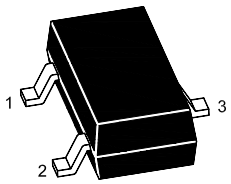
MMBTRA101SS~MMBTRA106SS
PNP Digital Transistor

Features

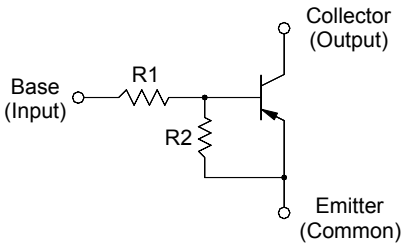
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process

SOT-23
(TO-236)



1.Base 2.Emitter 3.Collector

Equivalent Circuit



Resistor Values/Marking Code

Type	R1 (KΩ)	R2 (KΩ)	Marking
MMBTRA101SS	4.7	4.7	1BT
MMBTRA102SS	10	10	2BT
MMBTRA103SS	22	22	3BT
MMBTRA104SS	47	47	4BT
MMBTRA105SS	2.2	47	5BT
MMBTRA106SS	4.7	47	6BT

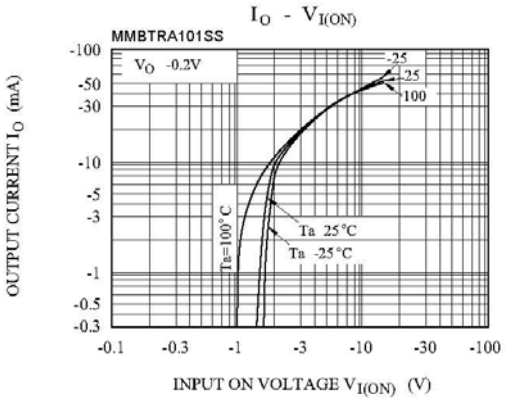
Absolute Maximum Ratings (T_a = 25 ℃)

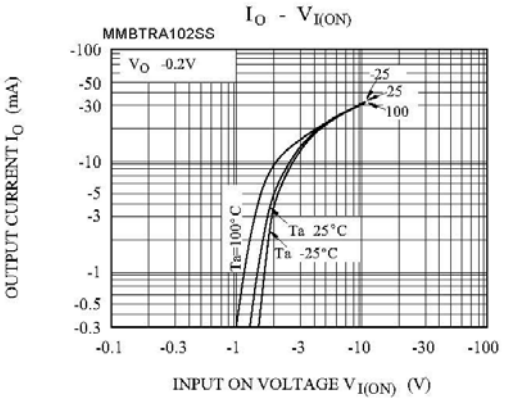
Parameter		Symbol	Value	Unit
Output Voltage		$-V_O$	50	V
Input Voltage	MMBTRA101SS	$-V_I$	20, -10	V
	MMBTRA102SS		30, -10	
	MMBTRA103SS		40, -10	
	MMBTRA104SS		40, -10	
	MMBTRA105SS		12, -5	
	MMBTRA106SS		20, -5	
Output Current		$-I_O$	100	mA
Total Power Dissipation		P_{tot}	200	mW
Junction Temperature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

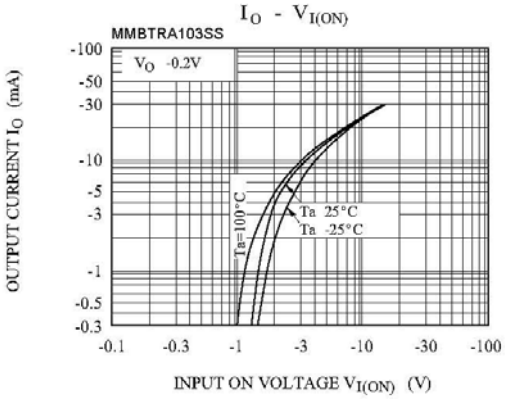
Characteristics at T_a = 25℃

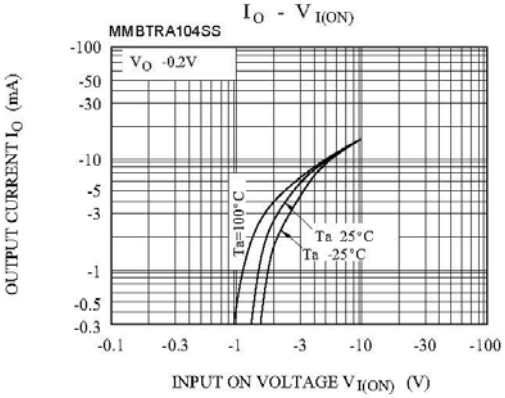
Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at $-V_O$ = 5 V, $-I_O$ = 10 mA	MMBTRA101SS	G_I	30	-	-	-
	MMBTRA102SS		50	-	-	-
	MMBTRA103SS		70	-	-	-
	MMBTRA104SS		80	-	-	-
	MMBTRA105SS		80	-	-	-
	MMBTRA106SS		80	-	-	-
Output Cutoff Current at $-V_O$ = 50 V		$-I_{O(OFF)}$	-	-	500	nA
Input Current 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	-	200	-	MHz

