

**SANYO**

No. 5008

**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

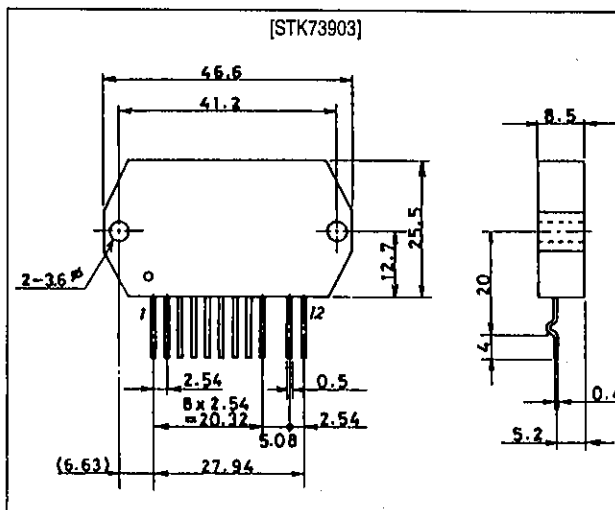
**Features**

- 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



## 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 $105^\circ\text{C}$ .	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
<b>[TR1]</b>				
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	$V_{GSS}$		$\pm 30$	V
Allowable power dissipation	$P_D$		100	W
Chip junction temperature	$T_J \text{ max}$		150	$^\circ\text{C}$
<b>[ZD1]</b>				
Allowable power dissipation	$P_{ZD1}$		500	mW
Chip junction temperature	$T_{J(ZD1)} \text{ max}$		125	$^\circ\text{C}$

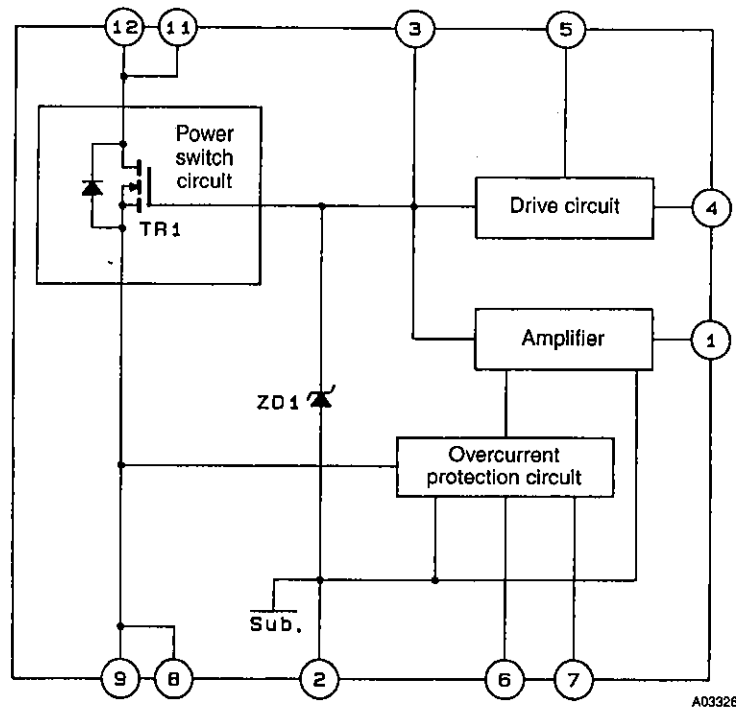
**Recommended Operating Conditions** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Pin 4 input voltage	$V_4$		$\pm 8$ to $\pm 24$	V
Oscillator frequency	$f_{osc}$		20 to 100	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
<b>[TR1]</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$	500	—	—	V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 1\text{mA}$ , $V_{DS} = 10\text{V}$	2.5	3.5	5.0	V
ON resistance	$R_{DS(on)}$	$I_D = 5\text{A}$ , $V_{GS} = 10\text{V}$	—	0.6	0.9	$\Omega$
Input capacitance	$C_{iss}$	$V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$	—	1400	—	pF
<b>[ZD1]</b>						
Zener voltage	$V_Z$	$I_Z = 5\text{mA}$	23.7	—	26.3	V

