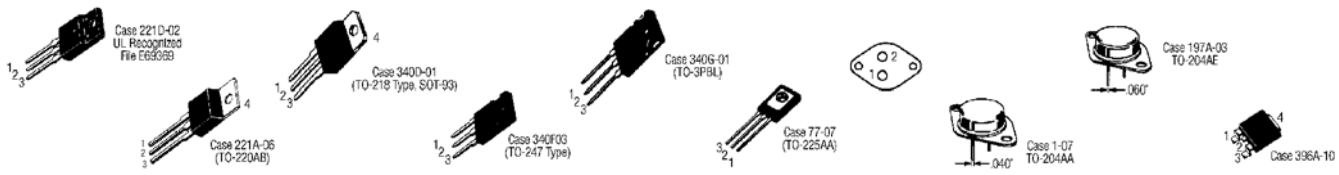
Bipolar Power Transistors



Plastic (Isolated TO-220 Type)
Pin: 1 — Base, 2 — Collector, 3 — Emitter (Style 2, Case 221D-02)

Mfr.'s Type NPN	Mfr.'s Type PNP	I_CCont (A) Max.	$V_{CEO(sus)}$ (V) Min.	V_{CES} (V) Min.	h_{FE} Min./Max.	@ I_C (A)	Resistive Switching t_s (µs) Max.	Resistive Switching t_f (µs) Max.	Resistive Switching @ I_C (A)	f_T (MHz) Min.	P_D (Case) Watts @ 25°C
MJF122[2]	MJF127[2]	5	100	—	2000 Min.	3.0	1.5 Typ.	1.50 Typ.	3.0	4[1]	28
MJF44H11	MJF45H11	10	80	—	40/100	4.0	0.5 Typ.	0.14 Typ.	5.0	40	35
MJF6388[2]	MJF6668[2]	10	100	—	3 K/20 K	3.0	1.5 Typ.	1.50 Typ.	—	20[1]	40

[1]$|h_{fe}|$ @ MHz. [2]Darlington. [3]Switching tests performed with special application simulator circuit. See data sheet for details.

Plastic TO-220
Pin: 1 — Base, 2 — Collector, 3 — Emitter, 4 — Collector (Style 1, Case 221A-06)

