TEMIC

TELEFUNKEN Semiconductors

U426B

Infrared Driver

Description

The U426B is an IR-driver-IC for IR data communication. The circuit contains a programmable constant current source (DRV) to drive the IRED. The current is programmed by an external resistor (RS). With the internal comparator (COMP) an external voltage can be monitored. The low power standby mode, controlled by means of the WAKE input, makes the circuit well suited for battery powered systems.

Features

- Programmable constant current 200 mA to 1.2 A
- Signal frequency up to 500 kHz
- Low power standby mode
- Internal voltage comparator
- Wide voltage range 2.4 to 12 V

Applications

- Keyless entry systems
- Remote control
- Wireless data communication

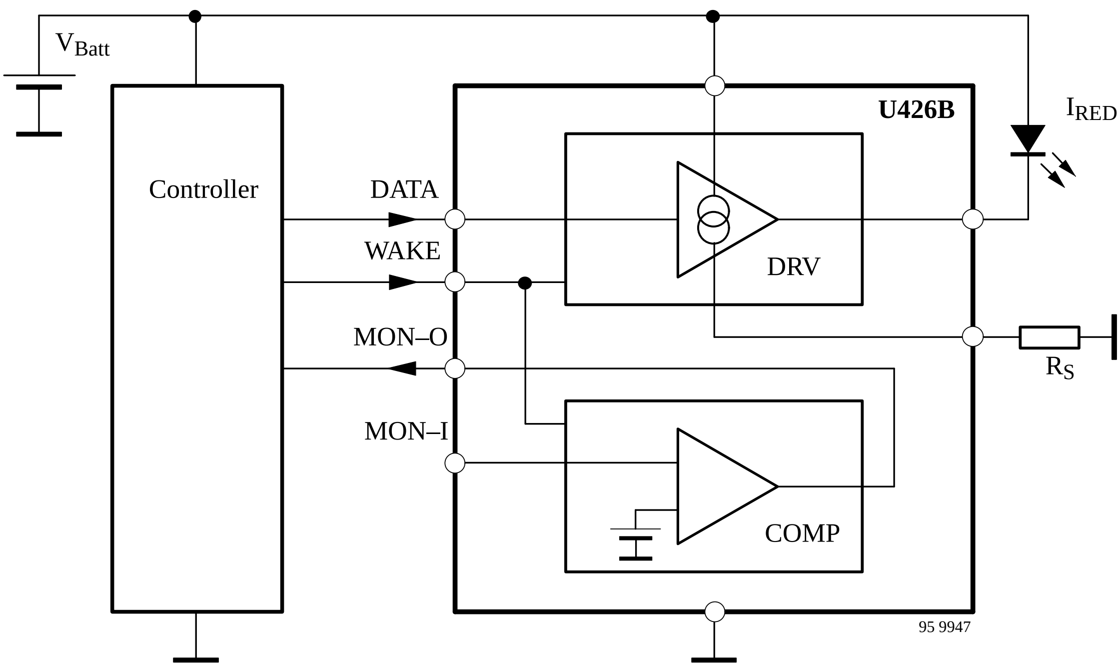
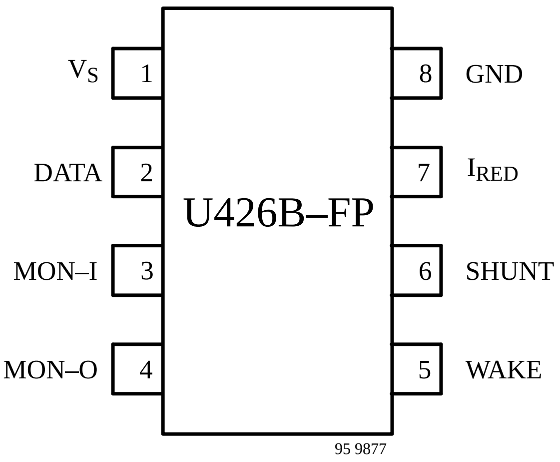


