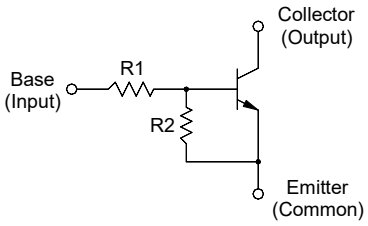
MMBTRC116SS…MMBTRC122SS

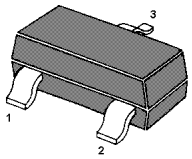
NPN Silicon Epitaxial Planar Transistors

For switching, interface circuit and drive circuit applications

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

Resistor Values

Type	R1 (KΩ)	R2 (KΩ)
MMBTRC116SS	1	10
MMBTRC117SS	2.2	2.2
MMBTRC118SS	2.2	10
MMBTRC119SS	4.7	10
MMBTRC120SS	10	4.7
MMBTRC121SS	47	10
MMBTRC122SS	100	100

Absolute Maximum Ratings (T_a = 25 °C)

Parameter		Symbol	Value	Unit
Output Voltage		V_O	50	V
Input Voltage	MMBTRC116SS	V_I	10, - 5	V
	MMBTRC117SS		12, - 10	
	MMBTRC118SS		12, - 5	
	MMBTRC119SS		20, - 7	
	MMBTRC120SS		30, - 10	
	MMBTRC121SS		40, - 15	
	MMBTRC122SS		40, - 10	
Output Current		I_O	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	°C/W

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

Dated：10/01/2022 Rev：03

Characteristics at T_a = 25 °C

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at V_O = 5 V, I_O = 5 mA	MMBTRC116SS	G_I	33	-	-	-
at V_O = 5 V, I_O = 20 mA	MMBTRC117SS		20	-	-	-
at V_O = 5 V, I_O = 10 mA	MMBTRC118SS		33	-	-	-
at V_O = 5 V, I_O = 10 mA	MMBTRC119SS		30	-	-	-
at V_O = 5 V, I_O = 10 mA	MMBTRC120SS		24	-	-	-
at V_O = 5 V, I_O = 5 mA	MMBTRC121SS		33	-	-	-
at V_O = 5 V, I_O = 5 mA	MMBTRC122SS		62	-	-	-
Output Cutoff Current at V_O = 50 V		$I_{O(OFF)}$	-	-	500	nA
Input Current						
at V_I = 5 V	MMBTRC116SS	I_I	-	-	7.2	mA
	MMBTRC117SS		-	-	3.8	
	MMBTRC118SS		-	-	3.8	
	MMBTRC119SS		-	-	1.8	
	MMBTRC120SS		-	-	0.88	
	MMBTRC121SS		-	-	0.16	
	MMBTRC122SS		-	-	0.15	
Output Voltage						
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC116SS	$V_{O(ON)}$	-	-	0.3	V
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC117SS		-	-	0.3	
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC118SS		-	-	0.3	
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC119SS		-	-	0.3	
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC120SS		-	-	0.3	
at I_O = 10 mA, I_I = 0.5 mA	MMBTRC121SS		-	-	0.3	
at I_O = 5 mA, I_I = 0.25 mA	MMBTRC122SS		-	-	0.3	
Input Voltage (ON)						
at V_O = 0.3 V, I_O = 20 mA	MMBTRC116SS	$V_{I(ON)}$	-	-	3	V
at V_O = 0.3 V, I_O = 20 mA	MMBTRC117SS		-	-	3	
at V_O = 0.3 V, I_O = 20 mA	MMBTRC118SS		-	-	3	
at V_O = 0.3 V, I_O = 20 mA	MMBTRC119SS		-	-	2.5	
at V_O = 0.3 V, I_O = 2 mA	MMBTRC120SS		-	-	3	
at V_O = 0.3 V, I_O = 2 mA	MMBTRC121SS		-	-	5	
at V_O = 0.3 V, I_O = 1 mA	MMBTRC122SS		-	-	3	
Input Voltage (OFF)						
at V_{CC} = 5 V, I_O = 100 µA	MMBTRC116SS	$V_{I(OFF)}$	0.3	-	-	V
	MMBTRC117SS		0.5	-	-	
	MMBTRC118SS		0.3	-	-	
	MMBTRC119SS		0.3	-	-	
	MMBTRC120SS		0.8	-	-	
	MMBTRC121SS		1	-	-	
	MMBTRC122SS		0.5	-	-	
Transition Frequency at V_O = 10 V, I_O = 5 mA		f_T [1)]	-	250	-	MHz

[1)] Characteristic of transistor only.