Mfr.'s Type NPN	Mfr.'s Type PNP	I_CCont (A) Max.	$V_{CEO(sus)}$[5] (V) Min.	h_{FE} Min./Max.	@ I_C (A)	Resistive Switching t_s (µs) Max.	Resistive Switching t_f (µs) Max.	Resistive Switching @ I_C (A)	f_T (MHz) Min.	P_D (Case) Watts @ 25°C
TIP29B	—	1	80	15/75	1.0	0.6 Typ.	0.30 Typ.	1.0	3.0	30
TIP29C	TIP30C	1	100	15/75	1.0	0.6 Typ.	0.30 Typ.	1.0	3.0	30
TIP47	—	1	250	30/150	0.3	2.0 Typ.	0.18 Typ.	0.3	10.0	40
TIP48	—	1	300	30/150	0.3	2.0 Typ.	0.18 Typ.	0.3	10.0	40
—	MJE5731	1	350	30/150	0.3	2.0 Typ.	0.18 Typ.	0.3	10.0	40
TIP50	—	1	400	30/150	0.3	2.0 Typ.	0.18 Typ.	0.3	10.0	40
TIP110[2]	TIP115[2]	2	60	500 Min.	2.0	1.7 Typ.	1.30 Typ.	2.0	25.0[1]	50
—	—	2	80	500 Min.	2.0	1.7 Typ.	1.30 Typ.	2.0	25.0[1]	50
TIP112[2,4]	TIP117[2,4]	—	100	500 Min.	2.0	1.7 Typ.	1.30 Typ.	2.0	25.0[1]	50
BUX85	—	2	450/1000	30	0.1	3.5	1.40	1.0	4.0	50
MJE1320	—	2	900/1800	3 Min.	1.0	4.0 Typ.	0.80 Typ.	1.0	—	80
TIP31A	TIP32A	3	60	25 Min.	1.0	0.6 Typ.	0.30 Typ.	1.0	3.0	40
—	TIP32B	3	80	25 Min.	1.0	0.6 Typ.	0.30 Typ.	1.0	3.0	40
TIP31C[4]	TIP32C[4]	3	100	25 Min.	1.0	0.6 Typ.	0.30 Typ.	1.0	3.0	40
MJE13005	—	4	400/700	6/30	3.0	3.0	0.70	3.0	4.0	60
TIP120[2]	TIP125[2]	5	60	1 K Min.	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	65
TIP121[2]	TIP126[2]	5	80	1 K Min.	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	65
TIP122[2,4]	TIP127[2,4]	5	100	1 K Min.	3.0	1.5 Typ.	1.50 Typ.	4.0	4.0[1]	75
MJE18204	—	5	450/1000	14/36	1.0	3.0	0.50	2.5	12.0	100
—	TIP42A	6	60	15/75	3.0	0.4 Typ.	0.15 Typ.	3.0	3.0	65
TIP41C	TIP42C	6	100	15/75	3.0	0.4 Typ.	0.15 Typ.	3.0	3.0	65
—	2N6109	7	50	30/150	2.5	0.4 Typ.	0.15 Typ.	3.0	4.0	40
2N6292	2N6107	7	70	30/150	2.5	0.4 Typ.	0.15 Typ.	3.0	4.0	40
2N6043[2]	2N6040[2]	8	80	1 K/10 K	4.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	75
TIP100[2]	TIP105[2]	8	60	1 K/20 K	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	80
TIP101[2]	TIP106[2]	8	80	1 K/20 K	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	75
2N6045[2]	2N6042[2]	8	100	1 K/10 K	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	75
TIP102[2]	TIP107[2]	8	100	1 K/20 K	3.0	1.5 Typ.	1.50 Typ.	3.0	4.0[1]	80
MJE15028	MJE15029	8	120	20 Min.	4.0	—	—	—	30.0	50
MJE15030	MJE15031	8	150	20 Min.	4.0	—	—	—	30.0	50
MJE5740[2]	—	8	300/600	200 Min.	4 .0	8.0 Typ.	2.00 Typ.	6.0	4.0	80
—	MJE5850	8	300/600	15 Min.	2.0	2.0	0.50	4.0	—	80
—	MJE5851	8	350	15 Min.	2.0	2.0	0.50	4.0	—	80
MJE5742[2]	—	8	400/700	200 Min.	4.0	8.0 Typ.	2.00 Typ.	6.0	12.0 Typ.	80
MJE13007[4]	—	8	400/700	5/30	5.0	3.0	0.70	5.0	12.0 Typ.	80
—	MJE5852[4]	8	400/700	15 Min.	2.0	2.0	0.50	4.0	12.0 Typ.	80
D44H8	D45H8	10	60	40 Min.	4.0	—	—	—	—	50
MJE3055T	MJE2955T	10	60	20/70	4.0	—	—	—	—	75
2N6387[2]	2N6667[2]	10	60	1K/20 K	5.0	—	—	—	20.0[1]	65
D44H11[4]	D45H11[4]	10	80	40 Min.	4.0	0.5 Typ.	0.14 Typ.	5.0	50.0 Typ.	50
2N6487	—	15	60	20/150	5.0	0.6 Typ.	0.30 Typ.	5.0	5.0	75
2N6488	2N6491	15	80	20/150	5.0	0.6 Typ.	0.30 Typ.	5.0	5.0	75
D44VH10	D45VH10	15	80	20 Min.	4.0	0.5	0.09	8.0	50.0 Typ.	83

Plastic TO-218 Type Pin: 1 — Base, 2 — Collector, 3 — Emitter, 4 — Collector (Style 1, Case 340D-01 (TO-218 Type, SOT-93))

