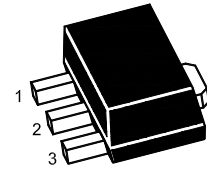


# 2N3906U

## PNP Silicon Epitaxial Planar Transistor



1.Base 2.Collector 3.Emitter  
SOT-89 Plastic Package

### Applications

- For switching and amplifier

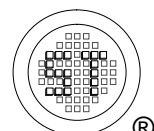
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	40	V
Collector Emitter Voltage	$-V_{CEO}$	40	V
Emitter Base Voltage	$-V_{EBO}$	6	V
Collector Current	$-I_C$	200	mA
Power Dissipation	$P_{tot}$	500	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction Ambient <sup>1)</sup>	$R_{\theta JA}$	250	$^\circ\text{C/W}$

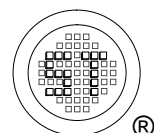
<sup>1)</sup> Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.



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## Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $-V_{CE} = 1\text{ V}$ , $-I_C = 0.1\text{ mA}$	$h_{FE}$	60	-	-
at $-V_{CE} = 1\text{ V}$ , $-I_C = 1\text{ mA}$	$h_{FE}$	80	-	-
at $-V_{CE} = 1\text{ V}$ , $-I_C = 10\text{ mA}$	$h_{FE}$	100	300	-
at $-V_{CE} = 1\text{ V}$ , $-I_C = 50\text{ mA}$	$h_{FE}$	60	-	-
at $-V_{CE} = 1\text{ V}$ , $-I_C = 100\text{ mA}$	$h_{FE}$	30	-	-
Collector Base Cutoff Current at $-V_{CB} = 30\text{ V}$	$-I_{CBO}$	-	50	nA
Emitter Base Cutoff Current at $-V_{EB} = 6\text{ V}$	$-I_{EBO}$	-	50	nA
Collector Base Breakdown Voltage at $-I_C = 10\text{ }\mu\text{A}$	$-V_{(BR)CBO}$	40	-	V
Collector Emitter Breakdown Voltage at $-I_C = 1\text{ mA}$	$-V_{(BR)CEO}$	40	-	V
Emitter Base Breakdown Voltage at $-I_E = 10\text{ }\mu\text{A}$	$-V_{(BR)EBO}$	6	-	V
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$ , $-I_B = 1\text{ mA}$	$-V_{CE(sat)}$	-	0.25	V
at $-I_C = 50\text{ mA}$ , $-I_B = 5\text{ mA}$	$-V_{CE(sat)}$	-	0.4	V
Base Emitter Saturation Voltage at $-I_C = 10\text{ mA}$ , $-I_B = 1\text{ mA}$	$-V_{BE(sat)}$	-	0.85	V
at $-I_C = 50\text{ mA}$ , $-I_B = 5\text{ mA}$	$-V_{BE(sat)}$	-	0.95	V
Gain Bandwidth Product at $-V_{CE} = 20\text{ V}$ , $-I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	250	-	MHz
Collector Base Capacitance at $-V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$	$C_{ob}$	-	4.5	pF
Delay Time at $-V_{CC} = 3\text{ V}$ , $-V_{BE} = 0.5\text{ V}$ , $-I_C = 10\text{ mA}$ , $-I_{B1} = 1\text{ mA}$	$t_d$	-	35	ns
Rise Time at $-V_{CC} = 3\text{ V}$ , $-V_{BE} = 0.5\text{ V}$ , $-I_C = 10\text{ mA}$ , $-I_{B1} = 1\text{ mA}$	$t_r$	-	35	ns
Storage Time at $-V_{CC} = 3\text{ V}$ , $-I_C = 10\text{ mA}$ , $-I_{B1} = I_{B2} = 1\text{ mA}$	$t_s$	-	225	ns
Fall Time at $-V_{CC} = 3\text{ V}$ , $-I_C = 10\text{ mA}$ , $-I_{B1} = I_{B2} = 1\text{ mA}$	$t_f$	-	75	ns



