



|           |      |       |         |        |       |         |      |        |      |         |
|-----------|------|-------|---------|--------|-------|---------|------|--------|------|---------|
| BAS40     | 200  | 40    | 100     | 200    | 0.2   | 30      | 1    | 40     | 5    | 43      |
| BAS40-04  | 200  | 40    | 100     | 200    | 0.2   | 30      | 1    | 40     | 5    | 44      |
| BAS40-05  | 200  | 40    | 100     | 200    | 0.2   | 30      | 1    | 40     | 5    | 45      |
| BAS40-06  | 200  | 40    | 100     | 200    | 0.2   | 30      | 1    | 40     | 5    | 46      |
| BAS70     | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5    | 73      |
| BAS70-04  | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5    | 74      |
| BAS70-05  | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5    | 75      |
| BAS70-06  | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5    | 76      |
| BAT54     | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5    | KL1     |
| BAT54A    | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5    | KL2     |
| BAT54C    | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5    | KL3     |
| BAT54S    | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5    | KL4     |
| BAV199LT1 | 225  | 70    | 100     | 215    | 5nA   | 70      | 1.25 | 150    | 3000 | JY      |
| BAV70LT1  | 225  | 70    | 100     | 200    | 2.5   | 70      | 1.25 | 150    | 6    | A4      |
| BAV74LT1  | 225  | 50    | 5       | 200    | 0.1   | 50      | 1    | 100    | 4    | JA      |
| BAV99LT1  | 225  | 70    | 100     | 215    | 2.5   | 70      | 1.25 | 150    | 6    | A7      |
| BAW56LT1  | 225  | 70    | 100     | 200    | 2.5   | 70      | 1.25 | 150    | 6    | A1      |
| CMPSH-3   | 350  | 30    | 100     | 100    | 0.5   | 25      | 1    | 100    | 5    | D95     |
| CMPSH-3A  | 350  | 30    | 100     | 100    | 0.5   | 25      | 1    | 100    | 5    | DB1     |
| CMPSH-3C  | 350  | 30    | 100     | 100    | 0.5   | 25      | 1    | 100    | 5    | DB2     |
| CMPSH-3S  | 350  | 30    | 100     | 100    | 0.5   | 25      | 1    | 100    | 5    | DA5     |
| MC2836    | 150  | 50    | 100     | 300    | 0.1   | 50      | 1.2  | 100    | 4    | A41     |
| MC2838    | 150  | 50    | 100     | 300    | 0.1   | 50      | 1.2  | 100    | 3    | A61     |
|           | PD   | VR(V) | IFM(mA) | IR(μA) | VF(V) | Trr(ns) |      |        |      |         |
|           | (mW) |       | IR(μA)  |        |       | VR(V)   |      | IF(mA) |      | MARKING |
| MMBD1501A | 350  | 200   | 5       | 600    | 0.01  | 180     | 1.5  | 300    |      | A11     |
| MMBD1503A | 350  | 200   | 5       | 600    | 0.01  | 180     | 1.5  | 300    |      | A13     |
| MMBD1504A | 350  | 200   | 5       | 600    | 0.01  | 180     | 1.5  | 300    |      | A14     |
| MMBD1505A | 350  | 200   | 5       | 600    | 0.01  | 180     | 1.5  | 300    |      | A15     |
| MMBD4148  | 350  | 75    | 100     | 300    | 2.5   | 75      | 1.25 | 150    | 4    | KA2     |
| MMBD4148A | 350  | 100   | 100     | 200    | 5     | 75      | 1    | 10     | 4    | 5H      |
| MMBD4148C | 350  | 100   | 100     | 200    | 5     | 75      | 1    | 10     | 4    | D6      |
| MMBD4148C | 350  | 100   | 100     | 200    | 5     | 75      | 1    | 10     | 4    | KD5     |
| MMBD4148S | 350  | 100   | 100     | 200    | 5     | 75      | 1    | 10     | 4    | D4      |
| MMBD7000  | 225  | 100   | 100     | 200    | 3     | 100     | 1.1  | 100    | 4    | M5C     |
| MMBD914LT | 225  | 75    | 100     | 200    | 2.5   | 75      | 1.25 | 150    | 4    | 5D      |

#### DIODES IN SOT-23-3L

|           |      |       |         |        |       |         |      |        |    |         |
|-----------|------|-------|---------|--------|-------|---------|------|--------|----|---------|
|           | PD   | VR(V) | IFM(mA) | IR(μA) | VF(V) | Trr(ns) |      |        |    |         |
|           | (mW) |       | IR(μA)  |        |       | VR(V)   |      | IF(mA) |    | MARKING |
| 1N5817    | 300  | 20    | 1000    | 1000   | 1000  | 20      | 0.75 | 3000   |    | SJ      |
| 1N5819    | 300  | 40    | 1000    | 1000   | 1000  | 40      | 0.9  | 3000   |    | SL      |
| CMSD2004S | 250  | 300   | 100     | 225    | 0.1   | 240     | 1    | 100    | 50 | B6D     |

#### DIODES IN SOT-323

|           |      |       |         |        |       |         |      |        |    |         |
|-----------|------|-------|---------|--------|-------|---------|------|--------|----|---------|
|           | PD   | VR(V) | IFM(mA) | IR(μA) | VF(V) | Trr(ns) |      |        |    |         |
|           | (mW) |       | IR(μA)  |        |       | VR(V)   |      | IF(mA) |    | MARKING |
| BAS19W    | 200  | 100   | 100     | 200    | 0.1   | 100     | 1.25 | 200    | 50 | KA8     |
| BAS20W    | 200  | 150   | 100     | 200    | 0.1   | 150     | 1.25 | 200    | 50 | KT2     |
| BAS21W    | 200  | 200   | 100     | 200    | 0.1   | 200     | 1.25 | 200    | 50 | KT3     |
| BAS40W*   | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 43      |
| BAS40W-04 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 44      |
| BAS40W-05 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 45      |
| BAS40W-06 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 46      |
| BAS70W    | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K73     |
| BAS70W-04 | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K74     |

#### DIODES IN SOT-323

|           |      |       |         |        |       |         |      |        |    |         |
|-----------|------|-------|---------|--------|-------|---------|------|--------|----|---------|
|           | PD   | VR(V) | IFM(mA) | IR(μA) | VF(V) | Trr(ns) |      |        |    |         |
|           | (mW) |       | IR(μA)  |        |       | VR(V)   |      | IF(mA) |    | MARKING |
| BAS19W    | 200  | 100   | 100     | 200    | 0.1   | 100     | 1.25 | 200    | 50 | KA8     |
| BAS20W    | 200  | 150   | 100     | 200    | 0.1   | 150     | 1.25 | 200    | 50 | KT2     |
| BAS21W    | 200  | 200   | 100     | 200    | 0.1   | 200     | 1.25 | 200    | 50 | KT3     |
| BAS40W*   | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 43      |
| BAS40W-04 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 44      |
| BAS40W-05 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 45      |
| BAS40W-06 | 200  | 40    | 10      | 200    | 0.2   | 30      | 1    | 40     | 5  | 46      |
| BAS70W    | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K73     |
| BAS70W-04 | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K74     |
| BAS70W-05 | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K75     |
| BAS70W-06 | 200  | 70    | 10      | 70     | 0.1   | 50      | 1    | 15     | 5  | K76     |
| BAT54AW*  | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5  | KL6     |
| BAT54CW   | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5  | KL7     |
| BAT54SW*  | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5  | KL8     |
| BAT54W*   | 200  | 30    | 100     | 200    | 2     | 25      | 1    | 100    | 5  | KL5     |
| BAV70W    | 200  | 75    | 100     | 150    | 2.5   | 75      | 1.25 | 150    | 4  | KJA     |
| BAV99W    | 200  | 75    | 100     | 150    | 2.5   | 75      | 1.25 | 150    | 4  | KJG     |
| BAW56W    | 200  | 75    | 100     | 150    | 2.5   | 75      | 1.25 | 150    | 4  | KJC     |
| CMSD2004S | 250  | 240   | 100     | 225    | 0.1   | 240     | 1    | 100    | 50 | B6D     |
| DA204U    | 200  | 20    | 100     | 100    | 0.1   | 15      | 1    | 10     |    | K       |
| DAN202U   | 200  | 80    | 100     | 100    | 0.1   | 70      | 1.2  | 100    | 4  | N       |
| DAP202U   | 200  | 80    | 100     | 100    | 0.1   | 70      | 1.2  | 100    | 4  | P       |
| MMBD4148V | 200  | 75    | 100     | 150    | 1     | 75      | 1.25 | 150    | 4  | A2,KA2  |
| MMBD4448V | 200  | 75    | 10      | 250    | 2.5   | 75      | 1.25 | 150    | 4  | KA3     |
| RB706F-40 | 200  | 40    | 100     | 30     | 1     | 10      | 0.37 | 1      |    | 3J      |
| RB715F    | 200  | 40    | 100     | 30     | 1     | 10      | 0.37 | 1      |    | 3D      |
| RB717F    | 200  | 40    | 100     | 30     | 1     | 10      | 0.37 | 1      |    | 3E      |

**SCHOTTKY BARRIER RECTIFIER IN TO-220**

|           | PD<br>(W) | POLARITY | VR(V)  | IFM(A) | IO(A) | IR(mA) | VF(V) | CJ(PF) | IF(A) |     |      |
|-----------|-----------|----------|--------|--------|-------|--------|-------|--------|-------|-----|------|
|           |           |          | IR(mA) |        |       |        | VR(V) |        |       |     |      |
| MBR1030CT | 2         | ACA      | 30     |        | 125   | 10     | 0.1   | 30     | 0.7   | 5   | 150  |
| MBR1035CT | 2         | ACA      | 35     |        | 125   | 10     | 0.1   | 35     | 0.7   | 5   | 150  |
| MBR1040CT | 2         | ACA      | 40     |        | 125   | 10     | 0.1   | 40     | 0.7   | 5   | 150  |
| MBR1045CT | 2         | ACA      | 45     |        | 125   | 10     | 0.1   | 45     | 0.7   | 5   | 150  |
| MBR1050CT | 2         | ACA      | 50     |        | 125   | 10     | 0.1   | 50     | 0.8   | 5   | 150  |
| MBR1060CT | 2         | ACA      | 60     |        | 125   | 10     | 0.1   | 60     | 0.8   | 5   | 150  |
| MBR1530CT | 2         | ACA      | 30     |        | 150   | 15     | 0.1   | 30     | 0.7   | 7.5 | 300  |
| MBR1535CT | 2         | ACA      | 35     |        | 150   | 15     | 0.1   | 35     | 0.7   | 7.5 | 300  |
| MBR1540CT | 2         | ACA      | 40     |        | 150   | 15     | 0.1   | 40     | 0.7   | 7.5 | 300  |
| MBR1545CT | 2         | ACA      | 45     |        | 150   | 15     | 0.1   | 45     | 0.7   | 7.5 | 300  |
| MBR1550CT | 2         | ACA      | 50     |        | 150   | 15     | 1     | 50     | 0.75  | 7.5 | 300  |
| MBR1560CT | 2         | ACA      | 60     |        | 150   | 15     | 1     | 60     | 0.75  | 7.5 | 300  |
| MBR2030CT | 2         | ACA      | 30     |        | 150   | 20     | 0.1   | 30     | 0.7   | 10  | 650  |
| MBR2035CT | 2         | ACA      | 35     |        | 150   | 20     | 0.1   | 35     | 0.7   | 10  | 650  |
| MBR2040CT | 2         | ACA      | 40     |        | 150   | 20     | 0.1   | 40     | 0.7   | 10  | 650  |
| MBR2045CT | 2         | ACA      | 45     |        | 150   | 20     | 0.1   | 45     | 0.7   | 10  | 650  |
| MBR2050CT | 2         | ACA      | 50     |        | 150   | 20     | 0.1   | 50     | 0.8   | 10  | 650  |
| MBR2060CT | 2         | ACA      | 60     |        | 150   | 20     | 0.1   | 60     | 0.8   | 10  | 650  |
| MBR2070CT | 2         | ACA      | 70     |        | 150   | 20     | 0.15  | 70     | 0.85  | 10  | 1000 |
| MBR2080CT | 2         | ACA      | 80     |        | 150   | 20     | 0.15  | 80     | 0.85  | 10  | 1000 |
| MBR2090CT | 2         | ACA      | 90     |        | 150   | 20     | 0.15  | 90     | 0.85  | 10  | 1000 |
| MBR20100C | 2         | ACA      | 100    |        | 150   | 20     | 0.15  | 100    | 0.85  | 10  | 1000 |
| MBR20150C | 2         | ACA      | 150    |        | 150   | 20     | 0.1   | 150    | 0.9   | 10  |      |
| MBR20200C | 2         | ACA      | 200    |        | 150   | 20     | 1     | 200    | 0.9   | 10  |      |
| SBL2030CT | 2         | ACA      | 30     | 0.5    | 150   | 20     | 0.45  | 30     | 0.55  | 10  |      |
| SBL2035CT | 2         | ACA      | 35     | 0.5    | 150   | 20     | 0.45  | 35     | 0.55  | 10  |      |
| SBL2040CT | 2         | ACA      | 40     | 0.5    | 150   | 20     | 0.45  | 40     | 0.55  | 10  |      |
| SBL2050CT | 2         | ACA      | 50     | 0.5    | 150   | 20     | 0.45  | 50     | 0.7   | 10  |      |
| SBL2060CT | 2         | ACA      | 60     | 0.5    | 150   | 20     | 0.45  | 60     | 0.7   | 10  |      |

