Features

- Interval Pause: 4s to 20s
- After-wiping Time: 2s to 20s
- Wiper Motor's Park Switch
- 0.6s Prewash Delay
- 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

Pb Lead Free

Interval and Wipe/Wash Wiper Control IC with Delay

U641B

1. Description

The U641B is a bi-polar integrated circuit designed for the wiper application in the automotive market. It includes wipe, wash and internal mode.

2. Functional Description

As a convenience feature of the windshield wiper, intermittent and wipe/wash operation functions are implemented in most of the automobiles. The U641B is a cost-effective solution for an accurate timing function control. Wipe/wash mode has priority over interval mode. Interval pause and after-wiping time can be set to fixed values by using 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 the U641B.

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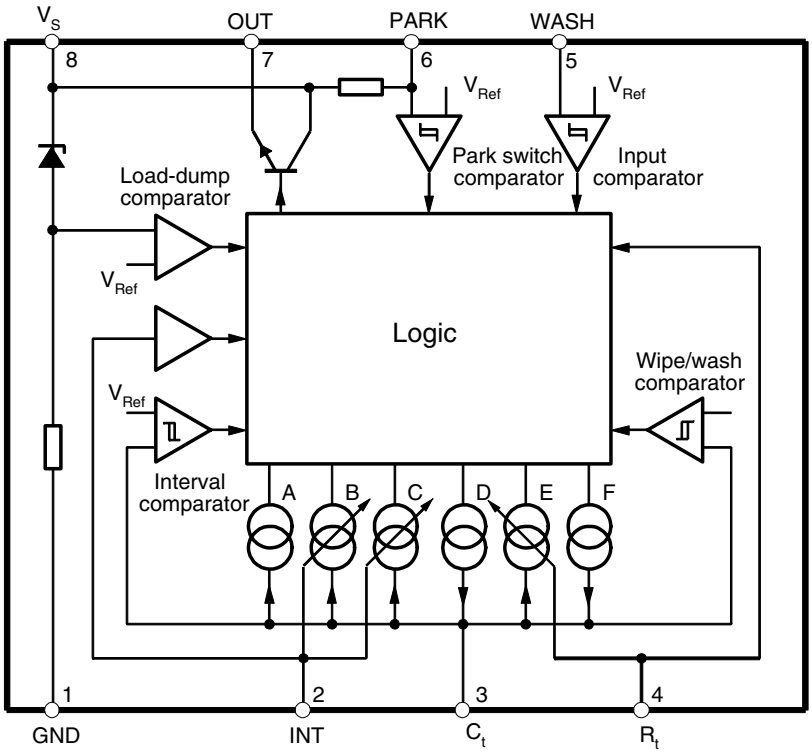
Figure 2-1. Block Diagram



3. Pin Configuration

Figure 3-1. Pinning

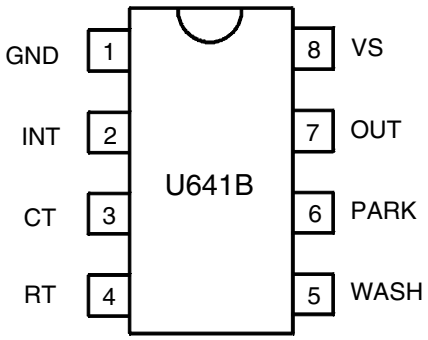


Table 3-1. Pin Description

Pin	Symbol	Function
1	GND	Ground
2	INT	Interval switch
3	CT	Timing capacitor C_2
4	RT	After-wiping time resistance
5	WASH	Wipe/wash switch
6	PARK	Park switch for wiper motor
7	OUT	Relay control output
8	VS	Supply voltage terminal 15

4. Circuit Description

4.1 Interval Function, Pin 2

By closing the interval switch, S_2, to supply voltage, V_{Batt}, the relay 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 2-1 on page 2) charges the capacitor C_2 very quickly. After the wiper operation is finished, S_1 is again at ground potential, the relay is in the 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 2V. 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.

4.2 Wipe/Wash (WIWA) Operation, Pin 5

By closing the WIWA switch, S_3, to supply voltage, V_{Batt}, the water pump starts spraying the water on the windshield. During this function, the current source A is switched-off which keeps the capacitor C_2 in a discharged state. Now the capacitor is charged through the current source F. If (after a time interval of approximately 600 ms) the voltage at the capacitor is greater than 6.1V, the relay is turned on as long as the switch WIWA is closed.

