阅读申明

1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描叙上的差异，建议读者做出适当判断。
4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有"数据手册"字样。

Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.

2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.

3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.

4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets".

Features

- **Phase Controlled Thyristor Ignition**
- **Triggering with Time Delay**
- **Repetition Time Delay**
- **Supply Current ≤ 2 mA**
- **Mains Supply via Resistor**

Applications

- **Electric Stapler Devices**

Description

The monolithic integrated bipolar circuit, U490B, is a one-shot power control circuit, designed to control the thyristor which is mainly used in electric stapler devices. The IC is preferred to realize a one-shot phase control, where any phase angle, thus any intensity of the load voltage is adjustable. After successful triggering and the following delay time, an ignition pulse at the output is released. Further triggering is only possible after the delay time elapses.
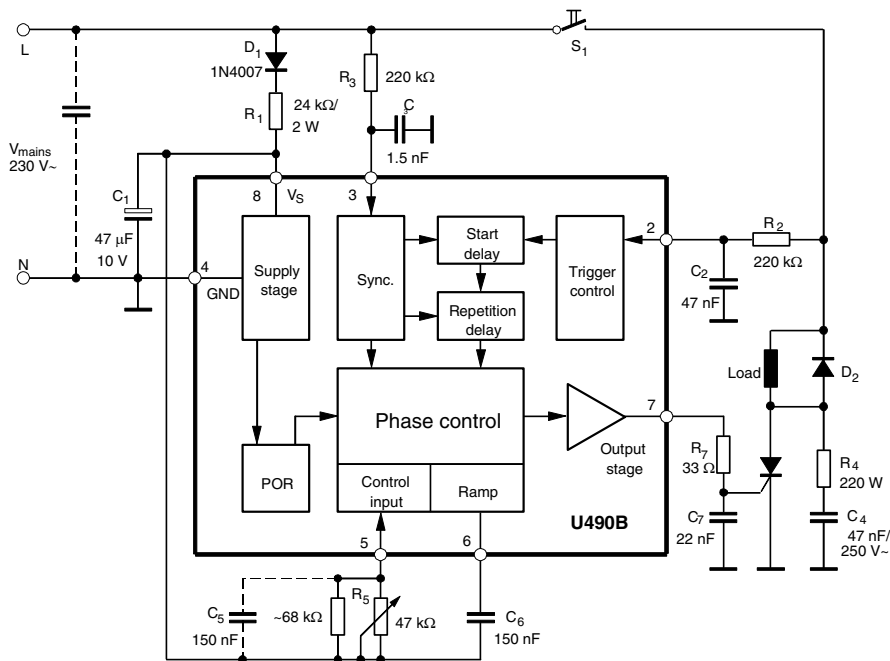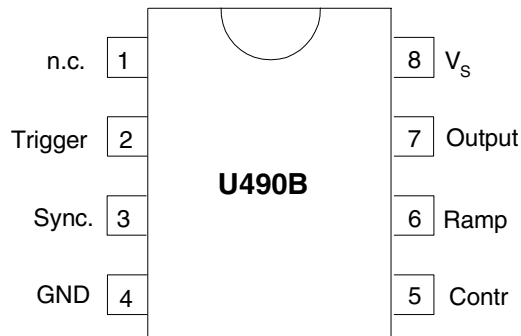
**One-shot
Phase Control
IC**

U490B

Figure 1. Block Diagram

Pin Configuration

Figure 2. Pinning DIP8/SO8

```
        ┌──────⌒──────┐
n.c.  1 │             │ 8  V_S
        │             │
Trigger 2 │           │ 7  Output
        │    U490B    │
Sync.   3 │           │ 6  Ramp
        │             │
GND     4 │           │ 5  Contr
        └─────────────┘
```

Pin Description

Pin	Symbol	Function
1	n.c.	Not connected
2	Trigger	Triggering
3	Sync.	Synchronization
4	GND	Ground
5	Contr	Control input
6	Ramp	Ramp
7	Output	Output
8	V_S	Supply voltage

Supply, Pin 8

The internal voltage limiter enables a simple supply from the mains via series resistor R_1. The supply voltage between pin 8 (V_S) and ground (pin 4) builds up via R_1 and is smoothed by the capacitor C_1.

