



STK73903

Self-Excitation Type Feedback Control Switching Regulator (180W Output)

Overview

The STK73903 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.

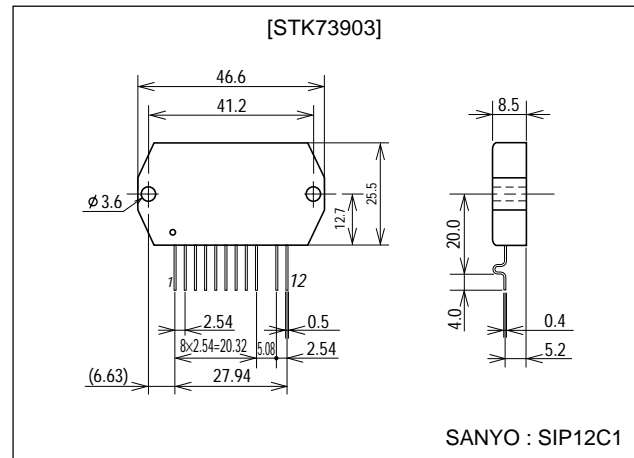
Features

- 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



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STK73903

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, $V_O=115\text{V}$	180	W
[TR1]				
Drain current	I_D	Refer to ASO characteristics for overcurrent condition	10	A
Pulse drain current	$I_{D(\text{pulse})}$		35	A
Drain reverse current	I_{DR}		10	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	$^\circ\text{C}$

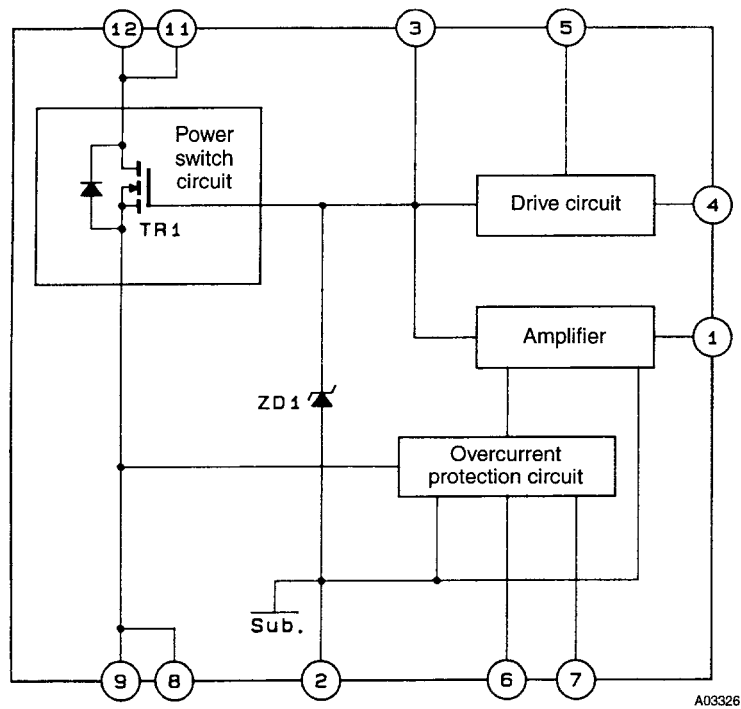
Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Pin 4 input voltage	V_4		± 8 to ± 24	V
Oscillator frequency	f_{OSC}		20 to 100	kHz

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR1]						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$, $V_{GS}=0\text{V}$	500			V
Cutoff voltage	$V_{GS(\text{off})}$	$I_D=1\text{mA}$, $V_{DS}=10\text{V}$	2.5	3.5	5.0	V
Drain-to-source ON resistance	$R_{DS(\text{on})}$	$I_D=5\text{A}$, $V_{GS}=10\text{V}$		0.6	0.9	Ω
Input capacitance	C_{iss}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		1400		pF
[ZD1]						
Zener voltage	V_Z	$I_Z=5\text{mA}$	23.7		26.3	V

