

Silicon NPN Transistors

Type	Con- struction	P <sub>c</sub> Max. (mW)	Typical f <sub>T</sub> or *f <sub>1</sub> † fab (MHz)	Absolute Max. Ratings				Typical h <sub>FE</sub> at (mA) (or *h <sub>fe</sub> )	Max I <sub>CB0</sub> at V <sub>CB</sub>		Application	Base Ref.
				V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	V <sub>EB0</sub> (V)	I <sub>C</sub> (mA)		μA	V		
BFS38	P	350	150	45	35	—	500	200 at 10	—	—	General purpose	53
BFS38A	P	350	150	25	25	—	500	175 at 10	—	—		53
BFS39	P	350	150	60	45	—	500	80 at 10	—	—		53
ZTX237	P	350	150	—	45	—	200	330 at 2	—	—	High speed switching	67
ZTX238	P	350	150	—	30	—	200	490 at 2	—	—		67
ZTX239	P	350	150	—	30	—	200	590 at 2	—	—		67
BSV35A	P	350	300	25	12	—	500	20‡ at 10	—	—	H.F. amplifiers	53
BSV35	P	350	500	40	15	—	500	80 at 10	—	—		53
BSV36	P	350	600	15	6	—	500	90 at 20	—	—		53
BSV46	P	350	600	30	15	—	500	20‡ at 3	—	—	H.F. amplifiers	53
BSV46A	P	350	600	30	15	—	500	20‡ at 3	—	—		53
BFS85	P	350	1,000	25	12	—	50	87 at 2	—	—		53
BFS88	P	350	1,300	30	12	—	50	87 at 2	—	—	53	
ZT708 } 2N708 }	PE	360	300‡	40	20	5	500	30‡ at 10	0.025	40	High speed switching	2
ZTX3707	P	500	—	—	30	—	—	250 at 0.1	—	—	Low noise amplifiers	67
ZTX3709	P	500	—	—	30	—	30	105 at 1	—	—	General purpose	67
ZTX3710	P	500	—	—	30	—	30	160 at 1	—	—		67
ZTX3711	P	500	—	—	30	—	30	420 at 1	—	—		67
ZTX223	P	500	100	—	30	—	800	250 at 50	—	—	High speed switching	67
ZTX3704	P	500	100	—	30	—	800	200 at 50	—	—		67
ZTX3705	P	500	100	—	30	—	800	100 at 50	—	—		67
ZTX3706	P	500	100	—	20	—	800	315 at 50	—	—	General purpose	67
BFS59	P	500	150	—	30	—	1A	170 at 150	—	—		67
BFS60	P	500	150	—	40	—	1A	200 at 150	—	—		67
BFS61	P	500	150	—	60	—	1A	100 at 150	—	—	General purpose	67
ZTX382	P	500	150	—	45	—	100	545 at 2	—	—		67
ZTX383	P	500	150	—	30	—	100	545 at 2	—	—		67
ZTX384	P	500	150	—	30	—	100	545 at 2	—	—	H.F. amplifiers	67
ZTX4400	P	500	200	—	40	—	600	100 at 150	—	—		67
ZTX3903	P	500	250	—	40	—	200	100 at 10	—	—		67
ZTX4401	P	500	250	—	40	—	600	200 at 150	—	—	H.F. amplifiers	67
ZTX3904	P	500	300	—	40	—	200	200 at 10	—	—		67
ZTX327	P	500	400	—	30	—	—	350 mW out, 80mW in at 400MHz	—	—		67
ZT2476 } 2N2476 }	PE	600	250‡	60	20	5	—	40‡ at 150	0.2	60	High speed switching	2
ZT2477 } 2N2477 }	PE	600	250‡	60	20	5	—	40 at 150	0.2	60	High speed switching	2
ZTX337	P	750	100	—	45	—	800	350 at 100	—	—	General purpose	67
ZTX338	P	750	100	—	25	—	800	350 at 100	—	—		67
BFX84	PE	800	50‡	100	60	6	1A	20‡ at 10	0.05	100		General purpose
