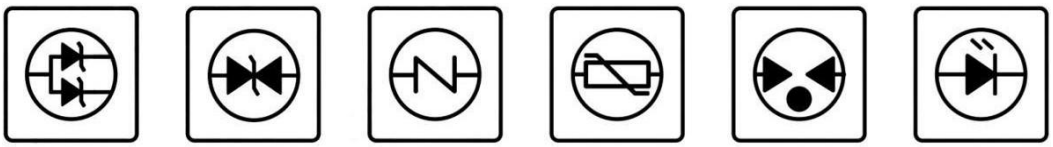
MSKSEMI 美森科
SEMICONDUCTOR



MMBT3904LP(MS)

Product specification

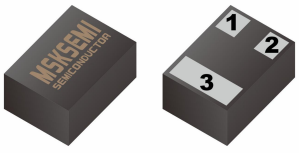
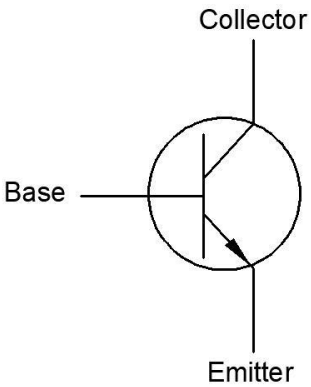
Features

- Low profile package
- Ideal for automated placement
- Low saturation voltages
- High voltage capability
- High Stability and High Reliability
- RoHS Compliant

Applications

- amplifying signal
- Electronic switch
- Oscillating circuit
- Variable resistance
- Lighting applications

Appearance & Symbol

PACKAGE OUTLINE	Pin Configuration	Marking
 1：Base 2：Emitter 3：Collector DFN1006-3		6P

Absolute Maximum Ratings (T=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current Continuous	I_C	0.2	A
Power Dissipation	P_D	0.3	W
Operating Junction temperature	T_J	-55 to +150	℃
Storage Temperature Range	T_{STG}	-55 to +150	℃

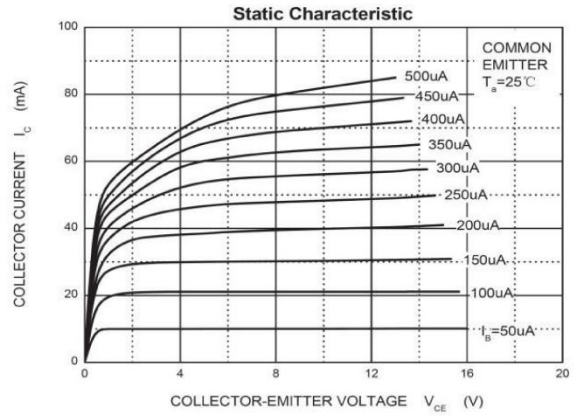
Electrical Characteristics (T=25℃ unless otherwise noted)

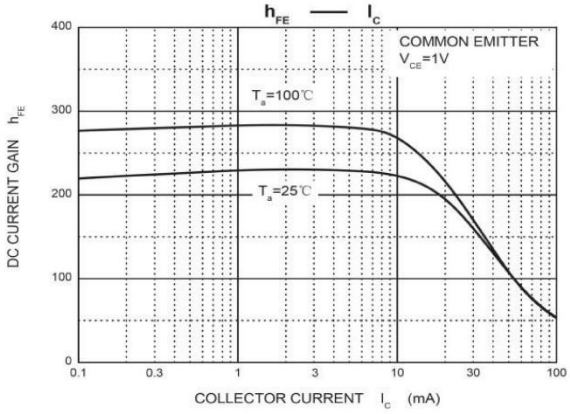
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	V_{CBO}	I_C=10μA，I_E=0	60			V
Collector-Emitter Breakdown Voltage	V_{CER}	I_C=1mA,I_B=0	40			V
Emitter-Base Breakdown Voltage	V_{EBO}	I_E=10uA,I_C=0	6			V
Collector Cut-Off Current	I_{CBO}	V_{CB}=60V，I_E=0			100	nA
Collector Cut-Off Current	I_{CEX}	V_{CE}=30V,$V_{EB(off)}$=3V			50	nA
Emitter Cut-Off Current	I_{EBO}	V_{EB}=5V,I_C=0			100	nA
DC current gain	h_{FE}	V_{CE}=1V,I_C=0.1mA	40			
		V_{CE}=1V,I_C=1mA	70			
		V_{CE}=1V,I_C=10mA	100		300	
		V_{CE}=1V,I_C=50mA	60			
		V_{CE}=1V,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	td	V_{CC} =3V, I_C = 10mA, $V_{BE(off)}$ =-0.5V, I_{B1}=1mA		35		
Rise time	tr			35		ns
Storage time	ts	V_{CC} =3V, I_C =10mA, I_{B1} = I_{B2} =1mA		200		us
Fall time	tf			50		ns

