

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## MMBT3906LP(MS)

Product specification

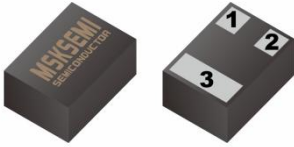
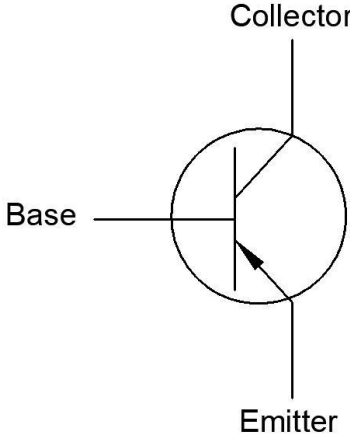

## Features

- Low profile package
- Ideal for automated placement
- Complementary to MMBT3904LP(MS) (NPN).
- Power Dissipation of 200mW
- High Stability and High Reliability
- RoHS Compliant

## Applications

- amplifying signal
- Electronic switch
- Oscillating circuit
- variable resistance

## Appearance & Symbol

PACKAGE OUTLINE	Pin Configuration	Marking
 <p>1: Base 2: Emitter 3: Collector</p>		
<p>DFN1006-3</p>		

**Absolute Maximum Ratings (T=25°C unless otherwise noted)**

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 - Continuous	$I_C$	-200	mA
Collector Power Dissipation	$P_C$	200	mW
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	625	°C/W
Junction Temperature	$T_J$	-55 to +150	°C
Junction and Storage Temperature	$T_{STG}$	-55 to +150	°C

