

Index

- absorption coefficient, 198
- acceleration sensor, 2
- activity, 17, 18
- actuator, 207
- Actuators based on electroactive polymers (EAP), 315
- adhesion, 343
- adhesion mask technique, 97
- air purity of clean rooms, 74
- alignment marks, 69
- Analog Behavioral Models, 257
- analysis harmonic, 261
- analysis systems, 9
- analysis transient, 267
- anisotropic, 93
- anisotropy, 31
- application specification, 157
- ARRHENIUS' law, 101
- aspect ratios, 96, 147
- atomic force effects, 9
- atomic force microscope (AFM), 308

- back transformation, 275
- back-end process, 9
- base atoms, 31
- bending radius, 60
- bimaterial, 234
- bolometer array, 303
- bond density, 37
- bonding, anodic, 2
- borosilicate glass, 30, 52
- Bosch process, 97
- bottom-up phase, 258
- boundary element method, 259
- bow, 45
- bubble jet, 237
- budget, thermal, 117, 149

- cantilever, 6
- cantilever beam, 171
- capacitance function, 219, 275
- capacitor discharging, 233
- capacity, fluidic, 189
- capillary electrophoresis, 190
- capillary forces, 343
- catheter pressure sensors, 295
- CAUCHY number, 24
- ceramics, 30
- channeling effect, 118
- clean room, 74
- clean room classes, 74
- clean room clothing, 77
- cleaning, 70
- cleaning procedures, 72
- coefficients, piezoelectric, 225
- comb structures, 181, 219
- compensating mask, 112
- conceptual phase, 256
- conductivity, 27
- construction materials, 28
- contact angle, 343
- contact lithography, 79
- continuum mechanics, 173
- convection, 195
- cooling-down time, 232
- coordinate measuring, 204
- coordinate, generalized, 261
- CORIOLIS principle, 10
- corner undercutting, 107
- corners 107
- coupled domain problem, 260
- coupler, 310
- coupling constants, 211
- coupling factor, 213
- coupling thermal, 200

- critical breakdown field, 21
- critical frequency, 179
- cross-sensitivity, 171
- crystal directions, 32
- crystal orientation, 39
- crystal planes, 33
- cut-off frequency, 178
- cycle time, 144
- CZOCHRALSKI technique, 47

- damping, 14
- damping constant, 178
- damping ratio, 178
- damping viscous, 177
- deep etching, anisotropic, 2, 68
- defect density, 73
- deformation bodies, 2
- degree of freedom, 172
- Design for Manufacturing, 283
- Design for Reliability, 159
- design methods, 255
- design parameters, 283
- design phase, 172
- design process, 255
- design tools, 257
- design-rule catalogues, 258
- differential capacitor, 219
- diffusion-restricted, 91
- digital light processor (DLP), 295
- Digital Light Projector, 300
- Digital Micromirror Devices, 300
- direct simulation Monte Carlo, 185
- direction cosines, 333
- displacement, virtual, 221
- distribution functions, 287, 288
- domain, non-electric, 2
- dopant sources, 116
- doping, 27
- dose, 118, 127
- double-sided lithography, 68
- down-scaling, 4
- drift current, electric, 216
- drive, electrostatic, 18, 21, 22
- driving force, 17
- dry oxidation, 85
- dynamic viscosity, 49

- effect direct piezoelectric, 1, 239, 224
 - reciprocal piezoelectric, 224
- effect piezoelectric, 224
- eigenfrequency, 171

- element dynamic, 171
 - static, 171
- energy functions, 275
- energy harvesting, 320
- energy potential, 18
- equivalent circuits, thermal, 199
- etch front, 107
 - groove, 97
 - mask, 70, 106, 127
 - rate, 107
 - resist, 61 93
 - stop, 93
 - stop layers, 47, 98, 112
- EULER number, 184
- evaporation sources, 88
- exposure, 78