BFX85	PE	800	50‡	100	60	6	1A	50‡ at 150	0.05	100	2	
BFY50	PE	800	50‡	80	60	6	1A	30‡ at 150	0.05	80	2	
BFY51	PE	800	50‡	60	60	6	1A	40‡ at 150	0.05	60	Low noise amplifiers	2
BFY52	PE	800	50‡	40	40	6	1A	60‡ at 150	0.05	40		2
2N3053	PE	1W	100‡	60	50	5	700	50‡ at 150	0.25	60		2
ZTX450	P	1W	150	—	45	—	1A	200 at 150	—	—	A.F. drivers	67
ZTX451	P	1W	150	—	60	—	1A	100 at 150	—	—		67
ZT1613 } 2N1613 }	PE	3W†	60‡	75	50	7	1A	40‡ at 150	0.01	75		General purpose
ZT1711 } 2N1711 }	PE	3W†	70‡	75	50	7	1A	100‡ at 150	0.01	75	General purpose	2
2N4428	PE	3.5W†	500‡	55	35	3.5	425	74mW out, 70mW in at 500MHz	—	—	A.M., F.M., C.W.	2
2N3866	PE	5W†	100‡	55	30	3.5	400	1.8W out, 0.5W in at 100MHz	—	—		2
2N4429	PE	5W†	1,000‡	55	35	3.5	425	1W out, 0.3W in at 1GHz	—	—		2
ZT1700 } 2N1700 }	DJ	5W†	1.2††	60	40	6	1A	20‡ at 100	75	60	General purpose	2
ZT1479 } 2N1479 }	DJ	5W†	1.5††	60	40	12	1.5A	20‡ at 200	10	60	Switching	2
ZT1480 } 2N1480 }	DJ	5W†	1.5††	100	55	12	1.5A	20‡ at 200	10	100		2

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				V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	V <sub>EB0</sub> (V)	I <sub>C</sub> (mA)		μA	V			
BCY58C	PE	300	300	32	32	5	200	350 at 2	0.01	32	Low level amplifiers	2	
BCY58D	PE	300	300	32	32	5	200	500 at 2	0.01	32		2	
BCY59A	PE	300	300	45	45	5	200	170 at 2	0.01	45		2	
BCY59B	PE	300	300	45	45	5	200	250 at 2	0.01	45		2	
BCY59C	PE	300	300	45	45	5	200	350 at 2	0.01	45		2	
BCY59D	PE	300	300	45	45	5	200	500 at 2	0.01	45		2	
BSY19 2N708	PE	300	300	40	15	5	200	30 at 10	0.025	20	Low level switching	2	
BSY21 2N914												2	
2N743	PE	300	300	20	12	5	200	10 at 100	1	20		2	
2N744	PE	300	300	20	12	5	200	20 at 100	1	20		2	
BF121	P	330	350	40	30	4	25	75 at 4	0.05	25		H.F. amplifiers & oscillators	37
BF127	P	330	350	40	30	4	25	60 at 4	0.05	20			37
BF125	PE	330	450	40	35	4	25	90 at 7	0.05	20	37		
BF123	PE	330	550	40	25	4	25	90 at 7	0.05	20	High speed switching	2	
2N3301	PE	360	250	60	30	5	500	35 at 10	0.01	50		2	
2N3302	PE	360	250	60	30	5	500	75 at 10	0.01	50		2	
2N2368	PE	360	400	40	15	4.5	500	40 at 10	0.4	20	H.S. saturated switching	2	
2N2369	PE	360	500	40	15	4.5	500	80 at 10	0.4	20		2	
2N2369A	PE	360	500	40	15	4.5	500	80 at 10	0.4	20		2	
BSW82	PE	500	200	40	25	5	500	30 at 10	0.1	30	High speed switching	2	
BSW83	PE	500	200	40	25	5	500	70 at 10	0.1	30		2	
BSW84	PE	500	200	75	40	5	500	35 at 10	0.01	50		2	
BSW85	PE	500	200	75	40	5	500	75 at 10	0.01	50	High speed switching	2	
2N2221	PE	500	250	60	30	5	800	35 at 10	0.01	50		2	
