Microcontroller Overview

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Board	Arduino NANO 3	Arduino Pro Mini 3.3V	Arduino Pro Mini 5V	Arduino UNO R3	Arduino MEGA R3	ESP8266 ESP-01S	ESP8266 NodeMCU V2	ESP8266 NodeMCU V3	ESP8266 WeMos D1 Mini	ESP32 – DevKitC	Ai-Thinker NodeMCU-32S	Adafruit HUZZAH32	Sparkfun ESP32 Thing Plus	FireBeetle ESP32	WiPy 3.0
Microcontroller	ATmega328p	ATmega328p	ATmega328p	ATmega328p	ATmega2560	ESP8266	ESP8266	ESP8266	ESP8266	ESP32	ESP32-S2	ESP32	ESP32	ESP32-S2	ESP32
Processor	AVR 8-bit	AVR 8-bit	AVR 8-bit	AVR 8-bit	AVR 8-bit	Tensilica Xtensa Diamond 32-bit	Tensilica Xtensa Diamond 32-bit	Tensilica Xtensa Diamond 32-bit	Tensilica Xtensa Diamond 32-bit	Xtensa single/dual-core 32-bit LX6	Xtensa single-core 32-bit LX7	Xtensa dual-core 32-bit LX6	Xtensa dual-core 32-bit LX6	Xtensa single-core 32-bit LX7	Xtensa single/dual-core 32-bit LX6
Operating Voltage	5V	3.3V	5V	5V	5V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V
Minimum Operating Voltage	2.7V	2.7V	2.7V	2.7V	2.7V	2.58V	2.58V	2.58V	2.58V	2.3V	2.3V	2.3V	2.3V	2.3V	2.3V
Maximum Operating Voltage	6V	6V	6V	6V	5.5V	3.6V	3.6V	3.6V	3.6V	3.6V	3.6V	3.6V	3.6V	3.6V	3.6V
Arduino IDE Board	Arduino Nano	Arduino Mini	Arduino Mini	Arduino/Genuino Uno	Arduino/Genuino Mega or Mega 2560	Generic ESP8266 Module	NodeMCU 1.0 (ESP-12E Module)	NodeMCU 1.0 (ESP-12E Module)	LOLIN(WEMOS) D1 R2 & mini	ESP32 Dev Module	ESP32 Dev Module	Adafruit ESP32 Feather	SparkFun ESP32 Thing	FireBeetle-ESP32	WiPy 3.0
Power Supply via VIN,VCC	7V...12V	3.35V...12V	5V...12V	7V...12V	7V...12V	3.3V	5V...12V	5V...12V	4V...6V	5.0V...12.0V	5.0V...12.0V	3.7V...6.5V	3.7V...6.5V	3.3V...5.0V	3.5V...5.5V
Digital I/O Pins (with PWM)	14 (6)	14 (6)	14 (6)	14 (6)	54 (15)	4 (4)	11 (11)	11 (11)	11 (11)	32 (32)	32 (32)	21 (21)	21 (16)	10 (10)	24 (18)
Analog Input Pins	8	6	6	6	16	0	1	1	1	16	16	13	13	5	18
Resolution ADC	10 bit (0...1023)	10 bit (0...1023)	10 bit (0...1023)	10 bit (0...1023)	10 bit (0...1023)	-	10 bit (0...1023)	10 bit (0...1023)	10 bit (0...1023)	12 bit (0...4095)	12 bit (0...4095)	12 bit (0...4095)	12 bit (0...4095)	12 bit (0...4095)	12 bit (0...4095)
Analog Output Pins	0	0	0	0	0	0	0	0	0	2	2	2	2	-	2
SPI/I2C/I2S/UART	1/1/0/1	1/1/0/1	1/1/0/1	1/1/0/1	1/1/0/4	1/0/0/1	2/1/2/2	2/1/2/2	1/1/1/1	4/2/2/3	4/2/2/3	3/2/2/3	3/2/2/3	1/1/1/1	2/1/1/2
Max DC Current per I/O Pin	40 mA	40 mA	40 mA	20 mA	20 mA	12 mA	12 mA	12 mA	12 mA	20 mA	20 mA	20 mA	20 mA	20 mA	12 mA
Flash Memory (Program space where the script is stored)	32 KB	32 KB	32 KB	32 KB	256 KB	1 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	16 MB	16 MB	8 MB
SRAM (static random access memory, where the script creates and manipulates variables when it runs)	2 KB	2 KB	2 KB	2 KB	8 KB	64 KB	64 KB	64 KB	64 KB	512 KB	320 KB	520 KB	520 KB	520 KB	520 KB
EEPROM (Values in memory are kept when board is turned off)	1024 bytes	1024 bytes	1024 bytes	1024 bytes	4096 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes	512 bytes
Clock Speed	16 MHz	8 MHz	16 MHz	16 MHz	16 MHz	80/160 MHz	80/160 MHz	80/160 MHz	80/160 MHz	160/240 MHz	240 MHz	240 MHz	160/240 MHz	240 MHz	160/240 MHz
Length x Width	45mm x 18mm	39mm x 18mm	39mm x 18mm	69mm x 53mm	102mm x 53mm	25mm x 14mm	48mm x 26mm	58mm x 31mm	34mm x 26mm	52mm x 31mm	48mm x 25mm	51mm x 23mm	60mm x 26mm	85mm x 29mm	45mm x 25mm
