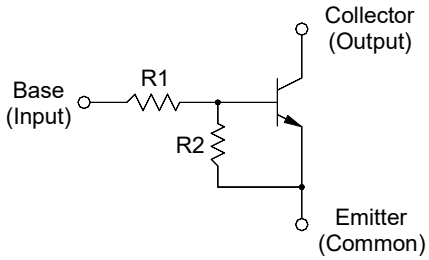
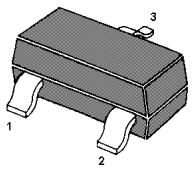
MMBTRC101SS~MMBTRC106SS

NPN Silicon Epitaxial Planar Digital Transistors

For switching and interface circuit and drive circuit applications





1. Base 2. Emitter 3. Collector

SOT-23 Plastic Package

Features

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process

Resistor Values

Type	R1 (KΩ)	R2 (KΩ)	Type	R1 (KΩ)	R2 (KΩ)
MMBTRC101SS	4.7	4.7	MMBTRC104SS	47	47
MMBTRC102SS	10	10	MMBTRC105SS	2.2	47
MMBTRC103SS	22	22	MMBTRC106SS	4.7	47

Absolute Maximum Ratings (T_a = 25 °C)

Parameter		Symbol	Value	Unit
Collector Base Voltage		V_{CBO}	50	V
Collector Emitter Voltage		V_{CEO}	50	V
Emitter Base Voltage	MMBTRC101SS	V_{EBO}	20, -10	V
	MMBTRC102SS		30, -10	
	MMBTRC103SS		40, -10	
	MMBTRC104SS		40, -10	
	MMBTRC105SS		12, -5	
	MMBTRC106SS		20, -5	
Collector Current		I_C	100	mA
Peak Collector Current, Pulsed		I_{CM}	100	mA
Total Power Dissipation		P_{tot}	200	mW
Operating Junction and Storage Temperature Range		T_j ,T_{stg}	- 55 to + 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient [1]	$R_{\theta JA}$	625	°C/W

[1] Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Dated: 11/11/2022 Rev: 06

Characteristics at T_a = 25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at V_{CE} = 5 V, I_C = 10 mA	MMBTRC101SS	h_{FE}	30	-	-	-
	MMBTRC102SS		50	-	-	-
	MMBTRC103SS		70	-	-	-
	MMBTRC104SS		80	-	-	-
	MMBTRC105SS		80	-	-	-
	MMBTRC106SS		80	-	-	-
Collector Base Breakdown Voltage at I_C = 10 μA		$V_{(BR)CBO}$	50	-	-	V
Collector Emitter Breakdown Voltage at I_C = 1 mA		$V_{(BR)CEO}$	50	-	-	V
Collector Base Cutoff Current at V_{CB} = 50 V		I_{CBO}	-	-	500	nA
Collector Emitter Cutoff Current at V_{CE} = 50 V		I_{CEO}	-	-	500	nA
Emitter Base Cutoff Current						
at V_{EB} = 5 V	MMBTRC101SS	I_{EBO}	-	-	1.8	mA
	MMBTRC102SS		-	-	0.88	
	MMBTRC103SS		-	-	0.36	
	MMBTRC104SS		-	-	0.18	
	MMBTRC105SS		-	-	3.6	
	MMBTRC106SS		-	-	1.8	
Collector Emitter Saturation Voltage at I_C = 10 mA, I_B = 0.5 mA		$V_{CE(sat)}$	-	-	0.3	V
Input Voltage (ON)						
at V_{CE} = 0.2 V, I_C = 5 mA	MMBTRC101SS	$V_{I(ON)}$	-	-	2	V
	MMBTRC102SS		-	-	2.4	
	MMBTRC103SS		-	-	3	
	MMBTRC104SS		-	-	5	
	MMBTRC105SS		-	-	1.1	
	MMBTRC106SS		-	-	1.3	
Input Voltage (OFF)						
at V_{CE} = 5 V, I_C = 0.1 mA	MMBTRC101SS~104SS	$V_{I(OFF)}$	1	-	-	V
	MMBTRC105SS~106SS		0.5	-	-	
Transition Frequency at V_{CE} = 10 V, I_C = 5 mA		f_T [1)]	-	200	-	MHz
Input Resistance	MMBTRC101SS	R1	- 30%	4.7	+ 30%	KΩ
	MMBTRC102SS			10		
	MMBTRC103SS			22		
	MMBTRC104SS			47		
	MMBTRC105SS			2.2		
	MMBTRC106SS			4.7		
Resistance Ratio						
	MMBTRC101SS~104SS	R2/R1	0.8	1	1.2	-
	MMBTRC105SS		17	21	26	-
	MMBTRC106SS		8	10	12	-

[1)] Characteristic of transistor only.