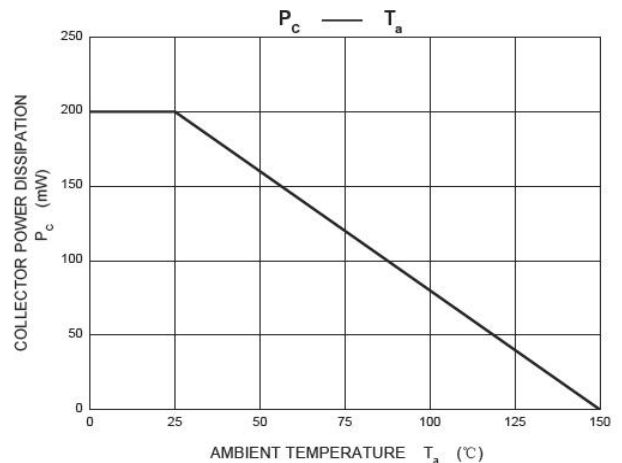
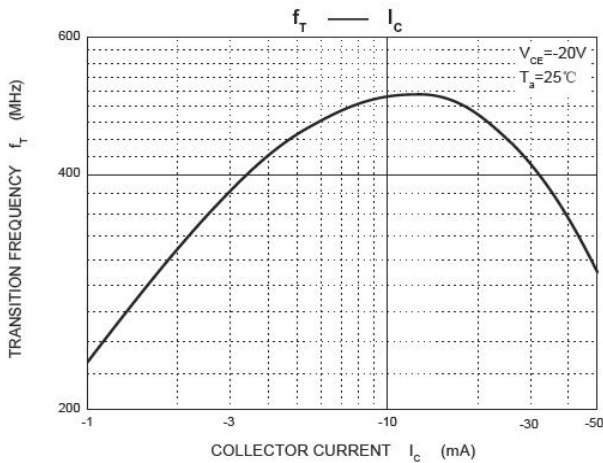
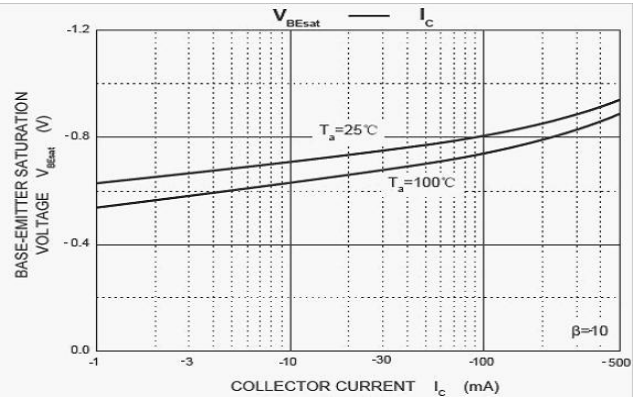
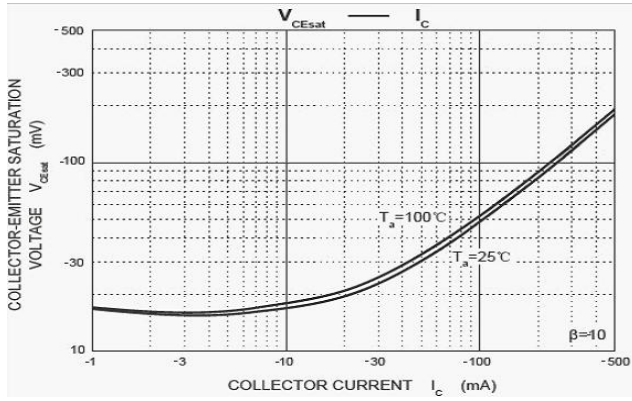
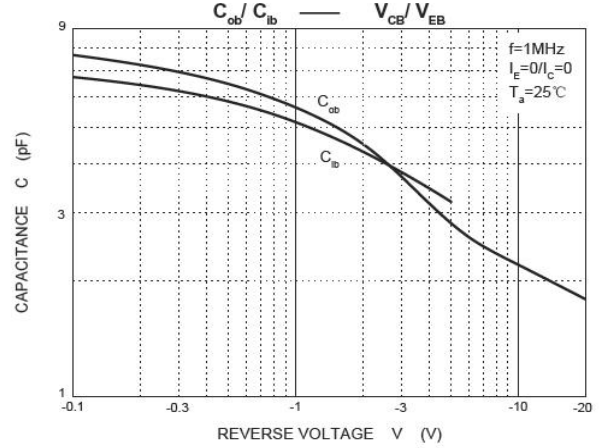
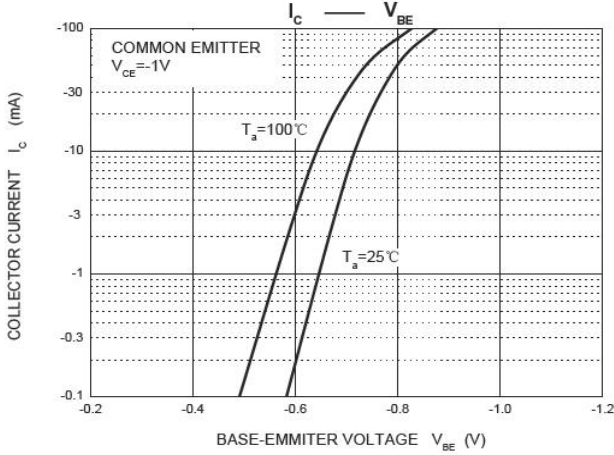
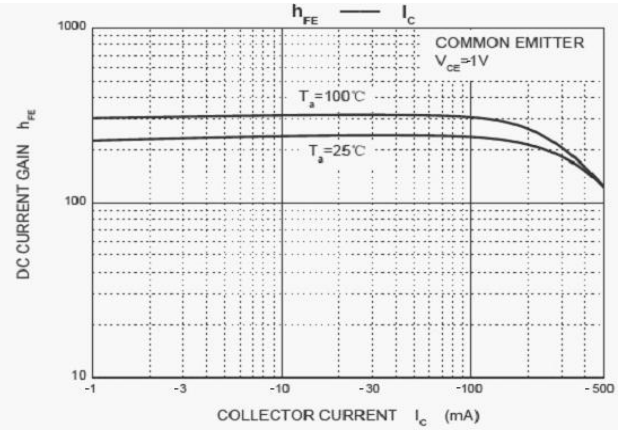
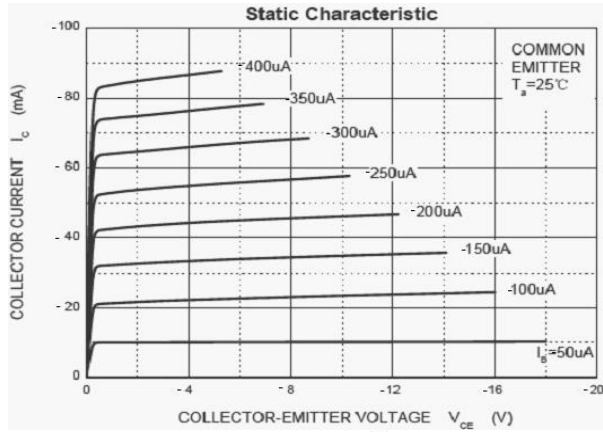
**Electrical Characteristics (T=25°C unless otherwise noted)**

Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = -10\mu A, I_E = 0$	-40		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -1mA, I_B = 0$	-40		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = -10\mu A, I_C = 0$	-5		V
Collector cut-off current	$I_{CEX}$	$V_{CE} = -30V, V_{BE(off)} = -3V$		-50	nA
Collector cut-off current	$I_{CBO}$	$V_{CB} = -40V, I_E = 0$		-100	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -5V, I_C = 0$		-100	nA
DC current gain	$h_{FE(1)}$	$V_{CE} = -1V, I_C = -10mA$	100	300	
	$h_{FE(2)}$	$V_{CE} = -1V, I_C = -50mA$	60		
	$h_{FE(3)}$	$V_{CE} = -2V, I_C = -100mA$	30		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -50mA, I_B = -5mA$		-0.3	V
Base -emitter saturation voltage	$V_{BE(sat)}$	$I_C = -50mA, I_B = -5mA$		-0.95	V
Transition frequency	$f_T$	$V_{CE} = -20V, I_C = -10mA, f = 100MHz$	300		MHz
Delay time	$t_d$	$V_{CC} = -3V, V_{BE} = -0.5V$ $I_C = -10mA, I_{B1} = I_{B2} = -1mA$		35	nS
Rise time	$t_r$			35	nS
Storage time	$t_s$			225	nS
Fall time	$t_f$			75	nS

**Classification of  $h_{FE}$** 

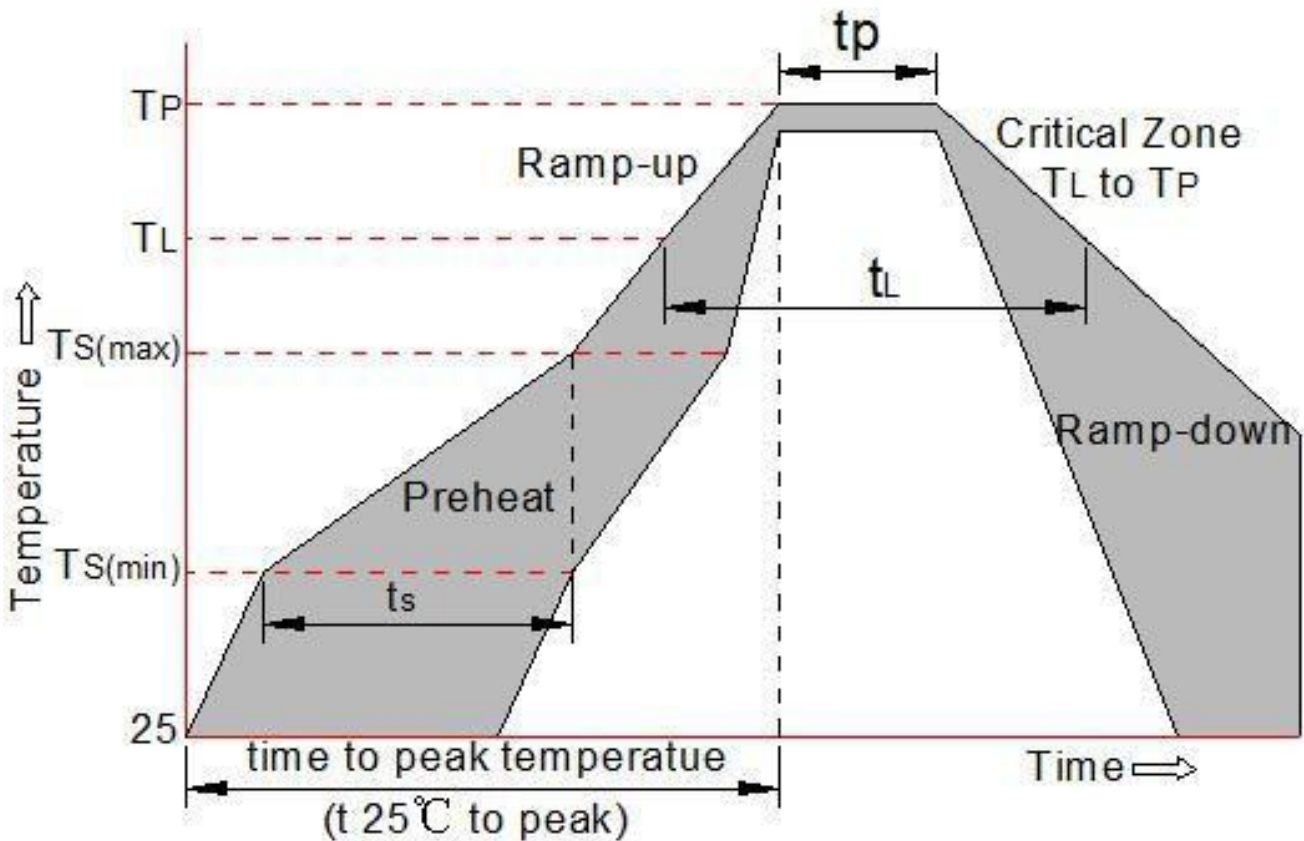
Range	100-300
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Typical Characteristics