- FANNING friction factor, 187
- FICK's law, 114
- filter, 310
- finger structure, interdigital, 10
- flip chip bonding, 165
- flow molecular, 179
 - viscous, 179
- fluid-gas mix, 237
- force-displacement relation, 261
- form functions, 271
- forms for parallel motions, 181
- FPA Focal Plane Arrays, 301
- fracture planes, 44
- function and form elements, 4
- function components, three-dimensional, 7
- function layer, 128
- function parameter, 283

- gas chromatograph, 2
- glass, 28
- glass transformation temperature, 47
- grain size, 142
- Grating Light Valve Technology (GLV), 300
- grey area, 75
- growth rate, 84
- gyrator, 210

- heat conduction, 195
- heat flow, 217, 233
- heat radiation, 195
- heating time, 232
- hermetic sealing, 167
- high-Q-capacitor, 310
- high-Q-inductor, 310

- inertia, fluidic, 189
- influence strength, 287
- injection moulding, 144
- input transducers, 207
- insulator, 28
- integrated semiconductor circuit, 2
- intelligent textile, 298
- interconnects, 190
 - press-fit, 189
 - substance-to-substance, 190
- ion etching, 95
- ion implantation, 71
- isotropic, 93

- junction rule, thermal, 200

- Kirchhoff networks, conservative, 268
- KNUDSEN number, 185

- lab on a chip, 320
- laminar flow, 75
- lateral stability, 182
- layer conformity, 85
- layer deposition, 84
- level of integration, 7
- LIGA technology, 2
- liquid film, 344
- liquid meniscus, 344
- lithographic process, 78
- load-vector, 260
- longitudinal coefficient, piezoresistive, 240
- long-term stability, 9
- loop rule, thermal, 200
- low-level behavioral models, 257

- MAXWELL's model, 50
- melting temperature, 47
- membrane, 171
- metallic strain gauge, 239
- method of modal superposition, 274
- micro fuel cells, 298, 326
- micro powder injection moulding, 142
- microanalysis, 9
- micro-dosing system, 9
- MicroElectroMechanical Systems (MEMS),
 - xi
 - microfluidics, 2
 - micromachining, xi
 - micromachining, near-surface, 2, 136
 - micro-mirror array, 295
 - microoptics, 2
 - microprocessors, 7
 - micropump, 192
 - microreactors, 9, 319
 - microsystem hybrid integration, 162
 - microsystem technology, xi, 2
 - microsystem's environment, 5
 - microvalve, 192
 - model libraries, 172
 - model parameters, 283
 - modelling step, 257
 - MOEMS, 301
 - monolithic integration, 163
 - moulding forms, 142

 - nanocomposite, 298
 - nanotechnology, 4
 - negative resist, 57
 - neutral axis, 59
 - NEWTON number, 24
 - NEWTON-RAPHSON method, 263
 - number dimensionless, 17, 22, 25
 - number of capillarity, 185

 - ONSAGER's criterion, 216
 - order reduction, 273
 - output transducers, 207
 - output value, 17
 - oxidation time, 86
 - oxidation, thermal, 28
 - oxide layer, buried, 125

 - packaging, 6, 155
 - parameter extraction, 276
 - parameter uncertainties, 287
 - parameter, geometric, 283
 - parameter, material, 283
 - parameters, critical, 283
 - parametric transducer, 208
 - particle, 69, 77
 - particle flow density, 90
 - PASCHEN effect, 21
 - passivating voltage, 104
 - path length, mean free, 87, 196
 - pattern transfer, 70
 - PECLET number, 185
 - per unit costs, 162
 - phase shifter, 310
 - phase transitions, 194, 231
 - photoresist, 55
 - photoresist layer, 78
 - piezoceramics, 225
 - piezoelectric generator, 321
 - piezopolymers, 225

