

Interval-and Wipe/ Wash Wiper Control IC with Delay

Description

As a convenience feature of the windshield wiper intermittent and wipe/wash operation are implemented in most of the automobiles. The U641B is the low-cost solution for an accurate timing function control. Wipe/wash mode has priority over interval mode. Interval pause and afterwiping 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 U641B.

Features

- Interval pause: 4 to 20 s
- Afterwiping time: 2 to 20 s
- Wiper motor's park switch
- 0.6 s 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

Block Diagram

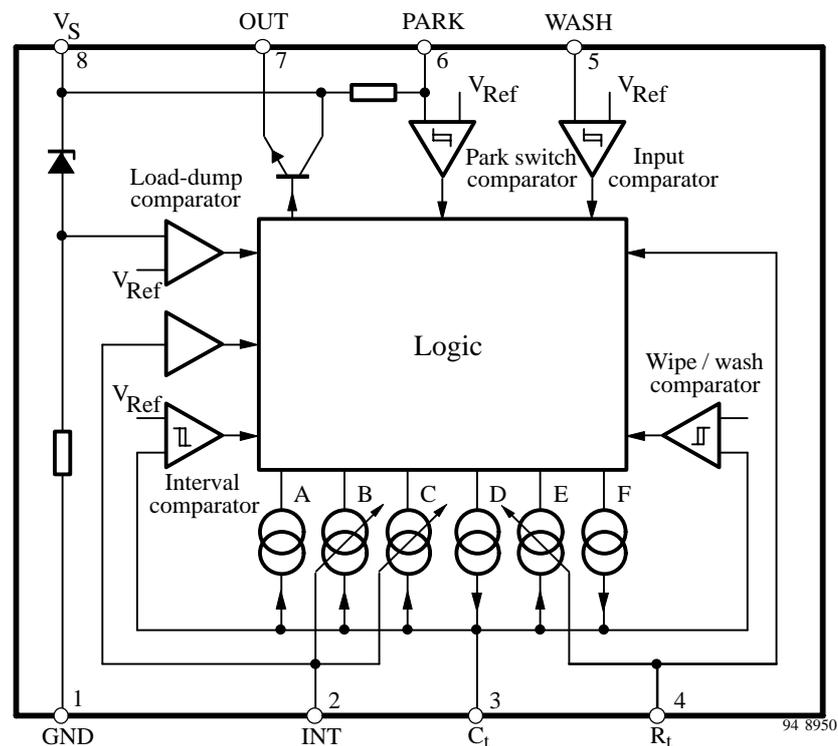


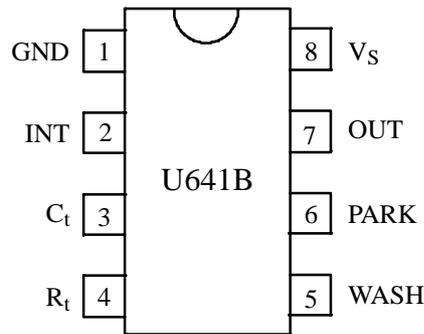
Figure 1. Block diagram

Ordering Information

Extended Type Number	Package	Remarks
U641B	DIP8	
U641B-FP	SO8	

Pin Description

Pin	Symbol	Function
1	GND	Ground
2	INT	Interval switch
3	C_t	Timing capacitor C_2
4	R_t	Afterwiping time resistance
5	WASH	Wipe/ wash switch
6	PARK	Park switch for wiper motor
7	OUT	Relay control output
8	V_S	Supply voltage KI. 15



13352

Figure 2. Pinning

Circuit Description

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 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} , the 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 source F, and when after a time interval of approximately 600 ms, the voltage

at the capacitor is greater than 6.1 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 supplied via the park switch until the park position will be reached. 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 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 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.

