

1. Description

The LPT-Switch is a low power timer switching device ideal for system wake up in duty cycled or battery powered applications. In such systems the LPT-Switch device can be used for system wakeup. Consuming only 490 μ A, the LPT-Switch allows any other device to be placed in battery powered environment. Such power savings enable the use of significantly smaller batteries. The LPT-Switch device provides selectable timing intervals from 50s to 3000s.



2. Features

- Supply Voltage from 8V to 14V
- Current Consumption at 12V 490 μ A (typ. while sleep)
- Switching current up to 4A
- Selectable Time Intervals 50s to 3000s
- Timer Accuracy 1% (typ.)
- Resistor Selectable Time Interval
- Resistor Selectable Sleep Delay Time (RevB++ only)
- Manual Reset

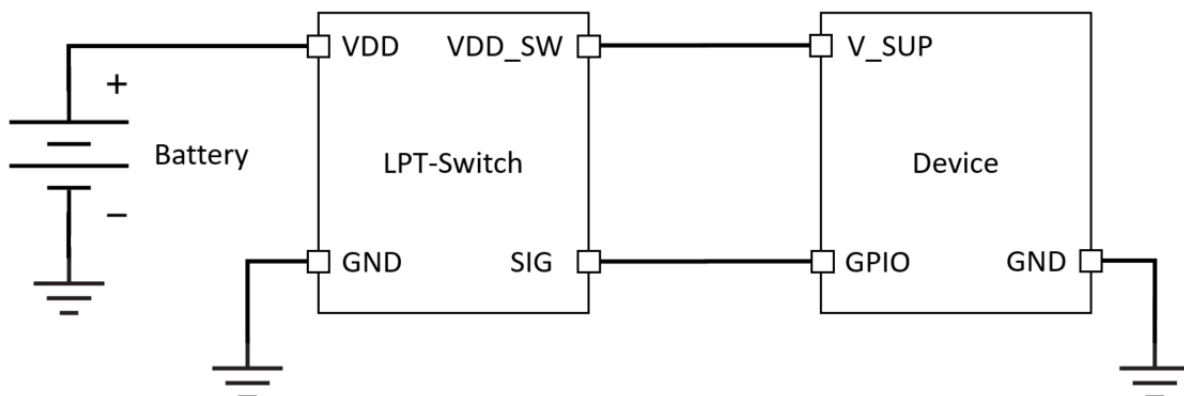
3. Applications

- Battery Powered Systems
- Home Automation
- Consumer Electronics

4. Device Information

PART NUMBER	PACKAGE	BODY SIZE (NOM)
128755	F524-50 IP40	(54 x 55.3 x 24.4)mm

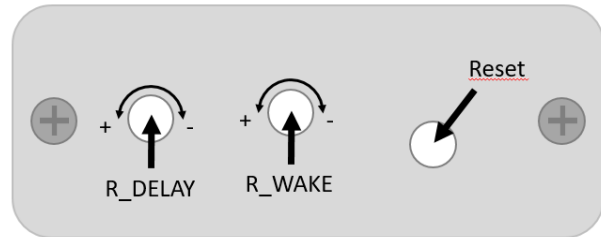
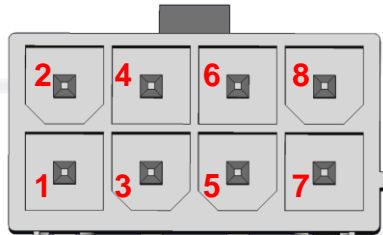
5. Simplified Application Schematic



6. Pin Configuration and Functions



PIN		TYPE	DESCRIPTION
NO.	NAME		
1	VDD	P	Supply voltage
2	VDD_SW	O	Switched power output
3	R_WAKE_REF	M	Cycle time resistor reference measuring point (RevB++)
4	R_DELAY_REF	M	Sleep delay time resistor reference measuring point (RevB++)
5	R_WAKE	M	Cycle time resistor measuring point
6	R_DELAY_REF	M	Sleep delay time resistor measuring point (RevB++)
7	SIG	I	Device alive signalling input
8	GND	G	Ground

G = Ground, P = Power, O = Output, M = Measuring Point.



