

TO-92 Plastic-Encapsulate Transistors

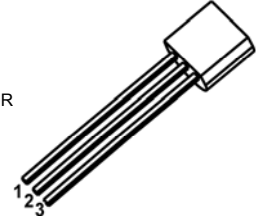
2SD1616A TRANSISTOR (NPN)

FEATURE

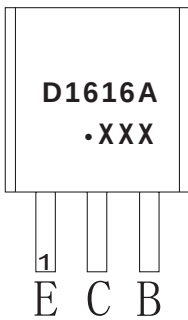
Power dissipation

TO-92

1. EMITTER
2. COLLECTOR
3. BASE



MARKING

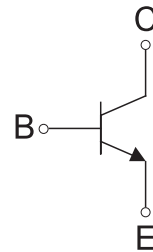


D1616A=Device code

Solid dot=Green molding compound device,
if none, the normal device

XXX=Code

Equivalent Circuit



ORDERING INFORMATION

Part Number	Package	Packing Method	Pack Quantity
2SD1616A	TO-92	Bulk	1000pcs/Bag
2SD1616A-TA	TO-92	Tape	2000pcs/Box

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

Symbol Para	meter	Value	Unit
V_{CBO}	Collector-Base Voltage	120	V
V_{CEO}	Collector-Emitter Voltage	60	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current	1	A
P_C	Collector Power Dissipation	0.75	W
$R_{\theta JA}$	Thermal Resistance From Junction To Ambient	167	$^{\circ}\text{C}/\text{W}$
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

