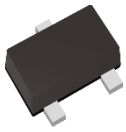
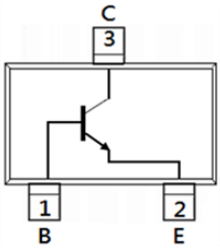
MMBT3904TB

NPN General Purpose Switching Transistor

Voltage	40V	Current	200mA

SOT-523





Features

- Silicon NPN planar design
- Collector-Emitter Voltage VCE = 40V
- Collector Current IC = 200mA
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 Standard

Mechanical Data

- Case : SOT-523 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.002 grams

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNITS
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current (DC)	I_C	200	mA
Collector Power Dissipation	P_D	150	mW
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55~150	°C
Thermal Resistance from Junction to Ambient(Note 1)	$R_{\theta JA}$	833	°C/W

Note 1 : Mounted on FR4 PCB at 1 inch square copper pad.

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Electrical Characteristics (T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
OFF Characteristics						
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= 1mA, I_B= 0A	40	-	-	V
Collector-Base Breakdown Voltage	BV_{CBO}	I_C= 10uA, I_E= 0A	60	-	-	V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= 10uA, I_C= 0A	6	-	-	V
Base Cutoff Current	I_{BL}	V_{CE}= 30V, V_{EB}= 3V	-	-	50	nA
Collector Cutoff Current	I_{CEX}	V_{CE}= 30V, V_{EB}= 3V	-	-	50	nA
ON characteristics						
DC Current Gain(Note 2)	h_{FE}	V_{CE}= 1V, I_C= 0.1mA	40	-	-	-
		V_{CE}= 1V, I_C= 1mA	70	-	-	
		V_{CE}= 1V, I_C= 10mA	100	-	300	
		V_{CE}= 1V, I_C= 50mA	60	-	-	
		V_{CE}= 1V, I_C= 100mA	30	-	-	
Collector-Emitter Saturation Voltage(Note 2)	$V_{CE(SAT)}$	I_C= 10mA, I_B= 1mA	-	-	200	mV
		I_C= 50mA, I_B= 5mA	-	-	300	
Base-Emitter Saturation voltage(Note 2)	$V_{BE(SAT)}$	I_C= 10mA, I_B= 1mA	650	-	850	mV
		I_C= 50mA, I_B= 5mA	-	-	950	
Collector-Base Capacitance	C_{CBO}	V_{CB}= 5V I_E= 0A, f=1MHz	-	-	4	pF
Emitter-Base Capacitance	C_{EBO}	V_{EB}= 0.5V I_C= 0A, f=1MHz	-	-	8	pF
Delay Time	Td	Vcc= 3V, V_{BE}= 0.5V	-	-	35	nS
Rise Time	Tr	I_C= 10mA, I_B= 1mA	-	-	35	nS
Storage Time	Ts	Vcc= 3V, I_C= 10mA	-	-	200	nS
Fall Time	Tf	I_{B1}= I_{B2} = 1mA	-	-	50	

Note 2 : Pulse Test: Pulse Width < 300uS , Duty Cycle < 2%

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TYPICAL CHARACTERISTIC CURVES

