

SANYO

No. 4935

STK73907

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

Overview

The STK73907 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

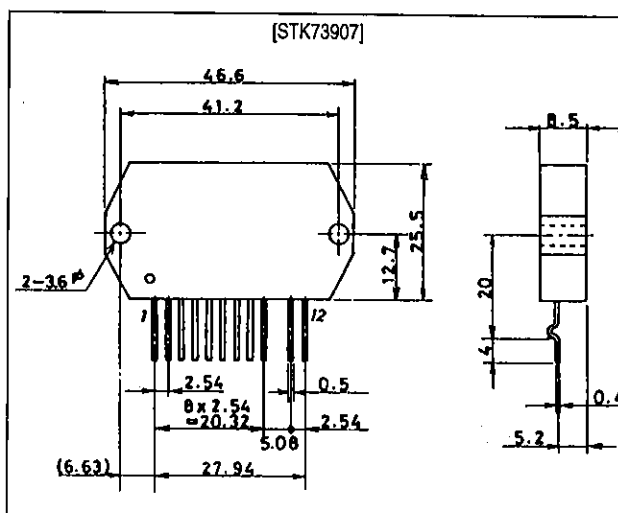
Features

- 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

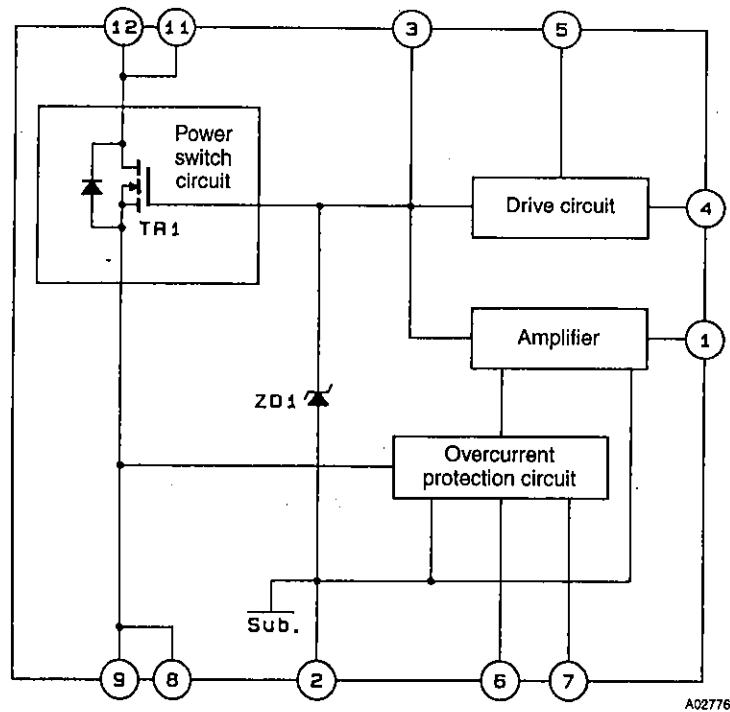
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Block Diagram



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

Pin Functions

Number	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	

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	280	Vrms
Operating temperature	T_{opg}		-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

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Parameter	Symbol	Conditions	Ratings	Unit
[TR1]				
Drain current	I_D	Refer to ASO characteristics for overcurrent condition.	5	A
Pulse drain current	$I_{D(pulse)}$		12	A
Drain reverse current	I_{DR}		5	A
Gate-source voltage	V_{GSS}		± 30	V
Allowable power dissipation	P_D		89.3	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	$^{\circ}\text{C}$