Electrical Characteristics Curves: MMBTRC101SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

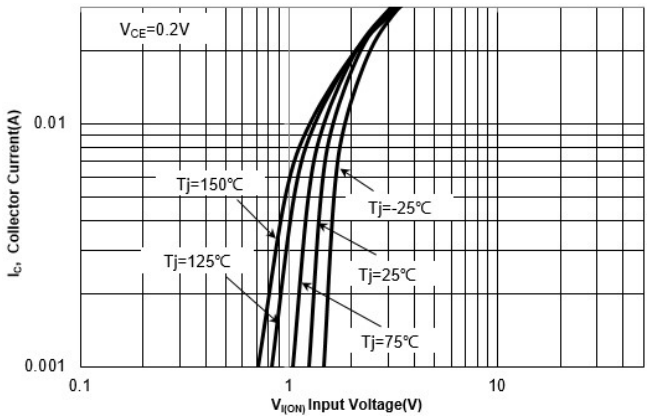


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage

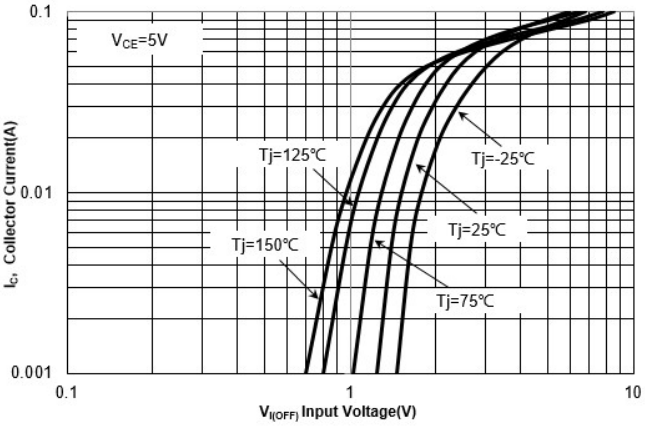


Fig. 3 DC Current Gain vs. Collector Current

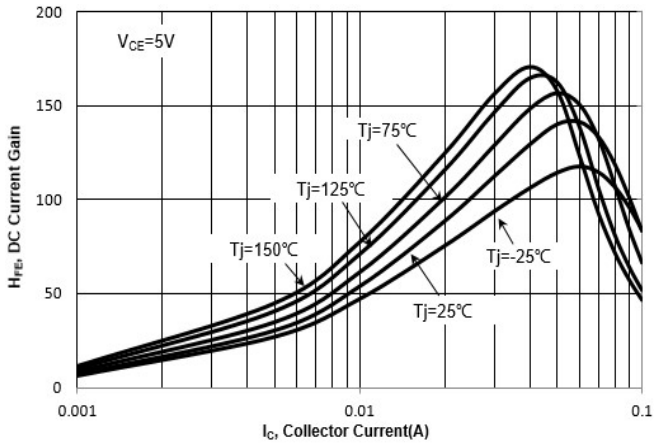
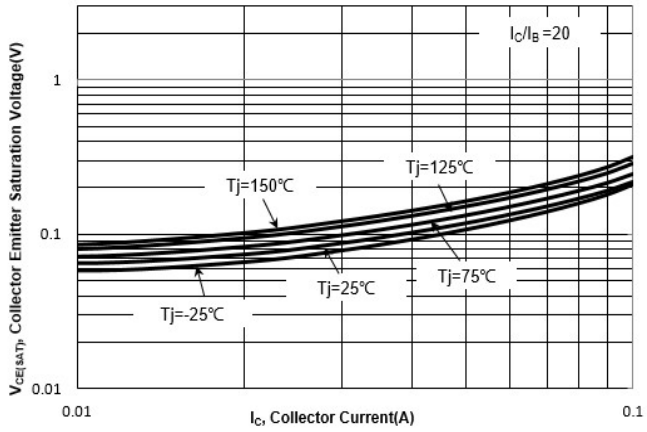


Fig. 4 V_{CESAT} vs. Collector Current



Electrical Characteristics Curves: MMBTRC102SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

