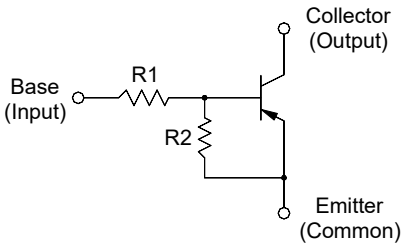
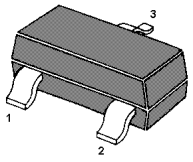
MMBTRA101SS…MMBTRA106SS

PNP Silicon Epitaxial Planar Digital Transistor

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)
MMBTRA101SS	4.7	4.7
MMBTRA102SS	10	10
MMBTRA103SS	22	22
MMBTRA104SS	47	47
MMBTRA105SS	2.2	47
MMBTRA106SS	4.7	47

Absolute Maximum Ratings (T_a = 25 °C)

Parameter		Symbol	Value	Unit
Output Voltage		$-V_O$	50	V
Input Voltage	MMBTRA101SS	$-V_I$	20, -10	V
	MMBTRA102SS		30, -10	
	MMBTRA103SS		40, -10	
	MMBTRA104SS		40, -10	
	MMBTRA105SS		12, -5	
	MMBTRA106SS		20, -5	
Output Current		$-I_O$	100	mA
Total Power Dissipation		P_{tot}	200	mW
Thermal Resistance - Junction to Ambient [1)]		$R_{\theta JA}$	625	°C/W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	- 55 to + 150	°C

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

Dated: 11/06/2021 Rev: 02

Characteristics at T_a = 25 °C

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at $-V_O$ = 5 V, $-I_O$ = 10 mA	MMBTRA101SS	G_I	30	-	-	-
	MMBTRA102SS		50	-	-	-
	MMBTRA103SS		70	-	-	-
	MMBTRA104SS		80	-	-	-
	MMBTRA105SS		80	-	-	-
	MMBTRA106SS		80	-	-	-
Output Cutoff Current at $-V_O$ = 50 V		$-I_{O(OFF)}$	-	-	500	nA
Input Current						
at $-V_I$ = 5 V	MMBTRA101SS	$-I_I$	-	-	1.8	mA
	MMBTRA102SS		-	-	0.88	
	MMBTRA103SS		-	-	0.36	
	MMBTRA104SS		-	-	0.18	
	MMBTRA105SS		-	-	3.6	
	MMBTRA106SS		-	-	1.8	
Output Voltage at $-I_O$ = 10 mA, $-I_I$ = 0.5 mA		$-V_{O(ON)}$	-	-	0.3	V
Input Voltage (ON)						
at $-V_O$ = 0.2 V, $-I_O$ = 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 $-V_O$ = 5 V, $-I_O$ = 0.1 mA	MMBTRA101SS~104SS	$-V_{I(OFF)}$	1	-	-	V
	MMBTRA105SS~106SS		0.5	-	-	
Transition Frequency at $-V_O$ = 10 V, $-I_O$ = 5 mA		f_T [1)]	-	200	-	MHz

[1)] Characteristic of transistor only.

Electrical characteristic curve (MMBTRA101SS)

