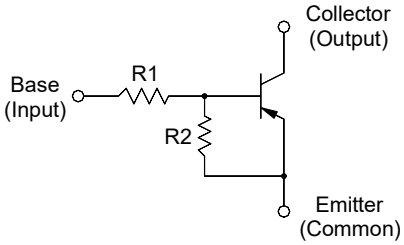
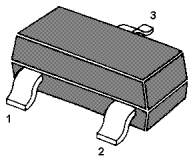
MMBTRA101SS…MMBTRA106SS

PNP Silicon Epitaxial Planar Digital Transistors

Features

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





1.Base 2.Emitter 3.Collector

SOT-23 Plastic Package

Applications

- For switching and interface circuit and drive circuit

Resistor Values

Type	R1 (KΩ)	R2 (KΩ)	Type	R1 (KΩ)	R2 (KΩ)
MMBTRA101SS	4.7	4.7	MMBTRA104SS	47	47
MMBTRA102SS	10	10	MMBTRA105SS	2.2	47
MMBTRA103SS	22	22	MMBTRA106SS	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
Input Voltage	MMBTRA101SS	V_I	20, -10	V
	MMBTRA102SS		40, -10	
	MMBTRA103SS		40, -10	
	MMBTRA104SS		40, -10	
	MMBTRA105SS		12, -5	
	MMBTRA106SS		20, -5	
Collector Current		$-I_C$	100	mA
Total Power Dissipation		P_{tot}	200	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	- 55 to + 150	°C

Thermal Characteristics

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

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

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Characteristics at T_a = 25 °C

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA	MMBTRA101SS	h_{FE}	30	-	-	-
	MMBTRA102SS		50	-	-	-
	MMBTRA103SS		70	-	-	-
	MMBTRA104SS		80	-	-	-
	MMBTRA105SS		80	-	-	-
	MMBTRA106SS		80	-	-	-
Collector Emitter Cutoff Current at $-V_{CE}$ = 50 V		$-I_{CEO}$	-	-	500	nA
Emitter Base Cutoff Current						
at $-V_{EB}$= 5 V	MMBTRA101SS	$-I_{EBO}$	-	-	1.8	mA
	MMBTRA102SS		-	-	0.88	
	MMBTRA103SS		-	-	0.36	
	MMBTRA104SS		-	-	0.18	
	MMBTRA105SS		-	-	3.6	
	MMBTRA106SS		-	-	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	MMBTRA101SS	$-V_{I(ON)}$	-	-	2	V
	MMBTRA102SS		-	-	2.4	
	MMBTRA103SS		-	-	3	
	MMBTRA104SS		-	-	5	
	MMBTRA105SS		-	-	1.1	
	MMBTRA106SS		-	-	1.3	
Input Voltage (OFF)						
at $-V_{CE}$ = 5 V, $-I_C$ = 0.1 mA	MMBTRA101SS~104SS	$-V_{I(OFF)}$	1	-	-	V
	MMBTRA105SS~106SS		0.5	-	-	
Transition Frequency at $-V_{CE}$ = 10 V, $-I_C$ = 5 mA		f_T [1)]	-	200	-	MHz
Input Resistance						
	MMBTRA101SS	R1	- 30%	4.7	+ 30%	KΩ
	MMBTRA102SS			10		
	MMBTRA103SS			22		
	MMBTRA104SS			47		
	MMBTRA105SS			2.2		
	MMBTRA106SS			4.7		
Resistance Ratio						
	MMBTRA101SS~104SS	R2/R1	0.8	1	1.2	-
	MMBTRA105SS		17	21	26	-
	MMBTRA106SS		8	10	12	-

[1)] Characteristic of transistor only.

