

Overview

The STK73908 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

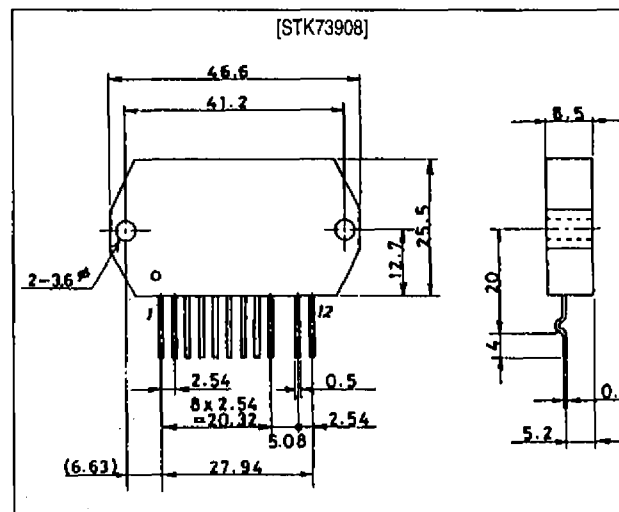
Features

- 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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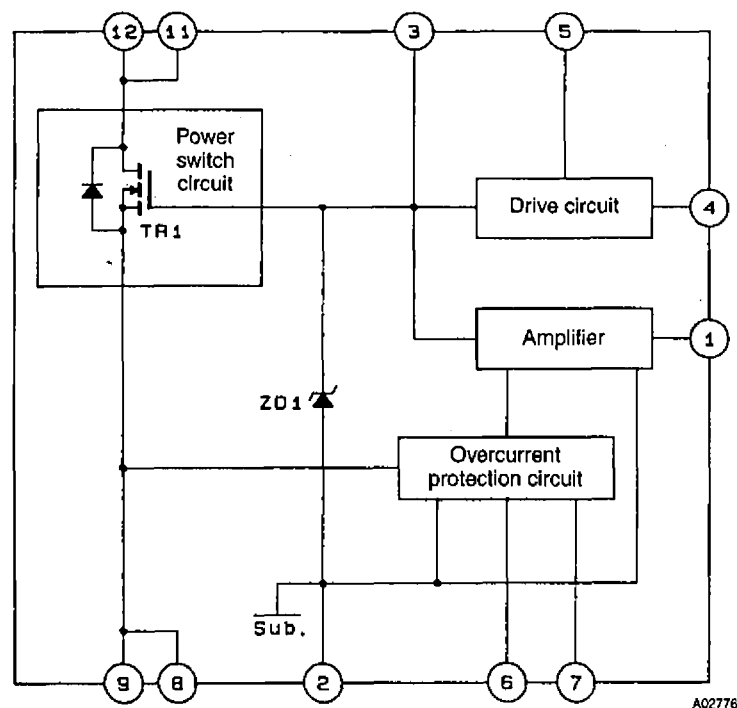
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Block Diagram



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, $V_o = 115\text{V}$ | 210 | W |

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| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------------|-----------------|---|----------|-------------|
| [TR1] | | | | |
| Drain current | I_D | Refer to ASO characteristics for overcurrent condition. | 6 | A |
| Pulse drain current | $I_{D(pulse)}$ | | 15 | A |
| Drain reverse current | I_{DR} | | 6 | A |
| Gate-source voltage | V_{GS} | | ± 30 | V |
| Allowable power dissipation | P_D | | 100 | W |
| Chip junction temperature | T_{jmax} | | 150 | $^{\circ}C$ |
| [ZD1] | | | | |
| Allowable power dissipation | P_{ZD1} | | 500 | mW |
| Chip junction temperature | $T_{j(ZD1)max}$ | | 125 | $^{\circ}C$ |

