

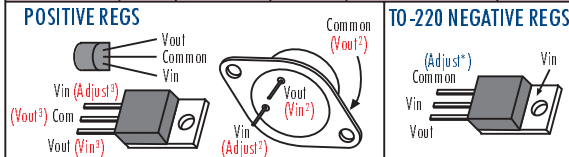
COMMON THREE-TERMINAL SEMICONDUCTORS: BASIC DATA & CONNECTIONS

I. Bipolar Transistors

TYPE	POL	CASE, Conn's	V <sub>ceo</sub>	V <sub>cb0</sub>	I <sub>c max</sub>	h <sub>FE</sub> @ I <sub>c</sub> (mA)	f <sub>T</sub> (MHz) @ I <sub>c</sub> (mA)	P <sub>total</sub>	R <sub>th(j-c)</sub> (°C/W)	Application	Packages & Pinouts
BC327	PNP	TO-92 (17)	-45	-50	-800mA	100 min -100mA	260 typ -10mA	625mW	83.3	Amplifier; low power output	TO-92 (17) TO-92 (14)
BC328	PNP	TO-92 (17)	-25	-30	-800mA	100 min -100mA	260 typ -10mA	625mW	83.3	Amplifier; low power output	
BC337	NPN	TO-92 (17)	45	50	800mA	100 min 100mA	210 typ 10mA	625mW	83.3	Amplifier; low power output	TO-92 (72) TO-5
BC338	NPN	TO-92 (17)	25	30	800mA	100 min 100mA	210 typ 10mA	625mW	83.3	Amplifier; low power output	
BC546	NPN	TO-92 (17)	65	80	100mA	125 min 2mA	300 typ 10mA	625mW	83.3	Small signal amplifier	TO-225 TO-220
BC547	NPN	TO-92 (17)	45	50	100mA	125 min 2mA	300 typ 10mA	625mW	83.3	Small signal amplifier	
BC548	NPN	TO-92 (17)	30	30	100mA	125 min 2mA	300 typ 10mA	625mW	83.3	Small signal amplifier	TO-218 TO-264
BC549	NPN	TO-92 (17)	30	30	100mA	125 min 2mA	300 typ 10mA	500mW	150	Low noise audio preamplifier	
BC550	NPN	TO-92 (17)	45	50	100mA	125 min 2mA	300 typ 10mA	500mW	150	Low noise audio preamplifier	TO-3
BC556	PNP	TO-92 (17)	-65	-80	-100mA	75 min -2mA	200 typ -10mA	500mW	150	Small signal amplifier	
BC557	PNP	TO-92 (17)	-45	-50	-100mA	75 min -2mA	200 typ -10mA	500mW	150	Small signal amplifier	TO-92 (72) TO-5
BC558	PNP	TO-92 (17)	-30	-30	-100mA	75 min -2mA	200 typ -10mA	500mW	150	Small signal amplifier	
BC559	PNP	TO-92 (17)	-30	-30	-100mA	125 min -2mA	200 typ -10mA	500mW	150	Low noise audio preamplifier	TO-225 TO-220
BC639	NPN	TO-92 (14)	80	100	1A	40 min 150mA	130 typ 10mA	1W	60	Audio driver; low power output	
BC640	PNP	TO-92 (14)	-80	-100	-1A	40 min -150mA	50 typ -10mA	1W	60	Audio driver; low power output	TO-218 TO-264
BD135	NPN	TO-225	45	45	1.5A	40 min 150mA	(not specified)	1.25W	10	Audio driver; low power output	
BD136	PNP	TO-225	-45	-45	-1.5A	40 min -150mA	(not specified)	1.25W	10	Audio driver; low power output	TO-218 TO-264
BD139	NPN	TO-225	80	100	1.5A	40 min 150mA	(not specified)	1.25W	10	Audio driver; low power output	
BD140	PNP	TO-225	-80	-100	-1.5A	40 min -150mA	(not specified)	1.25W	10	Audio driver; low power output	TO-218 TO-264
BD649	NPN	TO-220	100	100	8A	750 min 6A	5.0 typ 6A	62W	3.13	NPN Darlington; medium power	
BD650	PNP	TO-220	-100	-100	-8A	750 min -6A	5.0 typ -6A	62W	3.13	PNP Darlington; medium power	TO-218 TO-264