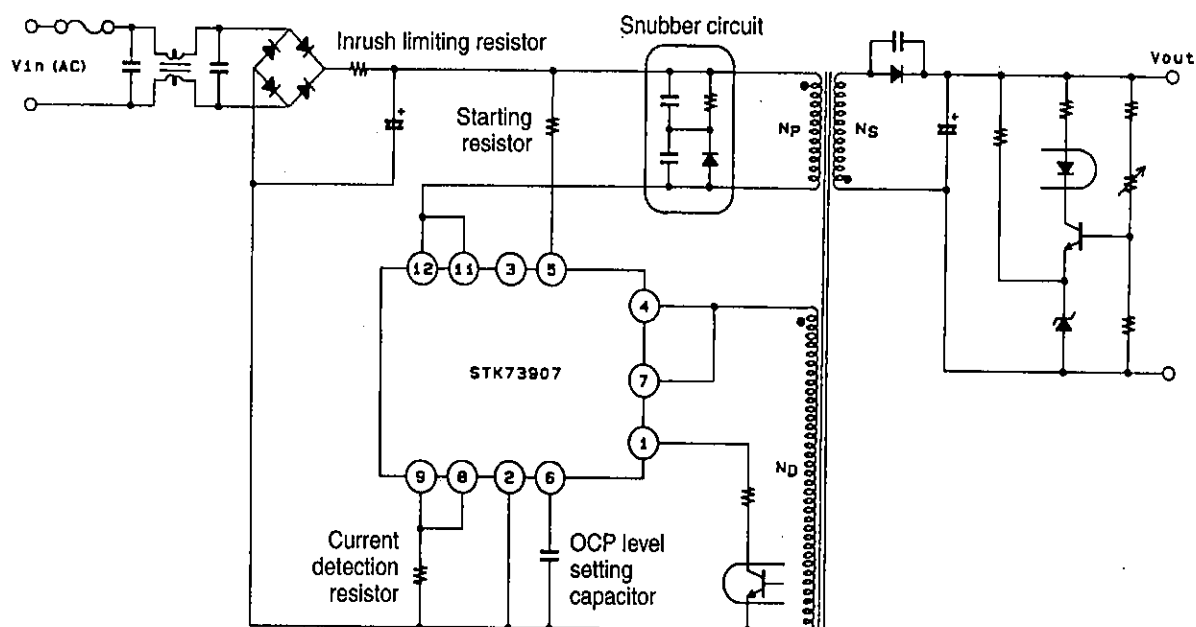
Allowable Operating Ranges at $T_a = 25^\circ\text{C}$

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

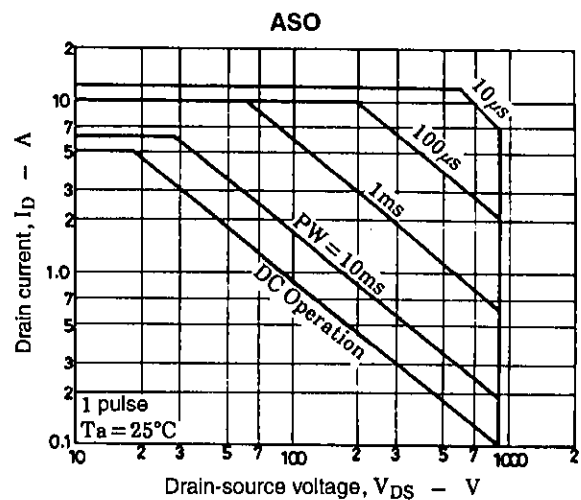
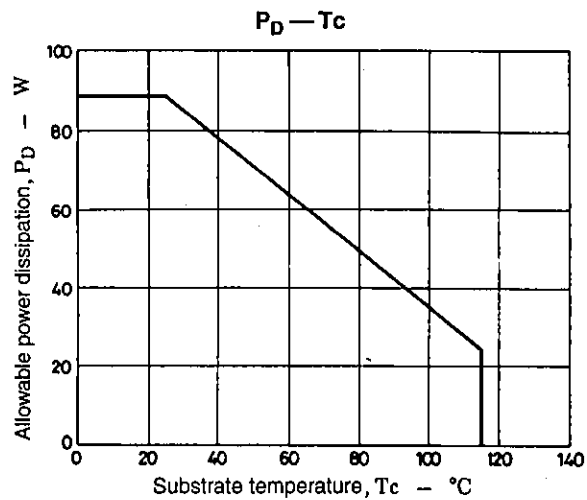
Operating Characteristics at $T_a = 25^\circ\text{C}$, $T_c = 25^\circ\text{C}$ unless otherwise specified, specified test circuit

Parameter	Symbol	Conditions	min	typ	max	Unit
[TR1]						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10mA, V_{GS} = 0V$	900	–	–	V
Gate-source cutoff voltage	$V_{GS(off)}$	$I_D = 1mA, V_{DS} = 10V$	2.0	–	3.0	V
ON resistance	$R_{DS(on)}$	$I_D = 3A, V_{GS} = 10V$	–	3.0	4.0	Ω
Input capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	–	800	–	pF
[ZD1]						
Zener voltage	V_Z	$I_Z = 5mA$	23.7	–	26.3	V