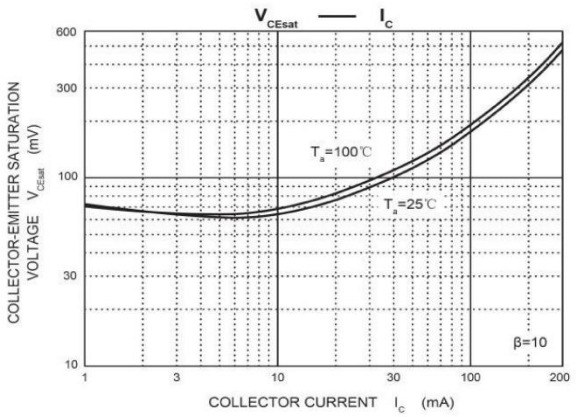
Classification of h_{FE}

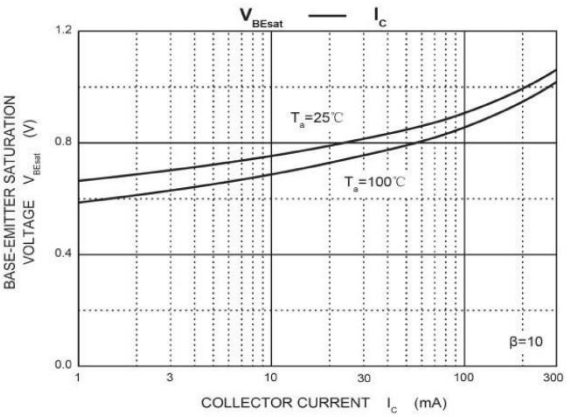
Range	100-300

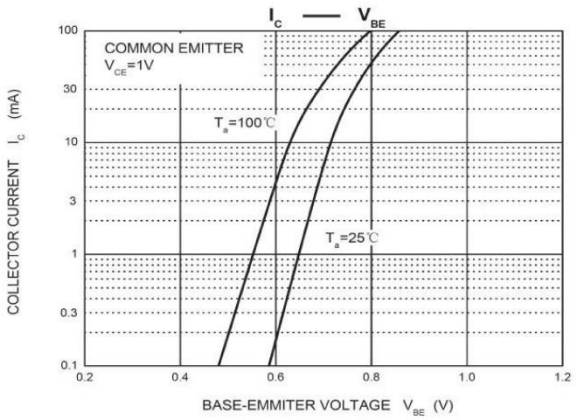
Typical Characteristics

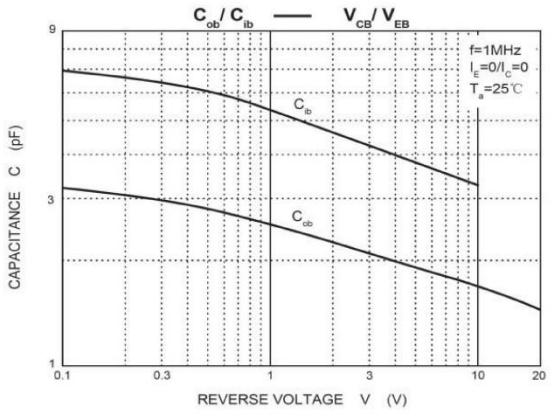


