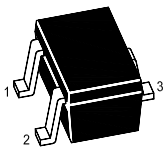
MMBT3904W

NPN Silicon Epitaxial Planar Transistor

for switching and amplifier applications



1.Base 2.Emitter 3.Collector
SOT-323 Plastic Package

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

Characteristics at T_a = 25 °C

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

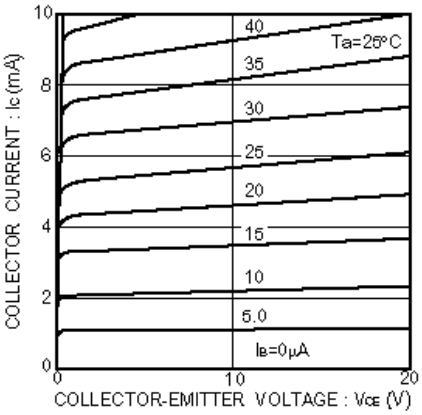


Fig.1 Grounded emitter output characteristics

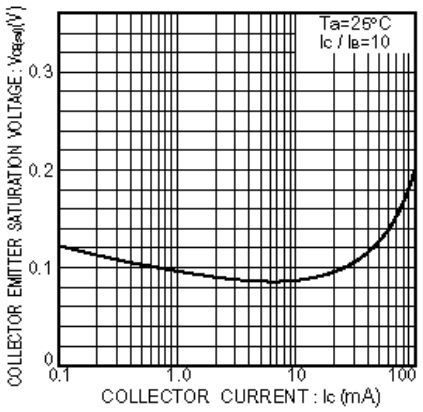


Fig.2 Collector-emitter saturation voltage vs. collector current

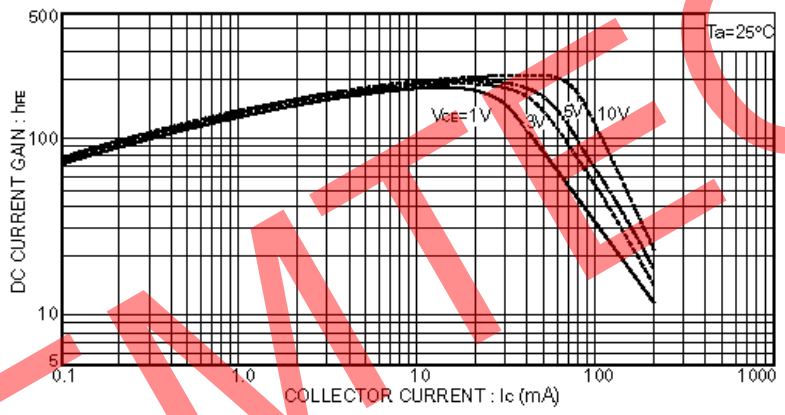


Fig.3 DC current gain vs. collector current (I)

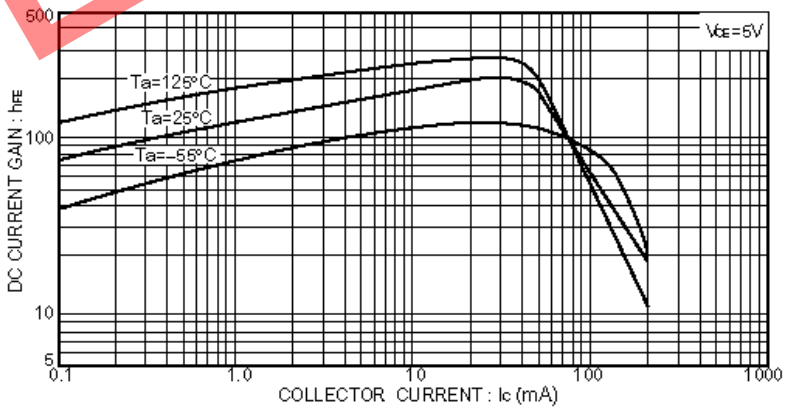


Fig.4 DC current gain vs. collector current (II)