Circuit Function Diagram



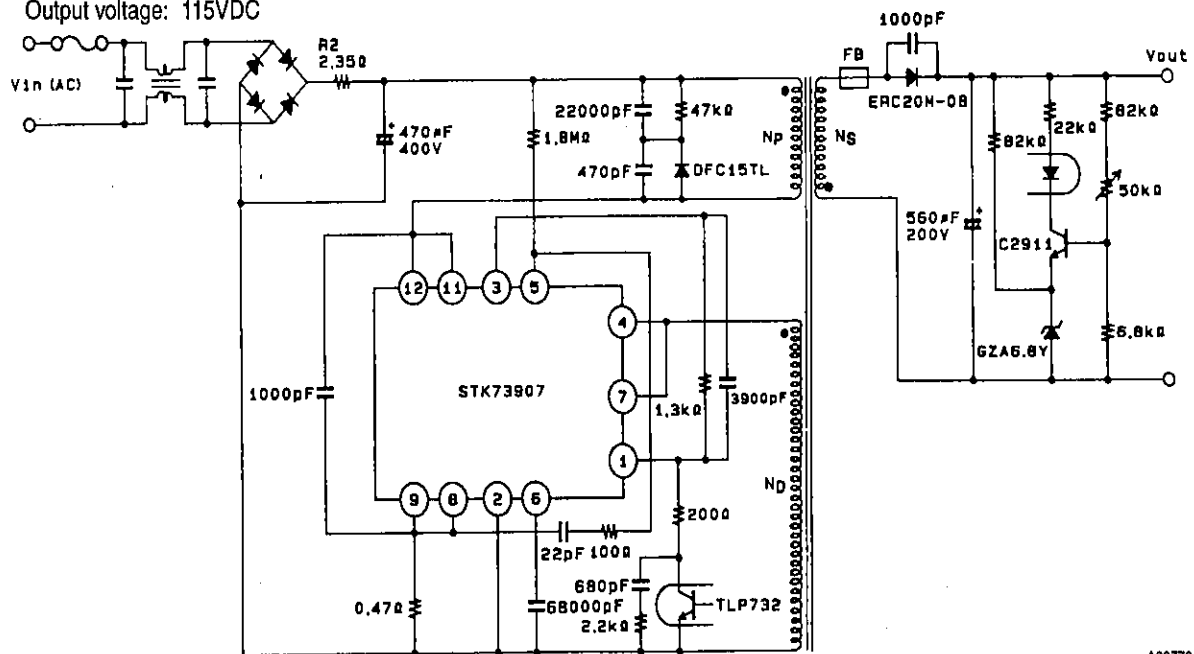
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Sample Application Circuit (200V System)

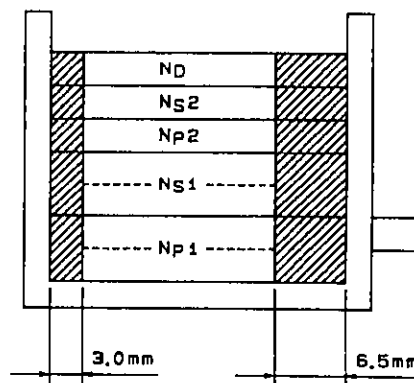
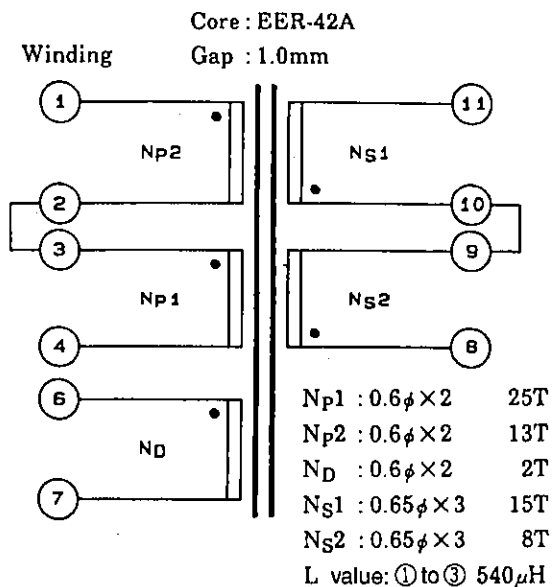
Input voltage: 170 to 264VAC

