

# Transistors

- \* Small signal transistor SMD version
- \* Power transistor
- \* Prebiased 100mA/500mA transistor

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# Small Signal Bipolar Transistors

## 25V~32V NPN Bipolar Transistors

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
MMS8050W-H	SOT-323	NPN	0.2	25	1.5	200-350	1	100	0.5	800	80	100	Fig.1
MMS8050W-J	SOT-323	NPN	0.2	25	1.5	300-400	1	100	0.5	800	80	100	Fig.1
MMS8050W-L	SOT-323	NPN	0.2	25	1.5	120-200	1	100	0.5	800	80	100	Fig.1
MMBTH10	SOT-23	NPN	0.225	25	0.05	60	10	4	0.5	4	0.4	650	Fig.1
MMS8050A-H	SOT-23	NPN	0.3	25	0.5	200-350	1	50	0.6	500	50	150	Fig.1
MMS8050A-L	SOT-23	NPN	0.3	25	0.5	120-200	1	50	0.6	500	50	150	Fig.1
MMS8050-H	SOT-23	NPN	0.3	25	0.5	200-350	1	50	0.6	500	50	150	Fig.1
MMS8050HE3-H	SOT-23	NPN	0.3	25	0.5	200-350	1	50	0.6	500	50	150	Fig.1
MMS8050HE3-L	SOT-23	NPN	0.3	25	0.5	120-200	1	50	0.6	500	50	150	Fig.1
MMS8050-L	SOT-23	NPN	0.3	25	0.5	120-200	1	50	0.6	500	50	150	Fig.1
MMS9013-H	SOT-23	NPN	0.3	25	0.5	200-350	1	50	0.6	500	50	150	Fig.1
MMS9013HE3-H	SOT-23	NPN	0.3	25	0.5	200-350	1	50	0.6	500	50	150	Fig.1
MMS9013HE3-L	SOT-23	NPN	0.3	25	0.5	120-200	1	50	0.6	500	50	150	Fig.1
MMS9013-L	SOT-23	NPN	0.3	25	0.5	120-200	1	50	0.6	500	50	150	Fig.1
MMSS8050-H	SOT-23	NPN	0.3	25	1.5	200-350	1	100	0.5	800	80	100	Fig.1
MMSS8050HE3-H	SOT-23	NPN	0.3	25	1.5	200-350	1	100	0.5	800	80	100	Fig.1
MMSS8050HE3-L	SOT-23	NPN	0.3	25	1.5	120-200	1	100	0.5	800	80	100	Fig.1
MMSS8050-L	SOT-23	NPN	0.3	25	1.5	120-200	1	100	0.5	800	80	100	Fig.1
MS8050-H	SOT-23	NPN	0.3	25	0.8	200-300	1	5	0.5	800	80	150	Fig.1
MS8050-L	SOT-23	NPN	0.3	25	0.8	80-200	1	5	0.5	800	80	150	Fig.1
2SC2859-Y	SOT-23	NPN	0.15	30	0.5	120-240	1	100	0.25	100	10	300	Fig.1
BC848AL3	DFN1006-3	NPN	0.15	30	0.1	110-220	5	2	0.6	100	5	100	Fig.1
BC848BL3	DFN1006-3	NPN	0.15	30	0.1	200-450	5	2	0.6	100	5	100	Fig.1
BC848CL3	DFN1006-3	NPN	0.15	30	0.1	420-800	5	2	0.6	100	5	100	Fig.1
BC848AW	SOT-323	NPN	0.2	30	0.1	110-220	5	2	0.25	10	0.5	100	Fig.1
BC848BW	SOT-323	NPN	0.2	30	0.1	200-450	5	2	0.25	10	0.5	100	Fig.1
BC848CW	SOT-323	NPN	0.2	30	0.1	420-800	5	2	0.25	10	0.5	100	Fig.1
BC848A	SOT-23	NPN	0.225	30	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC848AHE3	SOT-23	NPN	0.225	30	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC848B	SOT-23	NPN	0.225	30	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC848BHE3	SOT-23	NPN	0.225	30	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC848C	SOT-23	NPN	0.225	30	0.1	420-800	5	2	0.5	100	5	100	Fig.1
BC848CHE3	SOT-23	NPN	0.225	30	0.1	420-800	5	2	0.5	100	5	100	Fig.1
BC849B	SOT-23	NPN	0.225	30	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC849C	SOT-23	NPN	0.225	30	0.1	420-800	5	2	0.5	100	5	100	Fig.1
MMBTA13	SOT-23	NPN	0.225	30	0.3	5000	5	10	1.5	100	0.1	125	Fig.1
MMBTA14	SOT-23	NPN	0.225	30	0.3	10000	5	10	1.5	100	0.1	125	Fig.1
BC848AM3	SOT-723	NPN	0.265	30	0.1	110-220	5	2	0.3	10	0.5	100	Fig.1
BC848BM3	SOT-723	NPN	0.265	30	0.1	200-450	5	2	0.3	10	0.5	100	Fig.1
BC848CM3	SOT-723	NPN	0.265	30	0.1	420-800	5	2	0.3	10	0.5	100	Fig.1
2SC2411-R	SOT-23	NPN	0.2	32	0.5	180-390	3	100	0.4	500	50	250	Fig.1
2SC4097-P	SOT-323	NPN	0.2	32	0.5	82-180	3	10	0.4	100	10	250	Fig.1
2SC4097-Q	SOT-323	NPN	0.2	32	0.5	120-270	3	10	0.4	100	10	250	Fig.1
2SC4097-R	SOT-323	NPN	0.2	32	0.5	180-390	3	10	0.4	100	10	250	Fig.1

