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U642B

Interval and Wipe/ Wash Wiper Control IC

Description

As a convenience feature of the windshield wiper intermittent and wipe/wash operation are implemented in most of the automobiles. The U642B 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 U642B.

Features

- Interval pause: 4 to 20 s
- Afterwiping 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

Ordering Information

Package	Remarks
SOP8	Tubed, Reeled, Pb-free
DIP8	Tubed, Pb-free

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

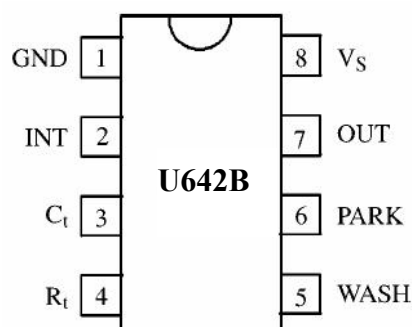


Figure 1. Pinning

Thermal Resistance

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



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Block Diagram

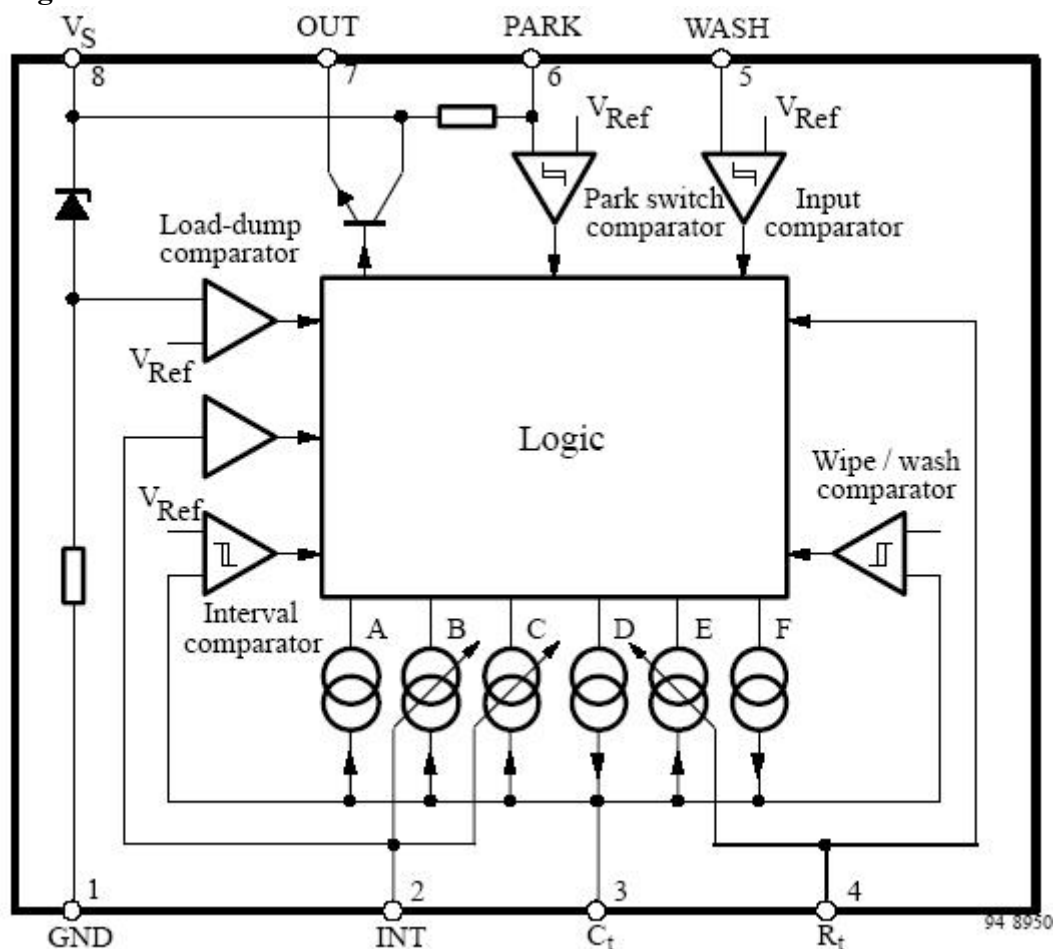


Figure 2. Block diagram

Circuit Description

Interval Function, Pin 2

By closing the interval switch, S₂, to supply voltage, V_{Batt}, the relay is activated. The internal current source (Pin 3) which holds the capacitor C₂ in charged state is switched-off. As soon as there is a positive potential at the park switch (S₁), the current source F (see figure 2) charges the capacitor C₂ very fast. After the wiper operation is finished, S₁ is again at ground potential, the relay is in "off" position-interval pause begins – the capacitor C₂ 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 R₃. Now the relay switches on and the next interval cycle begins. Opening of switch S₂ causes the current source A to discharge C₂ immediately and current sources C and F are switched-off.



Wipe/Wash (WIWA) Operation, Pin 5

By closing the WIWA-switch, S₃, to supply voltage, V_{Batt}, the water pump starts spraying water on the windscreen, the current source A is switched-off which keeps the capacitor C₂ in discharged state. Now the capacitor is charged through the current sources D and F, and when after a time interval of proximately 600 ms, the voltage at the capacitor is greater than 6.5V, 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 RTime. Afterwards the source A discharges the capacitor. The relay switch off is independent of the park switch S₁.

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 interval switch S₂ is activated. Interval function begins after the WIWA function is over

Absolute Maximum Ratings

Parameters			Symbol	Value	Unit
Supply voltage	t = 60s	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)		Pin 7	I ₇	200	mA
	t = 200 ms		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


Electrical Characteristics

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

Parameters	Test Conditions/Pins	Symbol	Min	Typ	Max	Unit
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		uA
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 7.6		V
Input Ct 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 = - 150uA						
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	U642B	tdel		100		ms
After-wipe-time	R ₄ = 130 kΩ Pin 5	t ₅	4.75	5.25	5.75	s

