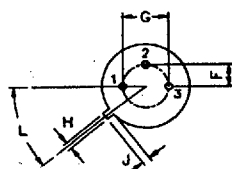


PIN CONFIGURATION
1. EMITTER
2. BASE
3. COLLECTOR



DIM	MIN	MAX
A	8,50	9,39
B	7,74	8,50
C	6,09	6,60
D	0,40	0,53
E	—	0,88
F	2,41	2,66
G	4,82	5,33
H	0,71	0,86
J	0,73	1,02
K	12,7	—
L	42 DEG	48 DEG

ALL DIMENSIONS ARE IN M.M.

TO-39 Metal-Can Package Transistors (NPN)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																
Type No.	V _{CB0} (V) Min	V _{CE0} (V) Min	V _{EB0} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CB0} (μA) Max	V _{CB} (V) @ I _C	I _{CES} (μA) Max	V _{CE} (V) @ I _C	h _{FE}	β	I _C & V _{CE} (mA) (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) Min	I _C (mA) Max	C _{ob} (pF) Min Max Typ	f _T (MHz) Min Typ Max	t _{off} (ns) Max	NF (dB) Max	β Freq (MHz) Max		
2N656	60	60	8				10	30			30	90	200	10	4		200						
2N657	100	100	8	1	0.5		10	30			30	90	200	10	4		200						
2N696	60	40	5	0.8	0.5		1	30			20	60	150	10	1.5	1.3	150	35					
2N697	60	40	5	0.6	0.5		1	30			40	120	150	10	1.5	1.3	150	35					
2N699	120	80	5	0.8	0.5		2	60			40	120	150	10	5	1.3	150	20	50		50		
2N1507	60	30	5	0.6	1		1	30			100	300	150	10	1.5		150	35		50			
2N1613	75	50	7	0.8	0.5		0.01	60			20		500	10	1.5	1.3	150	25	60		50		
											40	120	150	10							12		
											35		10	10							0.001		
											20		0.1	10									
2N1644	60		5	2			1	30			40		150	10	1.5	1.3	150						
2N1711	75	50	7	0.8	1		0.01	60			40		500	10	1.5	1.3	150	25	70		50		
											100	300	150	10							8		
											75		10	10									
											35		0.1	10									
											20		0.01	10									
2N1837	80	30	8	0.6	1	1	0.5	30			40	120	150	10	0.8	1.3	150	18					
2N1838	45	20	5	0.6	0.5		1.5	30			40	150	100	10	1.4	1.5	100	27					
2N1840	25	15	5	0.6		0.5	0.3	10			10		150	1.4	1.4	1.75	150	27					
											10	100	150	10									
2N1889	100	80	7	0.8			0.01	75			20		0.1	10	1.2	0.9	50	15	50		50		
											35		10	10	5	1.3	150						
											40	120	150	10									
2N1890	100	80	7	0.8			0.01	75			100	300	150	10	1.2	0.9	50	15	60		50		
															5	1.3	150						
2N1893	120	80	7	0.8	0.5	1	0.01	90			20		0.1	10	1.2	0.9	50	15	50		50		
											35		10	10	5	1.3	150						
											40	120	150	10									

TO-39 Metal-Can Package Transistors (NPN)