The series resistor R_1 can be calculated as follows:

$$R_{1max} \approx 0.85 \times \frac{V_{mains} - V_{Smax}}{2 \times I_{tot}} \quad \text{where}$$

V_{mains} Mains supply voltage

V_{Smax} Maximum supply voltage

I_{tot} $I_{Smax} + I_X$

I_{Smax} Maximum current consumption of the IC

I_X Current consumption of the external components

**Phase Control,
Pins 3, 5 and 6**

The circuit is synchronized with mains supply through pin 3. As long as the switch S_1 is open, the circuit is in wait state, i.e., the capacitor C_6 (150 nF) is discharged and is kept in this state (High level). When the switch S_1 is closed, there is a current flow in pin 2 which is evaluated by the circuit. If this current flows after the delay time elapses, the phase control is released. The capacitor C_6 is then charged with $I_6 + 100$ µA towards ground. At the same time, a current of ≈ 100 µA flows into pin 5, which results in a voltage drop across resistor R_5. The control voltage V_5 is then 1.5 V lower internally.

The output stage is released when the ramp voltage V_6 is equal to $(V_5 - 1.5$ V$)$. When the voltage difference is ≈ 150 mV, it is again turned-off.

The result is an output pulse, whose phase shift to the zero crossing of the mains voltage is determined by the resistor R_5 at the control input pin 5 (see Figure 3). The capacitor C_6 is charged to a value of ≈ 1.5 V. This value is kept until the switch S_1 opens again and the repetition delay time has elapsed.

The circuit is released when four periods of the line voltage have expired after build-up of the operating voltage, before the switch S_1 is closed.

Figure 3. Signal Characteristics
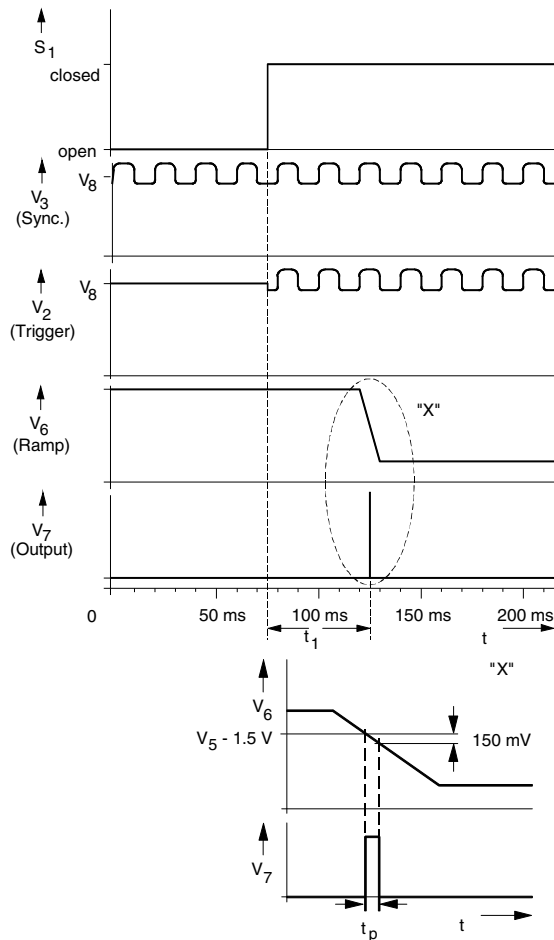
Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Reference point pin 4 (GND), unless otherwise specified

Parameters	Symbol	Value	Unit
Supply current, pin 8 $t \leq 10 \, \mu s$	I_S i_s	30 150	mA mA
Output stage			
Input voltage, pin 7	V_I	-0.5 to V_S	V
Input current, pins 2 and 3 $t \leq 1 \, ms$	$\pm I_I$ $\pm I_I$	5 30	mA mA
Input voltage, pins 5 and 6	V_I	0 to V_8	V
Junction temperature	T_j	+125	°C
Ambient temperature	T_{amb}	-10 to +100	°C
Storage temperature range	T_{stg}	-40 to +125	°C

