

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## MMBT3906DFN

Product specification

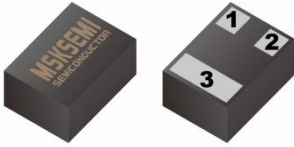
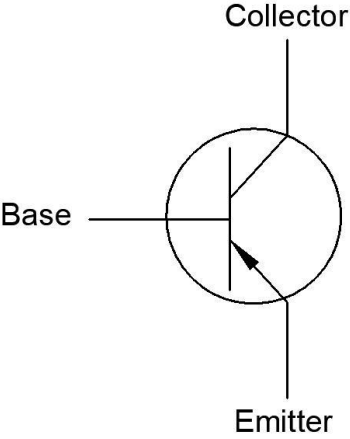

**Features**

- Low profile package
- Ideal for automated placement
- Complementary to MMBT3904DFN(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
<div><div>1: Base 2: Emitter 3: Collector</div></div> <div>DFN1006-3</div>	<div></div>	<div></div>

**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

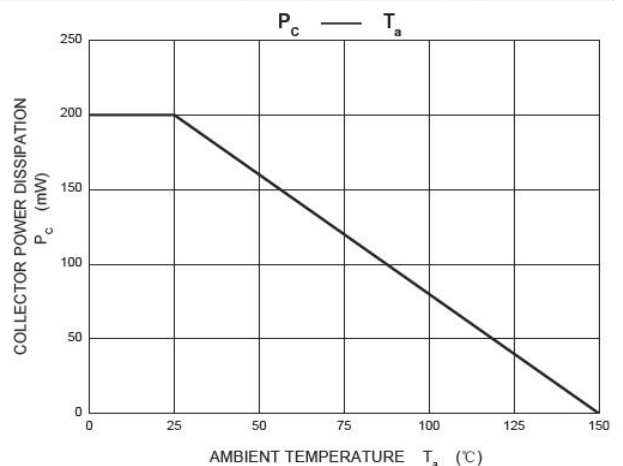
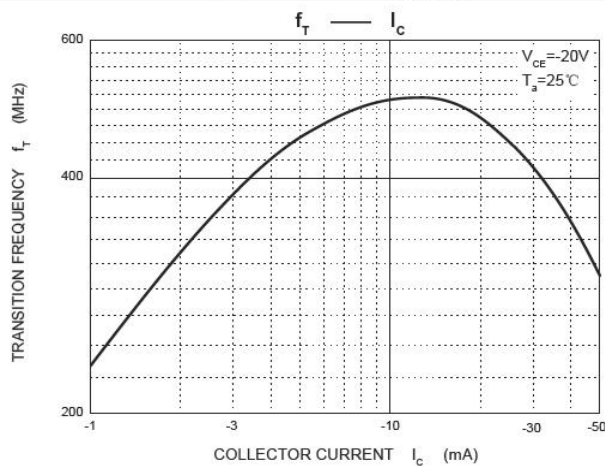
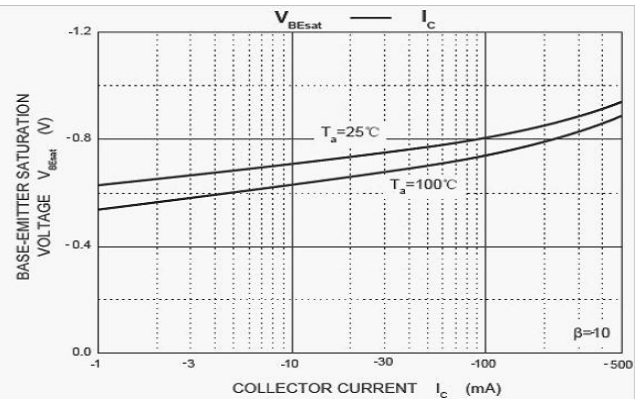
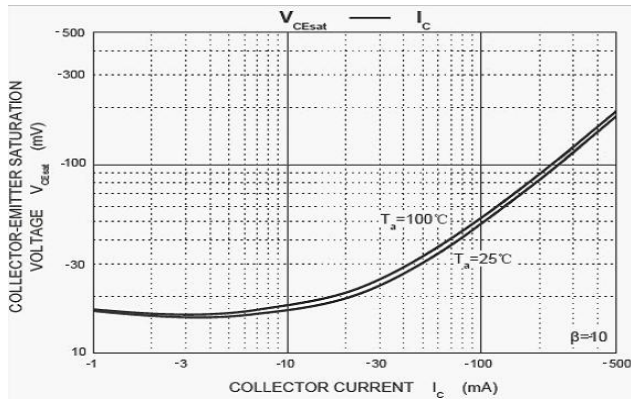
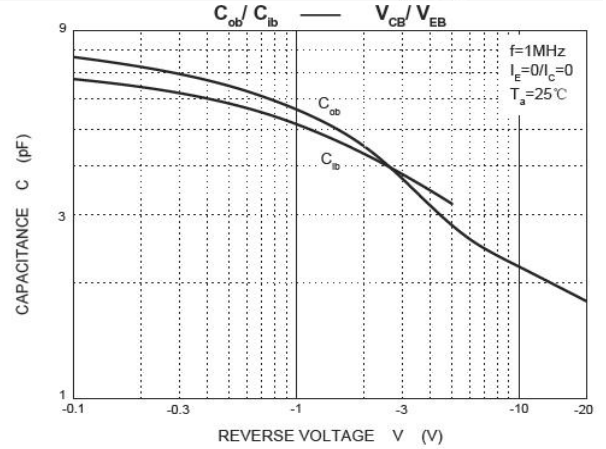
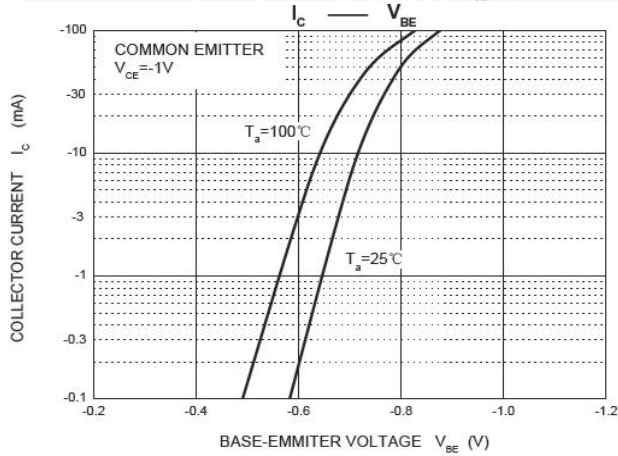
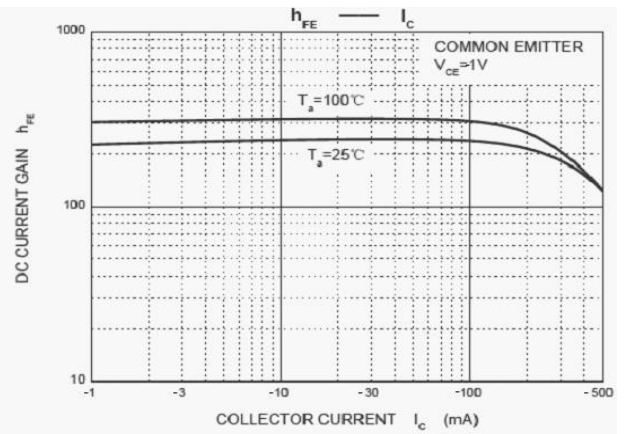
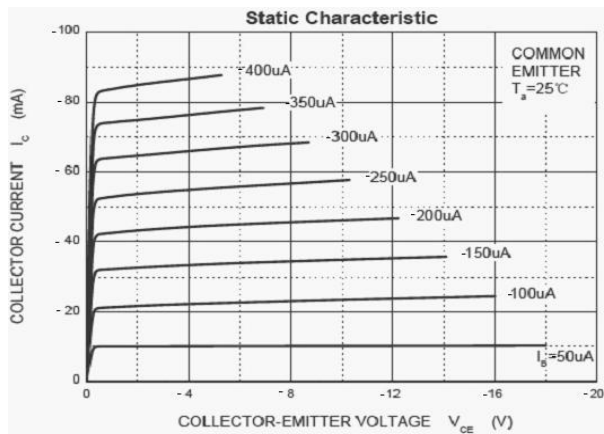
**Electrical Characteristics** (T=25°C unless otherwise noted)

