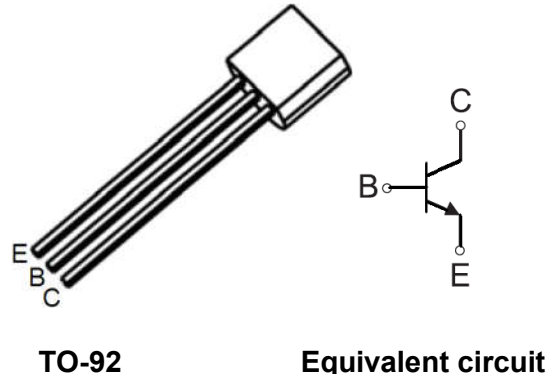


**NPN TRANSISTOR**
**FEATURES**

- General purpose switching and amplification
- Complementary to 2N2907

**MECHANICAL DATA**

- Case: TO-92
- Case material: Molded plastic. UL flammability 94V-0
- Terminals: Tin plated, solderable per MIL-STD-202, method 208
- Weight: 2.30grams(approximate)


**MAXIMUM RATINGS** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Value	Unit
Collector-base voltage	$V_{CBO}$	60	V
Collector-emitter voltage	$V_{CEO}$	30	
Emitter-base voltage	$V_{EBO}$	5	
Collector current -continuous	$I_C$	0.6	A
Collector power dissipation	$P_C$	625	mW
Thermal resistance from junction to ambient	$R_{\theta JA}$	200	$^{\circ}\text{C}/\text{W}$
Junction temperature	$T_J$	150	$^{\circ}\text{C}$
Storage temperature	$T_{stg}$	-55~+150	

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Min	Max	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	60		V	$I_C=0.01\text{mA}, I_E=0$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	30			$I_C=10\text{mA}, I_B=0$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	6			$I_E=0.01\text{mA}, I_C=0$
Collector cut-off current	$I_{CBO}$		10	nA	$V_{CB}=50\text{V}, I_E=0$
Collector cut-off current	$I_{CEX}$		10		$V_{CE}=60\text{V}, V_{EB(off)}=3\text{V}$
Emitter cut-off current	$I_{EBO}$		100		$V_{EB}=3\text{V}, I_C=0$
DC current gain	$h_{FE(1)}$	100	300		$V_{CE}=10\text{V}, I_C=150\text{mA}$ (note 1)
	$h_{FE(2)}$	40			$V_{CE}=10\text{V}, I_C=0.1\text{mA}$
	$h_{FE(3)}$	42			$V_{CE}=10\text{V}, I_C=500\text{mA}$
Collector-emitter saturation voltage	$V_{CE(sat)(1)}$		0.6	V	$I_C=500\text{mA}, I_B=50\text{mA}$ (note 1)
	$V_{CE(sat)(2)}$		0.3	V	$I_C=150\text{mA}, I_B=15\text{mA}$ (note 1)
Base-emitter saturation voltage	$V_{BE(sat)}$		1.2	V	$I_C=500\text{mA}, I_B=50\text{mA}$ (note 1)
Transition frequency	$f_T$	300		MHz	$V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$
Delay time	$t_d$		10	ns	$V_{CC}=30\text{V}, V_{BE(off)}=-0.5\text{V}$
Rise time	$t_r$		25	ns	$I_C=150\text{mA}, I_{B1}=15\text{mA}$
Storage time	$t_s$		225	ns	$V_{CC}=30\text{V}, I_C=150\text{mA}$
Fall time	$t_f$		60	ns	$I_{B1}=I_{B2}=15\text{mA}$

