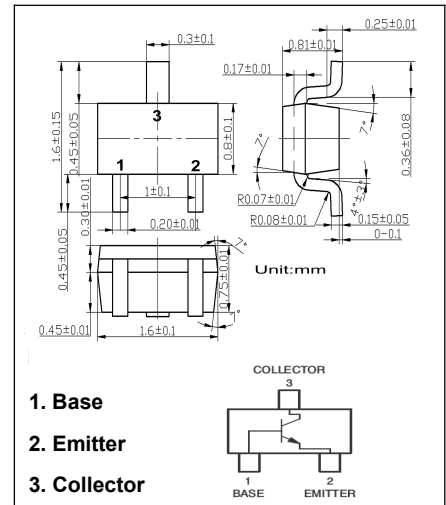


# MMBT3904T

## General Purpose Transistor NPN Silicon Surface Mount Plastic Package

### Features

- Simplifies Circuit Design
- RoHS Compliant
- Green EMC



Marking: 1N

### Maximum Ratings ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{CB0}$	Collector Base Voltage	60	V
$V_{CEO}$	Collector Emitter Voltage	40	V
$V_{EBO}$	Emitter Base Voltage	6	V
$I_c$	Collector Current	200	mA
$P_c$	Collector Power Dissipation	150	mW
$T_j$	Junction Temperature	-55 ~ +150	$^{\circ}\text{C}$
$T_{stg}$	Storage Temperature	-55 ~ +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	833	$^{\circ}\text{C/W}$

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## ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}, I_E=0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, I_B=0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}, I_C=0$	6			V
Collector cut-off current	$I_{CEX}$	$V_{CE}=30\text{V}, V_{EB(off)}=3\text{V}$			50	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB}=5\text{V}, I_C=0$			100	nA
DC current gain	$h_{FE(1)}$	$V_{CE}=1\text{V}, I_C=0.1\text{mA}$	40			
	$h_{FE(2)}$	$V_{CE}=1\text{V}, I_C=1\text{mA}$	70			
	$h_{FE(3)}$	$V_{CE}=1\text{V}, I_C=10\text{mA}$	100		300	
	$h_{FE(4)}$	$V_{CE}=1\text{V}, I_C=50\text{mA}$	60			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=10\text{mA}, I_B=1\text{mA}$			0.2	V
		$I_C=50\text{mA}, I_B=5\text{mA}$			0.3	V
Collector-emitter saturation voltage	$V_{BE(sat)}$	$I_C=10\text{mA}, I_B=1\text{mA}$	0.65		0.85	V
		$I_C=50\text{mA}, I_B=5\text{mA}$			0.95	V
Transition frequency	$f_T$	$V_{CE}=20\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	300			MHz
Collector output capacitance	$C_{ob}$	$V_{CB}=5\text{V}, I_E=0, f=1\text{MHz}$			4	pF
Base input capacitance	$C_{ib}$	$V_{EB}=0.5\text{V}, I_C=0, f=1\text{MHz}$			8	pF
Delay time	$t_d$	$V_{CC}=3\text{V}, V_{BE(off)}=-0.5\text{V}, I_C=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
Rise time	$t_r$	$V_{CC}=3\text{V}, V_{BE(off)}=-0.5\text{V}, I_C=10\text{mA}, I_{B1}=1\text{mA}$			35	ns
Storage time	$t_s$	$V_{CC}=3\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1\text{mA}$			200	ns
Fall time	$t_f$	$V_{CC}=3\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1\text{mA}$			50	ns

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## Typical Characteristics

