

## Automotive Wipe/Wash or Interval Switch

### Description

As a convenience feature of the windshield wiper intermittent and wipe/wash operation are implemented in most of the automobiles. The U641B controls all timing functions accurately at a reasonable price level. Interval pause and afterwiping time can be set to fixed values with the help of resistors in a broad time range. Added value

can be provided with an individual, continuous adjustment of the interval pause by a potentiometer which may be built into the stalk. For proper operation it is mandatory to feed the signal of the wiper motor's park switch into U641B.

### Features

- Interval pause: 4 to 20 s
- Afterwiping time: 2 to 20 s
- Wiper motor's park switch
- Wipe delay in WIWA mode 0.7 s
- Wipe/wash mode priority
- One external capacitor, determines all time sequences
- Relay driver with Z-diode
- Interference protection according to VDE 0839 or ISO/TR 7637/1
- Load-dump protected

### Ordering Information

Extended Type Number	Package	Remarks
U641B	DIP8	
U641B-FP	SO8	

### Block Diagram

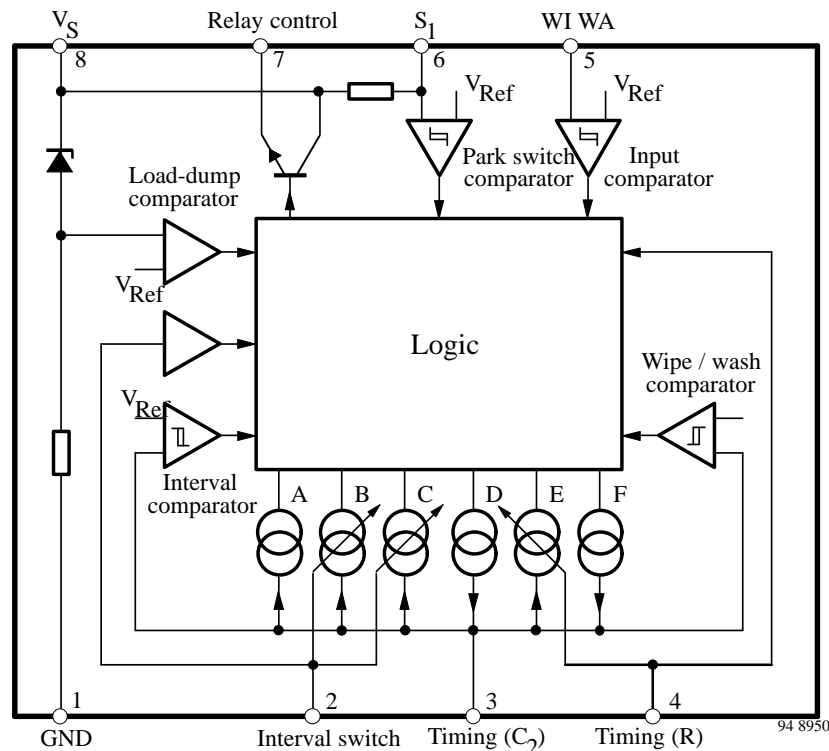
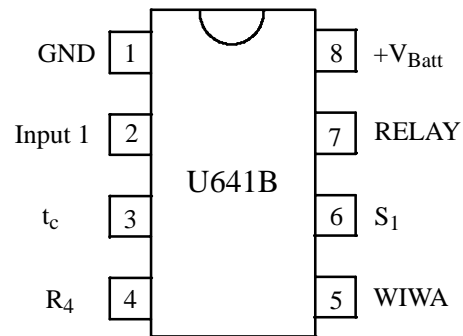


Figure 1. Block diagram

## Pin Configuration

Pin	Symbol	Function
1	GND	Ground
2	Input 1	Interval switch
3	$t_c$	Timing capacitor $C_2$
4	$R_4$	Afterwiping time resistance
5	WIWA	Wipe/Wash switch
6	$S_1$	Park switch for wiper motor
7	RELAY	Relay control output
8	$+V_{Batt}$	Supply voltage KI. 15



