U6432B-FP

Hazard Warning and Car Direction Indicator

Description

Based on TEMIC's expertise in automotive flashers in bipolar technology, the U6432B is an improvement of the well known U6043B.

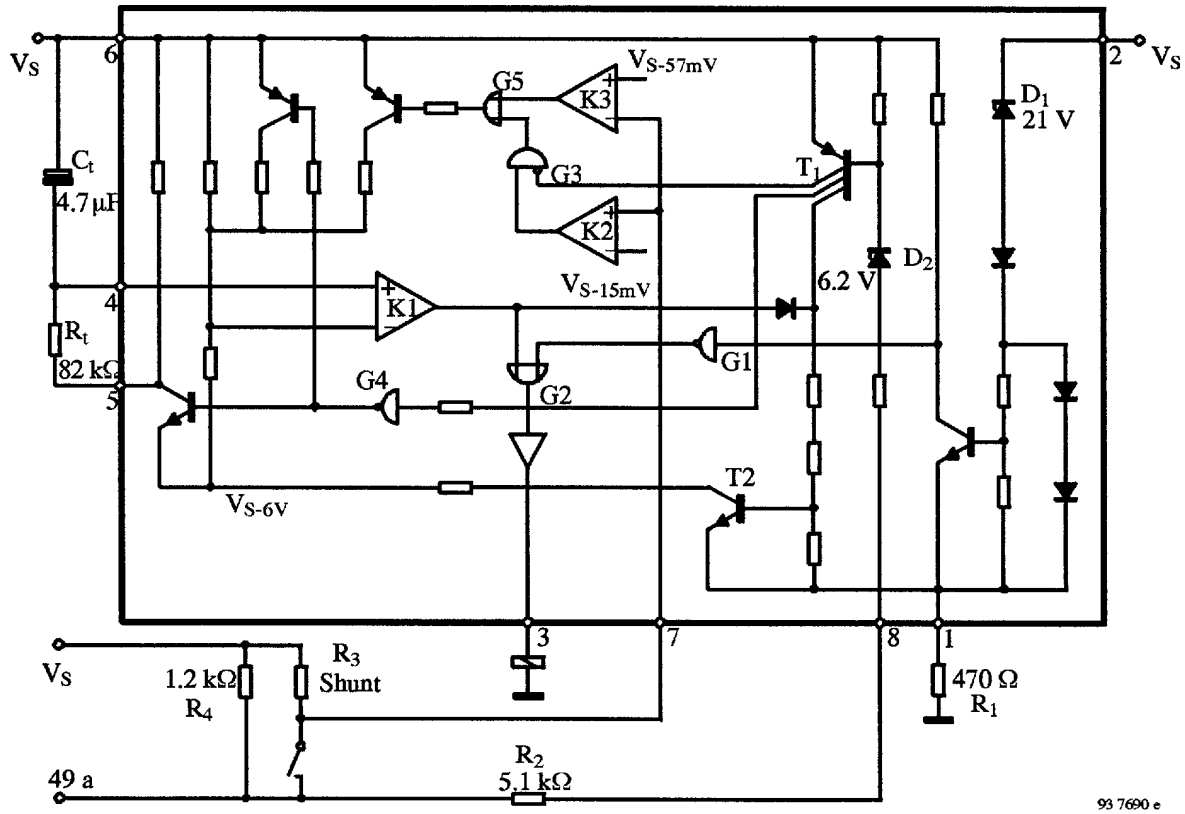
Features

- Temperature and voltage compensated frequency
- Warning indication of lamp failure by means of frequency doubling only in direction mode
- Voltage dependence of the car indicator lamps also compensated for lamp failure
- Relay output with high current carrying capacity and low saturation voltage
- Load-dump protection
- Lamp load ≧ 1 W
- RF protected
- Extremely low stand by current of 10 µA

Benefits

- Damage and interference protection with a minimum of external components
- Low stand-by current allows battery operation

Block Diagram



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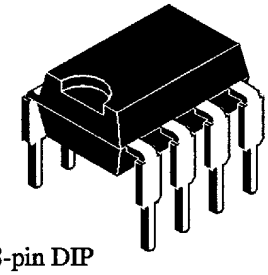
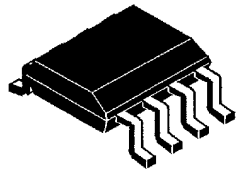
Package Options

8-pin dual inline plastic



8-pin DIP

8-pin SO plastic



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Circuit Description

The application circuit shows the operation of this IC as a car direction indicator signal generator. The flashing frequency is determined by the components R_t and C_t, and the frequency can be calculated from

$$f_1 \sim \frac{1}{R_t \cdot C_t \cdot 1.5} \text{ (Hz)}$$

where f_1 is the frequency in normal flashing operation (basic frequency). The control frequency, f_2, is typically 2.2 times the value of f_1 and is the frequency in the case of lamp failure. The bright periods for f_1 and f_2 are internally set in the IC and are 50% for f_1 and 40% for f_2.