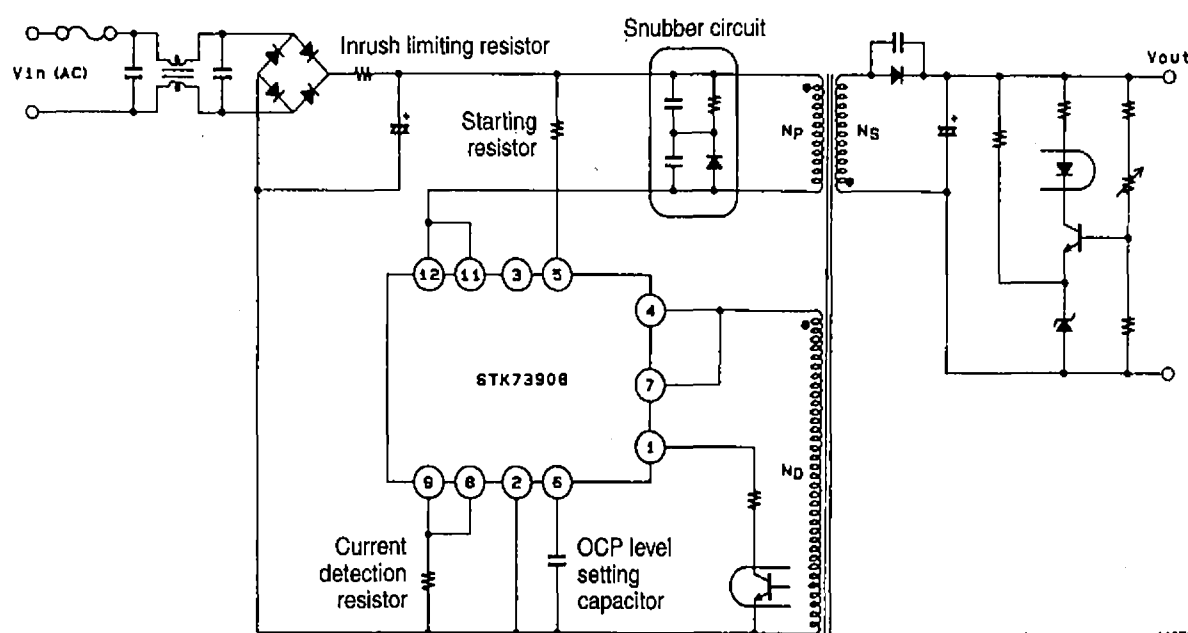
Allowable Operating Ranges at $T_a = 25^{\circ}C$

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------------|-----------|------------|---------------------|------|
| Pin 4 input voltage | V_4 | | ± 6 to ± 24 | V |
| Oscillator frequency | f_{osc} | | 20 to 100 | kHz |

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

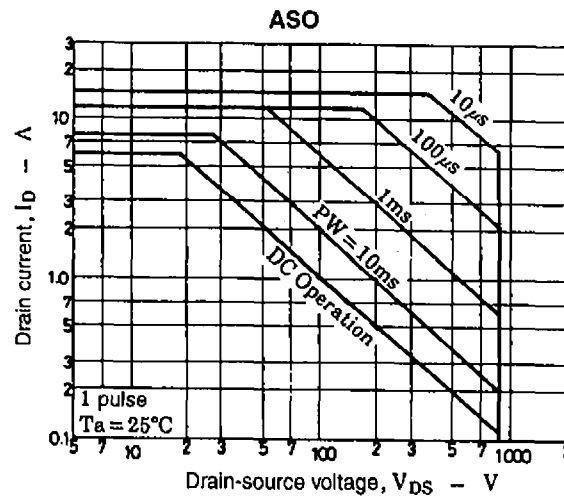
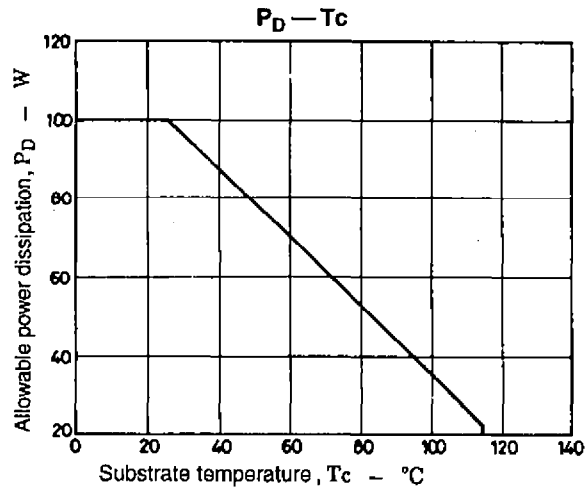
| Parameter | Symbol | Conditions | min | typ | max | Unit |
|--------------------------------|---------------|---------------------------------------|------|------|------|----------|
| [TR1] | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 10mA, V_{GS} = 0V$ | 900 | - | - | V |
| Gate-source cutoff voltage | $V_{GS(off)}$ | $I_D = 1mA, V_{DS} = 10V$ | 2.0 | - | 3.0 | V |
| ON resistance | $R_{DS(on)}$ | $I_D = 3A, V_{GS} = 10V$ | - | 2.0 | 3.0 | Ω |
| Input capacitance | C_{iss} | $V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$ | - | 1200 | - | pF |
| [ZD1] | | | | | | |
| Zener voltage | V_Z | $I_Z = 5mA$ | 23.7 | - | 26.3 | V |