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Figure 2. Pinning

## Circuit Description

### Interval Function, Pin 2

By closing the internal switch,  $S_2$ , to supply voltage,  $+V_{Batt}$ , the motor is activated. The internal current source (Pin 3) which holds the capacitor  $C_2$  in charged state is switched-OFF. As soon as there is a positive potential at the park switch ( $S_1$ ), current source F (see figure 1) charges the capacitor  $C_2$  very fast. After the wiper operation is finished,  $S_1$  is again at ground potential, the relay is in OFF position – interval pause begins – the capacitor  $C_2$  is discharged through the current source C, till the voltage at Pin 3 is below the threshold of 2 V. Interval pause can be adjusted between 4 s to 20 s with the help of potentiometer  $R_3$ . Now the relay switches ON and the next interval cycle begins. Opening switch  $S_2$  causes current source A to discharge  $C_2$  immediately and current sources C and F are switched-OFF.

### Wipe/Wash (WIWA) Operation, Pin 5

By closing the WIWA-switch,  $S_3$ , to supply voltage,  $+V_{Batt}$ , water pump starts spraying the water on the windscreen, the current source A is switched-OFF which keeps the capacitor  $C_2$  in discharged state. Now the capacitor is charged through the current sources D and F, and when after a time interval of approximately 700 ms, the voltage

at the capacitor is greater than 6.5 V, the relay is turned on as long as the switch "WIWA" is closed.

The after-wipe-time begins after the switch is open whereas the sources D and F are switched OFF and the source E is activated. Source E discharges the capacitor till the voltage is less than 2.2 V. The relay is OFF and the wiper-motor is switched OFF. The after-wipe-time is determined by the current source E which can be regulated with the external resistor  $R_{Time}$ . Afterwards the source A discharges the capacitor. Relay switch OFF is independent of the park switch  $S_1$ .

### Interval and WIWA Functions

The interval function is interrupted immediately when the switch  $S_2$  is activated. The current source A discharges the capacitor to a value of 2 V, afterwards the normal  $S_2$  function starts.

Interval wiping starts immediately when the after-wipe-time is over. The switching delays are slightly shorter, because the capacitor is already charged to a value of 2 V.

The Wipe/Wash function is not interrupted when interval switch  $S_2$  is activated. Interval function begins after the WIWA function is over.

