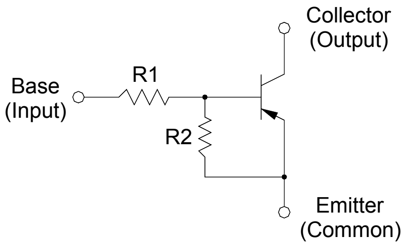
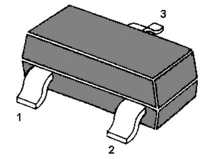
MMBTRA101SS…MMBTRA106SS

PNP Silicon Epitaxial Planar Transistor

for switching and interface circuit and drive circuit applications





1. Base 2. Emitter 3. Collector

TO-236 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

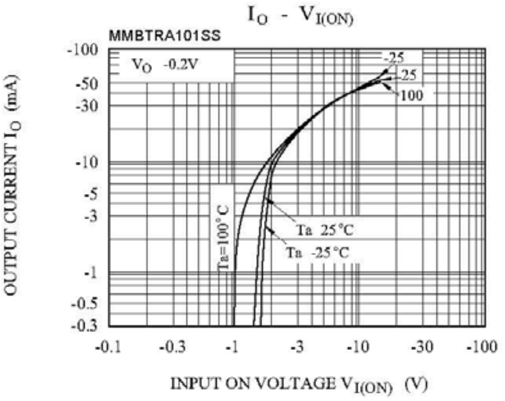
Absolute Maximum Ratings (T_a = 25 °C)

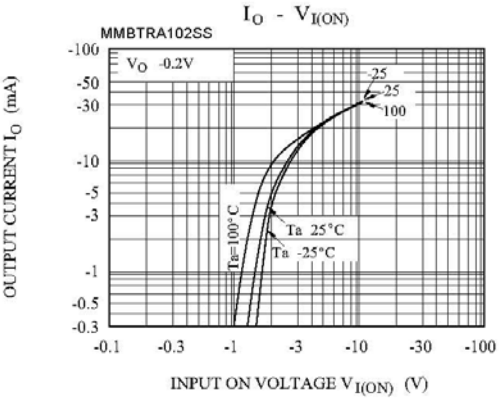
Parameter		Symbol	Value	Unit
Output Voltage		$-V_O$	50	V
Input Voltage	MMBTRA101SS	$-V_I$	20, -10	V
	MMBTRA102SS		30, -10	
	MMBTRA103SS		40, -10	
	MMBTRA104SS		40, -10	
	MMBTRA105SS		12, -5	
	MMBTRA106SS		20, -5	
Output Current		$-I_O$	100	mA
Total Power Dissipation		P_{tot}	200	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	- 55 to + 150	°C