**TRANSISTOR IN SOT-23**

|            | POLARITY | PD   | IC   | BVCBO | BVCEO | BVEBO | hFE | VCE(sat) | IT     | IC(mA) | V(V) | IC(mA) | IB(mA) | (MHz) | MARKING     |
|------------|----------|------|------|-------|-------|-------|-----|----------|--------|--------|------|--------|--------|-------|-------------|
|            |          | (mW) | (mA) | (V)   | (V)   | (V)   | MIN | MAX      | VCE(V) |        |      |        |        |       |             |
| 2SA1037    | PNP      | 200  | 150  | 60    | 50    | 6     | 120 | 560      | 6      | 1      | 0.5  | 50     | 5      | 120   | FQ,FR,FS    |
| 2SA1179    | PNP      | 200  | 150  | 55    | 50    | 5     | 200 | 400      | 6      | 1      | 0.5  | 50     | 5      | 180+  | M           |
| 2SA1235A   | PNP      | 200  | 200  | 60    | 50    | 6     | 150 | 600      | 6      | 1      | 0.3  | 100    | 10     | 180   | ME, MF      |
| 2SA812     | PNP      | 200  | 100  | 60    | 50    | 5     | 90  | 600      | 6      | 1      | 0.3  | 100    | 10     | 180   | M4,M5,M6,M7 |
| 2SB709A    | PNP      | 200  | 200  | 45    | 45    | 7     | 160 | 460      | 10     | 2      | 0.5  | 100    | 10     | 60    | BQ,BR,BS    |
| 2SC1623    | PNP      | 200  | 100  | 60    | 50    | 5     | 90  | 600      | 6      | 1      | 0.3  | 100    | 10     | 250   | L4,L5,L6,L7 |
| 2SC2712    | NPN      | 150  | 150  | 60    | 50    | 5     | 70  | 700      | 6      | 2      | 0.25 | 100    | 10     | 80    | LO,LY,LG,LL |
| 2SC3052    | NPN      | 150  | 200  | 50    | 50    | 6     | 150 | 800      | 6      | 1      | 0.3  | 100    | 10     | 180   | LE,LF,LG    |
| 2SC5344    | NPN      | 200  | 800  | 35    | 30    | 5     | 100 | 320      | 1      | 100    | 0.5  | 500    | 50     | 80    | FAO,FAY     |
| A1015LT1   | PNP      | 200  | 150  | 50    | 50    | 5     | 130 | 400      | 6      | 2      | 0.3  | 100    | 10     | 80    | BA          |
| A733LT1    | PNP      | 200  | 150  | 60    | 50    | 5     | 120 | 475      | 6      | 1      | 0.3  | 100    | 10     | 50    | CS          |
| BC807      | PNP      | 300  | 500  | 50    | 45    | 5     | 100 | 600      | 1      | 100    | 0.7  | 500    | 50     | 100   | 5A1,5B,5C   |
| BC808      | PNP      | 200  | 500  | 30    | 25    | 5     | 100 | 630      | 1      | 100    | 0.7  | 500    | 50     | 100   | 6A,6B,6C    |
| BC817      | PNP      | 200  | 500  | 30    | 25    | 5     | 100 | 630      | 1      | 100    | 0.7  | 500    | 50     | 100   | 6E,6F,6G    |
| BC846A,B,L | NPN      | 225  | 100  | 80    | 65    | 6     | 110 | 450      | 5      | 2      | 0.5  | 100    | 5      | 100   | 1A,1B       |
| BC847A,B,C | NPN      | 225  | 100  | 50    | 45    | 6     | 110 | 800      | 5      | 2      | 0.5  | 100    | 5      | 100   | 1E,1F,1G    |
| BC848A,B,C | NPN      | 225  | 100  | 30    | 30    | 6     | 110 | 800      | 5      | 2      | 0.5  | 100    | 5      | 100   | 1J,1K,1L    |
| BC849*     | NPN      | 310  | 100  | 30    | 30    | 5     | 110 | 800      | 5      | 2      | 0.6  | 100    | 5      | 200   | 8DA,8DB,8DC |
| BC850*     | NPN      | 310  | 100  | 50    | 45    | 5     | 110 | 800      | 5      | 2      | 0.6  | 100    | 5      | 200   | 8EA,8EB,8EC |
| BC856A,B,L | PNP      | 225  | 100  | 80    | 65    | 5     | 125 | 475      | 5      | 2      | 0.5  | 100    | 5      | 100   | 3A,3B       |
| BC857A,B,C | PNP      | 225  | 100  | 50    | 45    | 5     | 125 | 800      | 5      | 2      | 0.5  | 100    | 5      | 100   | 3E,3F,3G    |
| BC858A,B,C | PNP      | 225  | 100  | 30    | 30    | 5     | 125 | 800      | 5      | 2      | 0.5  | 100    | 5      | 100   | 3J,3K,3L    |
| BCW30LT1   | PNP      | 225  | 100  | 32    | 32    | 5     | 215 | 500      | 5      | 2      | 0.3  | 10     | 0.5    |       | C2X         |
| BCW60C     | NPN      | 250  | 100  | 32    | 32    | 5     | 250 | 460      | 5      | 2      | 0.55 | 50     | 1.25   | 100   | AC          |
| BCW61B     | PNP      | 250  | 200  | 32    | 32    | 5     | 180 | 310      | 5      | 2      | 0.55 | 50     | 1.25   | 100   | BB          |
| BCW61C     | PNP      | 250  | 100  | 32    | 32    | 5     | 250 | 460      | 5      | 2      | 1.05 | 50     | 1.25   | 100   | BC          |
| BCW66H     | NPN      | 330  | 800  | 75    | 45    | 5     | 250 | 630      | 1      | 100    | 0.7  | 500    | 50     | 100   | EH          |
| BCW68      | PNP      | 330  | 800  | 60    | 45    | 5     | 160 | 630      | 2      | 100    | 1    | 500    | 50     | 100   | DG,DH       |
| BCX19LT1   | NPN      | 225  | 500  | 50    | 45    | 5     | 100 | 600      | 1      | 100    | 0.62 | 500    | 50     |       | U1          |
| BCX70J     | NPN      | 250  | 200  | 45    | 45    | 5     | 250 | 460      | 5      | 2      | 0.55 | 50     | 1.25   | 100   | AJ          |
| BCX70K     | NPN      | 250  | 200  | 45    | 45    | 5     | 380 | 630      | 5      | 2      | 0.55 | 50     | 1.25   | 100   | AK          |
| BFS20      | NPN      | 250  | 25   | 30    | 20    | 4     | 40  | 120      | 10     | 7      | 0.3  | 10     | 1      | 275   | G11         |
| C1815LT1   | NPN      | 200  | 150  | 60    | 50    | 5     | 130 | 400      | 6      | 2      | 0.25 | 100    | 10     | 80    | HF          |
| C945LT1    | NPN      | 200  | 150  | 60    | 50    | 5     | 130 | 400      | 6      | 1      | 0.3  | 100    | 10     | 150   | CR          |
| FMMT4124   | NPN      | 330  | 200  | 30    | 25    | 5     | 120 | 360      | 1      | 2      | 0.3  | 50     | 5      | 300   | ZC          |
| FMMT458    | NPN      | 500  | 1000 | 400   | 400   | 5     | 100 | 300      | 10     | 50     | 0.5  | 50     | 6      | 50    | 458         |
| KSA1182    | PNP      | 150  | 500  | 35    | 30    | 5     | 70  | 240      | 1      | 100    | 0.25 | 100    | 10     | 150   | F10,F1Y     |
| KTA1298    | PNP      | 200  | 800  | 35    | 30    | 5     | 100 | 320      | 1      | 100    | 0.4  | 500    | 20     | 80    | IO,IY       |
| KTA1504    | PNP      | 150  | 150  | 50    | 50    | 5     | 70  | 400      | 6      | 2      | 0.3  | 100    | 10     | 80    | ASO,ASY,ASG |

|          | POLARITY | PD   | IC   | BVCBO | BVCEO | BVEBO | hFE | VCE(sat) | IT     | IC(mA) | V(V) | IC(mA) | IB(mA) | (MHz) | MARKING         |
|----------|----------|------|------|-------|-------|-------|-----|----------|--------|--------|------|--------|--------|-------|-----------------|
|          |          | (mW) | (mA) | (V)   | (V)   | (V)   | MIN | MAX      | VCE(V) |        |      |        |        |       |                 |
| KTA1505  | PNP      | 150  | 500  | 35    | 30    | 5     | 70  | 400      | 1      | 100    | 0.25 | 100    | 10     | 150   | AZO,AZY,AZG     |
| KTC3265  | NPN      | 200  | 800  | 35    | 30    | 5     | 100 | 320      | 1      | 100    | 0.5  | 500    | 20     | 120   | EO,EY           |
| KTC3875  | NPN      | 150  | 150  | 60    | 50    | 5     | 70  | 700      | 6      | 2      | 0.25 | 100    | 10     | 80    | ALO,ALY,ALG,ALL |
| KTC3880S | NPN      | 150  | 20   | 40    | 30    | 4     | 40  | 200      | 6      | 1      |      |        |        | 500   | AQR,AQO,AQY     |
| KTC4075  | NPN      | 100  | 150  | 60    | 50    | 5     | 70  | 700      | 6      | 2      | 0.25 | 100    | 10     | 80    | LO1,LY1,LG1,LL1 |
| M28S     | NPN      | 200  | 1000 | 40    | 20    | 6     | 300 | 1000     | 1      | 100    | 0.55 | 600    | 20     | 100   | 28S             |

|           |     |     |      |     |     |    |       |      |    |     |      |     |     |     |     |
|-----------|-----|-----|------|-----|-----|----|-------|------|----|-----|------|-----|-----|-----|-----|
| M8050     | NPN | 200 | 1000 | 40  | 25  | 6  | 80    | 300  | 1  | 100 | 0.5  | 800 | 80  | 150 | Y11 |
| M8550     | PNP | 200 | 1000 | 40  | 25  | 6  | 85    | 300  | 1  | 100 | 0.5  | 800 | 80  | 150 | Y21 |
| MMBT2222A | NPN | 300 | 600  | 75  | 40  | 6  | 100   | 300  | 10 | 150 | 0.6  | 500 | 50  | 300 | 1P  |
| MMBT2222L | NPN | 300 | 600  | 60  | 30  | 5  | 100   | 300  | 10 | 150 | 1    | 500 | 50  | 250 | M1B |
| MMBT2907A | PNP | 300 | 600  | 60  | 60  | 5  | 100   | 300  | 10 | 150 | 0.6  | 500 | 50  | 200 | 2F  |
| MMBT2907L | PNP | 300 | 600  | 60  | 40  | 5  | 100   | 300  | 10 | 150 | 1    | 500 | 50  | 200 | M2B |
| MMBT3904L | NPN | 200 | 200  | 60  | 40  | 6  | 100   | 300  | 10 | 1   | 0.3  | 50  | 5   | 250 | 1AM |
| MMBT3906L | PNP | 200 | 200  | 40  | 40  | 5  | 100   | 300  | 10 | 1   | 0.3  | 50  | 5   | 250 | 2A  |
| MMBT4401L | NPN | 300 | 600  | 60  | 40  | 6  | 100   | 300  | 1  | 150 | 0.4  | 150 | 15  | 250 | 2X  |
| MMBT4403L | PNP | 300 | 600  | 40  | 40  | 5  | 100   | 300  | 2  | 150 | 0.4  | 150 | 15  | 200 | 2T  |
| MMBT5401L | PNP | 300 | 600  | 160 | 150 | 5  | 100   | 200  | 5  | 10  | 0.5  | 50  | 5   | 100 | 2L  |
| MMBT5550L | NPN | 225 | 600  | 160 | 140 | 6  | 60    | 250  | 5  | 10  | 0.25 | 50  | 5   | 100 | M1F |
| MMBT5551L | NPN | 300 | 600  | 180 | 160 | 6  | 80    | 250  | 5  | 10  | 0.5  | 50  | 5   | 80  | G1  |
| MMBTA06L  | NPN | 300 | 500  | 80  | 80  | 4  | 100   | 200  | 1  | 100 | 0.25 | 100 | 10  | 100 | 1GM |
| MMBTA13   | NPN | 300 | 300  | 30  | 30  | 10 | 10000 |      | 5  | 100 | 1.5  | 100 | 0.1 | 125 | K2D |
| MMBTA14   | NPN | 300 | 300  | 30  | 30  | 10 | 20000 |      | 5  | 100 | 1.5  | 100 | 0.1 | 125 | K3D |
| MMBTA42L  | NPN | 300 | 300  | 300 | 300 | 5  | 100   | 200  | 10 | 10  | 0.2  | 20  | 2   | 50  | 1D  |
| MMBTA43   | NPN | 225 | 500  | 200 | 200 | 6  | 40    |      | 10 | 30  | 0.5  | 20  | 2   |     | M1E |
| MMBTA55L  | PNP | 225 | 500  | 60  | 60  | 4  | 100   |      | 1  | 10  | 0.25 | 100 | 10  | 50  | 2H  |
| MMBTA56L  | PNP | 225 | 500  | 80  | 80  | 4  | 100   |      | 1  | 10  | 0.25 | 100 | 10  | 50  | 2GM |
| MMBTA92L  | PNP | 300 | 300  | 300 | 300 | 5  | 100   | 200  | 10 | 10  | 0.2  | 20  | 2   | 50  | 2D  |
| MMBTH10L  | NPN | 225 | 50   | 30  | 25  | 3  | 60    |      | 10 | 4   | 0.5  | 4   | 0.4 | 650 | 3EM |
| S8050LT1  | NPN | 300 | 500  | 40  | 25  | 5  | 120   | 350  | 1  | 50  | 0.6  | 500 | 50  | 150 | J3Y |
| S8550LT1  | PNP | 300 | 500  | 40  | 25  | 5  | 120   | 350  | 1  | 50  | 0.6  | 500 | 50  | 150 | 2TY |
| S9011LT1  | NPN | 200 | 30   | 30  | 20  | 4  | 70    | 200  | 5  | 1   | 0.3  | 10  | 1   | 150 | 1T  |
| S9012LT1  | PNP | 300 | 500  | 40  | 25  | 5  | 120   | 350  | 1  | 50  | 0.6  | 500 | 50  | 150 | 2T1 |
| S9013LT1  | NPN | 300 | 500  | 40  | 25  | 5  | 120   | 350  | 1  | 50  | 0.6  | 500 | 50  | 150 | J3  |
| S9014LT1  | NPN | 200 | 100  | 50  | 45  | 5  | 200   | 1000 | 5  | 1   | 0.3  | 100 | 5   | 150 | J6  |
| S9015LT1  | PNP | 200 | 100  | 50  | 45  | 5  | 200   | 1000 | 5  | 1   | 0.3  | 100 | 10  | 150 | M6  |
| S9016LT1  | NPN | 200 | 25   | 30  | 20  | 5  | 70    | 200  | 5  | 1   | 0.3  | 10  | 1   | 300 | Y6  |
| S9018LT1  | NPN | 200 | 50   | 25  | 18  | 4  | 70    | 190  | 5  | 1   | 0.5  | 10  | 1   | 600 | J8  |
| SS8050LT1 | NPN | 300 | 1500 | 40  | 25  | 5  | 120   | 350  | 1  | 100 | 0.5  | 800 | 80  | 100 | Y1  |
| SS8550LT1 | PNP | 300 | 1500 | 40  | 25  | 5  | 120   | 350  | 1  | 100 | 0.5  | 800 | 80  | 100 | Y2  |