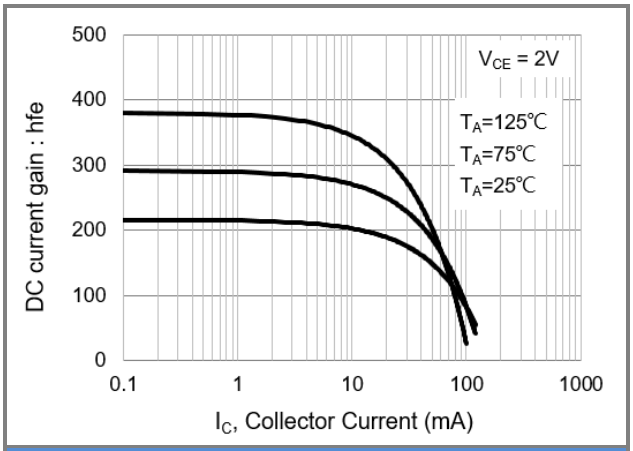

Fig.1 DC Current Gain

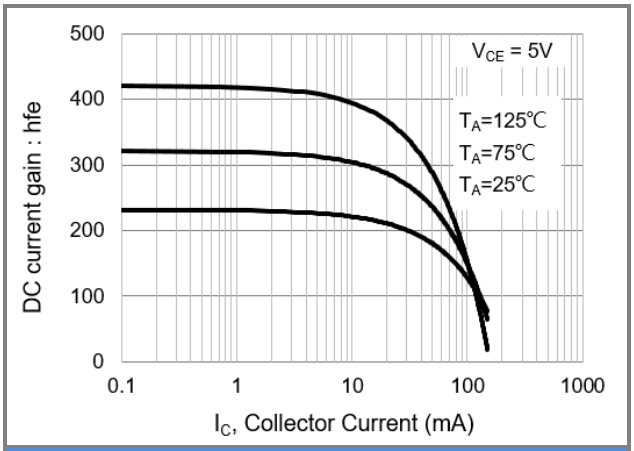

Fig.2 DC Current Gain

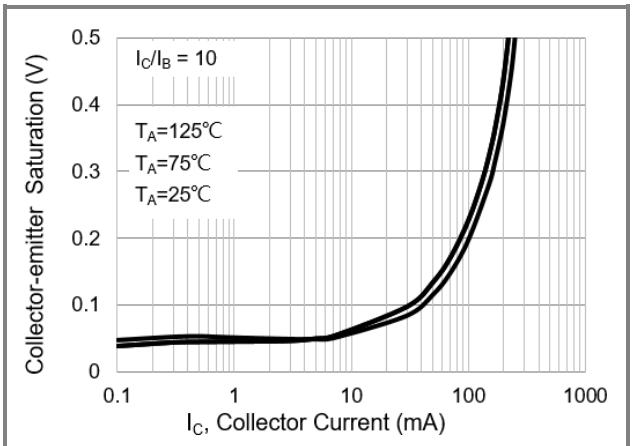

Fig.3 Collector-Emitter Saturation Voltage

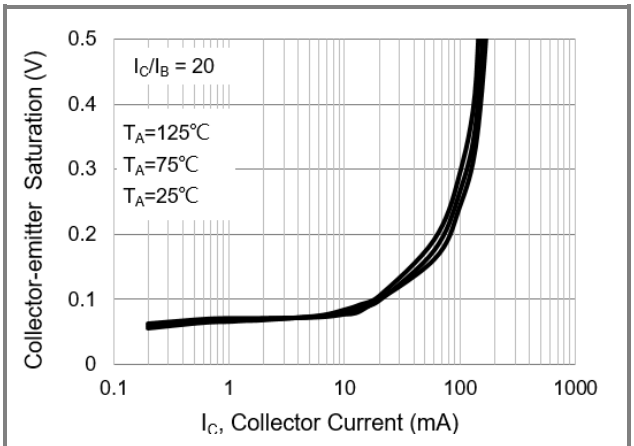

Fig.4 Collector-Emitter Saturation Voltage

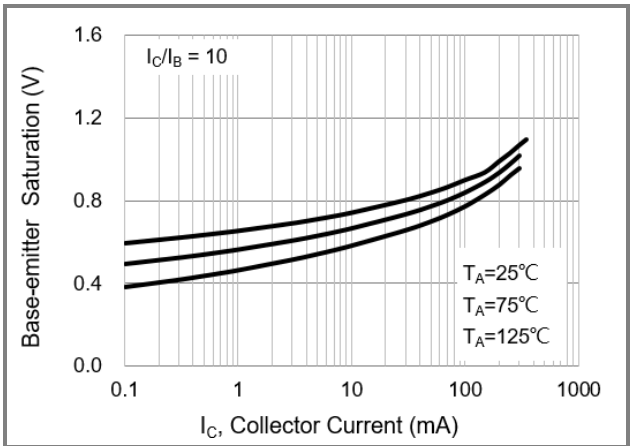

Fig.5 Base-Emitter Saturation Voltage

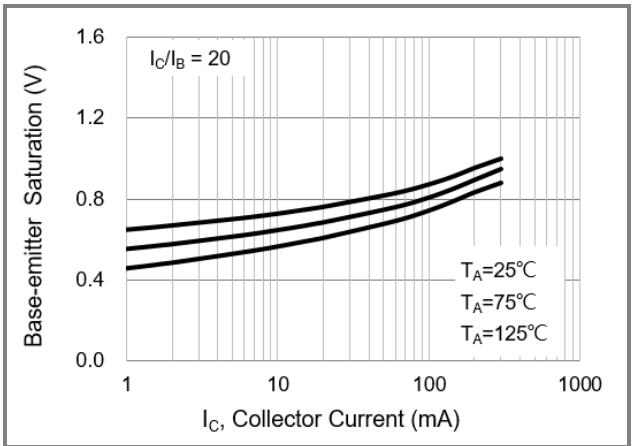

Fig.6 Base-Emitter Saturation Voltage

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TYPICAL CHARACTERISTIC CURVES

