Photon Wallswitch Parts List and Finished Unit Cost Estimate

Below are the parts BOM for the PCB, the parts BOM for the enclosure, a stab at what it would cost to assemble and test a finished unit.

The PCB's and stencils were sourced through Elecrow, a very low cost supplier from Shenzhen. I have good quality PCBs fro them.

The highest cost components: Particle Photon, capacitive touch switch, flyback transformer, the front facing plastic piece as that must be great quality (on Formlabs 2, the cost is $13 at my local TechShop - it would be $32.64 plus $5 shipping at Shapeways, and $14 with lower resolution filament printer).

Since these are for me, the assembly cost is my time for free obviously, so the relevant cost to me is about $78.

If this were a business, there would be some cost allocation for the use of the "capital equipment" needed to build, assemble and test.
In my case that would solder station and reflow oven, 3D printer, and test bench equipment (scope, multimeters, etc).

PCB

Qty	Part	Part Number	Part Description	Detail	Qty 1	Total	Qty 100	Total	
1	C1	CL21B102KECSFNC	1nF, 50V, ceramic	0805	$ 0.15	$ 0.15	$ 0.05	$ 0.05	
1	C2	C1206C102J2GACTU	1nF, 200V, ceramic	1206	$ 0.27	$ 0.27	$ 0.10	$ 0.10	
1	C4	EEU-FC1C561	560uF, 16V	Through Hole	$ 0.70	$ 0.70	$ 0.33	$ 0.33	
1	C5	C2012X7R1H334K125AA	330nF, 50V, Ceramic	0805	$ 0.21	$ 0.21	$ 0.07	$ 0.07	
2	C6. C9	C0805C104K5RACTU	.1uF, 50V, Ceramic	0805	$ 0.10	$ 0.20	$ 0.02	$ 0.05	
2	C7, C8	UVC2G4R7MPD	4.7uF 400V Electrolytic	Through Holse	$ 0.74	$ 1.48	$ 0.35	$ 0.69	
1	C3	JMK212BBJ476MG-T	47uF, 6.3V, Ceramic	0805	$ 0.38	$ 0.38	$ 0.38	$ 0.38	
1	C10	CC0805MKX5R8BB226	22uF, 25V, Ceramic	0805	$ 0.83	$ 0.83	$ 0.42	$ 0.42	
1	D1	MURS160-13-F	Diode, General Purpose, 600V, 1A	DO-214AA, SMB	$ 0.45	$ 0.45	$ 0.24	$ 0.24	
1	D2	B340LB-13-F	Schottkey Diode, 40V, 3A	DO-214AA, SMB	$ 0.44	$ 0.44	$ 0.29	$ 0.29	
1	D3	SMBJP6KE82A-TPMSCT-ND	TVS Diode Surge Suppressor	DO-214AA, SMB	$ 0.46	$ 0.46	$ 0.25	$ 0.25	
1	D4	RS1B-13-F	Diode General Purpose, 100v, 1A	DO-214AC, SMA	$ 0.49	$ 0.49	$ 0.21	$ 0.21	
1	D5	PMEG6010CEH,115	Schottkey Diode, 60V, 1A	SOD123F	$ 0.40	$ 0.40	$ 0.22	$ 0.22	
1	D6	HD06-T	Bridge Rectifier 600V, 800mA	4-SMD, Gull Wing	$ 0.53	$ 0.53	$ 0.29	$ 0.29	
1	L1	RLB0608-471KL	Inductor, 470uH	Through Hole	$ 0.25	$ 0.25	$ 0.15	$ 0.15	
1	Q1	MMBT3904	2N3904 NPN Transistor	SOT23	$ 0.13	$ 0.13	$ 0.06	$ 0.06	
1	Q2	STD2HNK60Z-1	MOSFET, N-Channel, 600V, 2A	Throigh Hole I-Pak	$ 1.30	$ 1.30	$ 0.90	$ 0.90	
1	Q3	MMBT3906	2N3906	SOT23	$ 0.11	$ 0.11	$ 0.06	$ 0.06	
1	R2	ERJ-6ENF6490V	649 Ohm, 1/18W, 0805, 1%	0805	$ 0.10	$ 0.10	$ 0.02	$ 0.02	
2	R1, R4	ERJ-6ENF22R6V	22.5 Ohm, 1/18W, 0805, 1%	0805	$ 0.10	$ 0.20	$ 0.02	$ 0.03	
1	R5	ERJ-6ENF8252V	82.5K, 1/8 Watt, 0805 1%	0805	$ 0.10	$ 0.10	$ 0.02	$ 0.02	
2	R6,R15	ERJ-6ENF10R0V	10 Ohm, 1/8W, 0805, 1%	0805	$ 0.10	$ 0.20	$ 0.02	$ 0.03	
2	R3, R7	ERJ-6GEYJ103V	10K Ohm, 1/8W, 0805, 1%	0805	$ 0.10	$ 0.20	$ 0.02	$ 0.03	
2	R12,R13	ERJ-6GEYJ102V	1K Ohm, 1/8W, 0805, 1%	0805	$ 0.10	$ 0.20	$ 0.02	$ 0.03	
1	U4	CTHS15CIC06ONOFF	Switch, Push, Capacitive, Illuminated	Custom	$ 7.31	$ 7.31	$ 4.41	$ 4.41	
1	R8	RC1206FR-071R96L	1.96 Ohm, 1/4W	1206	$ 0.10	$ 0.10	$ 0.02	$ 0.02	
1	R10	NTCS0805E3104JXT	NTC Thermistor, 100k Ohm, 0805	0805	$ 0.55	$ 0.55	$ 0.28	$ 0.28	
1	R11	ERA-6AEB2742V	27.4K Ohm, 1/8W, 0805, 1%	0805	$ 0.36	$ 0.36	$ 0.12	$ 0.12	
1	U1	UCC28711D	TI Flyback PWM Controller	8-SOIC (7 leads)	$ 2.50	$ 2.50	$ 1.04	$ 1.04	
1	F1	SP3AJT10R0	Resistor, fusible power, 4W, 10 Ohm	Through Hole	$ 0.55	$ 0.55	$ 0.31	$ 0.31	
1	U3	Particle Photon	Photon, No Headers	Surface Mount	$ 19.00	$ 19.00	$ 13.00	$ 13.00	???
1	RLY1	OJ-SH-105HM,000	10A 5VDC Relay	Through Hole	$ 1.75	$ 1.75	$ 1.31	$ 1.31	
1	T1	7508110127	WurthFlyback Transformer	Through Hole, 10 pins	$ 5.00	$ 5.00	$ 5.00	$ 5.00	
1	PCB	NA	Sourced from Elecrow	10 PCBs @ $11.50 + $10 Ship	$ 2.15	$ 2.15	$ 1.00	$ 1.00	
					Subtotal	$ 46.90	Subtotal	$ 31.40	

