GLF76121 / GLF76121S / GLF76121L
Nano-Current Power Integrated Switch with Reset Timer

DESCRIPTION

The GLF76121, GLF76121S and GLF76121L are ultra-efficient I_QSmart™ load switches with an integrated reset timer for wearables and IoT devices.

The /SRO pin offers a true reset function enabling the load switch to completely disconnect the load from the input battery after a reasonable long delay time. After the reset period, the main switch of the GLF76121, GLF76121S, and GLF76121L reconnect the output load to the input battery for normal operation. The GLF76121 / GLF76121S offers 6/2.95 s delay time before the 750 ms / 360 ms reset duration respectivfely while the GLF76121L has 12 s delay time and then 750 ms reset time.

The ultra-low IQ enables direct interface to lower voltage chipset without any external circuit and maintains lower power consumption. The OFF pin allows the GLF76121, GLF76121S, and GLF76121L to achieve complete shutdown with total downstream standby current of 7 nA typical. With the switch placed between a battery and system, this switch can help to significantly extend system battery life in mobile devices during shipping or periods of extended off time.

FEATURES

- Ultra-Low I_{SD}: 7 nA Typ at 3.6 V_{BAT}
- Ultra-Low I_Q: 7 nA Typ at 3.6 V_{BAT}
- Low R_{ON} : 34 mΩ Typ at 3.6 V_{BAT}
- I_{OUT} Max : 2 A
- Supply Voltage Range: 2.5 V to 5.5 V
- Reset Delay Time (/SRO Hold Time)
  - GLF76121 : 6 s
  - GLF76121S : 2.95 s
  - GLF76121L : 12 s
- Reset Pulse Period
  - GLF76121 : 750 ms
  - GLF76121S : 360 ms
  - GLF76121L : 750 ms
- Turn-Off Delay Time
  - GLF76121 : 6 s
  - GLF76121S : 2.95 s
  - GLF76121L : 12 s
- Output Rise Time: 1 ms at 3.6 V_{BAT}
- Integrated Output Discharge Switch When Disabled
- HBM: 6 kV, CDM: 2 kV
- Ultra-Small: 0.97 mm x 1.47 mm WLCSP

PRODUCT TABLE

Eval Board Ordering Info	Part Number	Top Mark	R_{ON} (Typ.) at 3.6 VBAT	/SRO Hold Time	Output Discharge
EV012-GLF76121S	GLF76121S	RG	34 mΩ	2.95 s	85 Ω
EV012-GLF76121	GLF76121	BN	34 mΩ	6 s	85 Ω
EV012-GLF76121L	GLF76121L	RS	34 mΩ	12 s	85 Ω

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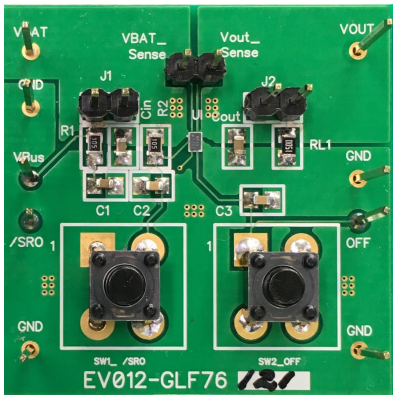
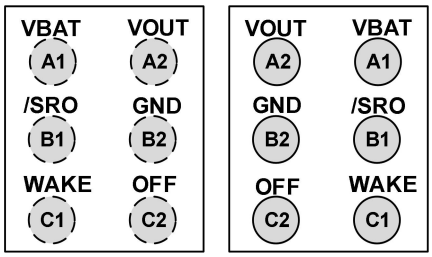
EVALUATION BOARD



