



# TO-92MOD Plastic-Encapsulate Transistors

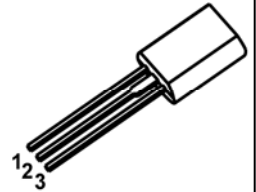
## 2SB647/2SB647A TRANSISTOR (PNP)

### FEATURES

- Low Frequency Power Amplifier
- Complementary Pair with 2SD667/A

TO – 92MOD

1. EMITTER
2. COLLECTOR
3. BASE



### MAXIMUM RATINGS (T<sub>a</sub>=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>CB0</sub>	Collector-Base Voltage	-120	V
V <sub>CEO</sub>	Collector-Emitter Voltage	2SB647	-80
		2SB647A	-100
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current	-1	A
P <sub>C</sub>	Collector Power Dissipation	900	mW
R <sub>θJA</sub>	Thermal Resistance From Junction To Ambient	139	°C/W
T <sub>j</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature	-55~+150	°C

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)

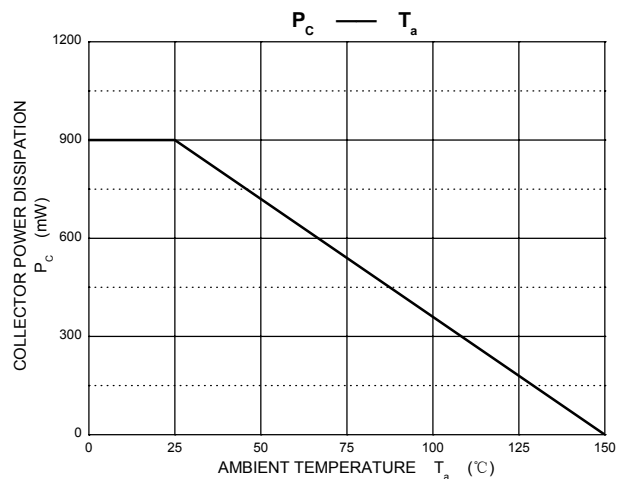
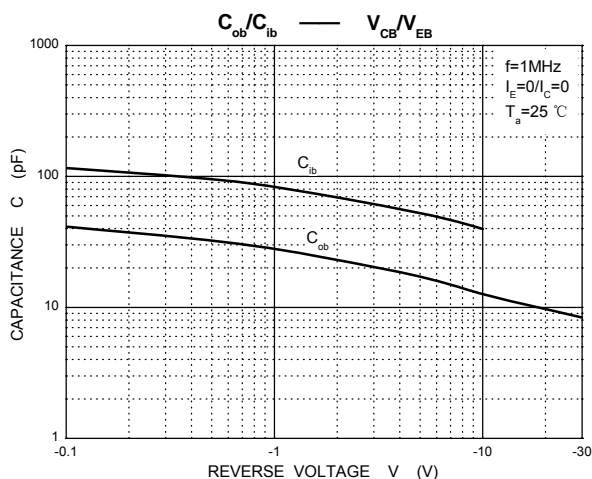
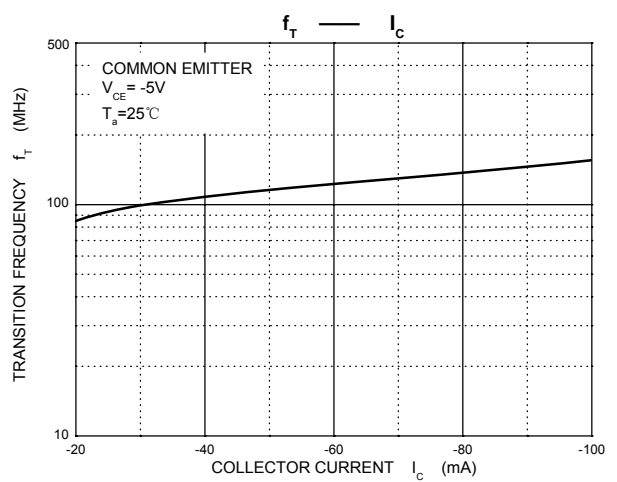
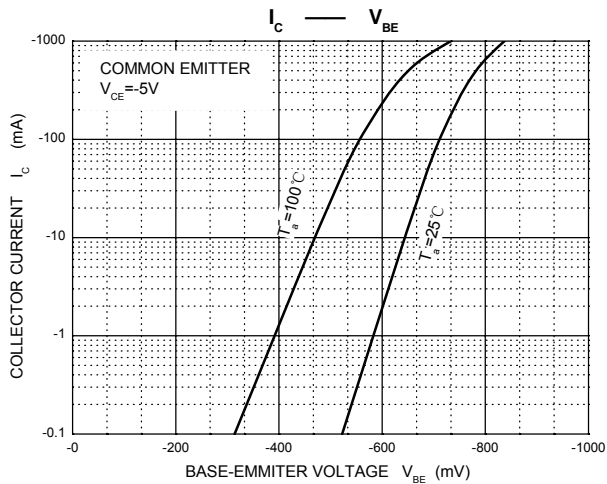
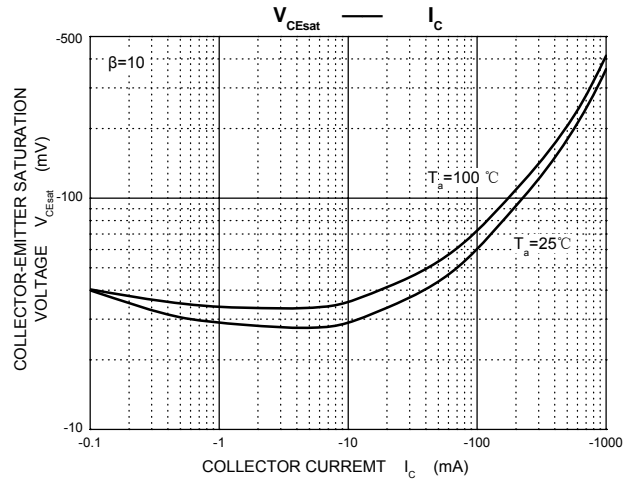