Electrical Characteristics Curve (MMBTRA101SS)

Fig. 1 Collector Current vs. Input On Voltage

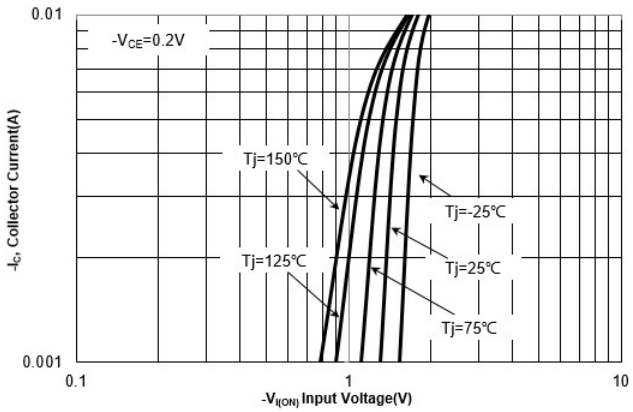


Fig. 2 Collector Current vs. Input Off Voltage

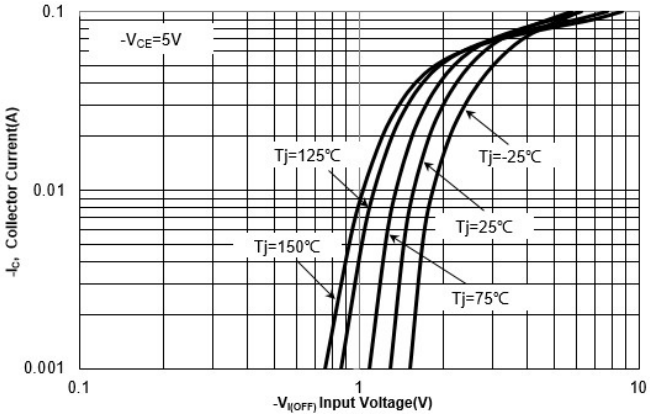


Fig. 3 DC Current Gain vs. Collector Current

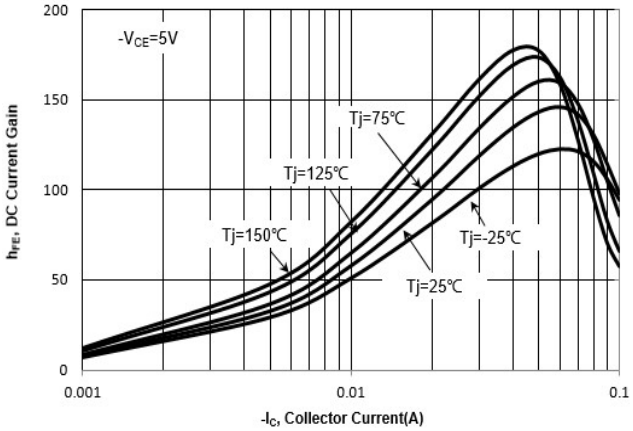
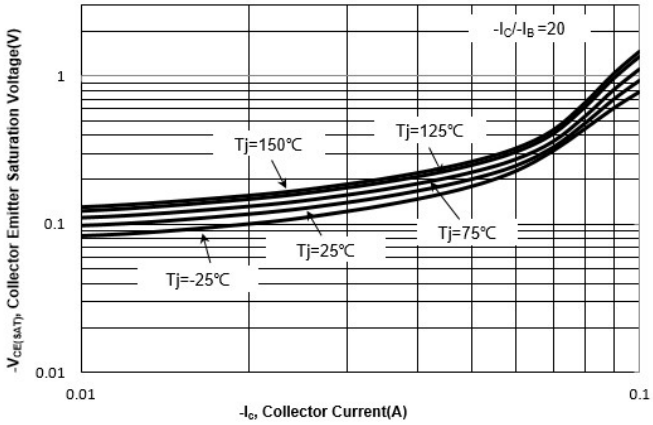
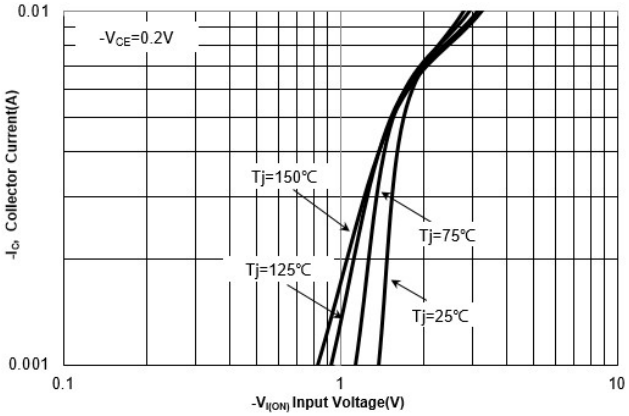