PIN CONFIGURATION AND DEFINITION



TOP VIEW BOTTOM VIEW

0.97 mm x 1.47 mm x 0.55 mm WLCSP

Pin #	Name	Description
A1	VBAT	Switch Input. VBAT pin is connected to the positive input of an external battery.
A2	VOUT	Switch Output.
B1	/SRO	Reset Input or Power-On. Active Low. It needs an external pull-up resistor. It is typically connected to the center between an external pull-up resistor which is directly tied with the battery and a mechanical key button on a device.
B2	GND	Ground
C1	WAKE	System Wake Input. It is triggered by the rising edge signal to change the main switch from off to on-state. It has an internal pull-down resistance, 10MΩ Typ. to keep the WAKE pin grounded. No need an external pull-down resistor.
C2	OFF	Main Switch Off Input. It is triggered by the rising edge signal to change the main switch from on to off-state. It has an internal pull-down resistance, 10MΩ Typ. to keep the OFF pin grounded. No need an external pull-down resistor.

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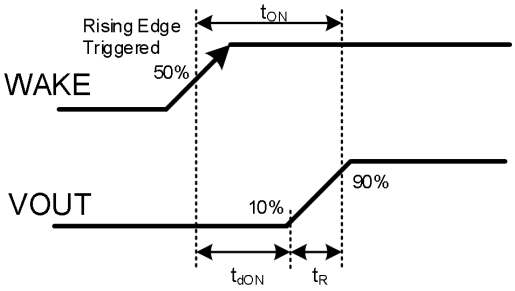
QUICK START GUIDE

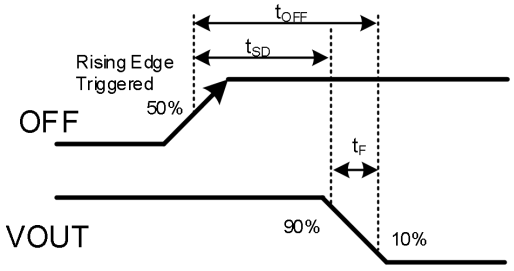
The evaluation board EV012 is easy to set up to evaluate the performance of GLF76121S, GLF76121 and GLF76121L.

1. Preset the input power supply to the desired operating voltage before applying to the VBAT Pin. Connect the positive and negative terminals of the input power supply or a Li-Ion battery pack to VBAT and GND respectively. Otherwise, connect a charged Li-Ion battery to the VBAT pin.
2. With the J1 connected, the VBAT input turns on GLF76121S, GLF76121, and GLF76121L by the WAKE pin through R1 and C1.
3. The load resistor, RL1=499 Ω, has been populated on the PCB board. Short the J2 to use the RL1. To increase the output current, connect an electronic load to VOUT and GND. The output current for GLF76121S / GLF76121 / GLF76121L is rated for 2A maximum output continuous current. Please ensure this absolute maximum is not exceeded.
4. The VIN_Sense and VOUT_Sense can be used for measurement points. Please make sure there is no high peak voltage generated when a VBAT input source is hot-plugged in.
5. When the /SRO pin is being held low for 2.95 s, 6 s and 12 s of duration in GLF76121S, GLF76121L and GLF76121 respectively, the main switch of the GLF76121S, GLF76121 and GLF76121L is disconnected from the input power supply / Li-battery for the reset duration time and then connected again.
6. When the OFF pin is triggered by the rising-edge high signal in GLF76121S, GLF76121 and GLF76121L, they are latched off after 2.95 s, 6 s and 12 s respectively.
7. In order to wake up GLF76121S, GLF76121 and GLF76121L again, either holding the /SRO pin down for 1.5 s or a rising edge of the WAKE pin turns on.