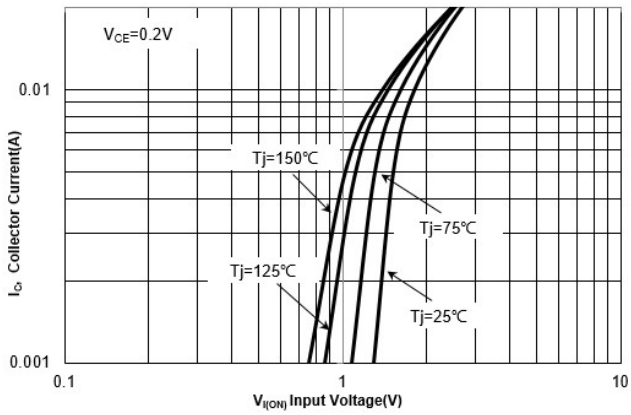
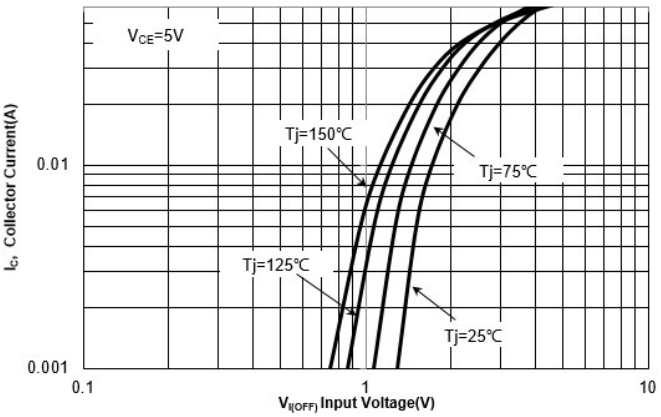


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage



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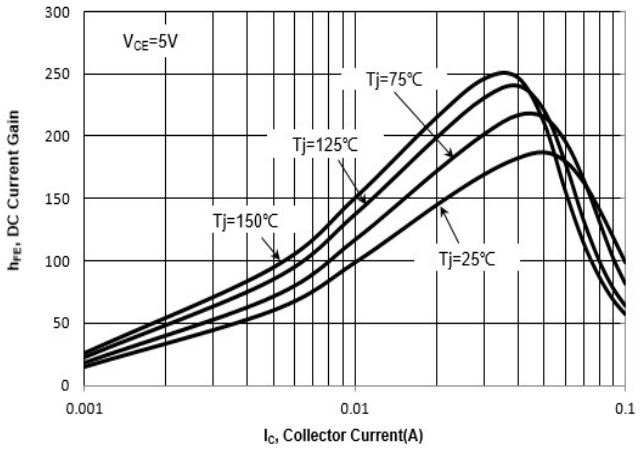
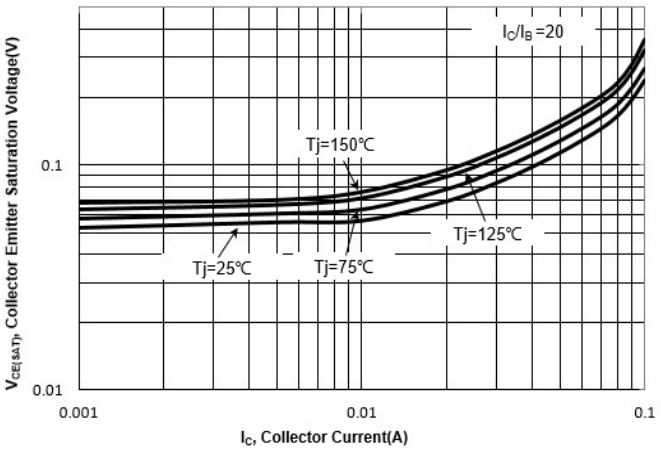


Fig. 4 V_{CESAT} vs. Collector Current



Electrical Characteristics Curves: MMBTRC103SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

