

BASIC ELECTRONIC (Active and Passive Components)

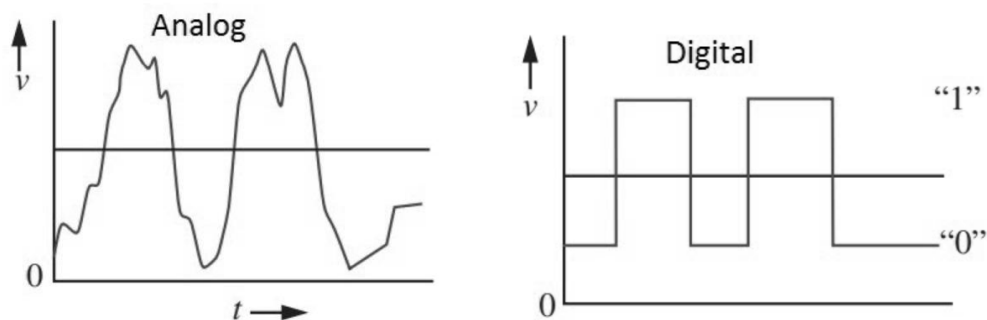
Electronics can be divided into two parts :

1. Analog electronics

Almost all the signals in the World are analog i.e. they are continuously varying values. There are lot of continuously variable signals in nature like light, motion, sound, temperature, pressure etc.

2. Digital electronics

Digital Signals vary in discrete levels, in contrast to the continuous representation of analog signals. Generally, the discrete levels in a digital signal are just two values: ON and OFF.




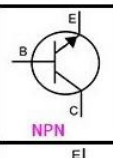
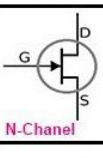
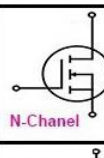

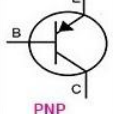
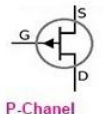
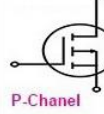
Electronic component can be divided into two parts:

1. Active component

Active components are parts of a circuit that rely on an external power source to control or modify electrical signals. Active components allow a small input to generate a matching, larger output.

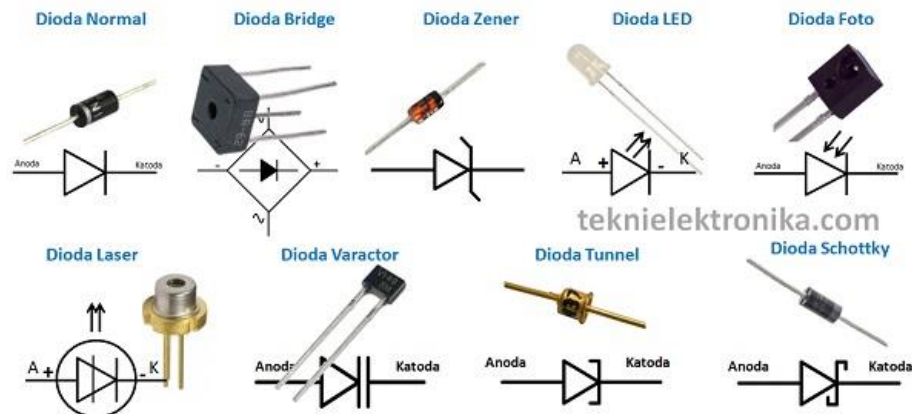
1) Transistors

Transistor, is an electronic component with 3 electrodes that function as a booster, as a circuit breaker and connector, voltage stabilization, signal modulation. In this case the input is inserted into point B and the output is taken from point A. Transistors can work like an electric faucet, which is based on the input current (BJT) or its input voltage (FET), allows accurate power delivery from the source circuit the electricity.

	Transistor Bipolar	Transistor Efek Medan		
	BIPOLAR	JFET	MOSFET	UJT
	 NPN	 N-Channel	 N-Channel	
	 PNP	 P-Channel	 P-Channel	

2) Diode

Diode, is an electronic component with two electrodes, which can be used to rectify electrical signal, thus including the active component. made of semiconductor material (silicon or germanium). The diode is composed of 2 materials, namely p-type material (anode) and n-type material (anode). Diodes are used in power supplies, for rectification, and in pulse shaping applications.



3) Integrated Circuits (IC)

IC may function in a linear or nonlinear manner. The output of a linear IC is directly proportional to the input. Linear IC applications include many types of amplification, modulation, and voltage regulation. Nonlinear ICs include all digital ICs and other circuits where there is not a linear relationship between the input and output signals. Digital IC, the most important type of a nonlinear ICs, usually use some form of bistable (on/off) operation. A minimum of two pins is required for connecting the IC to the power supply. The remaining connections are available for use as terminals for input and output signals.