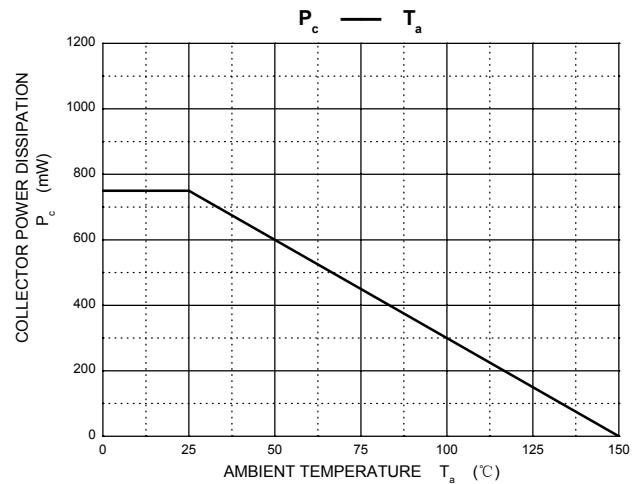
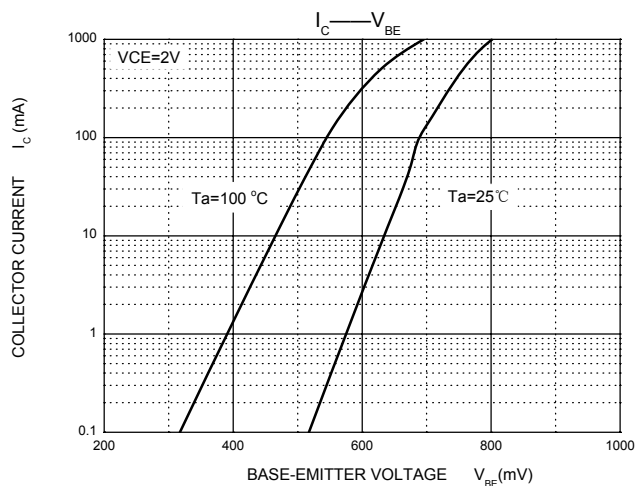
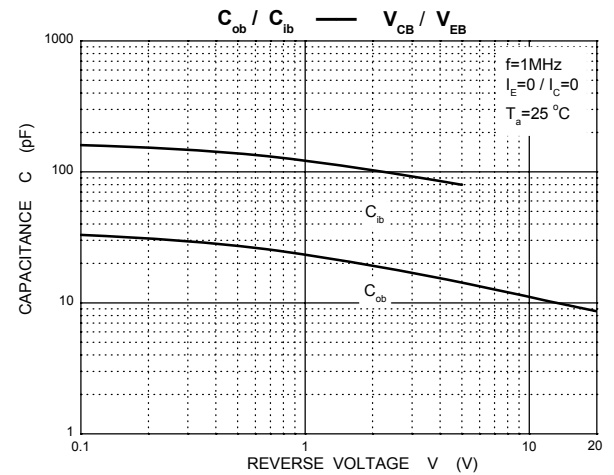
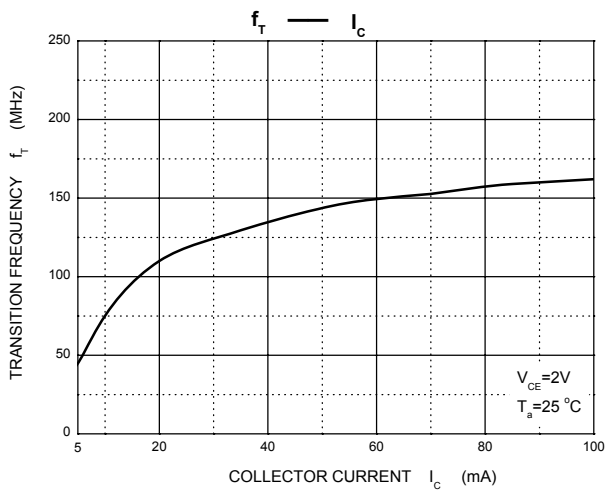
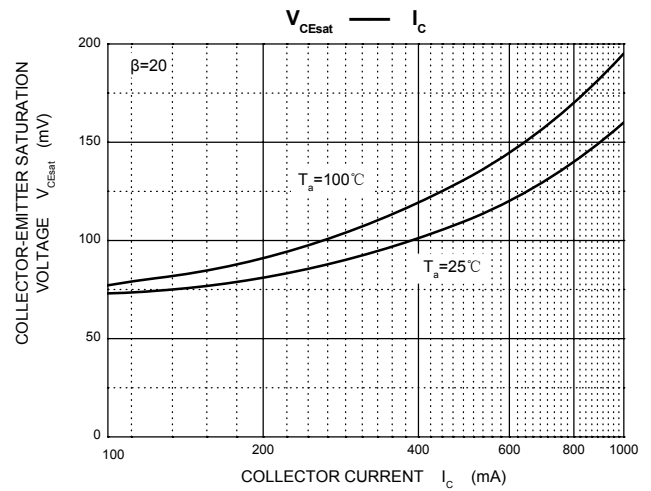
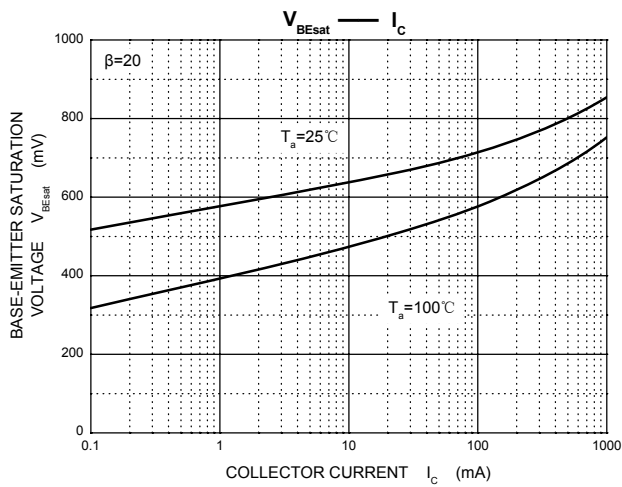
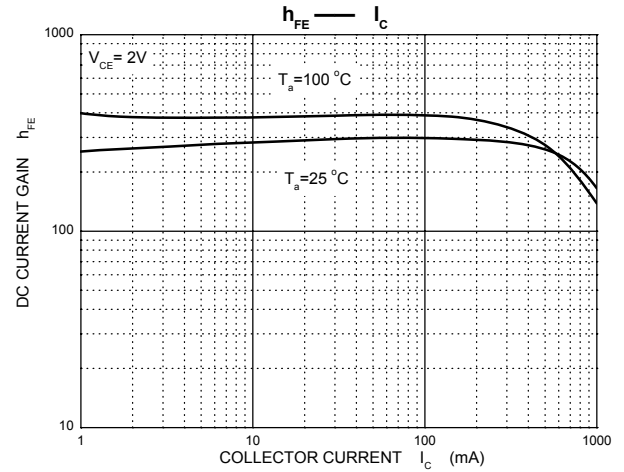
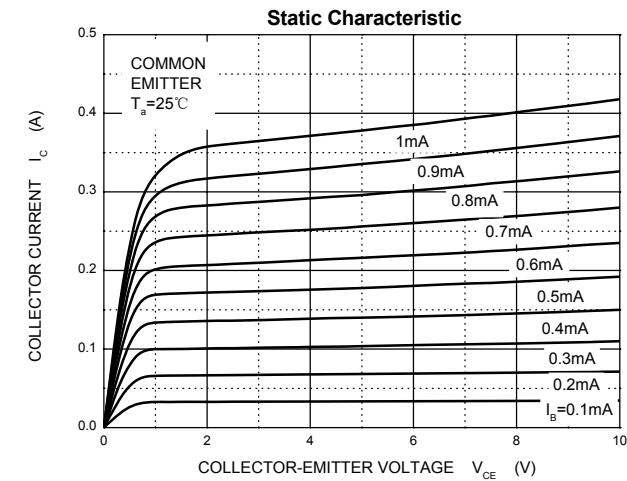
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$, $I_E = 0$	120			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 2\text{mA}$, $I_B = 0$	60			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	6			V
Collector cut-off current	I_{CBO}	$V_{CB} = 60\text{V}$, $I_E = 0$			0.1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 6\text{V}$, $I_C = 0$			0.1	μA
DC current gain	h_{FE1}	$V_{CE} = 2\text{V}$, $I_C = 100\text{mA}$	135		600	
	h_{FE2}	$V_{CE} = 2\text{V}$, $I_C = 1\text{A}$	81			
Collector-emitter saturation voltage *	$V_{CE(sat)}$	$I_C = 1\text{A}$, $I_B = 50\text{mA}$			0.3	V
Base-emitter saturation voltage *	$V_{BE(sat)}$	$I_C = 1\text{A}$, $I_B = 50\text{mA}$			1.2	V
Base-emitter voltage *	V_{BE}	$V_{CE} = 2\text{V}$, $I_C = 50\text{mA}$	0.6		0.7	V
Transition frequency	f_T	$V_{CE} = 2\text{V}$, $I_C = 100\text{mA}$	100			MHz
Output capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$			19	pF
Turn on time	t_{on}	$V_{CC} = 10\text{V}$, $I_C = 100\text{mA}$, $I_{B1} = -I_{B2} = 10\text{mA}$		0.07		μs
Storage time	t_s			0.95		μs
Fall time	t_F			0.07		μs