CDIL

[查询"2N1644"供应商](#)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EB0} (V) Min	P _D (W) @ Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} (V) @ I _C	I _{CES} (μA) Max	V _{CE} (V) @ I _C	h _{FE} Min	β Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) & Min	I _C (mA) Max	C _{ob} (pF) Min Max Typ	f _i (MHz) Min Typ Max	t _{off} (ns) Max	NF (dB) Max	θ Freq (MHz) Max	
2N1972	60	30	5	0.6			1	30			110	350	50	10	2		50	25		50			
2N1973	100	80	7	0.8			0.025	75			75		10	10	1.2		50	15		60			
2N1974	100	80	7	0.8			0.025	75			35		10	10	1.2		50	15		50			
2N1975	100	80	7	0.8			0.025	75			15		10	10	1.2		50	15		40			
2N1986	50	25	5	0.6	1		5	30			60		30	10	0.6	0.9	30	20 35					
											60	240	150	10	1.5	1.3	150						
2N1987	50	25	5	0.6	1		5	30			20		30	10	0.6	0.9	30	20 35					
											20	80	150	10	1.5	1.3	150						
2N1988	100	45	5	0.6		1	5	50			35	120	30	10	2	1	30	20					
2N1989	100	45	5	0.6		1	5	50			20	60	30	10	2	1	30	20					
2N1990	100		3	0.6							20		30	10	0.5	1	2						
2N2049	75	50	7	0.8	0.5		0.01	60			100	300	150	10	0.4		10	25		50			
2N2102	120	65	7	1	1		0.002	60			10		1000	10	0.5	1.1	150	15	60		50	6	0.001
											25		500	10									
											40	120	150	10									
											35		10	10									
											20		0.1	10									
2N2192	60	40	5	0.8	1		0.01	30			15		0.1	10	0.35	1.3	150	20	50		50		
											75		10	10									
											100	300	150	10									
											35		500	10									
											15		1000	10									
											70		150	1									
2N2193	80	50	8	0.8	1		0.01	60			15		0.1	10	0.35	1.3	150	20	50		50		
											30		10	10									
											40	120	150	10									
											20		500	10									
											15		1000	10									
											30		150	1									
2N2194	60	40	5	0.8	1		0.01	30			15		10	10	0.35	1.3	150	20	50		50		
											20	60	150	10									
											12		500	10									
											15		150	1									
2N2195	45	25	5	0.6		1	0.1	30			20		150	10	0.35	1.3	150	20	50		50		
											10		150	1									
2N2218	60	30	5	0.8	0.8		0.01	50			20		500	10	0.4	0.6	1.3	8	250		20		
											20		150	1	1.6	2.6	500						
											40	120	150	10									
											35		10	10									
											25		1	10									
											20		0.1	10									
2N2218A	75	40	6	0.8	0.8		0.01	60	* 0.01	60	20		0.1	10	0.3	0.6	1.2	8	300		20		
											25		1	10	1		2	500					
											35		10	10									
											40	120	150	10									
											20		150	1									
											25		500	1									
2N2219	60	30	5	0.8	0.8		0.01	50			35		0.1	10	0.4	0.6	1.3	8	250		20		
											50		1	10	1.6	2.6	500						
											75		10	10									
											100	300	150	10									
											50		150	1									
											30		500	1									