### TRANSISTOR IN SOT-223

|        | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE MIN | hFE MAX | VCE(sat) VCE(V) | IT IC(mA) | (V) | IC(mA) | IB(mA) | (MHz) |
|--------|----------|-----------|---------|---------|-----------|-----------|-----------|---------|---------|-----------------|-----------|-----|--------|--------|-------|
| BCP54  | NPN      | BCE       | 1330    | 1000    | 45        | 45        | 5         | 63      | 250     | 2               | 150       | 0.5 | 500    | 50     | 130   |
| TIP31  | NPN      | BCE       | 1300    | 3000    | 40        | 40        | 5         | 10      | 50      | 4               | 3000      | 1.2 | 3000   | 375    | 3     |
| TIP31A | NPN      | BCE       | 1300    | 3000    | 60        | 60        | 5         | 10      | 50      | 4               | 3000      | 1.2 | 3000   | 375    | 3     |
| TIP31B | NPN      | BCE       | 1300    | 3000    | 80        | 80        | 5         | 10      | 50      | 4               | 3000      | 1.2 | 3000   | 375    | 3     |
| TIP31C | NPN      | BCE       | 1300    | 3000    | 100       | 100       | 5         | 10      | 50      | 4               | 3000      | 1.2 | 3000   | 375    | 3     |

### TRANSISTOR SOT-23-3L

|           | POLARITY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE MIN | hFE MAX | VCE(sat) VCE(V) | IT IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) | MARKING             |
|-----------|----------|---------|---------|-----------|-----------|-----------|---------|---------|-----------------|-----------|------|--------|--------|-------|---------------------|
| 2SA1036K  | PNP      | 200     | 500     | 40        | 32        | 5         | 82      | 390     | 3               | 10        | 0.4  | 100    | 10     | 200+  | HP,HQ,HR            |
| 2SA1037   | PNP      | 200     | 150     | 60        | 50        | 6         | 120     | 560     | 6               | 1         | 0.5  | 50     | 5      | 120   | FQ,FR,FS            |
| 2SA1162   | PNP      | 150     | 150     | 50        | 50        | 5         | 70      | 400     | 6               | 2         | 0.3  | 100    | 10     | 80    | SO,SY,SG            |
| 2SA1235A  | PNP      | 200     | 200     | 60        | 50        | 6         | 150     | 500     | 6               | 1         | 0.3  | 100    | 10     | 180   | MoE,MoF             |
| 2SA1313   | PNP      | 200     | 500     | 50        | 50        | 5         | 70      | 240     | 1               | 100       | 0.25 | 100    | 10     | 200+  | ACO,ACY             |
| 2SA1464   | PNP      | 200     | 500     | 60        | 40        | 5         | 75      | 300     | 2               | 150       | 0.75 | 500    | 50     | 150   | Y12,Y13,Y14         |
| 2SA812    | PNP      | 200     | 100     | 60        | 50        | 5         | 90      | 600     | 6               | 1         | 0.3  | 100    | 10     | 180   | M4,M5,M6,M7         |
| 2SB1197K  | PNP      | 200     | 800     | 40        | 32        | 5         | 82      | 390     | 3               | 100       | 0.5  | 500    | 50     | 50    | AHP,AHQ,AHR         |
| 2SB624    | PNP      | 200     | 700     | 30        | 25        | 5         | 110     | 400     | 1               | 100       | 0.6  | 700    | 70     | 140   | BV1,BV2,BV3,BV4,BV5 |
| 2SC1623   | NPN      | 200     | 100     | 60        | 50        | 5         | 90      | 600     | 6               | 1         | 0.3  | 100    | 10     | 250+  | L4,L5,L6,L7         |
| 2SC2223   | NPN      | 150     | 20      | 30        | 20        | 4         | 40      | 180     | 6               | 1         | 0.3  | 10     | 1      | 400   | F12,F13,F14         |
| 2SC2411K  | NPN      | 200     | 500     | 40        | 32        | 5         | 82      | 390     | 3               | 100       | 0.4  | 500    | 50     | 250+  | CP,CQ,CR            |
| 2SC2412K  | NPN      | 200     | 150     | 60        | 50        | 7         | 120     | 560     | 6               | 1         | 0.4  | 50     | 5      | 150   | BQ,BR,BS            |
| 2SC2734*  | NPN      | 150     | 50      | 20        | 11        | 3         | 20      | 200     | 10              | 5         | 0.7  | 10     | 5      | 1400  | GC                  |
| 2SC2735*  | NPN      | 150     | 50      | 30        | 20        | 3         | 40      |         | 10              | 10        | 1    | 20     | 4      | 600   | JC                  |
| 2SC3052   | NPN      | 150     | 200     | 50        | 50        | 6         | 150     | 800     | 6               | 1         | 0.3  | 100    | 10     | 180   | LE,LF,LG            |
| 2SC3356*  | NPN      | 200     | 100     | 20        | 12        | 3         | 50      | 300     | 10              | 20        |      |        |        | 6000  | R23,R24,R25         |
| 2SC3739   | NPN      | 200     | 500     | 60        | 40        | 5         | 75      | 300     | 1               | 150       | 0.75 | 500    | 50     | 200   | B12,B13,B14         |
| 2SC3838K* | NPN      | 150     | 50      | 20        | 11        | 3         | 27      | 270     | 10              | 5         | 0.5  | 10     | 5      | 1400  | AD                  |
| 2SD1781K  | NPN      | 200     | 800     | 40        | 32        | 5         | 120     | 390     | 3               | 100       | 0.4  | 500    | 50     | 150+  | AFQ,AFR             |
| 2SD596    | NPN      | 200     | 700     | 30        | 25        | 5         | 110     | 400     | 1               | 100       | 0.6  | 700    | 70     | 140   | DV1,DV2,DV3,DV4,DV5 |
| MMBTA44   | NPN      | 350     | 300     | 500       | 400       | 6         | 50      | 240     | 10              | 10        | 0.75 | 50     | 5      | 50    | 3D                  |

### TRANSISTOR IN SOT-323

|           | POLARITY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE MIN | hFE MAX | VCE(sat) VCE(V) | IT IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) | MARKING     |
|-----------|----------|---------|---------|-----------|-----------|-----------|---------|---------|-----------------|-----------|------|--------|--------|-------|-------------|
| 2SA1576A  | PNP      | 200     | 150     | 60        | 50        | 6         | 120     | 560     | 6               | 1         | 0.5  | 50     | 5      | 100+  | FQ,FR,FS    |
| 2SA1577   | PNP      | 200     | 500     | 40        | 32        | 5         | 82      | 390     | 3               | 10        | 0.4  | 100    | 10     | 200+  | HP,HQ,HR    |
| 2SB1218A  | PNP      | 150     | 100     | 45        | 45        | 7         | 160     | 460     | 10              | 2         | 0.5  | 100    | 10     | 80+   | BQ1,BR1,BS1 |
| 2SC4081   | NPN      | 200     | 150     | 60        | 50        | 7         | 120     | 560     | 6               | 1         | 0.4  | 50     | 5      | 180+  | BQ,BR,BS    |
| 2SC4097   | NPN      | 200     | 500     | 40        | 32        | 5         | 82      | 390     | 3               | 10        | 0.4  | 100    | 10     | 250+  | CP,CQ,CR    |
| 2SC4177   | NPN      | 150     | 100     | 60        | 50        | 5         | 90      | 600     | 6               | 1         | 0.3  | 100    | 10     | 250   | L4,L5,L6,L7 |
| KTC4076   | NPN      | 100     | 500     | 35        | 30        | 5         | 70      | 240     | 1               | 100       | 0.25 | 100    | 10     | 300+  | WO,WY       |
| MMST2222A | NPN      | 200     | 600     | 75        | 40        | 6         | 100     | 300     | 10              | 150       | 0.6  | 500    | 50     | 300   | K3P         |
| MMST2907A | PNP      | 200     | 600     | 60        | 60        | 5         | 100     | 300     | 10              | 150       | 0.6  | 500    | 50     | 200   | K3F         |
| MMST3904  | NPN      | 200     | 200     | 60        | 40        | 5         | 100     | 300     | 1               | 10        | 0.3  | 50     | 5      | 250   | K2N         |
| MMST3906  | PNP      | 200     | 200     | 40        | 40        | 5         | 100     | 300     | 1               | 10        | 0.3  | 50     | 5      | 300   | K5N         |
| MMST4401  | NPN      | 200     | 600     | 60        | 40        | 6         | 100     | 300     | 1               | 150       | 0.75 | 500    | 50     | 250   | K3X         |

|           |     |     |      |     |     |   |     |     |    |     |     |     |    |     |     |
|-----------|-----|-----|------|-----|-----|---|-----|-----|----|-----|-----|-----|----|-----|-----|
| MMST4403  | PNP | 200 | 600  | 40  | 40  | 5 | 100 | 300 | 2  | 150 | 0.4 | 150 | 15 | 200 | K3T |
| MMST5401  | PNP | 200 | 600  | 160 | 150 | 5 | 60  | 240 | 5  | 10  | 0.5 | 50  | 5  | 100 | K4M |
| MMST5551  | NPN | 200 | 600  | 180 | 160 | 6 | 80  | 250 | 5  | 10  | 0.5 | 50  | 5  | 100 | K4N |
| MMSTA42   | NPN | 200 | 300  | 310 | 305 | 5 | 100 | 200 | 10 | 10  | 0.2 | 20  | 2  | 50  | K3M |
| MMSTA92   | PNP | 200 | 300  | 310 | 305 | 5 | 100 | 200 | 10 | 10  | 0.2 | 20  | 2  | 50  | K3R |
| SS8050LT1 | NPN | 200 | 1500 | 40  | 25  | 5 | 120 | 350 | 1  | 100 | 0.5 | 800 | 80 | 100 | Y1  |
| SS8550LT1 | PNP | 200 | 1500 | 40  | 25  | 5 | 120 | 350 | 1  | 100 | 0.5 | 800 | 80 | 100 | Y2  |

### TRANSISTOR SOT-363

|          | POLARITY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) (V) | ft | IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) | MARKING |
|----------|----------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|------|--------|--------|-------|---------|
| BC847BS  | NPN      | 300     | 100     | 50        | 45        | 5         | 200 | 450          | 5  | 2      | 0.1  | 10     | 0.5    | 100   | 1Ft     |
| BC847PN  | NPN      | 200     | 100     | 50        | 45        | 6         | 200 | 450          | 5  | 2      | 0.6  | 100    | 5      | 100   | 7P      |
|          | PNP      | 200     | 100     | 50        | 45        | 5         | 220 | 475          | 5  | 2      | 0.65 | 100    | 5      | 100   |         |
| BC847S   | NPN      | 300     | 100     | 50        | 45        | 6         | 110 | 630          | 5  | 2      | 0.25 | 10     | 0.5    | 200+  | 1C      |
| BC857S   | PNP      | 300     | 100     | 50        | 45        | 5         | 125 | 630          | 5  | 2      | 0.3  | 10     | 0.5    | 200+  | 3CS     |
| MMDT2227 | NPN      | 200     | 600     | 75        | 40        | 6         | 100 | 300          | 10 | 150    | 1    | 500    | 50     | 300   | K27     |
|          | PNP      | 200     | 600     | 60        | 60        | 5         | 100 | 300          | 10 | 150    | 1.6  | 500    | 50     | 200   |         |
| MMDT5401 | NPN      | 200     | 200     | 160       | 150       | 5         | 60  | 240          | 5  | 10     | 0.5  | 50     | 5      | 100   | K4M     |
| MMDT5451 | NPN      | 200     | 200     | 180       | 160       | 6         | 80  | 250          | 5  | 10     | 0.2  | 50     | 5      | 100   | KNM     |
|          | PNP      | 200     | 200     | 160       | 150       | 5         | 60  | 240          | 5  | 10     | 0.5  | 50     | 5      | 100   |         |
| MMDT5551 | NPN      | 200     | 200     | 180       | 160       | 6         | 80  | 250          | 5  | 10     | 0.15 | 10     | 1      | 100   | K4N     |
| UMZ1N    | NPN      | 150     | 150     | 60        | 50        | 7         | 120 | 560          | 6  | 1      | 0.4  | 50     | 5      | 140+  | Z1      |
|          | PNP      | 150     | 150     | 60        | 50        | 7         | 120 | 560          | 6  | 1      | 0.5  | 50     | 5      | 140+  |         |