The after-wiping time begins when the switch is open, the sources D and F are switched off and the source E is activated. Source E discharges the capacitor until the voltage is less than 2.2V. The relay is off and the wiper-motor is supplied via the park switch until the park position is reached. The after-wiping time is determined by the current source E which can be regulated with the external resistor R_{Time}. When the after-wiping time has elapsed, the source A discharges the capacitor. The relay switch is independent of the park switch S_1.

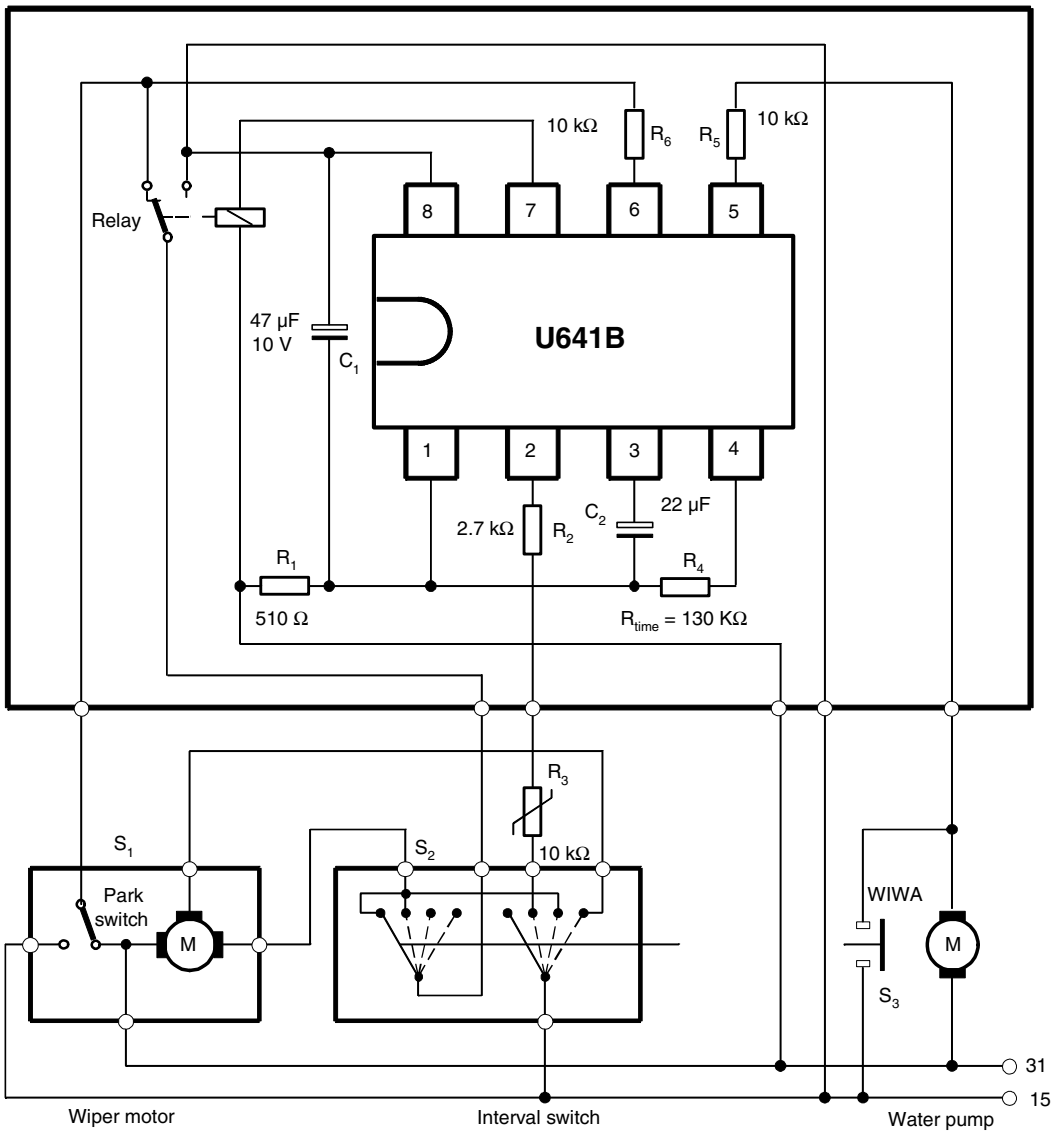
4.3 Interval and WIWA Functions

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

The Wipe/Wash function is not interrupted when the interval switch S_2 is activated. The interval function begins after the WIWA function has elapsed.