Thermal Resistance

Parameters		Symbol	Value	Unit
Junction ambient	DIP8	R_{thJA}	110	K/W
	SO8 on p.c.	R_{thJA}	220	K/W
	SO8 on ceramic	R_{thJA}	140	K/W

Electrical Characteristics

$V_S = 7$ V, $T_{amb} = 25°C$, reference point pin 4 (GND), unless otherwise specified

Parameters	Test Conditions/ Pins		Symbol	Min.	Typ.	Max.	Unit
Supply voltage limitation	$I_S = 3$ mA $I_S = 30$ mA	Pin 8	V_S V_S	7.2 7.4	8.2 8.4	9.2 9.4	V V
Current consumption	$V_S = 7$ V	Pin 8	I_S			2	mA
Voltage Monitoring							
Switch-on threshold Switch-off threshold		Pin 8	V_{Son} V_{Soff}		5 3		V V
Synchronization							
Voltage limitation	$I_3 = +1$ mA $I_3 = -1$ mA	Pin 3 – 8	V_{lim} $-V_{lim}$		1.5 0.75		V V
Switch-on threshold Switch-off threshold		Pin 3	I_{Ton} I_{Toff}		120 35		µA µA
Trigger Input							
Voltage limitation	$I_2 = +1$ mA $I_2 = -1$ mA	Pin 2 – 8	V_{lim} $-V_{lim}$		1.5 0.75		V V
Switch-on threshold Switch-off threshold		Pin 2	I_{Ton} I_{Toff}		120 35		µA µA
Start delay time Repetition delay time	$f_{mains} = 50$ Hz	Pin 2–7	t_1 t_2	40 60		60 80	ms ms

Electrical Characteristics (Continued)

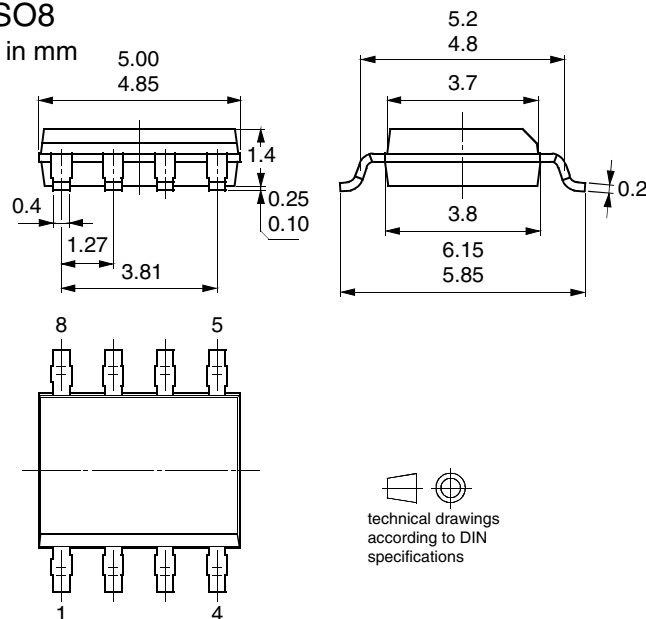$V_S = 7$ V, $T_{amb} = 25°C$, reference point pin 4 (GND), unless otherwise specified

Parameters	Test Conditions/ Pins	Symbol	Min.	Typ.	Max.	Unit
Phase Control						
Control input:	Pin 5					
Input voltage range		V_I	2		V_S	V
Input current	2 V $\leq V_5 \leq V_8$	I_I	50	90	130	μA
Ramp						
Charge current	2 V $\leq V_6 \leq V_8 - 0.5$ V	I_{ch}	50	90	130	μA
Discharge current	$V_5 = 4$ V	$-I_{dis}$	2			mA
Phase Shift	$C_6 = 150$ nF, $V_5 = 2$ V	t_{dmax}		7		ms
	$V_5 = V_8$, Pin 7–5	t_{dmin}		600		μs
Output Stage, $V_7 + 0$ V, Pin 7						
Output reverse current	Status OFF	$\pm I_{o(r)}$			10	μA
Output current	Status ON	$-I_o$	100			mA
Pulse width	$C_6 = 150$ nF (see Figure 3 on page 3)	t_p	100	200	300	μs

Ordering Information

Extended Type Number	Package	Remarks
U490B-x	DIP8	Tube
U490B-xFP	SO8	Tube
U490B-xFPG3	SO8	Taped and reeled

Package Information

Package SO8
Dimensions in mm

technical drawings according to DIN specifications

Package: DIP 8
Dimensions in mm

9.8 max.
9.6 ±0.1
1.2 ±0.3
1.8
4.2 ±0.3
0.3 B
6.7
2.5
0.53 ±0.05
2.54 nom.
B
3x 2.54 = 7.62 nom.

