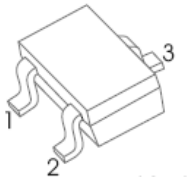
MMBT3906W

PNP Silicon Epitaxial Planar Transistor



SOT-323

1. BASE
2. EMITTER
3. COLLECTOR

FEATURES

for switching and amplifier applications

Marking

Type number	Marking code
MMBT3906W	2A

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (T_a = 25 °C)

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	40	V
Collector Emitter Voltage	$-V_{CEO}$	40	V
Emitter Base Voltage	$-V_{EBO}$	5	V
Collector Current	$-I_C$	200	mA
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	- 55 to +150	°C

Characteristics at T_a = 25 °C

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $-V_{CE}$ = 1 V, $-I_C$ = 1 mA at $-V_{CE}$ = 1 V, $-I_C$ = 10 mA at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA at $-V_{CE}$ = 1 V, $-I_C$ = 100 mA	h_{FE}	 80 100 60 30	 - 300 - -	 - - - -
Collector Emitter Cutoff Current at $-V_{CE}$ = 30 V	$-I_{CES}$	-	50	nA
Emitter Base Cutoff Current at $-V_{EB}$ = 3 V	$-I_{EBO}$	-	50	nA
Collector Base Breakdown Voltage at $-I_C$ = 10 µA	$-V_{(BR)CBO}$	40	-	V
Collector Emitter Breakdown Voltage at $-I_C$ = 1 mA	$-V_{(BR)CEO}$	40	-	V
Emitter Base Breakdown Voltage at $-I_E$ = 10 µA	$-V_{(BR)EBO}$	5	-	V
Collector Emitter Saturation Voltage at $-I_C$ = 10 mA, $-I_B$ = 1 mA at $-I_C$ = 50 mA, $-I_B$ = 5 mA	$-V_{CE(sat)}$	 - -	 0.25 0.4	V
Base Emitter Saturation Voltage at $-I_C$ = 10 mA, $-I_B$ = 1 mA at $-I_C$ = 50 mA, $-I_B$ = 5 mA	$-V_{BE(sat)}$	 0.65 -	 0.85 0.95	V
Transition Frequency at $-V_{CE}$ = 20 V, I_E = 10 mA, f = 100 MHz	f_T	250	-	MHz
Collector Output Capacitance at $-V_{CB}$ = 10 V, f = 100 KHz	C_{ob}	-	4.5	pF
Delay Time at $-V_{CC}$ = 3 V, $-V_{BE(OFF)}$ = 0.5 V, $-I_C$ = 10 mA, $-I_{B1}$ = 1 mA	t_d	-	35	ns
Rise Time at $-V_{CC}$ = 3 V, $-V_{BE(OFF)}$ = 0.5 V, $-I_C$ = 10 mA, $-I_{B1}$ = 1 mA	t_r	-	35	ns
Storage Time at $-V_{CC}$ = 3 V, $-I_C$ = 10 mA, I_{B1} = $-I_{B2}$ = -1 mA	t_{stg}	-	225	ns
Fall Time at $-V_{CC}$ = 3 V, $-I_C$ = 10 mA, I_{B1} = $-I_{B2}$ = -1 mA	t_f	-	75	ns

RATING AND CHARACTERISTIC CURVES

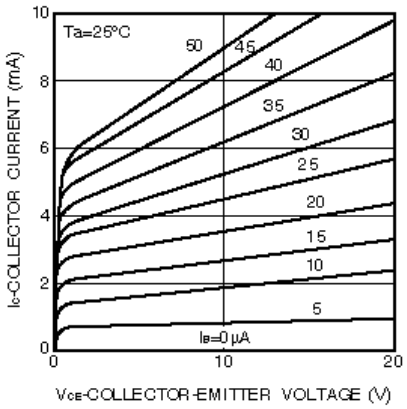


Fig.1 Grounded emitter output characteristics

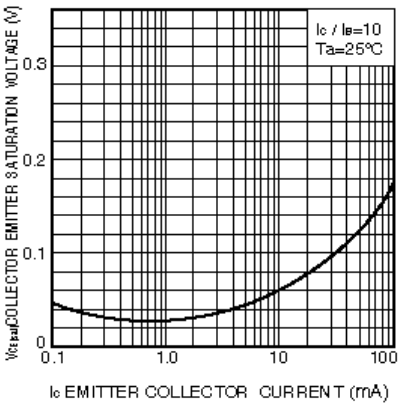


Fig.2 Collector-emitter saturation voltage vs. collector current

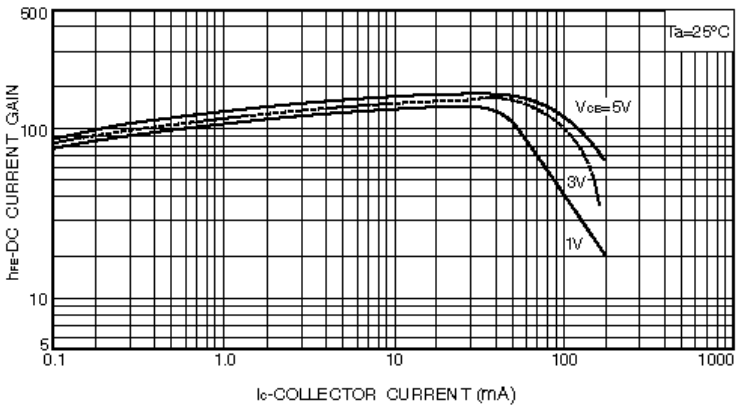


Fig.3 DC current gain vs.collector current (I)

