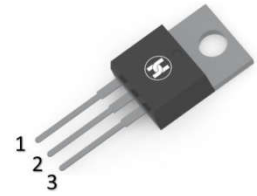


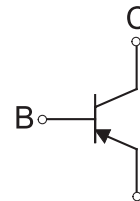
BIPOLAR TRANSISTOR (PNP)
FEATURES

- Complementary to NPN 2SD313
- Low Collector-Emitter Saturation Voltage

- 1.BASE
2.COLLECTOR(CASE)
3.EMITTER


TO-220
MECHANICAL DATA

- Case:TO-220
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Moisture Sensitivity: Level 1 perJ-STD-020
- Weight:2.30grams(approximate)

Equivalent Circuit

MAXIMUM RATINGS (TA = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-60	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current -Continuous	I_c	-3	A
Collector Power Dissipation	P_c	1.75	W
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	-55~+150	°C

ELECTRICAL CHARACTERISTICS (TA = 25°C unless otherwise specified)

Parameter	Symbol	Min	Max	Unit	Test conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	-60		V	$I_c = -100\mu A, I_E = 0$
Collector-emitter breakdown voltage	$V_{(BR)CEO}^*$	-60		V	$I_c = -10mA, I_B = 0$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	-5		V	$I_E = -100\mu A, I_c = 0$
Collector cut-off current	I_{CBO}		-100	μA	$V_{CB} = -20V, I_E = 0$
Collector cut-off current	I_{CEO}		-5	mA	$V_{CE} = -60V, I_E = 0$
Emitter cut-off current	I_{EBO}		-1	mA	$V_{EB} = -4V, I_c = 0$
DC current gain *	$h_{FE(1)}^*$	40	320		$V_{CE} = -2V, I_c = -1A$
	$h_{FE(2)}^*$	40			$V_{CE} = -2V, I_c = -0.1A$
Collector-emitter saturation voltage *	$V_{CE(sat)}^*$		-1	V	$I_c = -2A, I_B = -200mA$
Base-emitter voltage*	V_{BE}^*		-1.5	V	$V_{CE} = -2V, I_c = -1A$
Transition frequency	f_T	5		MHz	$V_{CE} = -5V, I_c = -500mA, f = 1MHz$

* Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

THERMAL CHARACTERISTICS

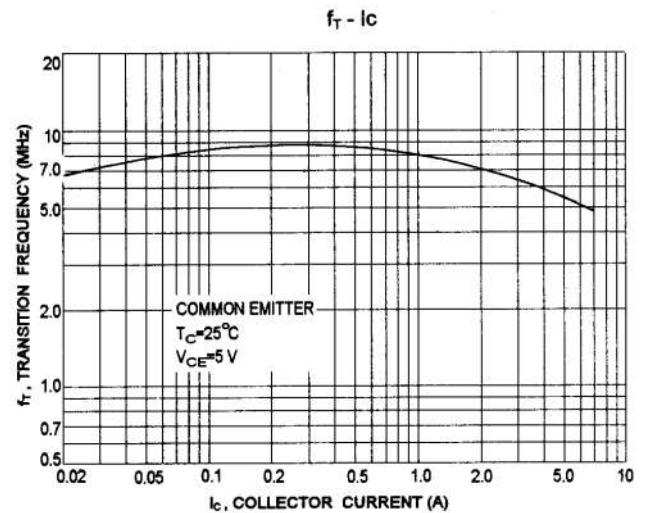
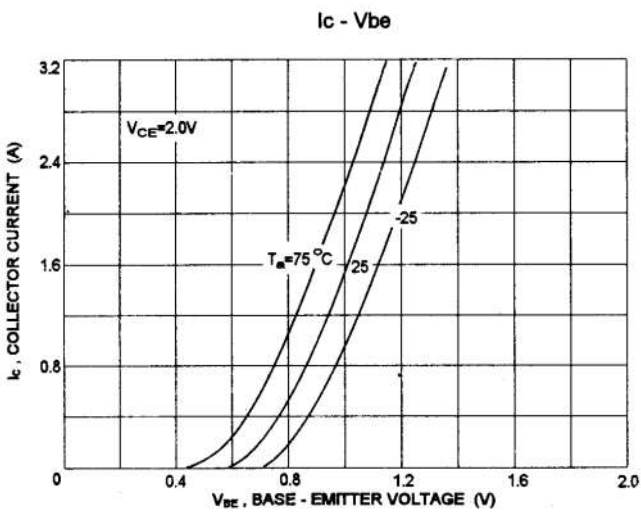
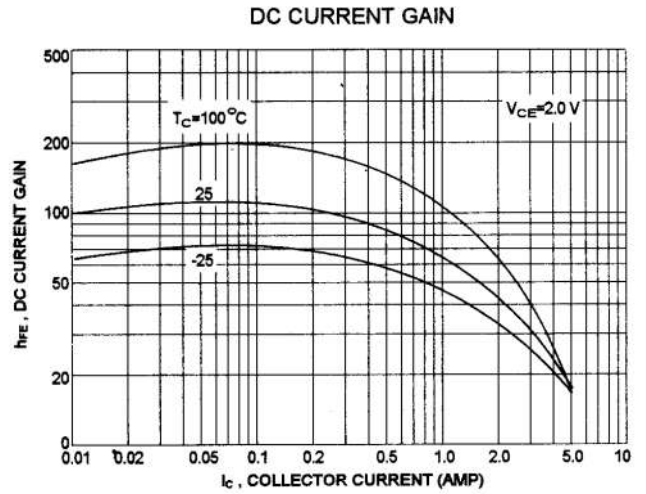
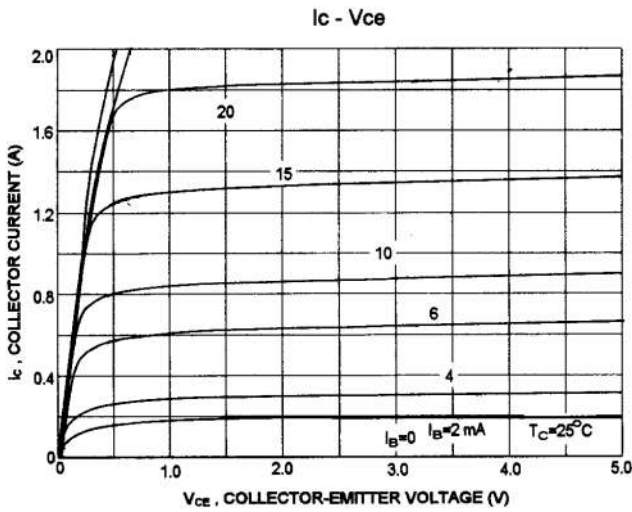
Parameter	Symbol	Max	Unit
Thermal resistance junction to case	$R_{\theta JA}$	4.16	°C/W