Electrical Characteristics Curves

Fig 1. Output Current vs. $V_{I(ON)}$

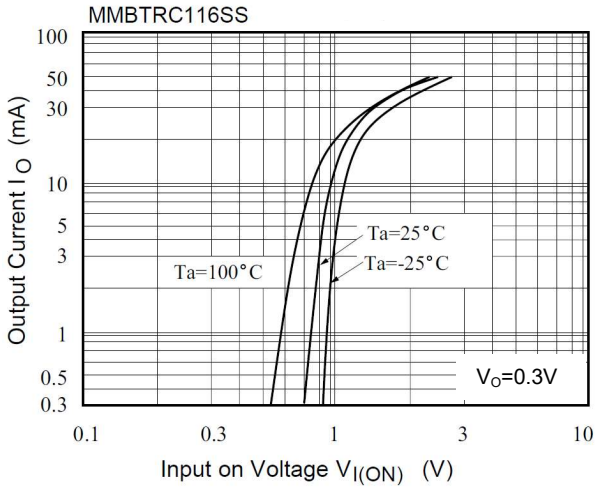


Fig 2. Output Current vs. $V_{I(ON)}$

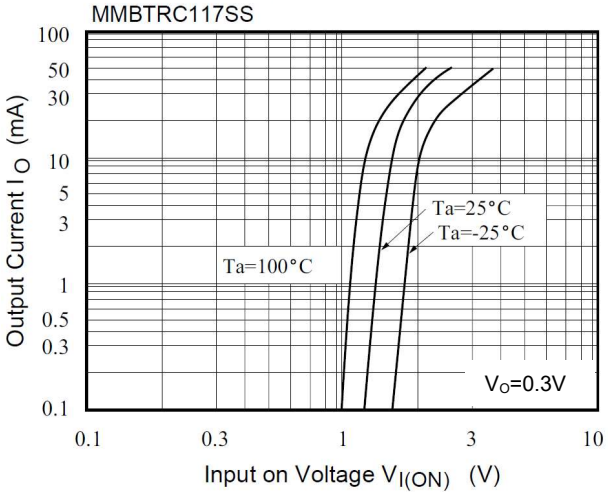


Fig 3. Output Current vs. $V_{I(off)}$

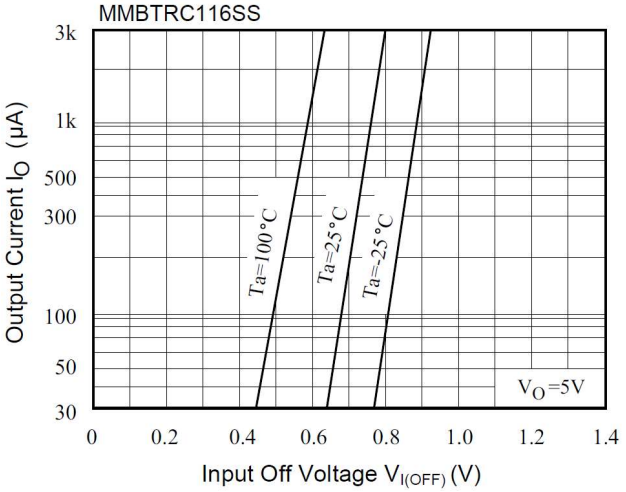


Fig 4. Output Current vs. $V_{I(off)}$