**40V~45V NPN Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
MMBT2222AT	SOT-523	NPN	0.15	40	0.6	100-300	10	150	1	500	50	300	Fig.1
MMBT3904L3	DFN1006-3	NPN	0.15	40	0.2	100-300	1	10	0.3	50	5	300	Fig.1
MMBT3904T	SOT-523	NPN	0.15	40	0.2	100-300	1	10	0.3	50	5	300	Fig.1
MMST2222A	SOT-323	NPN	0.2	40	0.6	100-300	10	150	0.6	500	50	300	Fig.1
MMST2222AHE3	SOT-323	NPN	0.2	40	0.6	100-300	10	150	0.5	500	50	300	Fig.1
MMST3904	SOT-323	NPN	0.2	40	0.2	100-300	1	10	0.3	50	5	300	Fig.1
MMST3904HE3	SOT-323	NPN	0.2	40	0.2	100-300	1	10	0.3	50	5	250	Fig.1
MMST4401	SOT-323	NPN	0.2	40	0.6	40	2	500	0.4	150	15	250	Fig.1
MMBT2222A	SOT-23	NPN	0.35	40	0.6	75	10	10	0.3	150	15	300	Fig.1
MMBT2222AHE3	SOT-23	NPN	0.35	40	0.6	75	10	10	0.3	150	15	300	Fig.1
MMBT3904	SOT-23	NPN	0.35	40	0.2	100-300	1	10	0.2	10	1	300	Fig.1
MMBT3904HE3	SOT-23	NPN	0.35	40	0.2	100-300	1	10	0.2	10	1	300	Fig.1
MMBT4401	SOT-23	NPN	0.35	40	0.6	80	1	10	0.4	150	15	250	Fig.1
MMBT4401HE3	SOT-23	NPN	0.35	40	0.6	80	1	10	0.4	150	15	250	Fig.1
BC847AL3	DFN1006-3	NPN	0.15	45	0.1	110-220	5	2	0.6	100	5	100	Fig.1
BC847AT	SOT-523	NPN	0.15	45	0.1	110-220	5	2	0.6	100	5	100	Fig.1
BC847BL3	DFN1006-3	NPN	0.15	45	0.1	200-450	5	2	0.6	100	5	100	Fig.1
BC847BT	SOT-523	NPN	0.15	45	0.1	200-450	5	2	0.6	100	5	100	Fig.1
BC847CL3	DFN1006-3	NPN	0.15	45	0.1	420-800	5	2	0.6	100	5	100	Fig.1
BC847CT	SOT-523	NPN	0.15	45	0.1	420-800	5	2	0.6	100	5	100	Fig.1
BC817-16W	SOT-323	NPN	0.2	45	0.5	100-250	1	100	0.7	500	50	100	Fig.1
BC817-16WHE3	SOT-323	NPN	0.2	45	0.5	100-250	1	100	0.7	500	50	100	Fig.1
BC817-25W	SOT-323	NPN	0.2	45	0.5	160-400	1	100	0.7	500	50	100	Fig.1
BC817-25WHE3	SOT-323	NPN	0.2	45	0.5	160-400	1	100	0.7	500	50	100	Fig.1
BC817-40W	SOT-323	NPN	0.2	45	0.5	250-600	1	100	0.7	500	50	100	Fig.1
BC817-40WHE3	SOT-323	NPN	0.2	45	0.5	250-600	1	100	0.7	500	50	100	Fig.1
BC847AW	SOT-323	NPN	0.2	45	0.1	110-220	5	2	0.25	10	0.5	100	Fig.1
BC847BW	SOT-323	NPN	0.2	45	0.1	200-450	5	2	0.25	10	0.5	100	Fig.1
BC847CW	SOT-323	NPN	0.2	45	0.1	420-800	5	2	0.25	10	0.5	100	Fig.1
BCW66F	SOT-23	NPN	0.2	45	0.8	100-250	1	100	0.3	100	10	100	Fig.1
BCW66G	SOT-23	NPN	0.2	45	0.8	110	1	10	0.3	100	10	100	Fig.1
BC847A	SOT-23	NPN	0.225	45	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC847AHE3	SOT-23	NPN	0.225	45	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC847B	SOT-23	NPN	0.225	45	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC847BHE3	SOT-23	NPN	0.225	45	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC847C	SOT-23	NPN	0.225	45	0.1	420-800	5	2	0.5	100	5	100	Fig.1
BC847CHE3	SOT-23	NPN	0.225	45	0.1	420-800	5	2	0.5	100	5	100	Fig.1
BCX70J	SOT-23	NPN	0.25	45	0.2	250-460	5	2	0.35	10	0.25	100	Fig.1
BC847AM3	SOT-723	NPN	0.265	45	0.1	110-220	5	2	0.3	10	0.5	100	Fig.1
BC847BM3	SOT-723	NPN	0.265	45	0.1	200-450	5	2	0.3	10	0.5	100	Fig.1
BC847CM3	SOT-723	NPN	0.265	45	0.1	420-800	5	2	0.3	10	0.5	100	Fig.1
BC817-16	SOT-23	NPN	0.3	45	0.5	100-250	1	100	0.7	500	50	100	Fig.1
BC817-16HE3	SOT-23	NPN	0.3	45	0.5	100-250	1	100	0.7	500	50	100	Fig.1
BC817-25	SOT-23	NPN	0.3	45	0.5	160-400	1	100	0.7	500	50	100	Fig.1

# Small Signal Bipolar Transistors

## 45V~140V NPN Bipolar Transistors

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
BC817-25HE3	SOT-23	NPN	0.3	45	0.5	160-400	1	100	0.7	500	50	100	Fig.1
BC817-40	SOT-23	NPN	0.3	45	0.5	250-600	1	100	0.7	500	50	100	Fig.1
BC817-40HE3	SOT-23	NPN	0.3	45	0.5	250-600	1	100	0.7	500	50	100	Fig.1
BCW66H	SOT-23	NPN	0.33	45	0.8	180	1	10	0.3	100	10	100	Fig.1
MMS9014-H	SOT-23	NPN	0.4	45	0.1	450-1000	5	1	0.3	100	5	150	Fig.1
MMS9014HE3-H	SOT-23	NPN	0.4	45	0.1	450-1000	5	1	0.3	100	5	150	Fig.1
MMS9014HE3-L	SOT-23	NPN	0.4	45	0.1	200-450	5	1	0.3	100	5	150	Fig.1
MMS9014-L	SOT-23	NPN	0.4	45	0.1	200-450	5	1	0.3	100	5	150	Fig.1
BC817K-16	SOT-23	NPN	0.5	45	0.5	100-250	1	100	0.7	500	50	100	Fig.1
BC817K-25	SOT-23	NPN	0.5	45	0.5	160-400	1	100	0.7	500	50	100	Fig.1
BC817K-40	SOT-23	NPN	0.5	45	0.5	250-600	1	100	0.7	500	50	100	Fig.1
2SC2712-Y	SOT-23	NPN	0.15	50	0.15	120-240	6	2	0.1	100	10	80	Fig.1
2SC4617-R	SOT-523	NPN	0.15	50	0.15	180-390	6	1	0.4	50	5	180	Fig.1
KTC3875-GR	SOT-23	NPN	0.15	50	0.15	200-400	6	2	0.25	100	10	80	Fig.1
KTC3875-Y	SOT-23	NPN	0.15	50	0.15	120-240	6	2	0.25	100	10	80	Fig.1
2SC1623-L5	SOT-23	NPN	0.2	50	0.1	135-270	6	1	0.3	100	10	250	Fig.1
2SC1623-L6	SOT-23	NPN	0.2	50	0.1	200-400	6	1	0.3	100	10	250	Fig.1
2SC1623-L7	SOT-23	NPN	0.2	50	0.1	300-600	6	1	0.3	100	10	250	Fig.1
2SC2412-R	SOT-23	NPN	0.2	50	0.15	180-390	6	1	0.4	50	5	150	Fig.1
2SC2412-S	SOT-23	NPN	0.2	50	0.15	270-560	6	1	0.4	50	5	150	Fig.1
2SC4081-A	SOT-323	NPN	0.2	50	0.15	120-270	6	1	0.4	50	5	180	Fig.1
2SC4081-B	SOT-323	NPN	0.2	50	0.15	180-390	6	1	0.4	50	5	180	Fig.1
MMBT1815-H	SOT-23	NPN	0.2	50	0.15	200-400	6	2	0.25	100	10	80	Fig.1
MMBT945-H	SOT-23	NPN	0.2	50	0.15	200-400	6	1	0.3	100	10	150	Fig.1
BCV47	SOT-23	NPN	0.3	60	0.5	2000	1	0.1	1	100	0.1	170	Fig.1
MMBTA05	SOT-23	NPN	0.3	60	0.5	100	1	10	0.25	100	10	100	Fig.1
FMMT491	SOT-23	NPN	0.5	60	1	80	5	1000	0.5	1000	100	150	Fig.1
BC846AL3	DFN1006-3	NPN	0.15	65	0.1	110-220	5	2	0.6	100	5	100	Fig.1
BC846BL3	DFN1006-3	NPN	0.15	65	0.1	200-450	5	2	0.6	100	5	100	Fig.1
BC846AW	SOT-323	NPN	0.2	65	0.1	110-220	5	2	0.25	10	0.5	100	Fig.1
BC846BW	SOT-323	NPN	0.2	65	0.1	200-450	5	2	0.25	10	0.5	100	Fig.1
BC846A	SOT-23	NPN	0.225	65	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC846AHE3	SOT-23	NPN	0.225	65	0.1	110-220	5	2	0.5	100	5	100	Fig.1
BC846B	SOT-23	NPN	0.225	65	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC846BHE3	SOT-23	NPN	0.225	65	0.1	200-450	5	2	0.5	100	5	100	Fig.1
BC846C	SOT-23	NPN	0.225	65	0.1	428-800	5	2	0.5	100	5	100	Fig.1
BC846AM3	SOT-723	NPN	0.265	65	0.1	110-220	5	2	0.3	10	0.5	100	Fig.1
BC846BM3	SOT-723	NPN	0.265	65	0.1	200-450	5	2	0.3	10	0.5	100	Fig.1
2SD1782HE3-R	SOT-23	NPN	0.2	80	0.5	180-390	3	100	0.5	500	50	180	Fig.1
MMBTA28	SOT-23	NPN	0.2	80	0.5	10000	5	10	1.5	100	0.1	125	Fig.1
MMBTA28L	SOT-23-3L	NPN	0.2	80	0.5	10000	5	10	1.2	10	0.01	125	Fig.8
MMBTA06	SOT-23	NPN	0.3	80	0.5	100	1	10	0.25	100	10	100	Fig.1
FMMT493	SOT-23	NPN	0.25	100	1	20	10	1000	0.3	500	50	150	Fig.1
MMBT5550	SOT-23	NPN	0.225	140	0.6	60	5	10	0.15	10	1		Fig.1