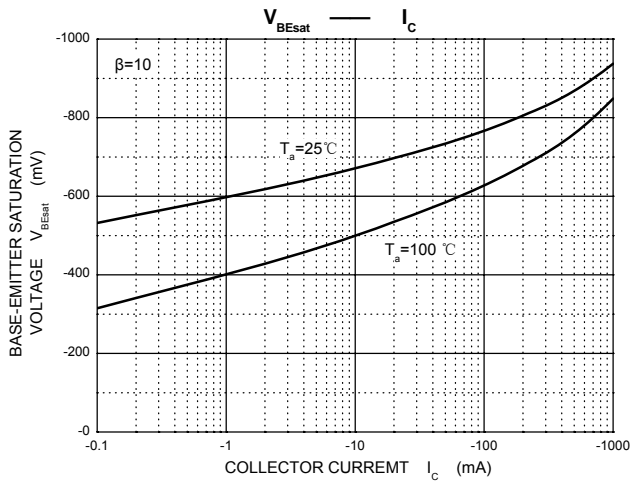
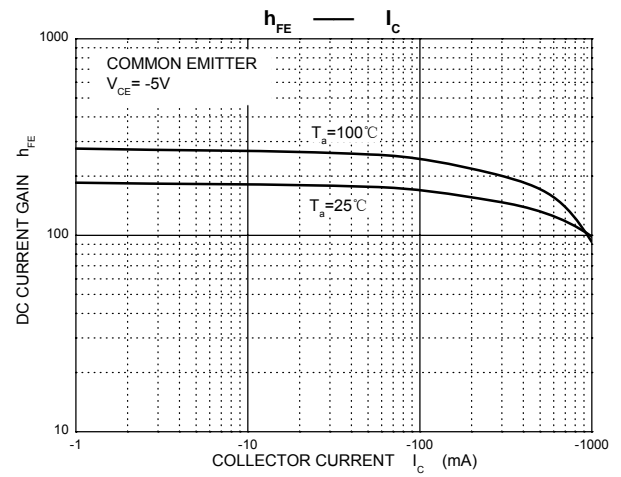
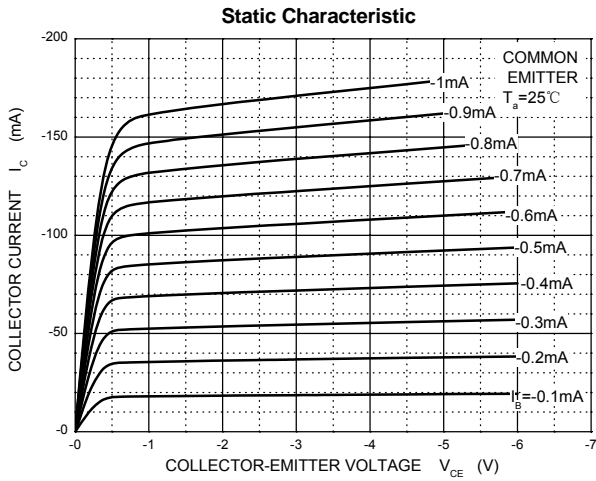
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = -10μA, I <sub>E</sub> =0	-120			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	2SB647	-80		V
			2SB647A	-100		
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			V
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =-100V, I <sub>E</sub> =0			-10	μA
DC current gain	h <sub>FE(1)</sub> *	V <sub>CE</sub> =-5V, I <sub>C</sub> =-150mA	2SB647	60	320	
			2SB647A	60	200	
	h <sub>FE(2)</sub> *	V <sub>CE</sub> =-5V, I <sub>C</sub> =-500mA	30			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub> *	I <sub>C</sub> =-500mA, I <sub>B</sub> =-50mA			-1	V
Base-emitter voltage	V <sub>BE</sub> *	V <sub>CE</sub> =-5V, I <sub>C</sub> =-150mA			-1.5	V
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =-10V, I <sub>E</sub> =0, f=1MHz		20		pF
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-5V, I <sub>C</sub> =-150mA		140		MHz