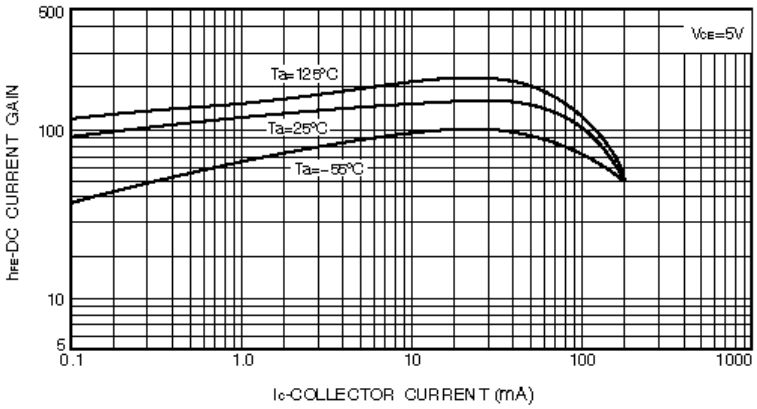


Fig.4 DC current gain vs. collector current (II)

RATING AND CHARACTERISTIC CURVES

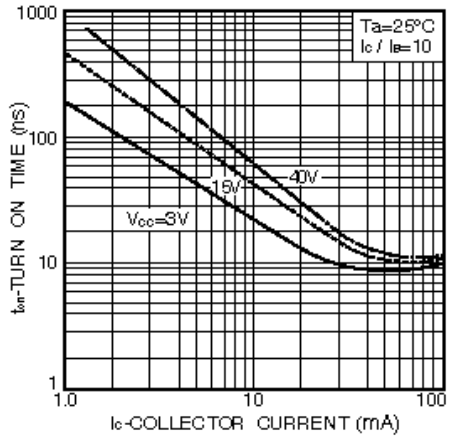


Fig.8 Turn-on time vs. collector current

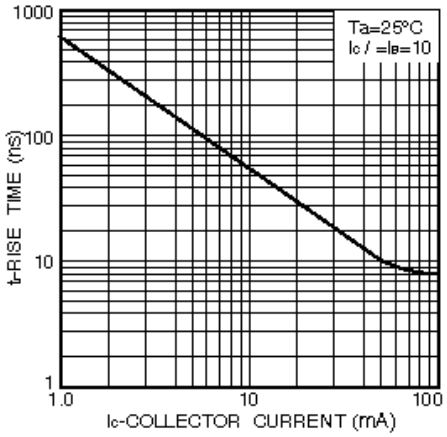


Fig.9 Rise time vs. collector current

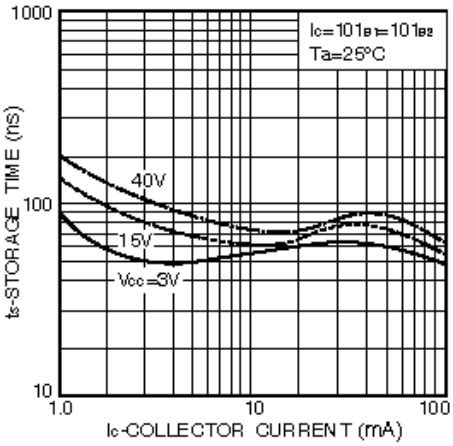


Fig.10 Storage time vs. collector current

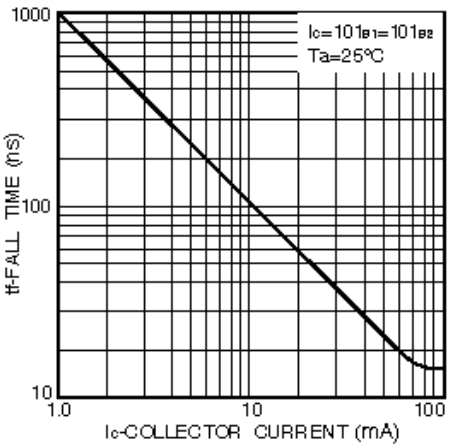


Fig.11 Fall time vs. collector current

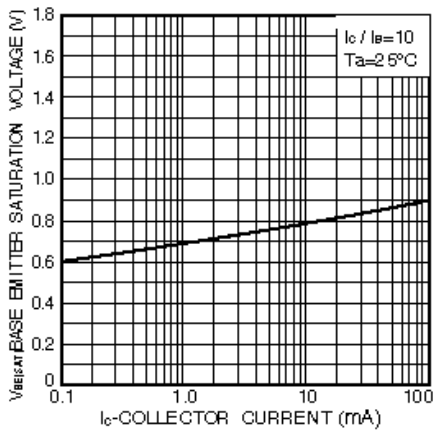


Fig.6 Base-emitter saturation voltage vs. collector current

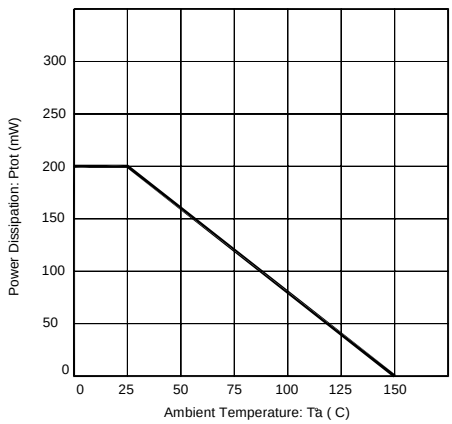
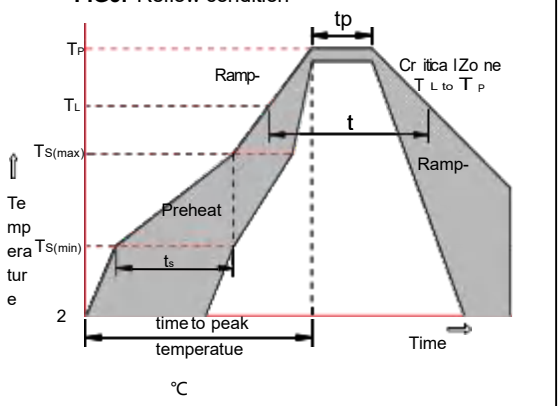


Fig.10 Power Dissipation vs Ambient Temperature

Soldering parameters

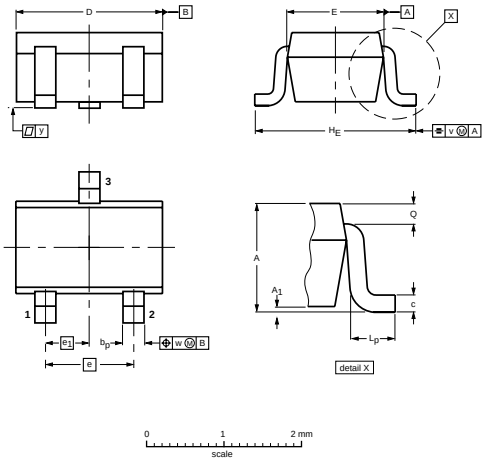