The resistors R_1 and R_2 are needed to protect the circuit against possible damage. An integrated protection circuit, together with these external resistors, limits the impulse current in the integrated circuit.

Protection in the case of battery reversal: The resistors R_1, R_2 and the relay coil limit the currents and the integrated circuit would not be damaged. To achieve a protection for continuous battery reversal, resistor R_1 should be capable of 30 mA (0.5 W type).

A short circuit between indicator lamp (49a) and ground (31) can give rise to a voltage drop of about 4 V across the measuring resistance R_3. In this case, the integrated circuit would not be damaged.

The use of the application circuit (see figure 1) ensures damage and interference protection consistent with VDE 0839 and load dump.

Control signal threshold 1 (49 mV comparator)

The detection point for lamp failure can be calculated from the control signal threshold, typically 49 mV with V_S = 12 V. With a measuring resistance of R_3 = 18 mΩ, the frequency changeover is reached at a lamp load of 21 W +11.4 W. The variation of the control signal threshold supply voltage takes into account the PTC characteristic of filament lamps.

Control signal threshold 2 (15 mV comparator)

A voltage drop at the shunt resistor R_3 between 49 mV and 15 mV let the flasher work in frequency doubling mode.

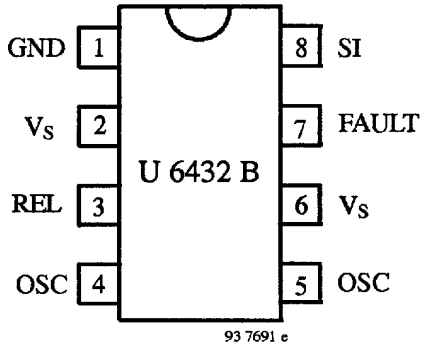
If the voltage drop falls of V_{R3MAX} =15 mV the frequency doubling is disabled.

This can be achieved either with a switch which by-passes the shunt resistor (e.g. a special hazard warning switch) or with a small lamp load.

The arrangement of the supply connections to Pin 2 and 6 must ensure that, on the connection PCB, the layer resistance from V_S to Pin 6 is lower than the one to Pin 2.

Flasher operation starts with a lamp load of $P_L \geqq 1$ W.

Pin Out



Pin Description

Pin	Symbol	Function
1	GND	IC ground
2	V_S	Supply voltage
3	REL	Relay driver
4	OSC	Oscillator
5	OSC	Oscillator
6	V_S	Supply voltage
7	FAULT	Lamp failure detection
8	SI	Start input (49a)

Absolute Maximum Ratings

Reference point pin 1

Parameters		Symbol	Value	Unit
Supply voltage	Pin 2, 6	V_S	18	V
Surge forward current				
t_p = 0.1 ms	Pin 2, 6		1.5	A
t_p = 300 ms	Pin 2, 6	I_{FSM}	1.0	A
t_p = 300 ms	Pin 8		30.0	mA
Output current	Pin 3	I_O	0.3	A
Power dissipation				
T_{amb} = 95°C	DIP 8		420	
	SO 8	P_{tot}	340	mW
T_{amb} = 60°C	DIP 8		690	
	SO 8		560	
Junction temperature		T_j	150	°C
Ambient temperature range		T_{amb}	−40 to +105	°C
Storage temperature range		T_{stg}	−55 to +125	°C

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Electrical Characteristics

T_{amb} = 25°C; typical values under normal operation in application circuit figure 1, V_S = 12 V (Pin 2, 6); reference point ground (–31), unless otherwise specified.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage range	Pin 2, 6	V_S	9		16.5	V
Supply current, dark phase	Pin 2, 6	I_S		4.5	8	mA
Supply current, stand-by	Pin 2, 6	I_S			10	µA
Supply current, bright phase	Pin 2, 6	I_S		7.0	11	mA
Relay output, saturation voltage	I_O = 150 mA, V_S = 9 V Pin 3	V_O			1.0	V
Relay output reverse current	Pin 3	I_O			0.1	mA
Relay coil resistance		R_L	60			Ω
Start delay	first bright phase	t_{on}			10	ms
Frequency determining resistor		R_t	6.8		510	kΩ
Frequency determining capacitor		C_t			47	µF
Frequency tolerance	normal flashing, basic frequency f_1 not including the tolerances of the external components R_t and C_t	Δf_1	–5		+5	%
Bright period	basic frequency f_1, V_S = 9-15 V	Δf_1	47		53	%
Bright period	basic frequency f_1, V_S = 9-15 V	Δf_1	47		53	%
Bright period	control frequency f_2, V_S = 9-15 V	Δf_2	37		45	%
Frequency increase	lamp failure, V_S = 9-15 V	f_2	2.15 f_1		2.3	f_1
Control signal threshold 1	V_S = 15 V V_S = 9 V V_S = 12 V Pin 7	V_{R3}	50 43 47	53 45 49	57 47 51	mV
Control signal threshold 2		V_{R3}			15	mV
Resistance between 49a to ground for standby		R_p			5	kΩ
Lamp load		P_L	1			W

Dimensions in mm