\*Pulse test: pulse width ≤300μs, duty cycles ≤ 2.0%.

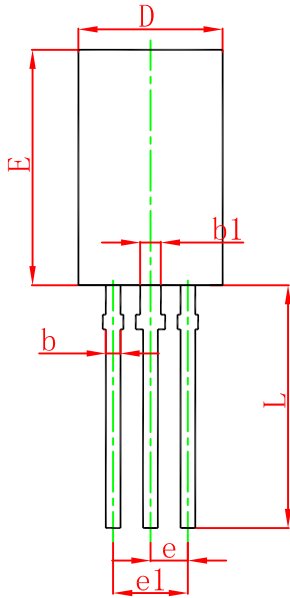
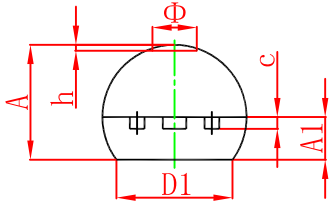
### CLASSIFICATION OF h<sub>FE(1)</sub>

TYPE	2SB647		
	2SB647A		
RANK	B	C	D
RANGE	60-120	100-200	160-320

# Typical Characteristics

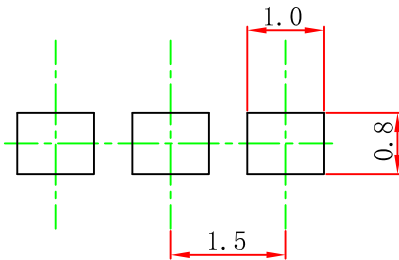


## TO-92MOD Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.000	0.189	0.197
A1	1.730	2.030	0.068	0.080
b	0.440	0.600	0.017	0.024
b1	0.940	1.100	0.037	0.043
c	0.350	0.450	0.014	0.018
D	5.900	6.100	0.232	0.240
D1	4.000		0.157	
E	8.500	8.700	0.335	0.343
e	1.500 TYP.		0.059 TYP.	
e1	2.900	3.100	0.114	0.122
L	13.800	14.200	0.543	0.559
$\Phi$		1.600		0.063
h	0.000	0.380	0.000	0.015