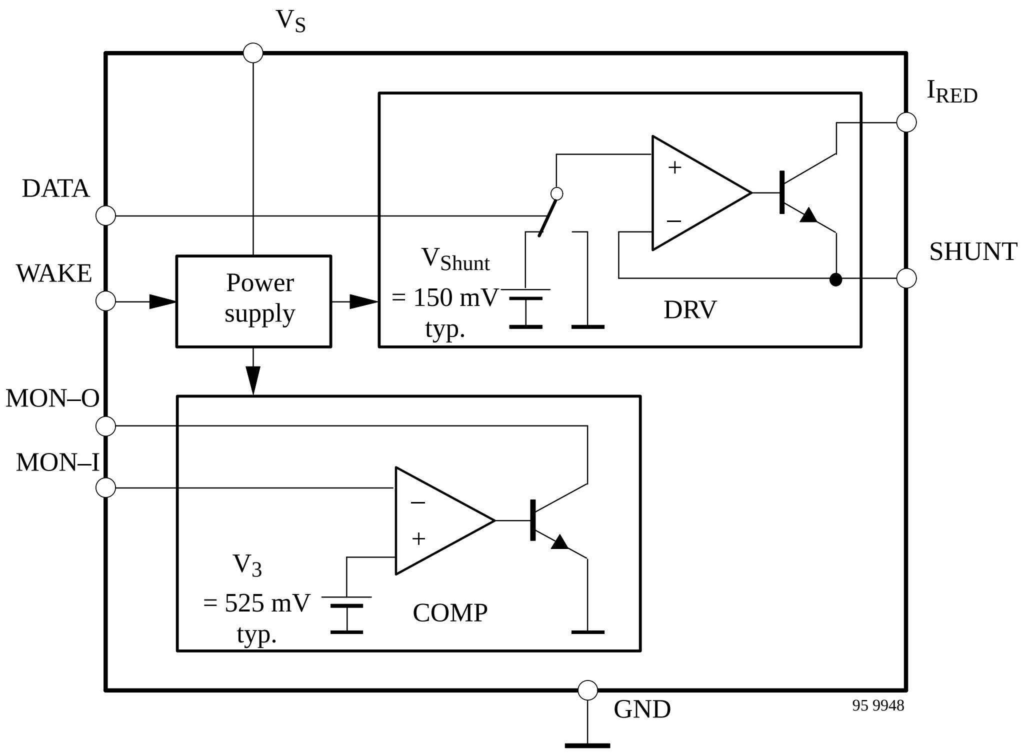
Figure 1.

Pin Description



Pin	Symbol	Function
1	V_S	Supply voltage
8	GND	Circuit ground
2	DATA	Data input for switching the IRED output current on and off
7	IRED	IR-LED output, when the data input is high this output supplies the IR-LED with the constant current
6	SHUNT	The resistor at this pin adjusts the IRED output current
3	MON-I	Voltage monitor input of the internal comparator
4	MON-O	Voltage monitor output. This open collector output is active when the voltage at MON-I is below the internal reference V_3 = 525 mV typ.
5	WAKE	WAKE input. When LOW the circuit is in standby mode. A high level activates the circuit

Block Diagram



COMP Monitoring comparator
DRV IRED constant current driver

Figure 2.

Constant Current Driver (DRV)

The constant current driver converts the incoming data pulses into adequate constant current pulses. A high level applied to the data-input causes a constant current flow through the IR-diode connected to the IRED output. This current can be programmed via the external resistor (RS). To calculate the output current, use the following formula:

$$I_{RED} = 150 \frac{mV}{R_S}$$

Power Supply

The power supply circuit generates the internal supply voltage from an external voltage (V_S = 2.4 to 12 V).The V_S-pin is protected by an internal suppressor diode against voltages above 13 V. The internal supply voltage can be switched on/off with a high/low-level at the WAKE input. Setting WAKE to low level switches the circuit from busy to standby mode, which results in a very low, current consumption (2 µA). Every change between busy and standby mode needs a latency up to 1 ms. Data transmission and voltage monitoring only takes place while WAKE remains high.

Monitoring Comparator (COMP)

The monitoring comparator compares the voltage at pin MON-I to an internal reference voltage of V_3 = 525 mV typ. The open collector output transistor is active, if the voltage at pin MON-I falls below the internal threshold voltage. The comparator can be used to monitor the power supply battery.