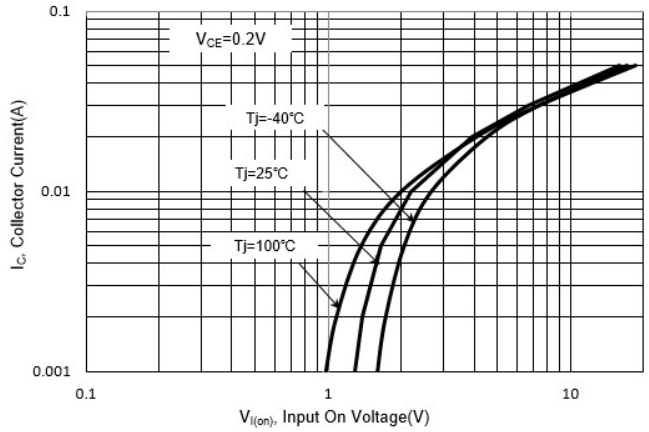


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage

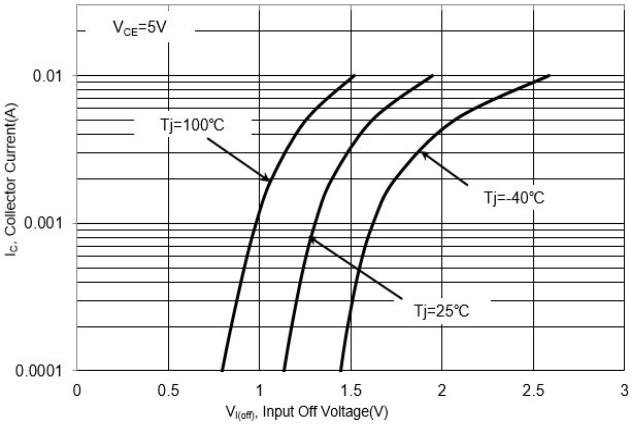


Fig. 3 DC Current Gain vs. Collector Current

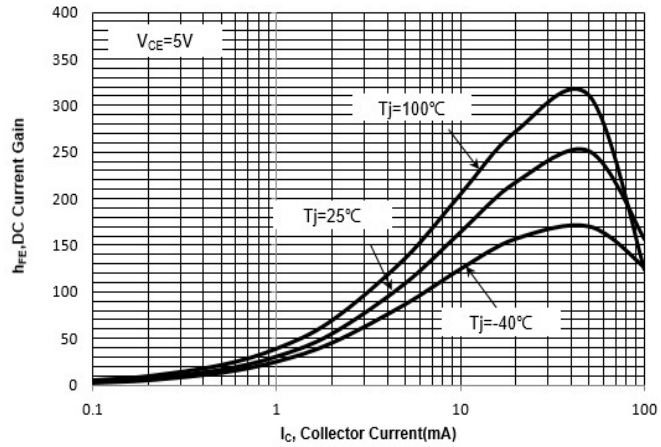
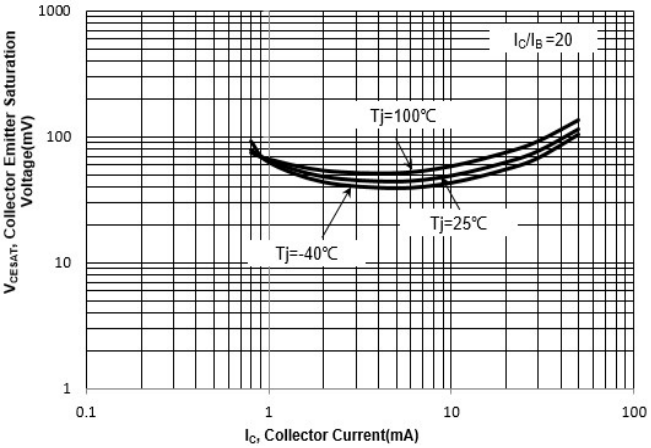


Fig. 4 V_{CESAT} vs. Collector Current



Electrical Characteristics Curves: MMBTRC104SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