TIMING DIAGRAM AND FUNCTION TABLE



Power-On by WAKE Pin



Power-Off by OFF Pin

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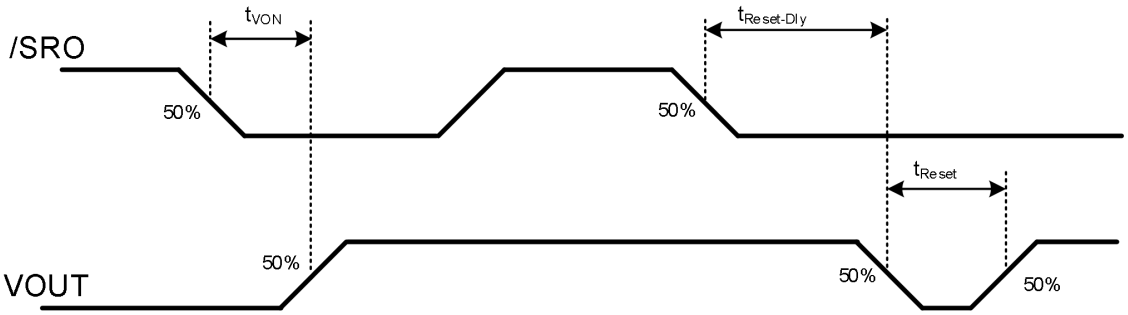

Power-On and Reset by /SRO Pin

Table 1. Pin Default State With Input Power Source

Pin Name	/SRO	WAKE	OFF	VOUT
Default State	1	0	0	GND

Note: 1=Logic High, 0=Logic Low, The VOUT=GND means the internal load switch is off.

Table 2. Input Conditions and VOUT

Function	/SRO	WAKE	OFF	Delay Time(Hold time)	VOUT Action
Power On	High to Low & Hold for t_{VON}=1.5 s	X	X	t_{VON}=1.5 s	VOUT=VBAT
	High	Low to High Rising Edge	X	t_{dON}=0.9 ms (2)	VOUT=VBAT
Reset	High to Low & Hold for $t_{Reset-Dly}$ = 2.95 s, 6 s, 12 s	X	X	GLF76121 : $t_{Reset-Dly}$=6 s t_{Reset} =750 ms GLF76121S : $t_{Reset-Dly}$=2.95 s t_{Reset} =360 ms GLF76121L : $t_{Reset-Dly}$= 12 s t_{Reset} =750 ms	VOUT to GND to VOUT
Power Off	High	Low	Low to High Rising Edge	GLF76121 : t_{SD}=6 s GLF76121S : t_{SD}=2.95 s GLF76121L : t_{SD}=12s	VOUT to GND

Notes: 1. X = Don't Care
2. The t_{dON} can be longer with an external capacitor on the WAKE pin due to a RC time-constant to the trig ger level of rising edge.

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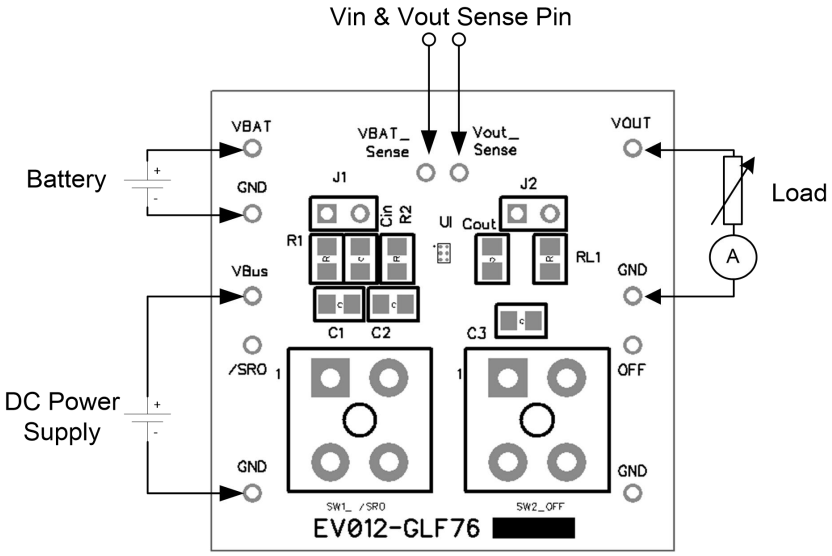
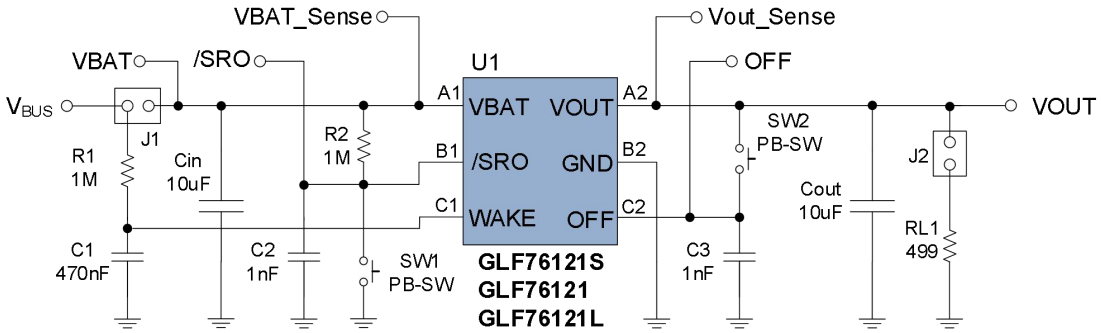
TEST SETUP