Absolute Maximum Ratings

Parameters			Symbol	Value	Unit
Supply voltage	t = 60 s	Terminal 15, Pin 8	V _{Batt}	28	V
Supply current	t = 2 ms	Pin 8	I ₈	1.5	A
	t = 200 ms		I ₈	150	mA
Relay control output current (DC)	t = 200 ms	Pin 7	I ₇	200	mA
			I ₇	1.2	A
Pulse current (control inputs) t = 200 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 _{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

Thermal Resistance

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

Electrical Characteristics

V_{Batt} = 12 V, T_{amb} = 25°C, reference point is Pin 8 (see figure 3) 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 ₁		7.6		V
Overvoltage						
Threshold current		I ₁		-50		mA
Threshold voltage		V _{Batt}		35		V
Relay control output Pin 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 Pin 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		-0.8		V
		V ₆		7.6		V

Electrical Characteristics (continued)

$V_{Batt} = 12\text{ V}$, $T_{amb} = 25^\circ\text{C}$, reference point is Pin 8 (see figure 3) unless otherwise specified.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Input C_t Pin 3						
Internal resistance		R ₃		100		Ω
Interval input , R ₂ = 2.7 to 30 kΩ Pin 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 Pin 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 Pin 5	t ₅	4.75	5.25	5.75	s