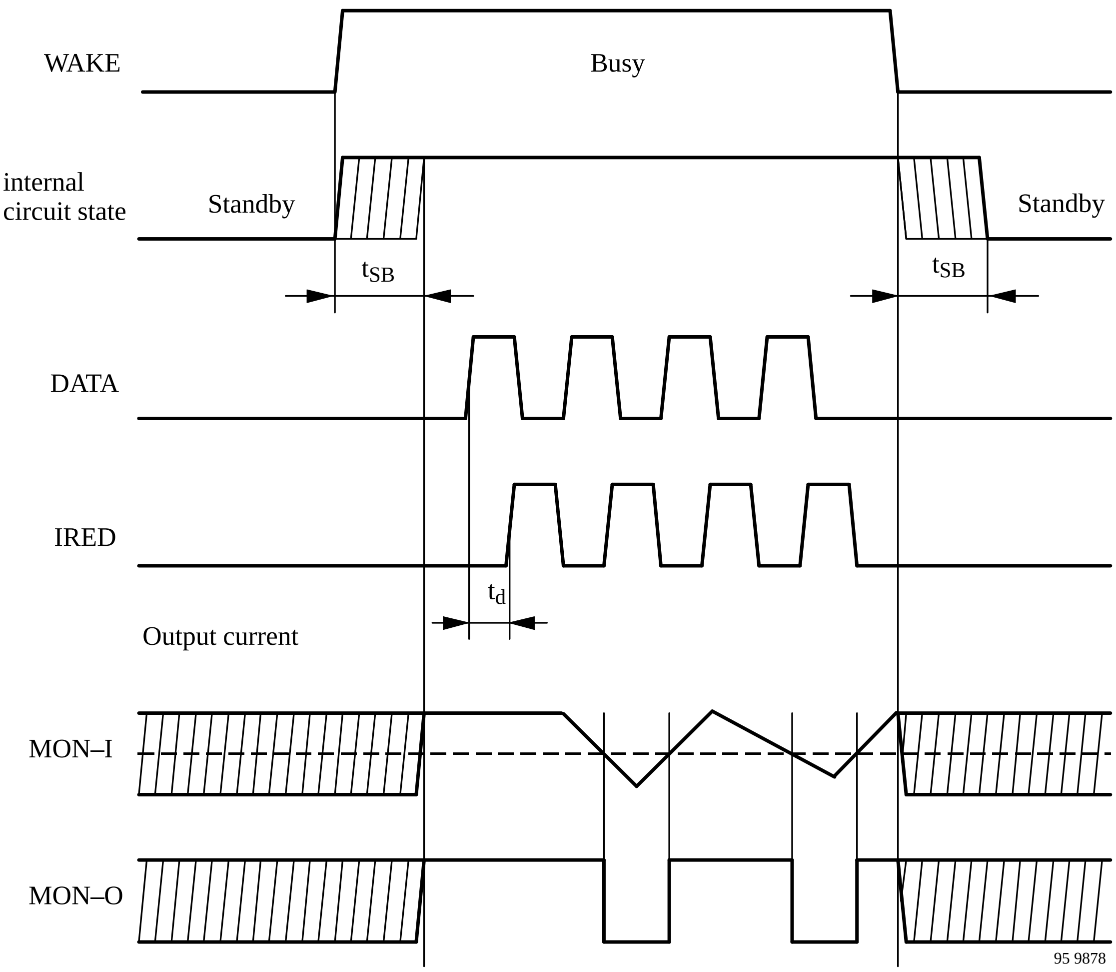


Figure 3. Timing diagram

Absolute Maximum Ratings

Parameters		Symbol	Value	Unit
Supply voltage	Pin 1	V_S	13.4	V
Supply current t < 10 µs		I_S i_s	40 150	mA mA
Input voltages	Pin 2, 3 and 5 Pin 6	V_I	V_S 1	V V
Input currents	Pins 2, 3 and 5	I_I	1	mA
Output voltage	Pin 7 Pin 4	V_7 V_4	13.4 V_S	V V
Output current t < 100 µs	Pin 7 Pin 4	I_7 I_4	1.5 5	A mA
Power dissipation T_{amb} = 85°C SO 8 : on p.c. board on ceramic on ceramic with silicon grease		P_{tot} P_{tot} P_{tot}	150 250 430	mW mW mW
Junction temperature		T_j	125	°C
Ambient temperature range		T_{amb}	–40 to 85	°C
Storage temperature range		T_{stg}	–40 to 150	°C

Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient SO 8: on p.c. board on ceramic on ceramic with silicon grease	R_{thJA} R_{thJA} R_{thJA}	220 140 80	K/W K/W K/W

