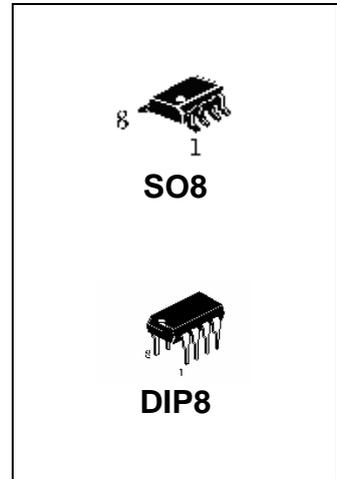


INTERVAL- and WIPE/WASH WIPER CONTROL IC

IK642B

The IK642B is a bi-polar integrated circuit designed for the wiper application in the automotive market. It includes wipe, wash and interval mode.



FEATURES

- Interval Pause: 4 to 20 s
- After-wiping Time: 2 to 20 s
- Wiper Motor's Park Switch
- Wipe/Wash Mode Priority
- One External Capacitor Determines All Time Sequences
- Relay Driver with Z-diode
- Load-dump Protected
- Prewash Delay 300mS
- Interference Protection According to VDE 0839 or ISO/TR 7637/1

ORDERING INFORMATION

Device	Operating Temperature Range	Package	Packing
IK642BN	$T_A = -40$ to $+85$ °C	DIP8	Tube
IK642BDT		SO8	Tape & Reel
IK642BD		SO8	Tube

FUNCTIONAL DESCRIPTION

As a convenience feature of the windshield wiper, intermittent and wipe/wash operation functions are implemented in most of the automobiles. The IK642B 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 IK642B.

BLOCK DIAGRAM

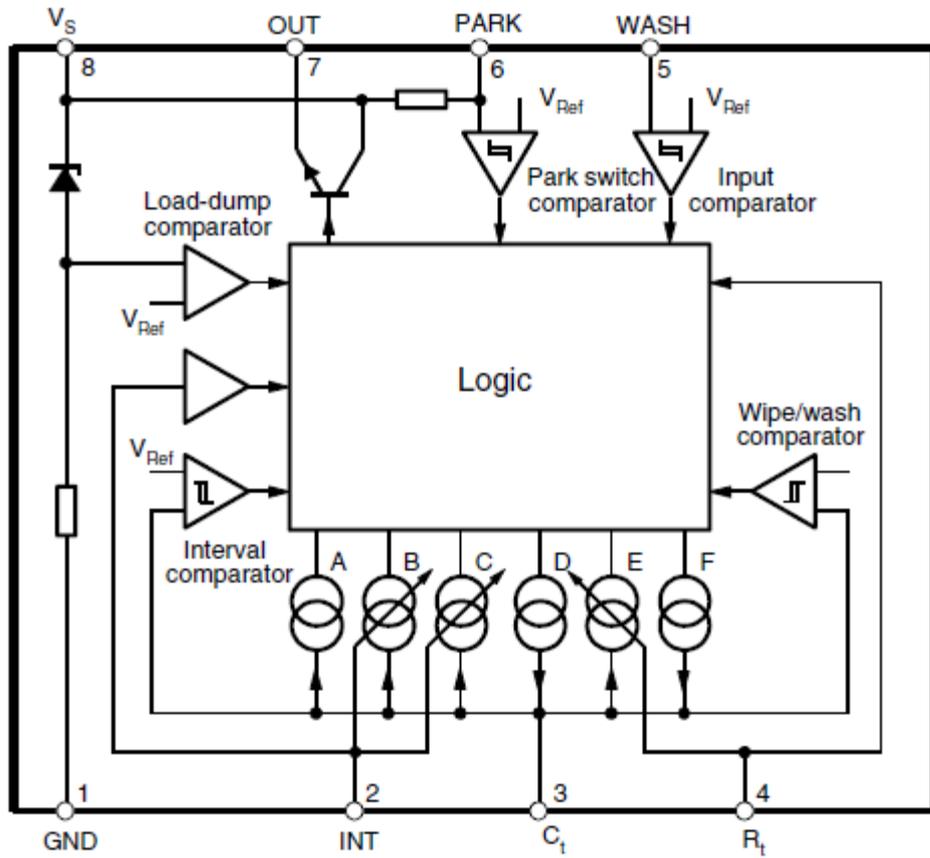


Figure 1

PIN CONFIGURATION

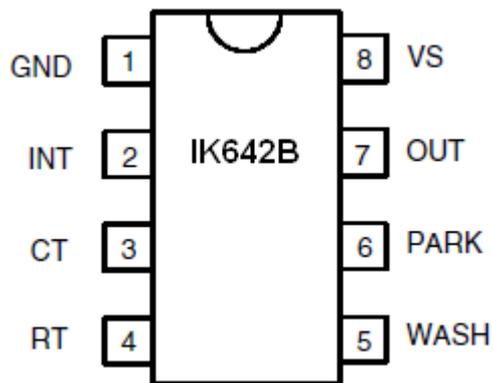


Figure 2

PIN DESCRIPTION

Pin No.	Symbol	Description
1	GND	Ground
2	INT	Interval switch
3	CT	Timing capacitor C2
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

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 a charged state is switched-off. As soon as there is a positive potential at the park switch (S_1), the current source F (see Figure 1 on page 1) 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 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 of switch S_2 causes the 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 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 sources D and F. If (after a time interval of approximately 100 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-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 2.2 V. 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 .