* NOTE: I_{CEX}

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																					
Type No.	V _{CB0} (V) Min	V _{CEO} (V) Min	V _{EBO} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} (V) @	I _{CES} (μA) Max	V _{CE} (V) @	h _{FE} Min	@ Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & (V) Min	V _{BE(SAT)} (V) Max	I _C (mA) @	C _{ob} (pF) Min Max Typ	f _t (MHz) Min Typ Max	@ Max	I _C (mA)	t(off) (ns) Max	NF (dB) Max	@ Max	Freq (MHz)		
2N2219A	75	40	6	0.8	0.8		0.01	60	* 0.01	60	35		0.1	10	0.3	0.6	1.2	150	8		300			20				
											50		1	10	1		2	500										
											75		10	10														
											100	300	150	10														
											50		150	1														
											40		500	1														
2N2243	120	80	7	0.8	1		0.01	60			15		500	10	0.35		1.3	150	15		50			50				
											40	120	150	10														
											30		10	10														
											30		150	1														
											15		0.1	10														
2N2270	60	45	7	1	1		0.05	60			50	200	150	10	0.9		1.2	150	15		100			50		10		0.001
											30		1	10														
2N2440	120	80	7	0.8	0.5		0.001	90			35		0.1	10	0.4		0.9	50	15									
											100	300	150	10	3		1.3	150										
2N3019	140	80	7	0.8		1	0.01	90			50		0.1	10	0.2		1.1	150	12		100	400	50		4			0.001
											90		10	10	0.5			500										
											100	300	150	10														
											50		500	10														
											15		1	10														
2N3020	140	80	7	0.8		1	0.01	90			30	100	0.1	10	0.2		1.1	150	12		80			50				
											40	120	10	10	0.5			500										
											40	120	150	10														
											30	100	500	10														
											15		1000	10														
2N3053	60	40	5	5	0.7				* 0.25	30	50	250	150	10	1.4		1.7	150	15				100	50				
											25		150	2.5														
2N3300	60	30	5	0.8	0.5				0.01	50	50		500	10	0.22		1.1	150	8		250			50	150			
											50		150	1	0.6		1.5	500										
											100	300	150	10														
											75		10	10														
											50		1	10														
											35		0.1	10														
2N3440	300	250	7	1	1		20	360			40	160	20	10	0.5		1.3	50	10				15	10				
2N3498	100	100	6	1.0	0.5		0.05	50			20		0.1	10	0.6		1.4	300	10		150			20				
											25		1	10	0.2		0.8	10										
											35		10	10	0.25		0.9	50										
											40	120	150	10														
											15		500	10														
											95		300	10														
2N3499	100	100	6	1	0.5		0.05	50			35		0.1	10	0.2		0.8	10	10		150			20				
											50		1	10	0.25		0.9	50										
											75		10	10	0.6		1.4	300										
											100	300	150	10														
											20		500	10														
											20		300	10														
2N3500	150	150	6	1	0.3		0.05	75			20		0.1	10	0.2		0.8	10	8		150			20				
											25		1	10	0.25		0.9	50										
											35		10	10	0.4		1.2	150										
											40	120	150	10														
											15		300	10														
											15		500	10														

* NOTE: I_{CEX}

TO-39 Metal-Can Package Transistors (NPN)

CDIL

[查询"2N1644"供应商](#)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EB0} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} (V) @	I _{CES} (μA) Max	V _{CE} (V) @	h _{FE} @	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) & Min	I _C (mA) Max	C _{ob} (pF) Min Max Typ	f _t (MHz) Min Typ Max	I _C (mA)	t(off) (ns) Max	NF (dB) Max	@ Freq (MHz) Max	
2N3501	150	150	6	1	0.3		0.05	75			35 50 100 20 75 20	0.1 1 150 300 10 500	10 10 10 10 10 10	0.4 0.2 0.25	1.2 0.8 0.9	150 10 50	8	150	20				
2N3678	75	55	6	0.8	0.8		0.01	60			25 20 40 35 25 20	500 150 150 10 1 0.1	10 1 10 10 10 10	0.4 1 1 1 1 1	.6 2 2 2 2 2	1.2 500 500 500 500 500			250				
2N3742	300	300	7	1	0.05		0.2	200			10 15 20 20	3 10 30 50	10 10 10 20	0.75 1 1 1	1 1.2 1.2 1.2	10 30 30 20	6	30	10				
2N4237	50	40	6	1	1		0.01	50			15 30 30 30	1000 500 250 50	1 1 1 1	0.6 0.3 0.3 0.3	1.5 500 500 500	1000 500 500 500	100						
2N4926	200	200	7	1	0.05		0.1	100			10 15 20 20	3 10 30 50	10 10 10 20	1 2 2 2	1.2 30 1.5 1.5	10 30 50 50		30	300	10			
2N5320	100	75	7	10	2				*100	100	30 10	130 1000	500 2	4 2	0.5 0.5	1.1 1.1	500 500			800			
2N5321	75	50	5	10	2				*100	75	40	250	500	4	0.8	1.4	500			800			
2N5681	100	100	4	1	1		1	100	* 1	100	5 40	1000 150	250 250	2 2	0.6 1 2	250 500 1	50	30	100				
2N5682	120	120	4	1	1		1	120	* 1	120	5 40	1000 150	250 250	2 2	0.6 1	250 500	50	30	100				
BC140	80	40	7	0.8	1				0.1	60	40	400	100	1	1	1000	25	50	50	850			
BC140-6	80	40	7	0.8	1				0.1	60	40	100	100	1	1	1000	25	50	50	850			
BC140-10	80	40	7	0.8	1				0.1	60	63	160	100	1	1	1000	25	50	50	850			
BC140-16	80	40	7	0.8	1				0.1	60	100	250	100	1	1	1000	25	50	50	850			
BC141	100	60	7	0.8	1				0.1	60	40	400	100	1	1	1000	25	50	50	850			
BC141-6	100	60	7	0.8	1				0.1	60	40	100	100	1	1	1000	25	50	50	850			
BC141-10	100	60	7	0.8	1				0.1	60	63	160	100	1	1	1000	25	50	50	850			
BC141-16	100	60	7	0.8	1				0.1	60	100	250	100	1	1	1000	25	50	50	850			
BC300	120	80	7	0.85	0.5		0.02	120			40	240	150	10	0.5	150		100	400	50			
BC300-4	120	80	7	0.85	0.5		0.02	120			40	80	150	10	0.5	150		100	400	50			
BC300-5	120	80	7	0.85	0.5		0.02	120			70	140	150	10	0.5	150		100	400	50			