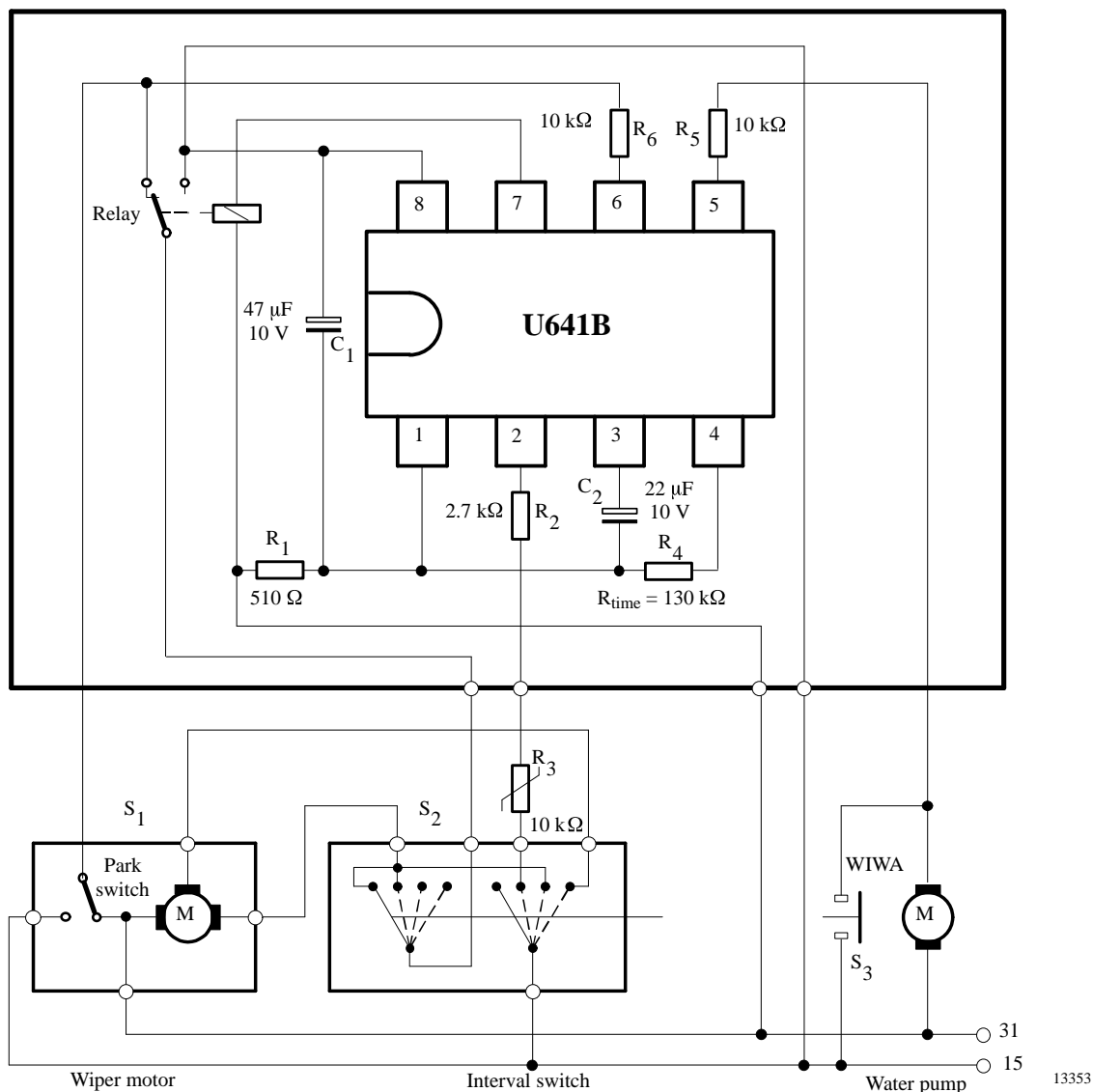


Figure 3. Application circuit with interval and wipe/wash operation

## Absolute Maximum Ratings

Parameters		Symbol	Value	Unit
Supply voltage	$t = 60 \text{ s}$ Terminal 15, Pin 8	$V_{\text{Batt}}$	28	V
Supply current	$t = 2 \text{ ms}$ Pin 8	$I_8$	1.5	A
	$t = 200 \text{ ms}$	$I_8$	150	mA
Relay control output current (DC)	Pin 7	$I_7$	200	mA
	$t = 200 \text{ ms}$	$I_7$	1.2	A
Pulse current (control inputs) $t = 200 \text{ ms}$				
	Park switch, $S_1$ Pin 6	$I_6$	50	mA
	Wipe/Wash switch, $S_3$ Pin 5	$I_5$	50	
	Interval switch, $S_2$ Pin 2	$I_2$	50	
Power dissipation	$T_{\text{amb}} = 90^\circ\text{C}$	$P_{\text{tot}}$	500	mW
Storage temperature range		$T_{\text{stg}}$	-55 to +125	$^\circ\text{C}$
Ambient temperature range		$T_{\text{amb}}$	-40 to +85	$^\circ\text{C}$

## Thermal Resistance

Parameters		Symbol	Value	Unit
Junction ambient	DIP8	$R_{thJA}$	110	K/W
	SO8	$R_{thJA}$	160	K/W