## Electrical Characteristics Curves

Fig. 1 Output Characteristics Curve

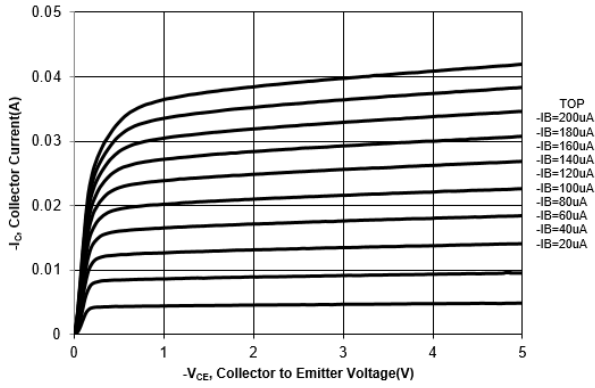


Fig. 2 Collector Current vs.  $V_{BE}$

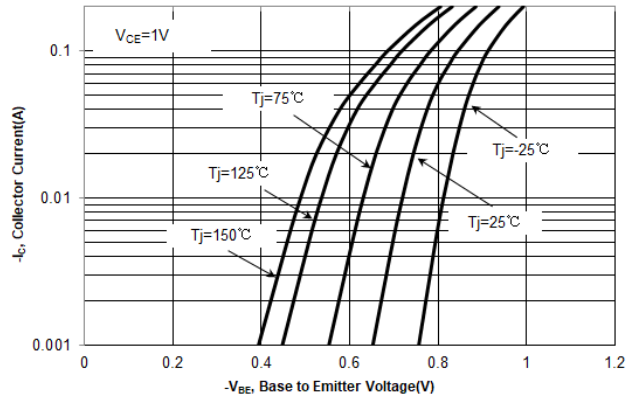


Fig. 3  $h_{FE}$  vs. Collector Current

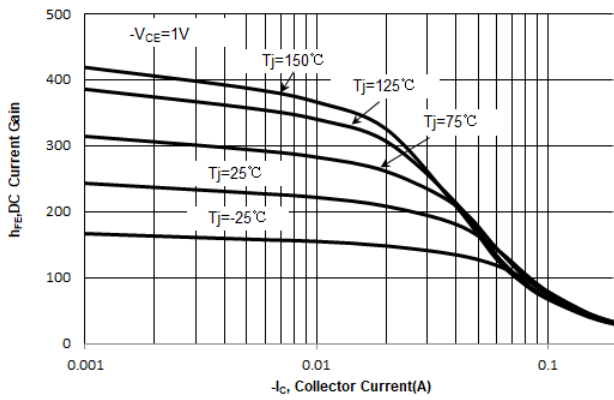
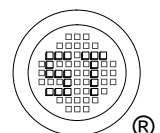
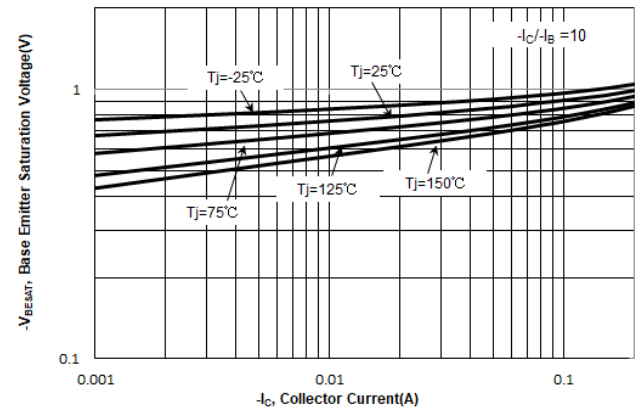