Fig. 4 $V_{(CE)SAT}$ vs. Collector Current



Electrical Characteristics Curve (MMBTRA102SS)

Fig. 1 Collector Current vs. Input On Voltage



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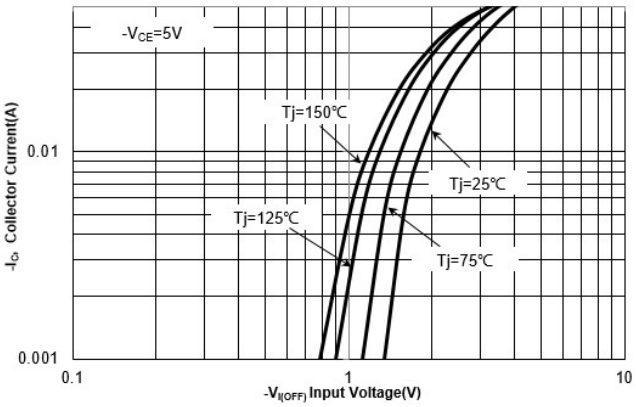

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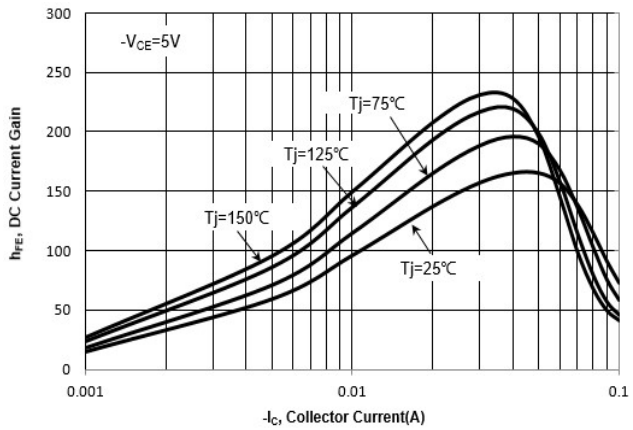

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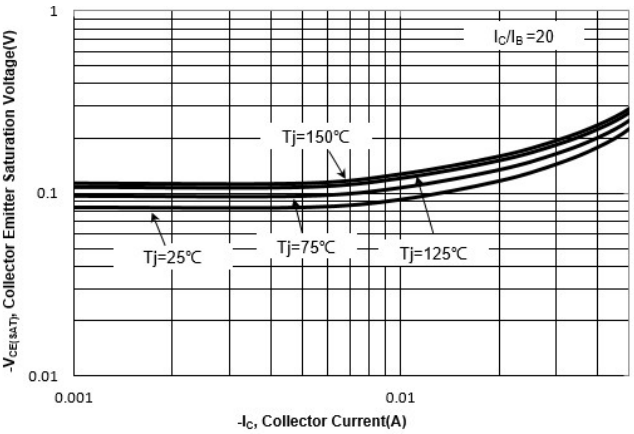
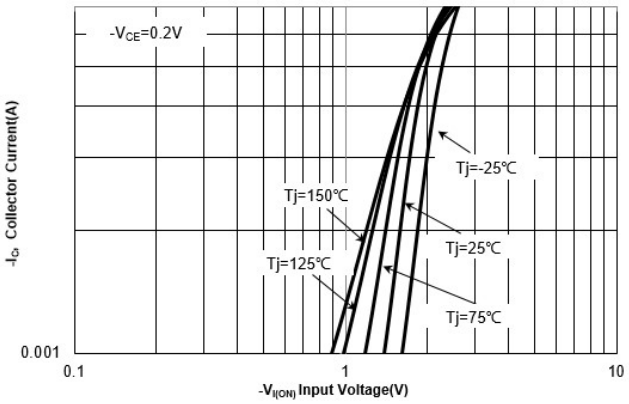


Electrical Characteristics Curve (MMBTRA103SS)