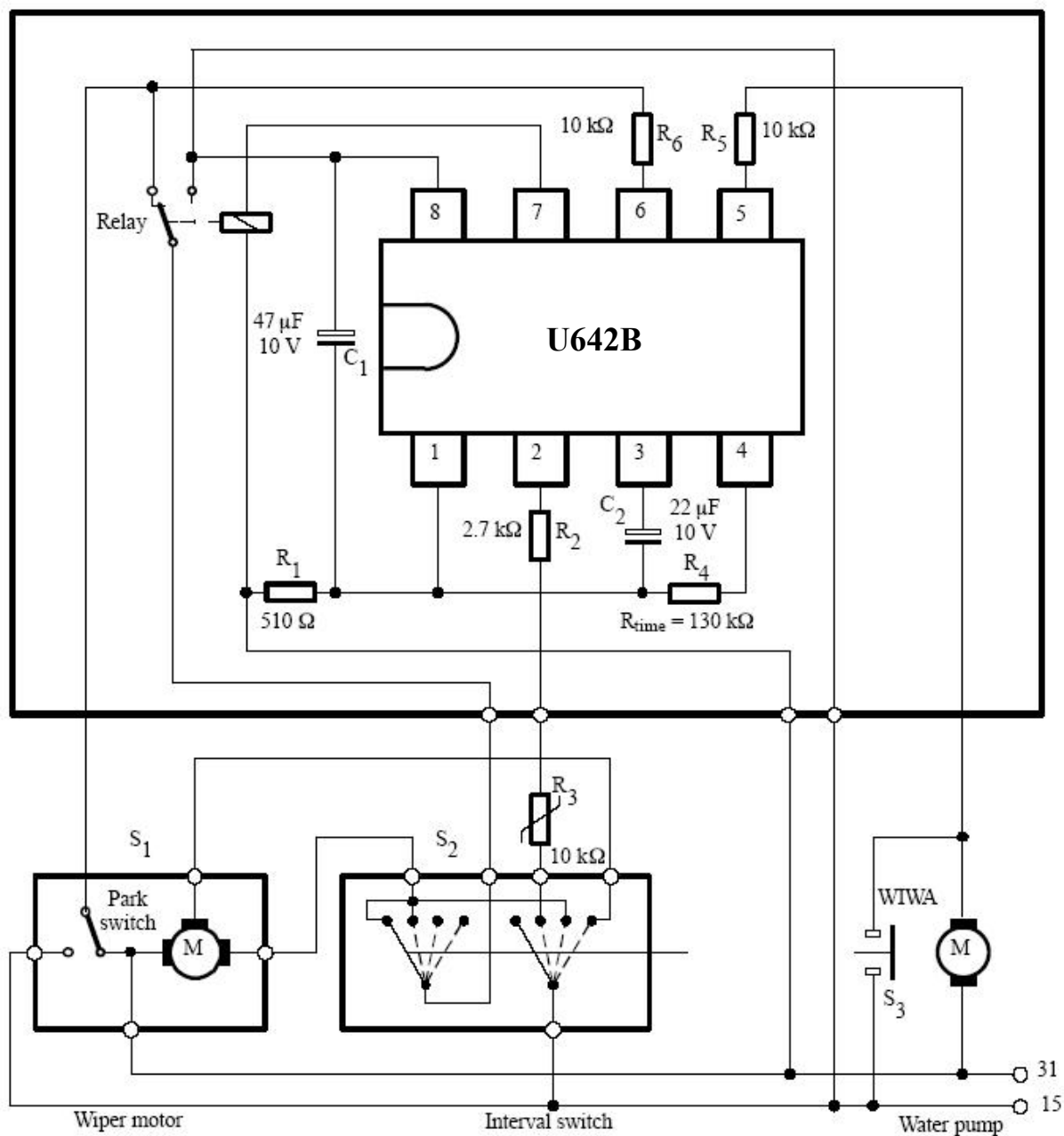
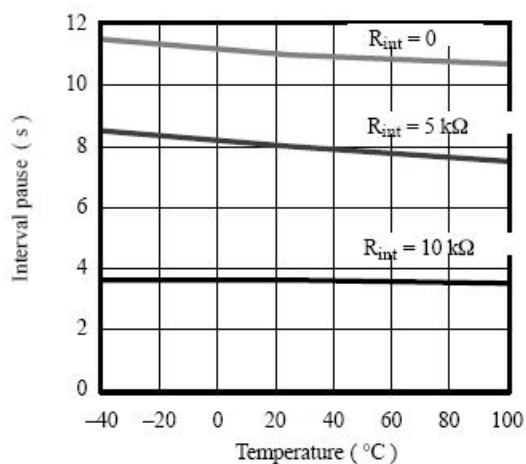
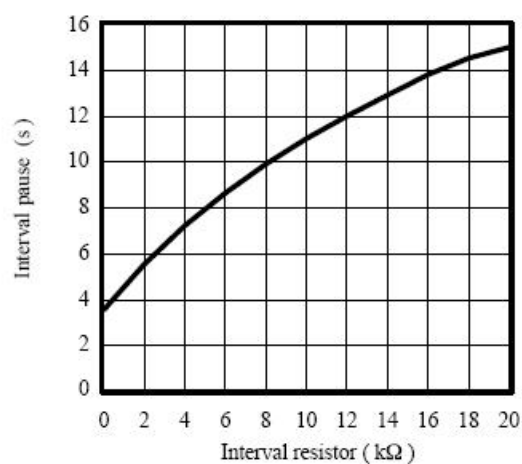