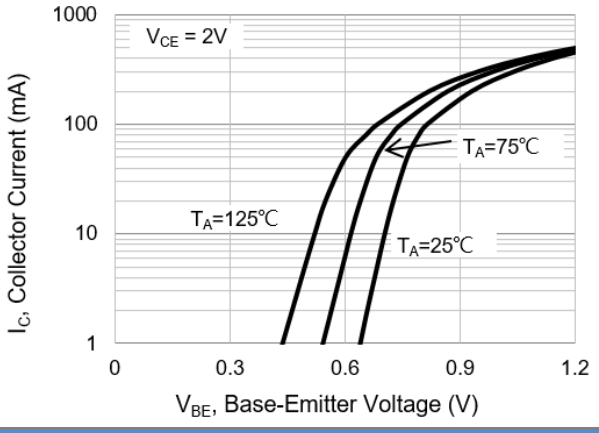


Fig.7 Base-Emitter Voltage

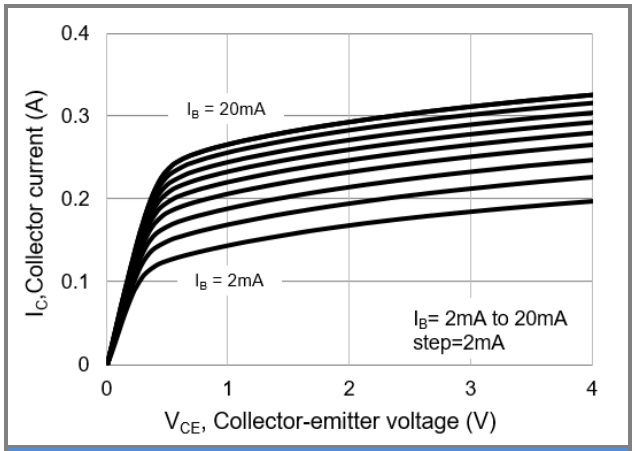


Fig.8 Collector Current

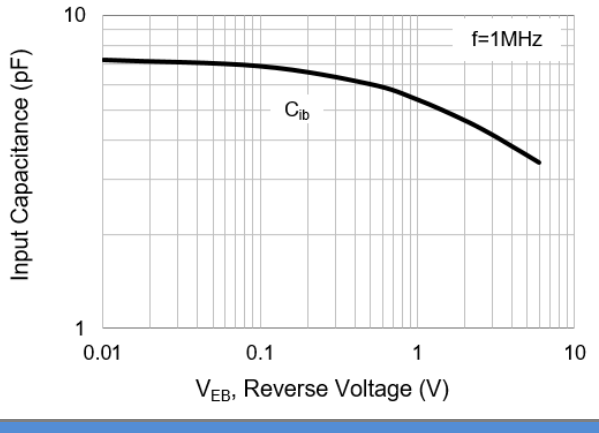


Fig.9 Input Capacitance

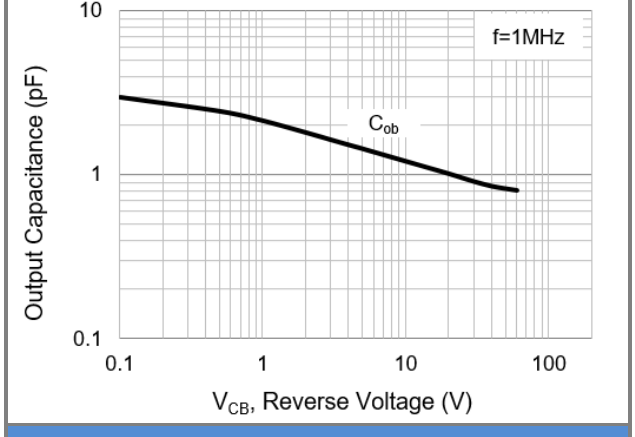


Fig.10 Output Capacitance

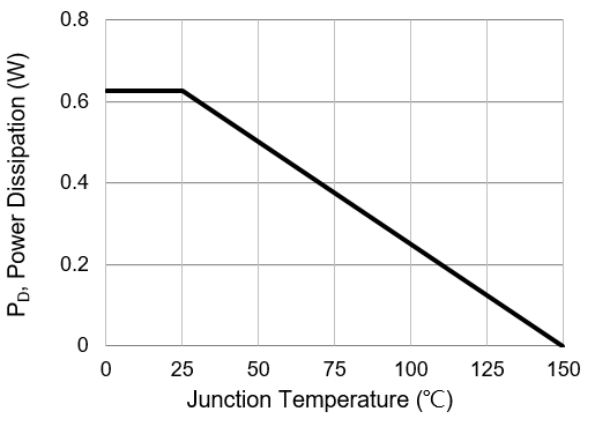


Fig.11 Power Derating Curve