Fig. 1 Collector Current vs. Input On Voltage



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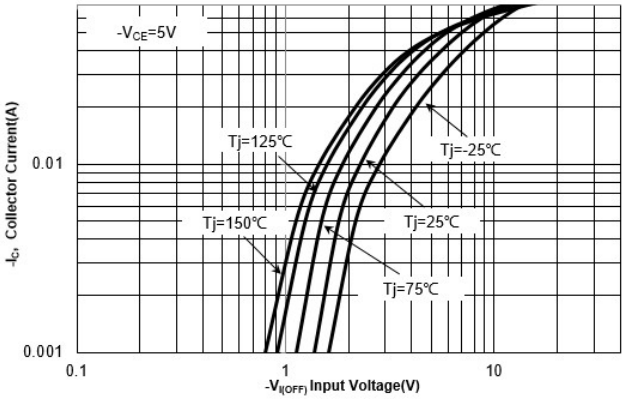

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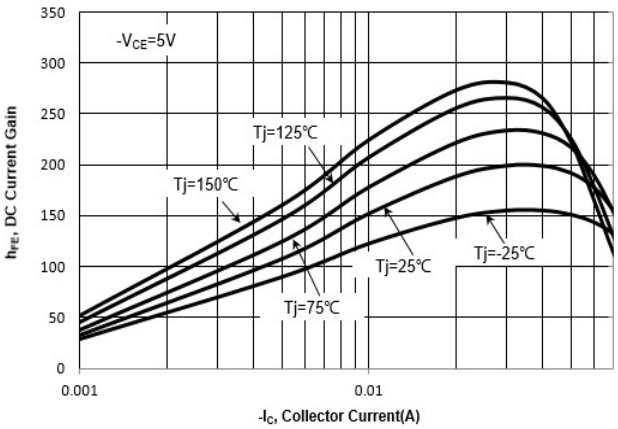

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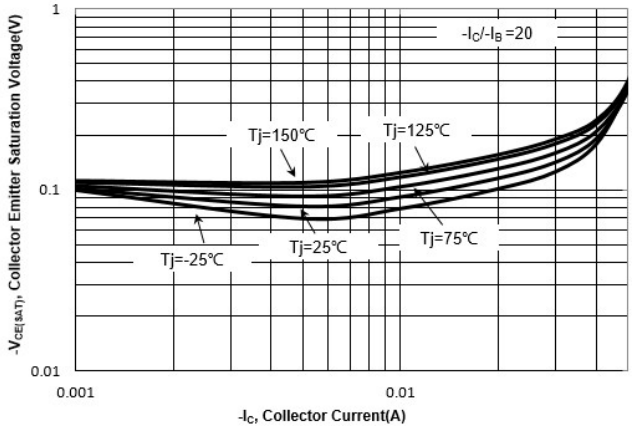
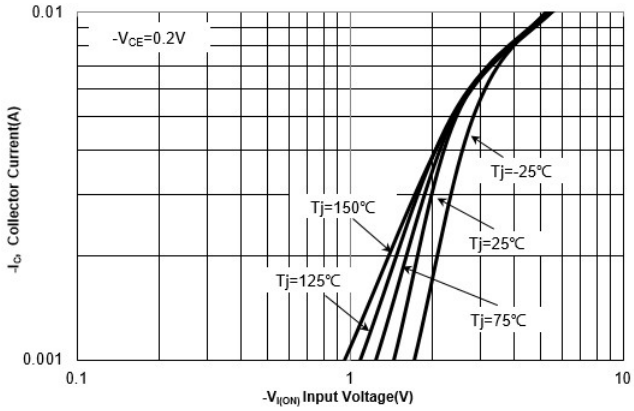


Electrical Characteristics Curve (MMBTRA104SS)

Fig. 1 Collector Current vs. Input On Voltage



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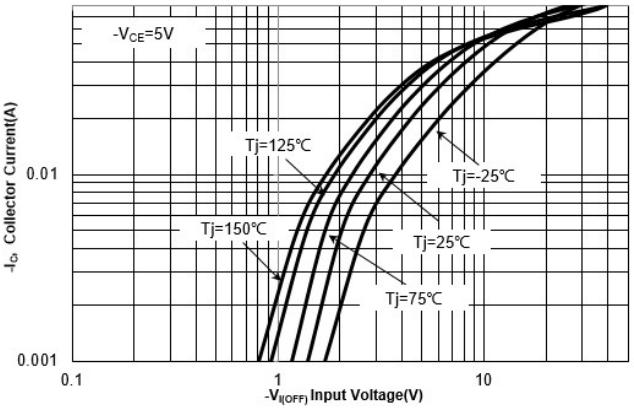

