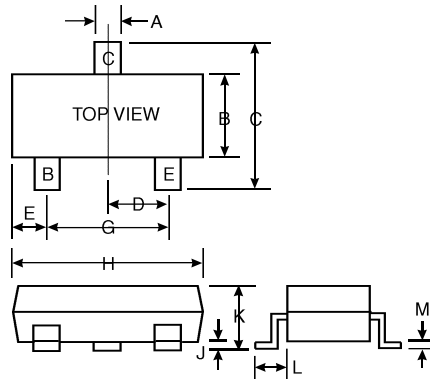


### Features

Epitaxial Planar Die Construction  
 Complementary PNP Type Available (MMBT3906)  
 Ideal for Medium Power Amplification and Switching

### Mechanical Data

Case: SOT-23, Molded Plastic  
 Terminals: Solderable per MIL-STD-202, Method 208  
 Terminal Connections: See Diagram  
 Marking: K1N, R1A, 1AM  
 Weight: 0.008 grams (approx.)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.19	1.40
C	2.10	2.50
D	0.89	1.05
E	0.45	0.61
G	1.78	2.05
H	2.65	3.05
J	0.013	0.15
K	0.89	1.10
L	0.45	0.61
M	0.076	0.178
All Dimensions in mm		

### Maximum Ratings @ T<sub>A</sub> = 25 C unless otherwise specified

Characteristic	Symbol	MMBT3904	Unit
Collector-Base Voltage	V <sub>CBO</sub>	60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	V
Collector Current - Continuous (Note 1)	I <sub>C</sub>	200	mA
Power Dissipation (Note 1)	P <sub>d</sub>	350	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>JA</sub>	357	K/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	C

Notes: 1. Valid provided that terminals are kept at ambient temperature.  
 2. Pulse test: Pulse width 300 s, duty cycle 2%.

## Electrical Characteristics @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60		V	$I_C = 10\text{ A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40		V	$I_C = 1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5.0		V	$I_E = 10\text{ A}, I_C = 0$
Collector Cutoff Current	$I_{CEX}$		50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current	$I_{BL}$		50	nA	$V_{CE} = 30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
ON CHARACTERISTICS (Note 2)					
DC Current Gain	$h_{FE}$	40 70 100 60 30	300		$I_C = 100\mu\text{A}, V_{CE} = 1.0\text{V}$ $I_C = 1.0\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.20 0.30	V	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
Base- Emitter Saturation Voltage	$V_{BE(SAT)}$	0.65	0.85 0.95	V	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	$C_{obo}$		4.0	pF	$V_{CB} = 5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	$C_{ibo}$		8.0	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$
Input Impedance	$h_{ie}$	1.0	10	k	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA}, f = 1.0\text{kHz}$
Voltage Feedback Ratio	$h_{re}$	0.5	8.0	$\times 10^{-4}$	
Small Signal Current Gain	$h_{fe}$	100	400		
Output Admittance	$h_{oe}$	1.0	40	S	
Current Gain-Bandwidth Product	$f_T$	300		MHz	
Noise Figure	NF		5.0	dB	$V_{CE} = 5.0\text{V}, I_C = 100\text{ A}, R_S = 1.0\text{k} f = 1.0\text{kHz}$
SWITCHING CHARACTERISTICS					
Delay Time	$t_d$		35	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}, V_{BE(off)} = -0.5\text{V}, I_{B1} = 1.0\text{mA}$
Rise Time	$t_r$		35	ns	
Storage Time	$t_s$		200	ns	$V_{CC} = 3.0\text{V}, I_C = 10\text{mA}, I_{B1} = I_{B2} = 1.0\text{mA}$
Fall Time	$t_f$		50	ns	

- Notes: 1. Valid provided that terminals are kept at ambient temperature.  
2. Pulse test: Pulse width 300 s, duty cycle 2%.