### TRANSISTOR IN SOT-89

|         | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) (V) | ft | IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) | MARK        |
|---------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|------|--------|--------|-------|-------------|
| 2SA1201 | PNP      | BCE       | 500     | 800     | 120       | 120       | 5         | 80  | 240          | 5  | 100    | 1    | 500    | 50     | 120+  | DO,DY       |
| 2SA1203 | PNP      | BCE       | 500     | 1500    | 30        | 30        | 5         | 100 | 320          | 2  | 500    | 2    | 1500   | 30     | 120+  | HO1,HY1     |
| 2SA1213 | PNP      | BCE       | 500     | 2000    | 50        | 50        | 5         | 70  | 240          | 2  | 500    | 0.5  | 1000   | 50     | 100   | NO,NY       |
| 2SA1740 | PNP      | BCE       | 500     | 200     | 400       | 400       | 5         | 60  | 200          | 10 | 50     | 0.8  | 50     | 5      | 70+   | AK          |
| 2SB1119 | PNP      | BCE       | 500     | 1000    | 25        | 25        | 5         | 100 | 560          | 2  | 50     | 0.7  | 500    | 50     | 180+  | BB          |
| 2SB1132 | PNP      | BCE       | 500     | 1000    | 40        | 32        | 5         | 82  | 390          | 3  | 100    | 0.5  | 500    | 50     | 150+  | BAP,BAQ,BAR |
| 2SB1188 | PNP      | BCE       | 500     | 2000    | 40        | 32        | 5         | 82  | 390          | 3  | 500    | 0.8  | 2000   | 200    | 80    | BCP,BCQ,BCR |
| 2SB1260 | PNP      | BCE       | 500     | 1000    | 80        | 80        | 5         | 82  | 390          | 3  | 100    | 0.4  | 500    | 50     | 80    | ZL          |
| 2SB1308 | PNP      | BCE       | 500     | 3000    | 30        | 20        | 6         | 82  | 390          | 2  | 500    | 0.45 | 1500   | 150    | 50    | BFP,BFQ,BFR |
| 2SB766  | PNP      | BCE       | 500     | 1000    | 30        | 25        | 5         | 85  | 340          | 10 | 500    | 0.4  | 500    | 50     | 200+  | AA,AR,AS    |
| 2SB766A | PNP      | BCE       | 500     | 1000    | 60        | 50        | 5         | 85  | 340          | 10 | 500    | 0.4  | 500    | 50     | 200+  | BQ,BR,BS    |
| 2SC2881 | NPN      | BCE       | 500     | 800     | 120       | 120       | 5         | 80  | 240          | 5  | 100    | 1    | 500    | 50     | 120+  | CO1,CY1     |
| 2SC2884 | NPN      | BCE       | 500     | 800     | 35        | 30        | 5         | 100 | 320          | 1  | 100    | 0.5  | 500    | 20     | 120+  | PO1,PY1     |
| 2SC4548 | NPN      | BCE       | 500     | 200     | 400       | 400       | 5         | 60  | 200          | 10 | 50     | 0.6  | 50     | 5      | 70+   | CN          |
| 2SD2150 | NPN      | BCE       | 500     | 3000    | 40        | 20        | 6         | 180 | 560          | 2  | 100    | 0.5  | 2000   | 100    | 290+  | CFQ,CFR,CFS |
| 2SD874  | NPN      | BCE       | 500     | 1000    | 30        | 25        | 5         | 85  | 340          | 10 | 500    | 0.4  | 500    | 50     | 200+  | ZQ,ZR,ZS    |
| 2SD874A | NPN      | BCE       | 500     | 1000    | 60        | 50        | 5         | 85  | 340          | 10 | 500    | 0.4  | 500    | 50     | 200+  | YQ,YR,YS    |
| A42     | NPN      | BCE       | 500     | 500     | 310       | 305       | 5         | 80  | 250          | 10 | 10     | 0.2  | 20     | 2      | 50    | A42         |
| A92     | PNP      | BCE       | 500     | 500     | 310       | 305       | 5         | 80  | 250          | 10 | 10     | 0.2  | 20     | 2      | 50    | A92         |
| B772    | PNP      | BCE       | 500     | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5  | 2000   | 200    | 50    | 772         |
| BC869   | PNP      | BCE       | 500     | 1000    | 32        | 20        | 5         | 100 | 375          | 1  | 500    | 0.5  | 1000   | 100    | 40    | CEC,CGC,CHC |
| BCX51   | PNP      | BCE       | 500     | 1000    | 45        | 45        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 50    | AA,AC,AD    |
| BCX52   | PNP      | BCE       | 500     | 1000    | 60        | 60        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 50    | AE,AG,AM    |
| BCX53   | PNP      | BCE       | 500     | 1000    | 100       | 80        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 50    | AH1,AK1,AL1 |
| BCX54   | NPN      | BCE       | 500     | 1000    | 45        | 45        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 130   | BA,BC,BD    |
| BCX55   | NPN      | BCE       | 500     | 1000    | 60        | 60        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 130   | BE,BG,BM    |
| BCX56   | NPN      | BCE       | 500     | 1000    | 100       | 80        | 5         | 63  | 250          | 2  | 150    | 0.5  | 500    | 50     | 130   | BH,BK,BL    |
| D882    | NPN      | BCE       | 500     | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5  | 2000   | 200    | 50    | 882         |
| FCX591  | PNP      | BCE       | 1000    | 1000    | 80        | 60        | 5         | 100 | 300          | 5  | 500    | 0.6  | 1000   | 100    | 150   | P1          |
| KTA1663 | PNP      | BCE       | 500     | 1500    | 35        | 30        | 5         | 100 | 320          | 2  | 500    | 2    | 1500   | 30     | 80    | HO,HY       |
| KTA1664 | PNP      | BCE       | 500     | 800     | 35        | 30        | 5         | 100 | 320          | 1  | 100    | 0.7  | 500    | 20     | 120+  | RO,RY       |
| KTA1666 | PNP      | BCE       | 500     | 2000    | 50        | 50        | 5         | 70  | 240          | 2  | 500    | 0.5  | 1000   | 50     | 120+  | WO,WY       |
| KTC4373 | NPN      | BCE       | 500     | 800     | 120       | 120       | 5         | 80  | 240          | 5  | 100    | 1    | 500    | 50     | 120+  | CO,CY       |
| KTC4374 | NPN      | BCE       | 500     | 400     | 80        | 80        | 5         | 70  | 240          | 2  | 50     | 0.4  | 200    | 20     | 100+  | EO,EY       |
| KTC4376 | NPN      | BCE       | 500     | 800     | 35        | 30        | 5         | 100 | 320          | 1  | 100    | 0.5  | 500    | 20     | 120+  | PO,PY       |
| KTC4379 | NPN      | BCE       | 500     | 2000    | 50        | 50        | 5         | 70  | 240          | 2  | 500    | 0.5  | 1000   | 50     | 120+  | UO,UY       |
| KTD1898 | NPN      | BCE       | 500     | 1000    | 100       | 80        | 5         | 70  | 400          | 3  | 500    | 0.4  | 500    | 20     | 100+  | ZO,ZY,ZG    |

### TRANSISTOR IN TO-92S

|          | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) (V) | ft | IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) |
|----------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|------|--------|--------|-------|
| 2SA1585S | PNP      | ECB       | 400     | 2000    | 20        | 20        | 6         | 120 | 390          | 2  | 100    | 0.5  | 2000   | 100    | 200   |
| 2SA608S  | PNP      | ECB       | 300     | 100     | 40        | 30        | 5         | 60  | 560          | 6  | 1      | 0.5  | 50     | 5      | 180+  |
| 2SA821S  | PNP      | ECB       | 250     | 30      | 210       | 210       | 5         | 56  | 270          | 3  | 5      | 0.6  | 2      | 0.2    | 30    |
| 2SA933AS | PNP      | ECB       | 300     | 150     | 60        | 50        | 6         | 120 | 560          | 6  | 1      | 0.5  | 50     | 5      | 120   |
| 2SC1740S | NPN      | ECB       | 300     | 150     | 60        | 50        | 7         | 120 | 560          | 6  | 1      | 0.4  | 50     | 5      | 100   |
| 2SC4115S | NPN      | ECB       | 300     | 3000    | 40        | 20        | 6         | 120 | 560          | 2  | 100    | 0.5  | 2000   | 100    | 200   |
| 2SC536S  | NPN      | ECB       | 300     | 100     | 40        | 30        | 5         | 60  | 960          | 6  | 1      | 0.5  | 50     | 5      | 100+  |
| KTC3199  | NPN      | ECB       | 400     | 150     | 50        | 50        | 5         | 70  | 700          | 6  | 2      | 0.25 | 100    | 10     | 80    |

### TRANSISTOR IN TO-92

|        | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) (V) | ft | IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) |
|--------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|------|--------|--------|-------|
| 2152   | NPN      | ECB       | 700     | 3000    | 22        | 22        | 6         | 180 | 950          | 2  | 100    | 0.4  | 2000   | 100    |       |
| 2N3904 | NPN      | EBC       | 625     | 200     | 60        | 40        | 6         | 100 | 400          | 1  | 10     | 0.3  | 50     | 5      | 300   |
| 2N3906 | PNP      | EBC       | 625     | 200     | 40        | 40        | 5         | 100 | 400          | 1  | 10     | 0.3  | 50     | 5      | 250   |
| 2N4126 | PNP      | EBC       | 625     | 200     | 25        | 25        | 4         | 120 | 360          | 1  | 2      | 0.4  | 50     | 5      | 250   |
| 2N4400 | NPN      | EBC       | 625     | 600     | 60        | 40        | 6         | 50  | 150          | 2  | 150    | 0.75 | 500    | 50     |       |
| 2N4401 | NPN      | EBC       | 625     | 600     | 60        | 40        | 6         | 100 | 300          | 1  | 150    | 0.4  | 150    | 15     | 250   |

|         |     |     |      |      |     |     |   |     |     |    |      |      |      |     |      |
|---------|-----|-----|------|------|-----|-----|---|-----|-----|----|------|------|------|-----|------|
| 2N4402  | NPN | EBC | 625  | 600  | 40  | 40  | 5 | 50  | 150 | 2  | 150  | 0.75 | 500  | 50  |      |
| 2N4403  | PNP | EBC | 625  | 600  | 40  | 40  | 5 | 100 | 300 | 1  | 150  | 0.4  | 150  | 15  | 200  |
| 2N5087  | PNP | EBC | 625  | 50   | 50  | 50  | 3 | 250 | 800 | 5  | 0.1  | 0.3  | 10   | 1   | 40   |
| 2N5172  | NPN | ECB | 625  | 500  | 25  | 25  | 5 | 100 | 500 | 10 | 10   | 0.25 | 10   | 1   |      |
| 2N5400  | PNP | EBC | 625  | 600  | 130 | 120 | 5 | 40  | 180 | 5  | 10   | 0.5  | 50   | 5   | 100  |
| 2N5401  | PNP | EBC | 625  | 600  | 160 | 150 | 5 | 80  | 250 | 5  | 10   | 0.5  | 50   | 5   | 100  |
| 2N5550  | NPN | EBC | 625  | 600  | 160 | 140 | 6 | 60  | 250 | 5  | 10   | 0.25 | 50   | 5   | 100  |
| 2N5551  | NPN | EBC | 625  | 600  | 180 | 160 | 6 | 80  | 250 | 5  | 10   | 0.2  | 50   | 5   | 80   |
| 2N6517  | NPN | EBC | 625  | 500  | 350 | 350 | 6 | 30  | 200 | 10 | 30   | 1    | 50   | 5   | 40   |
| 2N6520  | PNP | EBC | 625  | 500  | 350 | 350 | 5 | 30  | 200 | 10 | 30   | 1    | 50   | 5   | 40   |
| 2N6727  | PNP | EBC | 1000 | 1500 | 50  | 40  | 5 | 50  | 250 | 1  | 1000 | 0.5  | 1000 | 100 | 50   |
| 2SA1296 | PNP | ECB | 750  | 2000 | 20  | 20  | 6 | 120 | 400 | 2  | 100  | 0.5  | 2000 | 100 | 100  |
| 2SA1300 | PNP | ECB | 750  | 2000 | 20  | 10  | 6 | 140 | 600 | 1  | 500  | 0.82 | 2000 | 100 | 100  |
| 2SA1318 | PNP | ECB | 500  | 200  | 60  | 50  | 6 | 100 | 560 | 6  | 1    | 0.3  | 100  | 10  | 200+ |
| 2SA1625 | PNP | ECB | 750  | 500  | 400 | 400 | 7 | 40  | 200 | 5  | 50   | 1    | 100  | 10  | 10+  |

### Transistors in TO-92

|           | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCEO (V) | BVCEO (V) | VBEBO (V) | hFE |     | VCE(sat) |      | fT   | VCE(V) | IC(mA) | IB(mA) | (MHz) |
|-----------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|-----|----------|------|------|--------|--------|--------|-------|
|           |          |           |         |         |           |           |           | MIN | MAX | MAX      | MAX  |      |        |        |        |       |
| 2SA562    | PNP      | ECB       | 500     | 500     | 35        | 30        | 5         | 70  | 240 | 1        | 100  | 0.25 | 100    | 10     | 200    |       |
| 2SA608    | PNP      | ECB       | 400     | 100     | 40        | 30        | 5         | 60  | 560 | 6        | 1    | 0.5  | 50     | 5      | 180+   |       |
| 2SA608N   | PNP      | ECB       | 500     | 150     | 60        | 50        | 6         | 160 | 560 | 6        | 1    | 0.3  | 100    | 10     | 150    |       |
| 2SA673    | PNP      | ECB       | 400     | 500     | 35        | 35        | 4         | 60  | 320 | 3        | 10   | 0.6  | 150    | 15     |        |       |
| 2SA673A   | PNP      | ECB       | 400     | 500     | 50        | 50        | 4         | 60  | 320 | 3        | 10   | 0.6  | 150    | 15     |        |       |
| 2SA720    | PNP      | ECB       | 625     | 500     | 60        | 50        | 5         | 85  | 340 | 10       | 150  | 0.6  | 300    | 30     | 200+   |       |
| 2SA821    | PNP      | ECB       | 250     | 30      | 210       | 210       | 5         | 56  | 270 | 3        | 5    | 0.6  | 2      | 0.2    | 30     |       |
| 2SA836    | PNP      | ECB       | 200     | 100     | 55        | 55        | 5         | 160 | 500 | 12       | 2    | 0.5  | 10     | 1      | 150    |       |
| 2SA844    | PNP      | ECB       | 300     | 100     | 55        | 55        | 5         | 160 | 800 | 12       | 2    | 0.5  | 10     | 1      | 150    |       |
| 2SA950    | PNP      | ECB       | 600     | 800     | 35        | 30        | 5         | 100 | 320 | 1        | 100  | 0.7  | 500    | 20     | 120+   |       |
| 2SB562    | PNP      | ECB       | 900     | 1000    | 25        | 20        | 5         | 85  | 240 | 2        | 500  | 0.5  | 800    | 80     | 350+   |       |
| 2SC1008   | NPN      | EBC       | 800     | 700     | 80        | 60        | 8         | 40  | 400 | 2        | 50   | 0.4  | 500    | 50     | 30     |       |
| 2SC1213   | NPN      | ECB       | 400     | 500     | 35        | 35        | 4         | 60  | 320 | 3        | 10   | 0.6  | 150    | 15     |        |       |
| 2SC1213A  | NPN      | ECB       | 400     | 500     | 50        | 50        | 4         | 60  | 320 | 3        | 10   | 0.6  | 150    | 15     |        |       |
| 2SC1318   | NPN      | ECB       | 625     | 500     | 60        | 50        | 6         | 85  | 340 | 10       | 150  | 0.6  | 300    | 30     | 200+   |       |
| 2SC1674   | NPN      | ECB       | 250     | 20      | 30        | 20        | 4         | 40  | 180 | 6        | 1    | 0.3  | 10     | 1      | 400    |       |
| 2SC1959   | NPN      | ECB       | 500     | 500     | 35        | 30        | 5         | 70  | 400 | 1        | 100  | 0.25 | 100    | 10     | 200    |       |
| 2SC2001   | NPN      | ECB       | 600     | 700     | 30        | 25        | 5         | 90  | 400 | 1        | 100  | 0.6  | 700    | 70     | 50     |       |
| 2SC2120   | NPN      | ECB       | 600     | 800     | 35        | 30        | 5         | 100 | 320 | 1        | 100  | 0.5  | 500    | 20     | 100    |       |
| 2SC2216   | NPN      | BEC       | 300     | 50      | 50        | 45        | 4         | 40  | 140 | 12.5     | 12.5 | 0.2  | 15     | 1.5    | 300    |       |
| 2SC3279   | NPN      | ECB       | 750     | 2000    | 30        | 10        | 6         | 140 | 600 | 1        | 500  | 0.82 | 2000   | 100    | 100    |       |
| 2SC380TM  | NPN      | ECB       | 300     | 50      | 35        | 30        | 4         | 40  | 240 | 12       | 2    | 0.4  | 10     | 1      | 100    |       |
| 2SC536    | NPN      | ECB       | 400     | 100     | 40        | 30        | 5         | 60  | 960 | 6        | 1    | 0.5  | 50     | 5      | 100+   |       |
| 2SD1513   | NPN      | ECB       | 625     | 2000    | 20        | 16        | 6         | 135 | 650 | 2        | 100  | 0.4  | 1000   | 10     | 100    |       |
| 2SD1616*  | NPN      | ECB       | 750     | 1000    | 60        | 50        | 6         | 135 | 600 | 2        | 100  | 0.3  | 1000   | 50     | 100    |       |
| 8050S     | NPN      | ECB       | 625     | 500     | 40        | 25        | 5         | 85  | 300 | 1        | 50   | 0.6  | 500    | 50     | 150    |       |
| 8050SS    | NPN      | ECB       | 1000    | 1500    | 40        | 25        | 5         | 85  | 300 | 1        | 100  | 0.5  | 800    | 80     | 100    |       |
| 8550S     | PNP      | ECB       | 625     | 500     | 40        | 25        | 5         | 85  | 300 | 1        | 50   | 0.6  | 500    | 50     | 150    |       |
| 8550SS    | PNP      | ECB       | 1000    | 1500    | 40        | 25        | 5         | 85  | 300 | 1        | 100  | 0.5  | 800    | 80     | 100    |       |
| A1015     | PNP      | ECB       | 400     | 150     | 50        | 50        | 5         | 70  | 400 | 6        | 2    | 0.3  | 100    | 10     | 80     |       |
| A42       | NPN      | EBC       | 625     | 500     | 300       | 300       | 5         | 80  | 250 | 10       | 10   | 0.2  | 20     | 2      | 50     |       |
| A44       | NPN      | EBC       | 625     | 200     | 400       | 400       | 5         | 80  | 300 | 10       | 10   | 0.2  | 10     | 1      | 50     |       |
| A733      | PNP      | ECB       | 250     | 100     | 60        | 50        | 5         | 90  | 600 | 6        | 1    | 0.3  | 100    | 10     | 100    |       |
| A92       | PNP      | EBC       | 625     | 500     | 300       | 300       | 5         | 80  | 250 | 10       | 10   | 0.2  | 20     | 2      | 50     |       |
| A94       | PNP      | EBC       | 625     | 200     | 400       | 400       | 5         | 80  | 300 | 10       | 10   | 0.2  | 10     | 1      | 50     |       |
| B772      | PNP      | ECB       | 625     | 3000    | 40        | 30        | 6         | 60  | 400 | 2        | 1000 | 0.5  | 2000   | 200    | 50     |       |
| BC184,B,C | NPN      | CBE       | 350     | 100     | 45        | 30        | 6         | 240 | 900 | 5        | 2    | 0.6  | 100    | 5      | 150    |       |
| BC212,B,C | PNP      | EBC       | 350     | 100     | 60        | 50        | 5         | 140 | 600 | 5        | 2    | 0.6  | 100    | 5      | 200    |       |
| BC237     | NPN      | CBE       | 350     | 100     | 50        | 45        | 6         | 120 | 800 | 5        | 2    | 0.6  | 100    | 5      | 100+   |       |