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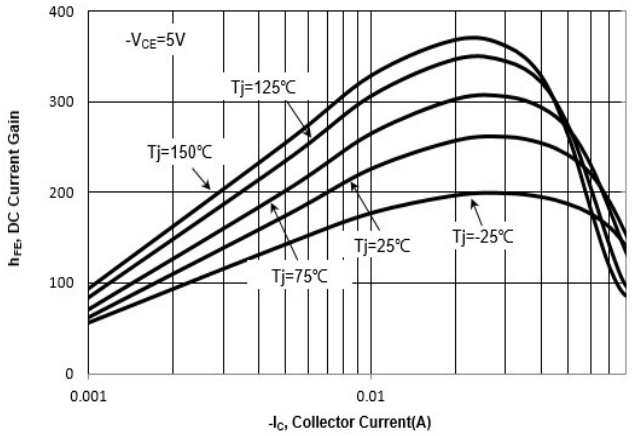

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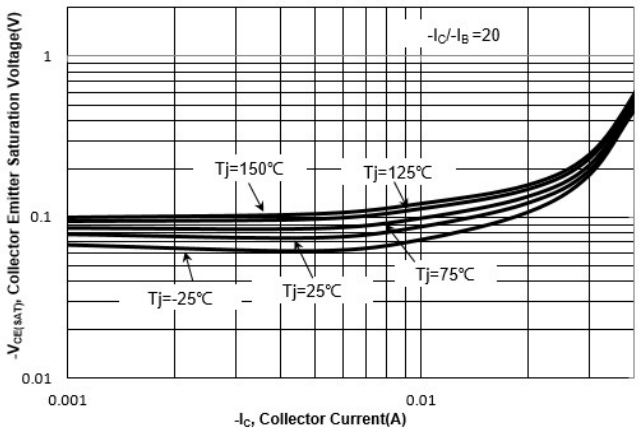


Electrical Characteristics Curve (MMBTRA105SS)

Fig. 1 Collector Current vs. Input On Voltage

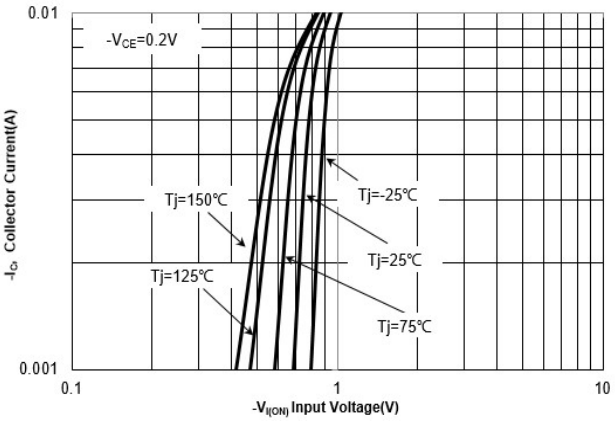
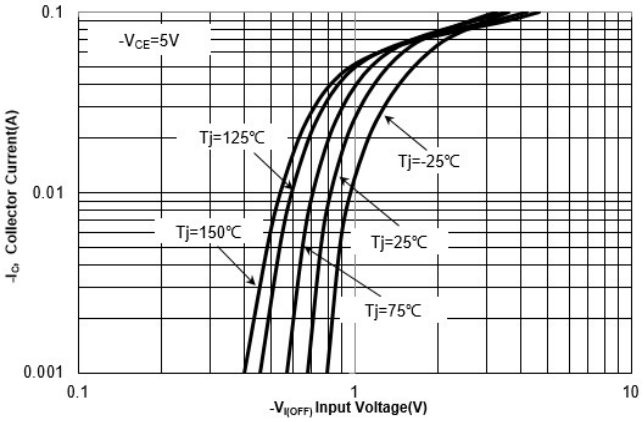