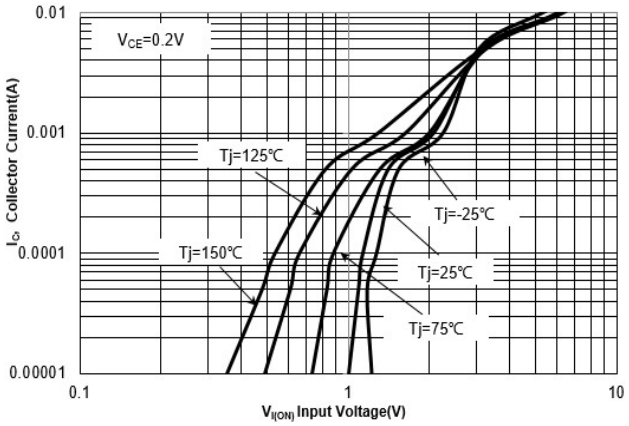


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage

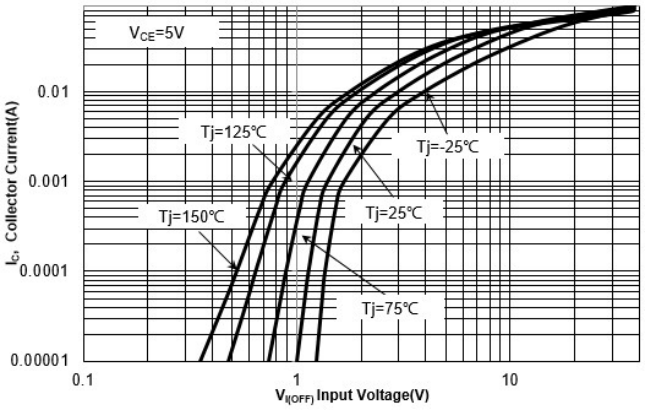


Fig. 3 DC Current Gain vs. Collector Current

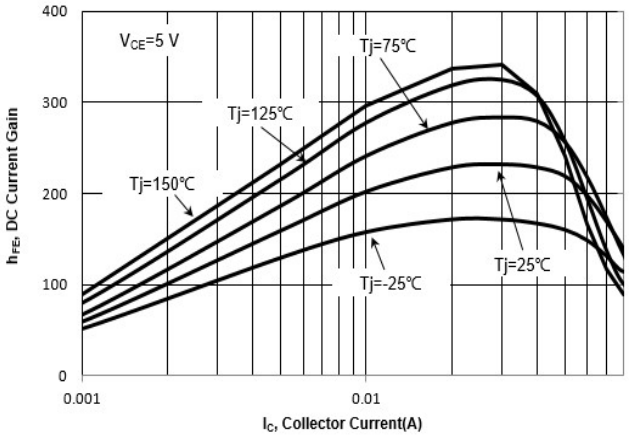
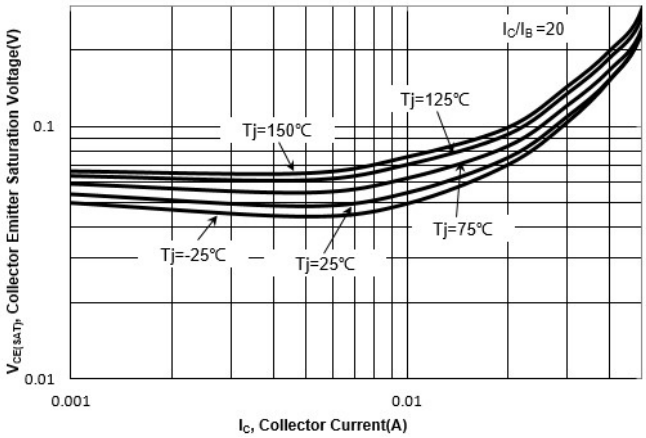


Fig. 4 V_{CESAT} vs. Collector Current



Electrical Characteristics Curves: MMBTRC105SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