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	$t_s$	$V_{CC} = -3V, I_C = -10mA$ $I_{B1} = I_{B2} = -1mA$		225	nS
Fall time	$t_f$			75	nS

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

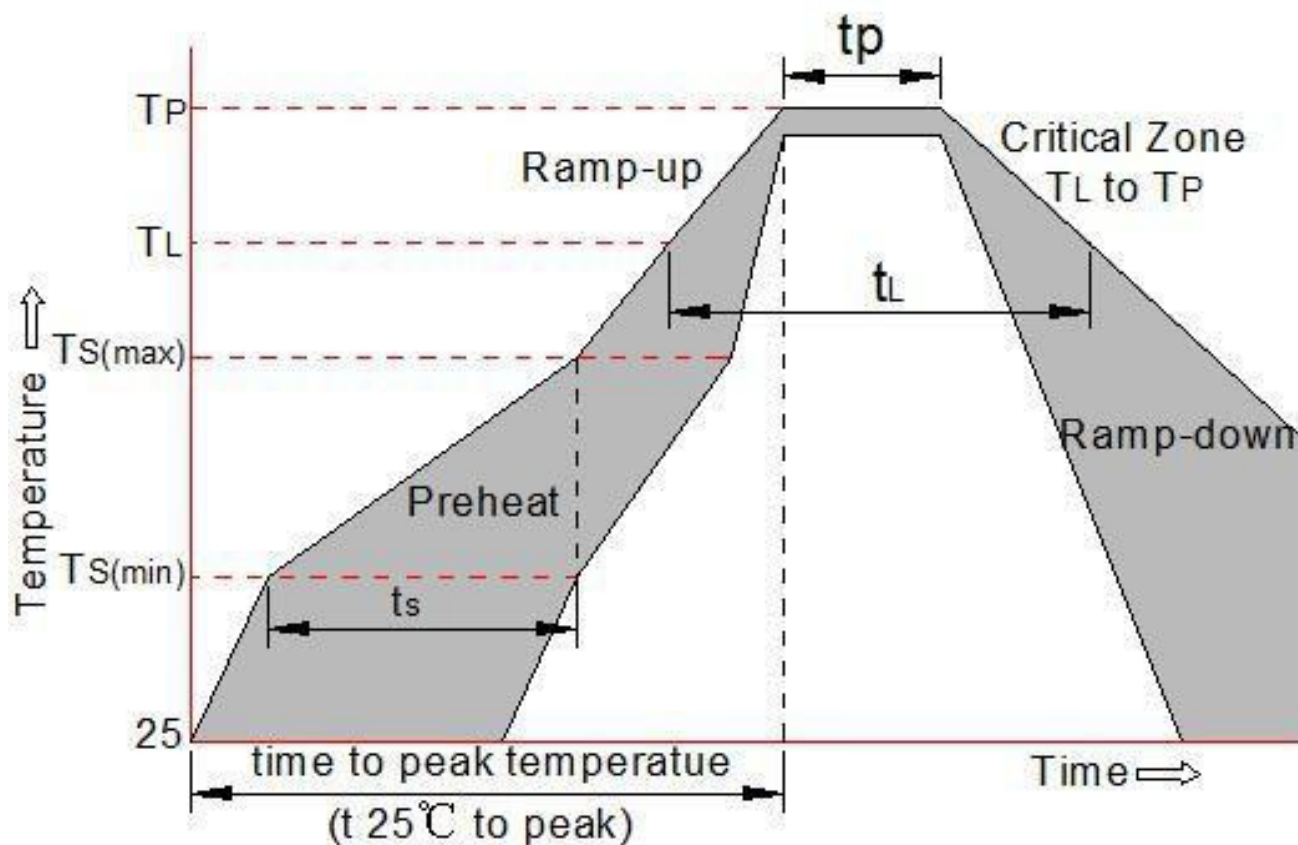
Range	100-300
-------	---------

## Typical Characteristics

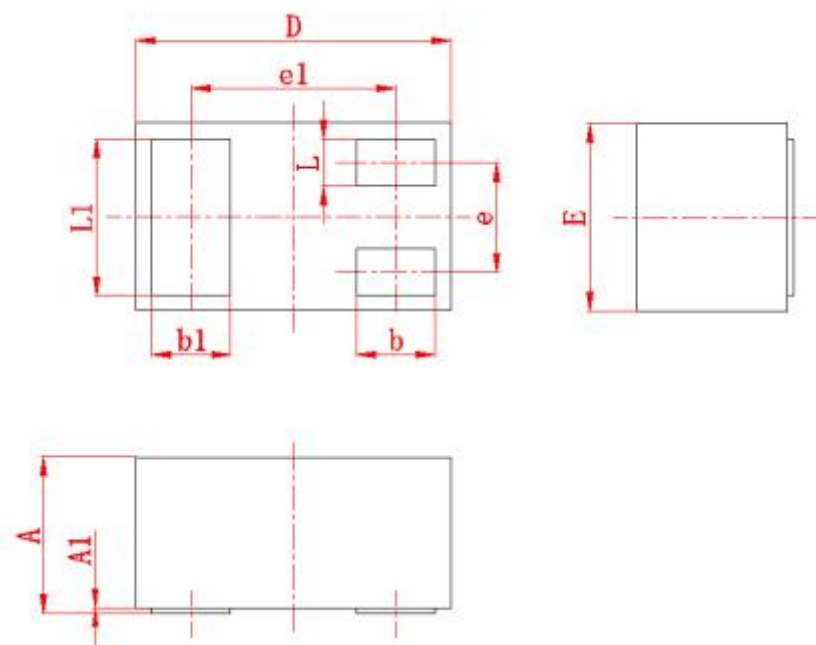


### Soldering parameters

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) ( $t_s$ )	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

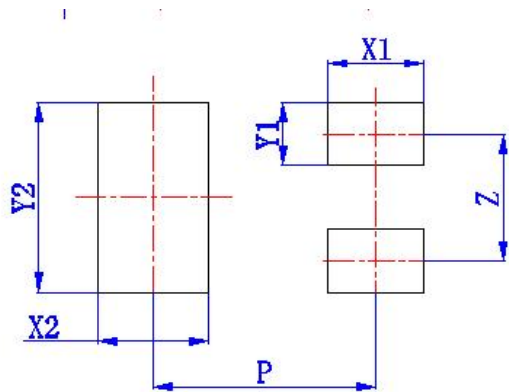


Package mechanical data



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
MMBT3906DFN	DFN1006-3	10000



## Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specification of any and all MSKSEMI Semiconductor products described or contained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.