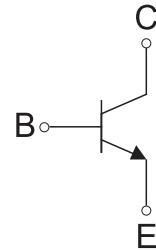


TO-92 Plastic-Encapsulate Transistors

FEATURES

- General Purpose Switching Application
- NPN Transistors

Equivalent Circuit

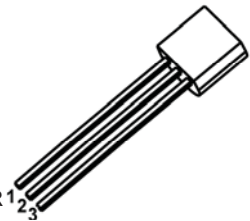


TO – 92

1. EMITTER

2. BASE

3. COLLECTOR



MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	180	V
V_{CEO}	Collector-Emitter Voltage	160	V
V_{EBO}	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	$^{\circ}\text{C} / \text{W}$
T_j	Junction Temperature	150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-55~+150	$^{\circ}\text{C}$

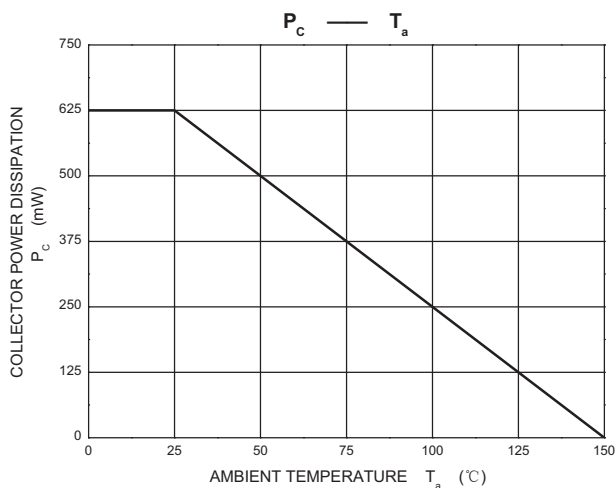
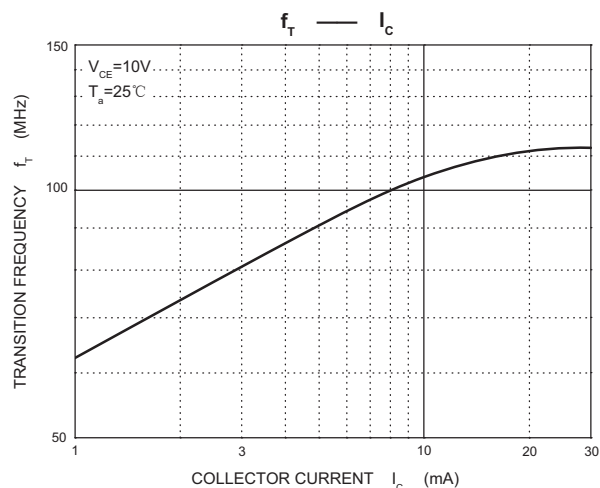
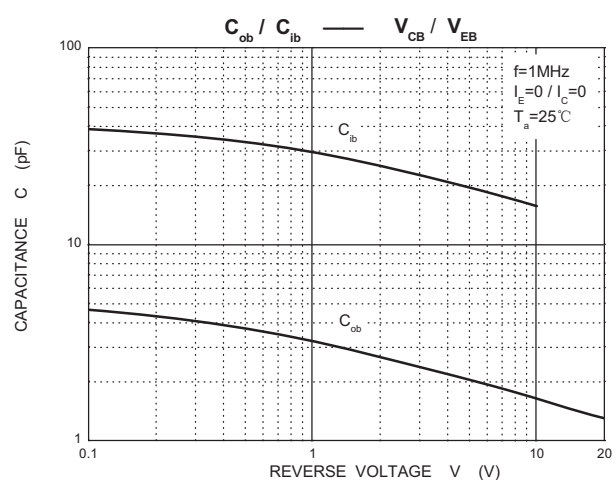
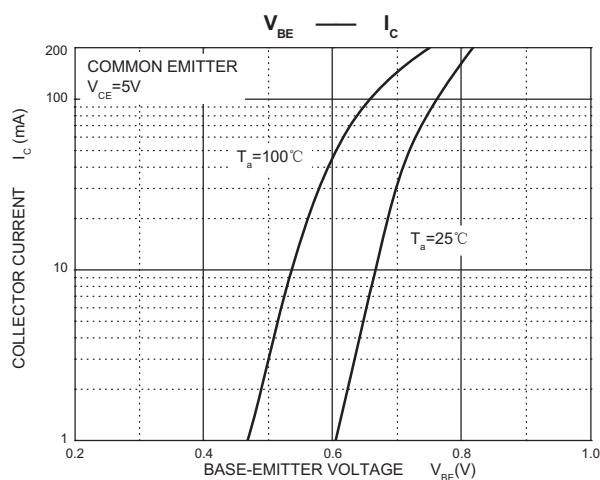
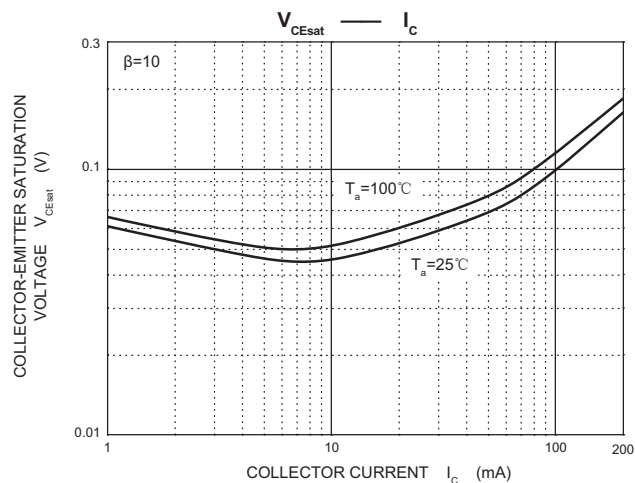