### Transistors in TO-92

|             | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCEO (V) | BVCEO (V) | VBEBO (V) | hFE |     | VCE(sat) |     | fT  | VCE(V) | IC(mA) | IB(mA) | (MHz) |
|-------------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|-----|----------|-----|-----|--------|--------|--------|-------|
|             |          |           |         |         |           |           |           | MIN | MAX | MAX      | MAX |     |        |        |        |       |
| BC327       | PNP      | CBE       | 625     | 800     | 50        | 45        | 5         | 100 | 630 | 1        | 100 | 0.7 | 500    | 50     | 260    |       |
| BC328       | PNP      | CBE       | 625     | 800     | 30        | 25        | 5         | 100 | 630 | 1        | 100 | 0.7 | 500    | 50     | 260    |       |
| BC337,16,25 | NPN      | CBE       | 625     | 800     | 50        | 45        | 5         | 100 | 630 | 1        | 100 | 0.7 | 500    | 50     | 210    |       |
| BC338,16,25 | NPN      | CBE       | 625     | 800     | 30        | 25        | 5         | 100 | 630 | 1        | 100 | 0.7 | 500    | 50     | 210    |       |
| BC347       | NPN      | EBC       | 300     | 100     | 50        | 45        | 5         | 40  | 450 | 5        | 2   | 0.3 | 10     | 1      | 125    |       |
| BC350       | PNP      | EBC       | 300     | 100     | 50        | 45        | 5         | 40  | 450 | 5        | 2   | 0.3 | 10     | 1      | 125    |       |
| BC368,-25   | NPN      | ECB       | 625     | 1000    | 25        | 20        | 5         | 85  | 375 | 1        | 0.5 | 0.5 | 1000   | 100    | 65     |       |
| BC369       | PNP      | ECB       | 625     | 1000    | 25        | 20        | 5         | 85  | 375 | 1        | 0.5 | 0.5 | 1000   | 100    | 65     |       |
| BC546,B     | NPN      | CBE       | 625     | 100     | 80        | 65        | 6         | 110 | 450 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC547,A,B,C | NPN      | CBE       | 625     | 100     | 50        | 45        | 6         | 110 | 800 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC548,A,B,C | NPN      | CBE       | 625     | 100     | 30        | 30        | 6         | 110 | 800 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC549,B,C*  | NPN      | CBE       | 625     | 100     | 30        | 30        | 5         | 200 | 800 | 5        | 2   | 0.6 | 100    | 5      | 250    |       |
| BC550,B,C*  | NPN      | CBE       | 625     | 100     | 50        | 40        | 4.5       | 100 | 800 | 5        | 2   | 0.6 | 100    | 5      | 250    |       |
| BC556,B     | PNP      | CBE       | 625     | 100     | 80        | 65        | 6         | 120 | 500 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC557,A,B,C | PNP      | CBE       | 625     | 100     | 50        | 45        | 6         | 120 | 800 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC558,B,C   | PNP      | CBE       | 625     | 100     | 30        | 30        | 6         | 120 | 800 | 5        | 2   | 0.3 | 100    | 5      | 150    |       |
| BC559*      | PNP      | CBE       | 625     | 100     | 30        | 30        | 5         | 110 | 800 | 5        | 2   | 0.6 | 100    | 5      | 300+   |       |
| BC635       | NPN      | ECB       | 830     | 1000    | 45        | 45        | 5         | 40  | 250 | 2        | 150 | 0.5 | 500    | 50     | 100+   |       |
| BC637       | NPN      | ECB       | 830     | 1000    | 60        | 60        | 5         | 40  | 150 | 2        | 150 | 0.5 | 500    | 50     | 100+   |       |
| BC638       | PNP      | ECB       | 830     | 1000    | 60        | 60        | 5         | 63  | 250 | 2        | 150 | 0.5 | 500    | 50     | 100    |       |
| BC639       | NPN      | ECB       | 830     | 1000    | 100       | 80        | 5         | 63  | 250 | 2        | 150 | 0.5 | 500    | 50     | 100    |       |
| BC640       | PNP      | ECB       | 830     | 1000    | 100       | 80        | 5         | 63  | 250 | 2        | 150 | 0.5 | 500    | 50     | 100+   |       |
| BF240       | NPN      | CBE       | 300     | 25      | 40        | 40        | 4         | 67  | 220 | 10       | 1   | 0.3 | 10     | 1      | 150    |       |
| BF370       | NPN      | CBE       | 500     | 100     | 40        | 15        | 4.5       | 40  | 200 | 1        | 10  | 0.2 | 15     | 1.5    | 500    |       |
| BF420       | NPN      | ECB       | 830     | 100     | 300       | 300       | 5         | 50  |     | 20       | 25  | 0.6 | 30     | 5      | 60     |       |

|         |     |     |     |      |     |     |   |     |     |    |      |      |      |     |     |
|---------|-----|-----|-----|------|-----|-----|---|-----|-----|----|------|------|------|-----|-----|
| BF421   | PNP | ECB | 830 | 100  | 300 | 300 | 5 | 50  |     | 20 | 25   | 0.6  | 30   | 5   | 60  |
| BF422   | NPN | ECB | 830 | 100  | 250 | 250 | 5 | 50  |     | 20 | 25   | 0.6  | 30   | 5   | 60  |
| BF423   | PNP | ECB | 830 | 100  | 250 | 250 | 5 | 50  |     | 20 | 25   | 0.6  | 30   | 5   | 60  |
| C1815   | NPN | ECB | 400 | 150  | 60  | 50  | 5 | 70  | 700 | 6  | 2    | 0.25 | 100  | 10  | 80  |
| C2611   | NPN | BCE | 750 | 200  | 600 | 400 | 7 | 10  | 40  | 20 | 20   | 0.5  | 50   | 10  | 8   |
| C945    | NPN | ECB | 400 | 150  | 60  | 50  | 5 | 70  | 700 | 6  | 1    | 0.3  | 100  | 10  | 200 |
| D882    | NPN | ECB | 750 | 3000 | 40  | 30  | 6 | 60  | 400 | 2  | 1000 | 0.5  | 2000 | 200 | 50  |
| D965    | NPN | ECB | 750 | 5000 | 42  | 22  | 6 | 340 | 950 | 2  | 500  | 0.35 | 3000 | 100 |     |
| KSA539  | PNP | EBC | 400 | 200  | 60  | 45  | 5 | 40  | 240 | 1  | 50   | 0.5  | 150  | 15  |     |
| KSA642  | PNP | EBC | 400 | 300  | 30  | 25  | 5 | 70  | 400 | 1  | 50   | 0.6  | 300  | 30  |     |
| KSB564A | PNP | EBC | 800 | 1000 | 30  | 25  | 5 | 70  | 400 | 1  | 100  | 0.5  | 1000 | 100 | 80  |
| KSC815  | NPN | EBC | 400 | 200  | 60  | 45  | 5 | 40  | 400 | 1  | 50   | 0.4  | 150  | 15  | 100 |
| KSD471A | NPN | EBC | 800 | 1000 | 40  | 30  | 5 | 70  | 400 | 1  | 100  | 0.5  | 1000 | 100 | 100 |
| KTA1270 | PNP | ECB | 625 | 500  | 35  | 30  | 5 | 70  | 240 | 1  | 100  | 0.25 | 100  | 10  | 150 |

### Transistors in TO-92

|            |          |           | PD   | IC   | BVCBO | BVCEO | BVEBO | hFE   | VCE(sat) | fT     |        |      |        |        |       |
|------------|----------|-----------|------|------|-------|-------|-------|-------|----------|--------|--------|------|--------|--------|-------|
|            | POLARITY | PIN ARRAY | (mW) | (mA) | (V)   | (V)   | (V)   | MIN   | MAX      | VCE(V) | IC(mA) | (V)  | IC(mA) | IB(mA) | (MHz) |
| KTA1271    | PNP      | ECB       | 625  | 800  | 35    | 30    | 5     | 100   | 320      | 1      | 100    | 0.7  | 500    | 20     | 120   |
| KTC3192    | NPN      | ECB       | 625  | 50   | 35    | 30    | 4     | 40    | 240      | 12     | 2      | 0.4  | 10     | 1      | 100   |
| KTC3194    | NPN      | ECB       | 625  | 20   | 40    | 30    | 4     | 40    | 200      | 6      | 1      |      |        |        | 450   |
| KTC3197    | NPN      | ECB       | 625  | 50   | 30    | 25    | 4     | 20    | 200      | 12.5   | 12.5   | 0.2  | 15     | 1.5    | 300   |
| KTC3198    | NPN      | ECB       | 625  | 150  | 60    | 50    | 5     | 70    | 700      | 6      | 2      | 0.25 | 100    | 10     | 80    |
| KTC3200    | NPN      | ECB       | 625  | 100  | 120   | 120   | 5     | 200   | 700      | 6      | 2      | 0.3  | 10     | 1      | 100+  |
| KTC3202/03 | NPN      | ECB       | 625  |      | 35    | 30    | 5     |       |          | 1      | 100    |      |        | 10     | 200+  |
| KTD1146    | NPN      | ECB       | 625  | 5000 | 40    | 20    | 7     | 120   | 700      | 2      | 500    | 0.4  | 3000   | 60     | 20    |
| M285       | NPN      | ECB       | 625  | 1000 | 40    | 20    | 6     | 300   | 1000     | 1      | 100    | 0.55 | 600    | 20     | 100   |
| M8050      | NPN      | EBC       | 625  | 1000 | 40    | 25    | 6     | 80    | 300      | 1      | 100    | 0.5  | 800    | 80     | 150   |
| M8550      | PNP      | EBC       | 625  | 1000 | 40    | 25    | 6     | 85    | 300      | 1      | 100    | 0.5  | 800    | 80     | 150   |
| MPS2222    | NPN      | EBC       | 625  | 600  | 60    | 30    | 5     | 100   | 300      | 10     | 150    | 1    | 500    | 50     | 300   |
| MPS2222A   | NPN      | EBC       | 625  | 600  | 75    | 40    | 6     | 100   | 300      | 10     | 150    | 0.6  | 500    | 50     | 300   |
| MPS2907    | PNP      | EBC       | 625  | 600  | 60    | 40    | 5     | 100   | 300      | 10     | 150    | 1    | 500    | 50     | 200   |
| MPS2907A   | PNP      | EBC       | 625  | 600  | 60    | 60    | 5     | 100   | 300      | 10     | 150    | 0.6  | 500    | 50     | 200   |
| MPS3702    | PNP      | EBC       | 625  | 800  | 40    | 25    | 5     | 60    | 300      | 5      | 50     | 0.25 | 50     | 5      | 100   |
| MPSA05     | NPN      | EBC       | 625  | 500  | 60    | 60    | 4     | 100   |          | 1      | 100    | 0.25 | 100    | 10     | 100   |
| MPSA06     | NPN      | EBC       | 625  | 500  | 80    | 80    | 4     | 100   |          | 1      | 100    | 0.25 | 100    | 10     | 100   |
| MPSA13     | NPN      | EBC       | 625  | 500  | 30    | 30    | 10    | 10000 |          | 5      | 100    | 1.5  | 100    | 0.1    | 125   |
| MPSA14     | NPN      | EBC       | 625  | 500  | 30    | 30    | 10    | 20000 |          | 5      | 100    | 1.5  | 100    | 0.1    | 125   |
| MPSA43     | NPN      | EBC       | 625  | 500  | 200   | 200   | 6     | 40    |          | 10     | 10     | 0.4  | 20     | 2      | 50    |
| MPSA55     | PNP      | EBC       | 625  | 500  | 60    | 60    | 4     | 100   |          | 1      | 100    | 0.25 | 100    | 10     | 50    |
| MPSA56     | PNP      | EBC       | 625  | 500  | 80    | 80    | 4     | 100   |          | 1      | 10     | 0.25 | 100    | 10     | 50    |
| MPSA93     | PNP      | EBC       | 625  | 500  | 200   | 200   | 5     | 40    |          | 10     | 10     | 0.4  | 20     | 2      | 50    |
| MPSH10/11  | NPN      | BEC       | 350  | 50   | 30    | 25    | 3     | 60    | 200      | 10     | 4      | 0.5  | 4      | 0.4    | 650   |
| MPSW56     | PNP      | EBC       | 1000 | 500  | 80    | 80    | 4     | 100   |          | 1      | 50     | 0.5  | 250    | 10     | 50+   |
| S8050      | NPN      | EBC       | 625  | 500  | 40    | 25    | 5     | 85    | 300      | 1      | 50     | 0.6  | 500    | 50     | 150   |
| S8550      | PNP      | EBC       | 625  | 500  | 40    | 25    | 5     | 85    | 300      | 1      | 50     | 0.6  | 500    | 50     | 150   |
| S9011      | NPN      | EBC       | 310  | 30   | 30    | 20    | 4     | 28    | 270      | 5      | 1      | 0.3  | 10     | 1      | 150   |
| S9012      | PNP      | EBC       | 625  | 500  | 40    | 25    | 5     | 64    | 300      | 1      | 50     | 0.6  | 500    | 50     | 150   |
| S9013      | NPN      | EBC       | 625  | 500  | 40    | 25    | 5     | 64    | 300      | 1      | 50     | 0.6  | 500    | 50     | 150   |
| S9014      | NPN      | EBC       | 400  | 100  | 50    | 45    | 5     | 60    | 1000     | 5      | 1      | 0.3  | 100    | 5      | 150   |
| S9015      | PNP      | EBC       | 450  | 100  | 50    | 45    | 5     | 60    | 1000     | 5      | 1      | 0.3  | 100    | 10     | 150   |
| S9016      | NPN      | EBC       | 300  | 25   | 30    | 20    | 5     | 28    | 270      | 5      | 1      | 0.3  | 10     | 1      | 300   |
| S9018      | NPN      | EBC       | 400  | 50   | 25    | 18    | 4     | 28    | 270      | 5      | 1      | 0.5  | 10     | 1      | 600   |
| SS8050     | NPN      | EBC       | 1000 | 1500 | 40    | 25    | 5     | 85    | 300      | 1      | 100    | 0.5  | 800    | 80     | 100   |
| SS8550     | PNP      | EBC       | 1000 | 1500 | 40    | 25    | 5     | 85    | 300      | 1      | 100    | 0.5  | 800    | 80     | 100   |
| STA124     | PNP      | ECB       | 625  | 1000 | 15    | 12    | 6.5   | 200   | 450      | 1      | 100    | 0.4  | 500    | 50     | 120+  |
| STC128     | NPN      | ECB       | 625  | 1000 | 20    | 15    | 6.5   | 150   |          | 1      | 100    | 0.3  | 500    | 50     | 120+  |