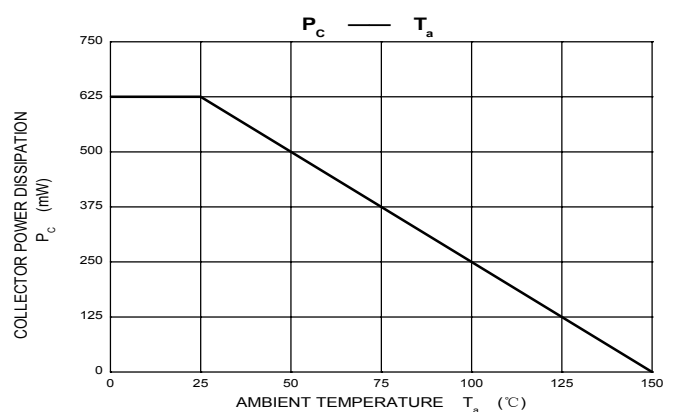
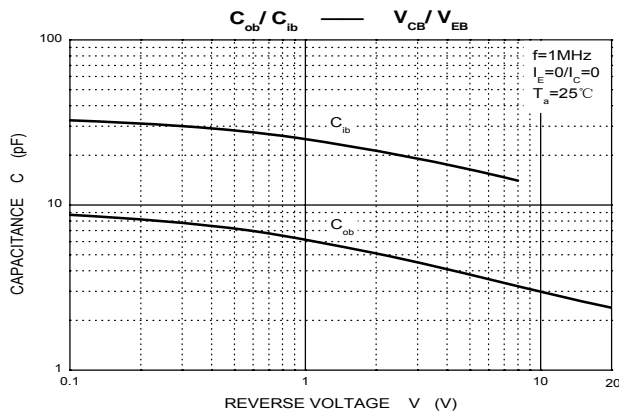
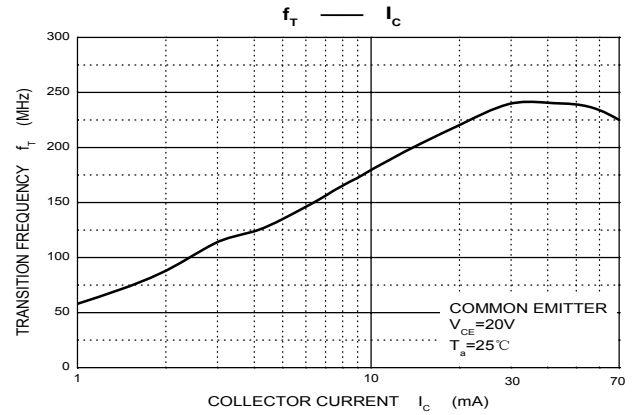
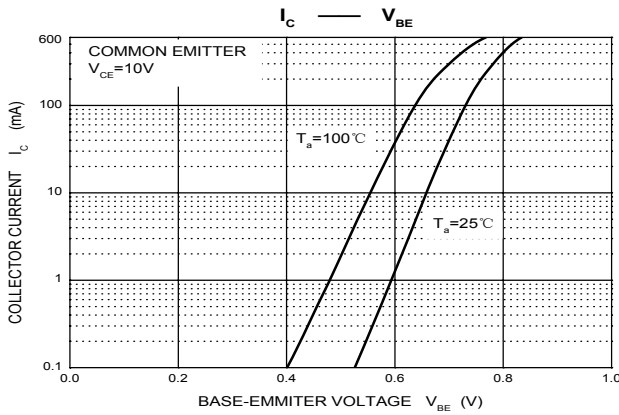
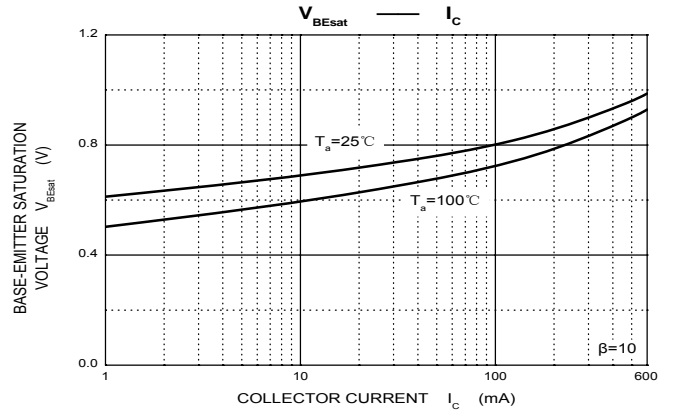
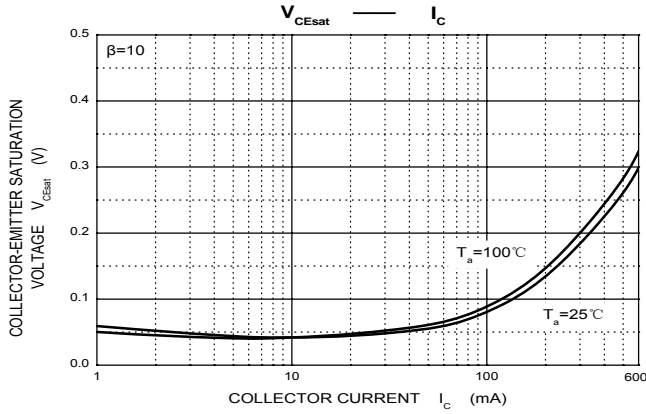
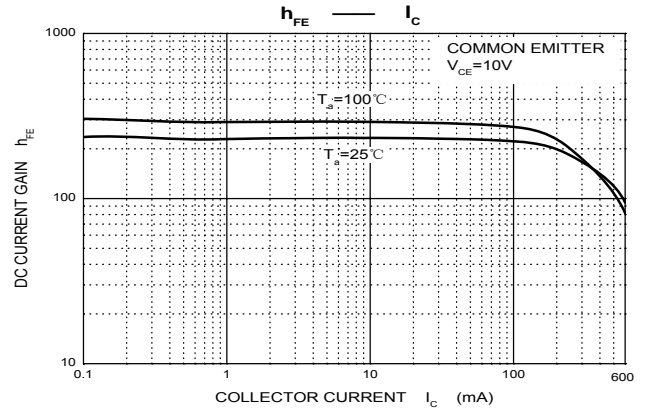
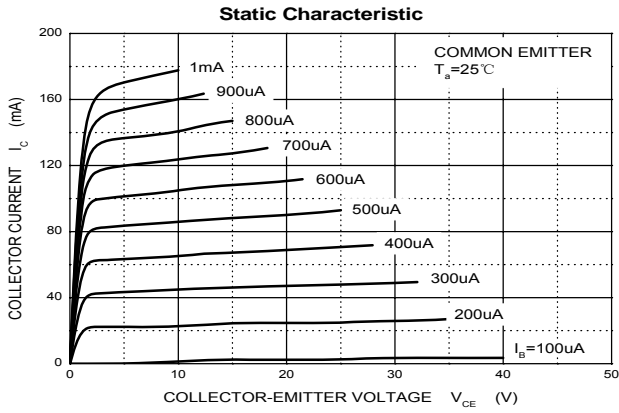
Note: 1. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycles  $\leq 2.0\%$ .