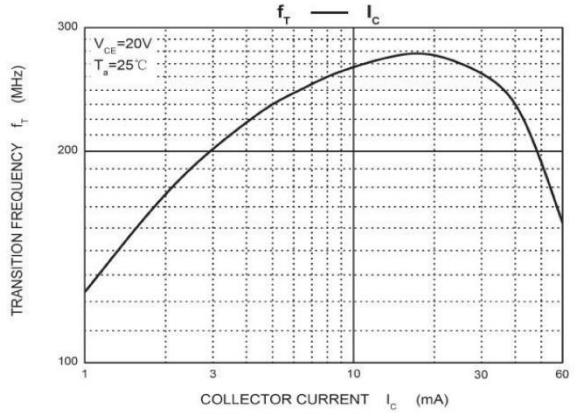


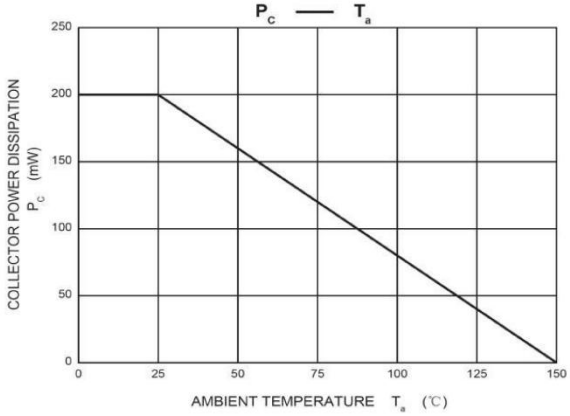






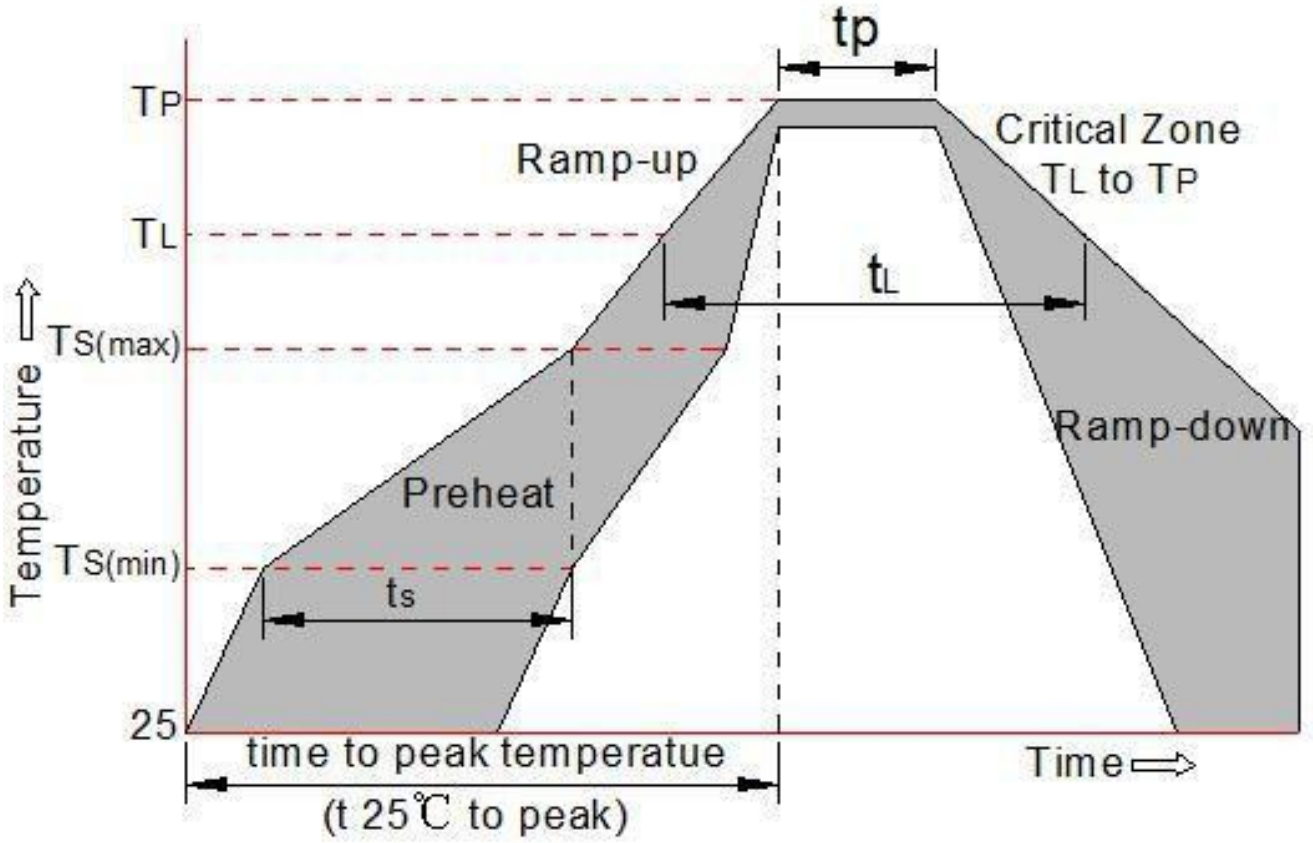




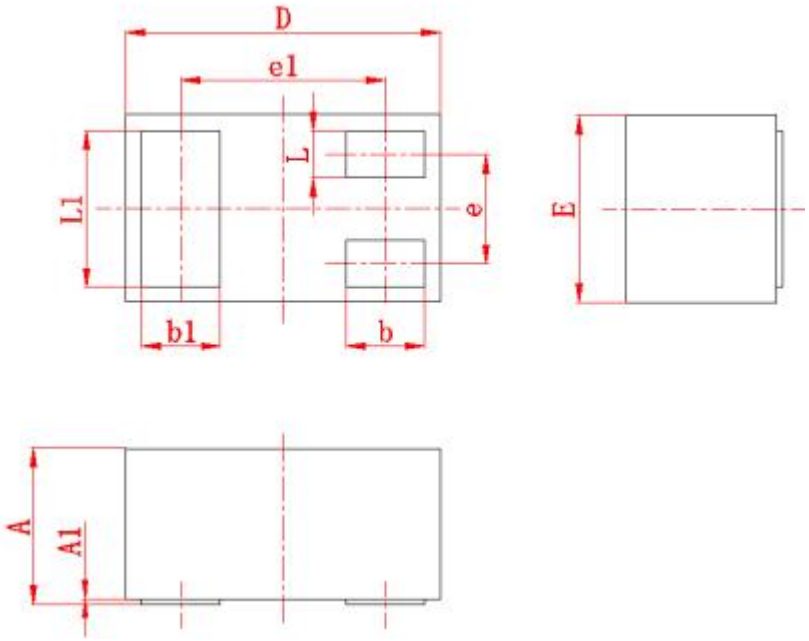


Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-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℃

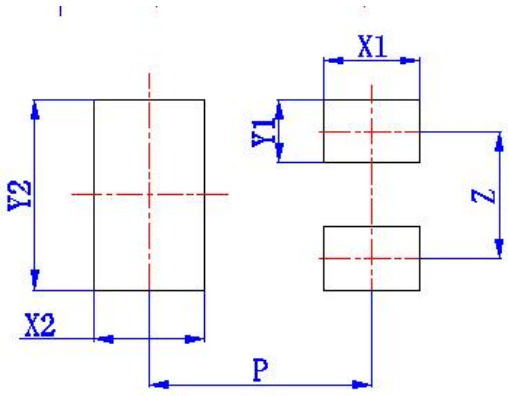


Package mechanical data



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
MMBT3904LP(MS)	DFN1006-3	10000

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