Block Diagram

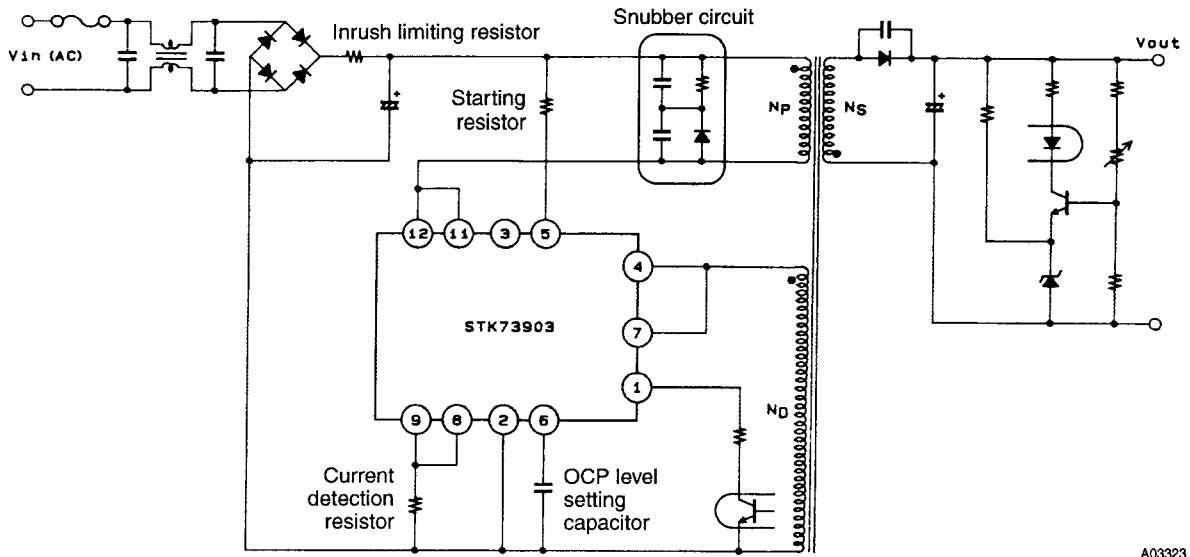


The back surface of the IC is not an insulator, and is effectively at pin 2 potentials

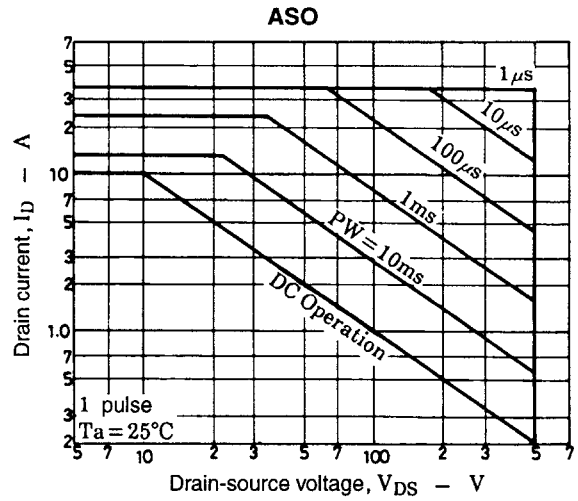
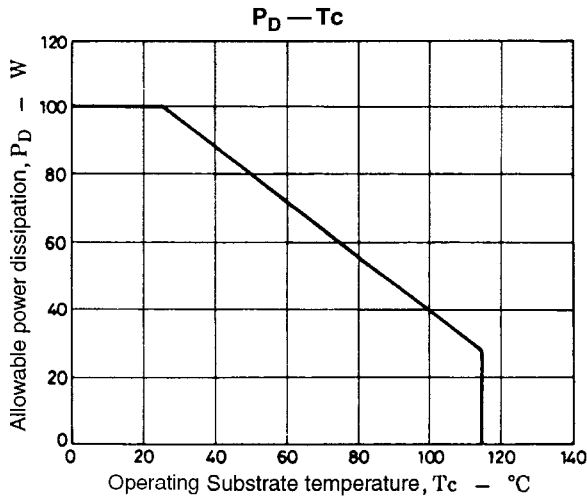
Pin Functions