Fig. 1 Output Current vs. Input On Voltage

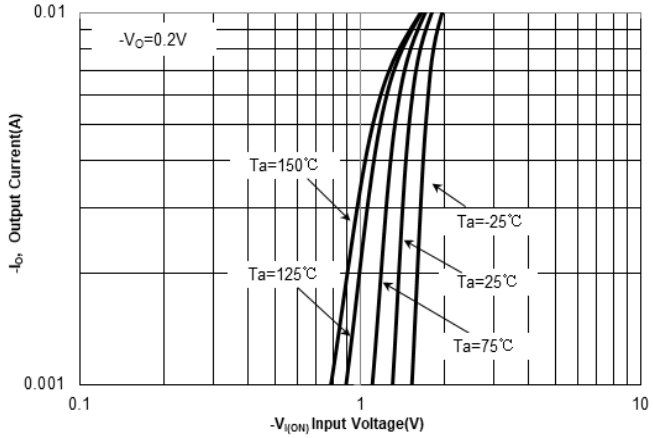


Fig. 2 Output Current vs. Input Off Voltage

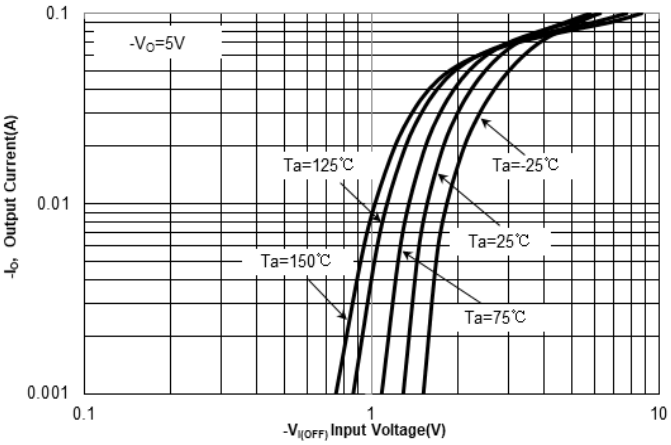


Fig. 3 DC Current Gain vs. Output Current

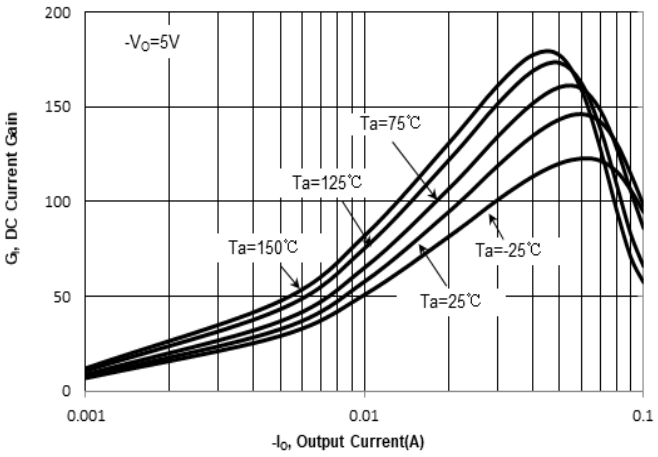
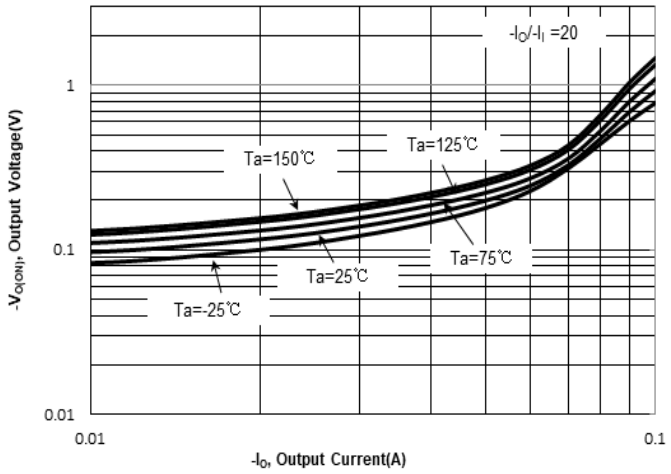


Fig. 4 Output Voltage vs. Output Current



Dated: 11/06/2021 Rev: 02

Electrical characteristic curve (MMBTRA102SS)

