Ordering number: EN 5008

Thick Film Hybrid IC



#### 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  $Ta = 25^{\circ}C$ ,  $Tc = 25^{\circ}C$  unless otherwise specified

Parameter	Symbol	Conditions	Ratings	Unit
Operating substrate temperature	Tc max	Recommended value is 105°C.	115	°C
AC input voltage	VAC	Specified test circuit	140	Vrms
Operating temperature	Topr		-10 to +85	°C
Storage temperature	Tstg		-30 to +115	°C
Maximum output power Wo max		Specified test circuit, 180 Vo = 115V		W
(TR1)	,,		······································	
Drain current	Ι <sub>D</sub>	Refer to ASO characteristics for	10	A
Pulse drain current	l <sub>O(pulse)</sub>	overcurrent condition.	35	A
Drain reverse current	IDR		10	A
Gate-source voltage	V <sub>GSS</sub>		±30	V
Allowable power dissipation	PD		100	w
Chip junction temperature	Tj max		150	°C
[ZD1]				
Allowable power dissipation	P <sub>ZD1</sub>		500	mW
Chip junction temperature	Tj <sub>(ZD1)</sub> max		125	°C

# Recommended Operating Conditions at Ta = $25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Pin 4 input voltage	V <sub>4</sub>		±8 to ±24	V
Oscillator frequency	fosc		20 to 100	kHz

**Operating Characteristics** at  $Ta = 25^{\circ}C$ ,  $Tc = 25^{\circ}C$  unless otherwise specified, specified test circuit

Parameter	Symbol	Conditions	min	typ	max	Unit
[TR1]						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	$I_0 = 1$ mA, $V_{GS} = 0$ V	500		_	V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V	2.5	3.5	5.0	۷
ON resistance	R <sub>DS(on)</sub>	I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V	-	0.6	0.9	Ω
Input capacitance	Ciss	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz	-	1400	-	p۲
[ZD1]						
Zener voltage	Vz	$l_z = 5mA$	23.7	-	26.3	٧

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STK73903

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	

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## **Circuit Function Diagram**







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## STK73903

## **Pulse Transformer Specifications**



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## **Series Organization**

These devices form a series with varying output power ratings.

	Maximum ratings					Operating characteristics		
Туре No.	V <sub>DSS</sub> [V]	Tstg [°C]	Tc max [°C]	Tj max [°C]	1 <sub>D</sub> [A]	Input voltage [V]	Output power [W]	ON resistance [Ω]
STK73902			+115	+150	6.0	85 to 132 170 to 264	110	1.4
STK73903	500				10.0		180	0.6
STK73904	500	30 to +115			12.0		210	0.55
STK73905					15.0		280	0.3
STK73906					3.0		110	5.0
STK73907	900				5.0		180	3.0
STK73908					6.0		210	2.0
STK73909					8.0	-	280	1.2

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