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	TR1 source
11	TR1 drain
12	TR1 drain

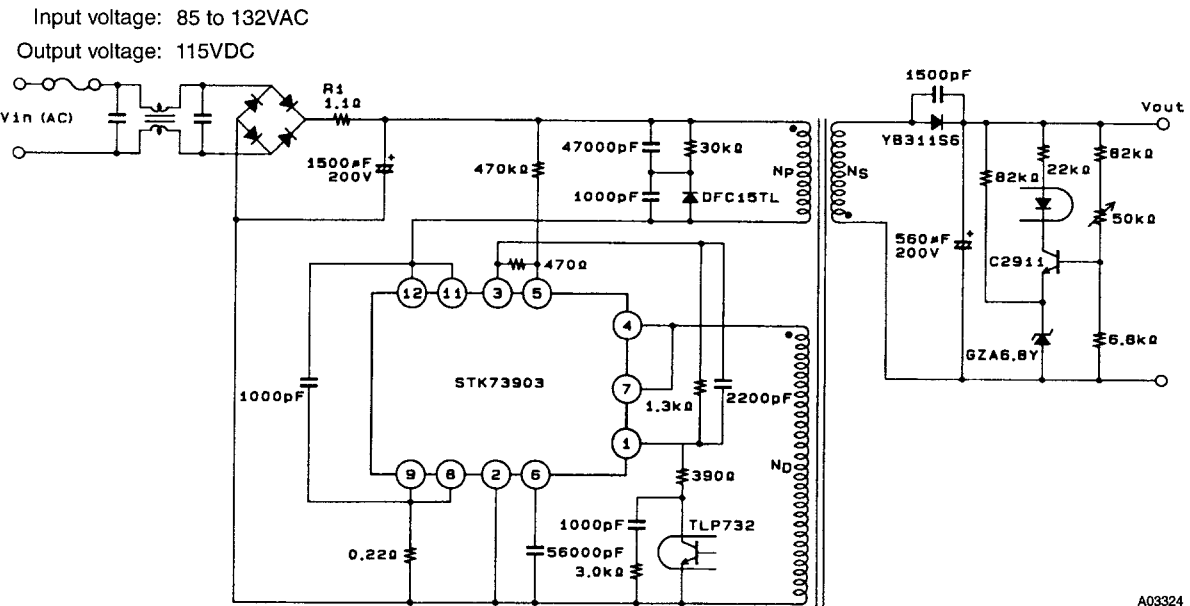
Circuit Function Diagram



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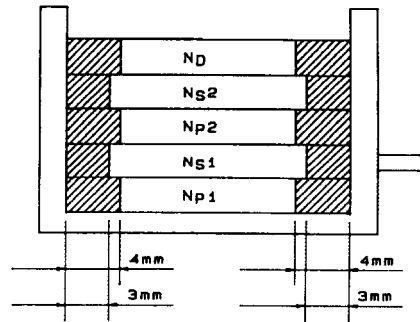
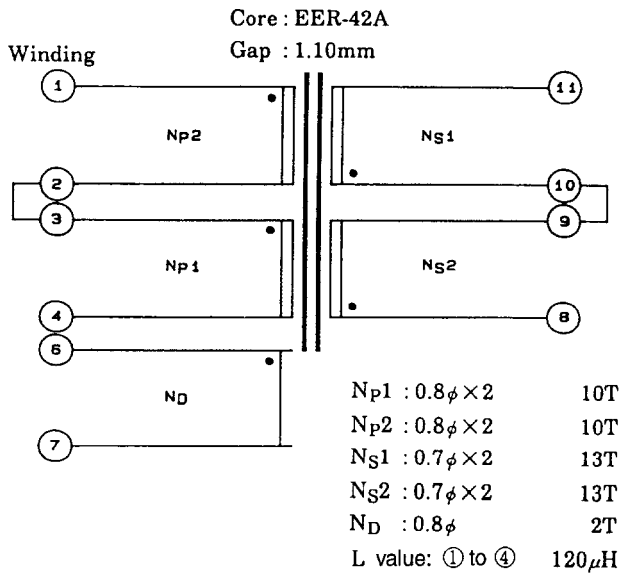