Fig. 1 Output Current vs. Input On Voltage

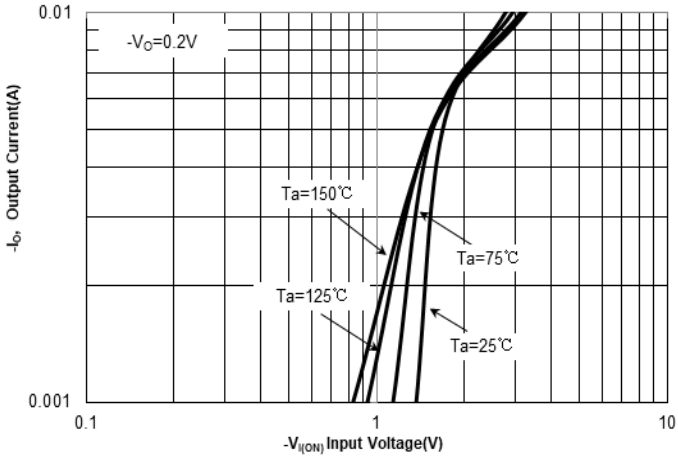


Fig. 2 Output Current vs. Input Off Voltage

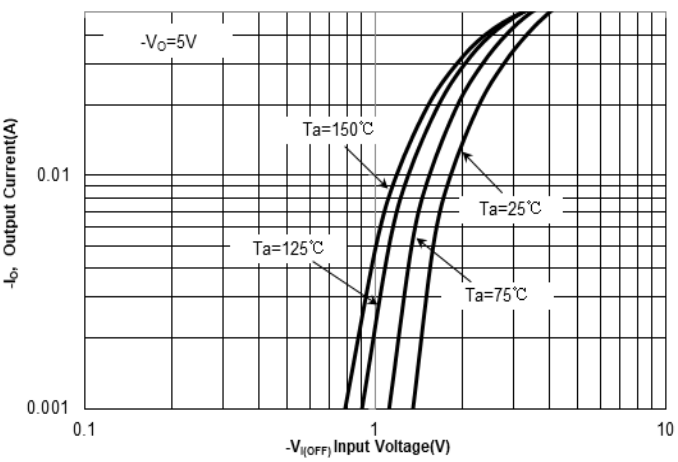


Fig. 3 DC Current Gain vs. Output Current

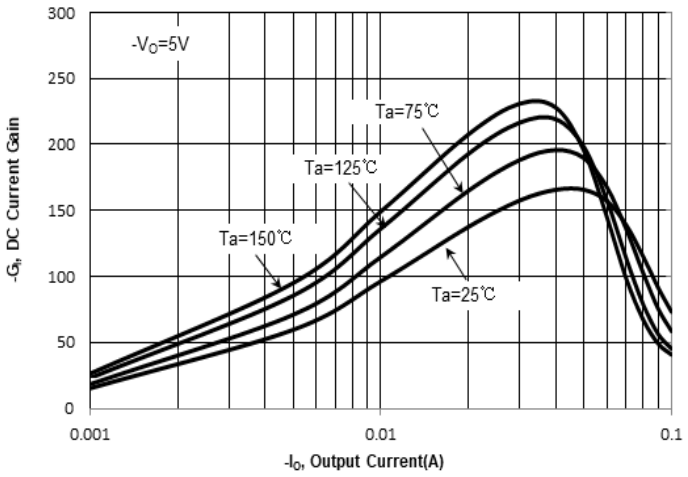
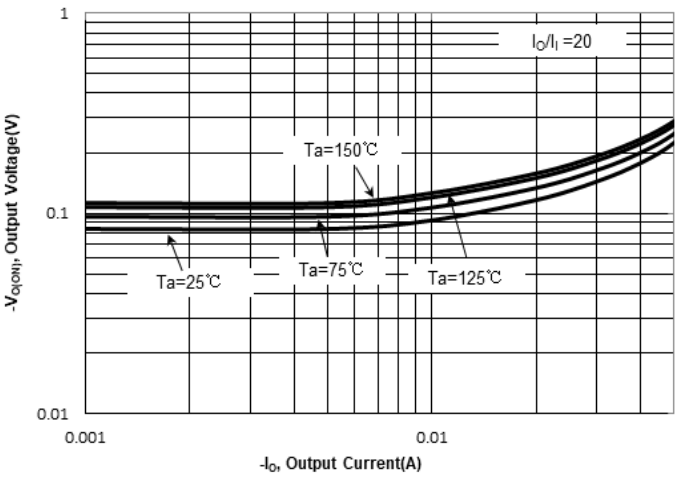