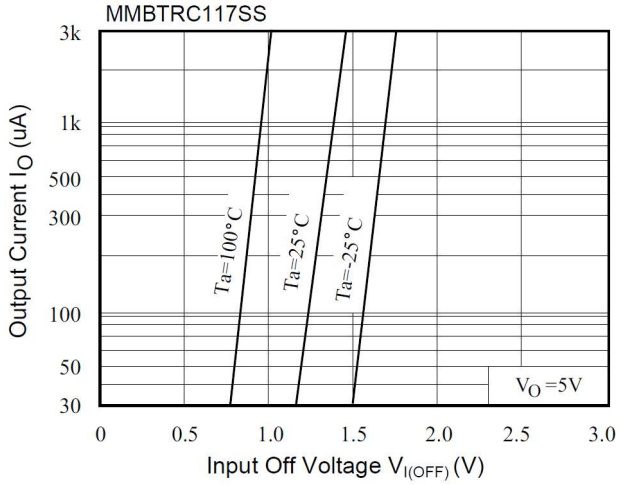


Fig 5. DC Current Gain vs. OutpOutputut Current

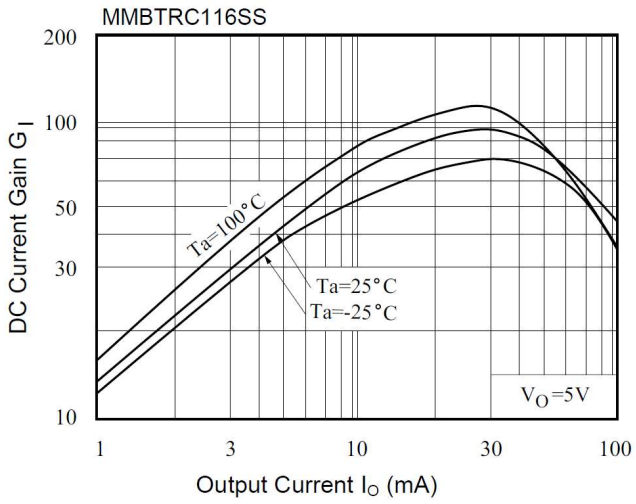
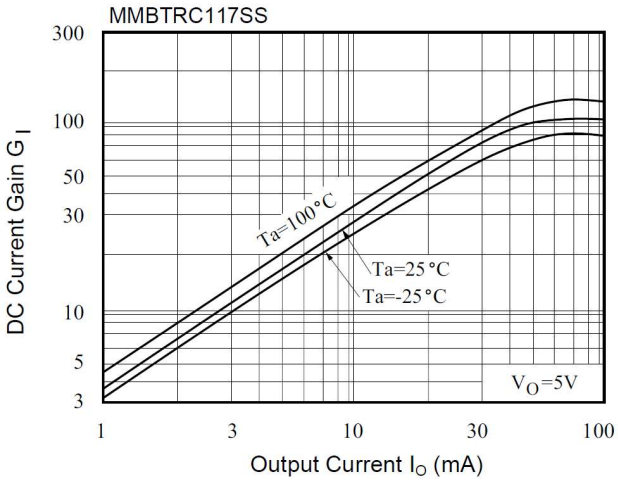


Fig 6. DC Current Gain vs. OutpOutputut Current



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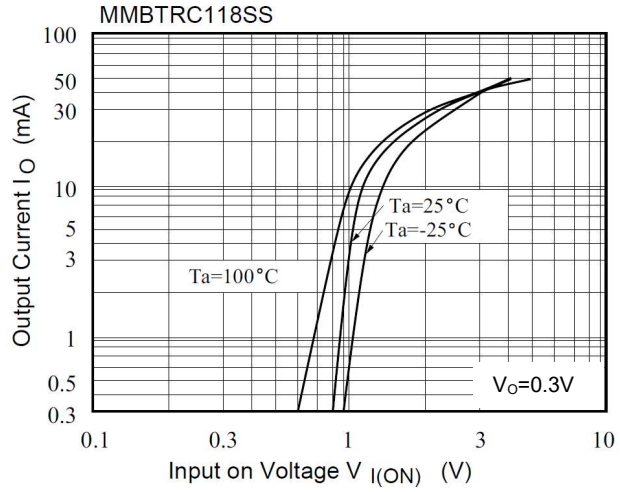