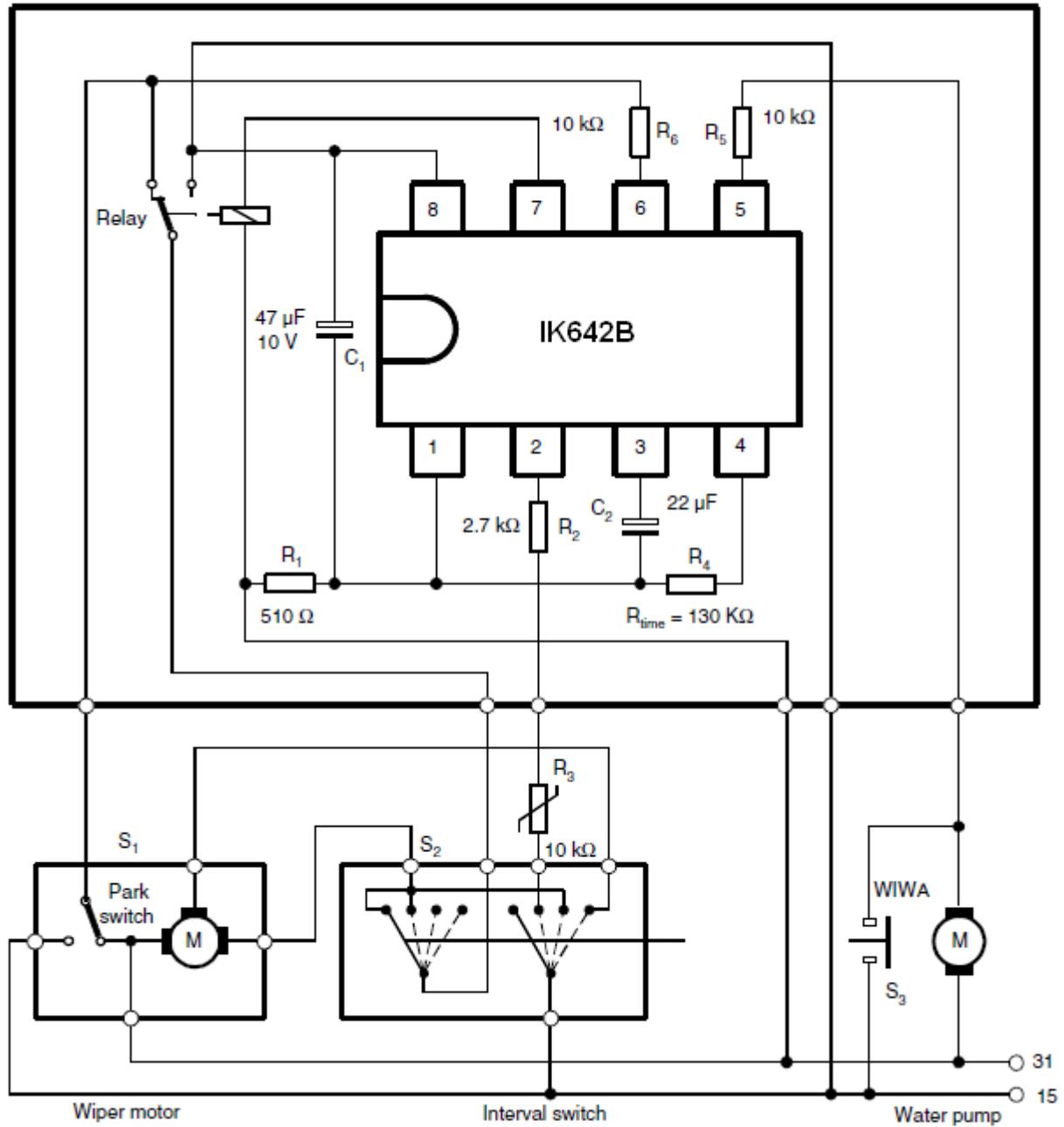
Interval and WIWA Functions

The interval function is interrupted immediately when the wipe/wash mode 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 the interval switch S_2 is activated. The interval function begins after the WIWA function has elapsed.

