

Index

- AC analysis, 69
- ACM (advanced compact model), 28
- active load, 94
- amplifier
 - charge, 18, 200
 - common-source, 93
 - differential, 159, 179
 - folded-cascode, 18
 - low-noise (LNA), 18, 188
 - two-stage, 18, 184
- backgate parameter, 22
- balun
 - active, 188
- bias
 - cascode, 175
 - constant current, 215f. 5.35
 - constant transconductance, 215, 221
- bias circuit
 - constant transconductance, 165
- bias voltage, 62
- bipolar junction transistor (BJT), 27
- BSIM (Berkeley short-channel IGFET model), 2, 39
- bulk potential, 23
- Cadence Spectre, 39, 303
- capacitance
 - extrinsic, 69, 90
 - gate-to-bulk, 57
 - gate-to-drain, 56
 - gate-to-source, 56
 - junction, 56, 62, 90
- cds_srr, 304
- channel length modulation, 40, 49, 295
- charge redistribution, 226
- charge sheet model, 17, 21
- class-A, 5
- CMFB (common-mode feedback), 227f. 6.2, 240
- CMOS (complementary metal-oxide-semiconductor), 1
- common mode, 282
- common-gate stage, 189
- common-mode feedback, 105
- common-source stage, 189
- compliance voltage, 173
- configuration file, 305
- contour plots, 85f. 3.18
- corner frequency, 63, 229
- current density, 11, 44, 83
- current factor, 22, 29, 151
- current mirror, 153, 171
- current-mirror load, 108
- DC sweep, 9, 303
- de-normalization, 66, 96
- depletion region, 41
- DIBL (drain-induced barrier lowering), 17, 40, 48, 68, 74, 80, 106, 146, 295
- differential pair, 5, 13, 62, 102, 131
- diffusion, 21
- distortion, 15, 18, 71, 126
 - cancellation, 199
 - differential pair, 131
 - fractional harmonic, 129, 196
 - harmonic, 128, 141
 - intercept point, 199
 - null, 130, 144, 196
 - output conductance, 139
 - transconductance, 126
- drain current
 - normalized, 29
 - drift, 21
 - dynamic range, 95, 120
- Early voltage, 53, 68, 94, 173
- effective noise charge (ENC), 203
- EKV model (Enz Krummenacher Vittoz model), 5, 28
 - basic, 21, 28, 31, 127, 166, 292
- fan-out, 12, 64, 83, 116, 203, 230
- feedback
 - series-shunt, 180
 - shunt-shunt, 201
- feedback factor, 229
 - maximum possible, 229
- figure of merit, 6
- finger partitioning, 316

- finger width, 316
flat-band voltage, 28
full design automation, 3
full design handcrafting, 3
gain boosting, 265
gain error
 static, 230
gate overdrive, 15
gate overdrive voltage, 7
GBW (gain-bandwidth product), 12, 64
generic flow, 12
Hooge model, 121
IGS (intrinsic gain stage), 17, 62, 114
interpolation, 307, 310
interpolation method, 308
intrinsic gain, 54, 63, 70, 217, 319
inversion charge, 7
inversion coefficient, 5, 15
inversion level, 4
iterative sizing, 92
large-signal characteristic, 98, 102
layout, 315
layout area, 154, 181, 213
layout dependent effects, 315
line regulation, 186
LNA (low-noise amplifier), 8
load capacitance, 229
 total, 229
load regulation, 180
lookup, 9, 39, 307
lookup table, 3, 9, 39, 294, 304, 315
lookupVGS, 67, 82 n.3, 106, 309
loop gain, 228
 low-frequency, 228, 253, 255
McWorther model, 121
Miller compensation, 267
Miller effect, 111, 185
Miller theorem, 65
minimum width, 317
mismatch, 18
 current factor, 151
 Pelgrom model, 152
 random, 151
 systematic, 151, 171
 threshold voltage, 151
mobile charge density, 22
 normalized, 29, 33, 125
mobility degradation, 1, 39, 42, 108, 118, 127, 141, 293
moderate inversion, 1, 10, 24, 28, 43, 100, 236
narrow-width effects, 67
neutralization, 268
noise, 18
 active load, 119
 cancellation, 189
 electronic, 114
 flicker, 114, 121
 flicker corner, 121
 input-referred, 116
 man-made, 114
 power spectral density, 230
 scaling, 241
 shot, 114
 supply, 177, 178
 thermal, 114
 total integrated, 124, 230
noise figure, 190, 192
notation, 18
offset drift, 160
on-resistance, 286
optimization
 constant drain current, 205
 constant noise and bandwidth, 207, 231
 constant transit frequency, 204
OTA (operational transconductance amplifier), 18, 226
 basic, 226
 folded-cascode, 249, 284
 two-stage, 267, 284
output conductance, 51
overdesign, 222
pinch-off voltage, 24, 30, 294
pocket implants, 47, 152
pole
 dominant, 111, 184, 269
 non-dominant, 111, 184, 249, 255, 269
pole-zero doublet, 110
power supply rejection (PSR), 179
process corners, 47, 214, 299
PSP (Penn State Philips model), 2, 17, 39, 58
quasi-static model, 56, 65
return ratio, 228
reverse short channel effect, 47
self-loading, 91, 96, 110, 253, 269
sensitivity parameters, 51
settling error
 dynamic, 230
settling time, 230, 244
shallow trench isolation, 315
silicon on insulator (SOI), 27
slew rate, 243, 267, 281
slewing, 242, 266, 281
 asymmetric, 282
slewing time, 244
specific current, 16, 29, 44, 49, 108, 292

Spectre Matlab Toolbox, 39, 304

square-law, 1, 6

square-law model, 33, 134

step response, 230

 critically damped, 251

strong inversion, 10, 23, 35, 45, 100, 236

subthreshold slope factor, 27, 108, 114, 292

surface potential, 21, 24

switch resistance, 226

switched-capacitor circuits, 226

Taylor series, 126

 two-dimensional, 139

technology scaling, 125

temperature variations, 165

thermal voltage, 14, 22

threshold voltage, 23, 28, 31, 41, 47, 151, 292, 315

threshold voltage roll-off, 47

time constant, 230

transcapacitance, 56

transconductance, 34

transconductance efficiency, 4, 27, 34, 65

 normalized, 34, 43

transit frequency, 12, 57, 70, 73, 117, 217, 319

transmission gate, 285

unity gain frequency, 64

V_{Dsat} , 7, 15, 26, 45, 52, 71, 94, 99, 174, 216

voltage biasing, 15

voltage regulator, 177

 low-dropout (LDO), 18, 108, 177

weak inversion, 1, 10, 14, 23, 33, 34, 45, 65, 79, 83, 156,
167, 233

weak inversion knee, 81

width independence, 9

XTRACT, 36 n.6, 41, 47, 51, 294, 297

zero

 right half-plane, 184, 229