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

FIG5: Reflow condition



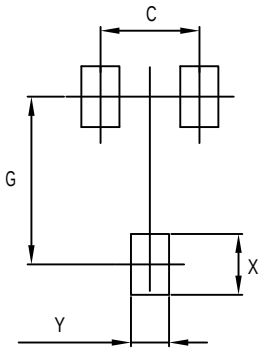
Package Dimensions & Suggested Pad Layout

SOT-323



DIMENSIONS (mm are the original dimensions)

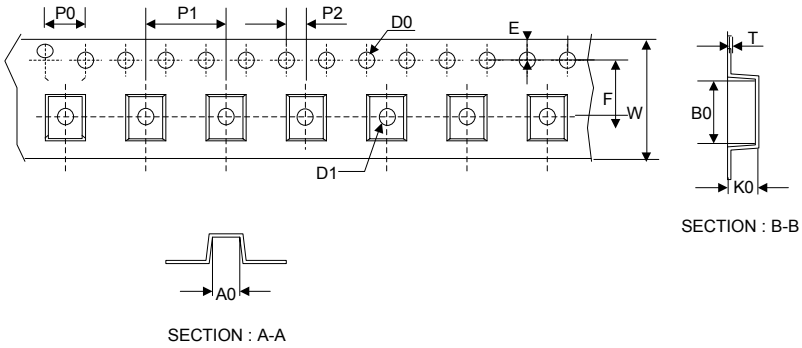
UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2



Dimensions	Value (in mm)
C	1.30
G	2.00
X	0.90
Y	0.65

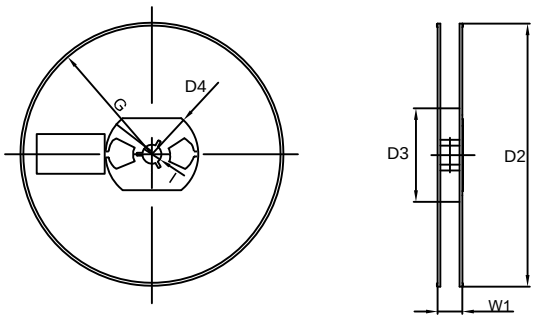
Tape & rell specification

Tape



Symbol	Dimension (mm)
P0	4.00±0.20
P1	4.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.00±0.20
E	1.55±0.25
F	3.60±0.20
W	8.00±0.20
A0	2.00±0.20
B0	3.25±0.20
K0	1.35±0.20
T	0.23±0.10

7” Reel



D2	177.0±5.0
D3	55Min.
D4	R24.6±2.0
G	R82.0±2.0
I	13.0±2.0
W1	10.20±3.0

Quantity: 3000PCS