Figure 4-1. Application Circuit with Interval and Wipe/Wash Operation



5. 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.

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

6. Thermal Resistance

Parameters		Symbol	Value	Unit
Junction ambient	DIP8	R_{thJA}	120	K/W
	SO8	R_{thJA}	160	K/W

7. Electrical Characteristics

V_{Batt} = 12V, T_{amb} = 25°C, reference point is pin 8 (see Figure 4-1 on page 5) unless otherwise specified.

Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit
Supply voltage		8	V_{Batt}	9		16.5	V
Supply current			I_8		10		mA
Z-diode limitation			V_1		7.6		V
Overvoltage							
Threshold current			I1		–50		mA
Threshold voltage			V_{Batt}		35		V
Relay Control Output		7					
Saturation voltage	I_7 = 100 mA I_7 = 200 mA		V_7			–1.0 –1.5	V
Leakage current			I_7		100		µA
Park Switch		6					
Internal pull-up resistance	R_6 = 10 kΩ		R_6		50		kΩ
Switching threshold voltage			V_6		–3.3		V
Protection diode	I_6 = –10 mA I_6 = 10 mA		V_6 V_6		–0.8 7.6		V V
Input C_t		3					
Internal resistance			R_3		100		Ω
Interval Input	R_2 = 2.7 to 30 kΩ	2					
Protection diode	I_2 = –10 mA I_2 = 30 mA/10 ms		V_2		–0.8 7.6		V
WASH Input	R_5 = 10 kΩ	5					
Switching threshold/ Hysteresis			V_5		–1.4/ –5.4		V
Protection diode	I_5 = –10 mA I_5 = 10 mA		V		–0.8 7.6		V
Switching Characteristics	R_4 = 47 kΩ to 300 kΩ, I_4 = –150 µA						
Interval time	R_3 = 0 kΩ R_3 = 10 kΩ		t_2	3.6 10.8	4 12	4.4 13.2	s
Prewash delay			t_{del}		600		ms
After-wipe-time	R_4 = 130 kΩ	5	t_5	4.75	5.25	5.75	s

