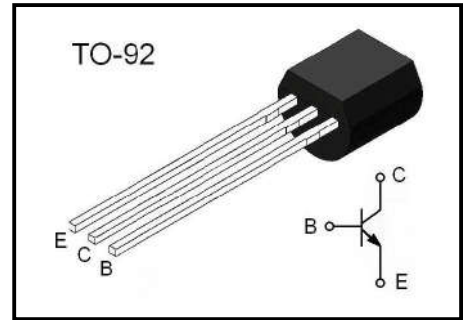


## NPN Plastic-Encapsulate Transistors



### Applications

- ◆ Low frequency amplifier
- ◆ Low noise amplifier

### FEATURES

- ◆ Low noise:  
 $NF = 4dB$  (typ.)  $R_G = 100\Omega$ ,  $V_{CE} = 6V$ ,  $I_C = 100\mu A$ ,  $f = 1kHz$   
 $NF = 0.5dB$  (typ.)  $R_G = 1k\Omega$ ,  $V_{CE} = 6V$ ,  $I_C = 100\mu A$ ,  $f = 1kHz$
- ◆ Low pulse noise: Low  $1/f$  noise
- ◆ High DC current gain:  $h_{FE} = 200\sim 700$
- ◆ High breakdown voltage:  $V_{CEO} = 120V$

### Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Value	Unit
Collector-base voltage	$BV_{CBO}$	120	V
Collector-emitter voltage	$BV_{CEO}$	120	V
Emitter-base voltage	$BV_{EBO}$	5	V
Collector current	$I_C$	100	mA
Base current	$I_B$	20	mA
Collector power dissipation	$P_C$	300	mW
Junction temperature	$T_j$	125	°C
Storage temperature	$T_{stg}$	-55~+125	°C

### Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$BV_{CBO}$	$I_C = 100\mu A$ , $I_E = 0$	120			V
Collector-emitter breakdown voltage	$BV_{CEO}$	$I_C = 1mA$ , $I_B = 0$	120			V
Emitter-base breakdown voltage	$BV_{EBO}$	$I_E = 100\mu A$ , $I_C = 0$	5			V
Collector cut-off current	$I_{CBO}$	$V_{CB} = 120V$ , $I_E = 0$			0.1	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 6V$ , $I_C = 0$			0.1	$\mu A$
DC current gain	$h_{FE}$	$V_{CE} = 6V$ , $I_C = 2mA$	200		700	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10mA$ , $I_B = 1mA$			0.3	V
Base-emitter voltage	$V_{BE(on)}$	$V_{CE} = 6V$ , $I_C = 2mA$			1.0	V
Transition frequency	$f_T$	$V_{CE} = 5V$ , $I_B = 10mA$		100		MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10V$ , $I_E = 0$ , $f = 1kHz$		3		pF

