

TO-92 Plastic-Encapsulate Transistors

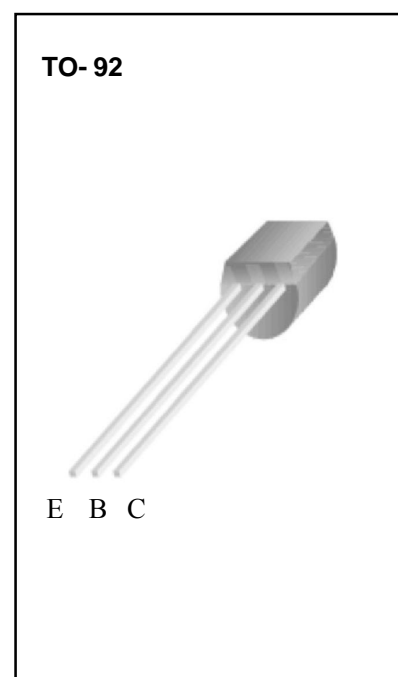
TRANSISTOR(NPN)

Features

- General Purpose Switching Application

Limiting Values (Absolute Maximum Rating)

Symbol	Parameter	Value	Unit
V_{CB0}	Collector-Base Voltage	180	V
V_{CE0}	Collector-Emitter Voltage	160	V
V_{EB0}	Emitter-Base Voltage	6	V
I_C	Collector Current	0.6	A
P_C	Collector Power Dissipation	625	mW
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	200	°C/W
T_j	Junction Temperature	150	°C
T_{stg}	Storage Temperature	-55~+150	°C



Electrical Characteristics (Ta=25°C Unless otherwise specified)