A
7.62 ±0.15
3.6 ±0.1
0.4 A
6.3 ±0.1
0.36 max.
8.75 ±0.8

1.54
0.65
8
5
1
4

technical drawings
according to DIN
specifications
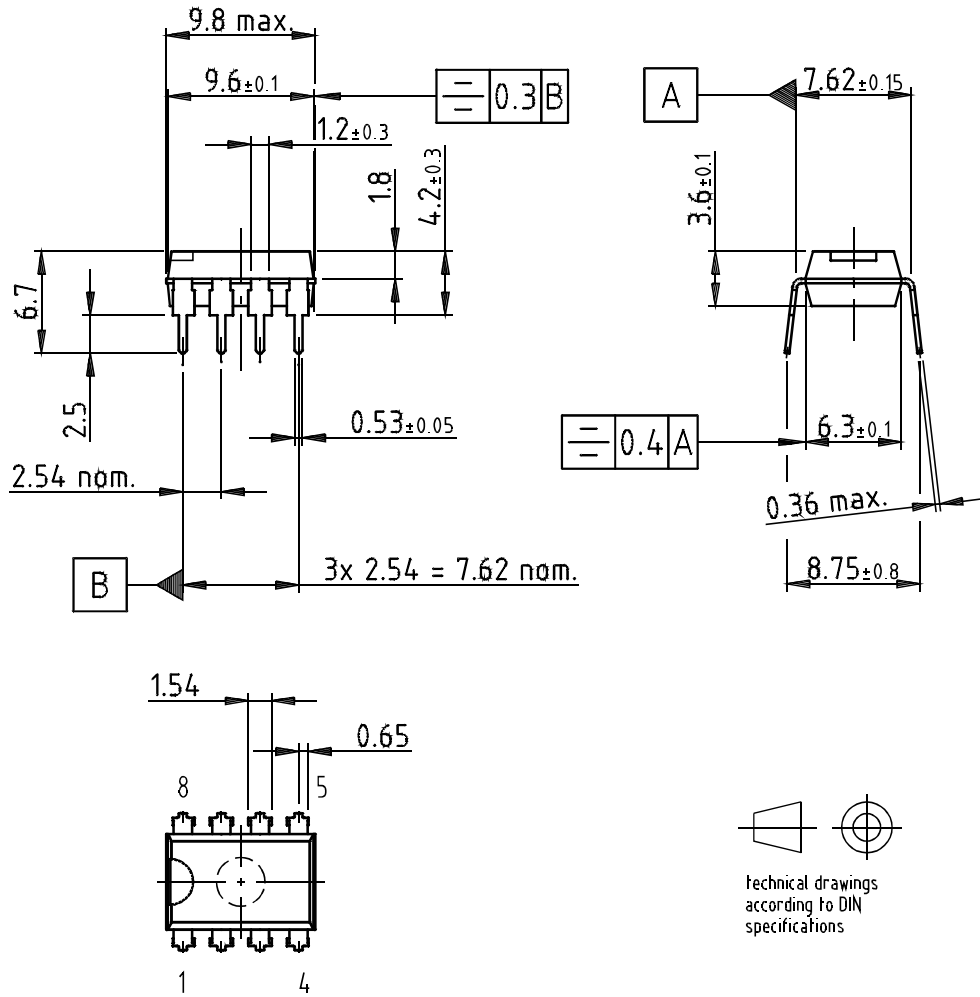
Drawing-No.: 6.543-5040.01-4
Issue: 1; 16.01.02

ATMEL

Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe
Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia
Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan
9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards
Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive
Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/
High Speed Converters/RF Datacom
Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

Literature Requests
www.atmel.com/literature

Printed on recycled paper.