2N2221A	PE	500	250	75	40	6	800	35 at 10	0.01	60		2	
2N2222	PE	500	250	60	30	5	800	75 at 10	0.01	50	Medium level amplifiers	2	
2N2222A	PE	500	300	75	40	6	800	75 at 10	0.01	60		2	
BC337	PE	625	—	—	45	5	800	350 at 100	0.1	45		64	
BC338	PE	625	—	—	25	5	800	350 at 100	0.1	45	High level amplifiers	64	
BC140-6	PE	750	—	—	40	7	1A	70 at 100	0.1	40		2	
BC140-10	PE	750	—	—	40	7	1A	110 at 100	0.1	40		2	
BC140-16	PE	750	—	—	40	7	1A	175 at 100	0.1	40	High level amplifiers	2	
BC141-6	PE	750	—	—	60	7	1A	70 at 100	0.1	60		2	
BC141-10	PE	750	—	—	60	7	1A	110 at 100	0.1	60		2	
BC141-16	PE	750	—	—	60	7	1A	175 at 100	0.1	60	Medium level amplifiers	2	
BC340-6	PE	800	—	—	40	5	500	70 at 50	0.1	40		2	
BC340-10	PE	800	—	—	40	5	500	110 at 50	0.1	40		2	
BC340-16	PE	800	—	—	40	5	500	175 at 50	0.1	40	Medium level amplifiers	2	
BC341-6	PE	800	—	—	60	5	500	70 at 50	0.1	60		2	
BC341-10	PE	800	—	—	60	5	500	110 at 50	0.1	60		2	
BSY51 2N697	PE	800	100	60	25	5	500	80 at 150	0.1	30	Medium level switching	2	
BSY52 2N1420												2	
BSY53 2N1613	PE	800	100	75	30	7	750	80 at 150	0.01	60		Medium level switching	2
BSY54 2N1711													2
BSY55 2N1893	PE	800	100	120	80	7	500	80 at 150	0.01	90			2
BSY56	PE	800	100	120	80	7	500	200 at 150	0.01	90		2	
BSY87 2N1889	PE	800	100	100	60	7	500	80 at 150	0.01	75	Medium level switching	2	
BSY88 2N1890												2	
2N1613	PE	800	100	75	50	7	500	80 at 150	0.01	60		Switching	2
2N1711	PE	800	100	75	50	7	500	200 at 150	0.01	60	2		
2N1893	PE	800	100	120	80	7	500	80 at 150	0.01	90	2		

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				V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	V <sub>EB0</sub> (V)	I <sub>C</sub> (mA)		μA	V		
BFR98	—	—	500	—	20	—	—	100 at 100	—	—	H.F. amplifiers	2
2N4427	—	—	500	—	30	—	—	80 at 4	0.05	30		9
BFX31	—	—	550	—	30	—	—	80 at 4	0.05	30		9
BFX18	—	—	550	—	30	—	—	75 at 2.5	0.05	30		9
BFX19	—	—	550	—	30	—	—	75 at 2.5	0.05	30		9
BFX20	—	—	550	—	30	—	—	70 at 2.5	0.05	30		9
BFX21	—	—	550	—	30	—	—	70 at 2.5	0.05	30		9
BFW63	—	—	600	—	30	—	—	70 at 4	—	—		21
BFW64	—	—	650	—	30	—	—	70 at 4	—	—		21
BFW70	—	—	900	—	30	—	—	75 at 10	—	—		21
BFX73	—	—	900	—	15	—	—	50 at 3	0.01	15		9
BFR36	—	—	1,300	—	30	—	—	95 at 150	—	—		2
BFR37	—	—	1,400	—	30	—	—	150 at 10	—	—		21
BF167	—	150	600	—	30	4	—	45 at 4	—	—		21
BF251	—	150	600	—	30	4	—	80 at 4	—	—		21
BF222	—	175	400	—	40	4	—	60 at 2	—	—	F.M. tuners	
BF166	—	175	500	—	40	3	—	50 at 2.5	—	—	V.H.F. a.g.c. amplifiers	
BF161	—	175	550	—	50	4	—	60 at 3	—	—	U.H.F. mixer/osc.	