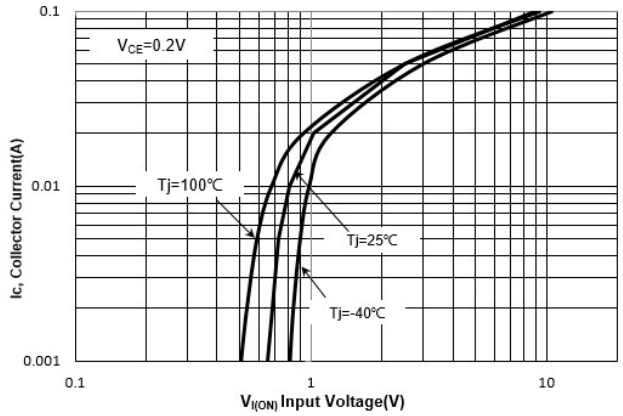


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage

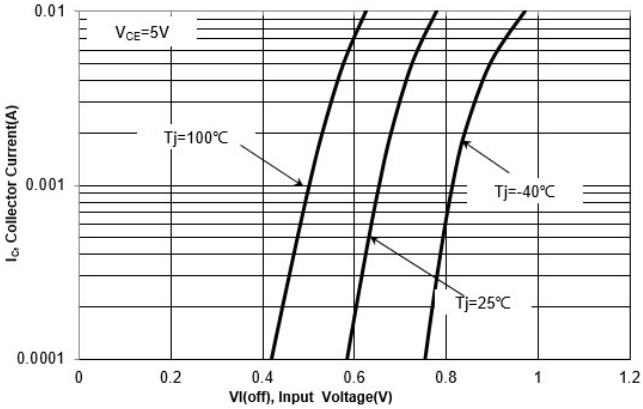


Fig. 3 DC Current Gain vs. Collector Current

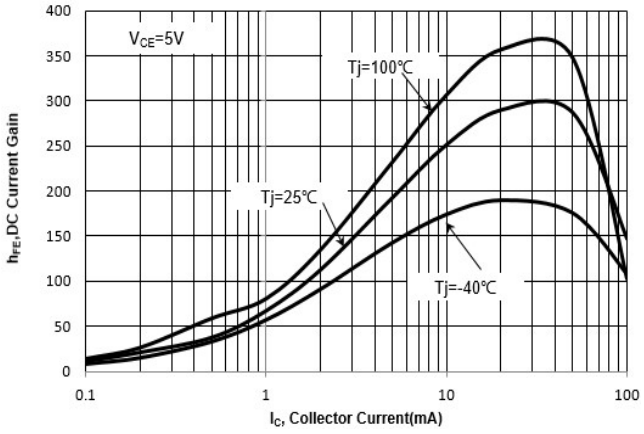
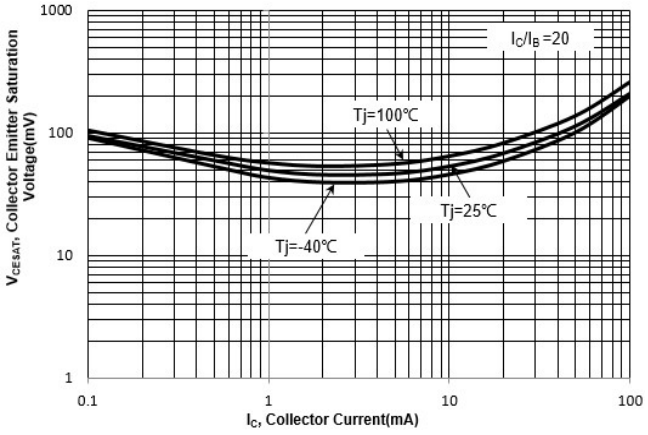