### Transistors in TO-92MOD

|          |          |           | PD   | IC   | BVCBO | BVCEO | BVEBO | hFE | VCE(sat) | fT     |        |     |        |        |       |
|----------|----------|-----------|------|------|-------|-------|-------|-----|----------|--------|--------|-----|--------|--------|-------|
|          | POLARITY | PIN ARRAY | (mW) | (mA) | (V)   | (V)   | (V)   | MIN | MAX      | VCE(V) | IC(mA) | (V) | IC(mA) | IB(mA) | (MHz) |
| 2SA1013  | PNP      | ECB       | 900  | 1000 | 160   | 160   | 6     | 65  | 310      | 5      | 200    | 1.5 | 500    | 50     | 15    |
| 2SA1020  | PNP      | ECB       | 900  | 2000 | 50    | 50    | 5     | 70  | 240      | 2      | 500    | 0.5 | 1000   | 50     | 100+  |
| 2SA1160  | PNP      | ECB       | 900  | 2000 | 20    | 10    | 6     | 140 | 600      | 1      | 500    | 0.5 | 2000   | 50     | 140+  |
| 2SA1283  | PNP      | ECB       | 900  | 1000 | 60    | 60    | 6     | 55  | 300      | 4      | 100    | 0.3 | 500    | 25     | 50    |
| 2SA1371  | PNP      | ECB       | 1000 | 100  | 300   | 300   | 5     | 40  | 320      | 10     | 10     | 0.6 | 20     | 2      | 100   |
| 2SA966   | PNP      | ECB       | 900  | 1500 | 30    | 30    | 5     | 100 | 320      | 2      | 500    | 2   | 1500   | 30     | 15    |
| 2SB560   | PNP      | ECB       | 900  | 700  | 100   | 80    | 5     | 60  | 560      | 5      | 50     | 0.8 | 500    | 50     | 100+  |
| 2SB647   | PNP      | ECB       | 900  | 1000 | 120   | 80    | 5     | 60  | 320      | 5      | 150    | 1   | 500    | 50     | 140   |
| 2SB647A  | PNP      | ECB       | 900  | 1000 | 120   | 100   | 5     | 60  | 200      | 5      | 150    | 1   | 500    | 50     | 140   |
| 2SB740   | PNP      | ECB       | 900  | 1000 | 70    | 50    | 6     | 100 | 320      | 2      | 100    | 0.6 | 1000   | 100    | 100   |
| 2SB764   | PNP      | ECB       | 900  | 1000 | 60    | 50    | 5     | 60  | 320      | 2      | 50     | 0.7 | 500    | 50     | 150+  |
| 2SB892   | PNP      | ECB       | 1000 | 2000 | 60    | 50    | 6     | 100 | 560      | 2      | 100    | 0.4 | 1000   | 50     | 150   |
| 2SB985   | PNP      | ECB       | 1000 | 3000 | 60    | 50    | 6     | 100 | 560      | 2      | 100    | 0.7 | 2000   | 100    | 100   |
| 2SC1383  | NPN      | ECB       | 1000 | 1000 | 30    | 25    | 5     | 85  | 340      | 10     | 500    | 0.4 | 500    | 50     | 100   |
| 2SC1384  | NPN      | ECB       | 1000 | 1000 | 50    | 50    | 5     | 85  | 340      | 10     | 500    | 0.4 | 500    | 50     | 100   |
| 2SC1627A | NPN      | ECB       | 800  | 400  | 80    | 80    | 5     | 70  | 240      | 2      | 50     | 0.4 | 200    | 20     | 80    |
| 2SC2060  | NPN      | ECB       | 750  | 1000 | 40    | 32    | 5     | 80  | 400      | 3      | 100    | 0.4 | 500    | 50     |       |
| 2SC2229* | NPN      | ECB       | 800  | 50   | 200   | 150   | 5     | 70  | 240      | 5      | 10     | 0.5 | 10     | 1      | 80    |
| 2SC2230* | NPN      | ECB       | 800  | 100  | 200   | 160   | 5     | 120 | 400      | 10     | 10     | 0.5 | 50     | 5      | 50    |
| 2SC2235  | NPN      | ECB       | 900  | 800  | 120   | 120   | 5     | 80  | 240      | 5      | 100    | 1   | 500    | 50     | 120+  |
| 2SC2236  | NPN      | ECB       | 900  | 1500 | 30    | 30    | 5     | 100 | 320      | 2      | 500    | 2   | 1500   | 30     | 100   |
| 2SC2383  | NPN      | ECB       | 900  | 1000 | 160   | 160   | 6     | 60  | 320      | 5      | 200    | 1   | 500    | 50     | 20    |
| 2SC2482* | NPN      | ECB       | 900  | 100  | 300   | 300   | 7     | 30  | 150      | 10     | 20     | 1   | 10     | 1      | 50    |
| 2SC2655  | NPN      | ECB       | 900  | 2000 | 50    | 50    | 5     | 70  | 240      | 2      | 500    | 0.5 | 1000   | 50     | 100+  |
| 2SC3243  | NPN      | ECB       | 900  | 1000 | 60    | 60    | 6     | 55  | 300      | 4      | 100    | 0.3 | 500    | 25     | 80    |
| 2SD468   | NPN      | ECB       | 900  | 1000 | 25    | 20    | 5     | 85  | 240      | 2      | 500    | 0.5 | 800    | 80     | 190+  |
| 2SD667   | NPN      | ECB       | 900  | 1000 | 120   | 80    | 5     | 60  | 320      | 5      | 150    | 1   | 500    | 50     | 140+  |

|          |     |     |      |      |     |     |   |     |     |    |     |     |      |     |      |
|----------|-----|-----|------|------|-----|-----|---|-----|-----|----|-----|-----|------|-----|------|
| 2SD667A  | NPN | ECB | 900  | 1000 | 120 | 100 | 5 | 60  | 200 | 5  | 150 | 1   | 500  | 50  | 140+ |
| 2SD789   | NPN | ECB | 900  | 1000 | 100 | 50  | 6 | 100 | 800 | 2  | 100 | 0.3 | 1000 | 100 | 80   |
| KSA910   | PNP | ECB | 800  | 50   | 150 | 150 | 5 | 40  | 240 | 5  | 10  | 0.8 | 10   | 1   | 80   |
| KSA928A  | PNP | ECB | 1000 | 2000 | 30  | 30  | 5 | 100 | 320 | 2  | 500 | 2   | 1500 | 30  | 100  |
| KSC2328A | NPN | ECB | 1000 | 2000 | 30  | 30  | 5 | 100 | 320 | 2  | 500 | 2   | 1500 | 30  | 80   |
| KSC2330  | NPN | ECB | 1000 | 100  | 300 | 300 | 7 | 40  | 240 | 10 | 20  | 0.5 | 10   | 1   | 50   |
| KSC2331  | NPN | ECB | 1000 | 700  | 80  | 60  | 8 | 120 | 240 | 2  | 50  | 0.7 | 500  | 50  | 50   |

### Transistors in TO-92L

|          | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) MAX | fT | VCE(V) | IC(mA) | IB(mA) | IC(mA) | IB(mA) | (MHz) |
|----------|----------|-----------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|--------|--------|--------|--------|-------|
| KSA928A  | PNP      | ECB       | 1000    | 2000    | 30        | 30        | 5         | 100 | 320          | 2  | 500    | 2      | 1500   | 30     | 100    |       |
| KTA1273* | PNP      | ECB       | 1000    | 2000    | 30        | 30        | 5         | 100 | 320          | 2  | 500    | 2      | 1500   | 30     | 80+    |       |
| KTA1274* | PNP      | ECB       | 1000    | 400     | 80        | 80        | 5         | 70  | 240          | 2  | 50     | 0.4    | 200    | 20     | 80+    |       |
| KTC1027  | NPN      | ECB       | 1000    | 800     | 120       | 120       | 5         | 80  | 240          | 5  | 100    | 1      | 500    | 50     | 120+   |       |
| KTC3205* | NPN      | ECB       | 1000    | 2000    | 30        | 30        | 5         | 100 | 320          | 2  | 500    | 2      | 1500   | 30     | 80+    |       |
| KTC3207* | NPN      | ECB       | 1000    | 100     | 300       | 300       | 7         | 30  | 150          | 10 | 20     | 1      | 10     | 1      | 50     |       |
| KTC3227* | NPN      | ECB       | 1000    | 400     | 80        | 80        | 5         | 70  | 240          | 2  | 50     | 0.4    | 200    | 20     | 80+    |       |

### Transistors in TO-220

|          | POLARITY | PIN ARRAY | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE  | VCE(sat) MAX | fT | VCE(V) | IC(mA) | IB(mA) | IC(mA) | IB(mA) | (MHz) |
|----------|----------|-----------|---------|---------|-----------|-----------|-----------|------|--------------|----|--------|--------|--------|--------|--------|-------|
| 2SB834   | PNP      | BCE       | 1500    | 3000    | 60        | 60        | 7         | 60   | 200          | 5  | 500    | 1      | 3000   | 300    | 9      |       |
| 2SD2137* | NPN      | BCE       | 2000    | 3000    | 60        | 60        | 6         | 70   | 320          | 4  | 1000   | 1.2    | 3000   | 375    | 30     |       |
| 2SD880   | NPN      | BCE       | 1500    | 3000    | 60        | 60        | 7         | 60   | 300          | 5  | 500    | 1      | 3000   | 300    | 3      |       |
| KTD1351  | NPN      | BCE       | 2000    | 3000    | 60        | 60        | 7         | 60   | 300          | 5  | 500    | 1      | 2000   | 200    | 2      |       |
| TIP110   | NPN      | BCE       | 2000    | 2000    | 60        | 60        | 5         | 1000 |              | 4  | 1000   | 2.5    | 2000   | 8      |        |       |
| TIP111   | NPN      | BCE       | 2000    | 2000    | 80        | 80        | 5         | 1000 |              | 4  | 1000   | 2.5    | 2000   | 8      |        |       |
| TIP112   | NPN      | BCE       | 2000    | 2000    | 100       | 100       | 5         | 1000 |              | 4  | 1000   | 2.5    | 2000   | 8      |        |       |
| TIP120   | NPN      | BCE       | 2000    | 5000    | 60        | 60        | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP121   | NPN      | BCE       | 2000    | 5000    | 80        | 80        | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP122   | NPN      | BCE       | 2000    | 5000    | 100       | 100       | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP125*  | PNP      | BCE       | 2000    | 5000    | 60        | 60        | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP126*  | PNP      | BCE       | 2000    | 5000    | 80        | 80        | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP127*  | PNP      | BCE       | 2000    | 5000    | 100       | 100       | 5         | 1000 |              | 3  | 500    | 4      | 5000   | 20     |        |       |
| TIP31    | NPN      | BCE       | 2000    | 3000    | 40        | 40        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP31A   | NPN      | BCE       | 2000    | 3000    | 60        | 60        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP31B   | NPN      | BCE       | 2000    | 3000    | 80        | 80        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP31C   | NPN      | BCE       | 2000    | 3000    | 100       | 100       | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP32    | PNP      | BCE       | 2000    | 3000    | 40        | 40        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP32A   | PNP      | BCE       | 2000    | 3000    | 60        | 60        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP32B   | PNP      | BCE       | 2000    | 3000    | 80        | 80        | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP32C   | PNP      | BCE       | 2000    | 3000    | 100       | 100       | 5         | 10   | 50           | 4  | 3000   | 1.2    | 3000   | 375    | 3      |       |
| TIP41A   | NPN      | BCE       | 2000    | 6000    | 60        | 60        | 5         | 15   | 75           | 4  | 3000   | 1.5    | 6000   | 600    | 3      |       |
| TIP41B   | NPN      | BCE       | 2000    | 6000    | 80        | 80        | 5         | 15   | 75           | 4  | 3000   | 1.5    | 6000   | 600    | 3      |       |
| TIP41C   | NPN      | BCE       | 2000    | 6000    | 100       | 100       | 5         | 15   | 75           | 4  | 3000   | 1.5    | 6000   | 600    | 3      |       |
| TIP42A   | PNP      | BCE       | 2000    | 6000    | 60        | 60        | 5         | 15   | 75           | 4  | 3000   | 1.5    | 6000   | 600    | 3      |       |
| TIP42B/C | PNP      | BCE       | 2000    | 6000    | 80        | 80        | 5         | 15   | 75           | 4  | 3000   | 1.5    | 6000   | 600    | 3      |       |