TIP140[2]	TIP145[2]	10	60	500 Min.	10.0	2.5 Typ.	2.50 Typ.	5.0	4.0[1]	125
TIP141[2]	TIP146[2]	10	80	500 Min.	10.0	2.5 Typ.	2.50 Typ.	5.0	4.0[1]	125
TIP142[2]	—	10	100	500 Min.	10.0	2.5 Typ.	2.50 Typ.	5.0	4.0[1]	125
TIP3055	TIP2955	15	60	5 Min.	10.0	—	—	—	2.5	80
MJH11020[2]	—	15	200	400/15 K	10.0	—	—	—	3.0[1]	150
MJH11022[2]	MJH11021[2]	15	250	400/15 K	10.0	—	—	—	3.0[1]	150
BUV48A	—	15	450	8 Min.	8.0	2.0	0.40	10.0	—	150
MJE4343	—	16	160	15 Min.	8.0	1.2 Typ.	1.20 Typ.	8.0	1.0	125
MJH6284[2]	MJH6287[2]	20	100	750/18 K	10.0	—	—	—	4.0[1]	125
TIP35C	TIP36C	25	100	10/75	15.0	0.6 Typ.	0.30 Typ.	10.0	3.0	125

[1]$|h_{fe}|$ @ MHz. [2]Darlington. [3]Switching tests performed with special application simulator circuit. See data sheet for details. [4]Available as preferred chip. [5]When 2 voltages are given, the format is $V_{CEO(sus)}/V_{CES}$.

Plastic TO-247 Type
Pin: 1 — Base, 2 — Collector, 3 — Emitter, 4 — Collector (Case 340F-03)

Mfr.'s Type NPN	I_CCont (A) Max.	$V_{CEO(sus)}$ (V) Min.	V_{CES} (V) Min.	h_{FE} Min./Max.	@ I_C (A)	Resistive Switching t_s (µs) Max.	Resistive Switching t_f (µs) Max.	Resistive Switching @ I_C (A)	f_T (MHz) Min.	P_D (Case) Watts @ 25°C
MJW16018	10	800	1500	4 Min.	5.0	4.50 Typ.	0.20 Typ.	5.0	3.0 Typ.	150
MJW16206	12	500	1200	5/13	10.0	2.25	0.25	6.5	3.0 Typ.	150

Plastic TO-3PBL
Pin: 1 — Base, 2 — Collector, 3 — Emitter,4 — Collector (Style 2, Case 340G-01)

Mfr.'s Type NPN	Mfr.'s Type PNP	I_CCont (A) Max.	$V_{CEO(sus)}$[5] (V) Min.	h_{FE} Min./Max.	@ I_C (A)	Resistive Switching t_s (µs) Max.	Resistive Switching t_f (µs) Max.	Resistive Switching @ I_C (A)	f_T (MHz) Min.	P_D (Case) Watts @ 25°C
MJL3281A	MJL1302A	15.0	200	60/175	7.00	—	—	—	30.0 Typ.	200.0
MJL21194	MJL21193	16.0	250	25/75	8.00	—	—	—	4.0 Min.	200.0

Plastic TO-225 Type (Formerly TO-126 Type)
Pin: 1 — Emitter, 2 — Collector, 3 — Base (Style 1, Case 77-07 (TO-225AA))
Pin: 1 — Base, 2 — Collector, 3 — Emitter (Style 3, Case 77-07 (TO-225AA))