8. Diagrams

Figure 8-1. Interval Pause = f (T); C_t = 22 µF

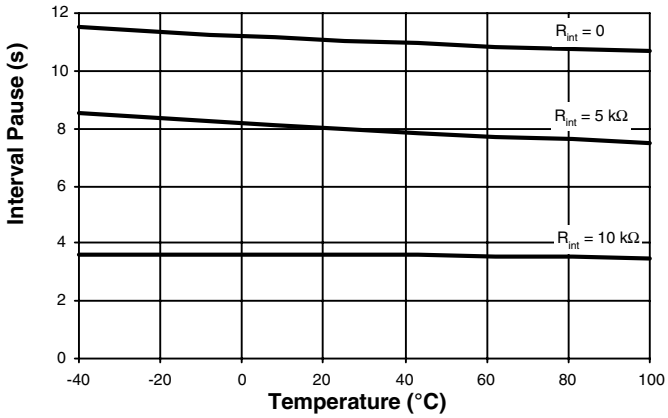


Figure 8-2. After-wiping Time = f (T); C_t = 22 µF; V_{Batt} = 8 V

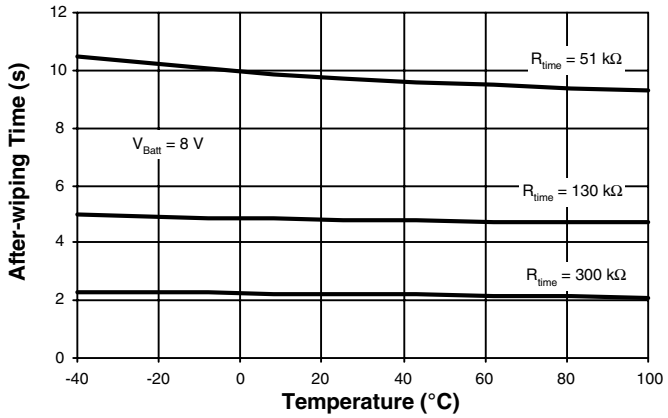


Figure 8-3. Prewash Time = f (T); C_t = 22 µF

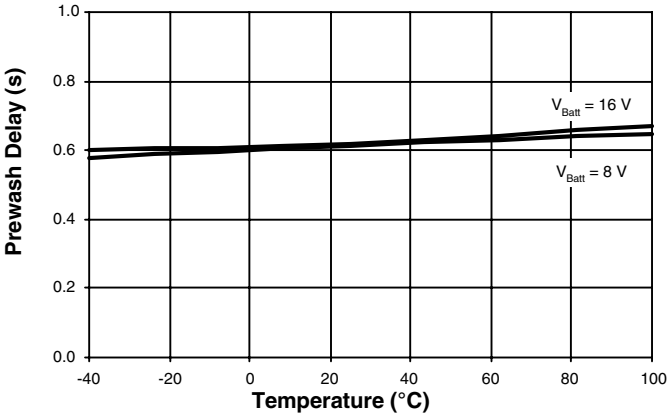


Figure 8-4. Interval Pause = f (R_{INT}); C_t = 22 µF

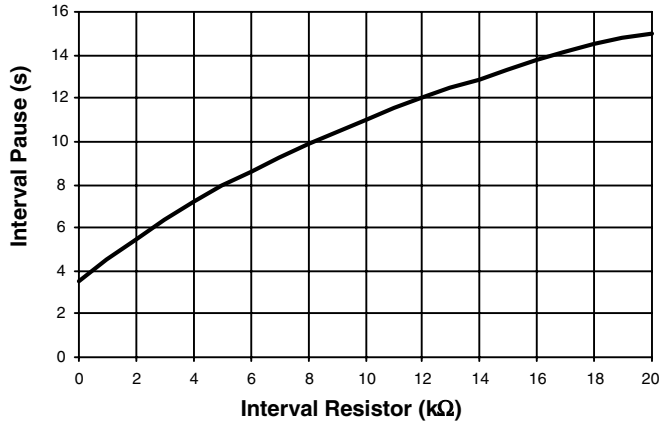
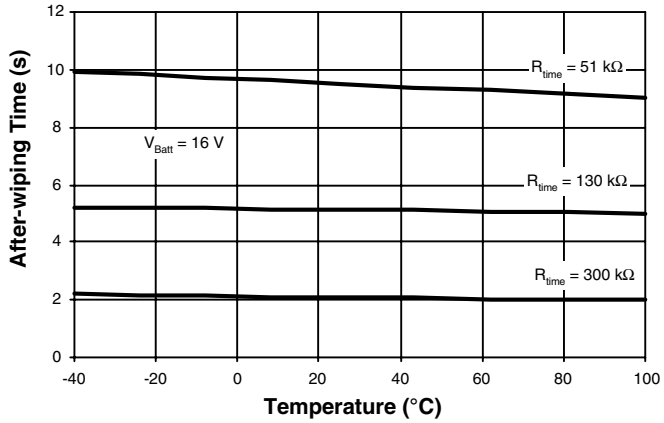