**160V~300V NPN Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emmitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emmitter Saturation Voltage			Transition Frequency	Internal Structure
			P <sub>C</sub> (W)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	H <sub>FE</sub>	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	f <sub>T</sub> (MHz)	
MMST5551	SOT-323	NPN	0.2	160	0.2	30	5	50	0.2	50	5	300	Fig.1
MMBT5551	SOT-23	NPN	0.3	160	0.6	100-300	5	10	0.2	50	5	100	Fig.1
MMBT5551HE3	SOT-23	NPN	0.3	160	0.6	100-300	5	10	0.2	50	5	100	Fig.1
MMBTA43	SOT-23	NPN	0.225	200	0.5	25	10	1	0.5	20	2	50	Fig.1
MMSTA42	SOT-323	NPN	0.2	300	0.2	40	10	10	0.5	20	2	50	Fig.1
MMBTA42	SOT-23	NPN	0.35	300	0.5	40	10	10	0.5	20	2	50	Fig.1

**40V~160V NPN\*2 Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emmitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emmitter Saturation Voltage			Transition Frequency	Internal Structure
			P <sub>C</sub> (W)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	H <sub>FE</sub>	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	f <sub>T</sub> (MHz)	
MMDT2222A	SOT-363	NPN*2	0.15	40	0.6	100-300	10	150	1	500	50	300	Fig.14
DMMT3904	SOT-363	NPN*2	0.2	40	0.2	100-300	1	10	0.3	50	5	300	Fig.15
MMDT3904	SOT-363	NPN*2	0.2	40	0.2	100-300	1	10	0.3	50	5	300	Fig.14
MMDT3904V	SOT-563	NPN*2	0.2	40	0.2	30	1	100	0.3	50	5	300	Fig.14
MMDT4401	SOT-363	NPN*2	0.2	40	0.6	40	2	500	0.75	500	50	250	Fig.14
BC847BV	SOT-563	NPN*2	0.15	45	0.1	200-450	5	2	0.3	100	5	100	Fig.14
BC847BS	SOT-363	NPN*2	0.3	45	0.1	200-450	5	2	0.65	100	5	200	Fig.14
UMX1N	SOT-363	NPN*2	0.15	50	0.15	120-560	6	1	0.4	50	5	180	Fig.14
BC846BS	SOT-363	NPN*2	0.2	65	0.1	200-450	5	2	0.1	10	0.5	100	Fig.14
BC846S	SOT-363	NPN*2	0.2	65	0.1	110	5	2	0.1	10	0.5	100	Fig.14
MMDT5551	SOT-363	NPN*2	0.2	160	0.2	100-300	5	10	0.15	10	1	300	Fig.14
SMBT5551	SOT23-6L	NPN*2	0.3	160	0.6	100-300	5	10	0.15	10	1	300	Fig.11

**NPN+Zener Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emmitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emmitter Saturation Voltage			Transition Frequency	Internal Structure
			P <sub>C</sub> (W)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	H <sub>FE</sub>	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	f <sub>T</sub> (MHz)	
SMBT445V6	SOT23-6L	NPN+Zener	0.38	40	0.6	100-300	1	0.15	0.4	150	15	250	Fig.19

# Small Signal Bipolar Transistors

## 25V~45V PNP Bipolar Transistors

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
MMS8550W-H	SOT-323	PNP	0.2	-25	-1.5	200-350	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550W-J	SOT-323	PNP	0.2	-25	-1.5	300-400	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550W-L	SOT-323	PNP	0.2	-25	-1.5	120-200	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550A-H	SOT-23	PNP	0.3	-25	-0.5	200-350	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550A-L	SOT-23	PNP	0.3	-25	-0.5	120-200	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550-H	SOT-23	PNP	0.3	-25	-0.5	200-350	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550HE3-H	SOT-23	PNP	0.3	-25	-0.5	200-350	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550HE3-L	SOT-23	PNP	0.3	-25	-0.5	120-200	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550-L	SOT-23	PNP	0.3	-25	-0.5	120-200	-1	-50	-0.6	-500	-50	150	Fig.2
MMS9012-H	SOT-23	PNP	0.3	-25	-0.5	200-350	-1	-50	-0.6	-500	-50	150	Fig.2
MMS9012HE3-H	SOT-23	PNP	0.3	-25	-0.5	200-350	-1	-50	-0.6	-500	-50	150	Fig.2
MMS9012HE3-L	SOT-23	PNP	0.3	-25	-0.5	120-200	-1	-50	-0.6	-500	-50	150	Fig.2
MMS9012-L	SOT-23	PNP	0.3	-25	-0.5	120-200	-1	-50	-0.6	-500	-50	150	Fig.2
MMS8550-H	SOT-23	PNP	0.3	-25	-1.5	200-350	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550-L	SOT-23	PNP	0.3	-25	-1.5	120-200	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550HE3-H	SOT-23	PNP	0.625	-25	-1.5	200-350	-1	-100	-0.5	-800	-80	100	Fig.2
MMS8550HE3-L	SOT-23	PNP	0.625	-25	-1.5	120-200	-1	-100	-0.5	-800	-80	100	Fig.2
BC858AL3	DFN1006-3	PNP	0.15	-30	-0.1	110-220	-5	-2	-0.65	-100	-5	100	Fig.2
BC858AWHE3	SOT-323	PNP	0.15	-30	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC858BL3	DFN1006-3	PNP	0.15	-30	-0.1	200-450	-5	-2	-0.65	-100	-5	100	Fig.2
BC858BWHE3	SOT-323	PNP	0.15	-30	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC858CL3	DFN1006-3	PNP	0.15	-30	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
BC858CWHE3	SOT-323	PNP	0.15	-30	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
2SA1298-Y	SOT-23	PNP	0.2	-30	-0.8	160-320	-1	-100	-0.4	-500	-20	250	Fig.2
BC858AW	SOT-323	PNP	0.2	-30	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC858BW	SOT-323	PNP	0.2	-30	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC858CW	SOT-323	PNP	0.2	-30	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
BC858AM3	SOT-723	PNP	0.265	-30	-0.1	110-220	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC858BM3	SOT-723	PNP	0.265	-30	-0.1	200-450	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC858CM3	SOT-723	PNP	0.265	-30	-0.1	420-800	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC858A	SOT-23	PNP	0.31	-30	-0.1	125-250	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC858B	SOT-23	PNP	0.31	-30	-0.1	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC858C	SOT-23	PNP	0.31	-30	-0.1	420-800	-5	-2	-0.3	-10	-0.5	200	Fig.2
2SA1577-R	SOT-323	PNP	0.2	-32	-0.5	180-390	-3	-10	-0.4	-100	-10	200	Fig.2
MMBT3906L3	DFN1006-3	PNP	0.15	-40	-0.2	100-300	-1	-10	-0.4	-50	-5	250	Fig.2
MMBT3906T	SOT-523	PNP	0.15	-40	-0.2	100-300	-1	-10	-0.25	-10	-1	250	Fig.2
MMST3906	SOT-323	PNP	0.2	-40	-0.2	100-300	-1	-10	-0.3	-50	-5	300	Fig.2
MMST4403	SOT-323	PNP	0.2	-40	-0.6	100-300	-2	-150	-0.4	-150	-15	200	Fig.2
MMBT3906	SOT-23	PNP	0.3	-40	-0.2	100-300	-1	-10	-0.25	-10	-1	250	Fig.2
MMBT3906HE3	SOT-23	PNP	0.3	-40	-0.2	100-300	-1	-10	-0.25	-10	-1	250	Fig.2
MMBT4403	SOT-23	PNP	0.35	-40	-0.6	100	-1	-10	-0.4	-150	-15	200	Fig.2
MMBT4403HE3	SOT-23	PNP	0.35	-40	-0.6	100	-1	-10	-0.4	-150	-15	200	Fig.2
BC857AL3	DFN1006-3	PNP	0.15	-45	-0.1	110-220	-5	-2	-0.65	-100	-5	100	Fig.2
BC857AT	SOT-523	PNP	0.15	-45	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2