MJE3439	—	0.3	350	40/160	0.02	—	—	—	15.0	15.0
MJE344	—	0.5	200	30/300	0.05	—	—	—	15.0	20.8
MJE340[3]	MJE350[3]	0.5	300	30/240	0.05	—	—	—	—	20.8
2N4921	2N4918	1.0	40	20/100	0.50	0.60 Typ.	0.300 Typ.	0.5	3.0	30.0
2N4922	2N4919	1.0	60	20/100	0.50	0.60 Typ.	0.300 Typ.	0.5	3.0	30.0
2N4923	2N4920	1.0	80	20/100	0.50	0.60 Typ.	0.300 Typ.	0.5	3.0	30.0
MJE181	MJE171	3.0	60	50/250	0.10	0.60 Typ.	0.120 Typ.	0.1	50.0	2.5
MJE182[3]	MJE172[3]	3.0	80	50/250	0.10	0.60 Typ.	0.120 Typ.	0.1	50.0	12.5
—	MJE371	4.0	40	40 Min.	1.00	—	—	—	—	40.0
2N5191	2N5194	4.0	60	25/100	1.50	0.40 Typ.	0.400 Typ.	0.5	2.0	40.0
MJE800[2]	MJE700[2]	4.0	60	750 Min.	1.50	—	—	—	1.0[1]	40.0
2N6038[2]	2N6035[2]	4.0	60	750/18 K	2.00	1.70 Typ.	1.200 Typ.	2.0	25.0	40.0
2N5192	2N5195	4.0	80	25/100	1.50	0.40 Typ.	0.400 Typ.	1.5	2.0	40.0
MJE802[2]	MJE702[2]	4.0	80	750 Min.	1.50	—	—	—	1.0[1]	40.0
MJE803[2]	—	4.0	80	750 Min.	2.00	—	—	—	1.0[1]	40.0
2N6039[2,3]	2N6036[2,6]	4.0	80	750/18 K	2.00	1.70 Typ.	1.200 Typ.	2.0	25.0	40.0
MJE243	MJE253	4.0	100	40/120	0.20	0.15 Typ.	0.070 Typ.	2.0	40.0	15.0
MJE200[3]	MJE210[3]	5.0	25	45/180	2.00	0.13 Typ.	0.035 Typ.	2.0	65.0	15.0

DPAK — Surface Mount Power Package
Pin: 1 — Base, 2 — Collector, 3 — Emitter, 4 — Collector (Style 1, Case 39A-10[7])

MJD112[2]	—	2.0	100	1000 Min.	2.00	1.70	1.300	2.0	25.0[1]	20.0
MJD31C	—	3.0	100	10 Min.	1.00	0.60	0.300	1.0	3.0	15.0
—	MJD45H11	8.0	80	40 Min.	4.00	0.50	0.140	5.0	50.0 Typ.	20.0

Metal TO-204 (Formerly TO-3), TO-204AE
Pin: 1 — Base, 2 — Emitter, 3 — Collector (Style 1, TO-204AA Case 1-07, TO-204AE Case 197A-03)