Circuit Function Diagram

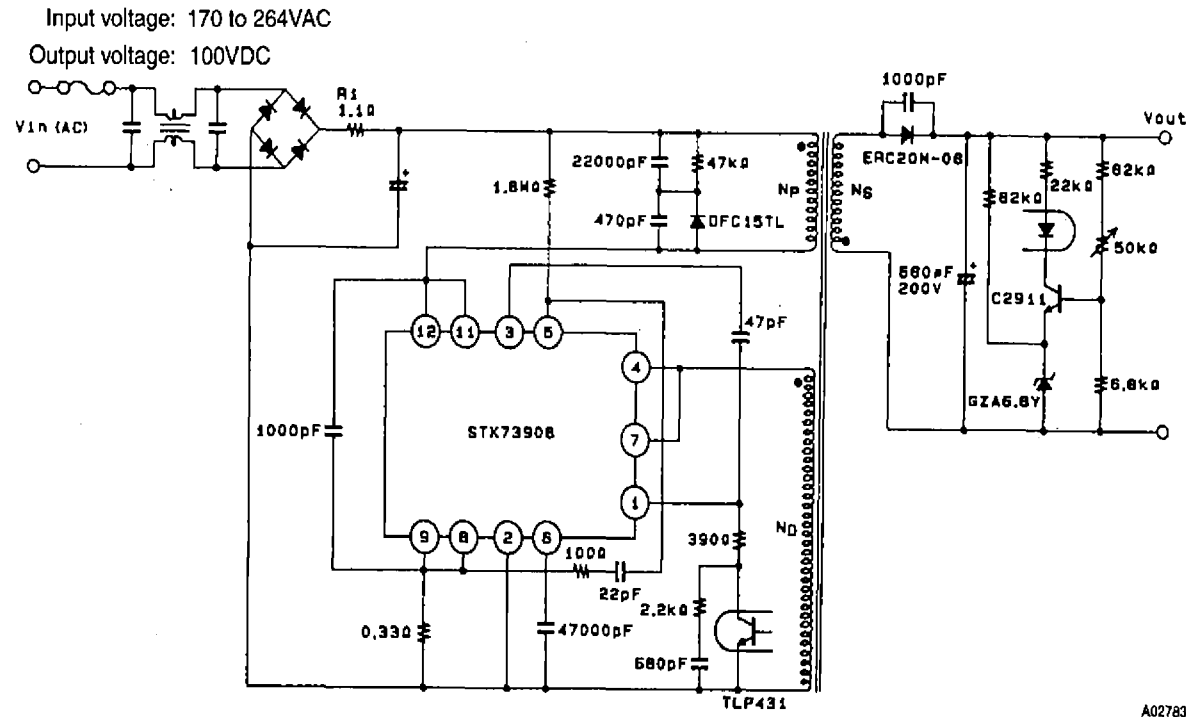


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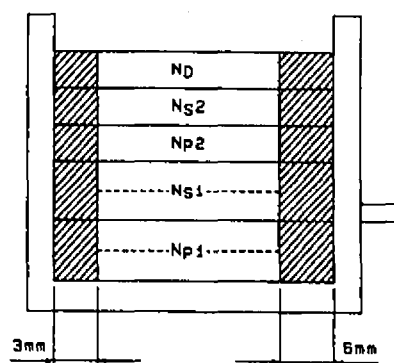
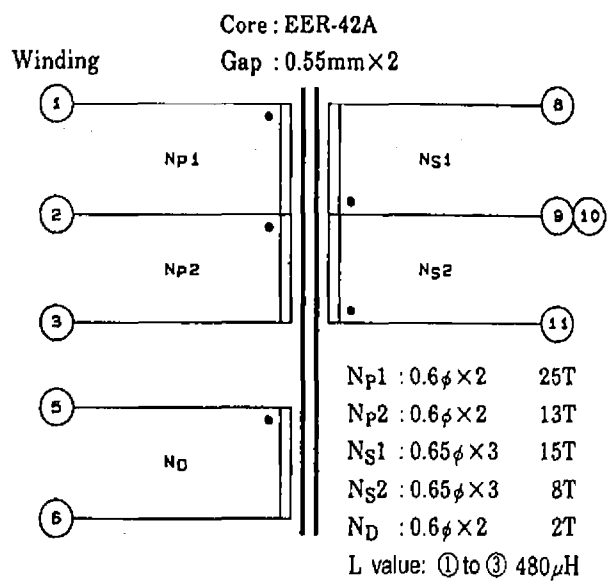