Output voltage: 115VDC

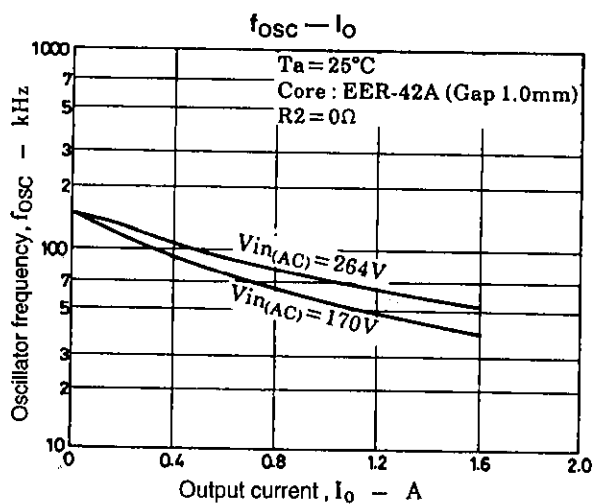
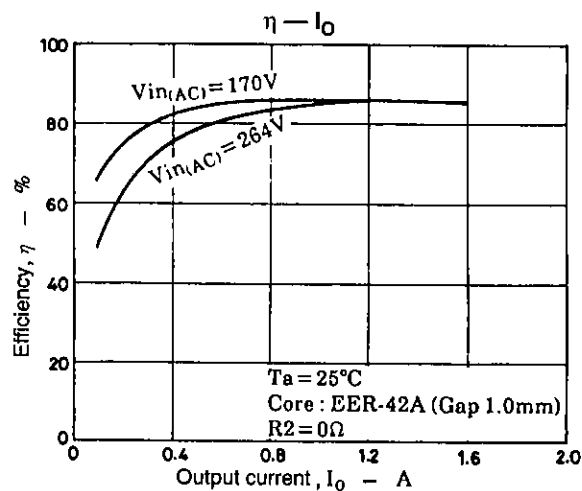
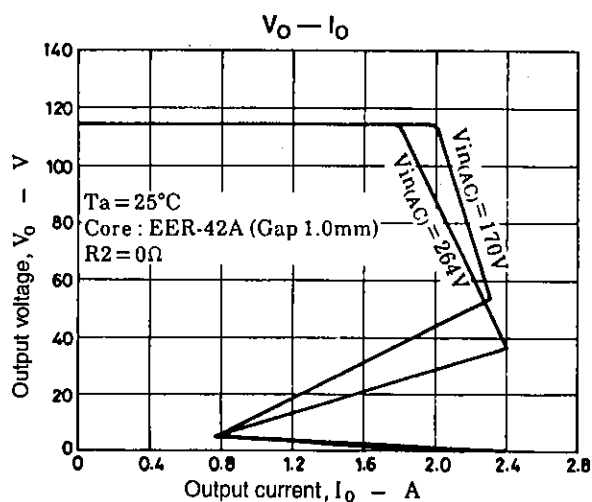


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Pulse Transformer Specifications



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Sample Application Circuit (World Input System)

Input voltage: 85 to 264VAC

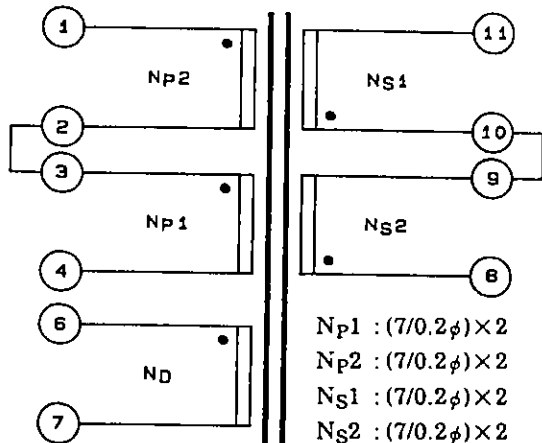
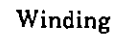
Output voltage: 115VDC