**CLASSIFICATION OF  $h_{FE(1)}$** 

Rank	L	H
Range	100-200	200-300

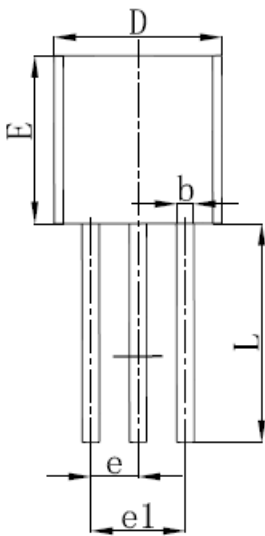
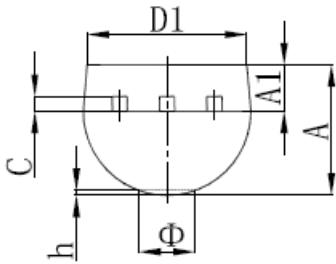
NPN TRANSISTOR

TYPICAL CHARACTERISTICS



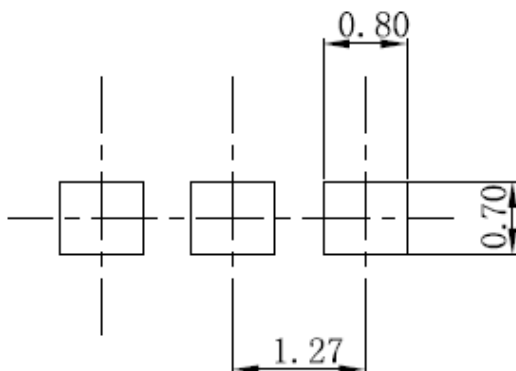
NPN TRANSISTOR

TO-92 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions in millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