Sample Application Circuit (200V System)

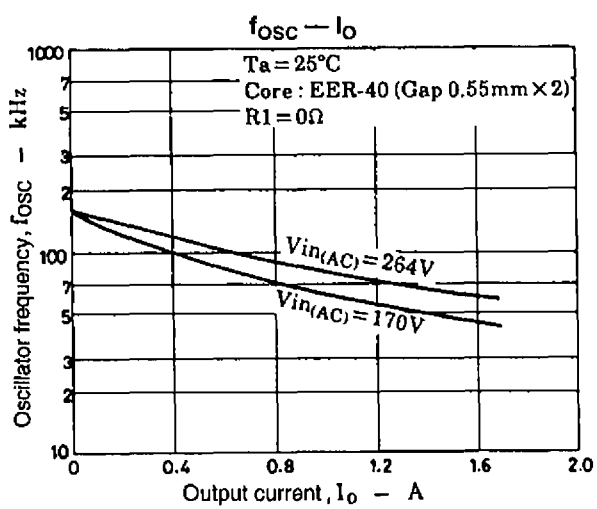
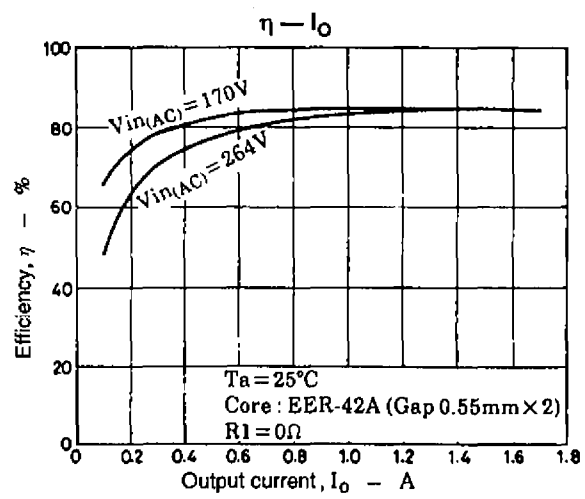
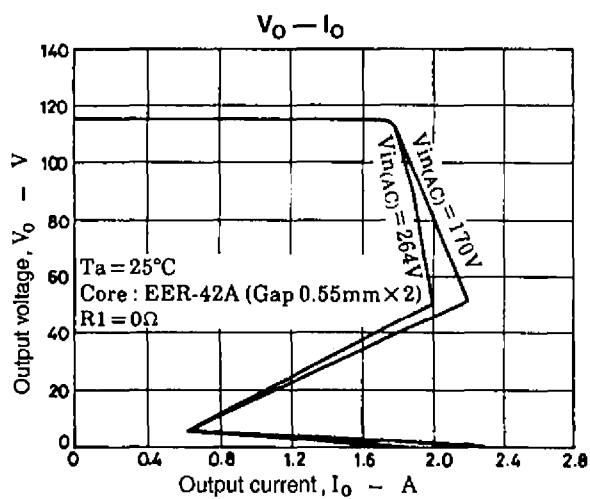


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Pulse Transformer Specifications