BF173	—	175	1,000	—	25	4	—	115 at 7	—	—	I.F. vision output	
BC113	—	200	—	30	—	—	50	600 at 1	—	—	Pre-amplifiers	
BC114	—	200	—	30	—	—	50	600 at 1	—	—	Low noise pre-amplifiers	
BC207	—	200	—	50	—	—	100	280 at 2	—	—	Audio drivers	
BC208	—	200	—	25	—	—	100	455 at 2	—	—	Low voltage	
BC209	—	200	—	25	—	—	100	500 at 2	—	—	Low noise hi-fi	
2N918	—	200	60	—	15	—	—	—	—	—	R.F. I.F. amps./osc.	
2N4135	—	200	60	—	30	—	—	—	—	—	9	
BF454	—	200	400	—	25	4	—	90 at 1	—	—	A.M./F.M. I.F. amplifiers	
BF455	—	200	400	—	25	4	—	65 at 1	—	—	A.M./F.M. I.F. pre-amplifiers	
2N4134	—	200	450	—	30	—	—	—	—	—	R.F. I.F. amps./osc.	
BF233	—	200	500	—	30	4	—	—	—	—	A.M./F.M. amplifiers	
BF155	—	200	600	—	40	3	—	70 at 2.5	—	—	U.H.F. amps./osc.	
BF160	—	200	600	—	12	2	—	50 at 3	—	—	A.M./F.M. I.F. amplifiers	
BF273	—	200	600	—	20	4	—	95 at 1	—	—	A.M./F.M. amplifiers	
BF274	—	200	700	—	20	4	—	170 at 1	—	—	A.M./F.M. I.F. amplifiers	
BF158	—	200	800	—	12	2	—	50 at 5	—	—	TV I.F. amplifiers	
BF288	—	250	500	—	40	4	—	90 at 1	—	—	A.M./F.M. I.F. amplifiers	
BF287	—	250	700	—	40	4	—	60 at 2	—	—	A.M./F.M. amplifiers	
BF271	—	250	900	—	25	4	—	75 at 10	—	—	I.F. vision output	
BC107	—	300	—	50	—	—	100	280 at 2	—	—	Audio driver	
BC108	—	300	—	30	—	—	100	455 at 2	—	—	Low voltage	
BC109	—	300	—	30	—	—	100	500 at 2	—	—	Low noise hi-fi	
BC115	—	300	—	40	—	—	200	250 at 10	—	—	Audio driver	
BC125	—	300	—	50	—	—	500	60 at 150	—	—	64	
2N707	—	300	—	—	25	—	—	—	—	—	R.F. I.F. amps./osc.	
2N706	—	300	200	—	20	—	—	20‡ at 10	—	—	2	
2N2205	—	300	200	—	12	—	—	20‡ at 10	—	—	2	
2N743	—	300	280	—	12	—	—	40 at 10	—	—	2	
2N744	—	300	280	—	12	—	—	80 at 10	—	—	H.S. saturated switching	
2N708	—	300	300	—	15	—	—	75 at 10	—	—	2	
2N834	—	300	350	—	10	—	—	25‡ at 10	—	—	2	
2N709	—	300	600	—	6	—	—	70 at 10	—	—	2	
2N915	—	360	250	—	50	—	—	125 at 10	—	—	General purpose	
2N3301	—	360	250	—	30	—	—	80 at 150	—	—	amplifiers	
2N3302	—	360	250	—	30	—	—	200 at 150	—	—	2	

Continued