* NOTE : ICEX

查询"2N1644"供应商

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																				
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EB0} (V) Min	P _D (W) @ Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} @ (V)	I _{CES} (μA) Max	V _{CE} @ (V)	h _{FE} Min	β Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & (V) Min	I _C @ (mA)	C _{ob} (pF) Min	Max	Typ	f _t (MHz) Min	β Typ	I _C (mA) Max	t(off) (ns) Max	NF (dB) Max	β @ Freq (MHz) Max	
BC300-6	120	80	7	0.85	0.5		0.02	120			120	240	150	10	0.5		150					100		400			
BC301	90	60	7	0.85	0.5		0.02	90			40	240	150	10	0.5		150					100		400	50		
BC301-4	90	60	7	0.85	0.5		0.02	90			40	80	150	10	0.5		150					100		400	50		
BC301-5	90	60	7	0.85	0.5		0.02	90			70	140	150	10	0.5		150					100		400	50		
BC301-6	90	60	7	0.85	0.5		0.02	90			120	240	150	10	0.5		150					100		400	50		
BC302	60	45	7	0.85	0.5		0.02	60			40	240	150	10	0.5		150					100		400	50		
BC302-4	60	45	7	0.85	0.5		0.02	60			40	80	150	10	0.5		150					100		400	50		
BC302-5	60	45	7	0.85	0.5		0.02	60			70	140	150	10	0.5		150					100		400	50		
BC302-6	60	45	7	0.85	0.5		0.02	60			120	240	150	10	0.5		150					100		400	50		
BD115	245	180	5	0.875	0.2						22		50	10	9		100										
BF257	160	160	5	1	0.1		0.05	100			25		30	10	1		30	3.5				110		30			3.5
BF258	250	250	5	1	0.1		0.05	200			25		30	10	1		30					110		30			
BF259	300	300	5	1	0.1		0.05	250			25		30	10	1		30					110		30			
BF336	185	180	5	0.8		0.2					20		30	10								80	130		30		
BF337	250	200	5	0.8		0.2					20		30	10								80			30		
BF338	300	225	5	0.8	0.2						20		30	10								80	130		30		
BFX84	45	45	6	0.8	1		0.5	100			15		1000	10	0.15	1.2	10	12	50			50		50	360		
											20		500	10	0.35	1.3	150										
											30		150	10	1	1.5	500										
											20		10	10	1.6	2	1000										
BFX85	100	60	6	0.8	1		0.5	100			15		1000	10	0.15	1.2	10	12	50			50		50			
							0.05	80			30		500	10	0.35	1.3	150										
											70		150	10	1	1.5	500										
											50		10	10	1.6	2	1000										
BFX86	45	45	6	0.8	1		0.05	30			15		1000	10	0.15	1.2	10	12	50			50		50	360		
											30		500	10	0.35	1.3	150										
											70		150	10	1	1.5	500										
											50		10	10	1.6	2	1000										
BFY50	80	35	6	0.8	1		0.05	60			20		10	6	0.2		150	12	60			50		50			
											30		150	6	1	2	1000										
											15		1000	6													
BFY51	60	30	6	0.8	1		0.05	40			30		10	6	0.35		150	12	50			50		50			
											40		150	6	1.6	2	1000										
											15		1000	6													
BFY52	40	20	6	0.8	1		0.05	30			30		10	6	0.35		150	12	50			50		50			
											60		150	6	1.6	2	1000										
											15		1000	6													
BFY56	85	45	7	0.8	1				0.02	50	15		0.1	10	0.3	1.5	150	25	40			50		50			
											20		500	10	1.2	2.3	1000										
											30	150	150	1													