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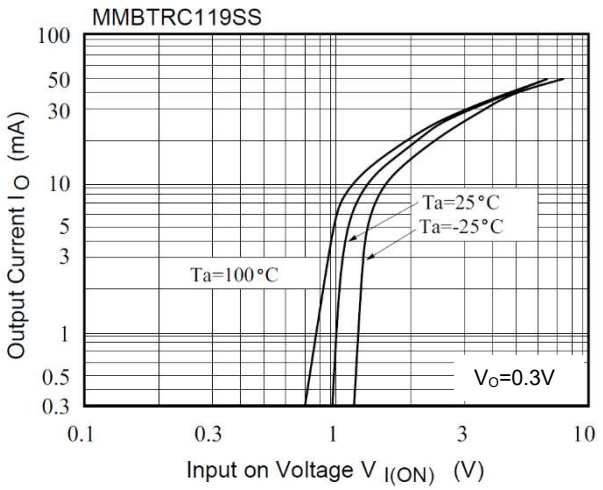

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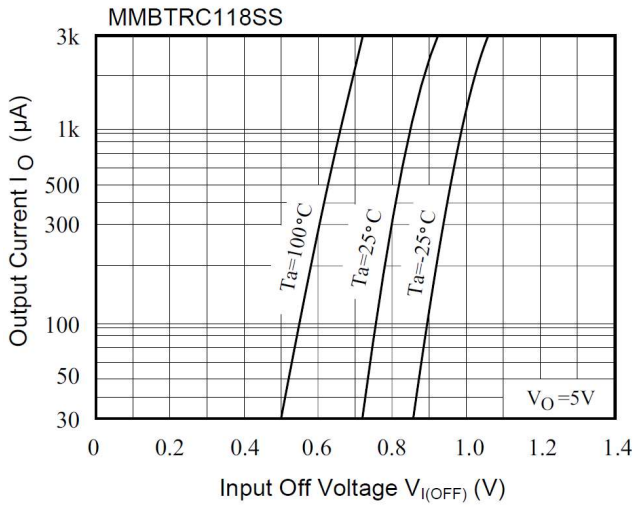

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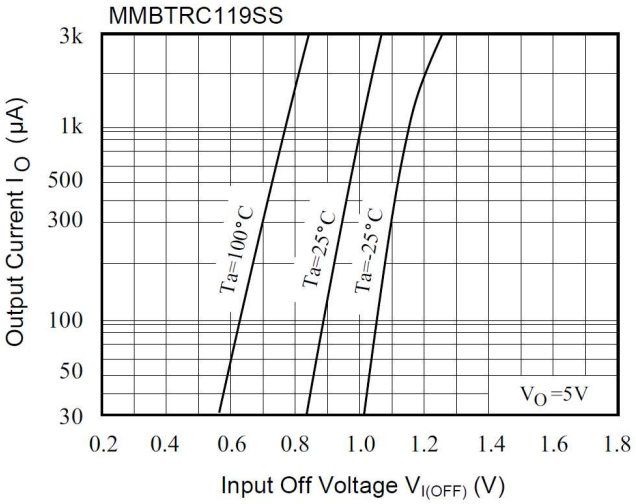

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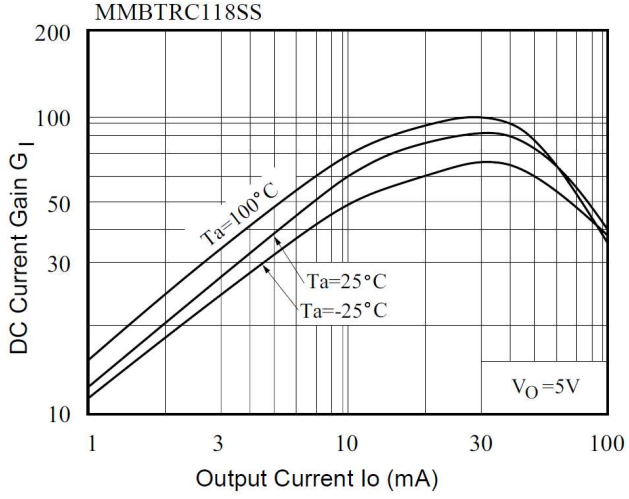