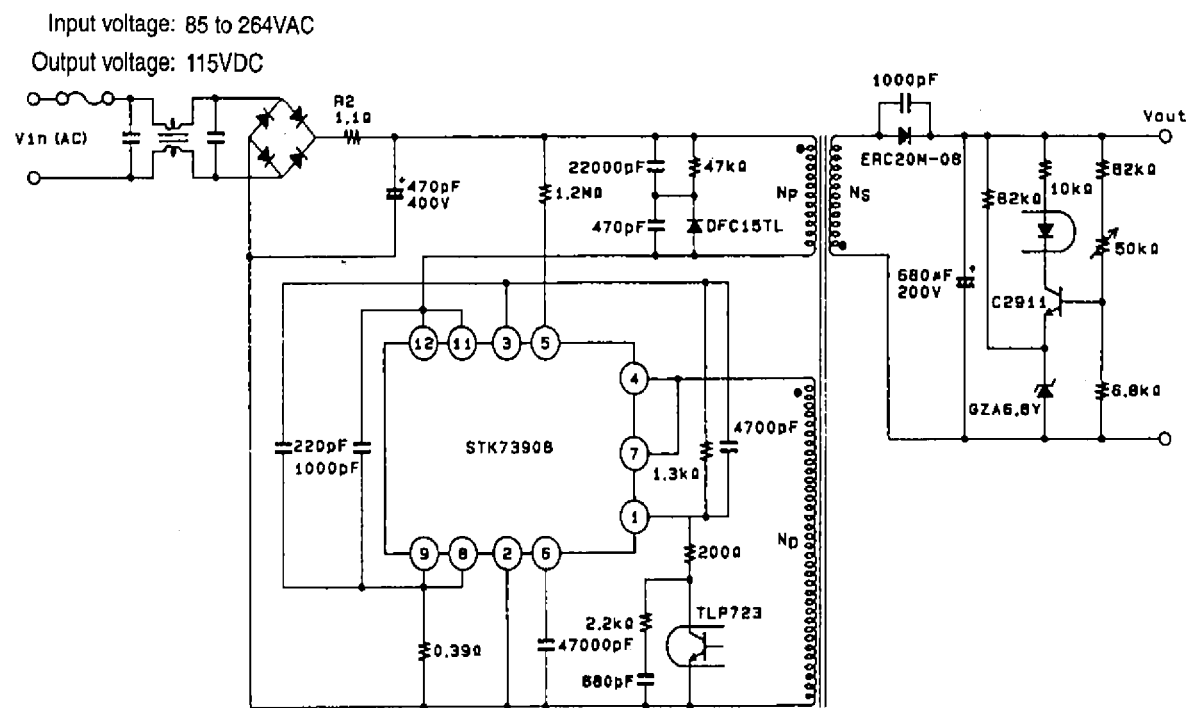


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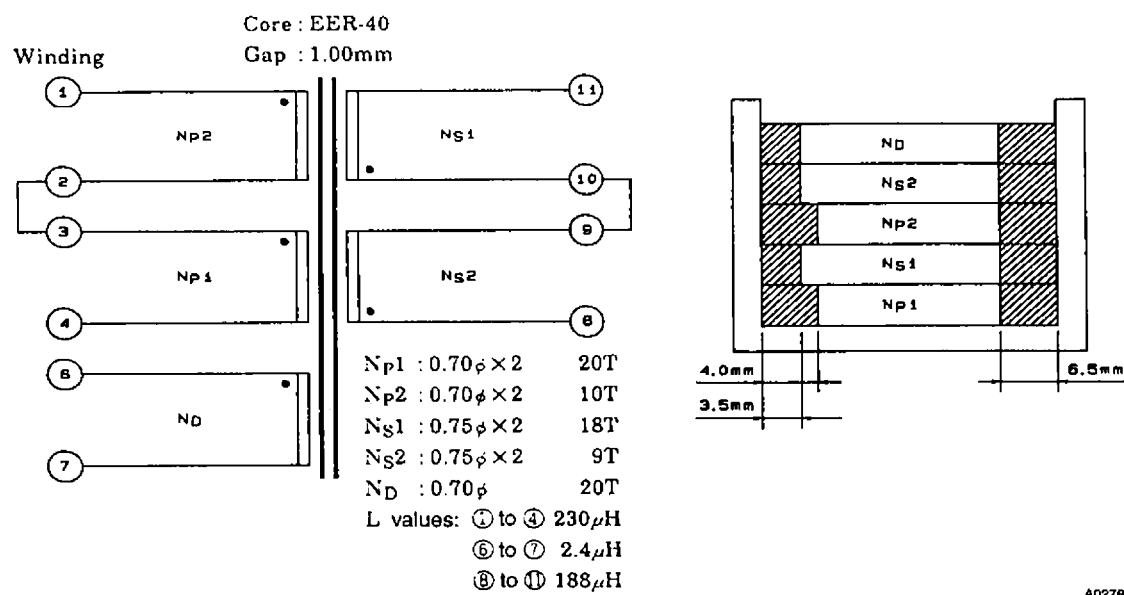
STK73908