TO-39 Metal-Can Package Transistors (NPN)

CDIL

[查询"2N1644"供应商](#)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																						
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EBO} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} @ (V)	I _{CES} (μA) Max	V _{CE} @ (V)	h _{FE} Min	β Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & (V) Min	V _{BE(SAT)} (V) Max	I _C @ (mA)	C _{ob} (pF) Min	Max	Typ	f _T (MHz) Min	Typ	Max	t _{off} (ns) Max	NF (dB) Max	β Max	Freq (MHz)	
BFY72	50	28	5	0.8	0.7		0.04	20			15		0.1	10	0.25		1.2	150		8			50		50				
											20		1	10	0.7		1.6	500											
											30		10	10															
											40	150	150	10															
											15		500	10															
BSX45	# 80	40	7	1	1				0.01	60	40	250	100	1	1			1000		25			50		50		850		
BSX45-6	# 80	40	7	1	1				0.01	60	10		0.1	1	1			1000		25			50		50		850		
											40	100	100	1															
											15		500	1															
BSX45-10	# 80	40	7	1	1				0.01	60	15		0.1	1	1			1000		25			50		50		850		
											63	160	100	1															
											25		500	1															
BSX45-16	# 80	40	7	1	1				0.01	60	25		0.1	1	1			1000		25			50		50		850		
											100	250	100	1															
											35		500	1															
BSX46	# 100	60	7	1	1				0.01	60	40	250	100	1	1			1000		20			50		50		850		
BSX46-6	# 100	60	7	1	1				0.01	60	10		0.1	1	1			1000		20			50		50		850		
											40	100	100	1															
											15		500	1															
BSX46-10	# 100	60	7	1	1				0.01	60	15		0.1	1	1			1000		20			50		50		850		
											63	160	100	1															
											25		500	1															
BSX46-16	# 100	60	7	1	1				0.01	60	25		0.1	1	1			1000		20			50		50		850		
											100	250	100	1															
											35		500	1															
BSX47	# 120	80	7	1	1				0.01	80	40	250	100	1	1			1000		15			50		50		850		
BSX47-6	# 120	80	7	1	1				0.01	80	1		0.1	1	1			1000		15			50		50		850		
											40	100	100	1															
											15		500	1															
BSX47-10	# 120	80	7	1	1				0.01	80	15		0.1	1	1			1000		15			50		50		850		
											63	160	100	1															
											25		500	1															
BSX47-16	# 120	80	7	1	1				0.01	80	25		0.1	1	1			1000		1	5		50		50		850		
											100	250	100	1															
											35		500	1															
BSX62	# 60	40	5	5	3				0.1	40	40	250	1000	1	0.8		1.3	2000		70			30		300				
															0.7		1.2	1000											
BSX62-6	# 60	40	5	5	3				0.1	40	30		100	1	0.8		1.3	2000		70			30		200				
											40	100	1000	1	0.7		1.2	1000											
											25		2000	5															
BSX62-10	# 60	40	5	5	3				0.1	40	30		100	1	0.8		1.3	2000		70			30		200				
											63	160	1000	1	0.7		1.2	1000											
											25		2000	5															
BSX62-16	# 60	40	5	5	3				0.1	40	30		100	1	0.8		1.3	2000		70			30		200				
											100	250	1000	1	0.7		1.2	1000											
											25		2000	5															
BSX63	# 80	60	5	5	3				0.1	60	4	250	1000	1	0.8		1.3	2000		70			30		200				
															0.7		1.2	1000											