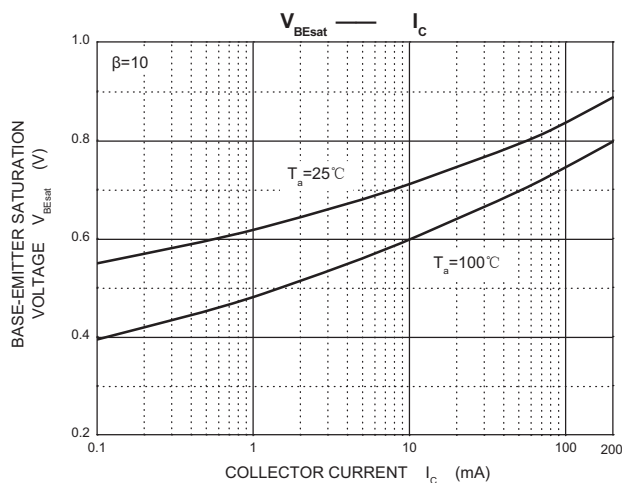
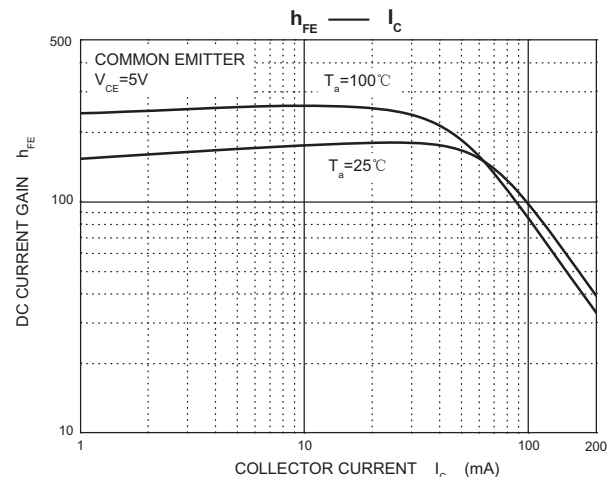
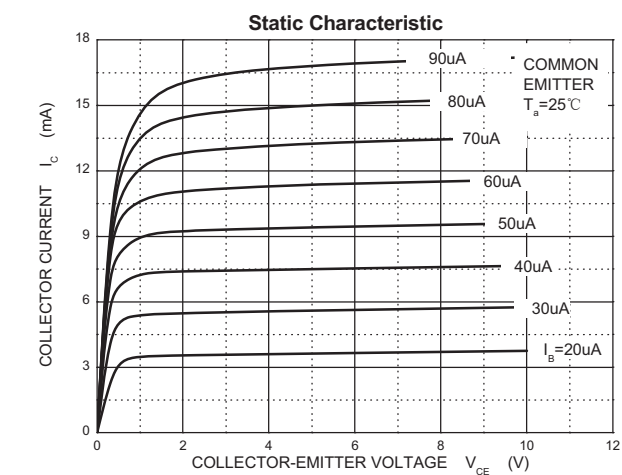
ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

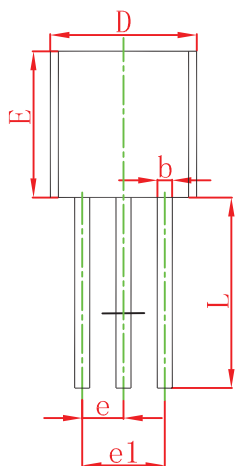
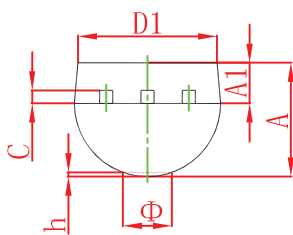
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$	180			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}^*$	$I_C = 1\text{mA}, I_B = 0$	160			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}, I_C = 0$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

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

Typical Characteristics

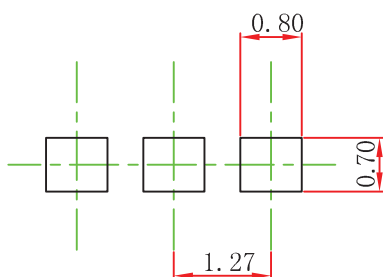


TO-92 Package Outline Dimensions



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: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.