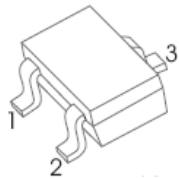


Features

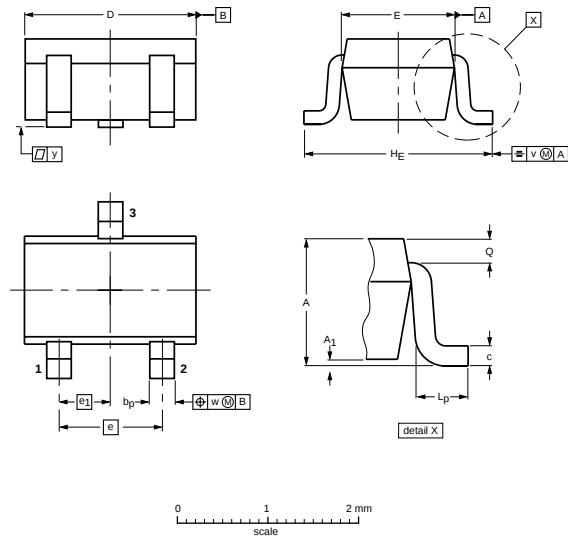
for switching and amplifier applications



SOT-323

1. BASE
2. EMITTER
3. COLLECTOR

SOT-323



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

Absolute Maximum Ratings (T_a = 25 °C)

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	I _C	200	mA
Total Power Dissipation	P _{tot}	200	mW
Junction Temperature	T _j	150	°C
Storage Temperature Range	T _{stg}	- 55 to + 150	°C

MMBT3904W

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

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain				
at $V_{CE} = 1\text{ V}$, $I_C = 0.1\text{ mA}$	h_{FE}	40	-	-
at $V_{CE} = 1\text{ V}$, $I_C = 1\text{ mA}$	h_{FE}	70	-	-
at $V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$	h_{FE}	100	300	-
at $V_{CE} = 1\text{ V}$, $I_C = 50\text{ mA}$	h_{FE}	60	-	-
at $V_{CE} = 1\text{ V}$, $I_C = 100\text{ mA}$	h_{FE}	30	-	-
Collector Emitter Cutoff Current at $V_{CE} = 30\text{ V}$	I_{CES}	-	50	nA
Emitter Base Cutoff Current at $V_{EB} = 3\text{ V}$	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 $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$	$V_{CE(sat)}$	- -	0.2 0.3	V
Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$	$V_{BE(sat)}$	0.65 -	0.85 0.95	V
Transition Frequency at $V_{CE} = 20\text{ V}$, $-I_E = 10\text{ mA}$, $f = 100\text{ MHz}$	f_T	300	-	MHz
Collector Output Capacitance at $V_{CB} = 10\text{ V}$, $f = 100\text{ KHz}$	C_{ob}	-	4	pF
Delay Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$	t_d	-	35	ns
Rise Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$	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_{stg}	-	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

RATING AND CHARACTERISTIC CURVES (MMBT3904W)

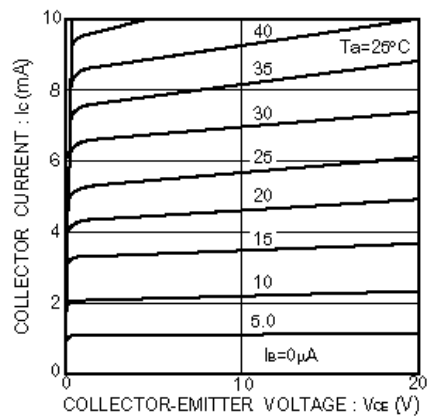


Fig.1 Grounded emitter output characteristics

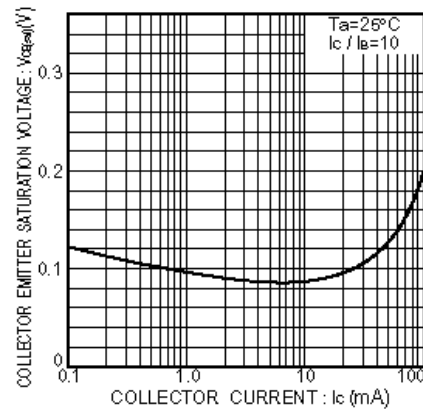


Fig.2 Collector-emitter saturation voltage vs. collector current

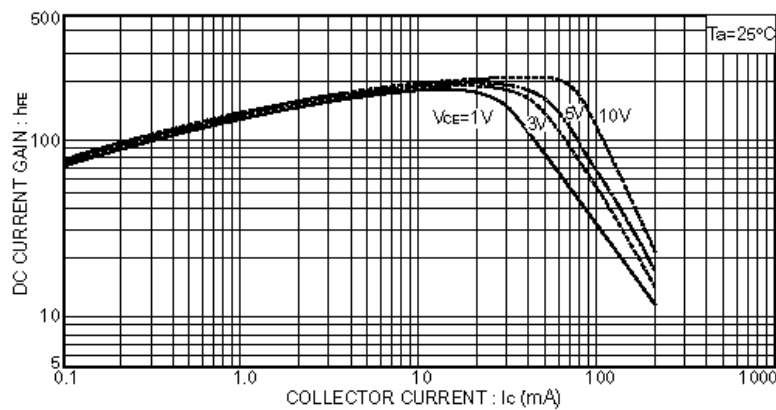


Fig.3 DC current gain vs. collector current (I)

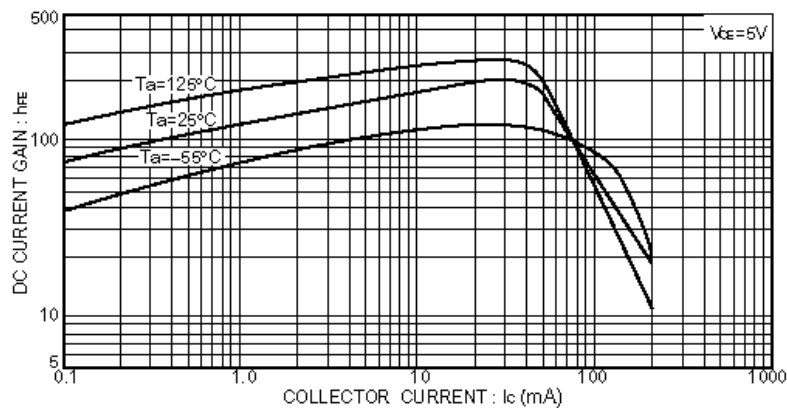


Fig.4 DC current gain vs. collector current (II)

RATING AND CHARACTERISTIC CURVES (MMBT3904W)