**45V~60V PNP Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
BC857AWHE3	SOT-323	PNP	0.15	-45	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC857BL3	DFN1006-3	PNP	0.15	-45	-0.1	200-450	-5	-2	-0.65	-100	-5	100	Fig.2
BC857BT	SOT-523	PNP	0.15	-45	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC857BWHE3	SOT-323	PNP	0.15	-45	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC857CL3	DFN1006-3	PNP	0.15	-45	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
BC857CT	SOT-523	PNP	0.15	-45	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
BC857CWHE3	SOT-323	PNP	0.15	-45	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
BC807-16W	SOT-323	PNP	0.2	-45	-0.5	100-250	-1	-100	-0.7	-500	-50	80	Fig.2
BC807-25W	SOT-323	PNP	0.2	-45	-0.5	160-400	-1	-100	-0.7	-500	-50	80	Fig.2
BC807-40W	SOT-323	PNP	0.2	-45	-0.5	250-600	-1	-100	-0.7	-500	-50	80	Fig.2
BC857AW	SOT-323	PNP	0.2	-45	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC857BW	SOT-323	PNP	0.2	-45	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC857CW	SOT-323	PNP	0.2	-45	-0.1	420-800	-5	-2	-0.65	-100	-5	100	Fig.2
MMS9015-H	SOT-23	PNP	0.2	-45	-0.1	450-1000	-5	-1	-0.3	-100	-10	150	Fig.2
MMS9015HE3-H	SOT-23	PNP	0.2	-45	-0.1	450-1000	-5	-1	-0.3	-100	-10	150	Fig.2
MMS9015HE3-L	SOT-23	PNP	0.2	-45	-0.1	200-450	-5	-1	-0.3	-100	-10	150	Fig.2
MMS9015-L	SOT-23	PNP	0.2	-45	-0.1	200-450	-5	-1	-0.3	-100	-10	150	Fig.2
BC857AM3	SOT-723	PNP	0.265	-45	-0.1	110-220	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC857BM3	SOT-723	PNP	0.265	-45	-0.1	200-450	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC857CM3	SOT-723	PNP	0.265	-45	-0.1	420-800	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC807-16	SOT-23	PNP	0.3	-45	-0.5	100-250	-1	-100	-0.7	500	50	100	Fig.2
BC807-16HE3	SOT-23	PNP	0.3	-45	-0.5	100-250	-1	-100	-0.7	500	50	100	Fig.2
BC807-25	SOT-23	PNP	0.3	-45	-0.5	160-400	-1	-100	-0.7	500	50	100	Fig.2
BC807-25HE3	SOT-23	PNP	0.3	-45	-0.5	160-400	-1	-100	-0.7	500	50	100	Fig.2
BC807-40	SOT-23	PNP	0.3	-45	-0.5	250-600	-1	-100	-0.7	500	50	100	Fig.2
BC807-40HE3	SOT-23	PNP	0.3	-45	-0.5	250-600	-1	-100	-0.7	500	50	100	Fig.2
BC857A	SOT-23	PNP	0.31	-45	-0.1	125-250	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC857AHE3	SOT-23	PNP	0.31	-45	-0.1	125-250	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC857B	SOT-23	PNP	0.31	-45	-0.1	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC857BHE3	SOT-23	PNP	0.31	-45	-0.1	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC857C	SOT-23	PNP	0.31	-45	-0.1	420-800	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC857CHE3	SOT-23	PNP	0.31	-45	-0.1	420-800	-5	-2	-0.3	-10	-0.5	200	Fig.2
BCW68G	SOT-23	PNP	0.33	-45	-0.8	160-240	-1	-100	-0.3	-100	-10	200	Fig.2
BCW68H	SOT-23	PNP	0.33	-45	-0.8	250-630	-2	-100	-0.3	-100	-10	100	Fig.2
2SA1774-R	SOT-523	PNP	0.15	-50	-0.15	180-390	-6	-1	-0.5	-50	-5	140	Fig.2
2SA1037-R	SOT-23	PNP	0.2	-50	-0.15	180-390	-6	-1	-0.5	-5	-5	120	Fig.2
2SA1576A-R	SOT-323	PNP	0.2	-50	-0.15	180-390	-6	-1	-0.5	-50	-5	100	Fig.2
2SA812-M6	SOT-23	PNP	0.2	-50	-0.1	200-400	-6	-1	-0.3	-100	-10	180	Fig.2
2SA812-M7	SOT-23	PNP	0.2	-50	-0.1	300-600	-6	-1	-0.3	-100	-10	180	Fig.2
MMBT2907AT	SOT-523	PNP	0.15	-60	-0.6	100-300	-10	-10	-0.4	-150	-15	140	Fig.2
MMST2907A	SOT-323	PNP	0.2	-60	-0.6	100	-10	-1	-1.6	-500	-50	200	Fig.2
MMBTA55	SOT-23	PNP	0.225	-60	-0.5	100	-1	-10	-0.25	-100	-10	50	Fig.2
MMBT2907A	SOT-23	PNP	0.35	-60	-0.6	100	-10	-10	-0.4	-150	-15	200	Fig.2
MMBT2907AHE3	SOT-23	PNP	0.35	-60	-0.6	100	-10	-10	-0.4	-150	-15	200	Fig.2