Fig. 4 V_{CESAT} vs. Collector Current



Electrical Characteristics Curves: MMBTRC106SS

Fig. 1 Collector Current vs. $V_{I(ON)}$, Input Voltage

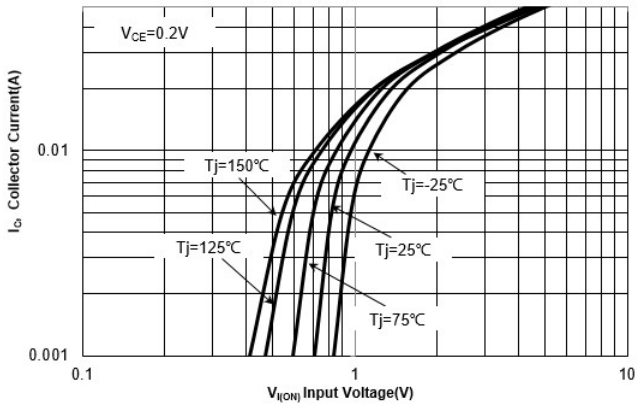


Fig. 2 Collector Current vs. $V_{I(OFF)}$, Input Voltage

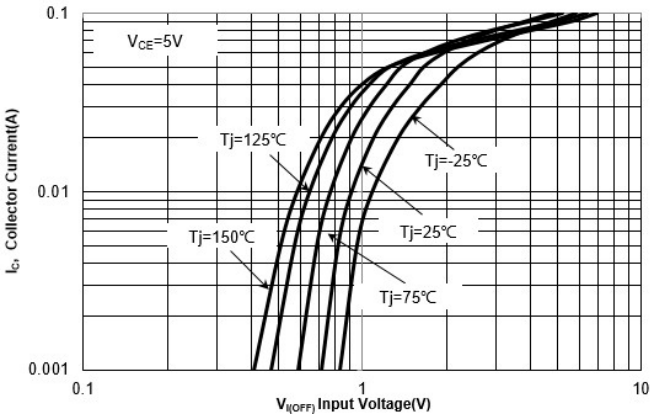


Fig. 3 DC Current Gain vs. Collector Current

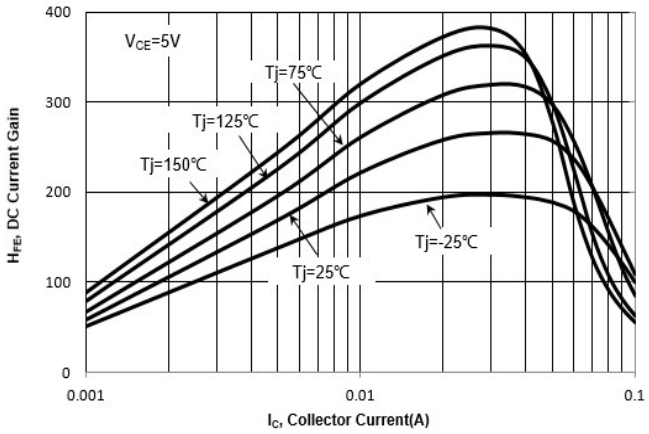
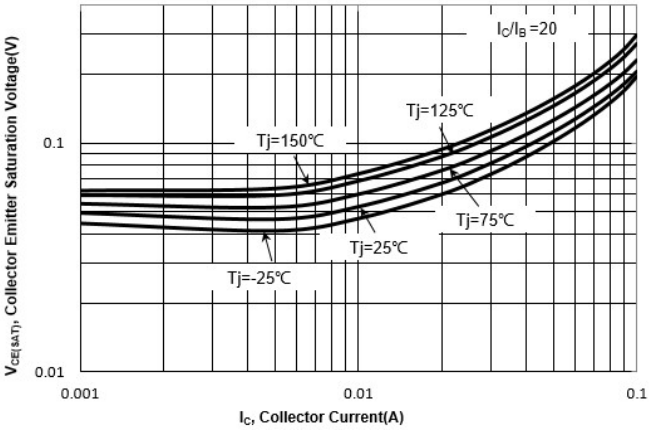
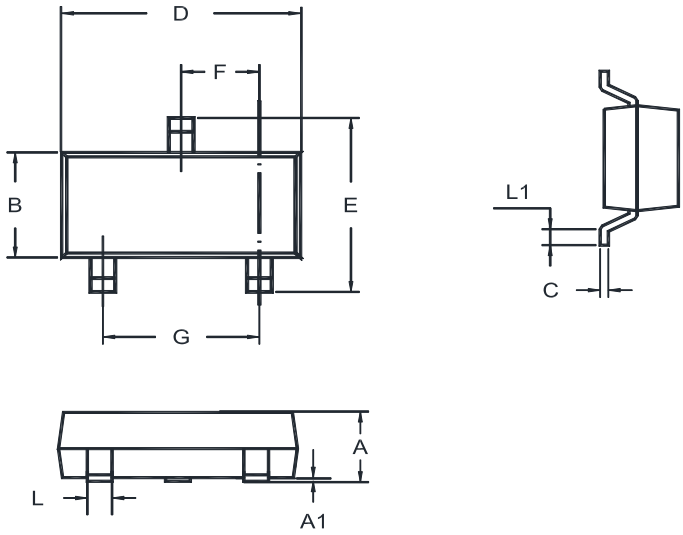


Fig. 4 V_{CESAT} vs. Collector Current

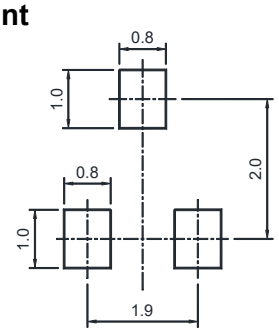


Package Outline (Dimensions in mm) SOT-23



Unit	A	A1	B	C	D	E	F	G	L	L1
mm	1.20 0.89	0.100 0.013	1.40 1.20	0.19 0.08	3.04 2.80	2.6 2.2	1.02 0.89	2.04 1.78	0.51 0.37	0.2 MIN

Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-23	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" ** " = Part No.

MMBTRC101SS:HP MMBTRC102SS:HN

MMBTRC103SS:HR MMBTRC104SS:HX

MMBTRC105SS:HY MMBTRC106SS:HZ

"YM" = Date Code Marking

"Y" = Year

"M" = Month

Font type: Arial