## Block Diagram

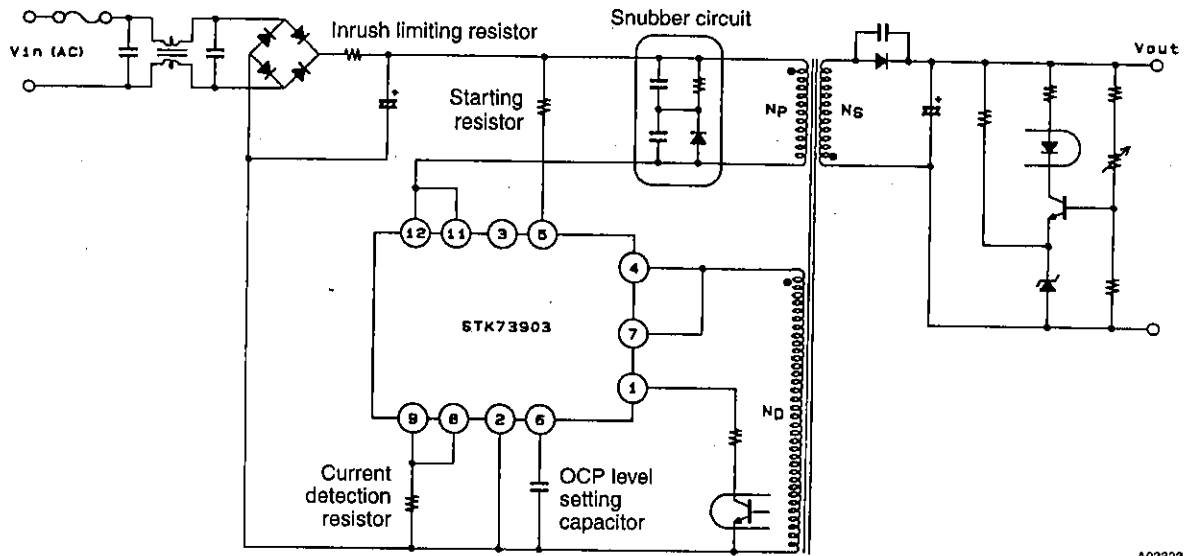


The back surface of the IC is not an insulator, and is effectively at pin 2 potential.

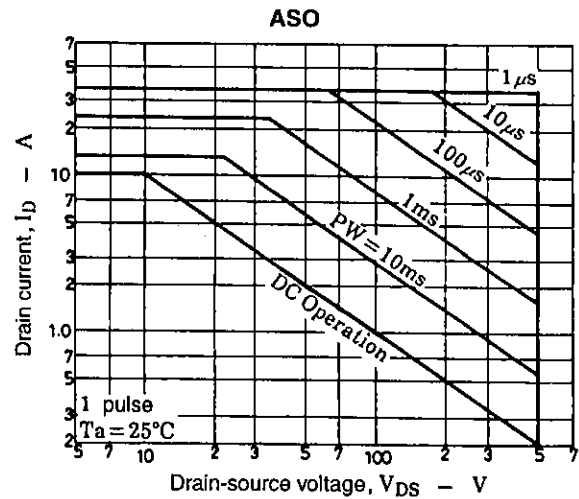
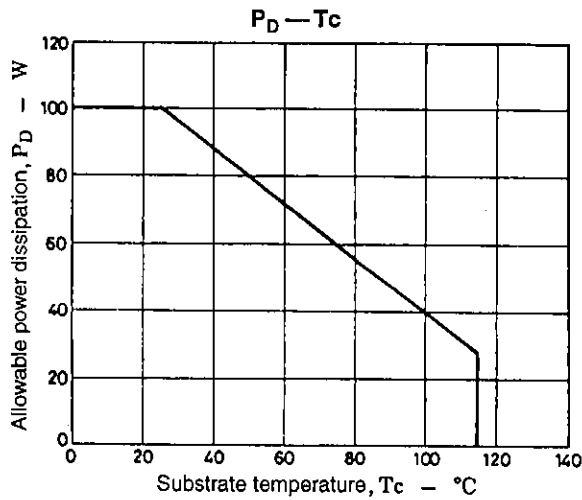
## Pin Functions