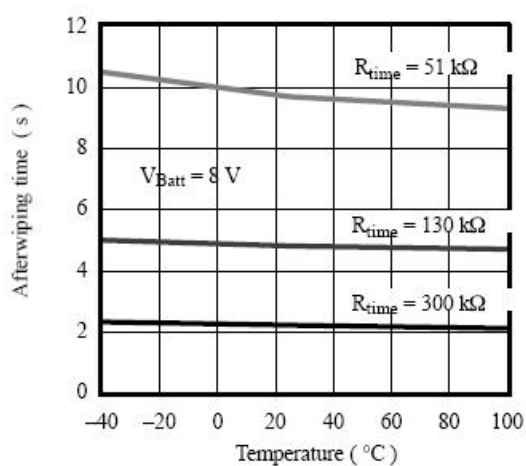
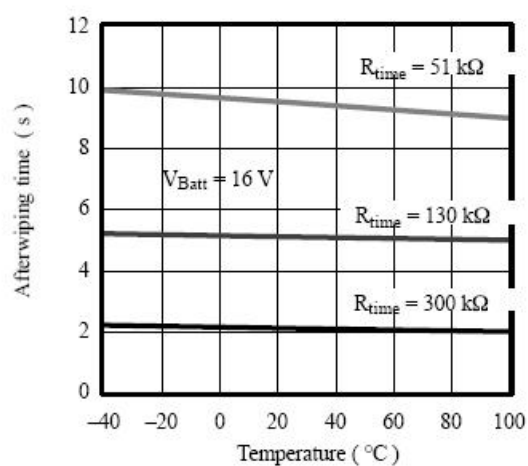