NOTE: V_{CES}

[查询"2N1644"供应商](#)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																						
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EBO} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} @ (V)	I _{CES} (μA) Max	V _{CE} @ (V)	h _{FE} Min	β Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & (V) Min	V _{BE(SAT)} (V) Max	I _C @ (mA)	C _{ob} (pF) Min	Max	Typ	f _t (MHz) Min	β Typ	I _C (mA) Max	t(off) (ns) Max	NF (dB) Max	β Max	Freq (MHz) Max	
BSX63-6	# 80	60	5	5	3				0.1	60	30		100	1	0.8		1.3	2000	70			30		200					
											40	100	1000	1	0.7		1.2	1000											
											25		2000	5															
BSX63-10	# 80	60	5	5	3				0.1	60	30		100	1	0.8		1.3	2000	70			30		200					
											63	160	1000	1	0.7		1.2	1000											
											25		2000	5															
BSX63-16	# 80	60	5	5	3				0.1	60	30		100	1	0.8		1.3	2000	70			30		200					
											100	250	1000	1	0.7		1.2	1000											
											25		2000	5															
BSY51	60	35	5	0.8	0.5				0.1	30	40	120	150	10	1		1.3	150	9			130		50					
BSY52	60	25	5	0.8	0.5				0.1	30	100	300	150	10	1		1.3	150	9			130		50					
BSY53	75	30	7	0.8	0.75				0.01	60	20		0.1	10	0.6		1.2	150				150		50					
											35		10	10	1.2		500												
											40	120	150	10															
											20		500	10															
BSY54	75	30	7	0.8	0.75				0.01	60	35		0.1	10	0.6		1.3	150				150		50					
											75		10	10															
											100	300	150	10															
											40		500	10															
CL21	20	20	5	0.75			0.5	15			150	350	100	3	0.6		150					80							
CL100	60	50	5	0.8		1	0.05	40			50	280	150	10	0.6		150												
CL150	35	30	5	0.8			0.05	25			50	280	150	1	0.6		150												

NOTE: V_{CES}

TO-39 Metal-Can Package Transistors (PNP)

CDIL

[查询"2N1644"供应商](#)