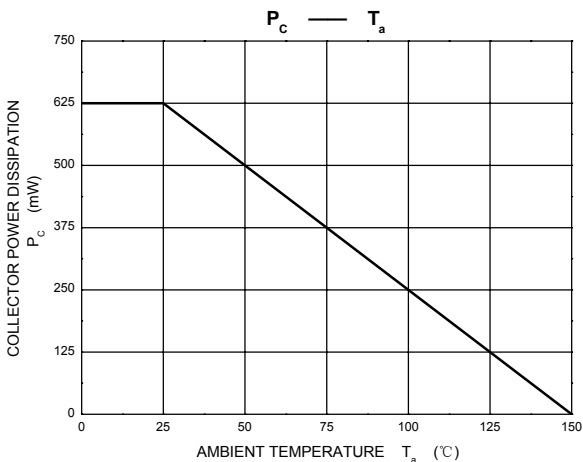
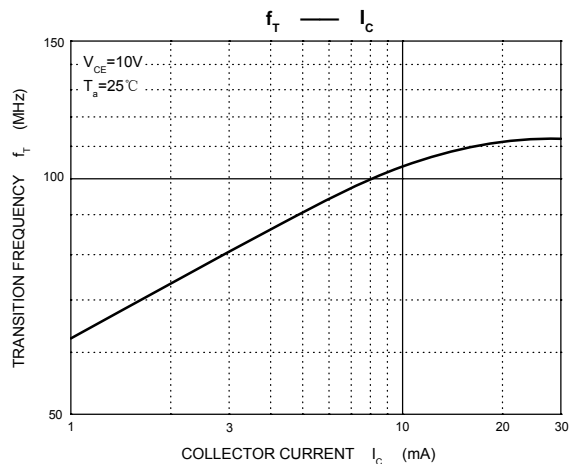
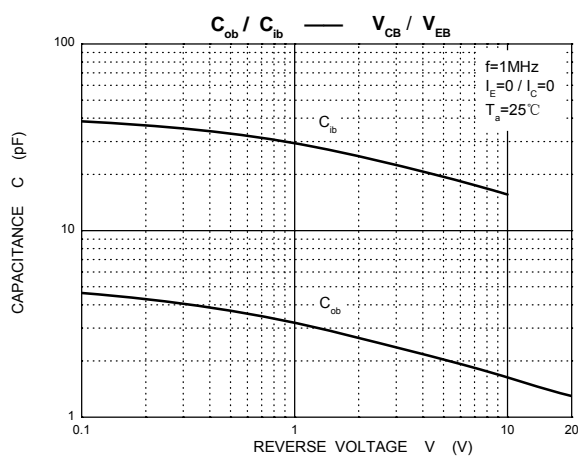
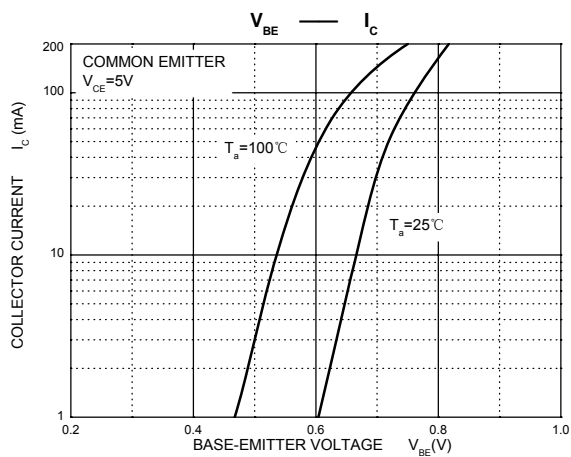
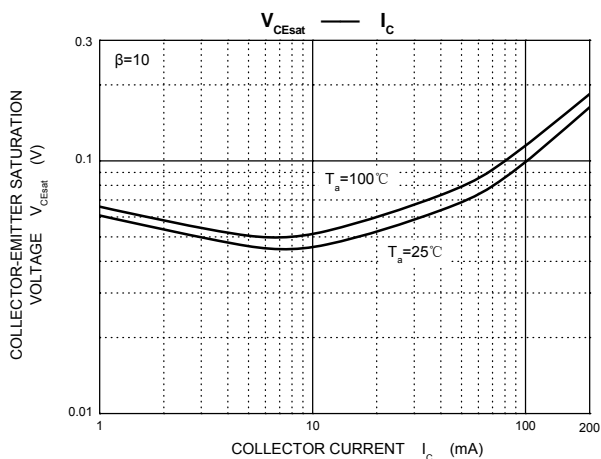
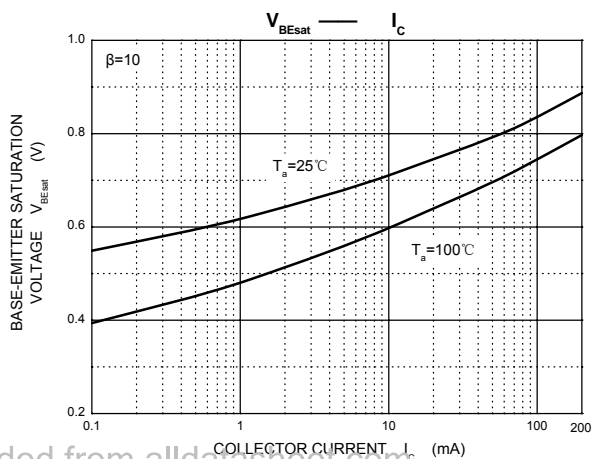
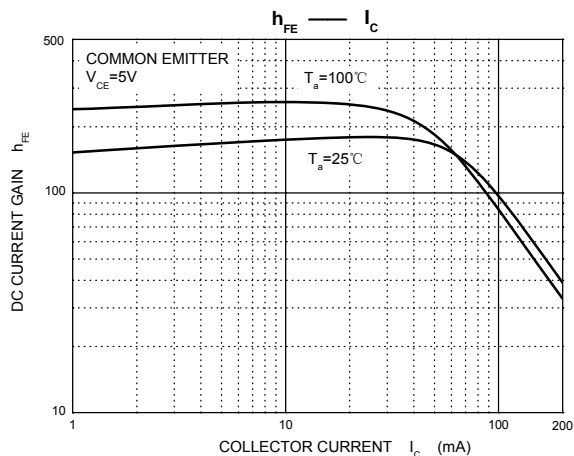
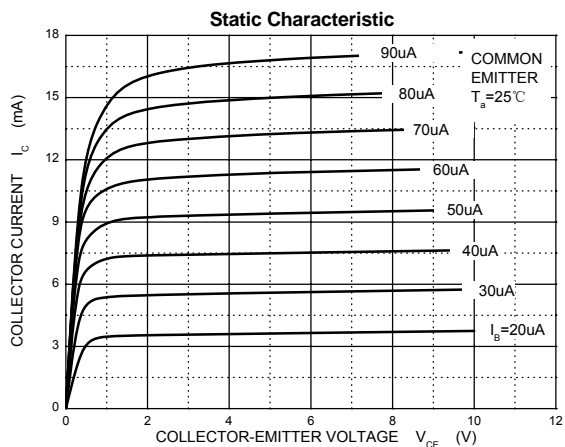
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu A, I_E=0$	180			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$ *	$I_C=1mA, I_B=0$	160			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0$	6			V
Collector cut-off current	I_{CBO}	$V_{CB}=120V, I_E=0$			50	nA
Emitter cut-off current	I_{EBO}	$V_{EB}=4V, I_C=0$			50	nA
DC current gain	$h_{FE(1)}$	$V_{CE}=5V, I_C=1mA$	80			
	$h_{FE(2)}$	$V_{CE}=5V, I_C=10mA$	80		300	
	$h_{FE(3)}$	$V_{CE}=5V, I_C=50mA$	50			
Collector-emitter saturation voltage	$V_{CE(sat) (1)}$	$I_C=10mA, I_B=1mA$			0.15	V
	$V_{CE(sat) (2)}$	$I_C=50mA, I_B=5mA$			0.2	V
Base-emitter saturation voltage	$V_{BE(sat) (1)}$	$I_C=10mA, I_B=1mA$			1	V
	$V_{BE(sat) (2)}$	$I_C=50mA, I_B=5mA$			1	V
Collector output capacitance	C_{ob}	$V_{CB}=10V, I_E=0, f=1MHz$			6	pF
Emitter input capacitance	C_{ib}	$V_{BE}=0.5V, I_C=0, f=1MHz$			20	pF
Transition frequency	f_T	$V_{CE}=10V, I_C=10mA, f=100MHz$	100		300	MHz

*Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2.0\%$.

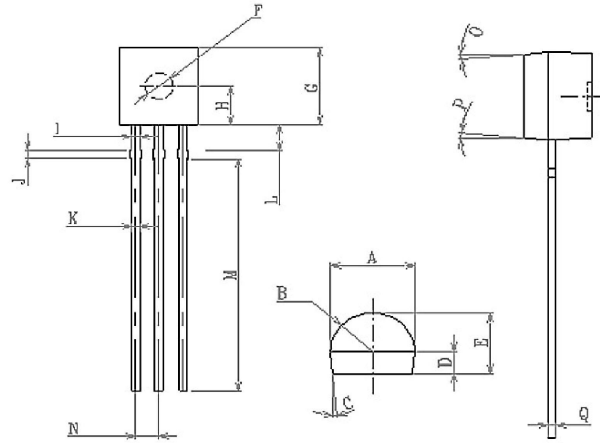
CLASSIFICATION OF h_{FE}

RANK	A	B	C
RANGE	80-100	100-150	150-200

Typical Characteristics



TO-92 Package Outline Dimensions

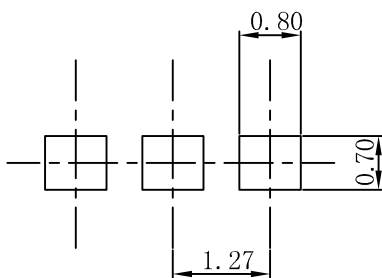


SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	4.1	4.3	K	0.36	0.56
B	R2.0	R2.2	L	1.35	1.45
C	4.1		M	12.00	12.5
D	1.1	1.2	N	1.24	1.3
E	3.13	3.33	O	5°	
F	Φ1.48	Φ1.52	P	5°	
G	4.4	4.6	Q	0.37	0.39
H	2.2	2.3			
I	0.36	0.56			
J	0.5	0.6			