Figure 3. Application circuit with interval and wipe/wash operation

Note: 24V Application Circuits See Appendix (Page 8)

Figure 4. Interval pause = $f(T)$; $C_t = 22 \mu\text{F}$ Figure 6. Interval pause = $f(R_{INT})$; $C_t = 22 \mu\text{F}$ Figure 5. Afterwiping time = $f(T)$; $C_t = 22 \mu\text{F}$ Figure 7. Afterwiping time = $f(T)$; $C_t = 22 \mu\text{F}$



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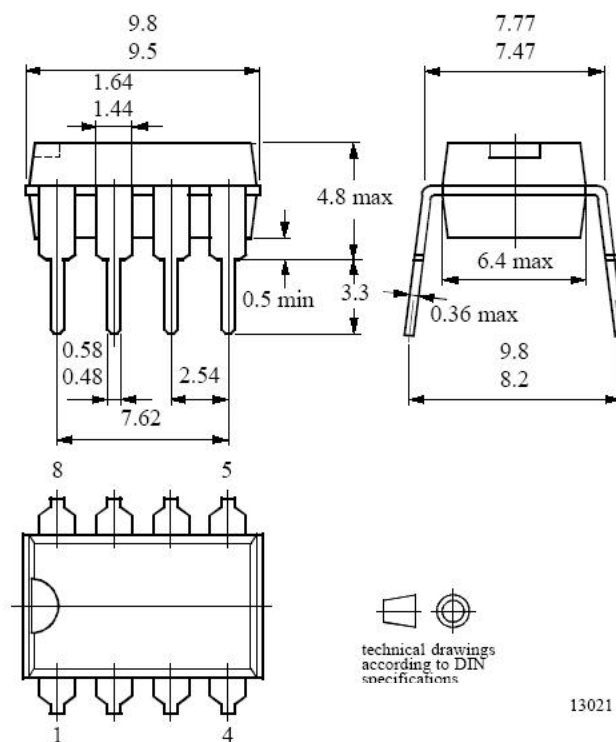
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Package Information