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	

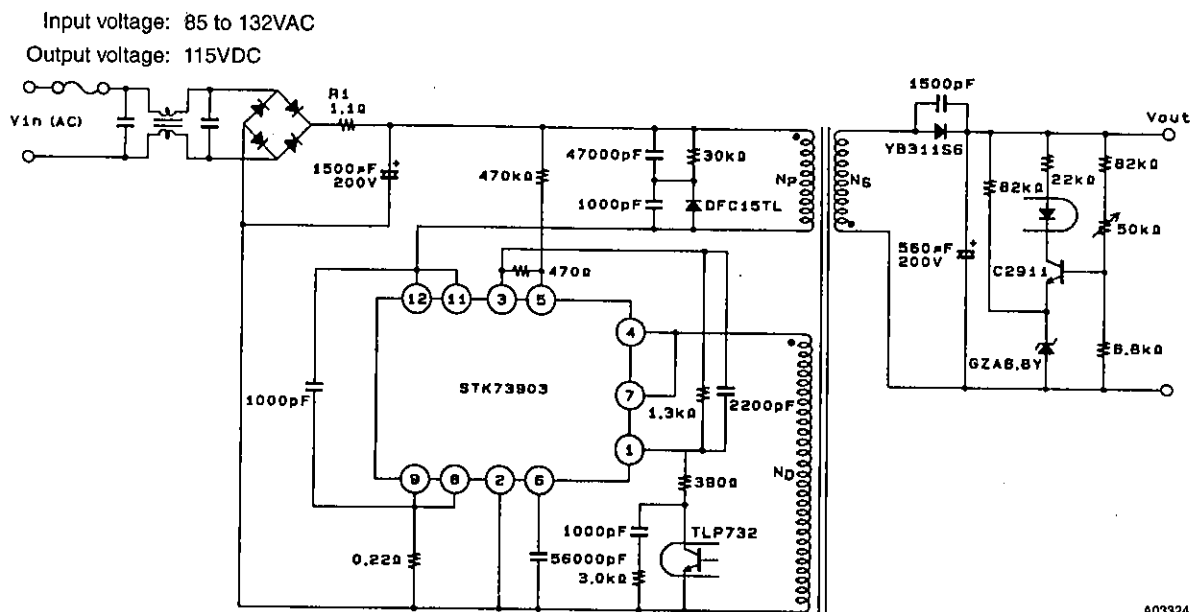
## Circuit Function Diagram



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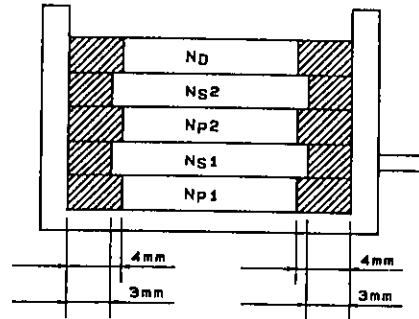
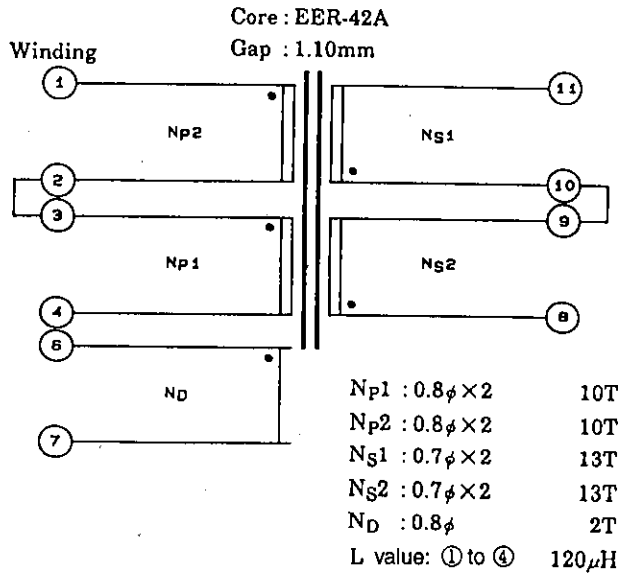


