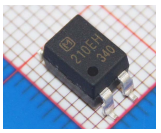
HS402 DIY Oscilloscope
Components List

PCB Version: 3.0

Designator	Quantity	Value	Description	Footprint	Comment	Photo
R1, R4, R5	3	1K	Resistor	0805		
R2, R6	2	910K	Resistor	0805		
R3, R7	2	100K	Resistor	0805		
R8, R18	2	5.1K	Resistor	0805	it can be also lower like 4.7K	
R9	1	1K	Potentiometer	VR5		
C1, C5	2	20pF var	Adjustable Capacitor	Capacitor Var	3*4mm	
C2, C6	2	100nF	Capacitor	0805	use 1uF to improve AC bandwidth at lower frequencies (<100Hz)	
C3, C7	2	47pF	Capacitor	0805		
C4	1	10uF	Capacitor	0805		
C8	1	47uF - 6.3V	Capacitor	0805		
C9	1	470nF	Capacitor	0805		
C11	1	47uF	Capacitor	0805		
D1, D2	2	BAV99	Diodes	SOT23		
U1, U3	2	MCP6S21	PGA	SOP-8 or SOIC-8	MSOP-8 in V1.6	
U2	1	AMS1117-1.2	Linear Regulator	SOT223		
U5	1	AMS1117-3.3	Linear Regulator	SOT223	Option 2 (indipendent 3V3)	
U6	1	TPS73733	Linear Regulator	SOT223-6	Option 3 (indipendent 3V3, lower noise)	
L1	1	22uH	Inductor	0805		
C10	1	47uF	Capacitor	0805		
K1, K2	2	AQY210EH	PhotoMOS	PNSC-DIP4(SMT)_V		
MCU	1	STM32F411	STM32 Black Pill Dev. Board	Black Pill	(or STM32F401)	

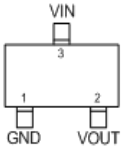
Designator	Quantity	Value	Description	Footprint	Comment	Photo
P2, P5	2	BNC	BNC Elbow Connector	BNC		
IN	1	Header 5	Header, 5-Pin	HDR1X5	I2C Input Buttons Module	
OUT	1	Header 4	Header, 4-Pin	HDR1X4	I2C Modules (other)	
UART	1	Header 4	Header, 2-Pin	HDR1X2	Serial Port (flashing & Wifi module)	
PWM	1	Header 2	Header, 2-Pin	HDR1X2	PWM Output	
BAT	1	Header 2	Header, 2-Pin	HDR1X2	Battery power	
SPI	1	Header 3	Header, 3-Pin	HDR1X3	SPI port (Wifi module)	

Revision History:

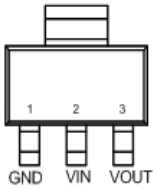
V2.1: C1, C5 to 20pF since the value needed is quite low, some 30pF var capacitor do not allow to regulate around 6pF.

V2.0: Removed J1, directly use PA2 pin for Vref, PWM become 2 pin header, added SP header (Serial Port), U1,U3 use SOP module.

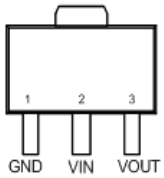
V1.6: Removed duplicated R8, Added comment for C2, C6.