### $h_{FE}$ Classification

Classification	G	BL
Range	200~400	350~700

Typical Characteristics

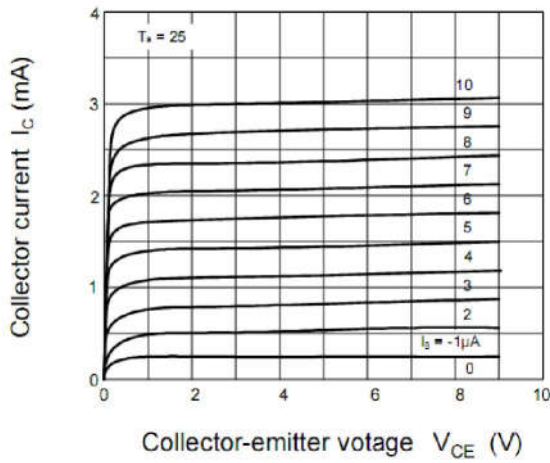


Figure 1. Static Characteristic

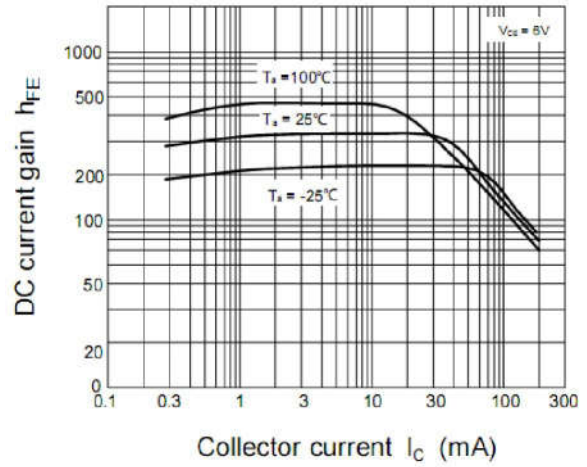


Figure 2. DC current Gain

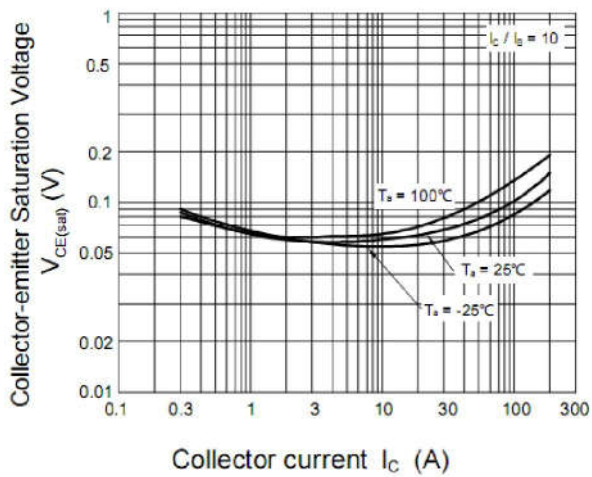


Figure 3. Collector-Emitter Saturation Voltage

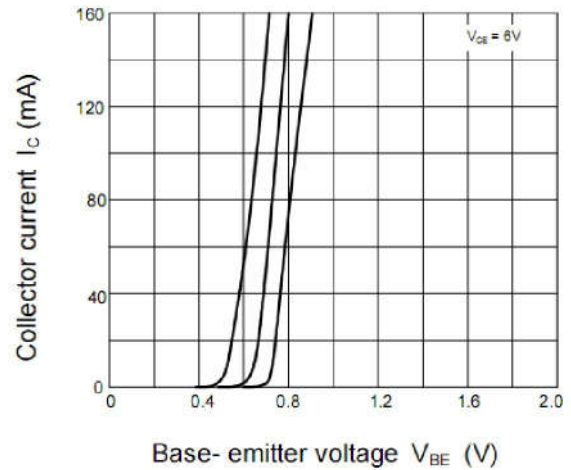


Figure 4. Base-Emitter Voltage

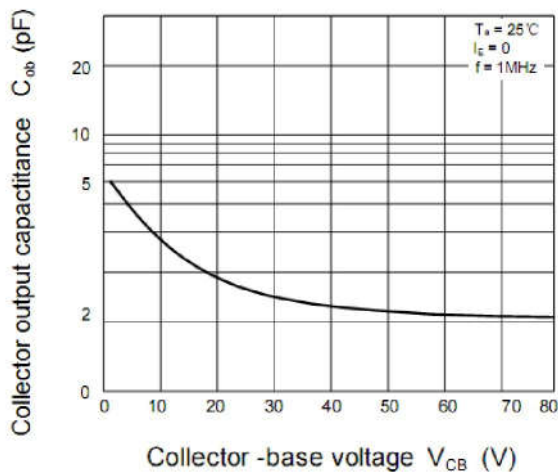


Figure 5. Output Capacitance

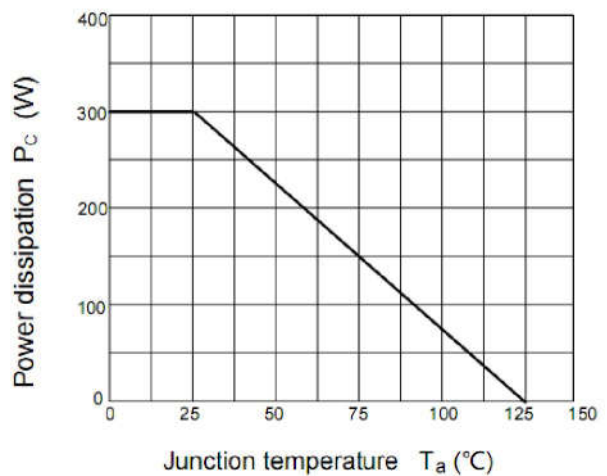


Figure 6. Power Derating

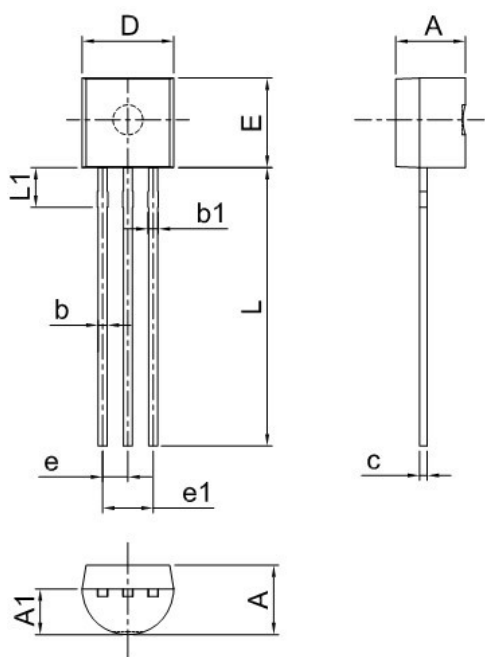
**Ordering information**

Package	Packing Description	Base Quantity
TO-92	Bulk	1000pcs/Bag
	Tape	2000pcs/Box