Fig. 4 Output Voltage vs. Output Current



Electrical characteristic curve (MMBTRA103SS)

Fig. 1 Output Current vs. Input On Voltage

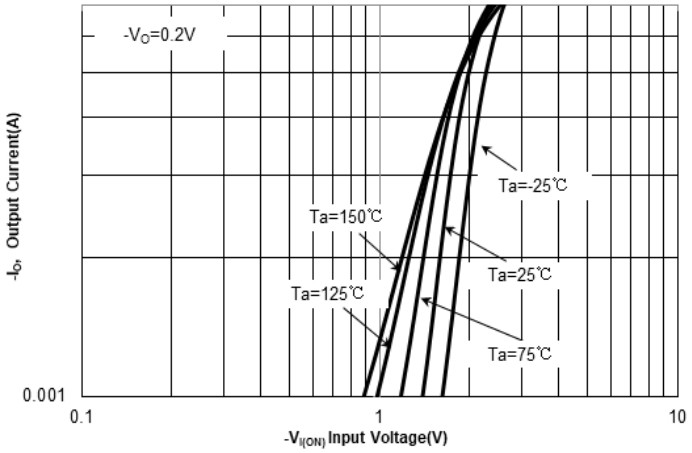


Fig. 2 Output Current vs. Input Off Voltage

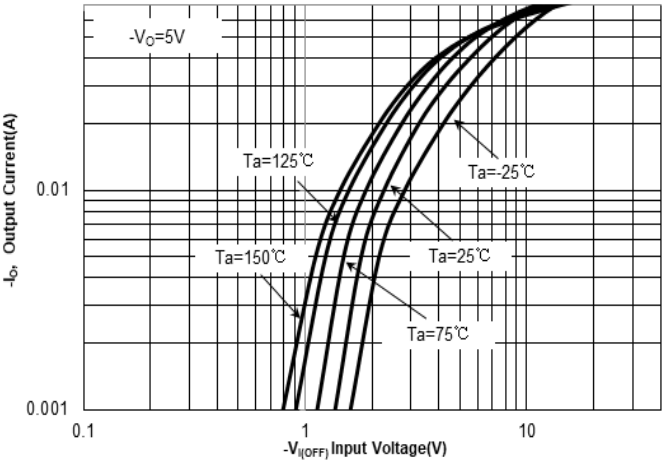


Fig. 3 DC Current Gain vs. Output Current

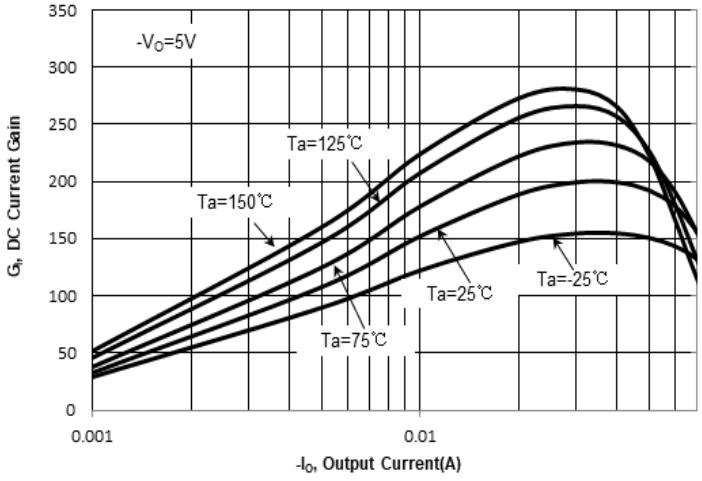
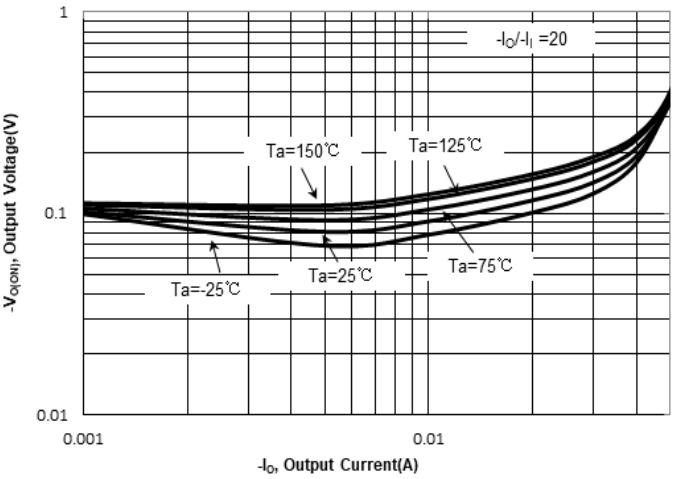