Fig. 2 Collector Current vs. Input Off Voltage



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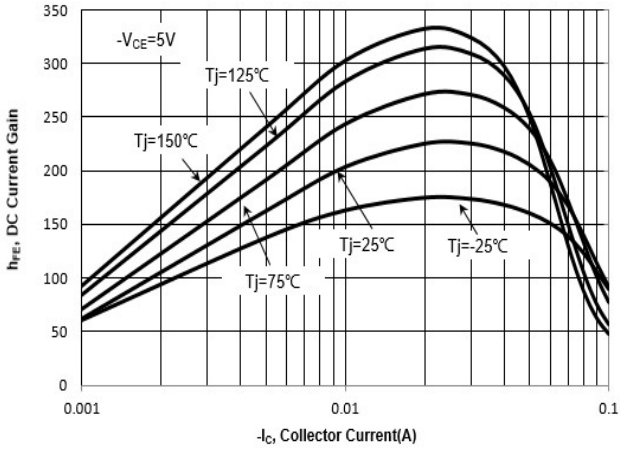

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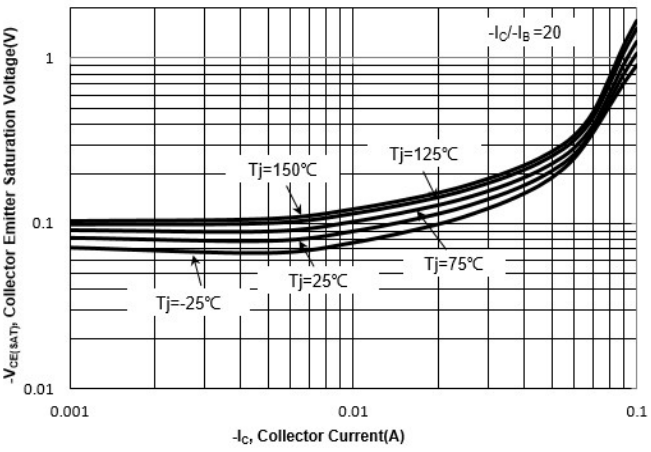


Electrical Characteristics Curve (MMBTRA106SS)

Fig. 1 Collector Current vs. Input On Voltage

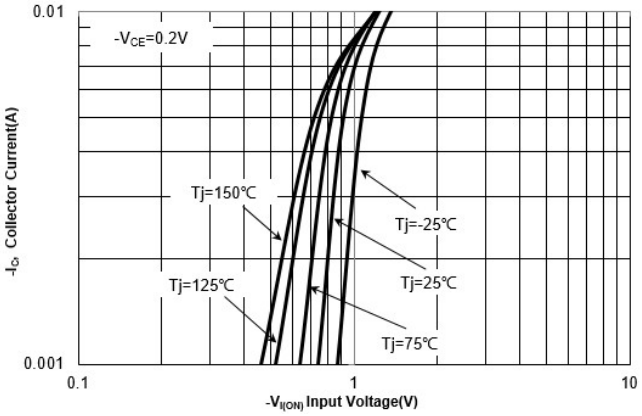
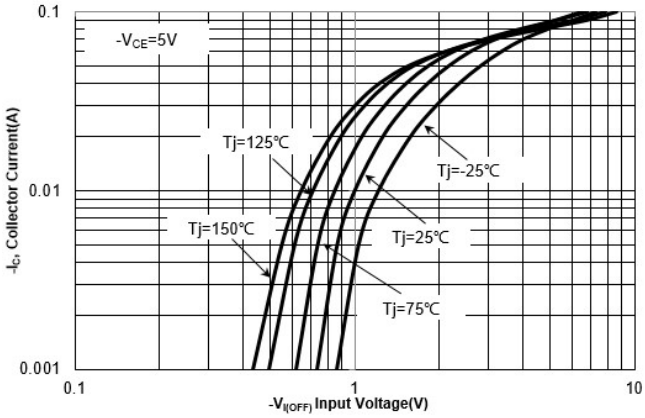