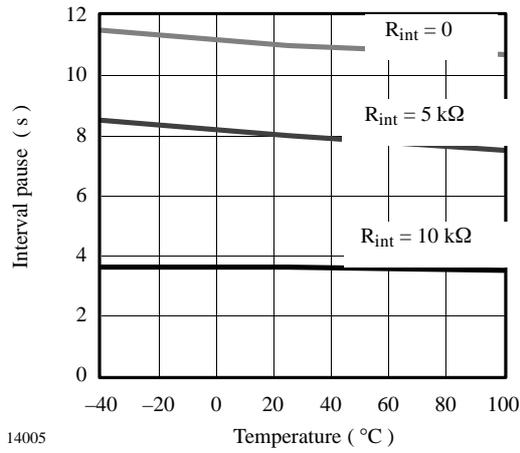


Figure 4. Interval pause = $f(T)$; $C_t = 22 \mu\text{F}$

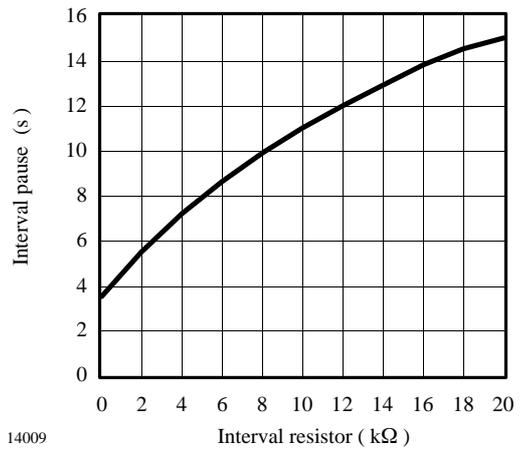


Figure 7. Interval pause = $f(R_{INT})$; $C_t = 22 \mu\text{F}$

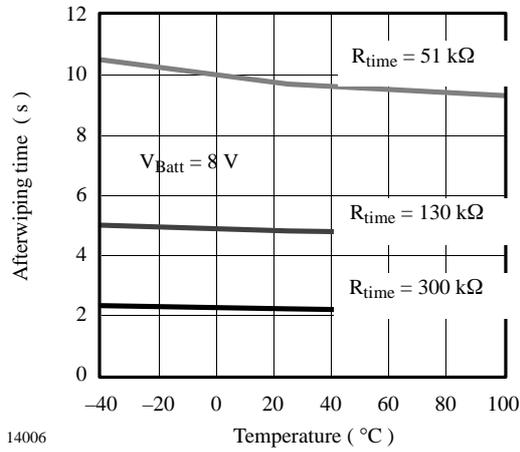


Figure 5. Afterwiping time = $f(T)$; $C_t = 22 \mu\text{F}$

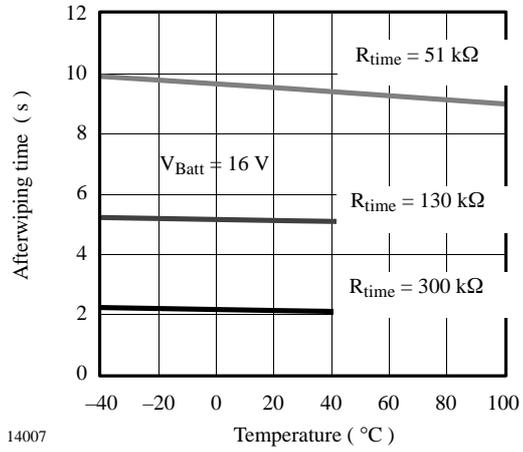


Figure 8. Afterwiping time = $f(T)$; $C_t = 22 \mu\text{F}$

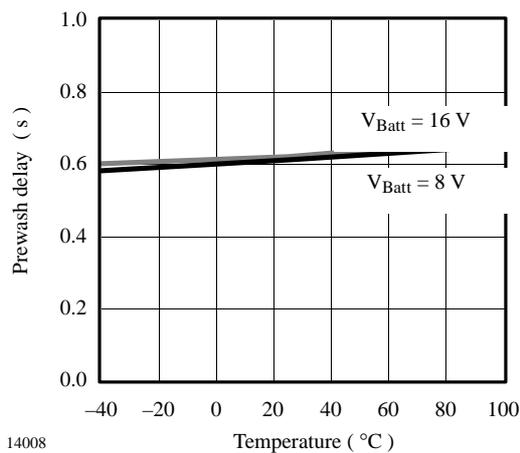
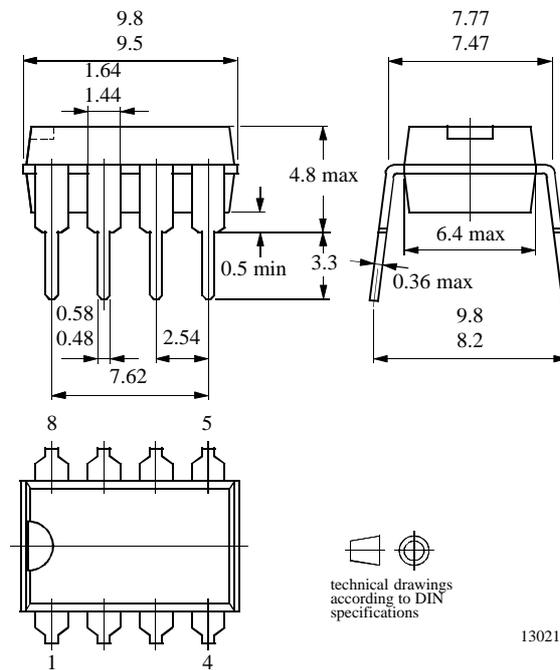


Figure 6. Prewash time = $f(T)$; $C_t = 22 \mu\text{F}$

Package Information

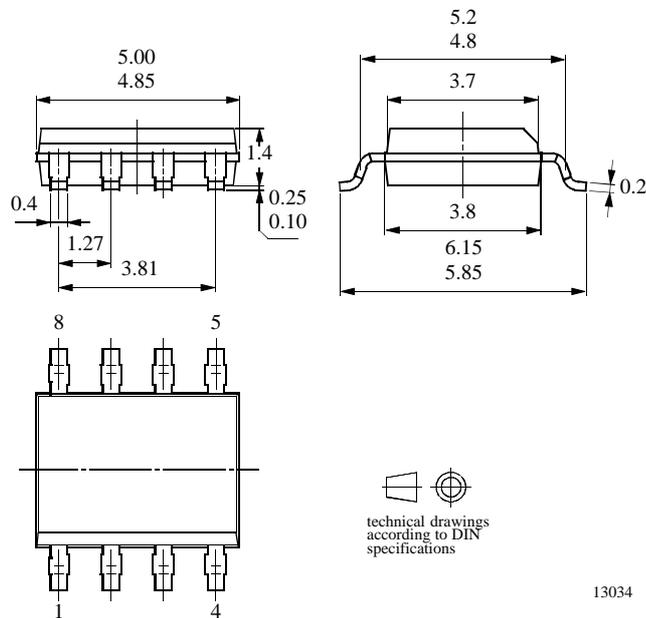
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Atmel Germany 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.

Atmel Germany GmbH 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.

Atmel Germany GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Atmel Wireless & Microcontrollers products for any unintended or unauthorized application, the buyer shall indemnify Atmel Wireless & Microcontrollers against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Data sheets can also be retrieved from the Internet: <http://www.atmel-wm.com>

Atmel Germany GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2594, Fax number: 49 (0)7131 67 2423