BD681	NPN	TO-225	100	100	4A	750 min 1.5A	(not specified)	40W	3.13	NPN Darlington; medium power	
BD682	PNP	TO-225	-100	-100	-4A	750 min -1.5A	(not specified)	40W	3.13	PNP Darlington; medium power	TO-218 TO-264
HJ2955	PNP	TO-3	-60	-70	-15A	20 min -4A	2.5 min -4A	115W	1.5	PNP Power amp & switch	
HJ10012	NPN	TO-3	400	600	10A	300 min 3A	(not specified)	175W	1.0	HV NPN Darlington; switch	TO-218 TO-264
HJ121193	NPN	TO-264	250	400	16A	25 min 8A	4.0 min 1A	200W	0.7	NPN Power amp & switch	
HJ121194	PNP	TO-264	-250	-400	-16A	25 min -8A	4.0 min -1A	200W	0.7	PNP Power amp & switch	TO-218 TO-264
HJ15003	NPN	TO-3	140	140	20A	25 min 5A	2.0 min 500mA	250W	0.7	NPN Power amp & switch	
HJ15004	PNP	TO-3	-140	-140	-20A	25 min -5A	2.0 min -500mA	250W	0.7	PNP Power amp & switch	TO-218 TO-264
HJE340	NPN	TO-225	300	300	500mA	30 min 50mA	(not specified)	20W	6.25	HV NPN medium power	
HJE350	PNP	TO-225	-300	-300	-500mA	30 min -50mA	(not specified)	20W	6.25	HV PNP medium power	TO-218 TO-264
HJE3055	NPN	TO-220	60	70	10A	20 min 4A	2.0 min 500mA	75W	1.67	NPN Power amp & switch	
HJE2955	PNP	TO-220	-60	-70	-10A	20 min -4A	2.0 min -500mA	75W	1.67	PNP Power amp & switch	TO-218 TO-264
TIP31	NPN	TO-220	40	40	3A	25 min 1A	3.0 min 500mA	40W	3.13	NPN Power amp & switch	
TIP32	PNP	TO-220	-40	-40	-3A	25 min -1A	3.0 min -500mA	40W	3.13	PNP Power amp & switch	TO-218 TO-264
TIP35C	NPN	TO-218	100	100	25A	25 min 1A	3.0 min 1A	125W	1.0	NPN Power amp & switch	
TIP36C	PNP	TO-218	-100	-100	-25A	25 min -1A	3.0 min -1A	125W	1.0	PNP Power amp & switch	TO-218 TO-264
TIP41C	NPN	TO-220	100	100	6A	30 min 300mA	3.0 min 500mA	65W	1.92	NPN Power amp & switch	
TIP122	NPN	TO-220	100	100	5A	1000 min 3A	(not specified)	65W	1.92	NPN Darlington; medium power	TO-218 TO-264
TIP3055	NPN	TO-218	60	100	15A	20 min 4A	2.5 min 500mA	90W	1.39	NPN Power amp & switch	
TIP2955	PNP	TO-218	-60	-100	-15A	20 min -4A	2.5 min -500mA	90W	1.39	PNP Power amp & switch	TO-218 TO-264
2N2222A	NPN	TO-92 (17)	40	75	600mA	100 min 150mA	300 min 20mA	625mW	83.3	NPN amplifier & switch	
2N3053	NPN	TO-5	40	60	700mA	50 min 150mA	100 min 150mA	1.0W	35	NPN amplifier & switch	TO-3
2N3055	NPN	TO-3	60	100	15A	20 min 4A	0.8 min 1A	115W	1.5	NPN Power amp & switch	
2N3638	PNP	TO-92 (17)	-25	-25	-500mA	25 min -10mA	100 min -10mA	300mW	83.3	PNP amplifier & switch	TO-3
PN100	NPN	TO-92 (72)	45	60	500mA	60 min 150mA	350 min 50mA	600mW	83.3	GP NPN amplifier & switch	
PN200	PNP	TO-92 (72)	-45	-60	-500mA	50 min -150mA	250 min -50mA	600mW	83.3	GP PNP amplifier & switch	