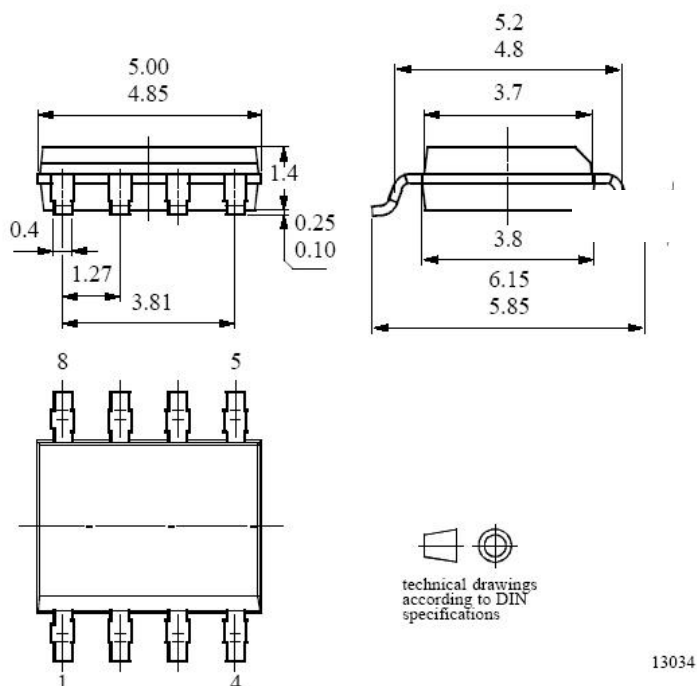
DIP8

Dimensions in mm



SOP8

Dimensions in mm





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Appendix

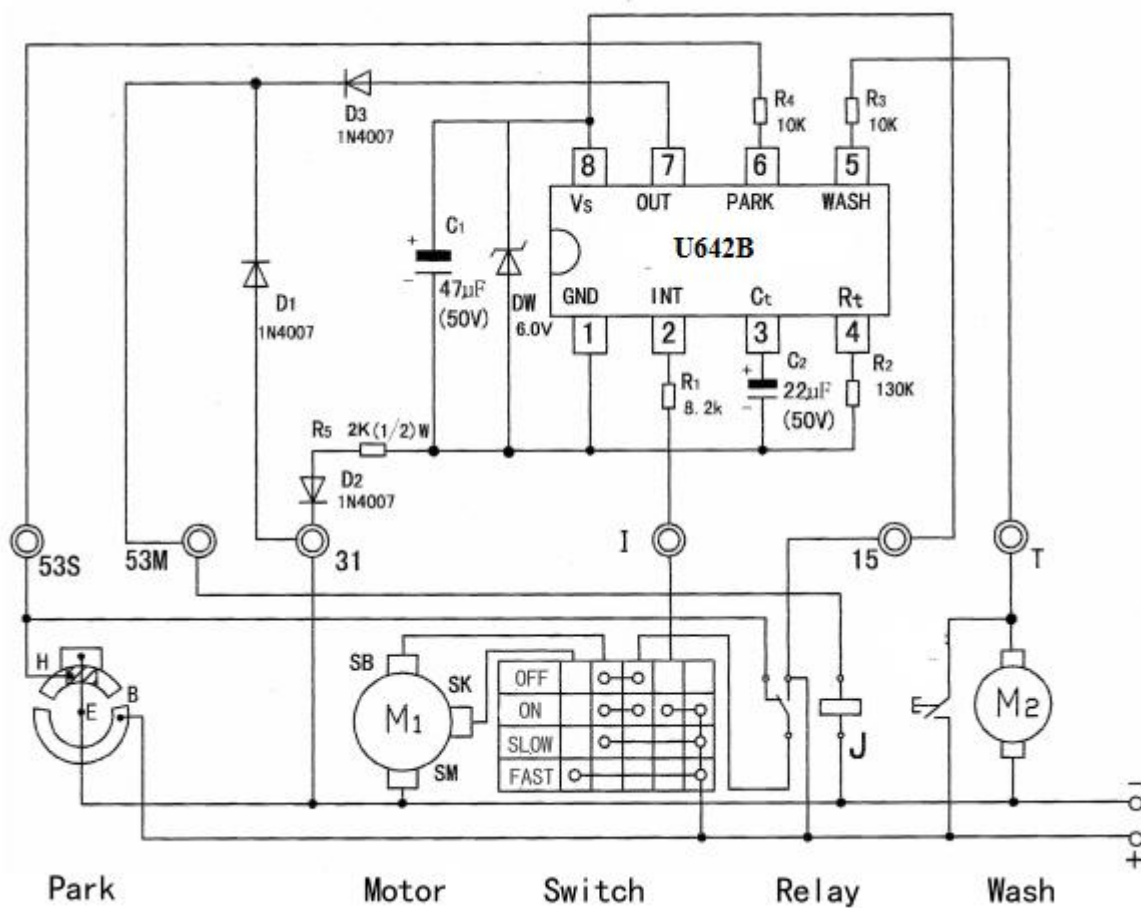


Figure 8. 24V application circuit diagram