Sample Application Circuit

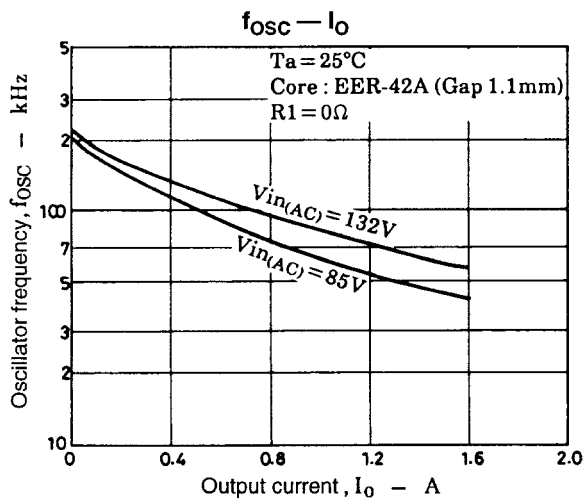
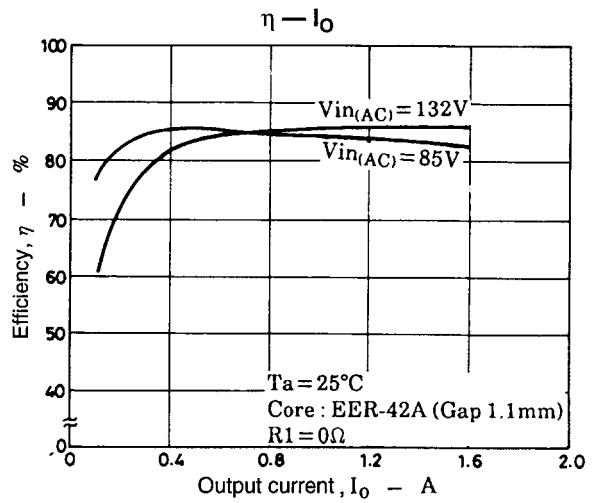
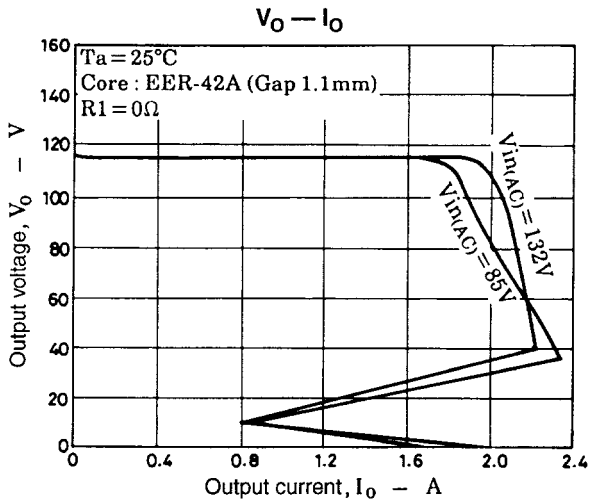


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Pulse Transformer Specifications



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STK73903

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	-30 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					3.0		110	5.0
STK73907	900				5.0	170 to 264	180	3.0
STK73908					6.0		210	2.0
STK73909					8.0		280	1.2

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