## TO-92MOD Suggested Pad Layout



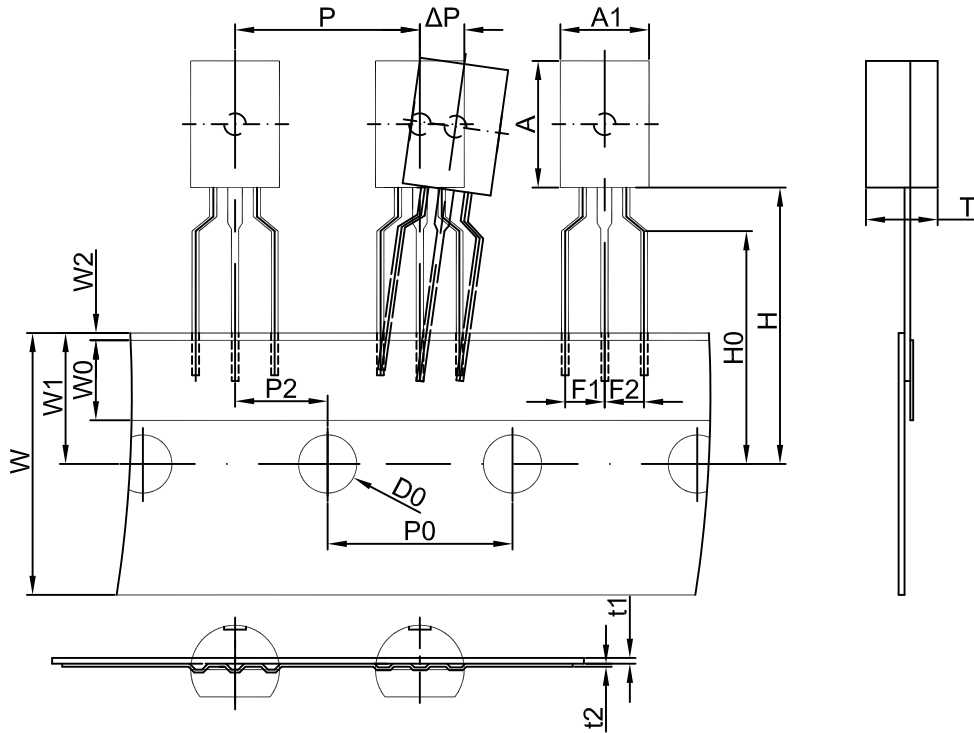
Note:

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

### NOTICE

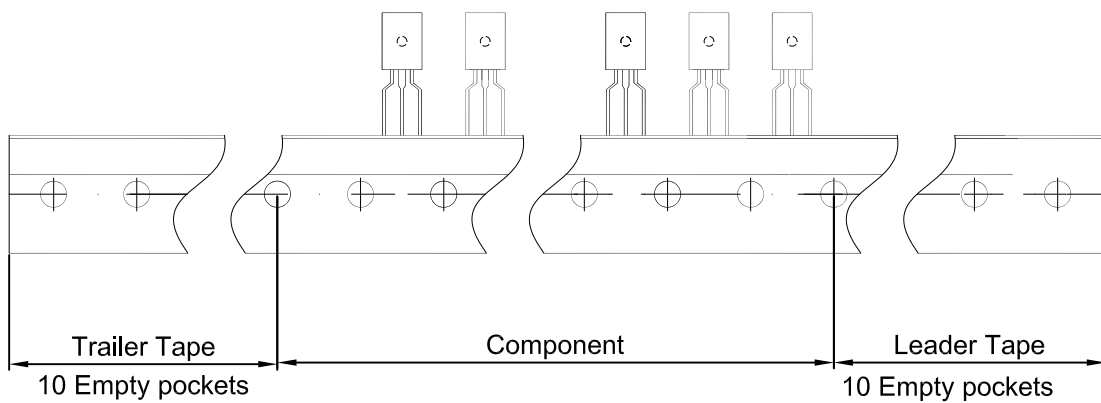
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# TO-92MOD PACKAGE TAPEING DIMENSION



Dimensions are in millimeter

A1	A	T	P	P0	P2	F1	F2	W
6.0	8.6	4.9	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	19.0	16.0	4.0	0.4	0.2	0



Package	Box	Box Size(mm)	Carton	Carton Size(mm)
TO-92MOD	2000 pcs	333×245×43	20,000 pcs	573×404×266