7. Molex plug specification

The LPT-Switch device is shipped with a plug set, consisting of a Molex plug housing and corresponding socket contacts.

	
Manufacturer: Molex	Manufacturer: Molex
Manufacturer No.: 39-01-2085	Manufacturer No.: 39-00-0038

8. Specifications

8.1. Absolut Maximum Ratings

	Min	Typ	Max	Unit
Supply Voltage (VDD)	6	12	18	V
Switched supply voltage output (VDD_SW)			VDD	V
Switched supply current (IDD_SW)		3	4.5	A
Device alive signalling input voltage	6		VDD	V
Ground		0		V

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

8.2. Recommended Operating Ratings

	Min	Max	Unit
Supply Voltage (VDD – GND)	8	15	V
Switched supply current (IDD_SW – GND)		3.5	A
Temperature Range	-40	85	°C

8.3. Electrical Characteristics ⁽¹⁾

Specifications are for TA= 25°C, VDD-GND=12 V, unless otherwise stated.

	Parameter	Test conditions	Min ⁽²⁾	Typ ⁽³⁾	Max ⁽²⁾	Unit
Power Supply						
IDD	Supply current ⁽⁴⁾	Sleep (IDD_SLP)		490		µA
		Alive, SIG = low (IDD_AS_L), de- vice current =0mA		1,86		mA
		Alive, SIG = low (IDD_AS_H), de- vice current = 0mA		2.82		mA
Timer						
tSIP	Time Schedule Interval Period	Min time interval		50		s
		Max time interval		3000		s
	Timer Interval Setting Accuracy over supply voltage	8V ≤ VDD ≤ 15V		±25		ppm/V
tSDP	Timer Sleep Delay Period	Min time interval		200		ms
		Max time interval		4000		ms
	Timer Interval Setting Accuracy over supply voltage	8V ≤ VDD ≤ 15V		±25		ppm/V

(1) Electrical Characteristics Table values apply only for factory testing conditions at the temperature indicated. Factory testing conditions result in very limited self-heating of the device such that TJ = TA. No specification of parametric performance is indicated in the electrical tables under conditions of internal self-heating where TJ > TA. Absolute Maximum Ratings indicate junction temperature limits beyond which the device may be permanently degraded, either mechanically or electrically.

(2) Limits are specified by testing, design, or statistical analysis at 25°C. Limits over the operating temperature range are specified through correlations using statistical quality control (SQC) method.

(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration. The typical values are not tested and are not specified on shipped production material.

(4) The supply current excludes load and pull-up resistor current. Input pins are at GND or VDD.

8.4. Timing Requirements

	Parameter	Test conditions	Min ⁽¹⁾	Typ ⁽²⁾	Max ⁽¹⁾	Unit
tSIG	SIG pulse width ⁽³⁾		200			ms
tSRT	SIG rise time ⁽³⁾	Capacitive load 50 pF, Rpull-up 100kΩ		10		µs
tSFT	SIG fall time ⁽³⁾	Capacitive load 50 pF		50		µs

(1) Limits are specified by testing, design, or statistical analysis at 25°C.

(2) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration. The typical values are not tested and are not specified on shipped production material.

(3) This parameter is specified by design and/or characterization and is not tested in production.

8.5. Most Common Time Interval Settings for Cyclic Wake Up

In order to set the switching time interval, the resistance R_WAKE needs to be adjusted according to the following formula:

$$R_WAKE = 100 \left(\frac{-b + \sqrt{b^2 - 4a(c - 100T)}}{2a} \right)$$

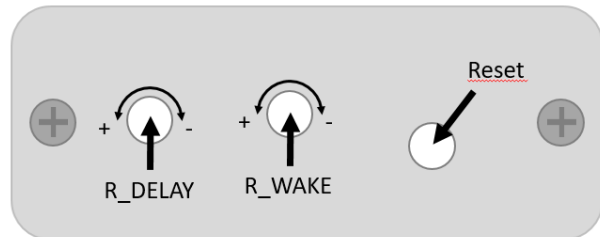
Where:

- T is the desired time interval in seconds.
- R_WAKE is the resistance value to use in Ω.
- a,b,c are coefficients depending on the range of the time interval.