CLASSIFICATION of $h_{FE(1)}$

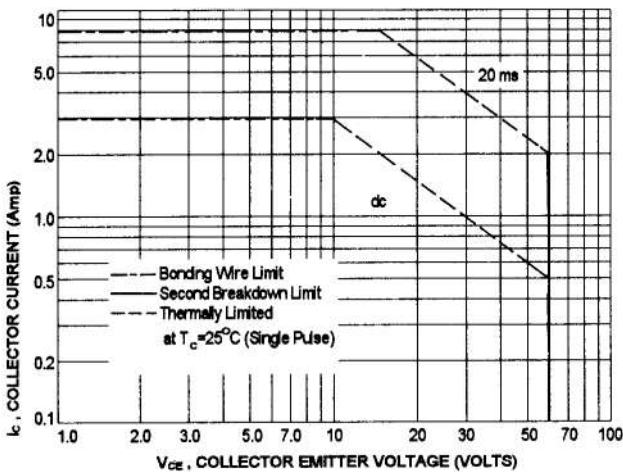
Rank	C	D	E	F
Range	40-80	60-120	100-200	160-320

BIPOLAR TRANSISTOR (PNP)

Typical Characteristics



ACTIVE-REGION SAFE OPERATING AREA (SOA)

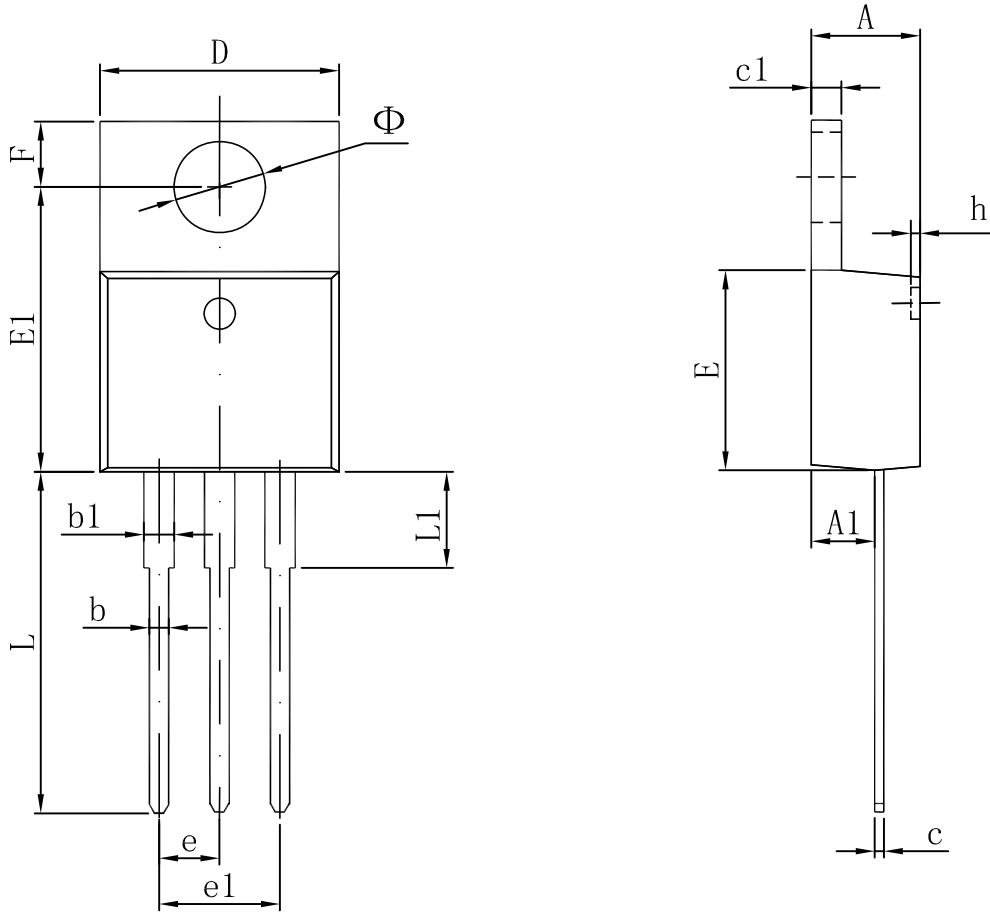


There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed of reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is based on $T_J(PK) = 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

BIPOLAR TRANSISTOR (PNP)

TO-220 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155