Figure 8-5. After-wiping Time = f (T); C_t = 22 µF; V_{Batt} = 16 V

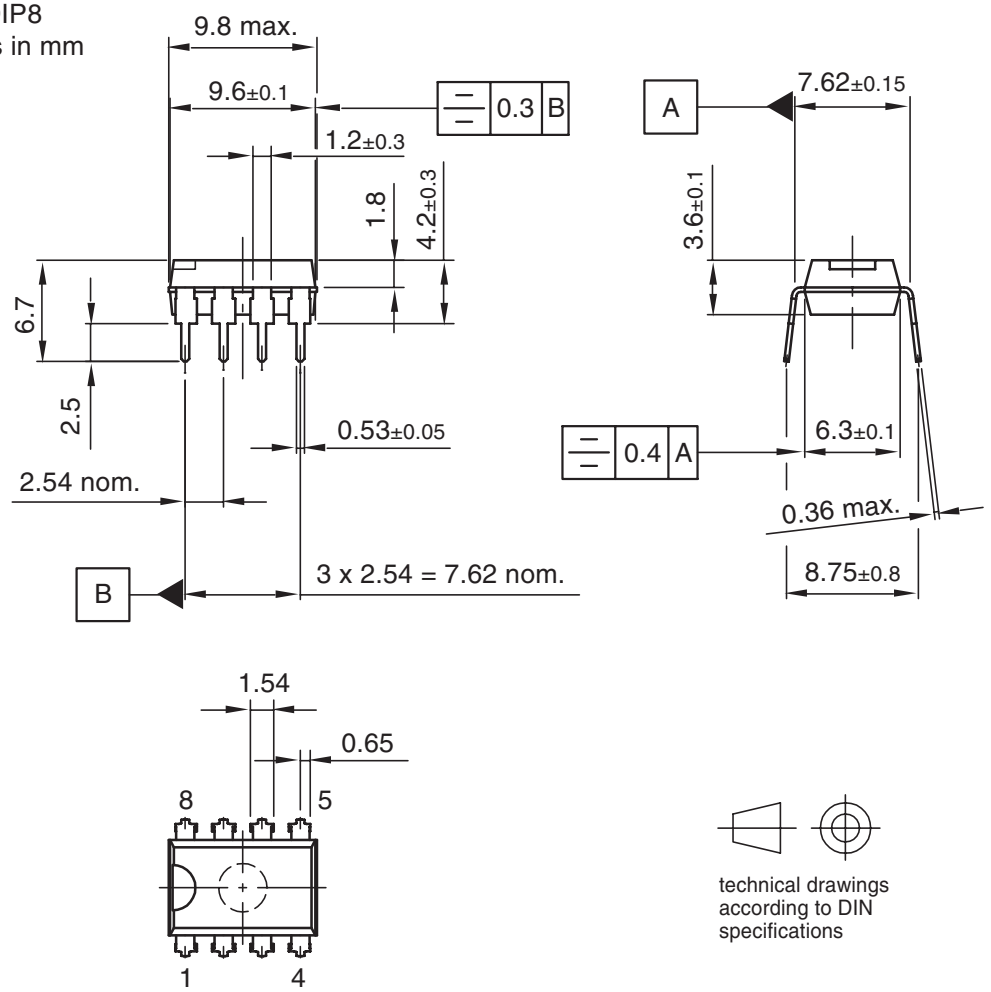


9. Ordering Information

Extended Type Number	Package	Remarks
U641B-MY	DIP8	Pb-free
U641B-MFPY	SO8	Tubed, Pb-free
U641B-MFPG3Y	SO8	Taped and reeled, Pb-free

10. Package Information

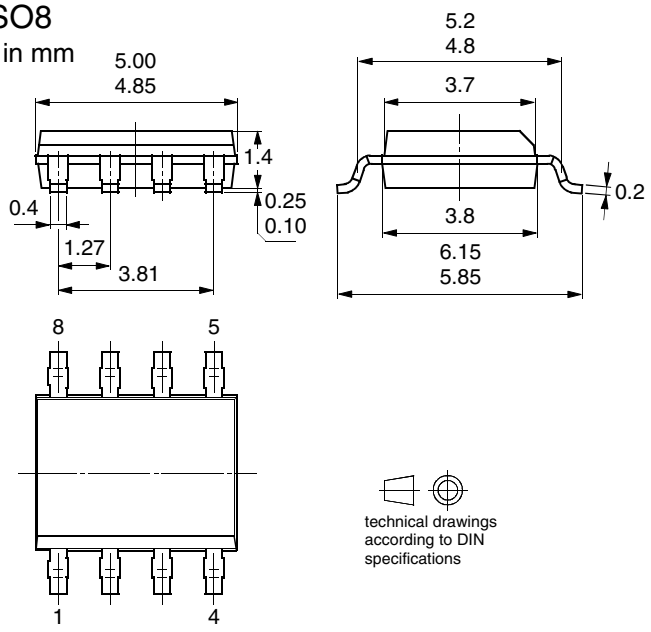
Package: DIP8
Dimensions in mm



Drawing-No.: 6.543-5040.01-4
Issue: 1; 16.01.02

Package SO8

Dimensions in mm



11. Revision History

Please note that the following page numbers referred to in this section refer to the specific revision mentioned, not to this document.

Revision No.	History
4773B-AUTO-09/05	• Put datasheet in a new template • Pb-free logo on page 1 added • Ordering Information on page 10 changed

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