## Small Signal Bipolar Transistors

### 65V~300V PNP Bipolar Transistors

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			P <sub>C</sub> (W)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	H <sub>FE</sub>	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	f <sub>T</sub> (MHz)	
FMMT591	SOT-23	PNP	0.5	-60	-1	100-300	-5	-500	-0.6	-1000	-100	150	Fig.2
BC856AL3	DFN1006-3	PNP	0.15	-65	-0.1	110-220	-5	-2	-0.65	-100	-5	100	Fig.2
BC856AWHE3	SOT-323	PNP	0.15	-65	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC856BL3	DFN1006-3	PNP	0.15	-65	-0.1	200-450	-5	-2	-0.65	-100	-5	100	Fig.2
BC856BWEH3	SOT-323	PNP	0.15	-65	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC856AW	SOT-323	PNP	0.2	-65	-0.1	125-250	-5	-2	-0.65	-100	-5	100	Fig.2
BC856BW	SOT-323	PNP	0.2	-65	-0.1	220-475	-5	-2	-0.65	-100	-5	100	Fig.2
BC856AM3	SOT-723	PNP	0.265	-65	-0.1	110-220	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC856BM3	SOT-723	PNP	0.265	-65	-0.1	200-450	-5	-2	-0.3	-10	-0.5	100	Fig.2
BC856A	SOT-23	PNP	0.31	-65	-0.1	125-250	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC856AHE3	SOT-23	PNP	0.31	-65	-0.1	125-250	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC856B	SOT-23	PNP	0.31	-65	-0.1	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.2
BC856BHE3	SOT-23	PNP	0.31	-65	-0.1	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.2
2SB1198HE3-R	SOT-23	PNP	0.2	-80	-0.5	180-390	3	100	-0.5	-500	-50	180	Fig.2
MMBTA56	SOT-23	PNP	0.225	-80	-0.5	100	-1	-10	-0.25	-100	-10	50	Fig.2
MMST5401	SOT-323	PNP	0.2	-150	-0.2	60-300	-5	-10	-0.5	-50	-5	300	Fig.2
MMBT5401	SOT-23	PNP	0.3	-150	-0.6	100-300	-5	-10	-0.5	-50	-5	100	Fig.2
MMBT5401HE3	SOT-23	PNP	0.3	-150	-0.6	100-300	-5	-10	-0.5	-50	-5	100	Fig.2
MMSTA92	SOT-323	PNP	0.2	-300	-0.1	40	-10	-10	-0.4	-20	-2	50	Fig.2
MMBTA92	SOT-23	PNP	0.3	-300	-0.3	100-200	-10	-10	-0.2	-20	-2	50	Fig.2

### 40V~150V PNP\*2 Bipolar Transistors

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			P <sub>C</sub> (W)	V <sub>CEO</sub> (V)	I <sub>C</sub> (A)	H <sub>FE</sub>	V <sub>CE</sub> (V)	I <sub>C</sub> (mA)	V <sub>CE(sat)</sub> (V)	I <sub>C</sub> (mA)	I <sub>B</sub> (mA)	f <sub>T</sub> (MHz)	
MMDT3906V	SOT-563	PNP*2	0.15	-40	-0.2	100-300	-1	-10	-0.4	-50	-5	250	Fig.5
DMMT3906	SOT-363	PNP*2	0.2	-40	-0.2	100-300	-1	-10	-0.4	-50	-5	250	Fig.16
MMDT3906	SOT-363	PNP*2	0.2	-40	-0.2	100-300	-1	-10	-0.4	-50	-5	250	Fig.5
MMDT4403	SOT-363	PNP*2	0.2	-40	-0.6	20	-2	-500	-0.75	-500	-50	200	Fig.5
BC857BV	SOT-563	PNP*2	0.15	-45	-0.1	200-475	-5	-2	-0.4	-100	-5	100	Fig.5
BC857BS	SOT-363	PNP*2	0.3	-45	-0.2	220-475	-5	-2	-0.3	-10	-0.5	200	Fig.5
BC857S	SOT-363	PNP*2	0.3	-45	-0.2	125-630	-5	-2	-0.3	-10	-0.5	200	Fig.5
MMDT2907A	SOT-363	PNP*2	0.2	-60	-0.6	100	-10	-10	-0.4	-150	-15	200	Fig.5
SMBT2907A	SOT23-6L	PNP*2	0.7	-60	-0.6	100-300	-10	-150	-0.4	-150	-15	200	Fig.12
BC856BS	SOT-363	PNP*2	0.2	-65	-0.1	200-450	-5	-2	-0.3	-10	-0.5	100	Fig.5
BC856S	SOT-363	PNP*2	0.2	-65	-0.1	110	-5	-2	-0.3	-10	-0.5	100	Fig.5
MMDT5401	SOT-363	PNP*2	0.2	-150	-0.2	100-300	-5	-10	-0.5	-50	-5	300	Fig.5



**NPN+PNP Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
MMDT3946	SOT-363	NPN	0.2	40	0.2	100-300	1	10	0.3	50	5	300	Fig.3
		PNP		-40	-5	100-300	-1	-10	-0.25	-10	-1	250	
MMDT4413	SOT-363	NPN	0.2	40	0.6	40	2	500	0.75	500	50	250	Fig.3
		PNP		-40	-0.6	20	-2	-500	-0.75	-500	-50	200	
MMDT2227	SOT-363	NPN	0.2	40	0.6	35	10	0.1	0.3	150	15	300	Fig.3
		PNP		-60	-0.6	75	-10	-0.1	-0.4	-150	-15	200	
SMBT2227A	SOT23-6L	NPN	0.7	40	0.6	100-300	10	150	0.3	150	15	300	Fig.18
		PNP		-60	-0.6	100-300	-10	-150	-0.4	-150	-15	200	
BC817DPN	SOT23-6L	NPN	0.37	45	0.5	160-400	1	100	0.7	500	50	100	Fig.3
		PNP		-45	-0.5	160-400	-1	-100	-0.7	-500	-50	80	
BC847PN	SOT-363	NPN	0.2	45	0.1	200-450	5	2	0.25	10	0.5	100	Fig.3
		PNP		-45	-0.1	220~475	-5	-2	-0.3	-10	-0.5	100	
UMZ2N	SOT-363	NPN	0.15	50	0.15	120-560	6	1	0.4	50	5	180	Fig.4
		PNP		-50	-0.15	120-560	-6	-1	-0.5	-50	-5	140	
BC846BPN	SOT-363	NPN	0.2	65	0.1	200-450	5	2	0.1	10	0.5	100	Fig.3
		PNP		-65	-0.1	200-450	-5	-2	-0.1	-10	-0.5	100	
MMDT5451	SOT-363	NPN	0.2	160	0.2	100-300	5	10	0.15	10	1	100	Fig.3
		PNP		-150	-0.2	100-300	-5	-10	-0.2	-10	-1	300	