Fig. 4 Output Voltage vs. Output Current



Electrical characteristic curve (MMBTRA104SS)

Fig. 1 Output Current vs. Input On Voltage

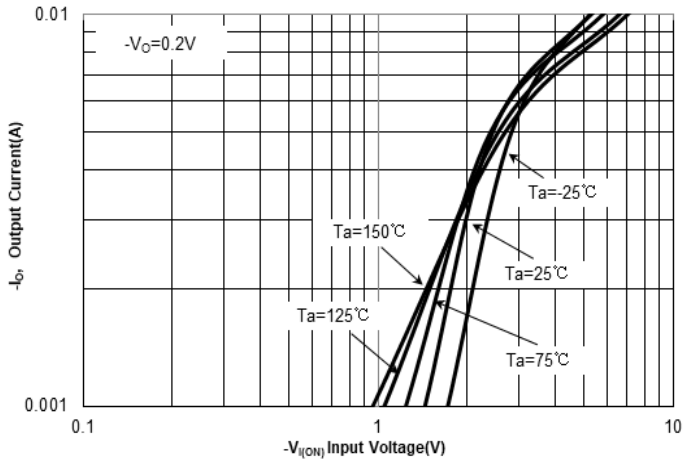


Fig. 2 Output Current vs. Input Off Voltage

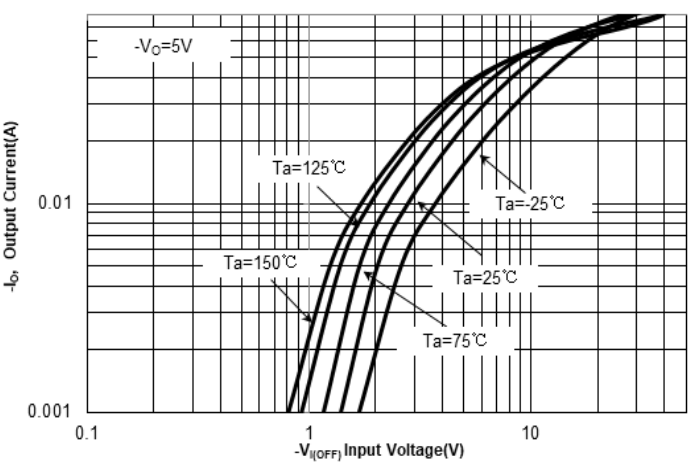


Fig. 3 DC Current Gain vs. Output Current

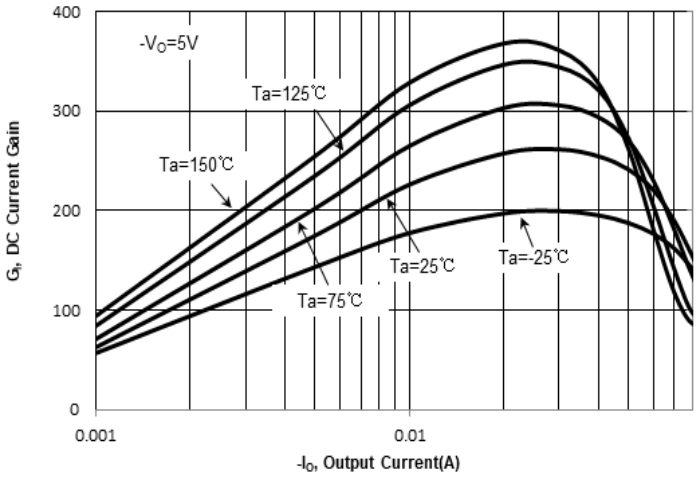
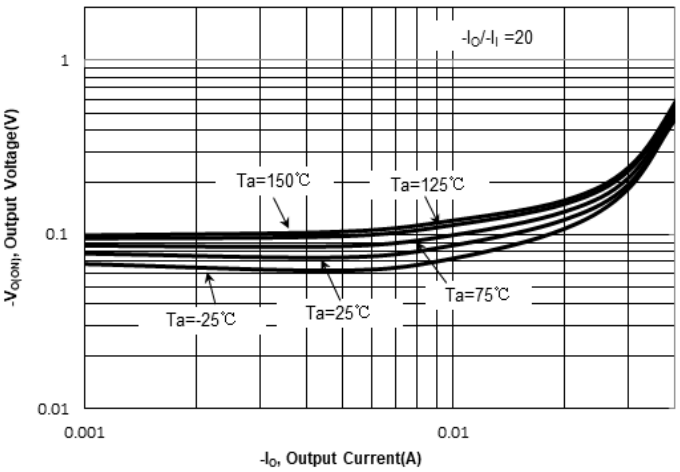


Fig. 4 Output Voltage vs. Output Current



Electrical characteristic curve (MMBTRA105SS)