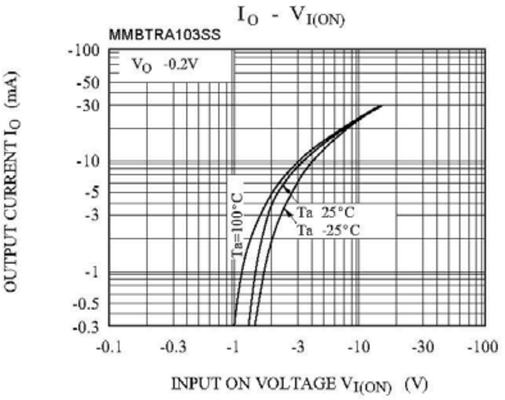
Characteristics at $T_a = 25\ ^oC$

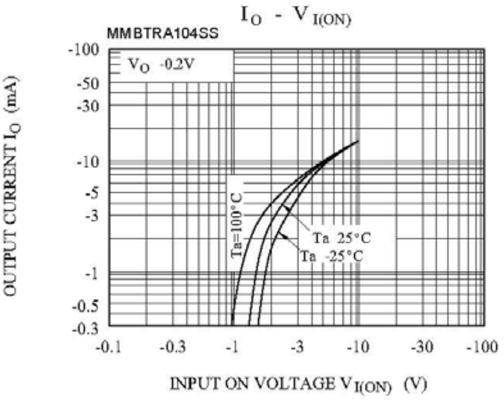
Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at $-V_O = 5$ V, $-I_O = 10$ mA	MMBTRA101SS	G_I	30	-	-	-
	MMBTRA102SS		50	-	-	-
	MMBTRA103SS		70	-	-	-
	MMBTRA104SS		80	-	-	-
	MMBTRA105SS		80	-	-	-
	MMBTRA106SS		80	-	-	-
Output Cutoff Current at $-V_O = 50$ V		$-I_{O(OFF)}$	-	-	500	nA
Input 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

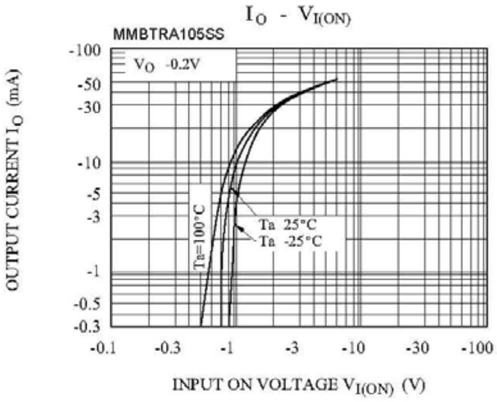
[1] Characteristic of transistor only.

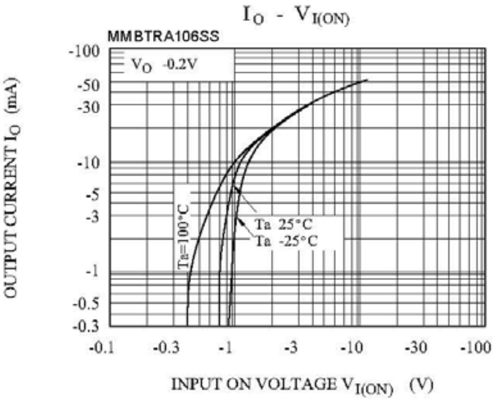

IO - VI(ON)
MMBTRA101SS
VO -0.2V
-25
-25
100
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

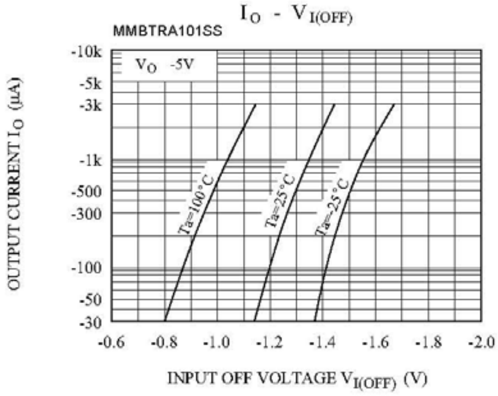

IO - VI(ON)
MMBTRA102SS
VO -0.2V
-25
25
100
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

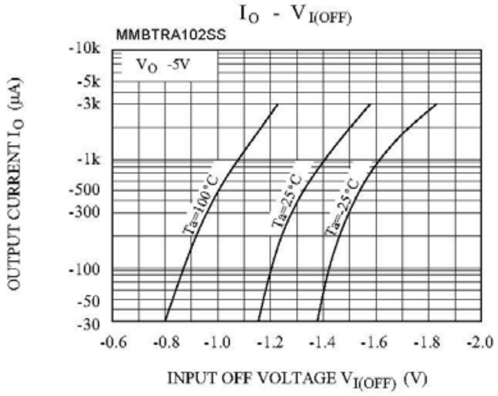

IO - VI(ON)
MMBTRA103SS
VO -0.2V
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