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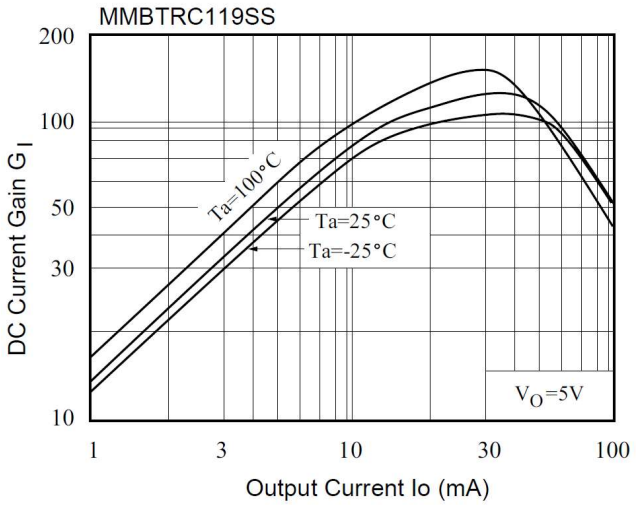

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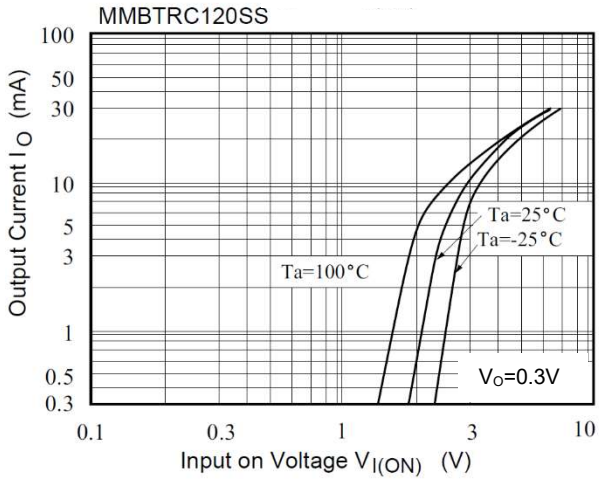
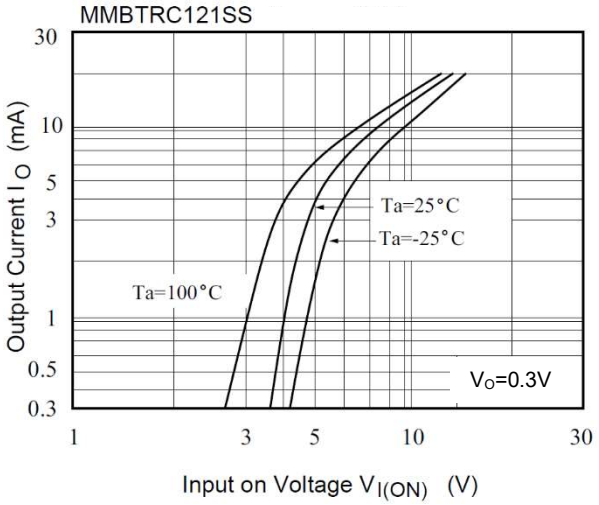


Fig 2. Output Current vs. $V_{I(ON)}$



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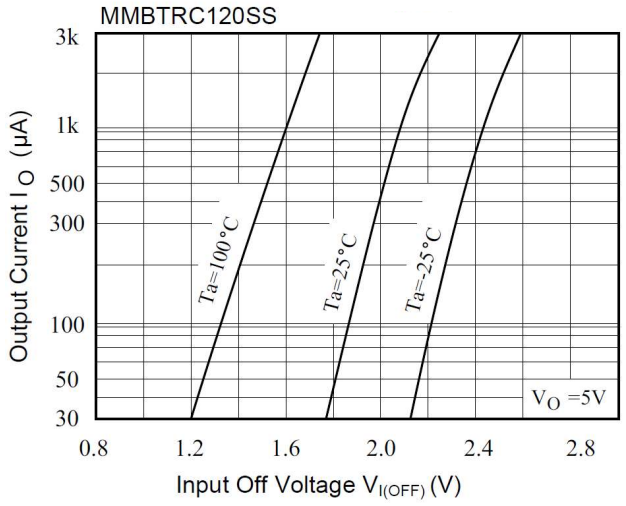

