



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.

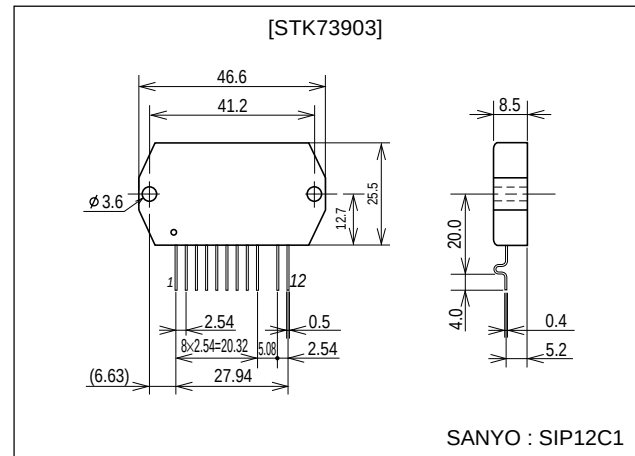
Features

- 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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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}		$-10 \text{ to } +85$	$^\circ\text{C}$
Storage temperature	T_{stg}		$-30 \text{ to } +115$	$^\circ\text{C}$
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	$I_{D(pulse)}$		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	$^\circ\text{C}$

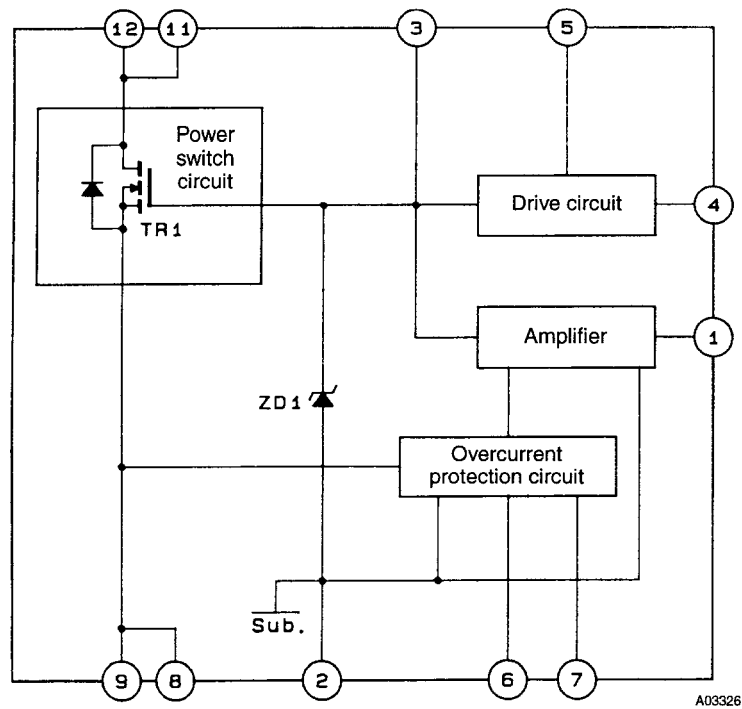
Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Pin 4 input voltage	V_4		$\pm 8 \text{ to } \pm 24$	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	$V_{(BR)DSS}$	$I_D=1mA, V_{GS}=0V$	500			V
Cutoff voltage	$V_{GS(off)}$	$I_D=1mA, V_{DS}=10V$	2.5	3.5	5.0	V
Drain-to-source ON resistance	$R_{DS(on)}$	$I_D=5A, V_{GS}=10V$		0.6	0.9	Ω
Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		1400		pF
[ZD1]						
Zener voltage	V_Z	$I_Z=5mA$	23.7		26.3	V