## Electrical Characteristics

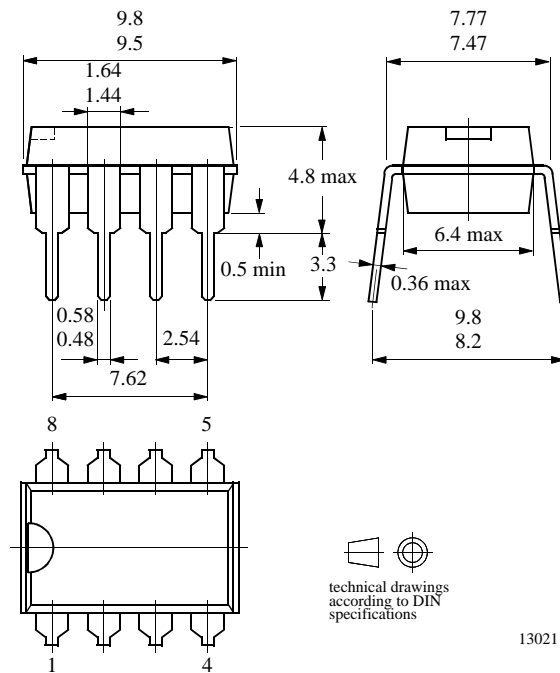
$V_{Batt} = 12\text{ V}$ ,  $T_{amb} = 25^\circ\text{C}$ , (see figure KEIN MERKER) unless otherwise specified.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Pin 8	$V_{Batt}$	9		16.5	V
Supply current		$I_8$		10		mA
Z-diode limitation		$V_2$		-7.6		V
<b>Overvoltage</b>						
Threshold current		$I_1$		-50		mA
Threshold voltage		$V_{Batt}$		35		V
<b>Relay control output</b> Pin 7						
Saturation voltage	$I_7 = 100\text{ mA}$ $I_7 = 200\text{ mA}$	$V_7$			-1.0 -1.5	V
Reverse current		$I_7$			-0.1	mA
<b>Park switch</b> Pin 6						
Internal pull-up resistance	$R_6 = 10\text{ k}\Omega$	$R_6$		50		$\text{k}\Omega$
Switching threshold voltage		$V_6$		-3.3		V
Protection diode	$I_6 = -10\text{ mA}$ $I_6 = 10\text{ mA}$	$V_6$		-0.8		V
		$V_6$		7.6		V
<b>Input C<sub>2</sub></b> Pin 3						
Internal resistance		$R_3$		100		$\Omega$
<b>Interval input, <math>R_2 = 2.7\text{ to }30\text{ k}\Omega</math></b> Pin 2						
Protection diode	$I_2 = -10\text{ mA}$ $I_2 = 30\text{ mA}/10\text{ ms}$	$V_2$		-0.8 7.6		V
<b>WIWA Input, <math>R_5 = 10\text{ k}\Omega</math></b> Pin 5						
Switching threshold/ Hysteresis		$V_5$		-1.4/-5.4		V
Protection diode	$I_5 = -10\text{ mA}$ $I_5 = 10\text{ mA}$	V		-0.8 7.6		V
<b>Switching Characteristics, <math>R_4 = 47\text{ k}\Omega\text{ to }300\text{ k}\Omega</math>, <math>I_4 = -150\text{ }\mu\text{A}</math></b>						
Interval time	$R_3 = 0\text{ k}\Omega$ $R_3 = 10\text{ k}\Omega$	$t_2$	3.6 10.8	4 12	4.4 13.2	s
Switch-ON time		$t_{on}$		700		ms
After-wipe-time	$R_4 = 130\text{ k}\Omega$ Pin 5	$t_5$	4.75	5.25	5.75	s

**Package Information**

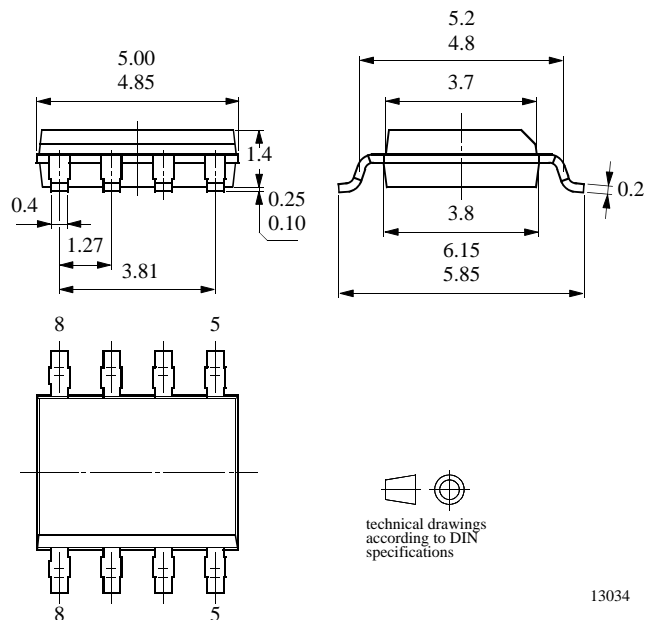
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm



## Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**TEMIC TELEFUNKEN microelectronic GmbH** semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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