Fig. 2 Collector Current vs. Input Off Voltage



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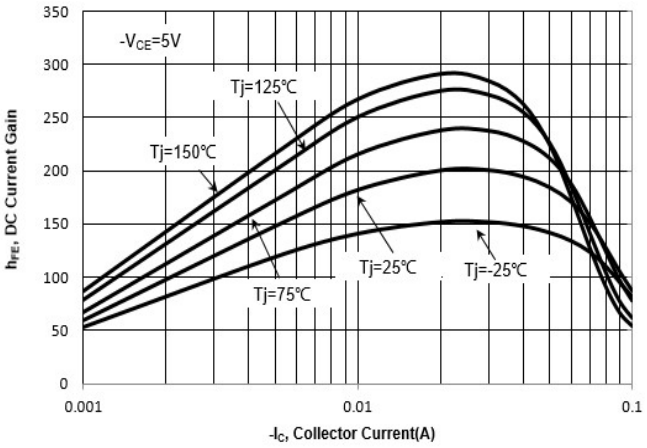
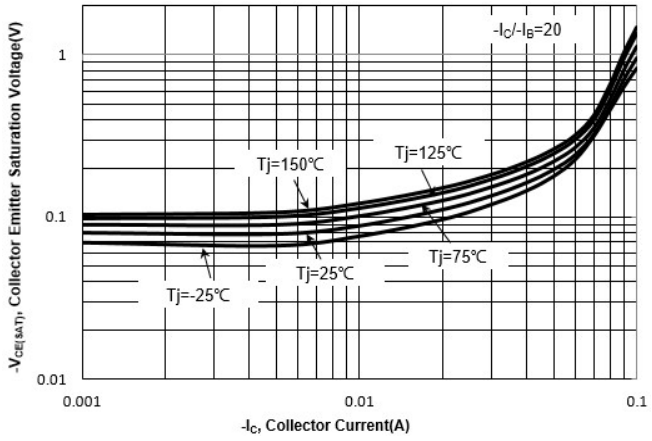
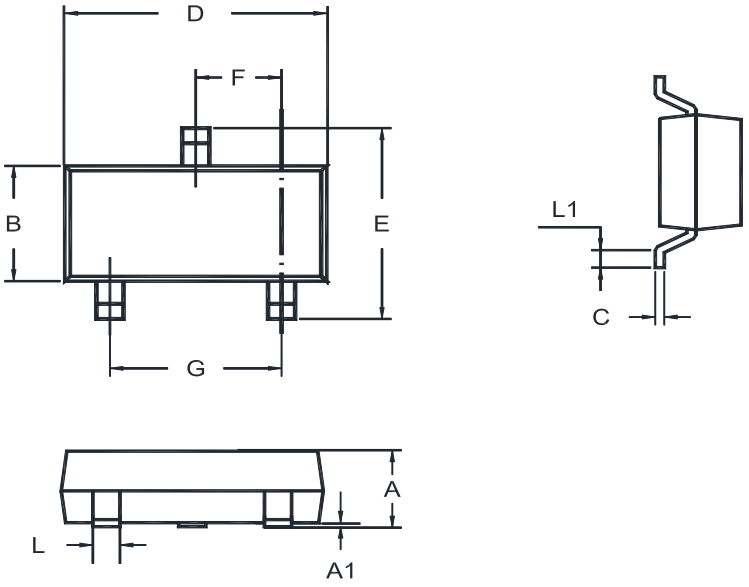


Fig. 4 $V_{(CE)SAT}$ vs. Collector Current

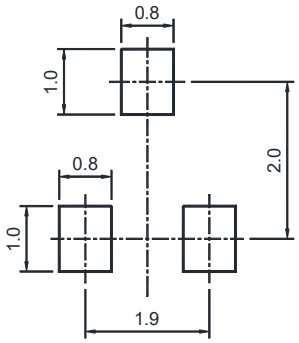


Package Outline (Dimensions in mm) SOT-23



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.

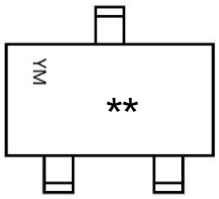
Type	Marking	Type	Marking	Type	Marking
MMBTRA101SS	RK	MMBTRA103SS	RN	MMBTRA105SS	RR
MMBTRA102SS	RM	MMBTRA104SS	RP	MMBTRA106SS	RX

" YM " = Date Code Marking

" Y " = Year

" M " = Month

Font type: Arial



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