Fig. 4  $V_{BE(sat)}$  vs. Collector Current



## Electrical Characteristics Curves

Fig. 5  $V_{CE(sat)}$  vs. Collector Current

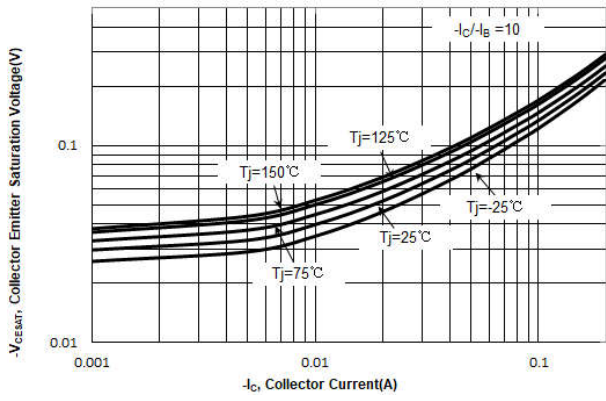


Fig. 6 Output Capacitance

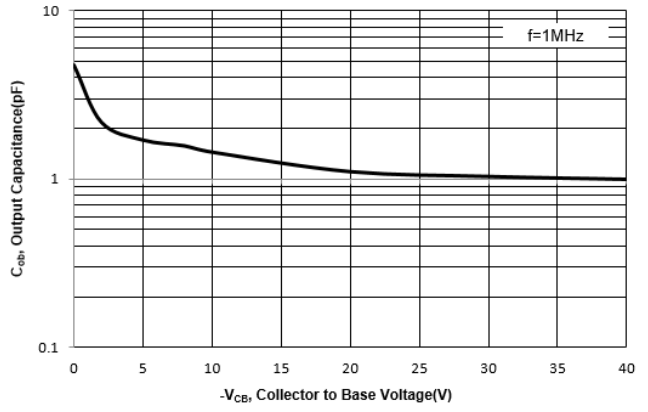
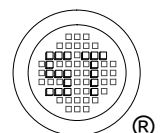
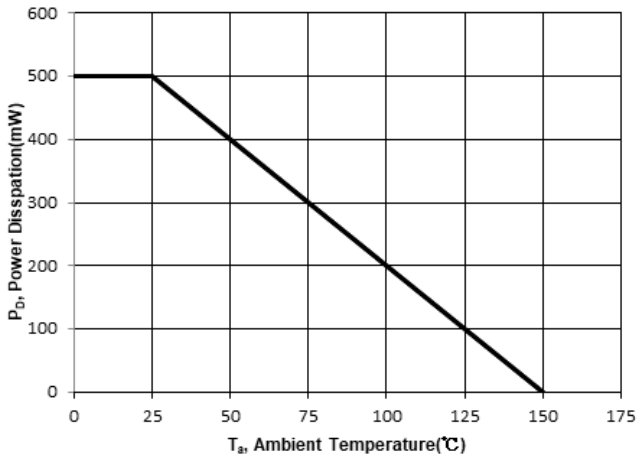


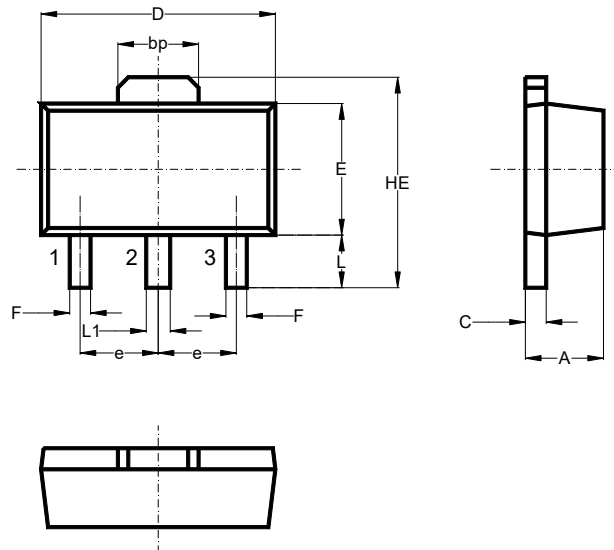
Fig. 7 Power Derating Curve



# 2N3906U

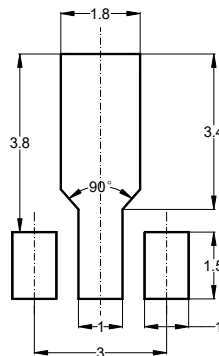
## Package Outline (Dimensions in mm)

SOT-89



Unit	A	bp	C	D	E	F	HE	e	L	L1
mm	1.6	1.60	0.5	4.6	2.6	0.45	4.25	1.5	1.05	0.51
	1.4	1.50	0.3	4.4	2.4	0.35	3.75	typ.	0.95	0.41

## Recommended Soldering Footprint



## Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-89	12	8 ± 0.1	0.315 ± 0.004	178	7	1,000
				330	13	4,000

## Marking information

" 2N3906U " = Part No.  
 "YM" = Date Code Marking  
 "Y" = Year  
 "M" = Month  
 Font type: Arial