Fits on standard breadboard	yes	yes	yes	no	no	no	yes	no	yes	no	no	yes	yes	no	yes
WIFI	no	no	no	no	no	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n
Bluetooth	no	no	no	no	no	no	no	no	no	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2
Touch sensor	no	no	no	no	no	no	no	no	no	10	10	10	10	6	10
CAN	no	no	no	no	no	no	no	no	no	yes	no		yes	no	no
Ethernet MAC Interface	no	no	no	no	no	no	no	no	no	yes	no		yes	no	no
Temperature Sensor	no	no	no	no	no	no	no	no	no	yes	no		yes	no	no
Hall effect sensor	no	no	no	no	no	no	no	no	no	yes	no	yes	yes	yes	no
Power jack	no	no	no	yes	yes	no	no	no	no	no	no	no	no	no	no
USB connection	yes	no	no	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no
Battery Connection	no	no	no	no	no	no	no	no	no	no	no	LiPo charger	LiPo charger	LiPo charger	no
Programmable	Arduino IDE	Arduino IDE	Arduino IDE	Arduino IDE	Arduino IDE	Arduino IDE, LuaNode SDK, Micropython	Arduino IDE, LuaNode SDK, Micropython	Arduino IDE, LuaNode SDK, Micropython	Arduino IDE, LuaNode SDK, Micropython	Arduino IDE, ESP-IDF, LuaNode SDK	Arduino IDE, LuaNode SDK, Micropython	Arduino IDE	Arduino IDE	Arduino IDE, IDF (linux), Micropython	Arduino IDE, Micropython
5V Voltage Regulator	LM1117IMPX-5.0	-	MIC5205	NCP1117ST50T3G	LD1117S50CTR	-	-	-	-	-	-	-	-	-	-
Output Voltage	5V	-	5V	5V	5V	-	-	-	-	-	-	-	-	-	-
Maximum Input Voltage	20V	-	20V	20V	15V	-	-	-	-	-	-	-	-	-	-
Minimum Input Voltage	7V	-	5.4V	6.5V	7V	-	-	-	-	-	-	-	-	-	-
Maximum Output Current	800mA	-	150mA	1A	800mA	-	-	-	-	-	-	-	-	-	-
Maximum Voltage Dropout	1.2V @ 800mA	-	165mV @ 150mA	1.2V @ 800mA	1.1V @ 800mA	-	-	-	-	-	-	-	-	-	-
Typical Quiescent Current	5mA	-	5µA	6mA	5mA	-	-	-	-	-	-	-	-	-	-
3.3V Voltage Regulator	FT232R USB UART	MIC5205	-	LP2985-33DBVR	LP2985-33DBVR	-	AMS1117	AMS1117	ME6211	AMS1117	AMS1117	AP2112-3.3	AP2112-3.3	RT9080-33GJ5	
Output Voltage	3.3V	3.3V	-	3.3V	3.3V	-	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	
Maximum Input Voltage	5.25V	20V	-	16V	16V	-	15V	15V	6V	15V	15V	6.5V	6.5V	6.5V	
Minimum Input Voltage	4.35V	3.7V	-	3.9V	3.9V	-	4.8V	4.8V	4.3V	4.8V	4.8V	3.4V	3.4V	3.4V	
Maximum Output Current	100mA	150mA	-	150mA	150mA	-	1A	1A	500mA	1A	1A	600mA	600mA	600mA	
Maximum Voltage Dropout		165mV @ 150mA	-	350mV @ 150mA	350mV @ 150mA	-	1.1V @ 800mA	1.1V @ 800mA	680mV @ 500mA	1.1V @ 800mA	1.1V @ 800mA	250mV @ 600mA	250mV @ 600mA	310mV @ 600mA	
Typical Quiescent Current	2.5mA	5µA	-	1.5mA	1.5mA	-	5mA	5mA	0.1µA	5mA	5mA	55µA	55µA	2µA	
Power Consumption @ 5V															
Reference WiFi Scan Mean [mA]	-	-	-	-	-	69	109	126	68	127	129	122	115	114	-
Reference Empty Script [mA]	-	-	-	-	-	73	82	81	72	51	55	47	41	39	192
Light Sleep [mA]	-	-	-	-	-	1	10	9	0.68	10	15.05	8.43	5.67	1.94	-
Deep Sleep [mA]	-	-	-	-	-	<1	9	9	0.17	9	6.18	6.81	4.43	0.011	0.015
Hibernation [mA]	-	-	-	-	-	-	-	-	-	9	6.18	6.8	4.43	0.008	-
Power Consumption @ 9V															
Reference Empty Script [mA]	22.05	5.13	14.62	98.43	73.19	-	-	-	-	-	-	-	-	-	-
Reduce Clock Speed [mA]	18.5	3.84	10	42.76	61.76	-	-	-	-	-	-	-	-	-	-
Low Power Mode [mA]	4.83	3.2	3.2	27.85	26.87	-	-	-	-	-	-	-	-	-	-
Power Consumption @ 3.3V															
Reduce Clock Speed [mA]	3.41	3.73	3.73	11.55	16.74	-	-	-	-	-	-	-	-	-	-
Low Power Mode [mA]	3.42	1.58	1.58	11.45	11.85	-	-	-	-	-	-	-	-	-	-