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																	
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{ESD} (V) Min	P _D (W) @ Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} @ (V)	I _{CES} (μA) Max	V _{CE} @ (V)	h _{FE} Min	β Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} & (V) Min	I _C @ (mA)	C _{ob} (pF) Min Max Typ	f _i (MHz) Min Typ Max	t _{off} (ns) Max	NF (dB) Max	Q Max	Freq (MHz)	
2N2904	60	40	5	0.6	0.6		0.02	50			20		500	10	0.4	1.3	150	8	200		50	100		
											40	120	150	10	1.6	2.6	500							
											35		10	10										
											25		1	10										
											20		0.1	10										
2N2904A	60	60	5	0.6	0.6		0.01	50			40		500	10	0.4	1.3	150	8	200		50	100		
											40	120	150	10	1.6	2.6	500							
											40		10	10										
											40		1	10										
											40		0.1	10										
2N2905	60	40	5	0.6	0.6		0.02	50			30		500	10	0.4	1.3	150	8	200		50	100		
											100	300	150	10	1.6	2.6	500							
											75		10	10										
											50		1	10										
											35		0.1	10										
2N2905A	60	60	5	0.6	0.6		0.01	50			50		500	10	0.4	1.3	150	8	200		50	100		
											100	300	150	10	1.6	2.6	500							
											100		10	10										
											100		1	10										
											75		0.1	10										
2N3072	60	60	4	0.8	0.5				0.01	30	15		300	2	0.25	1.2	50	10	130		50	100		
											30	130	50	1	1	2	300							
2N3073	60	60	4						0.01	30	15		300	2	0.25	1.2	50	10	130		50	100		
											30	130	50	1	1	2	300							
2N3502	45	45	5	0.6	0.6		0.01	30			50		500	10	0.25	1	50	8	200		50	100	4	
											100	300	150	10	0.4	1.3	150							
											140		10	10	1.6	2	500							
											135		1	10										
											120		0.1	10										
											80		0.01	10										
2N3503	60	60	5	0.6	0.6		0.01	50			50		500	10	0.25	1	50	8	200		50	100	4	
											100	300	150	10	0.4	1.3	150							
											140		10	10	1.6	2	500							
											135		1	10										
											120		0.1	10										
											80		0.01	10										
2N3635	140	140	5	1	1		0.1	100			80		0.1	10	0.3	0.8	10	10	200		30	600	3	0.001
											90		1	10	0.5	0.65	0.9	50						
											100		10	10										
											100	300	50	10										
											50		150	10										
2N3636	175	175	5	1	1		0.1	100			40		0.1	10	0.3	0.8	10	10	150		30	600	3	0.001
											45		1	10	0.5	0.65	0.9	50						
											50		10	10										
											50	150	50	10										
											25		150	10										
2N3637	175	175	5	1	1		0.1	100			80		0.1	10	0.3	0.8	10	10	200		30	600	3	0.001
											90		1	10	0.5	0.65	0.9	50						
											100		10	10										
											100	300	50	10										
											50		150	10										
2N4030	60	60	5	0.8		1	0.05	50			15		1000	5	1		1000	20						
											25		500	5	0.5		500							
											40	120	100	5	0.15	0.9	150							
											30		0.1	5										

Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)														
Type No.	V _{CBO} (V) Min	V _{CEO} (V) Min	V _{EBO} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} (V) @ I _C	I _{CES} (μA) Max	V _{CE} (V) @ I _{CES}	h _{FE} @ Min Max	I _C & (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) Max	I _C (mA) @ V _{CE}	C _{ob} (pF) Min Max Typ	f _i (MHz) Min Typ Max	t _{off} (ns) Max	NF (dB) Max	Freq. (MHz) @
2N4031	80	80	5	0.8		1	0.05	60			10 25 40 30	1000 500 100 0.1	5 5 5 5	0.5 0.15		500 150	20				
2N4032	60	60	5	0.8		1	0.05	50			40 70 100 75	1000 500 100 0.1	5 5 5 5	1 0.5 0.15		1000 500 150	20				
2N4033	80	80	5	0.8		1	0.05	60			25 70 100 75	1000 500 100 0.1	5 5 5 5	0.5 0.15		500 150	20				
2N4036	90	65	7	1	1		0.02	90			20 40 20	500 150 0.1	10 10 10	0.65	1.4	150	700				
2N4037	60	40	7	1	1		0.25	60			50 15	250 1	150 10	1.4		150					
2N4314	90	65		1	1		0.25	60			50 15	250 1	150 10	1.4		150	30	60		50	
2N5322	100	75	7	1					*100	100	30 10	130 1000	500 2	0.7	1.1	500				1000	
2N5323	75	50	5	10	2				*100	75	40	250	500	4	1.2	1.4	500				1000
2N5415	200	200	4	1	1		50	175			30	150	50	10			15				
2N5416	350	300	6	1	1		50	280			30	120	50	10			15				
2N5679	100	100	4	1	1		1	100	* 1	100	5 40	1 150	2 250	0.6 1 2		250 500 1000	50	30		100	
2N5680	120	120	4	1	1		1	120	* 1	120	5 40	1000 150	2 250	0.6 1 2		250 500 1000	50	30		100	10
BC160	40	40	5	0.8	1				0.1	40	40	400	100	1	1	1000	30	50		50	650
BC160-6	40	40	5	0.8	1				0.1	40	40	100	100	1	1	1000	25	50		50	850
BC160-10	40	40	5	0.8	1				0.1	40	63	160	100	1	1	1000	25	50		50	850
BC160-16	40	40	5	0.8	1				0.1	40	100	250	100	1	1	1000	25	50		50	850
BC161	60	60	5	0.8	1				0.1	60	40	400	100	1	1	1000	30	50		1	650
BC161-6	60	60	5	0.8	1				0.1	60	40	100	100	1	1	1000	25	50		50	850
BC161-10	60	60	5	0.8	1				0.1	60	63	160	100	1	1	1000	25	50		50	850
BC161-16	60	60	5	0.8	1				0.1	60	100	250	100	1	1	1000	30	50		50	650
BC303	85	60	7	0.85	0.5		0.02	85			40	240	150	10	0.65	150		75	400	50	
BC303-4	85	60	7	0.85	0.5		0.02	85			40	80	150	10	0.65	150		75	400	50	
BC303-5	85	60	7	0.85	0.5		0.02	85			70	140	150	10	0.65	150		75	400	50	