Fig. 1 Output Current vs. Input On Voltage

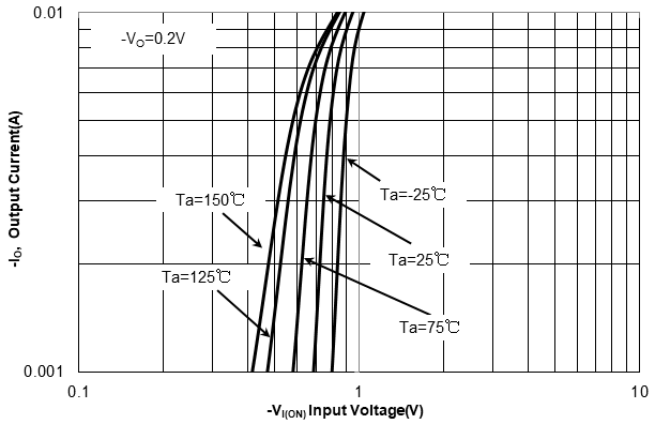


Fig. 2 Output Current vs. Input Off Voltage

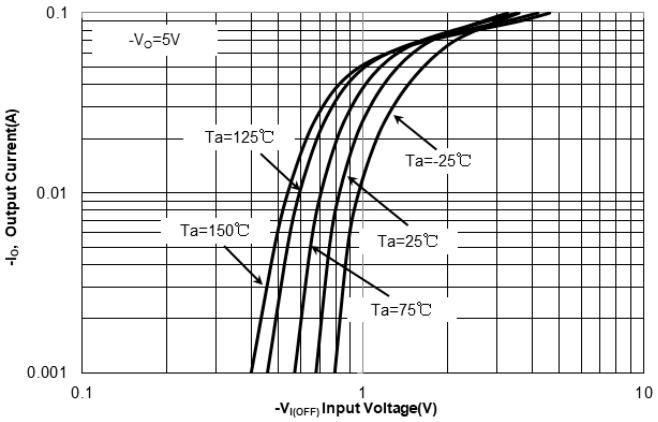


Fig. 3 DC Current Gain vs. Output Current

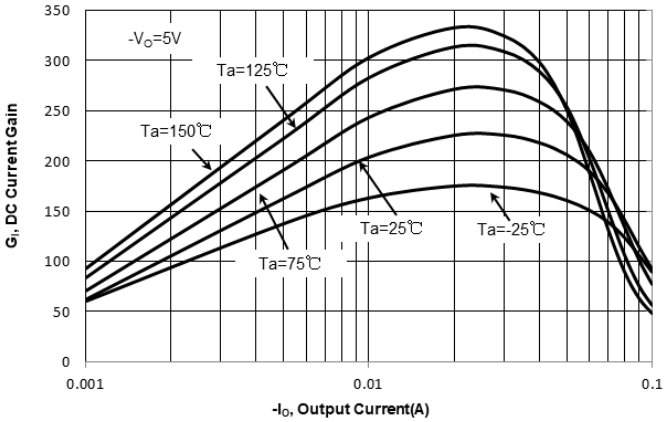
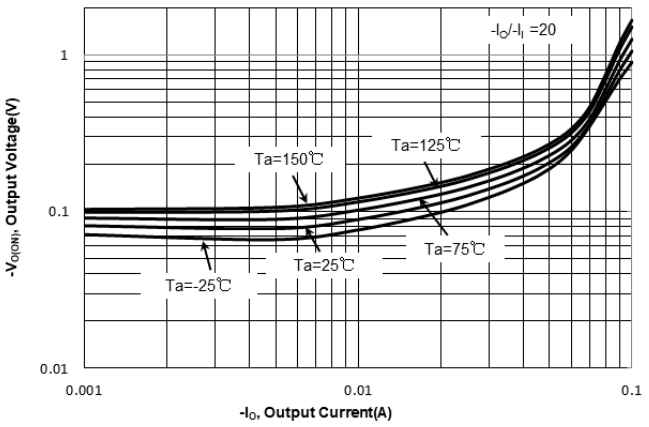


Fig. 4 Output Voltage vs. Output Current



Electrical characteristic curve (MMBTRA106SS)