Block Diagram

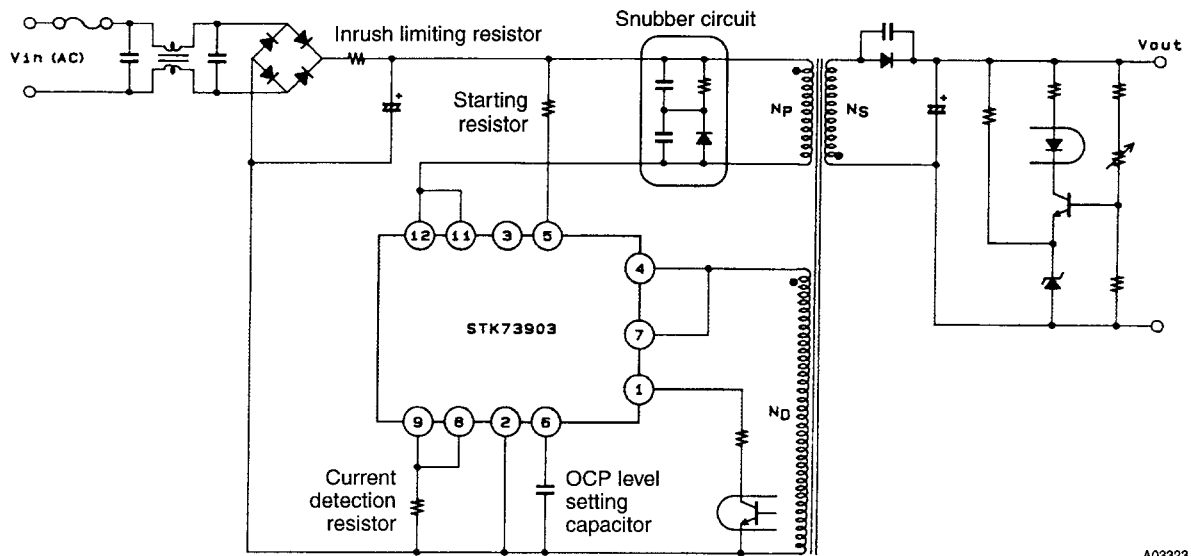


The back surface of the IC is not an insulator, and is effectively at pin 2 potentials

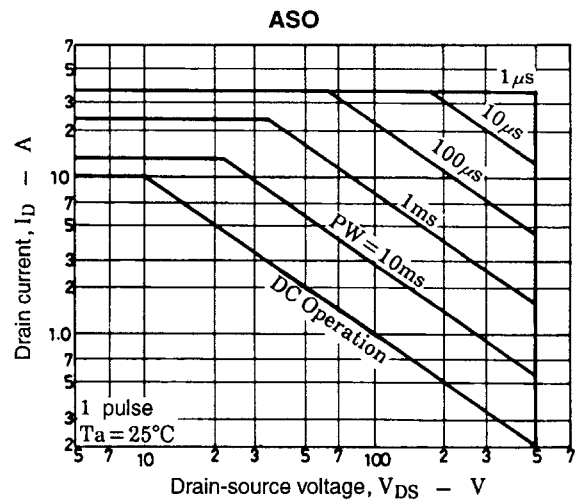
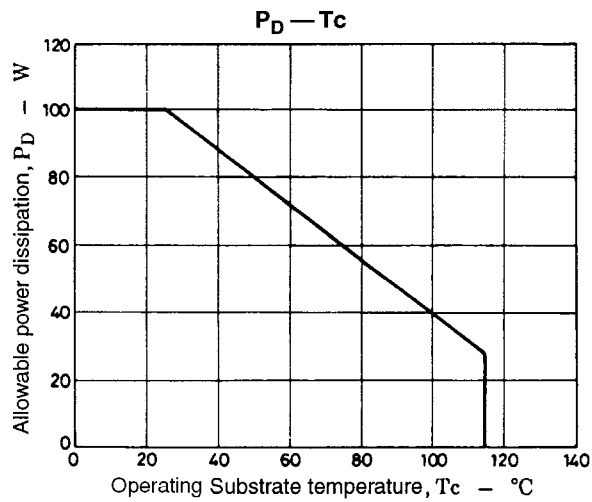
Pin Functions

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	
11	
12	TR1 drain

Circuit Function Diagram



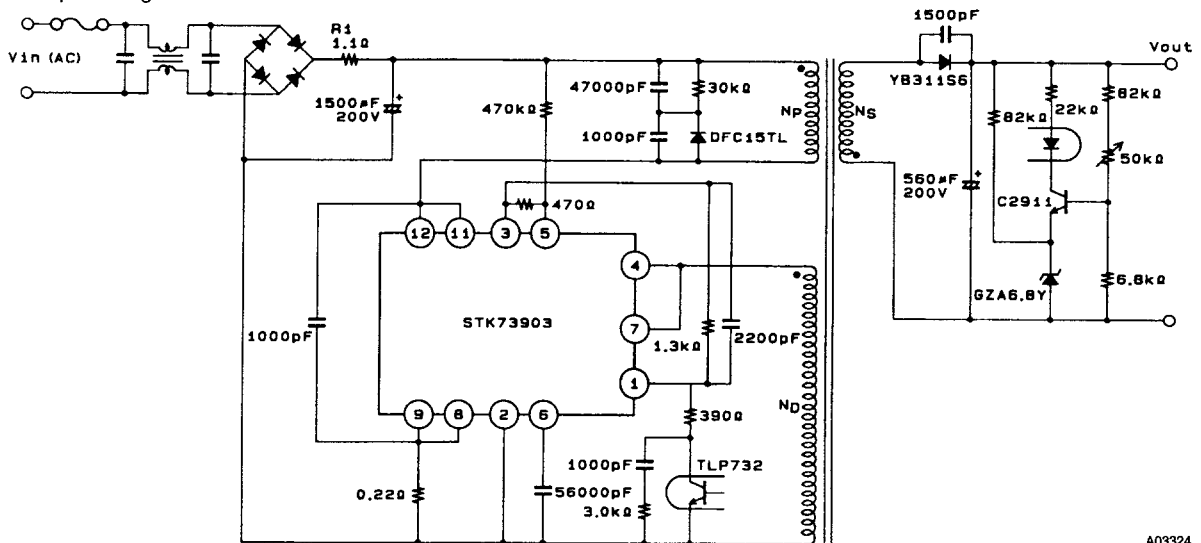
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Sample Application Circuit