SCHEMATIC



BILL OF MATERIALS

Qty	Reference	Value	Part Description	Manufacturer/Part Number
1	U1	GLF76121/L/S	GLF76121/L/S	GLF Integrated Power
2	Cin，Cout	10 μF	Cap., X5R, 25 V, 10% 0805	YAGEO CC0805KKX5R8BB106
1	C1	470 nF	Cap., X7R, 50 V, 10% 0805	YAGEO CC0805KKX5R9BB474
2	C2，C3	1 nF	Cap., NPO, 50 V, 5% 0805	YAGEO CC0805FRNPO9BN102
2	R1, R2	1 M	Res. 1 M, 1%, 0805	YAGEO RC0805FR-071ML
1	RL1	499 Ω	Res. 499 Ω, 1%, 0805	YAGEO RC0805FR-07499RL
2	SW1, SW2	PB-SW	Tactile Switch	BRIGHT TSA061G60
2	J1, J2	Jumper	Jumper	

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PRINTED CIRCUIT BOARD LAYOUT

Fig 1. Top Layer

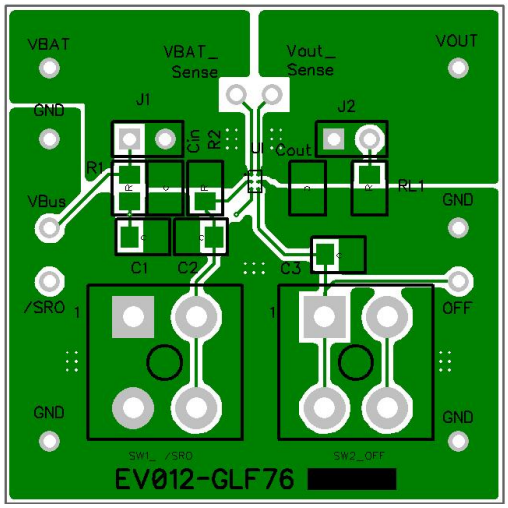
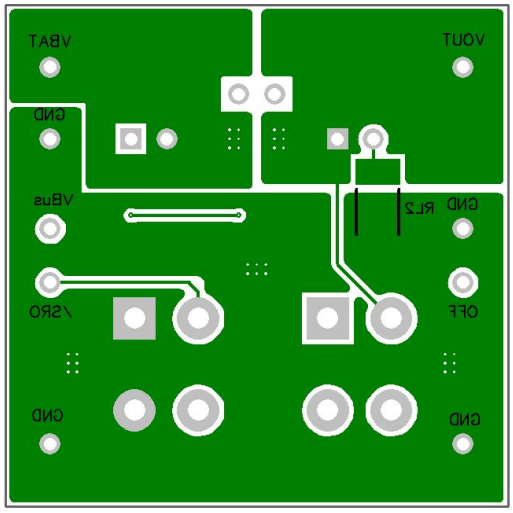


Fig 2. Bottom Layer



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