Enclosure/Other

Qty	Part	Part Number	Part Description	Detail	Qty 1	Total	Qty 100	Total
4	Hardware	90935A133	#4, 3/8" screws	To bolt front & back shells	$ 0.04	$ 0.16	$ 0.04	$ 0.16
1	3D print	Various Sources	Back Shell	Any old 3D printer	$ 1.00	$ 3.00	$ 1.00	$ 1.00
1	3D print	Various Sources	Front Shell	Form2 3D printer (TechShop)	$ 13.00	$ 13.00	$ 13.00	$ 13.00
2	Wire	Various Sources	Black 16 AWG	8-10" length	$ 0.20	$ 0.40	$ 0.20	$ 0.40
1	Wire	Various Sources	White 18 AWG	8-10" length	$ 0.20	$ 0.20	$ 0.20	$ 0.20
1	Wire	Various Sources	Green 18 AWG	8-10" length	$ 0.20	$ 0.20	$ 0.20	$ 0.20
1	Clamp	Various Sources	P-clamp, strain relief	3/8" opening	$ 0.15	$ 0.15	$ 0.15	$ 0.15
1	Hardware	Various Sources	#6 screw, nut, lock washer	To bolt down strain P-clamp	$ 0.20	$ 0.20	$ 0.20	$ 0.20
1	Packaging	Various Sources	Cardboard box, user guide	Wild guess	$ 0.75	$ 0.75	$ 0.75	$ 0.75
					Subtotal	$ 18.06	Subtotal	$ 16.06

Total	$ 64.96		Total	$ 47.46
CA Tax	$ 5.85		CA Tax	$ -
Ship Est.*	$ 8.00		Ship Est.*	$ 15.00
Total BOM	$ 78.81		Total	$ 62.46

* Digikey parts

Assembly Test Costs

Time	Job Description	Rate	Total
1	Solder Paste, Solder, Flux	$ 0.50	$ 0.50
30	SMD parts sort, squeegee paste, mount on PCB, place, and reflow (Assumed this takes 30 minutes)	$ 20.00	$ 10.00
20	Through parts sort, insert in board, solder (Assumed this takes 20 minutes)	$ 20.00	$ 6.67
20	Test the board (Assumes this takes average of 20 minutes)	$ 20.00	$ 6.67
20	3D print front/back plastic enclosure pieces (Assumed 20 minutes to start print/clean it (especially Form 2 Resin)	$ 20.00	$ 6.67
15	Final assembly and test	$ 20.00	$ 5.00
		Subtotal	$ 35.00

Total Cost	$ 99.96		Total Cost	$ 82.46

Manufacturing, One Time Cost

Qty	Part	Part Number	Part Description	Detail		
1	NA	NA	Stencil, 30mm x40mm frame	Elecrow, $18 plus $10 shipping	$ 28.00	$ 28.00