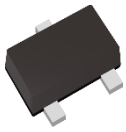
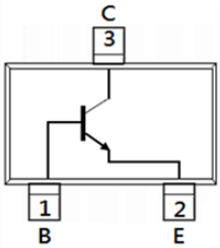
MMBT3904TB

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.

MMBT3904TB

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%

MMBT3904TB

TYPICAL CHARACTERISTIC CURVES

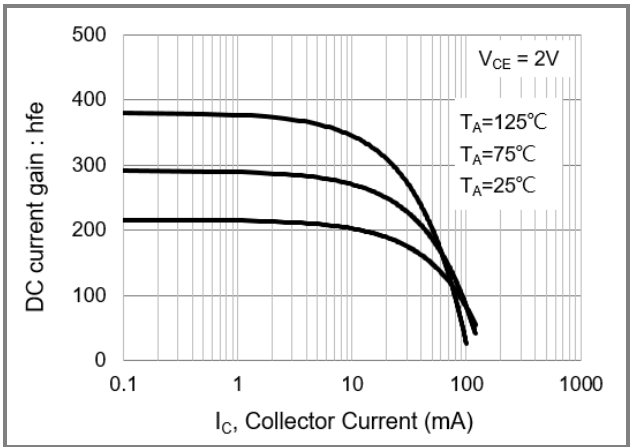


Fig.1 DC Current Gain

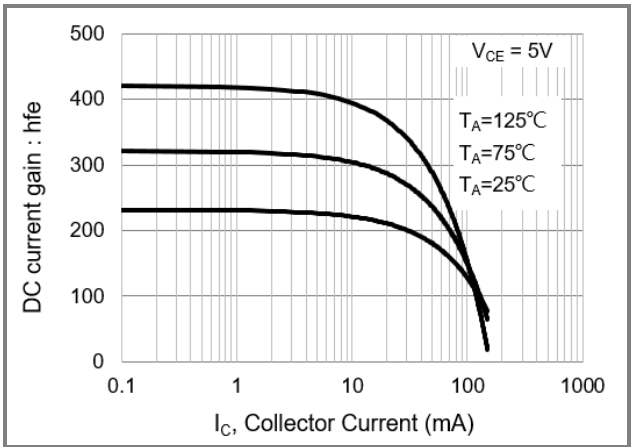


Fig.2 DC Current Gain

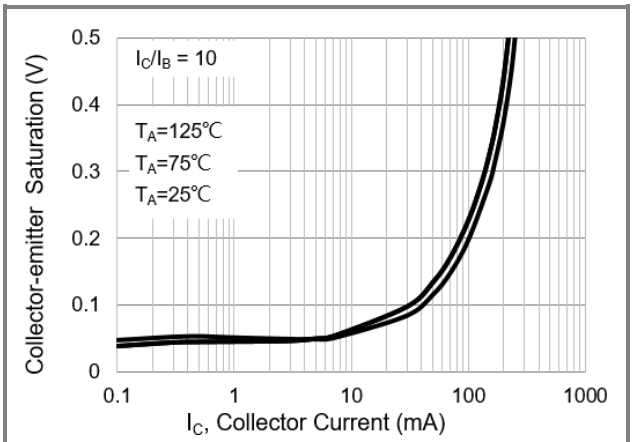


Fig.3 Collector-Emitter Saturation Voltage

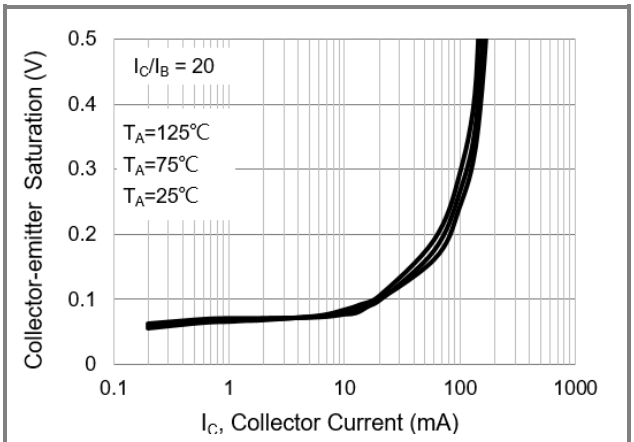


Fig.4 Collector-Emitter Saturation Voltage

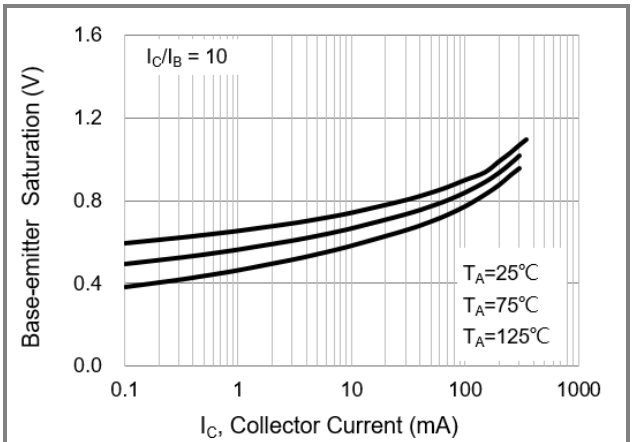


Fig.5 Base-Emitter Saturation Voltage

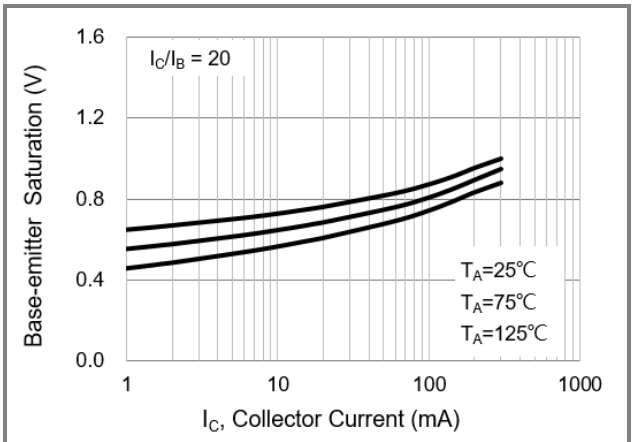


Fig.6 Base-Emitter Saturation Voltage