**Package Dimensions**

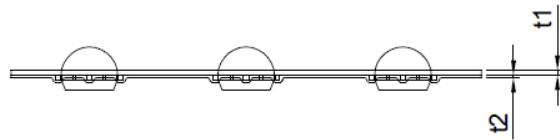
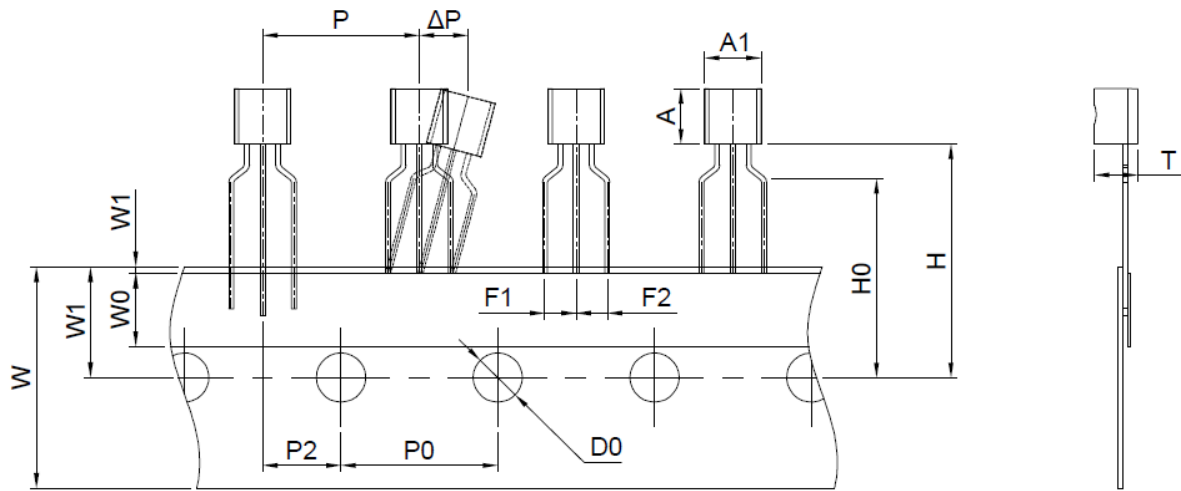
**TO-92**

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	3.30	3.70	0.130	0.146
A1	2.30	2.70	0.091	0.106
b	0.40	0.50	0.016	0.020
b1	0.50	0.70	0.020	0.028
c	0.35	0.45	0.014	0.018
D	4.45	4.70	0.175	0.185
E	4.40	4.65	0.173	0.183
e	1.17	1.37	0.046	0.054
e1	2.34	2.64	0.092	0.104
L	13.50	14.50	0.531	0.571
L1	1.80	2.20	0.071	0.087

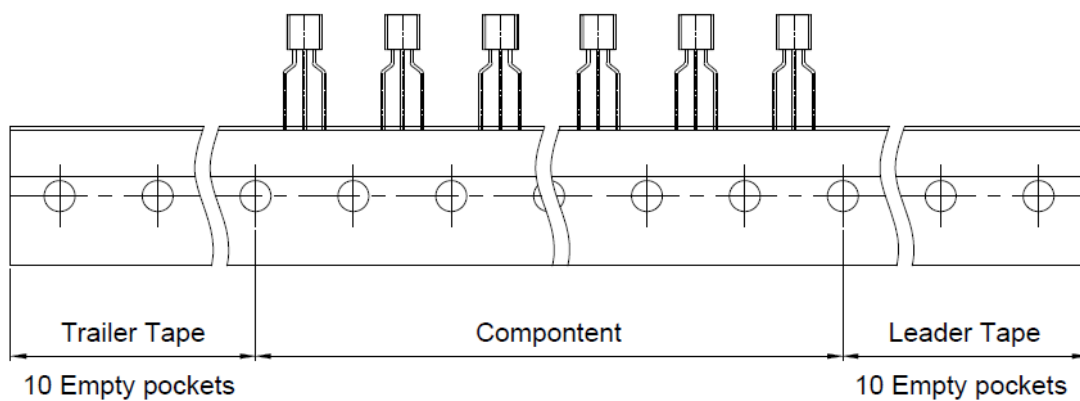


Taping Dimensions

TO-92



Dimensions are in millimeter								
A	A1	T	P	P0	P2	F1	F2	W
4.6	4.6	3.5	12.7	12.7	6.35	2.54	2.54	18.0
W0	W1	W2	H	H0	D0	t1	T2	ΔP
6.0	9.0	1.0Max	19.0	18.0	4.0	0.4	0.2	0



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