### Transistor TO-126

|          | POLARITY | PIN ARR | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) MAX | fT | VCE(V) | IC(mA) | IB(mA) | IC(mA) | IB(mA) | (MHz) |
|----------|----------|---------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|--------|--------|--------|--------|-------|
| 2SD2136* | NPN      | ECB     | 1250    | 3000    | 60        | 60        | 6         | 40  | 250          | 4  | 1000   | 1.2    | 3000   | 375    | 30+    |       |
| 3CA8772  | PNP      | ECB     | 1250    | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5    | 2000   | 200    | 50     |       |
| B772     | PNP      | ECB     | 1250    | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5    | 2000   | 200    | 50     |       |
| BD139    | NPN      | ECB     | 1250    | 1500    | 80        | 80        | 5         | 40  | 160          | 2  | 150    | 0.5    | 500    | 50     | 190+   |       |
| BD140    | PNP      | ECB     | 1250    | 1500    | 80        | 80        | 5         | 40  | 250          | 2  | 150    | 0.5    | 500    | 50     | 160    |       |
| BD233    | NPN      | ECB     | 1250    | 2000    | 45        | 45        | 5         | 40  |              | 2  | 150    | 0.6    | 1000   | 100    | 3      |       |
| BD235    | NPN      | ECB     | 1250    | 2000    | 60        | 60        | 5         | 40  |              | 2  | 150    | 0.6    | 1000   | 100    | 3      |       |
| BD237    | NPN      | ECB     | 1250    | 2000    | 100       | 80        | 5         | 40  |              | 2  | 150    | 0.6    | 1000   | 100    | 3      |       |
| BD433    | NPN      | ECB     | 1250    | 4000    | 22        | 22        | 5         | 40  | 130          | 5  | 10     | 0.5    | 2000   | 200    | 3      |       |
| BD435    | NPN      | ECB     | 1250    | 4000    | 32        | 32        | 5         | 40  | 130          | 5  | 10     | 0.5    | 2000   | 200    | 3      |       |
| BD437    | NPN      | ECB     | 1250    | 4000    | 45        | 45        | 5         | 30  | 130          | 5  | 10     | 0.6    | 2000   | 200    | 3      |       |
| D882     | NPN      | ECB     | 1250    | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5    | 2000   | 200    | 50     |       |

### Transistors in TO-251/252

|           | POLARITY | PIN ARR | PD (mW) | IC (mA) | BVCBO (V) | BVCEO (V) | BVEBO (V) | hFE | VCE(sat) MAX | fT | VCE(V) | IC(mA) | IB(mA) | IC(mA) | IB(mA) | (MHz) |
|-----------|----------|---------|---------|---------|-----------|-----------|-----------|-----|--------------|----|--------|--------|--------|--------|--------|-------|
| 2SA1700   | PNP      | BCE     | 1000    | 200     | 400       | 400       | 5         | 60  | 200          | 10 | 50     | 0.6    | 50     | 5      | 70+    |       |
| 2SB1261-Z | PNP      | BCE     | 2000    | 3000    | 60        | 60        | 7         | 100 | 400          | 2  | 600    | 0.3    | 1500   | 150    | 120+   |       |
| 2SC4003   | NPN      | BCE     | 1000    | 200     | 400       | 400       | 5         | 60  | 200          | 10 | 50     | 0.6    | 50     | 5      | 70+    |       |
| 2SD1758   | NPN      | BCE     | 2000    | 2000    | 40        | 32        | 5         | 82  | 390          | 3  | 500    | 0.8    | 2000   | 200    | 80     |       |
| 2SD1899-Z | NPN      | BCE     | 2000    | 3000    | 60        | 60        | 7         | 100 | 400          | 2  | 600    | 0.25   | 1500   | 150    | 120+   |       |
| B772      | PNP      | BCE     | 1250    | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5    | 2000   | 200    | 50     |       |
| D882      | NPN      | BCE     | 1250    | 3000    | 40        | 30        | 6         | 60  | 400          | 2  | 1000   | 0.5    | 2000   | 200    | 50     |       |
| TIP29     | NPN      | BCE     | 1000    | 1000    | 40        | 40        | 5         | 15  | 75           | 4  | 1000   | 0.7    | 1000   | 125    | 3      |       |
| TIP29A    | NPN      | BCE     | 1000    | 1000    | 60        | 60        | 5         | 15  | 75           | 4  | 1000   | 0.7    | 1000   | 125    | 3      |       |
| TIP29B    | NPN      | BCE     | 1000    | 1000    | 80        | 80        | 5         | 15  | 75           | 4  | 1000   | 0.7    | 1000   | 125    | 3      |       |
| TIP29C    | NPN      | BCE     | 1000    | 1000    | 100       | 100       | 5         | 15  | 75           | 4  | 1000   | 0.7    | 1000   | 125    | 3      |       |

### IC Regulator

| PD (mW) | IO (mA) | VI (V) | VO (V) | Iq (mA) | PACKAGING | PIN ARRAY |
|---------|---------|--------|--------|---------|-----------|-----------|
|---------|---------|--------|--------|---------|-----------|-----------|



|         |      |      |     |             |     |               |     |
|---------|------|------|-----|-------------|-----|---------------|-----|
| CJ431   | 350  | 10   |     | VREF 2.44   |     | SOT-23-3L     | RCA |
| CJ431   | 500  | 10   |     | VREF 2.44   |     | SOT-89        | RAC |
| CJ431   | 770  | 10   |     | VREF 2.44   |     | TO-92         | RAC |
| CJ7805  | 2000 | 1500 | 35  | 4.8~5.2     |     | TO-220        | IGO |
| CJ7806  | 2000 | 1500 | 35  | 5.75~6.25   |     | TO-220        | IGO |
| CJ7808  | 2000 | 1500 | 35  | 7.7~8.3     |     | TO-220        | IGO |
| CJ7809  | 2000 | 1500 | 35  | 8.65~9.35   |     | TO-220        | IGO |
| CJ7812  | 2000 | 1500 | 40  | 11.5~12.5   |     | 8 TO-220      | IGO |
| CJ7815  | 2000 | 1500 | 35  | 14.4~15.6   |     | 8 TO-220      | IGO |
| CJ78L05 | 350  | 100  | 30  | 4.8~5.2     |     | 6 SOT-23-3L   | OIG |
| CJ78L05 | 500  | 100  | 30  | 4.8~5.2     |     | 6 SOT-89      | OIG |
| CJ78L05 | 625  | 100  | 30  | 4.8~5.2     |     | 6 TO-92       | OIG |
| CJ78L06 | 350  | 100  | 30  | 5.75~6.25   |     | 6 SOT-23-3L   | OIG |
| CJ78L06 | 500  | 100  | 30  | 5.75~6.25   |     | 6 SOT-89      | OIG |
| CJ78L06 | 625  | 100  | 30  | 5.75~6.25   |     | 6 TO-92       | OIG |
| CJ78L08 | 350  | 100  | 30  | 7.7~8.3     |     | 6 SOT-23-3L   | OIG |
| CJ78L08 | 500  | 100  | 30  | 7.7~8.3     |     | 6 SOT-89      | OIG |
| CJ78L08 | 625  | 100  | 30  | 7.7~8.3     |     | 6 TO-92       | OIG |
| CJ78L09 | 350  | 100  | 30  | 8.64~9.36   |     | 6 SOT-23-3L   | OIG |
| CJ78L09 | 500  | 100  | 30  | 8.64~9.36   |     | 6 SOT-89      | OIG |
| CJ78L09 | 625  | 100  | 30  | 8.64~9.36   |     | 6 TO-92       | OIG |
| CJ78L12 | 350  | 100  | 35  | 11.5~12.5   | 6.5 | 6.5 SOT-23-3L | OIG |
| CJ78L12 | 500  | 100  | 35  | 11.5~12.5   | 6.5 | 6.5 SOT-89    | OIG |
| CJ78L12 | 625  | 100  | 35  | 11.5~12.5   | 6.5 | 6.5 TO-92     | OIG |
| CJ78L15 | 500  | 100  | 30  | 14.4~15.6   | 6.5 | 6.5 SOT-89    | OIG |
| CJ78L15 | 625  | 100  | 30  | 14.4~15.6   | 6.5 | 6.5 TO-92     | OIG |
| CJ78L18 | 500  | 100  | 30  | 17.3~18.7   | 6.5 | 6.5 SOT-89    | OIG |
| CJ78L18 | 625  | 100  | 30  | 17.3~18.7   | 6.5 | 6.5 TO-92     | OIG |
| CJ78M05 | 2000 | 500  | 25  | 4.8~5.2     |     | 6 TO-220      | IGO |
| CJ78M05 | 1250 | 500  | 25  | 4.8~5.2     |     | 6 TO-252      | IGO |
| CJ7915  | 2000 | 1500 | -35 | -14.4~-15.4 |     | 3 TO-220      | GIO |
| CJ79L05 | 350  | 100  | -30 | -4.8~-5.2   |     | 6 SOT-23-3L   | GOL |
| CJ79L05 | 500  | 100  | -30 | -4.8~-5.2   |     | 6 SOT-89      | GIO |
| CJ79L05 | 625  | 100  | -30 | -4.8~-5.2   |     | 6 TO-92       | GIO |
| CJ79L06 | 350  | 100  | -30 | -5.75~-6.25 |     | 6 SOT-23-3L   | GOL |
| CJ79L06 | 500  | 100  | -30 | -5.75~-6.25 |     | 6 SOT-89      | GIO |
| CJ79L06 | 625  | 100  | -30 | -5.75~-6.25 |     | 6 TO-92       | GIO |
| CJ79L08 | 350  | 100  | -30 | -7.7~-8.3   |     | 6 SOT-23-3L   | GOL |
| CJ79L08 | 500  | 100  | -30 | -7.7~-8.3   |     | 6 SOT-89      | GIO |

### IC Regulator

|         |     |     |     |             |     |               |     |
|---------|-----|-----|-----|-------------|-----|---------------|-----|
| CJ79L08 | 625 | 100 | -30 | -7.7~-8.3   |     | 6 TO-92       | GIO |
| CJ79L09 | 350 | 100 | -30 | -8.64~-9.36 |     | 6 SOT-23-3L   | GOL |
| CJ79L09 | 500 | 100 | -30 | -8.64~-9.36 |     | 6 SOT-89      | GIO |
| CJ79L09 | 625 | 100 | -30 | -8.64~-9.36 |     | 6 TO-92       | GIO |
| CJ79L12 | 350 | 100 | -35 | -11.5~-12.5 | 6.5 | 6.5 SOT-23-3L | GOL |
| CJ79L12 | 500 | 100 | -35 | -11.5~-12.5 | 6.5 | 6.5 SOT-89    | GIO |
| CJ79L12 | 625 | 100 | -35 | -11.5~-12.5 | 6.5 | 6.5 TO-92     | GIO |
| CJ79L15 | 500 | 100 | -35 | -14.4~-15.4 | 6.5 | 6.5 SOT-89    | GIO |
| CJ79L15 | 625 | 100 | -35 | -14.4~-15.4 | 6.5 | 6.5 TO-92     | GIO |

### SCR

|           | VDRM<br>(V) | VRRM<br>(V) | IT(AV)<br>(A) | VGT<br>(V) | IGT<br>VAK(V) | VTM<br>MIN(μA) | MAX(μA) | (V) | PACKAGING TYPE |
|-----------|-------------|-------------|---------------|------------|---------------|----------------|---------|-----|----------------|
| MAC97A6*  | 400         | 400         | 1             | 1.5        | 12            |                | 15000   | 1.9 | TO-92          |
| PCR0.6A   | 400         |             | 0.6           | 0.8        | 7             | 5              | 120     | 1.7 | SOT-223        |
| PCR0.6A   | 400         |             | 0.6           | 0.8        | 7             | 5              | 120     | 1.7 | TO-92          |
| PCR100-6* | 400         | 400         | 0.8           | 0.8        | 7             | 5              | 200     | 1.7 | TO-92          |
| PCR100-8* | 600         | 600         | 0.8           | 0.8        | 7             | 5              | 200     | 1.7 | TO-92          |

### JUNCTION FIELD EFFECT TRANSISTOR

|        | PD<br>(mW) | ID<br>(mA) | BVGD0<br>(V) | IDSS<br>(μA) | VGS(OFF)<br>VDS(V) | gfs(min)<br>VGS(V) | (V) | VDS(V) | ID(μA) | Ciss | CRSS | VDS(V) | PACKAGING | PIN ARRAY |
|--------|------------|------------|--------------|--------------|--------------------|--------------------|-----|--------|--------|------|------|--------|-----------|-----------|
| K596-A | 100        | 1          | -20          | 100~170      | 5                  | 0                  | 1.5 | 5      | 1      | 3.5  | 0.65 | 5      | TO-92S    | SGD       |
| K596-B | 100        | 1          | -20          | 150~240      | 5                  | 0                  | 1.5 | 5      | 1      | 3.5  | 0.65 | 5      | TO-92S    | SGD       |
| K596-C | 100        | 1          | -20          | 210~350      | 5                  | 0                  | 1.5 | 5      | 1      | 3.5  | 0.65 | 5      | TO-92S    | SGD       |
| K596-D | 100        | 1          | -20          | 320~480      | 5                  | 0                  | 1.5 | 5      | 1      | 3.5  | 0.65 | 5      | TO-92S    | SGD       |
| K596-E | 100        | 1          | -20          | 400~800      | 5                  | 0                  | 1.5 | 5      | 1      | 3.5  | 0.65 | 5      | TO-92S    | SGD       |