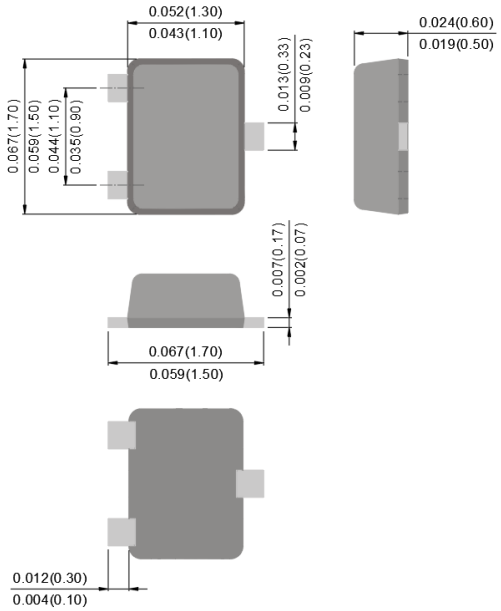
MMBT3904TB

Product and Packing Information

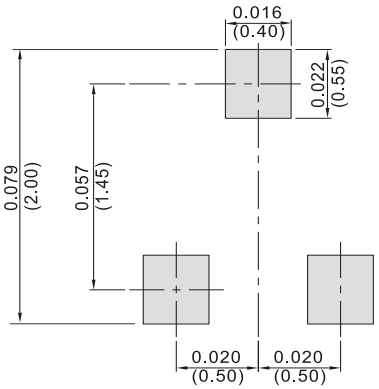
Part No.	Package Type	Packing Type	Marking
MMBT3904TB	SOT-523	4K pcs / 7” reel	4E

Packaging Information & Mounting Pad Layout

SOT-523 Dimension — Unit: inch(mm)



SOT-523 Pad Layout — Unit: inch(mm)



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