Electrical Characteristics

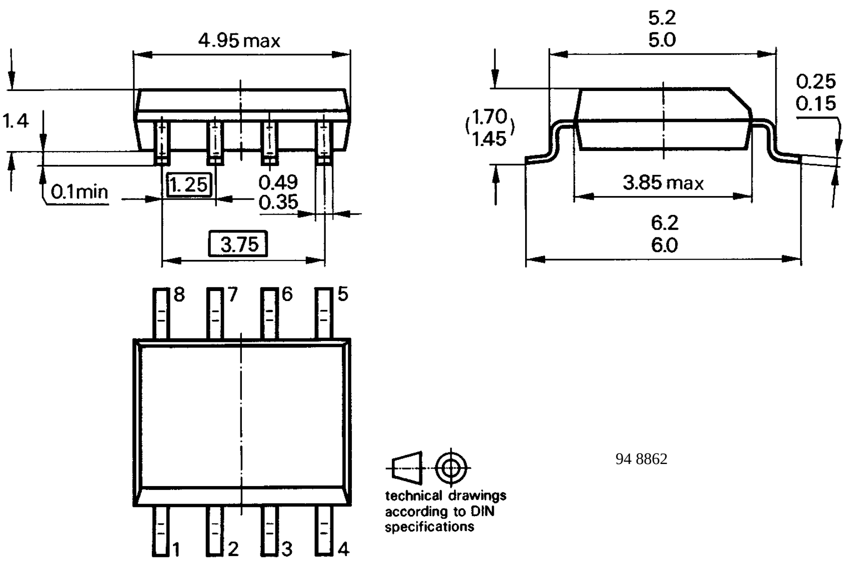
V_S = 6 V, T_{amb} = 25°C, reference point pin 8, unless otherwise specified

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply current	**Pin 1**					
Supply voltage	Pin 1	V_S	2.4		12	V
Standby current		I_I			2	µA
Wake-up current	Without pulse	I_I			1.5	mA
Overvoltage protection	I_1 = 20 mA	V_S		13		V
DATA	**Pin 2**					
Input signal	High Low	V_2 V_2	3 1.6	3.6 2.1	4.2 2.6	V V
Common mode input			0		V_S	V
Rise time		t_r			500	ns
Fall time		t_f			500	ns
Signal frequency		f			500	kHz
Input current		I_2			100	µA

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
MON-I	**Pin 3**					
Input current	V_3 = 6 V	I_3			0.3	µA
Reverse current	V_3 = 0 V	I_r			0.8	µA
Input voltage high Input voltage low	MON-I on MON-O off	V_3 V_3	485 515	525 545	555 580	mV mV
Hysteresis				4		%
Temperature coefficient		TC		100		µA/K
MON-O	**Pin 4**					
Output current	$V_4 \geq$ 200 mV	I_4	1			mA
Output current	$V_4 \geq$ 400 mV	I_4	3			mA
Reverse current	$V_4 \leq$ 6 V	I_r			0.2	µA
Output voltage High					V_S	V
Saturation voltage	I_4 = 1 mA	V_{sat}			200	mV
WAKE	**Pin 5**					
Input current	V_5 = 6 V V_5 = 0 V	I_5 I_5			80 ±0.2	µA µA
Input voltage High Input voltage LOW	Busy Standby	V_5 V_5	 0		V_S 0.2	V V
SHUNT	**Pin 6**					
Output current IRED	V_S = 2.4 V; R_S = 0.62 Ω V_S = 6.0 V; R_S = 0.62 Ω V_S = 12 V; R_S = 0.62 Ω V_S = 6 V; R_S = 0.11 Ω V_S = 12 V; R_S = 0.11 Ω	I_7 I_7 I_7 I_7 I_7	205 220 235 1.25 1.3		245 265 275 1.5 1.55	mA mA mA A A
Shunt voltage	$V_2 = V_S$ = 6 V; R_S = 0.11 Ω	V_{Shunt}	140	150	160	mV
Temperature coefficient	T_{amb} = –40 to 85°C	T_C		40		µV/K
IRED	**Pin 7**					
Output voltage	$V_2 = V_S$ = 6 V; I_7 = 1 A	V_{out}			1000	mV
Output voltage	V_2 =0 V; I_7 = 0	V_{out}		12	13.2	V
Reverse current	V_2 =0 V; V_7 = 6 V	I_r			1	µA
Rise/Fall time		t_r			300	ns
Delay time	Pin 2 to pin 7	t_d			1	µs
Standby/Busy		t_{SB}			1	ms
Busy/Standby		t_{BS}			1	ms

Dimensions in mm

Package: SO 8



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic 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.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division 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.

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

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