SET	Time interval Range (s)	a	b	c
1	50 < T ≤ 100	0.1972	-19.3450	692.1201
2	100 < T ≤ 1000	0.2617	-56.2407	5957.7934
3	T > 100	0.3177	-136.2571	34522.4680

The following Look-Up-Table contains example values of t_{SIP} and their corresponding value of R_WAKE .

t_{SIP}	Calculated Resistance
50 s	20478 Ohm
1 min	22029 Ohm
2 min	29357 Ohm
3 min	34739 Ohm
4 min	39117 Ohm
5 min	42905 Ohm
6 min	46292 Ohm
7 min	49382 Ohm
8 min	52243 Ohm
9 min	54920 Ohm
10 min	57443 Ohm
15 min	68426 Ohm
20 min	77572 Ohm
30 min	92430 Ohm
40 min	104676 Ohm
50 min	115338 Ohm



The measuring reference point depends on the version of LPT-Switch as follows:

Revision A (Model: P128755-A):
Measuring needs to be done between R_WAKE and GND

Revision B (Model: P128755-B) and newer:
Measuring needs to be done between R_WAKE and R_WAKE_REF

IMPORTANT NOTE: Measuring the resistance value between connection points R_WAKE_REF and R_WAKE SHALL ONLY be performed when LPT_Switch is completely disconnected from power supply!!!

8.6. Most Common Time Settings for Sleep Delay

This feature is only supported by LPT-Switch Revision B (Model: P128755-B) or newer!

In order to set the delay time between SIG becomes low and VDD_SW is switched off, the resistance R_DELAY needs to be adjusted according to the following formula:

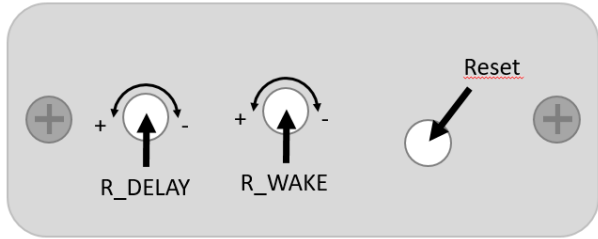
$$R_DELAY = \frac{(\sqrt{T-199})-1}{0.00521} + 3900$$

Where:

- T is the desired time interval in milliseconds.
- R_DELAY is the resistance value to use in Ω .

The following Look-Up-Table contains example values of t_{SDP} and their corresponding value of R_DELAY .

t _{SDP}	Calculated Resistance
200 ms	3900 Ohm
300 ms	5637 Ohm
400 ms	6429 Ohm
500 ms	7038 Ohm
600 ms	7552 Ohm
700 ms	8004 Ohm
800 ms	8413 Ohm
900 ms	8790 Ohm
1 s	9140 Ohm
10 s	22710 Ohm
20 s	30717 Ohm
30 s	36842 Ohm
40 s	42000 Ohm
50 s	46541 Ohm
1 min	50645 Ohm
2 min	70142 Ohm
3 min	85096 Ohm
4 min	97699 Ohm



Sleep Delay is not supported in Revision A (Model: P128755-A) but only Revision B (Model: P128755-B) and newer

IMPORTANT NOTE: Measuring the resistance value between connection points R_DELAY_REF and R_DELAY SHALL ONLY be performed when LPT_Switch is completely disconnected from power supply!!!

GENERAL IMPORTANT NOTICE

CAUTION: For damage of any kind, arising by the employment of the LPT-Switch device, no claims can be made valid opposite the supplier!

9. Contact

In case there are any questions or hints, please feel free to contact us.

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