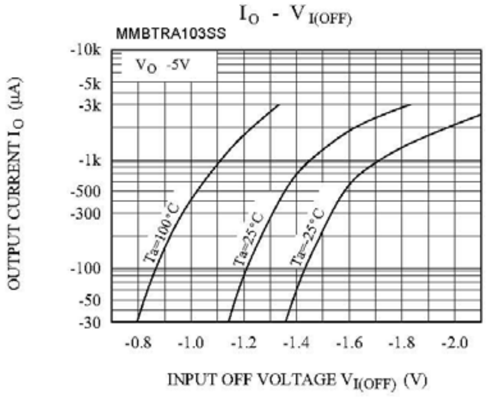

IO - V I(ON)
MMBTRA104SS
VO -0.2V
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

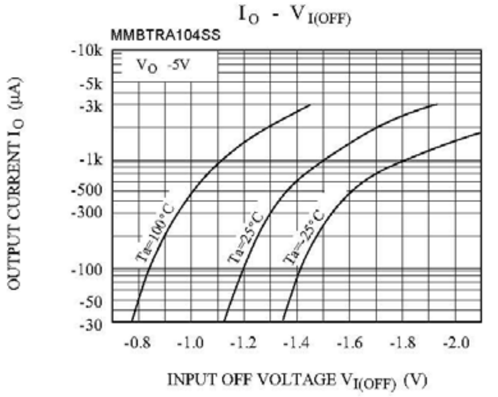

IO - VI(ON)
MMBTRA105SS
VO -0.2V
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

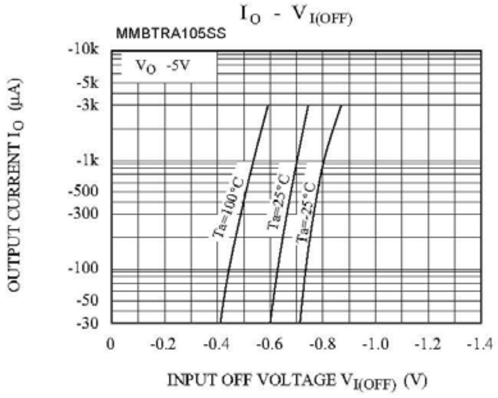

IO - VI(ON)
MMBTRA106SS
VO -0.2V
Ta 25°C
Ta -25°C
Ta=100°C
OUTPUT CURRENT IO (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE VI(ON) (V)

