

Index

- active filters 64, 236
- AC waveforms 30
- adder circuits 210
- air cored inductors 42
- amplitude stabilization 269, 271
- analog computers 233
- analog switch 193
- analog to digital converters 280
- angular frequency 30
- anode 99, 290
- antilog function 230
- attenuation 54
- attractor 308
- autobias 179, 180
- avalanche effect 127

- band gap 91, 94, 96
- band pass filters 64, 238, 316
- band stop filters 64
- band structure 93, 95
- β (current gain) 132
- bipolar transistors 132, 172
- Bode plot 59, 61
- breakover voltage 290
- bridge circuits 216
- Brillouin zones 93
- bulk resistance 106

- capacitors 38, 315
- cathode 99, 290
- chaos theory 250
- chaotic oscillators 299
- characteristic of diode 104, 115
- characteristic of FET 177, 189, 190
- characteristic of transistor 134
- Chua's diode 299, 304, 321
- Chua's oscillator 305
- CMOS 187, 192
- colour codes (resistors) 2, 6
- common 3
- common emitter, base, collector 145
- complex algebra 54
- complex impedance 45
 - diagram 48
 - vector 48
- complex numbers 45
- conductors 91
- control loop 206, 274
- controller 234, 319
- conversion I — V 214
- crossover distortion 160
- current gain (β) 132
- current mirror 162, 166
- current source 82
- current to voltage conversion 214

- dB 27
- DC 30
- decibels 27
- depletion layer 99, 101, 102, 127
- depletion mode MOSFET 188
- deterministic chaos 299
- diac 296
- differential amplifier 160, 217
- differentiator 222
- digital to analog conversion 275, 283
- dimmer 296
- diode characteristic 104, 115
- diode connected transistor 163, 231
- diode current equation 104
- diode operation 99
- diode structure 99

- direct band gap 91
- distortion 270
- dopant 97, 170
- drain saturation 177
- dummy sensor 217
- dynamic resistance 115

- earth 3
- electrolytic capacitor 123
- electrons 91
- ellipse 67
- emitter follower 138
- enhancement mode MOSFET 190
- etch process 170
- extrinsic semiconductors 91

- fabrication process 170
- farad 38
- feedback AD converters 280
- feedback fraction 205
- Fermi level 94, 97
- ferrite cored inductors 43
- filter order 65
- filters 64, 236
- flash converters 284
- flicker noise 249
- form factor 35
- forward bias 100, 104
- Fourier series 69
- frequency beats 298
- frequency response 59
 - of op-amps 242
- full wave rectifier 122, 252
- functional amplifiers 229
- fundamental frequency 69

- gain peaking 237
- gallium arsenide 91, 109
- gas detector 217
- ground 3
- gyrator 311

- half wave rectifier 121
- Hall effect probe 221
- harmonic 69
- hearing threshold 29
- heat sink 26
- henry 42
- HF 170
- high pass filters 238
- holes 91

- impedance 45
- indirect band gap 91
- indium phosphide 91, 109
- inductance 41
- inductors 41
 - air cored 42
 - ferrite 43
- instrumentation amplifier 253
- insulators 91
- integrating AD converters 285
- integrator 225
- interfacing 214
- interference 247, 296
- intrinsic semiconductors 91
- inverse function amplifier 229
- inverting amplifier 147, 195
- isolating pulse transformer 295
- isolation amplifier 253, 255

- j 45
- JFET amplifiers 179
- JFET fabrication 173
- JFET operation 169
- Johnson noise 247
- junction field effect transistors 169

- knee voltage 106, 109, 110

- lag 32
- latch circuit 288
- lattice constant 93

- lead 32
- led (light emitting diode) 109
- Lenz's law 31, 42
- light detection 215
- load line 145, 182
- lock-in amplifier 256, 259
- logarithmic amplifiers 231
- low pass filters 54, 59, 237, 315

- magnetic field 31, 34, 221
- magnetic permeability 43
- measurement loading 79
- metallic conductors 91
- Miller effect 168
- modes 92, 248
- modulus 54
- MOSFETs 187
- mutual conductance 177

- negative feedback 205
- negative resistance amplifier 308
- negative resistor 304
- networks 18
- noise 246
- noninverting amplifier 201
- nonlinearity 153, 270, 299
- Norton's theorem 82
- notch filter 66
- Nyquist noise 247

- Occam 302
- ohmic contact 101
- Ohm's law 1
- op-amp 168, 195, 322
- op-amp rules 195
- operational amplifiers 168, 195
- optocoupled isolation 297
- oscillators 268

- passive filter 64, 236
- Pauli exclusion 94

- PD action controller 234
- peaking factor 237
- peak inverse voltage 126
- peak to peak voltage 35
- percolation theory 23
- period 30, 69
- period doubling 301
- phase angle triggering 296
- phase lag and lead 32
- phase sensitive detection 253, 256
- phase shift oscillator 269, 272
- phonons 93
- photodiode 214, 220, 303
- photomultiplier tube 26
- photoresist 169, 170, 178
- pinch-off voltage 175
- PIV 126
- platinum resistance thermometer 221
- positive feedback 268, 274
- potential difference 5, 10
- potential divider 54
- power dissipation 24
- power factor correction 40
- power in AC circuits 35
- power ratio 27
- power spectral density 247
- principle of superposition 86
- PRT_{100} 221
- PSPICE 313
- push-pull output 160

- Q factor 64
- quantum tunnelling 127

- $R-2R$ ladder 276, 277, 314
- $R-2R$ network 19, 314
- radio 102, 251
- ramp type converter 281
- reactance 51
- recombination in base 133
- recovery of signals 253

- resistors in parallel 10
- resistors in series 7
- resistors power dissipation 24
- reverse bias 101
- Riordan gyrator 311
- ripple voltage 123
- RMS voltage 35

- scanning tunnelling microscope 235
- Schottky diode 102
- Schrödinger's equation 91
- SCR 287
- self balancing bridge 218
- semiconductor eqn. 91, 97, 101, 189
- semiconductor materials 91
- sensors 214
- servo loop 207, 235
- shot noise 247, 249
- shunt impedance 82
- signal-to-noise ratio 259
- silane 170
- silicon 91
- silicon controlled rectifiers 287
- silicon dioxide 169
- simulation with PSPICE 313
- sinusoidal oscillators 268
- small signals 145, 152
- SPICE 313
- strain gauge 251
- strange attractor 308
- successive approximation AD 283
- superposition 86, 117, 210, 252, 317

- temperature coefficient 95
- tesla 34
- thermistor 97, 220, 274
- thermometer 220, 261
- Thevenin's theorem 74

- thyristor 287
- time constant 62, 220
- timer (555) 260
- tolerances of resistors 2
- tracking converter 282
- transdiode 231
- transformer rating 121, 124
- transistor amplifier 145, 152, 318
- transistor bias 132
- transistor characteristic 134
- transistor fabrication 132, 172
- transmission line 248
- trapezoidal waveform 37
- triac 287, 296
- triangular waveform 32
- trigger SCR 287
- tuned amplifier 151, 163
- two port amplifier 148

- unijunction transistor 293

- varactor diode 102
- varicap diode 102
- virtual earth 211
- voltage multiplier 125
- voltage source 74

- wafer 169
- Wein band pass filter 65
- Wein bridge oscillator 271, 320
- white noise 247
- work function 102
- wrt (with respect to) 5

- Zener barrier 131
- Zener diodes 126
- zero volts switching 297