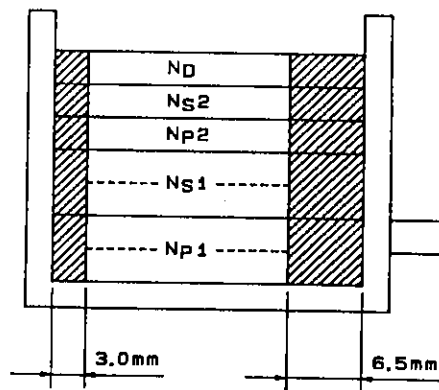
Pulse Transformer Specifications

Core : EER-35L

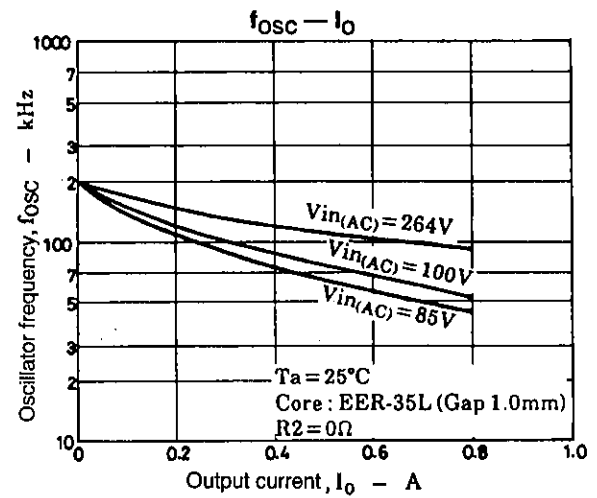
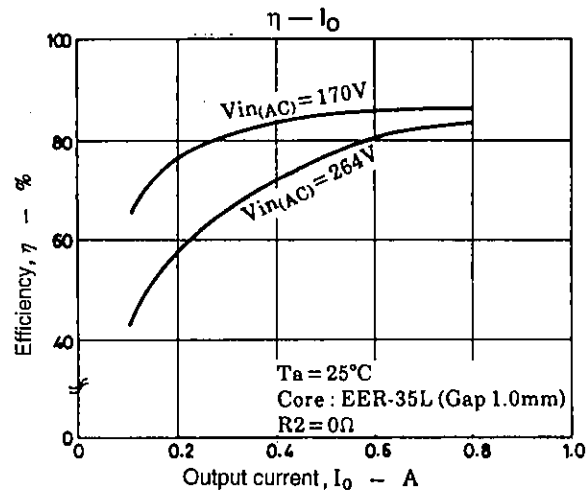
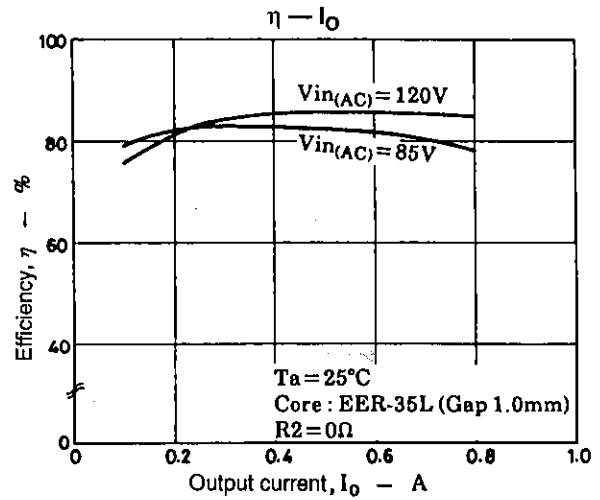
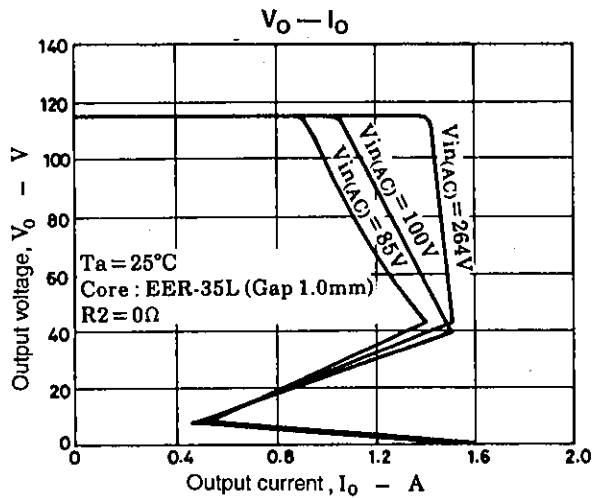
Gap : 1.00mm



$N_{P1} : (7/0.2\phi) \times 2$	26T
$N_{P2} : (7/0.2\phi) \times 2$	13T
$N_{S1} : (7/0.2\phi) \times 2$	26T
$N_{S2} : (7/0.2\phi) \times 2$	13T
$N_D : 0.6\phi$	3T
L value: ① to ④	280 μ H



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Series Organization

These devices form a series with varying output power ratings.

Device	Maximum ratings					Operating characteristics		
	V_{DSS} [V]	T_{stg} [°C]	$T_c \text{ max}$ [°C]	$T_J \text{ max}$ [°C]	I_O [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