Fig. 1 Output Current vs. Input On Voltage

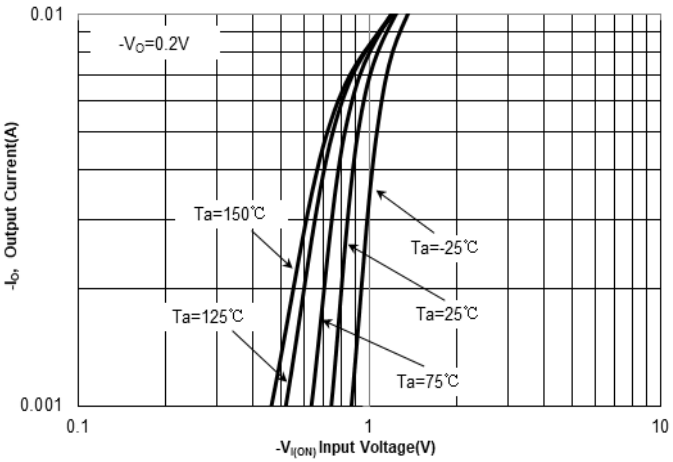


Fig. 2 Output Current vs. Input Off Voltage

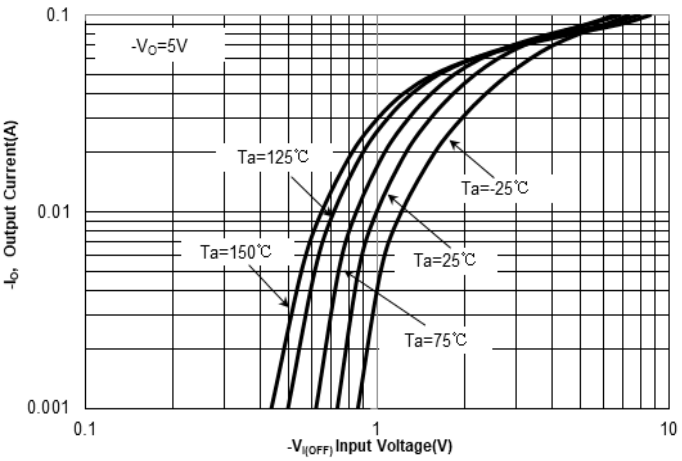


Fig. 3 DC Current Gain vs. Output Current

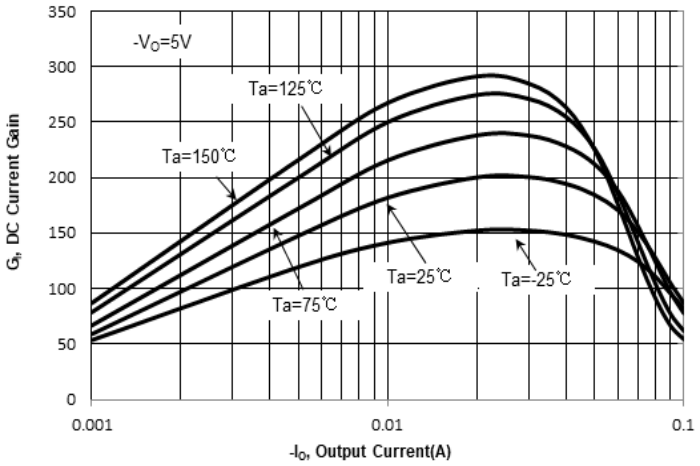
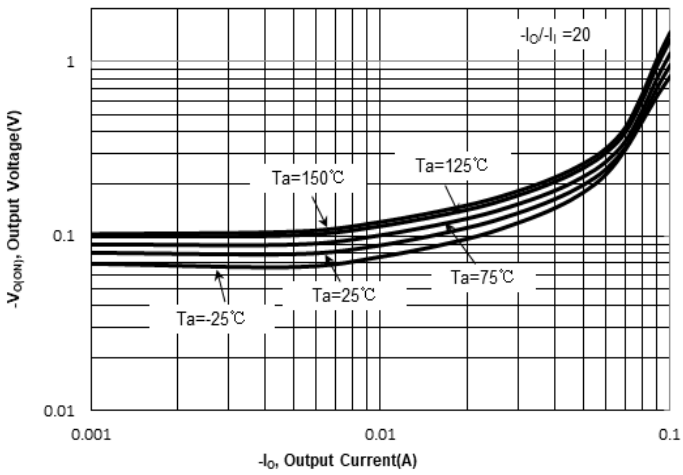