2N3442	—	10.0	140	20/70	4.00	—	—	—	—	117.0
MJ15011	—	10.0	250	20/100	2.00	—	—	—	—	200.0
MJ423	—	10.0	325	30/90	1.00	—	—	—	2.5	125.0
MJ10012[2]	—	10.0	400	100/2 K	6.00	15.00	15.000	6.0	—	175.0
2N6058[2]	—	12.0	80	750/18 K	6.00	1.60 Typ.	1.500 Typ.	6.0	4.0[1]	150.0
2N6059[2,3]	2N6052[2,3]	12.0	100	750/18 K	6.00	1.60 Typ.	1.500 Typ.	6.0	4.0[1]	150.0
2N3055[3]	—	15.0	60	20/70	4.00	0.70 Typ.	0.300 Typ.	4.0	2.5	115.0
2N3055A	—	15.0	60	20/70	4.00	—	—	—	0.8	115.0
MJ15015[3]	MJ15016	15.0	120	20/70	4.00	0.70 Typ.	0.300 Typ.	4.0	1.0	180.0
MJ15001	MJ15002	15.0	140	25/150	4.00	—	—	—	2.0	200.0
—	MJ11021[2]	15.0	300	6/30	10.00	4.00	0.700	10.0	6.0-24	175.0
2N6547	—	15.0	400/850	6/30	10.00	4.00	0.700	10.0	6.0-24	175.0
MJ16010	—	15.0	450/850	5 Min.	15.00	1.20 Typ.	0.200 Typ.	10.0	—	175.0
MJ16012	—	15.0	450/850	7 Min.	15.00	0.90 Typ.	0.150 Typ.	10.0	—	175.0
2N3773[3]	2N6609	16.0	140	15/60	8.00	1.10 Typ.	1.500 Typ.	8.0	4.0	150.0
—	2N6031[3]	16.0	140	15/60	8.00	1.20 Typ.	1.200 Typ.	8.0	1.0	200.0
MJ15022	MJ15023	16.0	200	15/60	8.00	—	—	—	5.0	250.0
MJ15024	MJ15025	16.0	250	15/60	8.00	—	—	—	5.0	250.0
2N3772	—	20.0	60	15/60	10.00	—	—	—	5.0	250.0
2N6282[2]	—	20.0	60	750/18 K	10.00	2.50 Typ.	2.500 Typ.	10.0	4.0[1]	160.0
—	2N6286[2]	20.0	80	750/18 K	10.00	2.50 Typ.	2.500 Typ.	10.0	4.0[1]	160.0
2N5038[3]	—	20.0	90	20/100	12.00	1.50	0.500	12.0	60.0	140.0
2N6284[2,3]	2N6287[2,3]	20.0	100	750/18 K	10.00	2.50 Typ.	2.500 Typ.	10.0	4.0[1]	160.0
MJ15003[3]	MJ15004[3]	20.0	140	25/150	5.00	—	—	—	2.0	250.0
MJ10005[2]	—	20.0	400	40/400	10.00	1.50	0.500	10.0	10.0[1]	175.0
MJ13333	—	20.0	400	10/60	5.00	4.00	0.700	10.0	—	175.0
MJ10009[2]	—	20.0	500	30/300	10.00	2.00	0.600	10.0	8.0[1]	175.0
2N5885	—	25.0	60	20/100	10.00	1.00	0.800	10.0	4.0	200.0
2N5886[3]	2N5884[3]	25.0	80	20/100	10.00	1.00	0.800	10.0	4.0	200.0
2N6341	—	25.0	150	30/120	10.00	1.00	0.250	10.0	40.0	200.0
2N3771	—	30.0	40	15/60	15.00	—	—	—	2.0	150.0
MJ11012[2]	—	30.0	60	1 K Min.	20.00	—	—	—	4.0[1]	200.0
MJ802	MJ4502	30.0	100	25/100	7.50	—	—	—	2.0	200.0
MJ11016[2,3]	MJ11015[2,3]	30.0	120	1 K Min.	20.00	—	—	—	4.0[1]	200.0
MJ10023[2,7]	—	40.0	400	50/600	10.00	2.50	0.900	20.0	—	250.0
2N5686[7]	2N5684[7]	50.0	80	15/60	25.00	0.50 Typ.	0.300 Typ.	25.0	2.0	300.0
MJ11030[2,7]	—	50.0	90	400 Min.	50.00	—	—	—	—	300.0
MJ11032[2,7]	MJ11033[2,7]	50.0	120	400 Min.	50.00	—	—	—	—	300.0
MJ10016[2,7]	—	50.0	500	10 Min.	40.00	2.50	1.000	20.0	—	250.0
MJ14002[7]	MJ14003[7]	60.0	80	15/100	50.00	—	—	—	—	300.0
MJ10021[2,7]	—	60.0	250	75 Min.	15.00	3.50	0.500	30.0	—	250.0

[1]$|h_{fe}|$ @ MHz. [2]Darlington. [3]Available as preferred chip. [4]Case 77, (Style 3). [5]When 2 voltages are given, the format is $V_{CEO(sus)}/V_{CES}$. [6]Case 369A-10 may be ordered tape and reeled by adding a "T4" suffix; 2500 units/reel. [7]Case 197A-03 (TO-204AE).