Sample Application Circuit (World Input System)

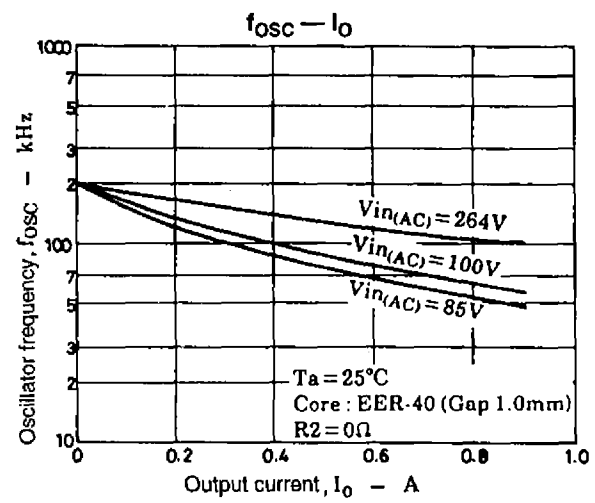
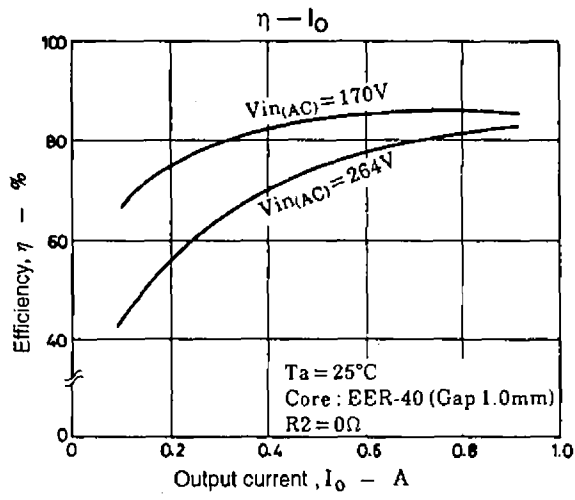
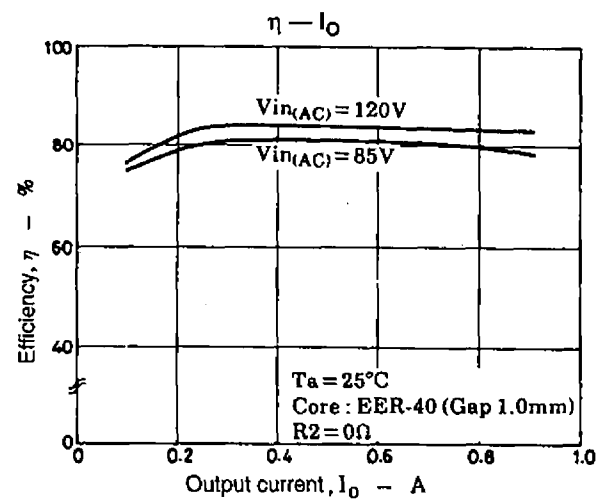
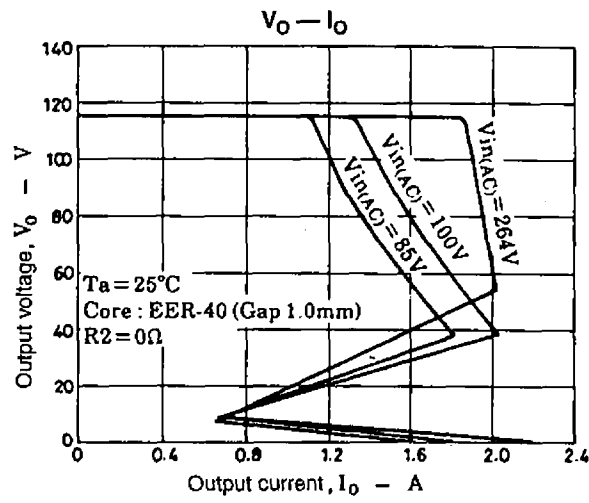


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Pulse Transformer Specifications



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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 max} [°C] | T _{j 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 |