Figure 3. Application Circuit with Interval and Wipe/Wash Operation



ABSOLUTE MAXIMUM RATINGS

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

THERMAL RESISTANCE

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

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 are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS
 $V_{Batt} = 12V$, $T_{amb} = 25^{\circ}C$, reference point is pin 8 (see Figure 3 on page 4) unless otherwise specified.

Parameter	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			I_1		-50		mA
Threshold voltage			V_{Batt}		35		V
Relay Control Output		7					
Saturation voltage	$I_7 = 100\text{ mA}$ $I_7 = 200\text{ mA}$		V_7			-1.0 -1.5	V
Leakage current			I_7		100		uA
Park Switch		6					
Internal pull-up resistance	$R_6 = 10\text{ k}\Omega$		R_6		50		k Ω
Switching threshold voltage			V_6		-3.3		V
Protection diode	$I_6 = -10\text{ mA}$ $I_6 = 10\text{ mA}$		V_6 V_6		-0.8 7.6		V
Input Ct		3					
Internal resistance			R_3		100		Ω
Interval Input		$R_2 = 2.7\text{ to }30\text{ k}\Omega$	2				
Protection diode	$I_2 = -10\text{ mA}$ $I_2 = 30\text{ mA}/10\text{ ms}$		V_2		-0.8 7.6		V
WASH Input		$R_5 = 10\text{ k}\Omega$	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
Switching Characteristics		$R_4 = 47\text{ k}\Omega\text{ to }300\text{ k}\Omega$, $I_4 = -150\text{ }\mu\text{A}$					
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
Prewash delay			t_{del}		300		ms
After-wipe-time	$R_4 = 130\text{ k}\Omega$	5	t_5	4.75	5.25	5.75	s

DIAGRAMS

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

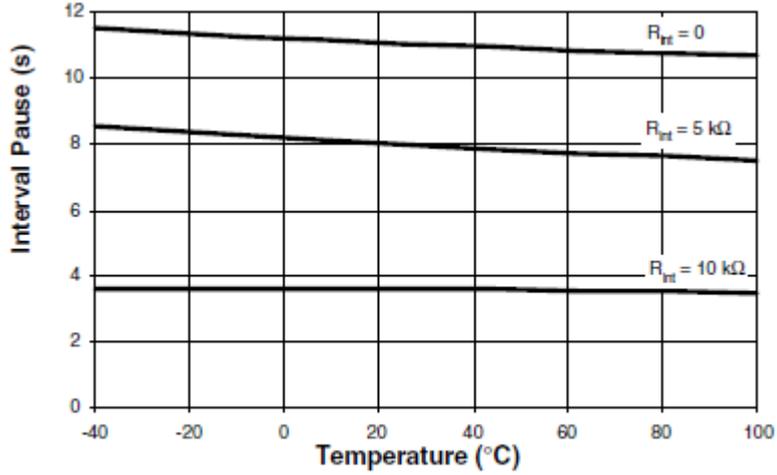


Figure 5. After-wiping Time = f (T); $C_t = 22 \mu\text{F}$; $V_{Batt} = 8 \text{ V}$