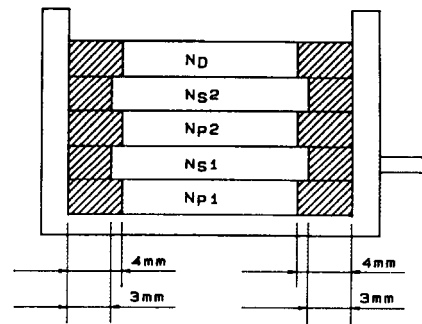
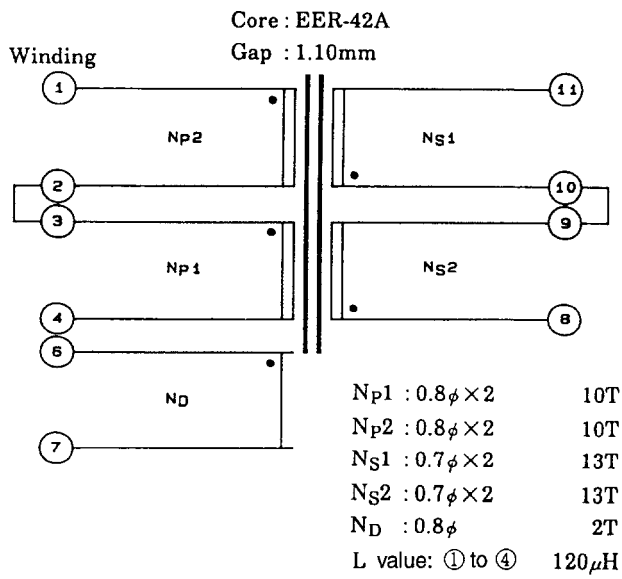
Input voltage: 85 to 132VAC

Output voltage: 115VDC

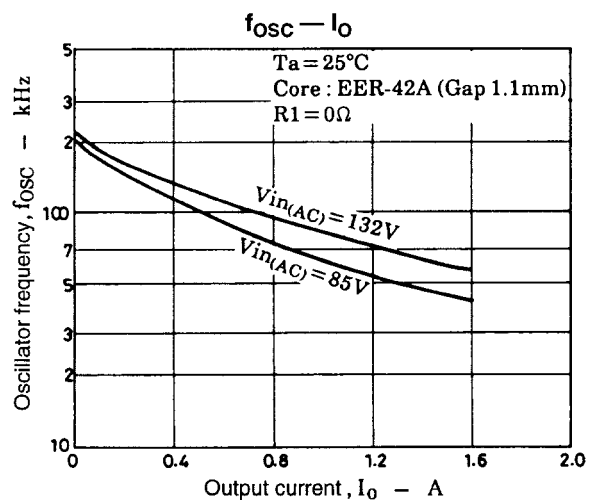
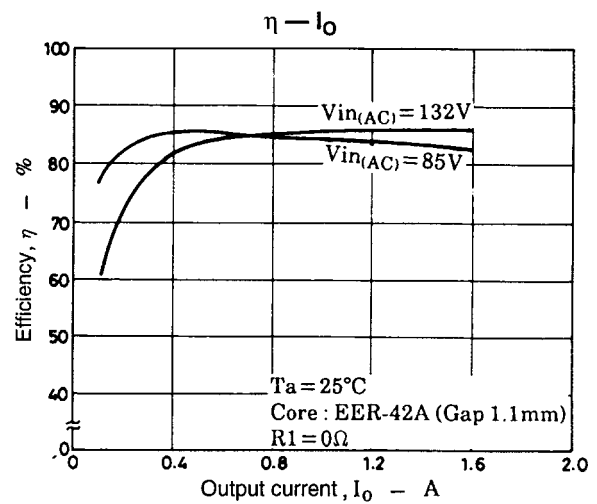
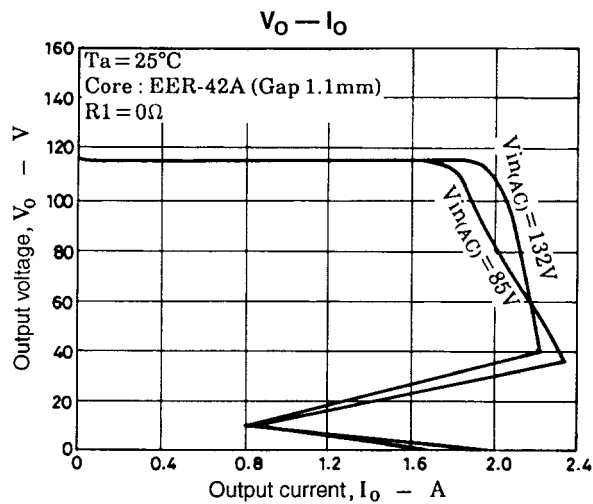


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Pulse Transformer Specifications



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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]	Oputut 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	900				−30 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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