*pulse test: $PW \leq 350\mu\text{s}$, $\delta \leq 2\%$.

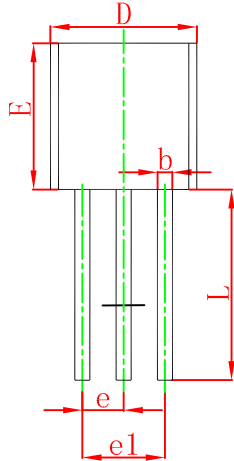
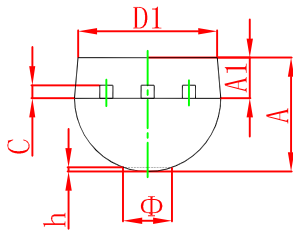
CLASSIFICATION OF h_{FE1}

Rank L		K	U
Range	135-270	200-400	300-600

Typical Characteristics

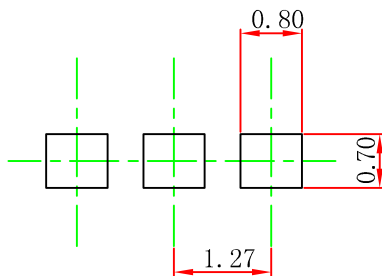


TO-92 Package Outline Dimensions



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

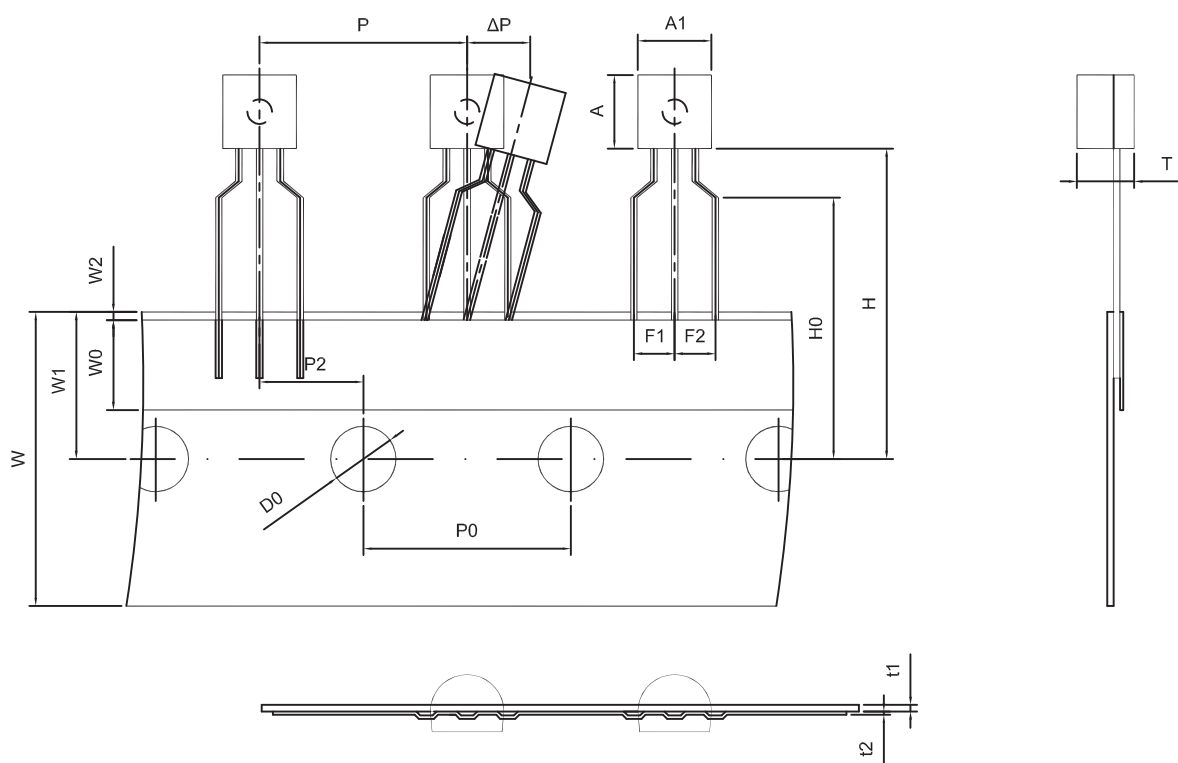


- Note:
- 1.Controlling dimension:in millimeters.
 - 2.General tolerance:± 0.05mm.
 - 3.The pad layout is for reference purposes only.

NOTICE

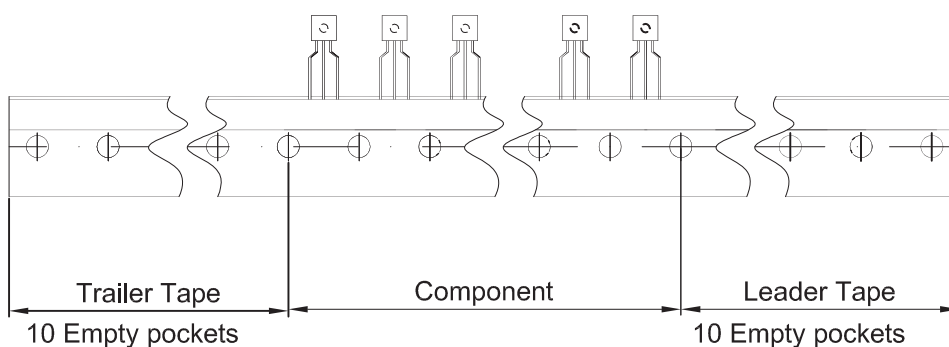
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TO-92 PACKAGE TAPEING DIMENSION



Dimiensions 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



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92	2000 pcs	333×162×43	20,000 pcs	350×340×250