TO-92 SUGGESTED PAD LAYOUT

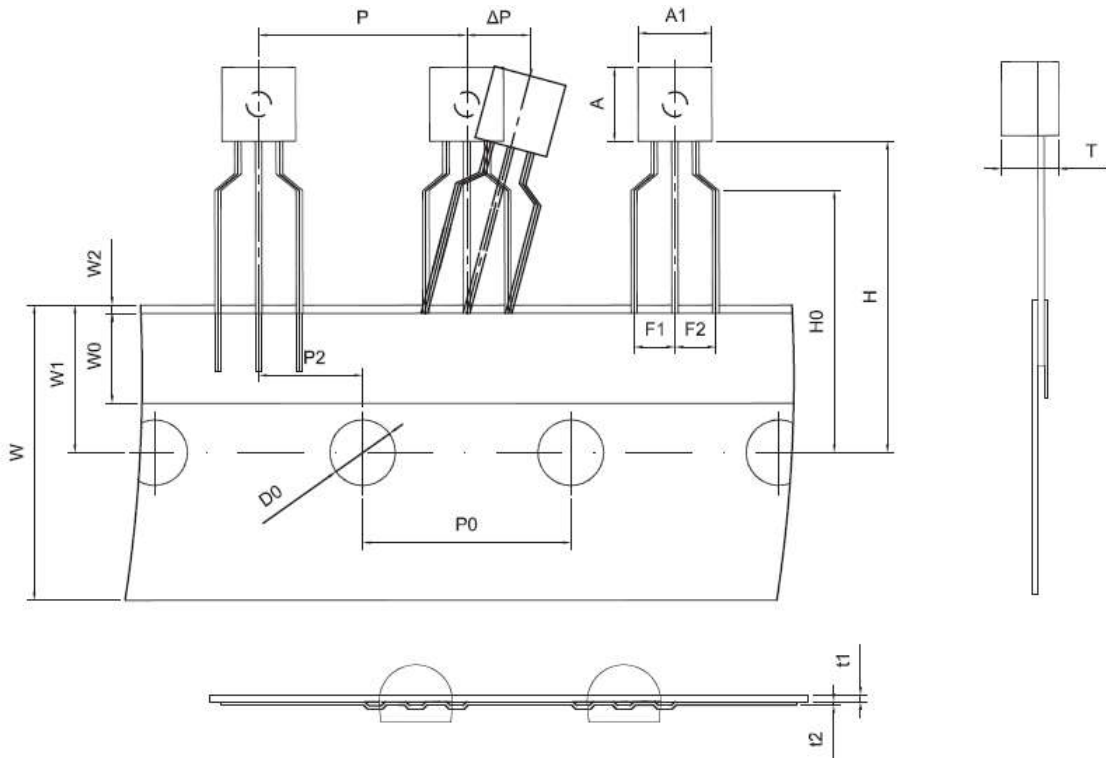


**Note:**

1. Controlling dimension: in millimeters
2. General tolerance: ±0.05mm
3. The pad layout is for reference purposes only

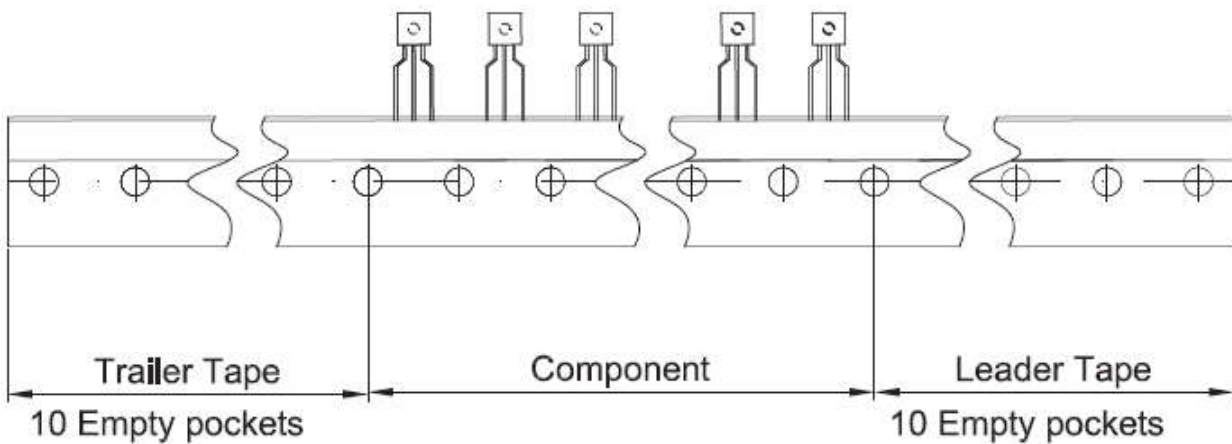
**NPN TRANSISTOR**

**TO-92 TAPE AND REEL**



Dimensions are in millimeter								
A1	A	T	P	P0	P2	F1	F2	W
4.5	4.5	3.5	12.7	12.7	6.35	2.5	2.5	18.0
W0	W1	W2	H	H0	D0	t1	t2	ΔP
6.0	9.0	1.0 MAX	19.0	16.0	4.0	0.4	0.2	0

**TO-92 PACKAGE TAPING DIMENSION**



Package	Box	Box size(mm)	Carton	Carton size(mm)
TO-92	2000pcs	333x162x43	20000pcs	350x340x250