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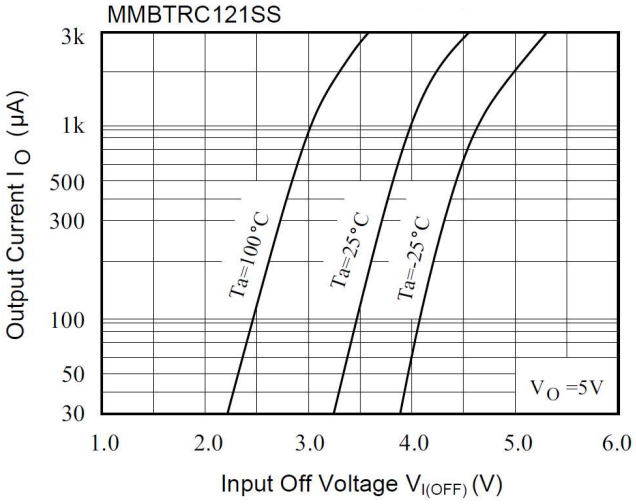

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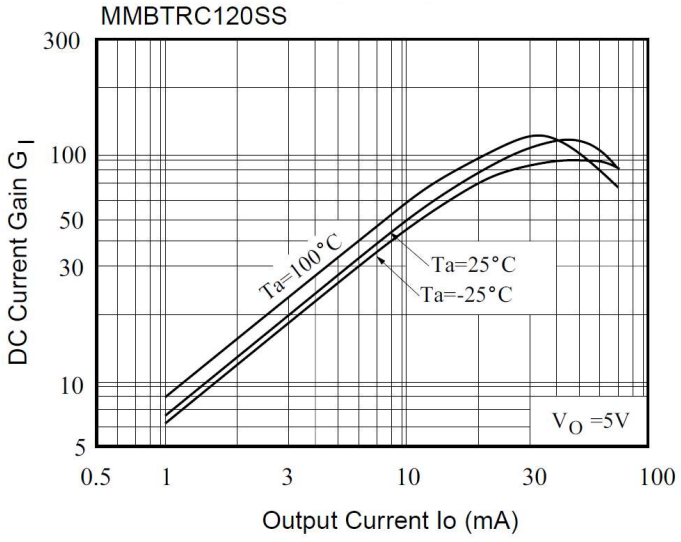

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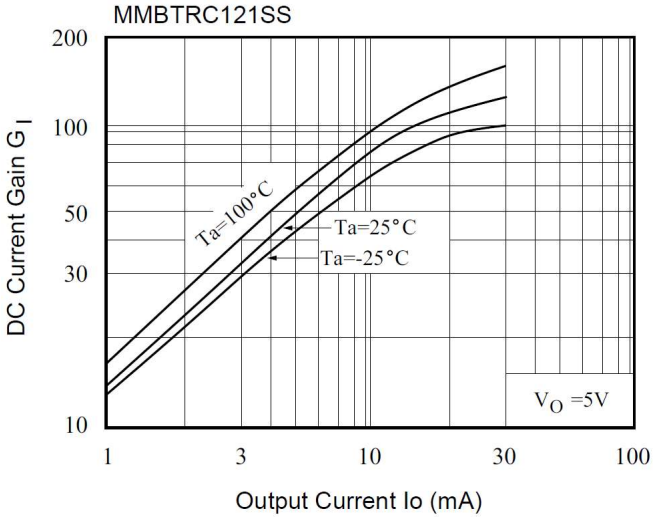