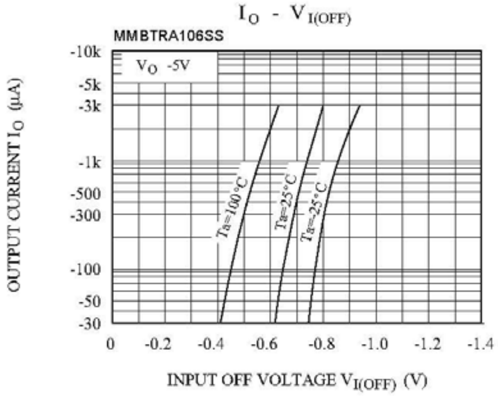

I_O - V_I(OFF)
MMBTRA101SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

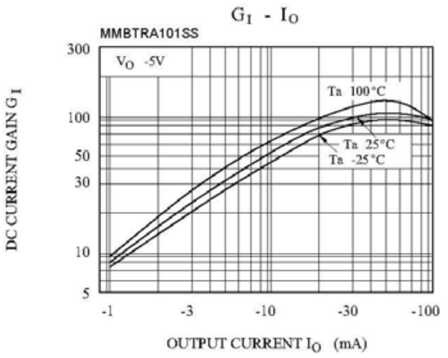

I_O - V_I(OFF)
MMBTRA102SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

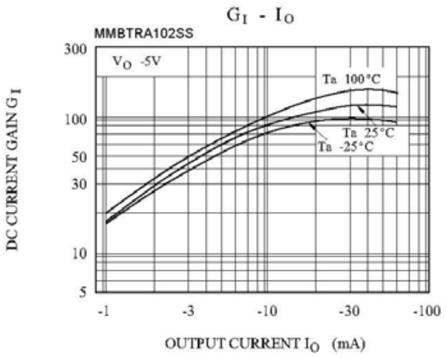

I_O - V_I(OFF)
MMBTRA103SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

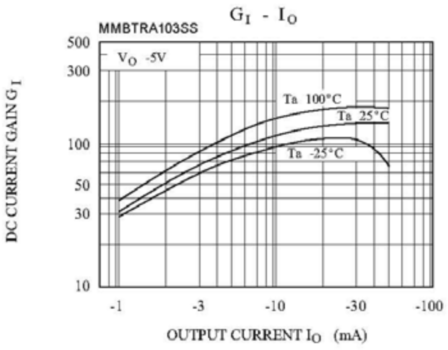

I_O - V_I(OFF)
MMBTRA104SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

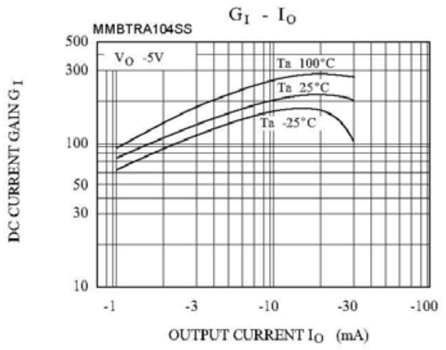

I_O - V_I(OFF)
MMBTRA105SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

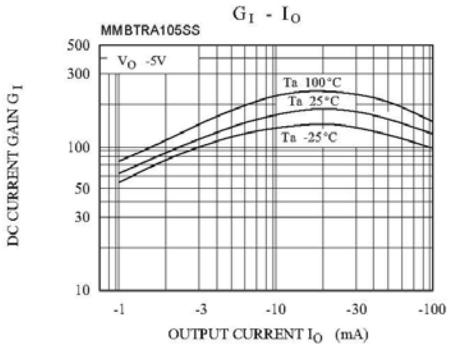

I_O - V_I(OFF)
MMBTRA106SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
OUTPUT CURRENT I_O (μA)
INPUT OFF VOLTAGE V_I(OFF) (V)

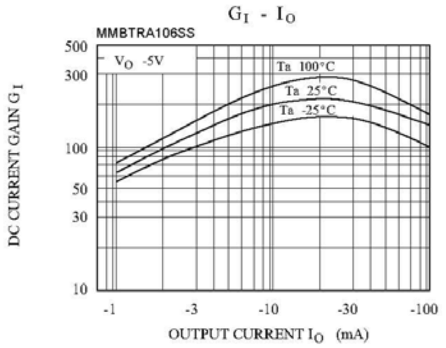

GI - IO
MMBTRA101SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
300
100
50
30
10
5
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)

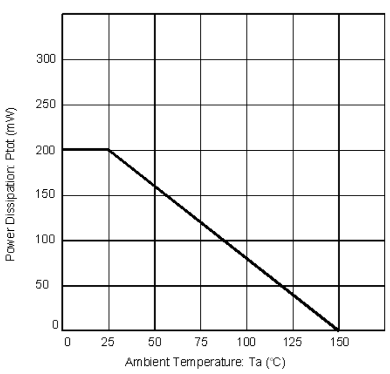

GI - IO
MMBTRA102SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
300
100
50
30
10
5
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)


GI - IO
MMBTRA103SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
500
300
100
50
30
10
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)


GI - IO
MMBTRA104SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
500
300
100
50
30
10
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)


GI - IO
MMBTRA105SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
500
300
100
50
30
10
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)


GI - IO
MMBTRA106SS
VO -5V
Ta 100°C
Ta 25°C
Ta -25°C
DC CURRENT GAIN GI
500
300
100
50
30
10
-1
-3
-10
-30
-100
OUTPUT CURRENT IO (mA)


PC-TA
Power Dissipation: Ptot (mW)
300
250
200
150
100
50
0
0
25
50
75
100
125
150
Ambient Temperature: Ta (°C)