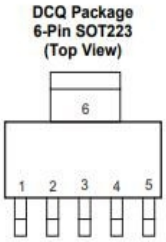
SOT-23-3

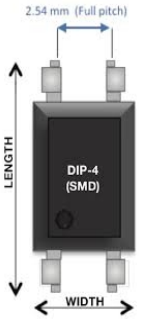


SOT-223

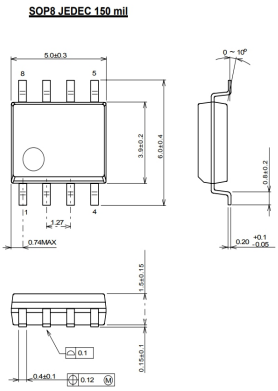


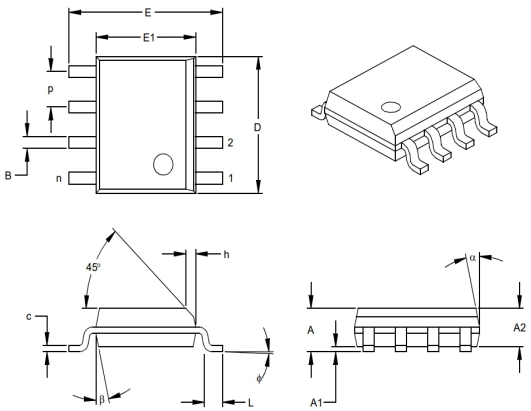
SOT-89



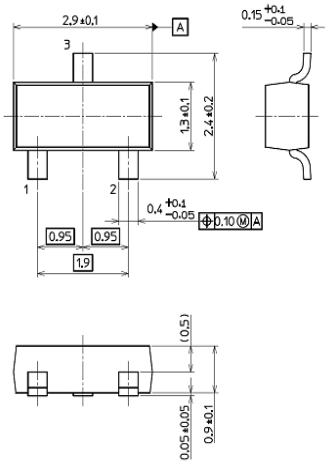


8-Lead Plastic Small Outline (SN) – Narrow, 150 mil (SOIC) or SOP8



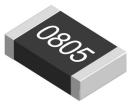


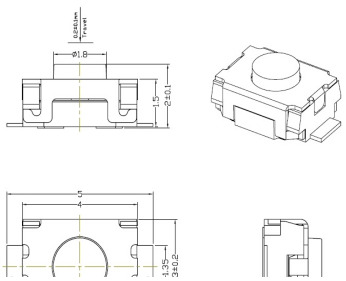
SOT-23

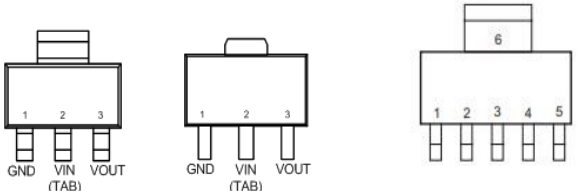


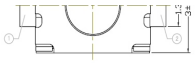
WIFI Module (PCB Built)
Components List

PCB Version: 3.0

Designator	Quantity	Value	Description	Footprint	Comment	Photo
R10, R11, R12	3	5.1K	Resistor	0805		
R13, R14	2	20K	Resistor	0805		
R15, R16, R17	3	1K	Resistor	0805		
C20, C21	2	1uF	Capacitor	0805		
C22, C23	2	47uF	Capacitor	0805	working but can test if lower values can work	
C3, C7	2	47pF	Capacitor	0805		
L10	1	1uH	Inductor	0805		
C24	1	150uF	Capacitor	B_3528		
S1	1	-	Button	1206 (or 3x4mm)		
LED	1	RGB LED 3528	Common anode	1210		
U10	1	ESP32-WROOM-32D or ESP32-WROOM-32E	MCU	-	Older model is ok	
U11 (or U11-1)	1	AMS1117-3.3	Linear Regulator	SOT223 (or SOT89)	Option 1 (to use when power with 5V)	
U12	1	TPS73733	Linear Regulator	SOT223-6	Option 2 (to use when power directly with 3.7 Lithium battery)	
WIFI	1	Header 9	Header, 9-Pin	HDR1X9	Main connector	
SP	1	Header 2	Header, 2-Pin	HDR1X2	Serial connector (for flashing)	







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SOT-223

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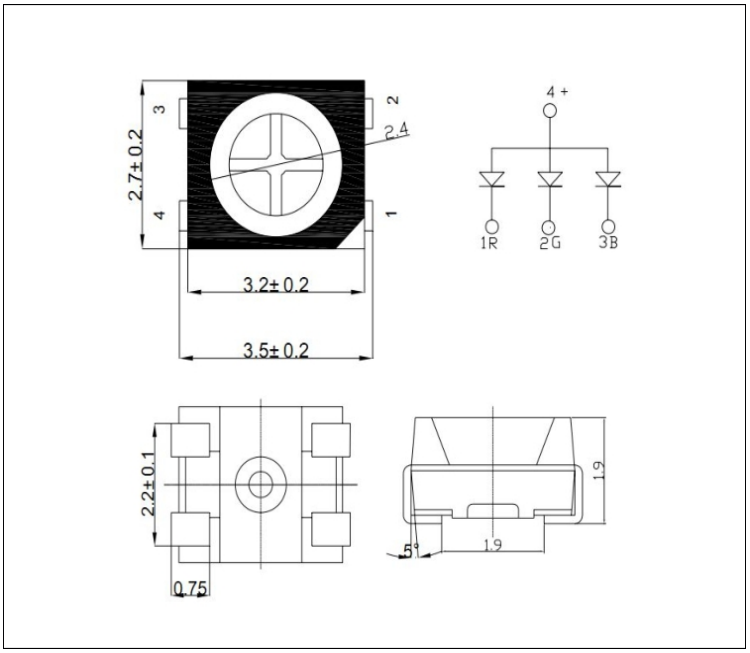
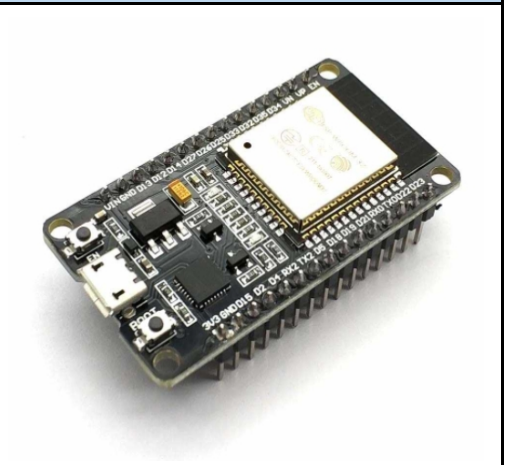
SOT-89



WIFI Module (no PCB)
Components List

HS402 PCB Ver: 1.7-3.0

Notes: The Wifi module can be implemented easily without the custom PC just by using this ESP32 Development Board.

Designator	Quantity	Value	Comment	Photo
MCU	1	ESP32 Development Board 30-pins	Based of ESP32 WROOM 32D (dual core)	
LED	1	RGB LED Module	Optional, it could be common catode or anode