## Medium Power Bipolar Transistors

### 45V~300V NPN Bipolar Transistors

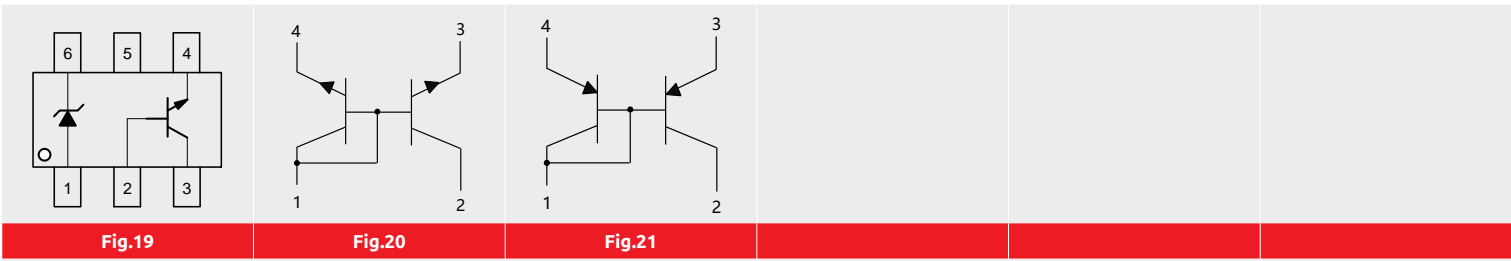
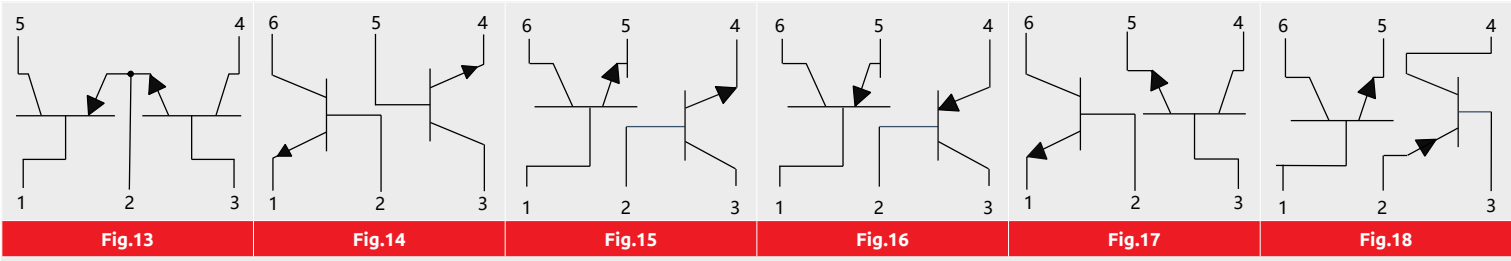
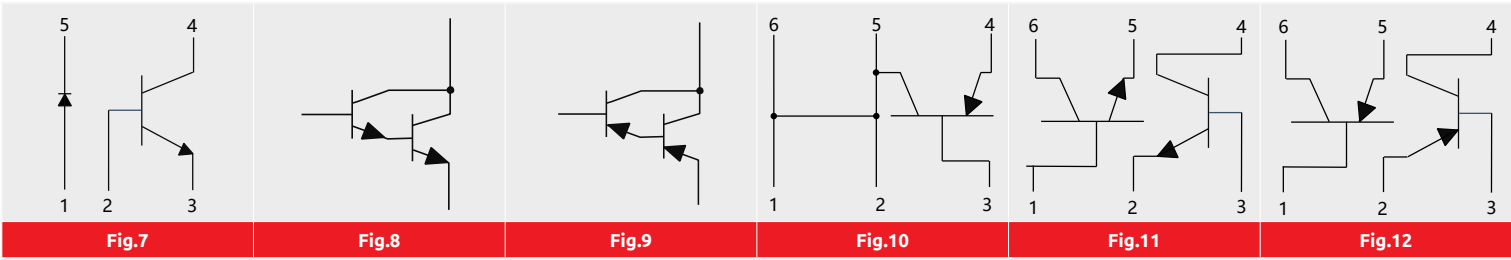
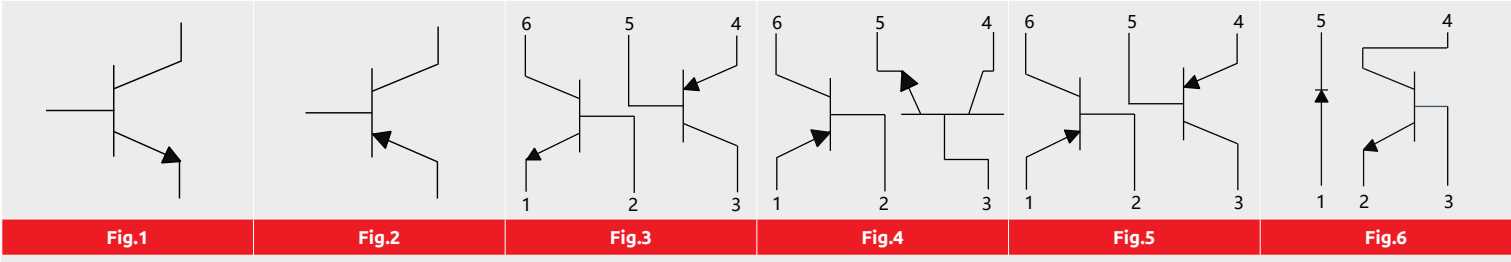
Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_c$ (W)	$V_{CEO}$ (V)	$I_c$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_c$ (mA)	$V_{CE(sat)}$ (V)	$I_c$ (mA)	$I_b$ (mA)	$f_T$ (MHz)	
BCX54-16	SOT-89	NPN	0.5	45	1	100-250	2	150	0.5	500	50	130	Fig.1
BCX54	SOT-89	NPN	0.5	45	1	63-250	2	150	0.5	500	50	130	Fig.1
BCP54-16	SOT-223	NPN	1.5	45	1	100-250	2	150	0.5	500	50	100	Fig.1
2SC2873-Y	SOT-89	NPN	0.5	50	2	120-240	2	500	0.5	1000	50	120	Fig.1
BCX55-16	SOT-89	NPN	0.5	60	1	100-250	2	150	0.5	500	50	130	Fig.1
BCX55	SOT-89	NPN	0.5	60	1	63-250	2	150	0.5	500	50	130	Fig.1
BCP55-16	SOT-223	NPN	1.5	60	1	100-250	2	150	0.5	500	50	100	Fig.1
BD882HY	SOT-89	NPN	0.5	70	3	160-320	2	1000	0.5	2000	200	50	Fig.1
BCX56-16	SOT-89	NPN	0.5	80	1	100-250	2	150	0.5	500	50	130	Fig.1
2SD1898-R	SOT-89	NPN	0.5	80	1	180-390	3	500	0.15	500	20	100	Fig.1
BCX56	SOT-89	NPN	0.5	80	1	63-250	2	150	0.5	500	50	130	Fig.1
BCP56-16	SOT-223	NPN	1.5	80	1	100-250	2	150	0.5	500	50	100	Fig.1
BCP56-16HE3	SOT-223	NPN	1.5	80	1	100-250	2	150	0.5	500	50	100	Fig.1
MJD31C	DPAK	NPN	1.25	100	3	10-75	4	3000	1.2	3000	375	3	Fig.1
MJD122	DPAK	NPN	1.5	100	8	1000-12000	4	4000	2	4000	16		Fig.8
TIP31C	TO-220	NPN	2	100	3	25	4	1000	1.2	3000	375	3	Fig.1
TIP41C	TO-220	NPN	2	100	6	30	4	300	1.5	6000	600	3	Fig.1
TIP122L	TO-220	NPN	2	100	5	1000	3	500	2	3000	12		Fig.8
2SC2881-Y	SOT-89	NPN	0.5	120	0.8	120-240	5	100	1	500	50	120	Fig.1
CXT5551	SOT-89	NPN	0.5	160	0.6	80	5	1	0.15	10	1	100	Fig.1
2SC2383P-O	SOT-89	NPN	0.5	160	1	100-200	5	200	1	500	50	20	Fig.1
2SC2383P-Y	SOT-89	NPN	0.5	160	1	160-320	5	200	1	500	50	20	Fig.1
PZT5551	SOT-223	NPN	1	160	0.6	80	5	1	0.15	10	1	300	Fig.1
PZTA42	SOT-223	NPN	1	300	0.2	25	10	1	0.5	20	2	50	Fig.1