2. Voltage Regulators

TYPE	POL.	V <sub>OUT</sub>	I <sub>OUT max</sub>	V <sub>IN min</sub>	V <sub>IN max</sub>	CASE
7805/LM340T5	POS	+5V fixed	1A	+7.5	+35	TO-220
7806/LM340T6	POS	+6V fixed	1A	+8.6	+35	TO-220
7808/LM340T8	POS	+8V fixed	1A	+10.6	+35	TO-220
7809/LM340T9	POS	+9V fixed	1A	+11.7	+35	TO-220
7812/LM340T12	POS	+12V fixed	1A	+14.8	+35	TO-220
7815/LM340T15	POS	+15V fixed	1A	+17.9	+35	TO-220
7824/LM340T24	POS	+24V fixed	1A	+27.5	+40	TO-220
78L05	POS	+5V fixed	100mA	+7.3	+30	TO-92
78L12	POS	+12V fixed	100mA	+14.5	+35	TO-92
LM317K	POS	+1.2 — 37V	1.5A	V <sub>OUT</sub> + 3.0	V <sub>OUT</sub> + 40	TO-3 <sup>2</sup>
LM317T	POS	+1.2 — 37V	1.5A	V <sub>OUT</sub> + 3.0	V <sub>OUT</sub> + 40	TO-220 <sup>3</sup>
LM338K	POS	+3.0 — 35V	5A	V <sub>OUT</sub> + 3.0	V <sub>OUT</sub> + 35	TO-3 <sup>2</sup>
LM350K	POS	+1.2 — 32V	3A	V <sub>OUT</sub> + 3.0	V <sub>OUT</sub> + 35	TO-3 <sup>2</sup>
7905/LM320T5	NEG	-5V fixed	1A	-7.5	-25	TO-220
7909/LM320T9	NEG	-9V fixed	1A	-11.8	-30	TO-220
7912/LM320T12	NEG	-12V fixed	1A	-14.8	-30	TO-220
7915/LM320T15	NEG	-15V fixed	1A	-17.9	-30	TO-220
LM337T	NEG	-1.2 — 37V	1.5A	V <sub>OUT</sub> - 3.0	V <sub>OUT</sub> - 40	TO-220 <sup>4</sup>



3. SCRs and Triacs

TYPE	V <sub>FX max</sub>	I <sub>F max (RMS)</sub>	I <sub>GATE max</sub>	dV/dT (V/μs)	CASE	Connections
C103B	200	800mA	+200μA	20	TO-92	TO-92 TO-220 <sup>2</sup>
C106D1	400	4A	+200μA	8	TO-220	
C122E	500	8A	+25mA	50	TO-220	TO-220 <sup>2</sup> TO-220 <sup>2</sup> TO-220 <sup>2</sup>
SC141D	400	6A	±50mA	100	TO-220 <sup>2</sup>	
SC151D	400	15A	±50mA	250	TO-220 <sup>2</sup>	TO-220 <sup>2</sup> TO-220 <sup>2</sup>
TAG225	400	5A	±25mA	250	TO-220 <sup>2</sup>	
BT137F	600	8A	±35mA	100	TO-220 <sup>2</sup>	TO-220 <sup>2</sup>

Note 1: C106D1 may alternatively be in TO-126/TO-202 package, with virtually same connections. \*Except BT137F

4. MOSFETs and JFETs

TYPE	Polarity, Description	BV <sub>DSS</sub>	IDSS max	Pror	R <sub>DS(on) max</sub>	CASE
BUK456-60	N-channel power MOSFET	60V	52A	150W	28mΩ	TO-220
BUZ71	N-channel power MOSFET	50V	14A	40W	100mΩ	TO-220
MTP3055E	N-channel power MOSFET	60V	12A	40W	150mΩ	TO-220
2S1162	P-channel power MOSFET	-160V	-7A	100W	1.0Ω	TO-3P
2SK1058	N-channel power MOSFET	160V	7A	100W	1.0Ω	TO-3P
MPF105/2N5459	N-channel gen. purp. JFET	-25V (g-s)	16mA	310mW	—	TO-92
2N5484	N-channel VHF JFET	-25V (g-s)	5mA	310mW	—	TO-92