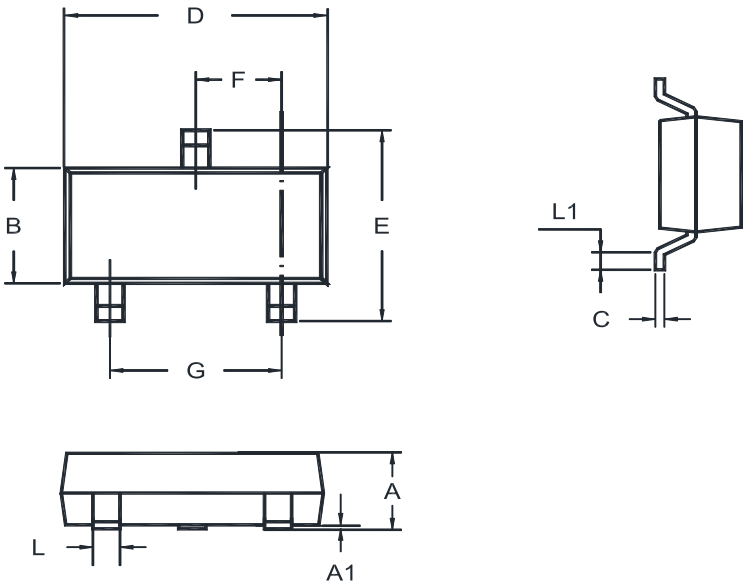


Fig. 4 Output Voltage vs. Output Current



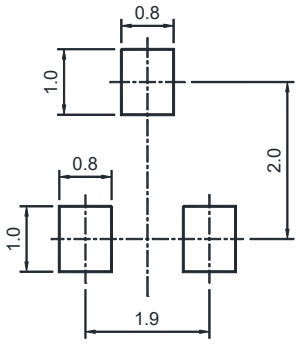
Package Outline (Dimensions in mm)

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.

" YM " = Date Code Marking

" Y " = Year

" M " = Month

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