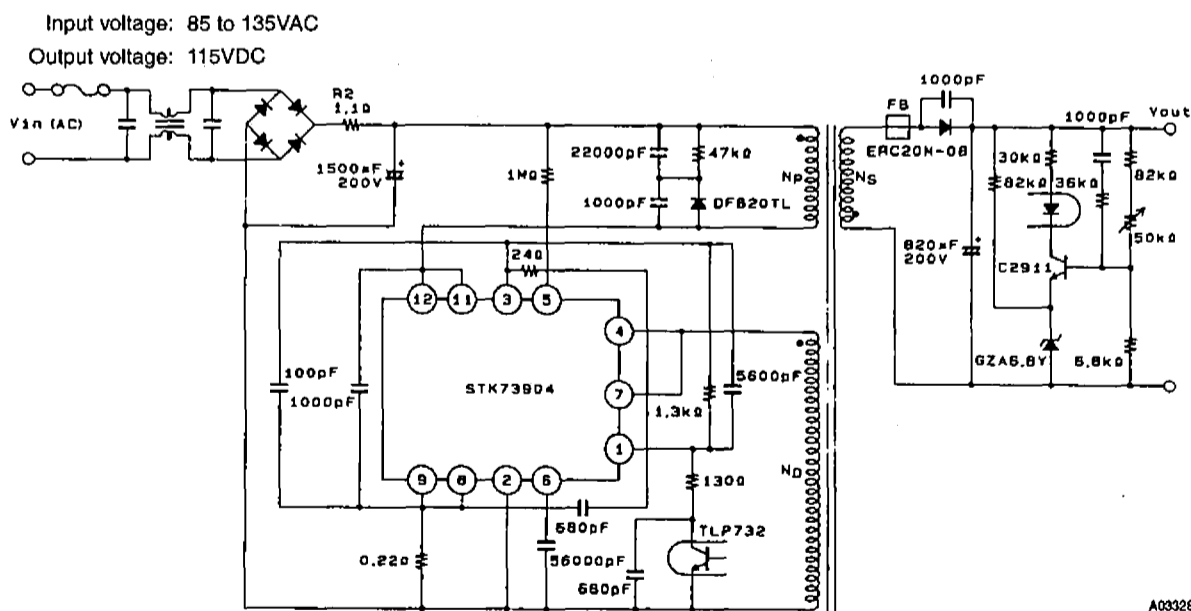
Circuit Function Diagram



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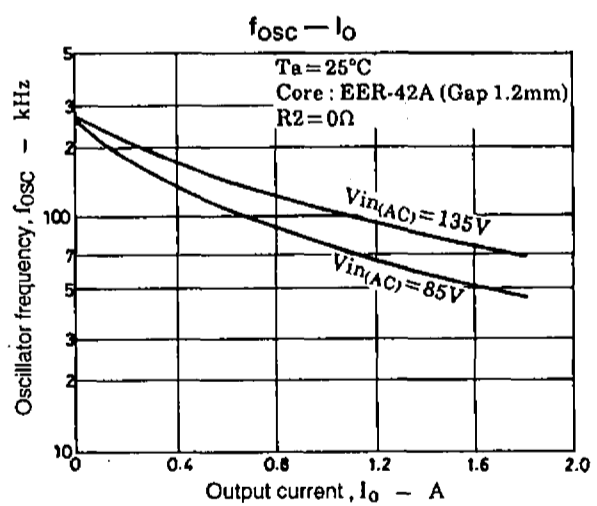
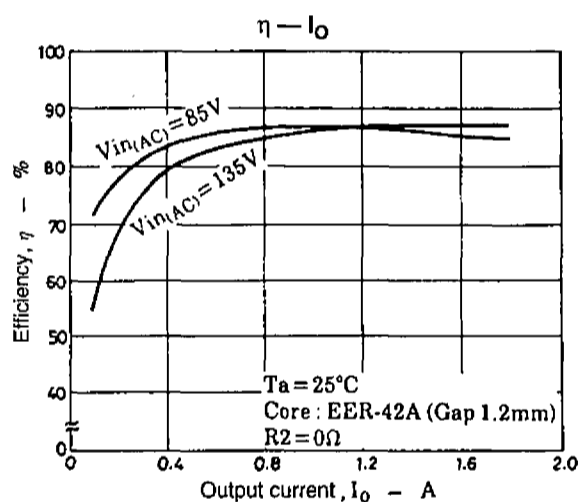
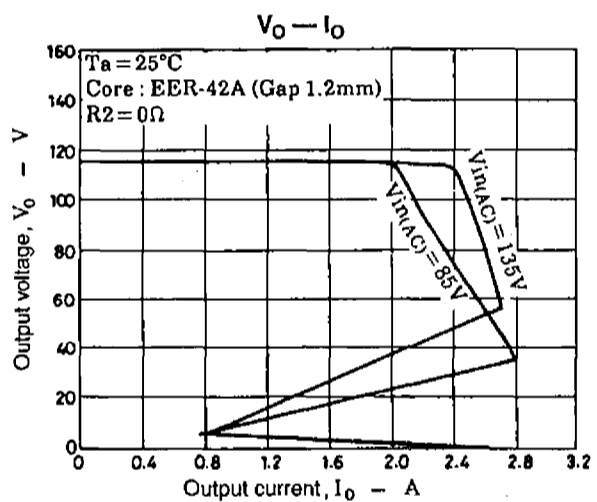
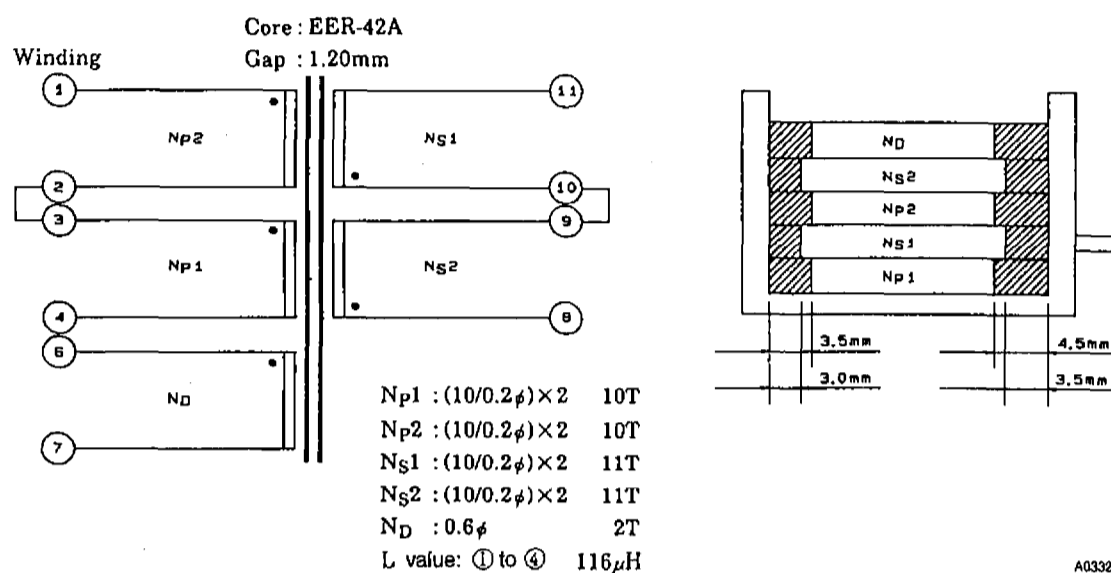


Sample Application Circuit



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Pulse Transformer Specifications



STK73904

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 _b [A]	Input voltage [V]	Output power [W]	ON resistance [Ω]
STK73902	500	-80 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	-80 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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