- piezoresistors, 240
 piezoresponse microscopy (PRM), 308
 planar coil, 228
 planar transistor, 2
 plasma, 89
 plasma etching, 95
 pn-junctions, 2
 POISSON's ratio, 39, 176
 polymers, 30, 53
 positive resist, 58
 potentiostat, 104
 power supply, 6
 pressure sensor, piezoresistive, 3, 28
 pressure sensors, 2
 probe tips, 307
 process parameters, 283
 product requirements, 155
 projection display, 2
 projection exposure, 81
 pull-in effect, 263
- quantum effects, 4
 quartz, 30
 quartz glass, 30
- range, projected, 118
 reaction kinetics, 101
 reaction-restricted, 91
 realization phase, 257
 recharge currents, capacitive, 222
 reciprocity parameter, 209
 recrystallization, 124
 reduction coefficient, 18
 relaxation method, 263
 reliability, 7
 replication techniques, 142
 resistance structure, diffused, 3
 resistor, fluidic, 187
 resonance quality, 14
 resonant system, 10
 resonator, 310
 restoring force, 171
 reversibility, 216
 REYNOLDS number, 184
 RF Microsystem, 310
 RF-MEMS, 299
 roughness, 44
 rounded edges, 46
- sacrificial layer, 128
 scale factor, 22
 scaling, 17, 18, 19, 21, 25
- Scanning Spreading Resistance Microscopy (SSRM), 308
 scanning tunneling microscopy, 9
 SCREAM process, 2
 selectivity, 93
 semiconductor electronics, 1
 sensitivity, 17–20, 171, 174
 static, 179
 sensor, 207
 capacitive, 19
 miniaturized, 2
 sensor signal processor, digital, 2
 sensors and actuators, system suitable, 5
 shape, 67
 Shape Memory Alloys (SMA), 314
 shape-memory effect, 231
 shear modulus, 39
 shutter, 88
 signal flow charts, 268
 signal processing components, 5
 signal processing electronics, bipolar, 2
 silicate glass, 52
 silicon circuit, planar, 2
 silicon direct bonding, 2
 silicon wire resistance strain gauge, 3
 silicon, strain gauge, 240
 silicon-based technology, 7
 similar, 17, 22, 24
 similarity, 17, 23–25
 similarity constant, 22
 simulation, transient, 267
 single-domain problem, 259
 single-domain basic element, 260
 single-electron component, 4
 snap effect, 235
 softening, electrostatic, 222
 soldering, eutectic, 121
 spectrometers, 307
 spring stiffness, electric, 223
 spring-mass-systems, 172
 sputtering yield, 89
 squeeze-film damping, 178
 S-spring, 181
 state equations, 225
 step-by-step switchgear, micromechanical, 250
 sticking, 133
 stiffness, 59
 stiffness, electrostatic, 264
 strain difference, 59
 strain relaxation, 50
 strain-gauge effect, 239

- stress compensation, 62
- STROUHAL number, 185
- structure model, 173
- substrates, 28
- superposition, modal, 274
- surface effect, 22
- surface force, 22
- surface micromachining, 2
- surface normal direction, 174
- surface quality, 72
- surface transformation, 83
- switch, 310
- system function, 155

- TAB-bonding, 164
- taper, 45
- target, 88
- thermal conductivity, 31
- thermal shrinkage, 58
- thermopiles, 304
- thermoplastics, 54
- thin film, 29
- threshold acceleration sensor, 248
- tolerance bands, 292
- tolerance limits, 283
- top-down phase, 258
- torsional beam, 171
- total cost, 161
- total deviation, 287
- transducer constant, 209
- transducer, parametric, 215
- transfer function, 17
- transformation equations, 333
- transformer elements, 6

- transistor, 1, 2
- transversal coefficient, 242
- transverse response, 181
- trimming, 289
- TTV, total thickness variation, 45
- tunable capacitor, 310
- tuning voltage, 223
- tunnel effect, 4
- two-layer compound, 59
- two-step diffusion, 116

- ultimate stress, 41
- undercutting, 105
- undercutting etch rate, 105
- underfiller, 165

- vapor bubbles, 238
- variance contribution, 288
- volume effect, 22

- wafer, 44
- wafer bonding, 120, 149
- warp, 45
- WEBER number, 184
- WEIBULL distribution, 42
- wet etching, 94
- wet oxidation, 85
- white area, 75
- wire bonding, 164
- wireless communications, 320

- yaw rate sensor, 9
- yield, 71, 73
- YOUNG's modulus, 39