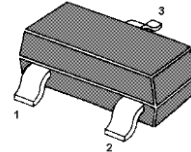


# MMBT3904

## NPN Silicon General Purpose Transistor

for switching and amplifier applications.



1. Base 2. Emitter 3. Collector  
SOT-23 Plastic Package

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

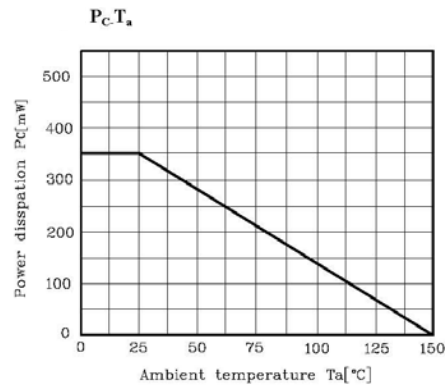
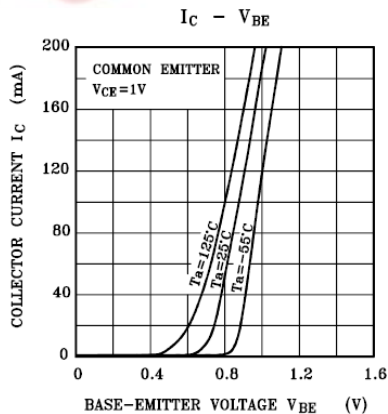
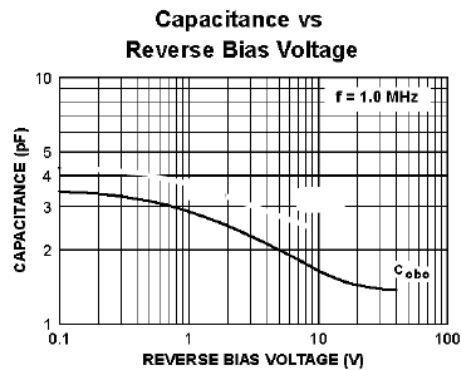
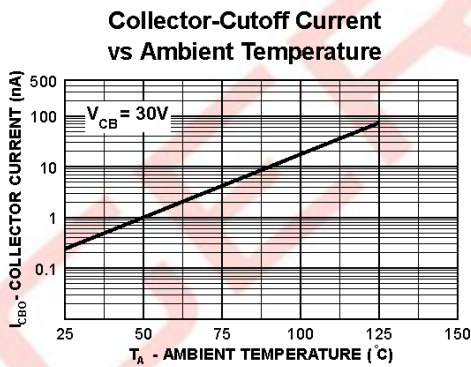
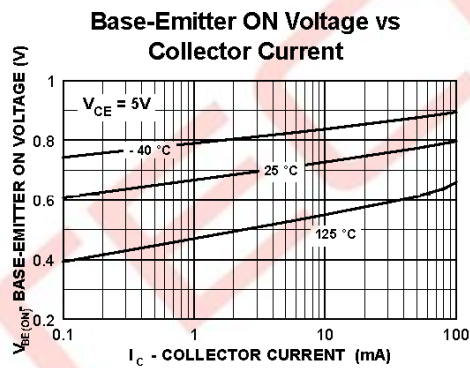
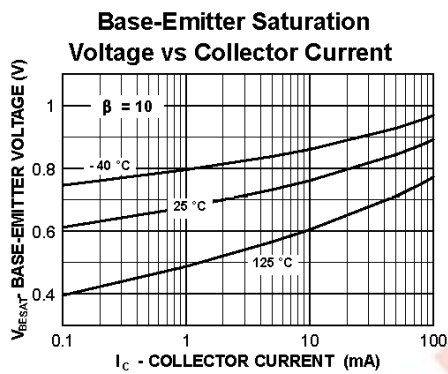
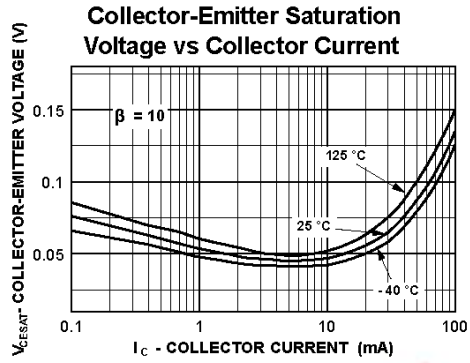
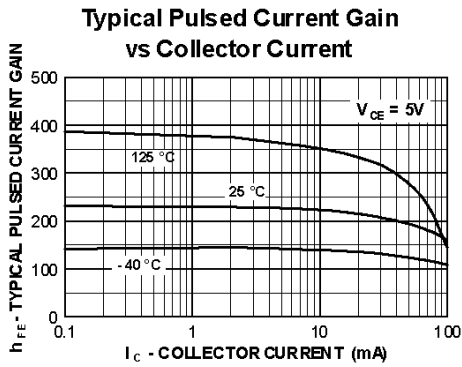
Parameter	Symbol	Value	Unit
Collector Base Voltage	$V_{CB0}$	60	V
Collector Emitter Voltage	$V_{CEO}$	40	V
Emitter Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	200	mA
Power Dissipation	$P_{tot}$	350	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 55 to + 150	$^\circ\text{C}$

# MMBT3904

## Characteristics at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $V_{CE} = 1\text{ V}$ , $I_C = 0.1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 1\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 10\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$ at $V_{CE} = 1\text{ V}$ , $I_C = 100\text{ mA}$	$h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$ $h_{FE}$	40 70 100 60 30	- - 300 - -	- - - - -
Collector Base Cutoff Current at $V_{CB} = 30\text{ V}$	$I_{CBO}$	-	50	nA
Emitter Base Cutoff Current at $V_{EB} = 6\text{ V}$	$I_{EBO}$	-	50	nA
Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	60	-	V
Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$	$V_{(BR)CEO}$	40	-	V
Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EBO}$	6	-	V
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$ , $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{CE(sat)}$ $V_{CE(sat)}$	- -	0.2 0.3	V V
Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$ , $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{BE(sat)}$ $V_{BE(sat)}$	0.65 -	0.85 0.95	V V
Current Gain Bandwidth Product at $V_{CE} = 20\text{ V}$ , $I_C = 10\text{ mA}$ , $f = 100\text{ MHz}$	$f_T$	300	-	MHz
Collector Output Capacitance at $V_{CB} = 5\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$	$C_{ob}$	-	4	pF
Delay Time at $V_{CC} = 3\text{ V}$ , $V_{BE} = 0.5\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = 1\text{ mA}$	$t_d$	-	35	ns
Rise Time at $V_{CC} = 3\text{ V}$ , $V_{BE} = 0.5\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = 1\text{ mA}$	$t_r$	-	35	ns
Storage Time at $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = -I_{B2} = 1\text{ mA}$	$t_s$	-	200	ns
Fall Time at $V_{CC} = 3\text{ V}$ , $I_C = 10\text{ mA}$ , $I_{B1} = -I_{B2} = 1\text{ mA}$	$t_f$	-	50	ns

Typical Characteristics Curves



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