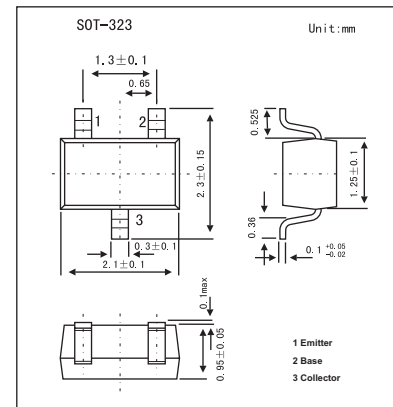
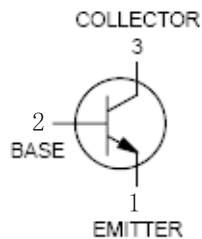


General Purpose Transistor

MMBT3904W

■ Features

- Pb-Free package is available.

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CE0}	40	V
Collector-base voltage	V_{CBO}	60	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	200	mA
Total Device Dissipation FR-5 Board	P_D	150	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

MMBT3904W■ Electrical Characteristics $T_a = 25^\circ\text{C}$

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1.0\text{ mA}, I_B = 0$	40			V
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 10\text{ }\mu\text{A}, I_E = 0$	60			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	6			V
Base cutoff current	I_{BL}	$V_{CE} = 30\text{ V}, V_{EB} = 3.0\text{ V}$			50	nA
Collector cutoff current	I_{CEX}	$V_{CE} = 30\text{ V}, V_{EB} = 3.0\text{ V}$			50	nA
DC current gain *	H_{FE}	$I_C = 0.1\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 50\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}$	40 70 100 60 30		300	
Collector-emitter saturation voltage *	$V_{CE(sat)}$	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$			0.2	V
		$I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$			0.3	
Base-emitter saturation voltage *	$V_{BE(sat)}$	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$	0.65		0.85	
		$I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$			0.95	
Current-gain-bandwidth product	f_T	$I_C = 10\text{ mA}, V_{CE} = 20\text{ V}, f = 100\text{ MHz}$	300			MHz
Output capacitance	C_{obo}	$V_{CB} = 5.0\text{ V}, I_E = 0, f = 1.0\text{ MHz}$			4	pF
Input capacitance	C_{ibo}	$V_{EB} = 0.5\text{ V}, I_C = 0, f = 1.0\text{ MHz}$			8	pF
Input impedance	h_{ie}	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ mA}, f = 1.0\text{ kHz}$	1.0		10	k Ω
Voltage feedback ratio	h_{re}	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ mA}, f = 1.0\text{ kHz}$	0.5		8.0	$\times 10^{-4}$
Small-signal current gain	h_{fe}	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ mA}, f = 1.0\text{ kHz}$	100		400	
Output admittance	h_{oe}	$V_{CE} = 10\text{ V}, I_C = 1.0\text{ mA}, f = 1.0\text{ kHz}$	1.0		40	μmhos
Noise figure	NF	$V_{CE} = 5.0\text{ V}, I_C = 100\text{ }\mu\text{A}, R_s = 1.0\text{ k}\Omega, f = 1.0\text{ kHz}$			5	dB
Delay time	t_d	$V_{CC} = 3.0\text{ V}, V = -0.5\text{ V}$			35	ns
Rise time	t_r	$I_C = 10\text{ mA}, I_{B1} = 1.0\text{ mA}$			35	ns
Storage time	t_s	$V_{CC} = 3.0\text{ V}, I_C = 10\text{ mA}$			200	ns
Fall time	t_f	$I_{B1} = I_{B2} = 1.0\text{ mA}$			50	ns

* Pulse test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2.0\%$.

■ Marking

Marking	AM
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