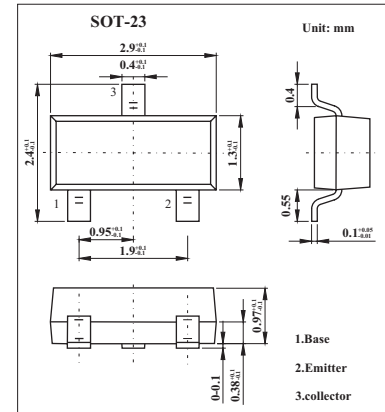


NPN Transistors

KMBT3904(MMBT3904)

■ Features

- Epitaxial planar die construction



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

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V_{CBO}	60	V
Collector - Emitter Voltage	V_{CEO}	40	V
Emitter - Base Voltage	V_{EBO}	6	V
Collector Current - Continuous	I_C	0.2	A
Collector Power Dissipation	P_C	0.2	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to 150	$^\circ\text{C}$

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

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Collecto- base breakdown voltage	V_{CBO}	$I_C = 100 \mu\text{A}$, $I_E = 0$	60			V
Collector- emitter breakdown voltage	V_{CEO}	$I_C = 1 \text{mA}$, $I_B = 0$	40			V
Emitter - base breakdown voltage	V_{EBO}	$I_E = 10 \mu\text{A}$, $I_C = 0$	6			V
Collector cut-off current	I_{CBO}	$V_{CB} = 60 \text{V}$, $I_E = 0$			0.1	μA
Collector cut-off current	I_{CEO}	$V_{CE} = 30 \text{V}$, $V_{BE(off)} = 3\text{V}$			50	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5 \text{V}$, $I_C = 0$			0.1	μA
DC current gain	h_{FE}	$V_{CE} = 1\text{V}$, $I_C = 10\text{mA}$	100		400	
		$V_{CE} = 1\text{V}$, $I_C = 50\text{mA}$	60			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 50 \text{mA}$, $I_B = 5\text{mA}$			0.3	V
Base - emitter saturation voltage	$V_{BE(sat)}$	$I_C = 50 \text{mA}$, $I_B = 5\text{mA}$			0.95	V
Delay time	t_d	$V_{CC} = 3.0\text{V}$, $V_{BE} = -0.5\text{V}$			35	ns
Rise time	t_r	$I_C = 10\text{mA}$, $I_{B1} = -I_{B2} = 1.0\text{mA}$			35	
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	
Transition frequency	f_T	$V_{CE} = 20\text{V}$, $I_C = 10\text{mA}$, $f = 100\text{MHz}$	250			MHz

■ Marking

Marking	1AM
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KMBT3904(MMBT3904)

■ Typical Characteristics

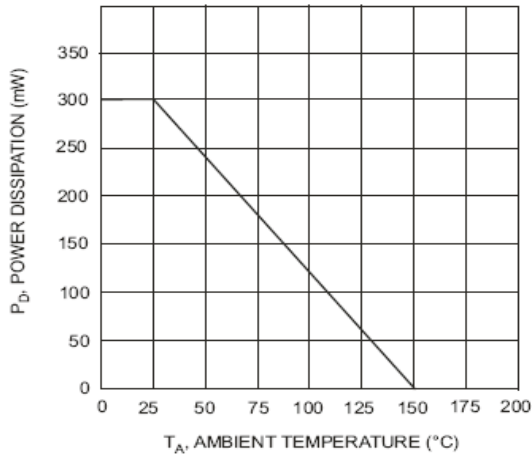


Fig.1 Max Power Dissipation vs Ambient Temperature

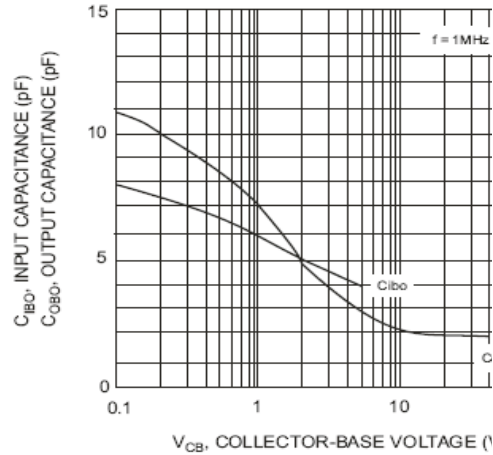


Fig.2 Input and Output Capacitance vs. Collector-Base Voltage

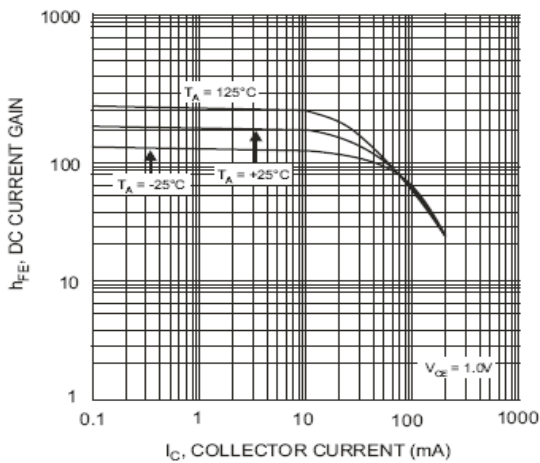


Fig.3 Typical DC Current Gain vs Collector Current

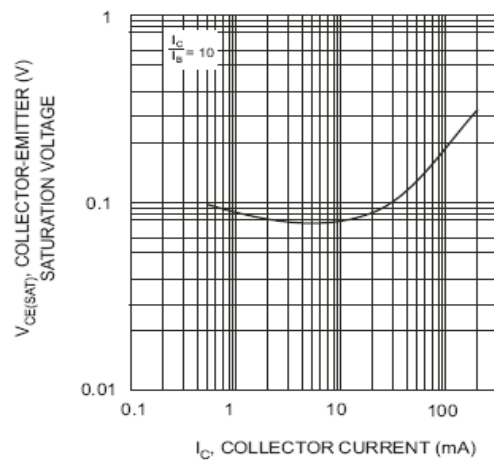


Fig.4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

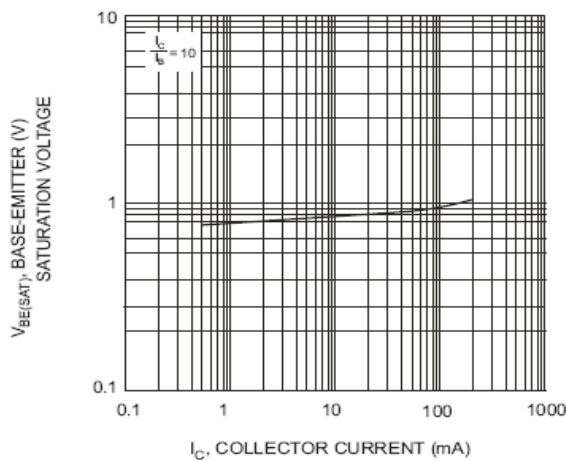


Fig.5 Typical Base-Emitter Saturation Voltage vs. Collector Current