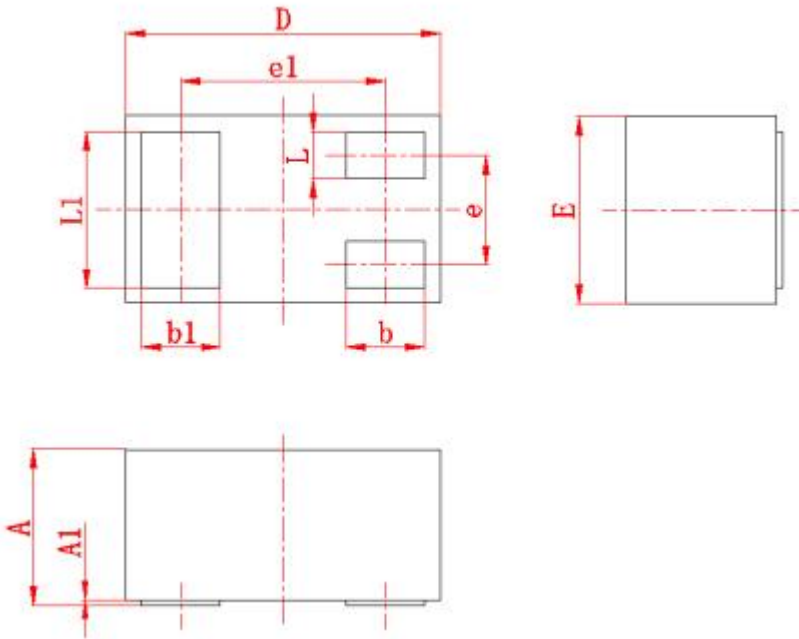


**Soldering parameters**

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

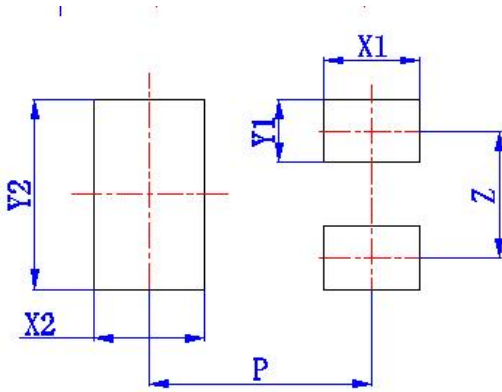


**Package mechanical data**



Symbol	Millimeters	
	min	max
A	0.4	0.5
A1	0	0.05
D	0.9	1.1
E	0.55	0.65
e	(0.35)	
e1	(0.65)	
b	0.2	0.3
b1	0.2	0.3
L	0.1	0.2
L1	0.45	0.55

**Suggested Land Pattern**



Symbol	Dimension in Millimeters
	typ
X1	(0.3)
X2	(0.35)
Y1	(0.2)
Y2	(0.6)
Z	(0.4)
P	(0.7)

**REEL SPECIFICATION**

P/N	PKG	QTY
MMBT3906LP(MS)	DFN1006-3	10000



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