**20V~150V PNP Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Base-Emitter Saturation Voltage			Transition Frequency	Internal Structure
			$P_C$ (W)	$V_{CEO}$ (V)	$I_C$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_C$ (mA)	$V_{CE(sat)}$ (V)	$I_C$ (mA)	$I_B$ (mA)	$f_T$ (MHz)	
BC869	SOT-89	PNP	0.5	-20	-1	100-375	-1	-500	-0.5	-1000	-100	40	Fig.2
2SB1386-R	SOT-89	PNP	0.5	-20	-5	180-390	-2	-500	-1	-4000	-100	120	Fig.2
BD772-Y	SOT-89	PNP	0.5	-30	-3	160-320	-2	-1000	-0.5	-2000	-200	80	Fig.2
2SB1412-R	DPAK	PNP	1	-30	-5	180-390	-2	-500	-1	-4000	-100	120	Fig.2
2SB1188-Q	SOT-89	PNP	0.5	-32	-2	120-270	-3	-500	-0.8	-2000	-200	80	Fig.2
PXT3906	SOT-89	PNP	0.5	-40	-0.2	100-300	-1	-10	-0.25	-10	-1	250	Fig.2
BCP51-16	SOT-223	PNP	1.5	-45	-1	100-250	-2	-150	-0.5	-500	-50	100	Fig.2
2SA1213-Y	SOT-89	PNP	0.5	-50	-2	120-240	-2	-500	-0.5	1000	50	120	Fig.2
2SB1184-Q	DPAK	PNP	1	-50	-3	120-270	-3	-500	-1	-2000	-200	70	Fig.2
BCX52-16	SOT-89	PNP	0.5	-60	-1	100-250	-2	-150	-0.5	-500	-50	50	Fig.2
BCX52	SOT-89	PNP	0.5	-60	-1	63-250	-2	-150	-0.5	-500	-50	50	Fig.2
PZT2907A	SOT-223	PNP	1	-60	-0.6	100-300	-10	-150	-0.4	-150	-15	200	Fig.2
BCP52-16	SOT-223	PNP	1.5	-60	-1	100-250	-2	-150	-0.5	-500	-50	100	Fig.2
TIP32A	TO-220	PNP	2	-60	-3	25	-4	-1000	-1.2	-3000	-375	3	Fig.2
TIP42A	TO-220	PNP	2	-60	-6	30	-4	-300	-1.5	-6000	-600	3	Fig.1
BCX53-16	SOT-89	PNP	0.5	-80	-1	100-250	-2	-150	-0.5	-500	-50	50	Fig.2
BSR33	SOT-89	PNP	0.5	-80	-1	100-300	-5	-100	-0.5	-500	-50	100	Fig.2
BCX53	SOT-89	PNP	0.5	-80	-1	63-250	-2	-150	-0.5	-500	-50	50	Fig.2
BCP53-16	SOT-223	PNP	1.5	-80	-1	100-250	-2	-150	-0.5	-500	-50	100	Fig.2
MJD32C	DPAK	PNP	1.25	-100	-3	10-50	-4	-3000	-1.2	-3000	-375	3	Fig.2
MJD127	DPAK	PNP	1.5	-100	-8	1000-12000	-4	-4000	-2	-4000	-16		Fig.9
TIP32C	TO-220	PNP	2	-100	-3	25	-4	-1000	-1.2	-3000	-375	3	Fig.2
TIP42C	TO-220	PNP	2	-100	-6	30	-4	-300	-1.5	-6000	-600	3	Fig.1
TIP127L	TO-220	PNP	2	-100	-5	1000	-3	-500	-2	-3000	-12		Fig.9
CXT5401	SOT-89	PNP	0.5	-150	-0.5	50	-5	-1	-0.2	-10	-1	100	Fig.2

**Internal Structure**

**Internal Structure**



## NPN Pre-biased Transistors

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>o</sub> (mW)	I <sub>o</sub> (mA)	V <sub>cc</sub> (V)	G <sub>i</sub>	V <sub>o</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>2</sub> (KΩ)	f <sub>r</sub> (MHZ)	
DTC123JM	SOT-723	NPN	100	100	50	80	0.3	2.2	47	250	Fig.2
DTC143TM	SOT-723	NPN	100	100	50	600	0.3	4.7		250	Fig.1
DTC143ZM	SOT-723	NPN	100	100	50	80	0.3	4.7	47	250	Fig.2
DTC144EM	SOT-723	NPN	100	100	50	68	0.3	47	47	250	Fig.2
DTC114EE	SOT-523	NPN	150	100	50	30	0.3	10	10	250	Fig.2
DTC114TE	SOT-523	NPN	150	100	50	300	0.3	10		250	Fig.1
DTC114YE	SOT-523	NPN	150	100	50	68	0.3	10	47	250	Fig.2
DTC123JE	SOT-523	NPN	150	100	50	80	0.3	2.2	47	250	Fig.2
DTC124EE	SOT-523	NPN	150	100	50	56	0.3	22	22	250	Fig.2
DTC143EE	SOT-523	NPN	150	100	50	20	0.3	4.7	4.7	250	Fig.2
DTC143TE	SOT-523	NPN	150	100	50	300	0.3	4.7		250	Fig.1
DTC143ZE	SOT-523	NPN	150	100	50	80	0.3	4.7	47	250	Fig.2
DTC144EE	SOT-523	NPN	150	100	50	68	0.3	47	47	250	Fig.2
DTC144TE	SOT-523	NPN	150	100	50	300	0.3	47		250	Fig.1
DTC114EM	SOT-723	NPN	150	100	50	30	0.3	10	10	250	Fig.2
DTC113ZCA	SOT-23	NPN	200	100	50	33	0.3	1	10	250	Fig.2
DTC114TCA	SOT-23	NPN	200	100	50	300	0.3	10		250	Fig.1
DTC123ECA	SOT-23	NPN	200	100	50	20	0.3	2.2	2.2	250	Fig.2
DTC123JCA	SOT-23	NPN	200	100	50	80	0.3	2.2	47	250	Fig.2
DTC123YCA	SOT-23	NPN	200	100	50	33	0.3	2.2	10	250	Fig.2
DTC124ECA	SOT-23	NPN	200	100	50	56	0.3	22	22	250	Fig.2
DTC143ECA	SOT-23	NPN	200	100	50	20	0.3	4.7	4.7	250	Fig.2
DTC143TCA	SOT-23	NPN	200	100	50	600	0.3	4.7		250	Fig.1
DTC143XCA	SOT-23	NPN	200	100	50	30	0.3	4.7	10	250	Fig.2
DTC144ECA	SOT-23	NPN	200	100	50	68	0.3	47	47	250	Fig.2
DTC144TCA	SOT-23	NPN	200	100	50	300	0.3	47		250	Fig.1
DTC113ZUA	SOT-323	NPN	200	100	50	33	0.3	1	10	250	Fig.2
DTC114EUA	SOT-323	NPN	200	100	50	30	0.3	10	10	250	Fig.2
DTC114TUA	SOT-323	NPN	200	100	50	300	0.3	10		250	Fig.1
DTC114YUA	SOT-323	NPN	200	100	50	68	0.3	10	47	250	Fig.2
DTC123JUA	SOT-323	NPN	200	100	50	80	0.3	2.2	47	250	Fig.2
DTC123YUA	SOT-323	NPN	200	100	50	33	0.3	2.2	10	250	Fig.2
DTC124EUA	SOT-323	NPN	200	100	50	56	0.3	22	22	250	Fig.2
DTC143EUA	SOT-323	NPN	200	100	50	20	0.3	4.7	4.7	250	Fig.2
DTC143TUA	SOT-323	NPN	200	100	50	300	0.3	4.7		250	Fig.1
DTC143XUA	SOT-323	NPN	200	100	50	30	0.3	4.7	10	250	Fig.2
DTC143ZUA	SOT-323	NPN	200	100	50	80	0.3	4.7	47	250	Fig.2
DTC144EUA	SOT-323	NPN	200	100	50	68	0.3	47	47	250	Fig.2
DTC144TUA	SOT-323	NPN	200	100	50	300	0.3	47		250	Fig.1
DDTC123YCA	SOT-23	NPN	200	500	50	56	0.3	2.2	10	200	Fig.2
DDTC142TC	SOT-23	NPN	200	500	50	56	5	0.47		200	Fig.1
DTC114YCA	SOT-23	NPN	230	100	50	80	0.3	10	47	250	Fig.2
DTC114ECA	SOT-23	NPN	246	100	50	35	0.25	10	10	250	Fig.2
DTC143ZCA	SOT-23	NPN	246	100	50	80	0.3	4.7	47	250	Fig.2
DDTC113ZCA	SOT-23	NPN	250	500	50	70	0.3	1	10	250	Fig.2