MMBT3904TB

TYPICAL CHARACTERISTIC CURVES

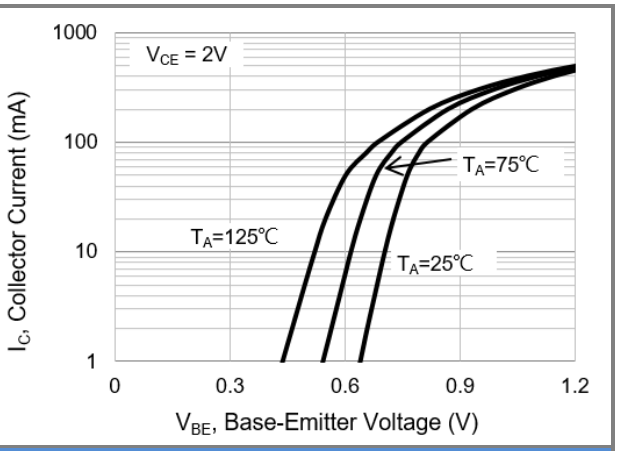


Fig.7 Base-Emitter Voltage

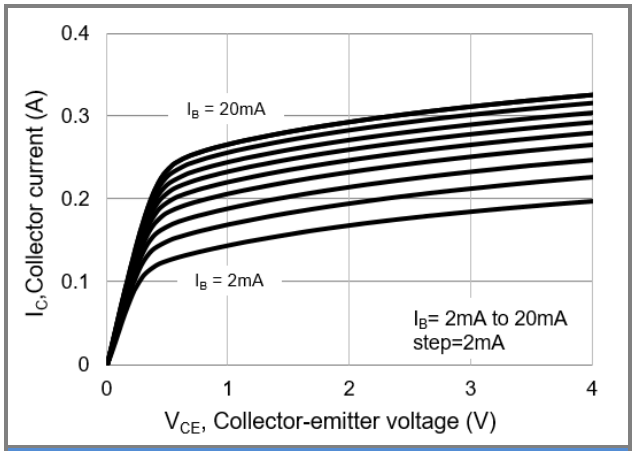


Fig.8 Collector Current

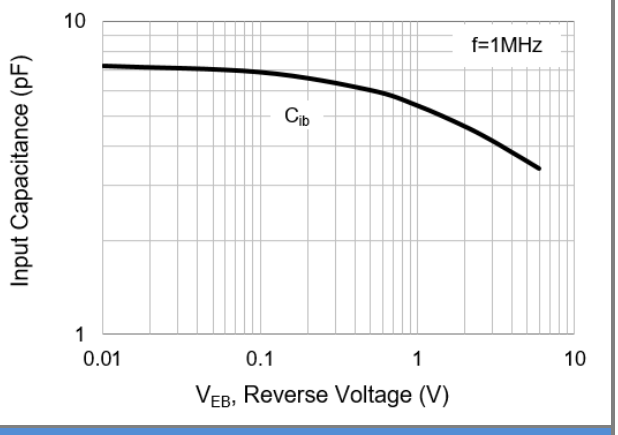


Fig.9 Input Capacitance

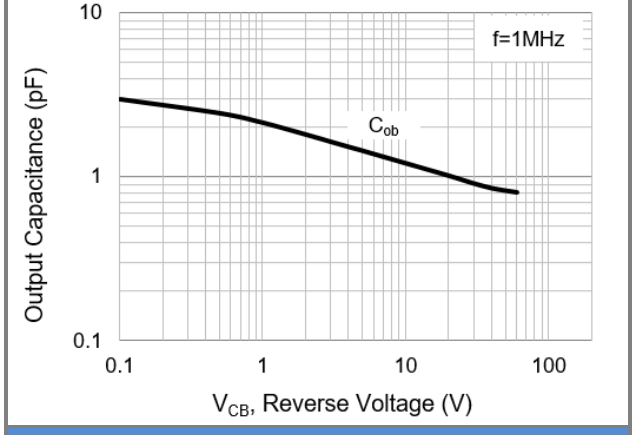


Fig.10 Output Capacitance

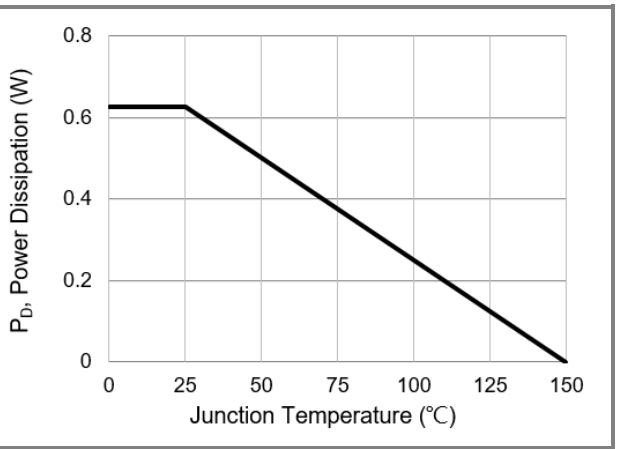


Fig.11 Power Derating Curve

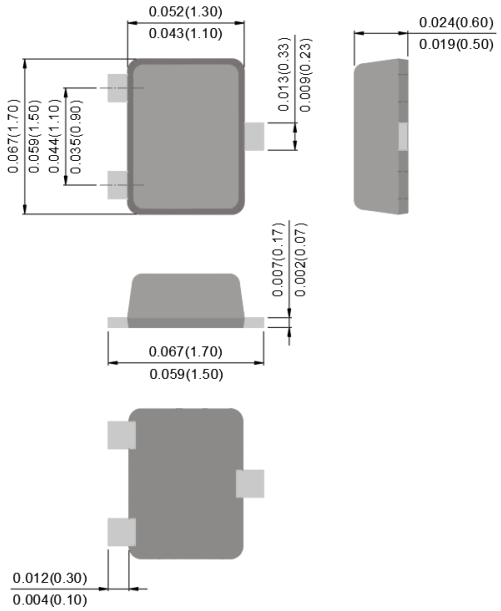
MMBT3904TB

Product and Packing Information

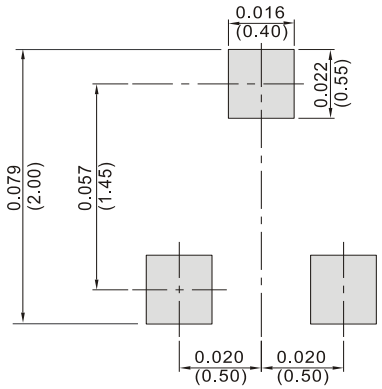
Part No.	Package Type	Packing Type	Marking
MMBT3904TB	SOT-523	4K pcs / 7” reel	4E

Packaging Information & Mounting Pad Layout

SOT-523 Dimension — Unit: inch(mm)



SOT-523 Pad Layout — Unit: inch(mm)



Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Panjit International Inc..
- Panjit International Inc. reserves the rights to make changes of the content herein the document anytime without notification. Please refer to our website for the latest document.
- Panjit International Inc. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Panjit International Inc. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Panjit International Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panjit International Inc. for any damages resulting from such improper use or sale.
- Since Panjit uses lot number as the tracking base, please provide the lot number for tracking when complaining.