单位: mm

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TO-92 Suggested Pad Layout



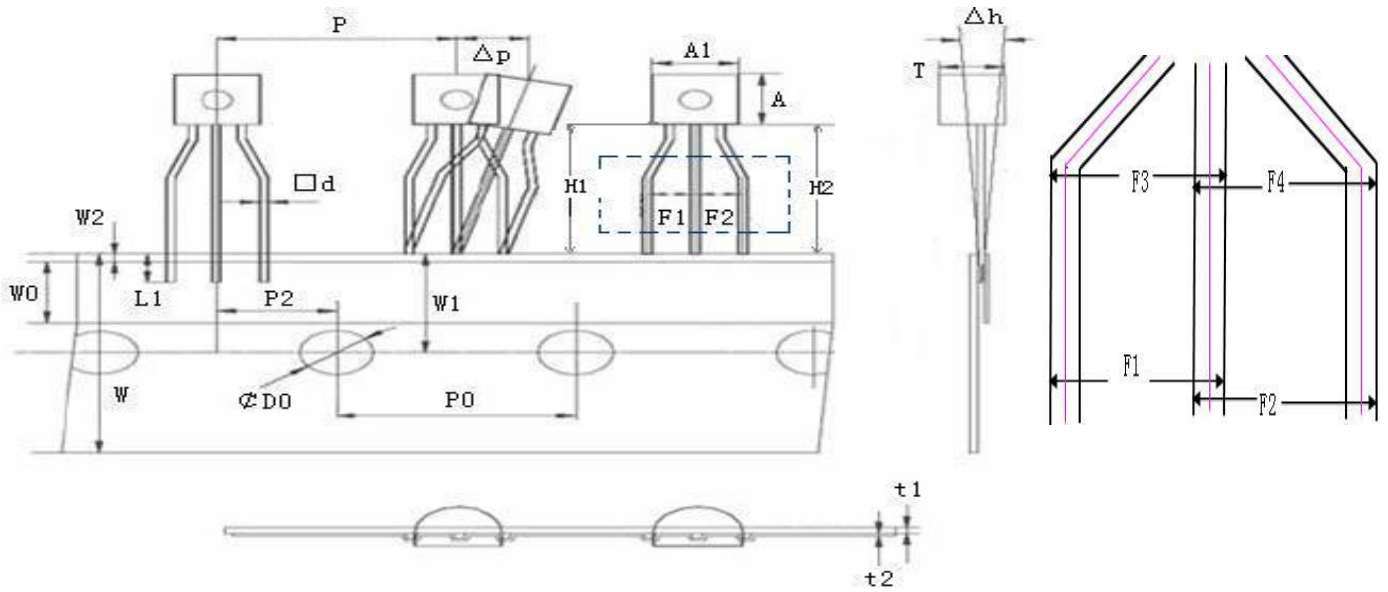
Note:

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

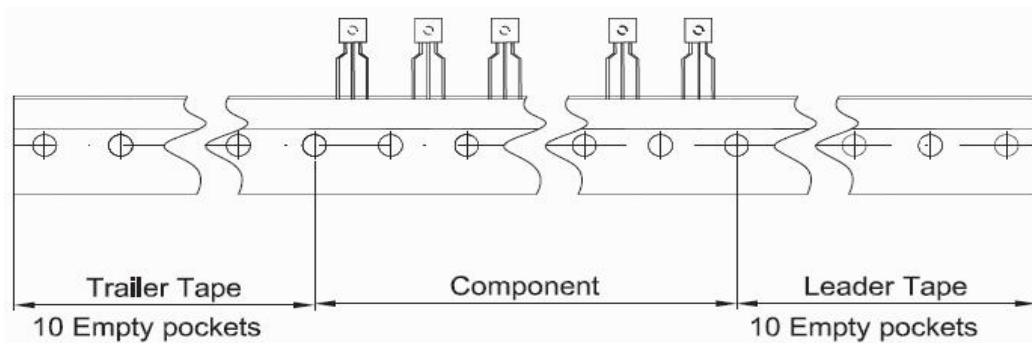
NOTICE

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TO-92 Tape and Reel



Symbol	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A1	4.1	4.2	4.3	0.171	0.176	0.180
A	4.4	4.5	4.6	0.184	0.188	0.192
F	3.13	3.23	3.33	0.131	0.134	0.139
□d	0.36	0.45	0.56	0.015	0.018	0.022
L1	2.5	—	—	0.098	—	—
P	12.4	—	13	0.488	—	0.512
P0	12.5	12.7	12.9	0.492	0.5	0.508
P2	6.05	6.35	6.65	0.238	0.25	0.262
F1,F2	2.75	3.00	3.25			
F3,F4	2.75	3.00	3.25			
F1-F2	—	—	0.4			



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92	2000PCS	343×158×42	20000PCS	470×358×180