## Pre-biased Transistors

### NPN\*2 Pre-biased Transistors

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>D</sub> (mW)	I <sub>O</sub> (mA)	V <sub>CC</sub> (V)	G <sub>i</sub>	V <sub>O</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>z</sub> (KΩ)	f <sub>T</sub> (MHZ)	
UMH10N	SOT-363	NPN*2	150	100	50	80	0.3	2.2	47	250	Fig.5
UMH11N	SOT-363	NPN*2	150	100	50	30	0.3	10	10	250	Fig.5
UMH13N	SOT-363	NPN*2	150	100	50	80	0.3	4.7	47	250	Fig.5
UMH1N	SOT-363	NPN*2	150	100	50	56	0.3	22	22	250	Fig.5
UMH2N	SOT-363	NPN*2	150	100	50	68	0.3	47	47	250	Fig.5
UMH3N	SOT-363	NPN*2	150	100	50	600	0.3	4.7		250	Fig.11
UMH9N	SOT-363	NPN*2	150	100	50	68	0.3	10	47	250	Fig.5
EMH10	SOT-563	NPN*2	150	100	50	80	0.3	2.2	47	250	Fig.5

### PNP Pre-biased Transistors

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>D</sub> (mW)	I <sub>O</sub> (mA)	V <sub>CC</sub> (V)	G <sub>i</sub>	V <sub>O</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>z</sub> (KΩ)	f <sub>T</sub> (MHZ)	
DTA114YM	SOT-723	PNP	100	-70	-50	68	-5	10	47	250	Fig.4
DTA123JM	SOT-723	PNP	100	-100	-50	80	-0.3	2.2	47	250	Fig.4
DTA114EE	SOT-523	PNP	150	-100	-50	30	-0.3	10	10	250	Fig.4
DTA114TE	SOT-523	PNP	150	-100	-50	250	-0.3	10		250	Fig.3
DTA123JE	SOT-523	PNP	150	-100	-50	80	-0.3	2.2	47	250	Fig.4
DTA124EE	SOT-523	PNP	150	-100	-50	56	-0.3	22	22	250	Fig.4
DTA143EE	SOT-523	PNP	150	-100	-50	30	-0.3	4.7	4.7	250	Fig.4
DTA143ZE	SOT-523	PNP	150	-100	-50	80	-0.3	4.7	47	250	Fig.4
DTA144EE	SOT-523	PNP	150	-100	-50	68	-0.3	47	47	250	Fig.4
DTA113ZCA	SOT-23	PNP	200	-100	-50	33	-0.3	1	10	250	Fig.4
DTA114ECA	SOT-23	PNP	200	-100	-50	30	-0.3	10	10	250	Fig.4
DTA114TCA	SOT-23	PNP	200	-100	-50	250	-0.3	10		250	Fig.3
DTA114YCA	SOT-23	PNP	200	-100	-50	68	-0.3	10	47	250	Fig.4
DTA123ECA	SOT-23	PNP	200	-100	-50	30	-0.3	2.2	2.2	250	Fig.4
DTA123JCA	SOT-23	PNP	200	-100	-50	80	-0.3	2.2	47	250	Fig.4
DTA123YCA	SOT-23	PNP	200	-100	-50	33	-0.3	2.2	10	250	Fig.4
DTA124ECA	SOT-23	PNP	200	-100	-50	56	-0.3	22	22	250	Fig.4
DTA143ECA	SOT-23	PNP	200	-100	-50	30	-0.3	4.7	4.7	250	Fig.4
DTA143XCA	SOT-23	PNP	200	-100	-50	30	-0.3	4.7	10	250	Fig.4
DTA143ZCA	SOT-23	PNP	200	-100	-50	80	-0.25	4.7	47	250	Fig.4
DTA144ECA	SOT-23	PNP	200	-100	-50	68	-0.3	47	47	250	Fig.4
DTA114EUA	SOT-323	PNP	200	-100	-50	30	-0.3	10	10	250	Fig.4
DTA114TUA	SOT-323	PNP	200	-100	-50	250	-0.3	10		250	Fig.3
DTA114YUA	SOT-323	PNP	200	-100	-50	68	-0.3	10	47	250	Fig.4

**PNP Pre-biased Transistors**

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>o</sub> (mW)	I <sub>o</sub> (mA)	V <sub>cc</sub> (V)	G <sub>i</sub>	V <sub>o</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>z</sub> (KΩ)	f <sub>r</sub> (MHZ)	
DTA123JUA	SOT-323	PNP	200	-100	-50	80	-0.3	2.2	47	250	Fig.4
DTA123YUA	SOT-323	PNP	200	-100	-50	33	-0.3	2.2	10	250	Fig.4
DTA124EUA	SOT-323	PNP	200	-100	-50	56	-0.3	22	22	250	Fig.4
DTA143EUA	SOT-323	PNP	200	-100	-50	30	-0.3	4.7	4.7	250	Fig.4
DTA143XUA	SOT-323	PNP	200	-100	-50	30	-0.3	4.7	10	250	Fig.4
DTA143ZUA	SOT-323	PNP	200	-100	-50	80	-0.3	4.7	47	250	Fig.4
DTA144EUA	SOT-323	PNP	200	-100	-50	68	-0.3	47	47	250	Fig.4
DDTA123YCA	SOT-23	PNP	200	-500	-50	56	-0.3	2.2	10	200	Fig.4

**PNP\*2 Pre-biased Transistors**

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>o</sub> (mW)	I <sub>o</sub> (mA)	V <sub>cc</sub> (V)	G <sub>i</sub>	V <sub>o</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>z</sub> (KΩ)	f <sub>r</sub> (MHZ)	
UMB4N	SOT-363	PNP*2	150	-100	-50	100	-0.3	10		250	Fig.4

**NPN+PNP Pre-biased Transistors**

Part Number	Package	Polarity	Power Dissipation	Output current	Supply Voltage	DC Current Gain	Output Voltage	Input Resistance		Transition frequency	Internal Structure
			P <sub>o</sub> (mW)	I <sub>o</sub> (mA)	V <sub>cc</sub> (V)	G <sub>i</sub>	V <sub>o</sub> (V)	R <sub>i</sub> (KΩ)	R <sub>z</sub> (KΩ)	f <sub>r</sub> (MHZ)	
UMD10N	SOT-363	NPN+PNP	150	100	50/-50	80	0.3/-0.3	2.2	47	250	Fig.6
UMD12N	SOT-363	NPN+PNP	150	100	50/-50	68	0.3/-0.3	47	47	250	Fig.6
UMD15N	SOT-363	NPN+PNP	150	100	50/-50	20	0.3/-0.3	4.7	4.7	250	Fig.6
UMD22N	SOT-363	NPN+PNP	150	100	50/-50	80	0.3/-0.3	4.7	47	250	Fig.6
UMD2N	SOT-363	NPN+PNP	150	100	50/-50	56	0.3/-0.3	22	22	250	Fig.6
UMD3N	SOT-363	NPN+PNP	150	100	50/-50	30	0.3/-0.3	10	10	250	Fig.6
UMD9N	SOT-363	NPN+PNP	150	100	50/-50	68	0.3/-0.3	10	47	250	Fig.6
UMF21N	SOT-363	NPN+PNP	150	100	50	30	0.3	10	10	250	Fig.10
EMD22	SOT-563	NPN+PNP	150	100	50/-50	80	0.3/-0.3	4.7	47	250	Fig.6



**RF Bipolar Transistors**

**RF Bipolar Transistors**

Part Number	Package	Polarity	Power Dissipation	Collector-Emitter Breakdown Voltage	Collector Current	DC Current Gain			Power Gain	Noise Figure	Transition Frequency	Internal Structure
			$P_c$ (W)	$V_{CEO}$ (V)		$I_c$ (A)	$H_{FE}$	$V_{CE}$ (V)	$I_c$ (mA)	$G_p$ (dB)	$N_f$ (dB)	
RF3356	SOT-23	NPN	0.15	12	0.1	130-300	10	20	12.5	2	7	Fig.1
RF3358	SOT-23	NPN	0.2	18	0.1	130-300	10	20	10	-	6	Fig.1

**Internal Structure**