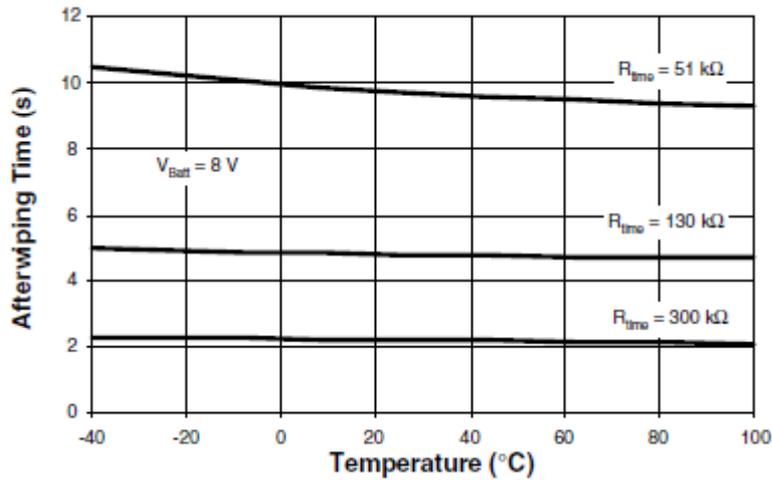


Figure 6. Interval Pause = f (RINT); $C_t = 22 \mu\text{F}$

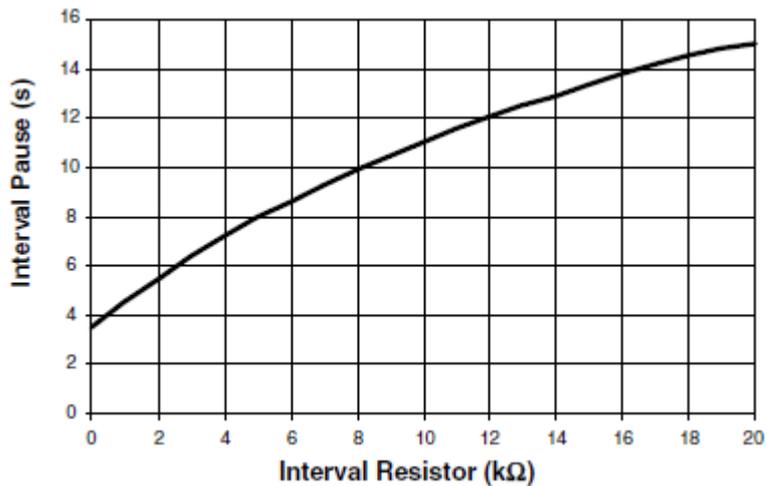
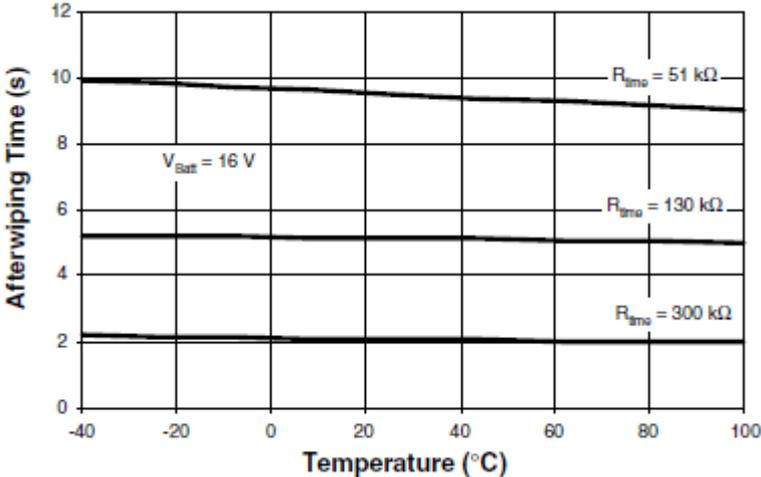
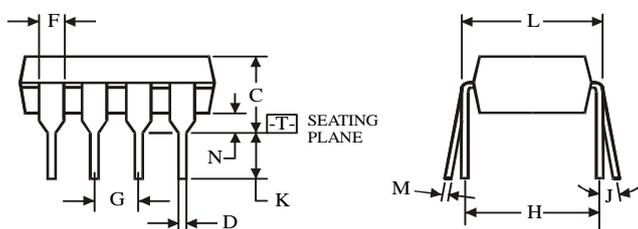
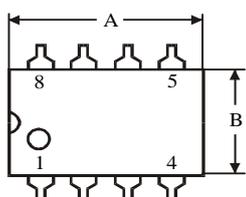
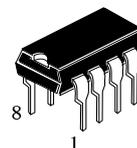


Figure 7. After-wiping Time = f (T); $C_t = 22 \mu\text{F}$; $V_{\text{Batt}} = 16 \text{ V}$



PACKAGE DIMENSION

N SUFFIX PLASTIC DIP
(MS - 001BA)



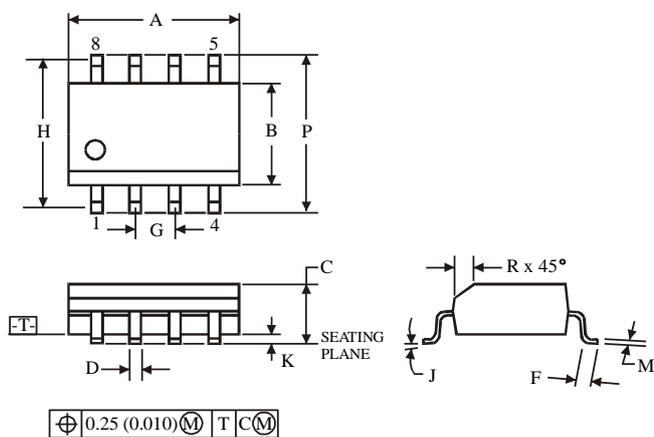
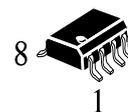
$\oplus 0.25 (0.010) \text{M} \text{T}$

Symbol	Dimension, mm	
	MIN	MAX
A	8.51	10.16
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

**D SUFFIX SOIC
(MS - 012AA)**



$\oplus 0.25 (0.010) \text{ (M) } T C \text{ (M)}$

Symbol	Dimension, mm	
	MIN	MAX
A	4.8	5
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.