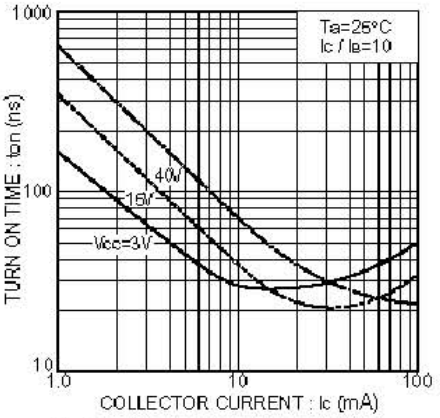


Fig.5 Turn-on time vs. collector current

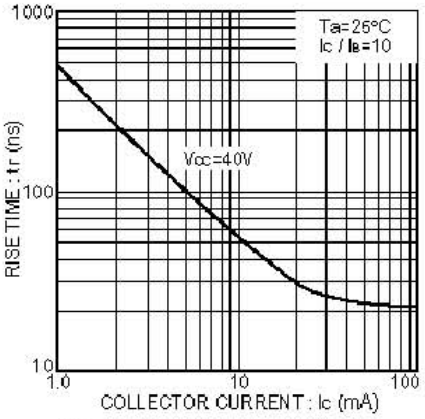


Fig.6 Rise time vs. collector current

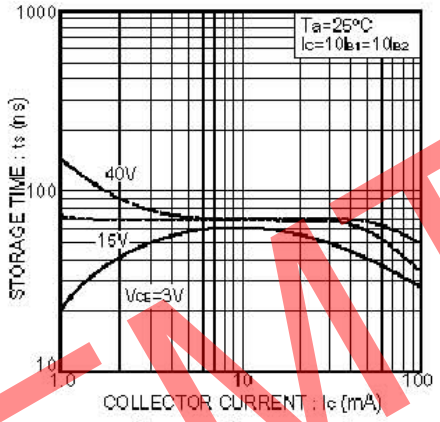


Fig.7 Storage time vs. collector current

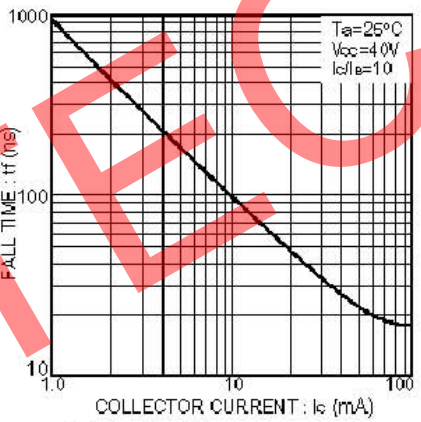


Fig.8 Fall time vs. collector current

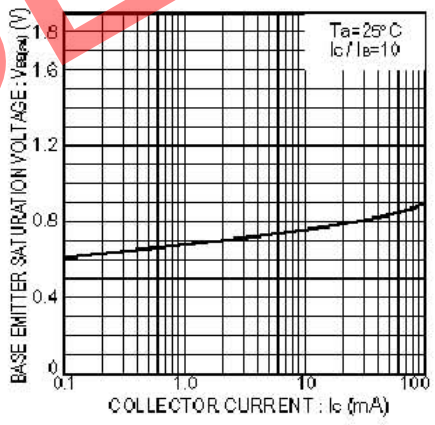


Fig.9 Base-emitter saturation voltage vs. collector current

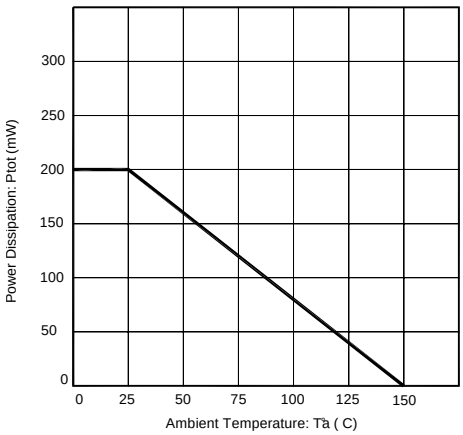


Fig.10 Power Dissipation vs Ambient Temperature