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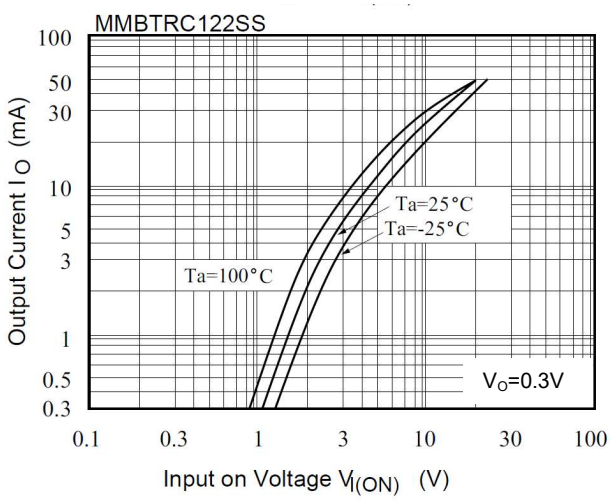
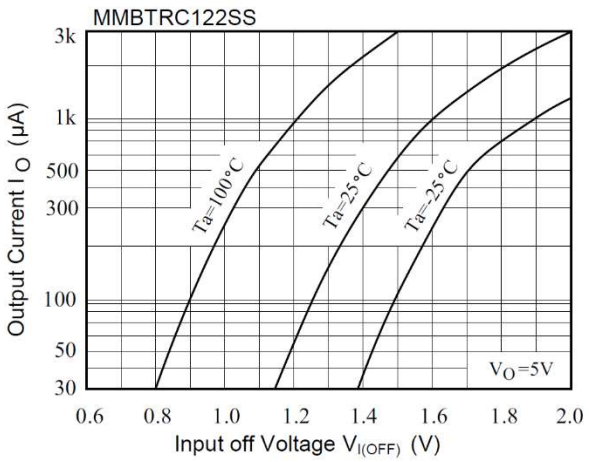


Fig 2. Output Current vs. $V_{I(off)}$



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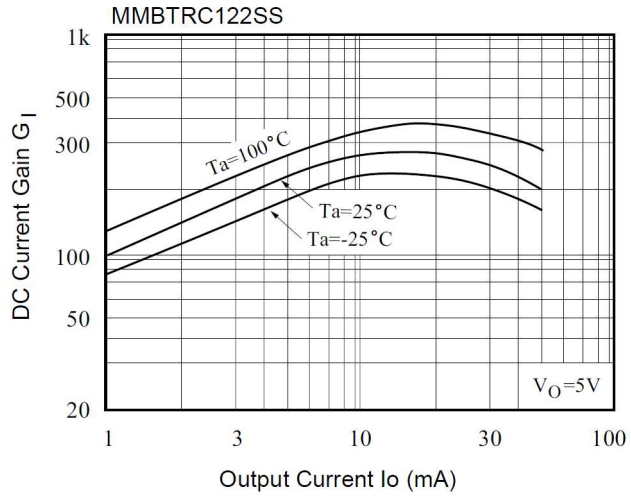
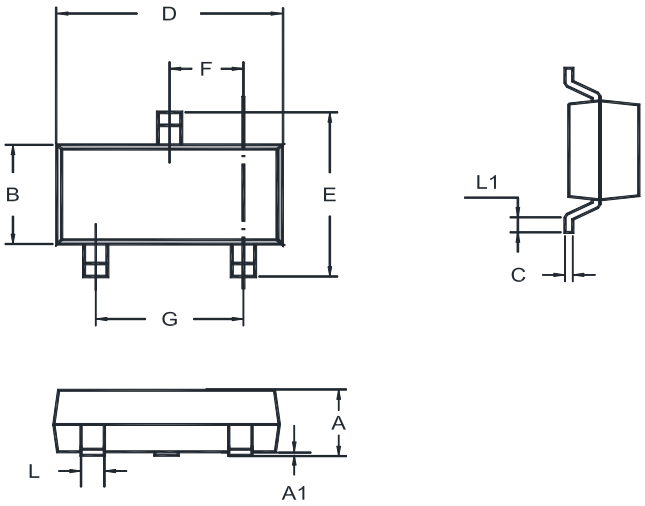
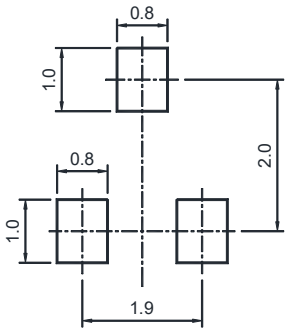


Package Outline (Dimensions in mm) SOT-23



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	Type	Marking
MMBTRC116SS	YN	MMBTRC118SS	YR	MMBTRC120SS	YY	MMBTRC122SS	ZA
MMBTRC117SS	YP	MMBTRC119SS	YX	MMBTRC121SS	YZ		

" YM " = Date Code Marking

" Y " = Year

" M " = Month

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