Nama Komponen	Gambar	Simbol
<div>IC</div> <div>(Integrated Circuit)</div>		<div><div>No. pin</div><div>connect</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div><div>11</div><div>12</div><div>13</div><div>14</div><div>15</div><div>16</div><div>17</div><div>18</div><div>19</div><div>20</div><div>21</div><div>22</div><div>23</div><div>24</div><div>25</div><div>26</div><div>27</div><div>28</div><div>29</div><div>30</div><div>31</div><div>32</div><div>33</div><div>34</div><div>35</div><div>36</div><div>37</div><div>38</div><div>39</div><div>40</div><div>41</div><div>42</div><div>43</div><div>44</div><div>45</div><div>46</div><div>47</div><div>48</div><div>49</div><div>50</div><div>51</div><div>52</div><div>53</div><div>54</div><div>55</div><div>56</div><div>57</div><div>58</div><div>59</div><div>60</div><div>61</div><div>62</div><div>63</div><div>64</div><div>65</div><div>66</div><div>67</div><div>68</div><div>69</div><div>70</div><div>71</div><div>72</div><div>73</div><div>74</div><div>75</div><div>76</div><div>77</div><div>78</div><div>79</div><div>80</div><div>81</div><div>82</div><div>83</div><div>84</div><div>85</div><div>86</div><div>87</div><div>88</div><div>89</div><div>90</div><div>91</div><div>92</div><div>93</div><div>94</div><div>95</div><div>96</div><div>97</div><div>98</div><div>99</div><div>100</div><div>101</div><div>102</div><div>103</div><div>104</div><div>105</div><div>106</div><div>107</div><div>108</div><div>109</div><div>110</div><div>111</div><div>112</div><div>113</div><div>114</div><div>115</div><div>116</div><div>117</div><div>118</div><div>119</div><div>120</div><div>121</div><div>122</div><div>123</div><div>124</div><div>125</div><div>126</div><div>127</div><div>128</div><div>129</div><div>130</div><div>131</div><div>132</div><div>133</div><div>134</div><div>135</div><div>136</div><div>137</div><div>138</div><div>139</div><div>140</div><div>141</div><div>142</div><div>143</div><div>144</div><div>145</div><div>146</div><div>147</div><div>148</div><div>149</div><div>150</div><div>151</div><div>152</div><div>153</div><div>154</div><div>155</div><div>156</div><div>157</div><div>158</div><div>159</div><div>160</div><div>161</div><div>162</div><div>163</div><div>164</div><div>165</div><div>166</div><div>167</div><div>168</div><div>169</div><div>170</div><div>171</div><div>172</div><div>173</div><div>174</div><div>175</div><div>176</div><div>177</div><div>178</div><div>179</div><div>180</div><div>181</div><div>182</div><div>183</div><div>184</div><div>185</div><div>186</div><div>187</div><div>188</div><div>189</div><div>190</div><div>191</div><div>192</div><div>193</div><div>194</div><div>195</div><div>196</div><div>197</div><div>198</div><div>199</div><div>200</div><div>201</div><div>202</div><div>203</div><div>204</div><div>205</div><div>206</div><div>207</div><div>208</div><div>209</div><div>210</div><div>211</div><div>212</div><div>213</div><div>214</div><div>215</div><div>216</div><div>217</div><div>218</div><div>219</div><div>220</div><div>221</div><div>222</div><div>223</div><div>224</div><div>225</div><div>226</div><div>227</div><div>228</div><div>229</div><div>230</div><div>231</div><div>232</div><div>233</div><div>234</div><div>235</div><div>236</div><div>237</div><div>238</div><div>239</div><div>240</div><div>241</div><div>242</div><div>243</div><div>244</div><div>245</div><div>246</div><div>247</div><div>248</div><div>249</div><div>250</div><div>251</div><div>252</div><div>253</div><div>254</div><div>255</div><div>256</div><div>257</div><div>258</div><div>259</div><div>260</div><div>261</div><div>262</div><div>263</div><div>264</div><div>265</div><div>266</div><div>267</div><div>268</div><div>269</div><div>270</div><div>271</div><div>272</div><div>273</div><div>274</div><div>275</div><div>276</div><div>277</div><div>278</div><div>279</div><div>280</div><div>281</div><div>282</div><div>283</div><div>284</div><div>285</div><div>286</div><div>287</div><div>288</div><div>289</div><div>290</div><div>291</div><div>292</div><div>293</div><div>294</div><div>295</div><div>296</div><div>297</div><div>298</div><div>299</div><div>300</div><div>301</div><div>302</div><div>303</div><div>304</div><div>305</div><div>306</div><div>307</div><div>308</div><div>309</div><div>310</div><div>311</div><div>312</div><div>313</div><div>314</div><div>315</div><div>316</div><div>317</div><div>318</div><div>319</div><div>320</div><div>321</div><div>322</div><div>323</div><div>324</div><div>325</div><div>326</div><div>327</div><div>328</div><div>329</div><div>330</div><div>331</div><div>332</div><div>333</div><div>334</div><div>335</div><div>336</div><div>337</div><div>338</div><div>339</div><div>340</div><div>341</div><div>342</div><div>343</div><div>344</div><div>345</div><div>346</div><div>347</div><div>348</div><div>349</div><div>350</div><div>351</div><div>352</div><div>353</div><div>354</div><div>355</div><div>356</div><div>357</div><div>358</div><div>359</div><div>360</div><div>361</div><div>362</div><div>363</div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2. Passive component