## Sample Application Circuit

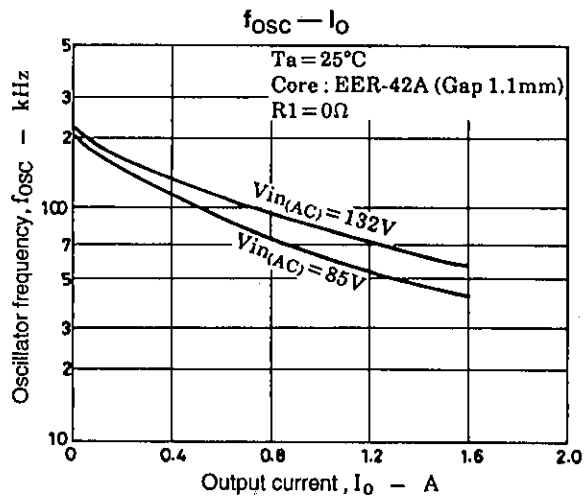
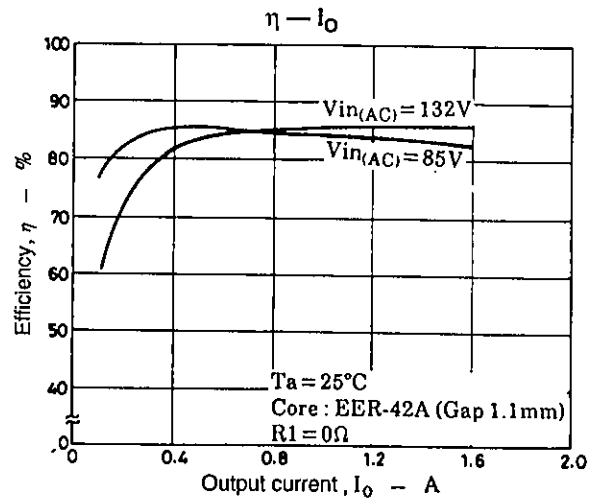
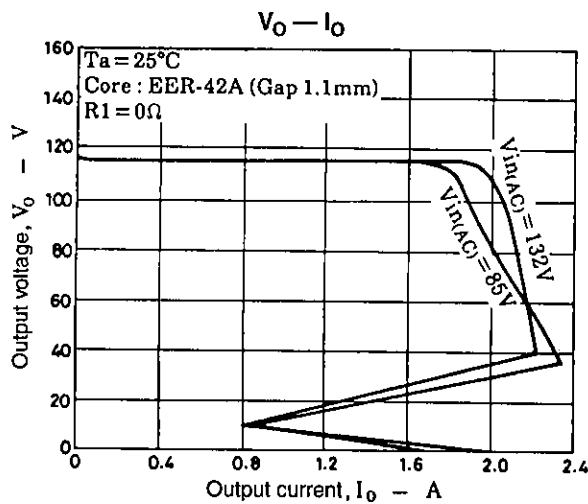


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# Pulse Transformer Specifications



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## Series Organization

These devices form a series with varying output power ratings.

Type No.	Maximum ratings					Operating characteristics		
	V <sub>oss</sub> [V]	T <sub>stg</sub> [°C]	T <sub>c</sub> max [°C]	T <sub>j</sub> max [°C]	I <sub>o</sub> [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	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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