### FIELD EFFECT TRANSISTOR

|           | PD<br>(W) | ID<br>(A) | V(BR)DSS<br>(V) | RDS(on)(max)<br>(Ω) | VGS(th)<br>ID(A) | gfs(min)<br>VGS(V) | (V)   | ID(μA) | (S)   | VDS(V) | ID(A) | PACKAGING | PIN ARRAY |
|-----------|-----------|-----------|-----------------|---------------------|------------------|--------------------|-------|--------|-------|--------|-------|-----------|-----------|
| 2N7000    | 0.35      | 0.2       | 60              | 5                   | 0.5              | 10                 | 0.8~3 | 1000   | 100μs | 10     | 0.2   | TO-92     | SGD       |
| 2N7002    | 0.2       | 0.25      | 60              | 3                   | 0.25             | 10                 | 1~2.5 | 250    | 0.3+  | 15     | 0.2   | SOT-23    | GSD       |
| 2N7002W   | 0.2       | 0.115     | 60              | 13.5                | 0.5              | 10                 | 1~2   | 250    | 0.08  | 10     | 0.2   | SOT-323   | GSD       |
| CJP02N60  | 2         | 2         | 600             | 3.8                 | 1                | 10                 | 2~4   | 250    | 1     | 50     | 1     | TO-220    | GDS       |
| CJP03N50* | 2         | 3         | 500             | 3                   | 1.5              | 10                 | 2~4   | 250    | 1     | 15     | 1.5   | TO-220    | GDS       |
| CJP03N60* | 2         | 3         | 600             | 2.2                 | 1.5              | 10                 | 2~4   | 250    | 1.5   | 15     | 1.5   | TO-220    | GDS       |
| CJP04N20* | 2         | 4         | 200             | 1.2                 | 2                | 10                 | 2~4   | 250    | 1.5   | 15     | 2     | TO-220    | GDS       |
| CJP04N40* | 2         | 4         | 400             | 1.8                 | 2                | 10                 | 2~4   | 250    | 1.8   | 15     | 2     | TO-220    | GDS       |
| CJP04N50* | 2         | 4         | 500             | 1.5                 | 2                | 10                 | 2~4   | 250    | 1.5   | 15     | 2     | TO-220    | GDS       |
| CJP04N60* | 2         | 4         | 600             | 2.2                 | 2                | 10                 | 2~4   | 250    | 2.8+  | 40     | 2     | TO-220    | GDS       |
| CJP05N40* | 2         | 5         | 400             | 1                   | 2.5              | 10                 | 2~4   | 250    | 2     | 15     | 2.5   | TO-220    | GDS       |
| CJP06N60* | 2         | 6         | 600             | 1.2                 | 3                | 10                 | 2~4   | 250    | 2     | 15     | 3     | TO-220    | GDS       |
| CJP07N20* | 2         | 7         | 200             | 0.7                 | 3.5              | 10                 | 2~4   | 250    | 1.5   | 14     | 3.5   | TO-220    | GDS       |
| CJP07N80* | 2         | 7         | 800             | 2                   | 6                | 10                 | 2~4   | 250    | 3     | 50     | 6     | TO-220    | GDS       |
| CJP08N20* | 2         | 8         | 200             | 0.18                | 10               | 10                 | 2~4   | 250    | 3.8   | 50     | 5.4   | TO-220    | GDS       |
| CJP08N50* | 2         | 8         | 500             | 0.8                 | 4                | 10                 | 2~4   | 250    | 4     | 15     | 4     | TO-220    | GDS       |
| CJP09N60* | 2         | 9         | 600             | 1.2                 | 6                | 10                 | 2~4   | 250    | 3     | 50     | 6     | TO-220    | GDS       |

|           |      |     |     |      |     |    |       |      |      |     |     |         |     |
|-----------|------|-----|-----|------|-----|----|-------|------|------|-----|-----|---------|-----|
| CJP10N10* | 2    | 10  | 100 | 0.22 | 5   | 5  | 1-2   | 250  | 5    | 8   | 5   | TO-220  | GDS |
| CJP10N40* | 2    | 10  | 400 | 0.55 | 5   | 5  | 2-4   | 250  | 4+   | 15  | 5   | TO-220  | GDS |
| CJP10N45* | 2    | 10  | 450 | 0.7  | 6   | 10 | 2-4   | 250  | 3    | 50  | 6   | TO-220  | GDS |
| CJP10N60* | 2    | 10  | 600 | 0.75 | 5   | 10 | 2-4   | 250  | 3    | 15  | 5   | TO-220  | GDS |
| CJP12N10* | 2    | 12  | 100 | 0.16 | 6   | 10 | 2-4   | 250  | 4    | 15  | 6   | TO-220  | GDS |
| CJP16N25* | 2    | 16  | 250 | 0.25 | 8   | 10 | 2-4   | 250  | 3    | 15  | 8   | TO-220  | GDS |
| CJP18N20* | 2    | 18  | 200 | 0.18 | 10  | 10 | 2-4   | 250  | 6    | 3.2 | 10  | TO-220  | GDS |
| CJP20N15* | 2    | 20  | 150 | 0.13 | 10  | 10 | 2-4   | 250  | 8    | 13  | 10  | TO-220  | GDS |
| CJP20N20* | 2    | 20  | 200 | 0.16 | 10  | 10 | 2-4   | 250  | 8    | 13  | 10  | TO-220  | GDS |
| CJT01N10  | 0.8  | 1   | 100 | 0.25 | 0.5 | 10 | 2-4.5 | 1000 | 2.2+ | 10  | 0.5 | SOT-223 | GDS |
| CJU03N25* | 1.25 | 3   | 250 | 2    | 1.5 | 10 | 2-4   | 250  | 2.3+ | 15  | 1.5 | TO-252  | GDS |
| CJU05N25* | 1.25 | 5   | 250 | 1    | 2.5 | 10 | 2-4   | 250  | 1.5  | 15  | 2.5 | TO-252  | GDS |
| CJU06N10* | 1.25 | 6   | 100 | 0.4  | 3   | 10 | 2-4   | 250  | 1.5  | 15  | 2.5 | TO-252  | GDS |
| IRF630    | 2    | 9   | 200 | 0.4  | 5   | 10 | 2-4   | 250  | 3    | 3.6 | 5   | TO-220  | GDS |
| IRF640    | 2    | 18  | 200 | 0.18 | 11  | 10 | 2-4   | 250  | 6.7  | 50  | 11  | TO-220  | GDS |
| IRF820    | 2    | 2.5 | 500 | 3    | 1.5 | 10 | 2-4   | 250  | 1.5  | 10  | 2   | TO-220  | GDS |
| IRF830*   | 2    | 4.5 | 500 | 1.5  | 2.7 | 10 | 2-4   | 250  | 2.5  | 50  | 2.7 | TO-220  | GDS |
| IRF840*   | 2    | 8   | 500 | 0.85 | 4.8 | 10 | 2-4   | 250  | 4.9  | 50  | 4.8 | TO-220  | GDS |

### DIGITAL TRANSISTOR

|           | PACKAGING | POLARITY | PIN ARRAY | PD<br>(mW) | IO<br>(mA) | VCC<br>(V) | Gi  | VO(on)<br>(V) | R1<br>(Ω) | R2<br>(Ω) | fT<br>(MHz) | MARKING |
|-----------|-----------|----------|-----------|------------|------------|------------|-----|---------------|-----------|-----------|-------------|---------|
| DTA114ECA | SOT-23    | PNP      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 14      |
| DTA114EKA | SOT-23-3L | PNP      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 14      |
| DTA114ESA | TO-92S    | PNP      | GOI       | 300        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        |         |
| DTA114EUA | SOT-323   | PNP      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 14      |
| DTA114TCA | SOT-23    | PNP      | GIO       | 200        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        | 94      |
| DTA114TKA | SOT-23-3L | PNP      | GIO       | 200        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        | 94      |
| DTA114TSA | TO-92S    | PNP      | GOI       | 300        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        |         |
| DTA114TUA | SOT-323   | PNP      | GIO       | 200        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        | 94      |
| DTA143ZKA | SOT-23-3L | PNP      | GIO       | 200        | 100        | 50         | 80  | 0.3           | 4.7K      | 47K       | 250+        | E13     |
| DTA143ZSA | TO-92S    | PNP      | GOI       | 300        | 100        | 50         | 80  | 0.3           | 4.7K      | 47K       | 250+        |         |
| DTA143ZUA | SOT-323   | PNP      | GIO       | 200        | 100        | 50         | 80  | 0.3           | 4.7K      | 47K       | 250+        | 113     |
| DTC114ECA | SOT-23    | NPN      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 24      |
| DTC114EKA | SOT-23-3L | NPN      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 24      |
| DTC114ESA | TO-92S    | NPN      | GOI       | 300        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        |         |
| DTC114EUA | SOT-323   | NPN      | GIO       | 200        | 50         | 50         | 30  | 0.3           | 10K       | 10K       | 250+        | 24      |
| DTC114TKA | SOT-23-3L | NPN      | GIO       | 200        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        | 4       |
| DTC114TSA | TO-92S    | NPN      | GOI       | 300        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        |         |
| DTC114TUA | SOT-323   | NPN      | GIO       | 200        | 100        | 50         | 100 | 0.3           | 10K       | 0         | 250+        | 4       |
| DTC114YKA | SOT-23-3L | NPN      | GIO       | 200        | 70         | 50         | 68  | 0.3           | 10K       | 47K       | 250+        | 64      |
| DTC114YSA | TO-92S    | NPN      | GOI       | 300        | 70         | 50         | 68  | 0.3           | 10K       | 47K       | 250+        |         |
| DTC114YUA | SOT-323   | NPN      | GIO       | 200        | 70         | 50         | 68  | 0.3           | 10K       | 47K       | 250+        | 64      |
| DTC143XCA | SOT-23    | NPN      | GIO       | 200        | 100        | 50         | 30  | 0.3           | 4.7K      | 10K       | 250+        | 43      |
| DTC143XKA | SOT-23-3L | NPN      | GIO       | 200        | 100        | 50         | 30  | 0.3           | 4.7K      | 10K       | 250+        | 43      |
| DTC143XSA | TO-92S    | NPN      | GOI       | 300        | 100        | 50         | 30  | 0.3           | 4.7K      | 10K       | 250+        |         |
| DTC143XUA | SOT-323   | NPN      | GIO       | 200        | 100        | 50         | 30  | 0.3           | 4.7K      | 10K       | 250+        | 43      |
| DTC144ECA | SOT-23    | NPN      | GIO       | 200        | 100        | 50         | 68  | 0.3           | 47K       | 47K       | 250+        | 26      |
| DTC144EKA | SOT-23-3L | NPN      | GIO       | 200        | 100        | 50         | 68  | 0.3           | 47K       | 47K       | 250+        | 26      |
| DTC144ESA | TO-92S    | NPN      | GOI       | 300        | 100        | 50         | 68  | 0.3           | 47K       | 47K       | 250+        |         |
| DTC144EUA | SOT-323   | NPN      | GIO       | 200        | 100        | 50         | 68  | 0.3           | 47K       | 47K       | 250+        | 26      |

### ZENER VOLTAGE DIODES

|           | PD<br>(mW) | VZ(V)  | ZzT(Ω) | ZzK(Ω)   | VF<br>(V) | IF(mA) |         |
|-----------|------------|--------|--------|----------|-----------|--------|---------|
| BZT52CS   | 200        | 2.0~39 | 10~130 | 80~600   | 0.9       | 10     | SOD-323 |
| BZT52C    | 500        | 2.4~51 | 10~100 | 80~750   | 0.9       | 10     | SOD-123 |
| BZX84CW   | 200        | 2.4~39 | 15~130 | 80~600   | 0.9       | 10     | SOT-323 |
| BZX84C    | 350        | 2.4~51 | 10~180 | 80~600   | 0.9       | 10     | SOT-23  |
| MMBZ5221E | 350        | 2.4~39 | 5~80   | 500~2000 | 0.9       | 10     | SOT-23  |
| MMBZ5221E | 200        | 2.4~39 | 5~80   | 500~2000 | 0.9       | 10     | SOT-323 |
| MMSZ5221E | 500        | 2.4~39 | 3.2~20 | 500~2000 | 0.9       | 10     | SOD-123 |
| MMSZ5221E | 200        | 2.4~39 | 5~80   | 500~2000 | 0.9       | 10     | SOD-323 |

### SWITCHING TRANSISTOR FOR POWER-SAVING LAMP AND RECTIFIER

|           | PACKAGING | PIN ARRAY | PD<br>(mW) | IC<br>(mA) | BVCBO<br>(V) | BVCEO<br>(V) | BVEBO<br>(V) | hFE<br>MIN | VCE(sat)<br>MAX | fT<br>VCE(V) | IC(mA)<br>(V) | IC(mA)<br>(V) | IB(mA)<br>(MHz) |      |   |
|-----------|-----------|-----------|------------|------------|--------------|--------------|--------------|------------|-----------------|--------------|---------------|---------------|-----------------|------|---|
| 3DD13001  | TO-252    | BCE       | 1200       | 200        | 600          | 400          | 7            | 10         | 40              | 20           | 20            | 0.5           | 50              | 10   | 5 |
| 3DD13001  | TO-92     | BCE       | 750        | 200        | 600          | 400          | 7            | 10         | 70              | 20           | 20            | 0.5           | 50              | 10   | 5 |
| 3DD13002  | TO-126    | BCE       | 1250       | 1000       | 600          | 400          | 6            | 9          | 40              | 10           | 200           | 0.8           | 200             | 40   | 5 |
| 3DD13002  | TO-251    | BCE       | 1250       | 1000       | 600          | 400          | 6            | 9          | 40              | 10           | 200           | 0.8           | 200             | 40   | 5 |
| 3DD13002B | TO-92     | ECB       | 750        | 1000       | 600          | 400          | 6            | 9          | 40              | 10           | 200           | 0.8           | 200             | 40   | 5 |
| 3DD13003  | TO-126    | BCE       | 1250       | 1500       | 700          | 400          | 9            | 8          | 40              | 2            | 500           | 1             | 1000            | 250  | 5 |
| 3DD13003  | TO-220    | BCE       | 2000       | 1500       | 700          | 400          | 9            | 8          | 40              | 2            | 500           | 1             | 1000            | 250  | 5 |
| 3DD13005  | TO-220    | BCE       | 2000       | 4000       | 700          | 400          | 9            | 10         | 40              | 5            | 1000          | 0.6           | 2000            | 500  | 5 |
| 3DD13007  | TO-220    | BCE       | 2000       | 8000       | 700          | 400          | 9            | 8          | 40              | 5            | 2000          | 1.5           | 5000            | 1000 | 4 |
| C2611     | TO-251    | ECB       | 1000       | 200        | 600          | 400          | 7            | 10         | 40              | 20           | 20            | 0.5           | 50              | 10   | 5 |