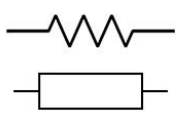
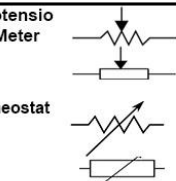
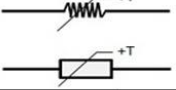
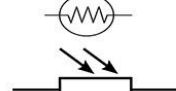
Passive components influence the flow of power but do not require an external power source to function. These components use some other property to control the electrical signal. As a result, they only require the current traveling through the connected circuit.

1) Resistor

Resistors can be made to control the flow of current, to work as Voltage dividers, to dissipate power and it can shape electrical waves when used in combination of other components. Basic unit is ohms (Ω). Resistors can be made of various compounds and

films, even resistance wire (wire made from high resistivity alloys such as nickel-chromium). Resistors can be designed in many ways by usage, shape, physical construction tolerances, resistances are of the following three types i.e.

- Fixed Resistors
The fixed resistances are those whose values cannot be changed.
- Semivariable Resistors
Semivariable types of resistances their values can be changed with help of a screwdriver.
- Variable Resistors
Variable resistances their values can be changed from zero to maximum with the help of a movable arm.

Komponen TeknikElektro.com			Simbol
Fixed Resistor			
Resistor Komposisi Karbon	Film Metal Resistor	Film Karbon Resistor	
Variabel Resistor			
Potensio Meter	Trimpot	Rheostat	
Thermal Resistor			
Light Dependent Resistor			

2) Inductor

The inductor (coil) is one of the passive electronic components that can produce a magnetic field magnet when energized by an electric current and vice versa can produce electricity when it is given a magnetic field. In general, this inductor is made of copper conducting wire which is formed into a coil or coil. Its electrical property is called inductance and the unit for this is the Henry, symbol H.

- Iron Core Inductor
This type of inductor is made of iron. These inductors are low space inductors that have high power and high inductance value.
- Air Core Inductor
These inductors are used when the amount of inductance required is low. The number of turns the inductor must have is more for this type when compared to the inductors with the core.
- Ferrite Core Inductor
In this type of Inductor, ferrite materials are used as core. The general composition of ferrites is XFe_2O_4 . Where X represents transition material. Ferrites can be classified into two types:

- a. Soft Ferrite: Materials that have the ability to reverse their polarity without any external energy.
- b. Hard Ferrite: These are permanent magnets. That is their polarity will not change even when the magnetic field is removed.



3) Capacitor

When an insulating material is placed between two conducting plates a capacitor is formed. The ability of capacitor to store electric charge is called the capacitance and the symbol of its is C and its unit is farad (F). The capacitor is identified as having two legs and two poles, namely positive and negative and has a liquid electrolyte and is usually in the form of a tube.

The value of capacitor never remains constant except under certain fixed conditions. It changes with temperature, frequency and ageing. The behavior of capacitor at various frequencies may be grouped into the following seven classes.

- Mica, glass, air, and low loss ceramic capacitors are used from few kHz to few hundreds MHz.
- Paper and metalized paper capacitor cover the frequency range from few Hz to few hundred kHz.
- High dielectric constant ceramic capacitor can only be used between the frequency ranges from few kHz to few, hundred of kHz however, they can find use from very low frequency to 1000 kHz.
- Aluminum electrolytic capacitor can find use at power frequency from 10Hz to 1000Hz but can be used up to 10 kHz.
- Tantalum electrolytic capacitor may be used from dc to few hundred Hz.
- Polyethylene, tere-phthalate (Mylar), cellulose acetate capacitor may find use from few hundred Hz to few MHz.
- Polystyrene, polyethylene, poly-tetra-fluoro-ethylene (Teflon) capacitors are used from dc to 1000 MHz range.



Kapasitor elektrolit



Kapasitor tantalum



Kapasitor Polister Film



Kapasitor Polipropyene



Kapasitor Kertas



Kapasitor Mica



Kapasitor Keramik



Kapasitor Epoxy



Kapasitor Variable