* NOTE: I_{CES}

TO-39 Metal-Can Package Transistors (PNP)

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Maximum Ratings							Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)																
Type No.	V _{CEO} (V) Min	V _{CE0} (V) Min	V _{EBO} (V) Min	P _D (W) @Tc=25°C	I _C (A)	I _{CM} (A)	I _{CBO} (μA) Max	V _{CB} (V) @ I _C	I _{CES} (μA) Max	V _{CE} (V) @ I _C	h _{FE}	@ I _C & V _{CE} (V)	I _C (mA)	V _{CE} (V)	V _{CE(SAT)} (V) Max	V _{BE(SAT)} (V) Min	I _C (mA) Max	C _{ob} (pF) Min Max Typ	f _i (MHz) Min Typ Max	I _C (mA) Max	t(off) (ns) Max	NF (dB) Max	@ Freq (MHz) Max
BC303-6	85	60	7	0.85	0.5		0.02	85			120	240	150	10	0.65		150		75	400	50		
BC304	60	45	7	0.85	0.5		0.02	60			40	240	150	10	0.65		150		75	400	50		
BC304-4	60	45	7	0.85	0.5		0.02	60			40	80	150	10	0.65		150		75	400	50		
BC304-5	60	45	7	0.85	0.5		0.02	60			70	140	150	10	0.65		150		75	400	50		
BC304-6	60	45	7	0.85	0.5		0.02	60			120	240	150	10	0.65		150		75	400	50		
BFX29	20	15	5	0.5	0.6		0.05	50			40		150	10	0.4		1.3	150	12	100		50	150
											50		50	10			0.9	30					
											50		10	10									
											40		1	10									
											20		0.1	10									
BFX30	65	65	5	0.5	0.6		0.05	50			10		150	0.4			0.9	30	12			290	
											20		50	0.4			1.3	150					
											50	200	10	0.4									
											40		1	0.4									
BFX38	55	55	5	0.8	1		0.05	40			60		0.1	5	0.15		0.9	150	20	100		50	350
											85		100	5	0.5		1.1	500					
											60		500	5									
											30		1000	5									
BFX40	75	75	5	0.8	1		0.05	50			60		0.1	5	0.15		0.9	150	20	100		50	350
											85		100	5	0.5		1.1	500					
											60		500	5									
											25		1000	5									
BFX41	75	75	5	0.8	1		0.05	50			35		0.1	5	0.15		0.9	150	20	100		50	
											40		100	5	0.5		1.1	500					
											25		500	5									
											10		1000	5									
BFX87	45	50	6	0.6	0.6		0.05	40			25		500	10	0.4		1.3	150	12	100		50	150
											40		150	10	0.9			30					
											40		10	10									
											40		1	10									
BFX88	45	40	6	0.8	0.8		0.05	30			25		500	10	0.4		1.3	150	12	100		50	150
											40		150	10			0.9	30					
											40		10	10									
											40		1	10									
CK100	60	50	5	0.8	1		0.05	40			50	280	150	10	0.6			150					
CK150	35	30	5	0.8			0.05	25			50	280	150	1	0.6			150					