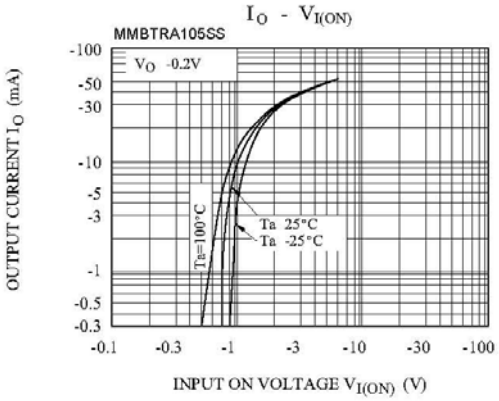
Typical Characteristic Curves

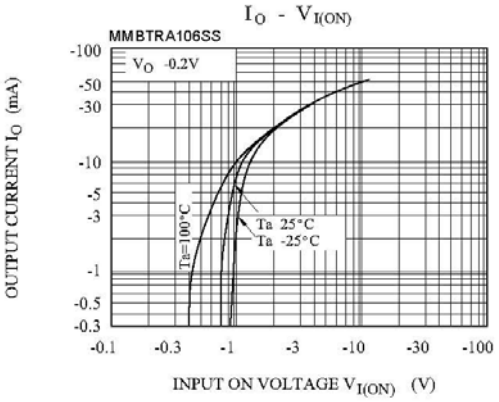


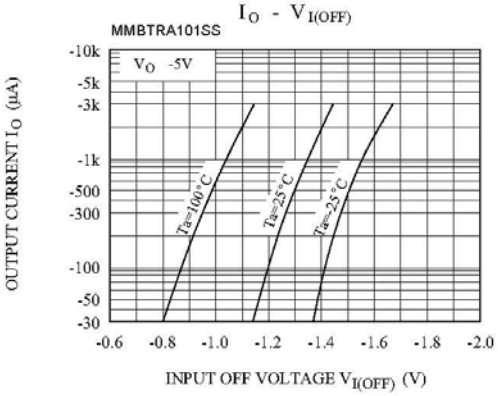


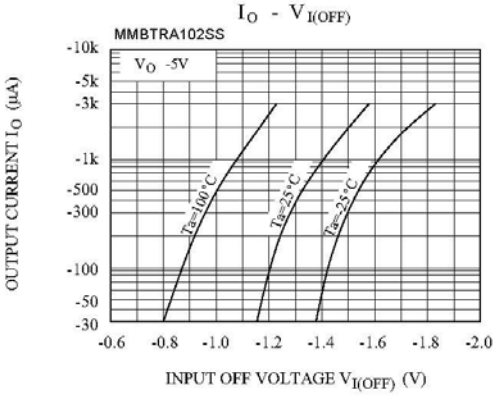


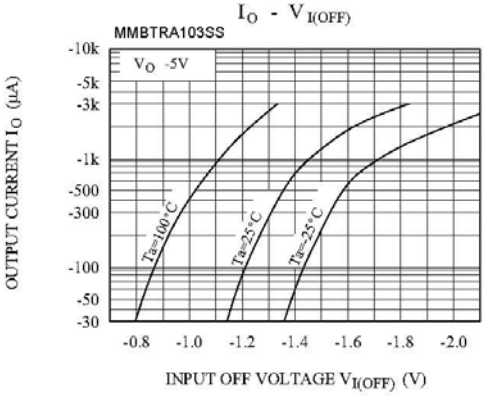


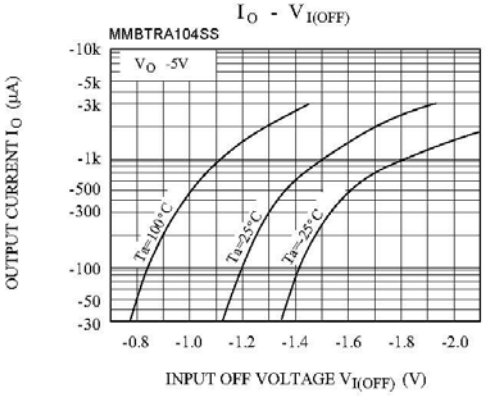


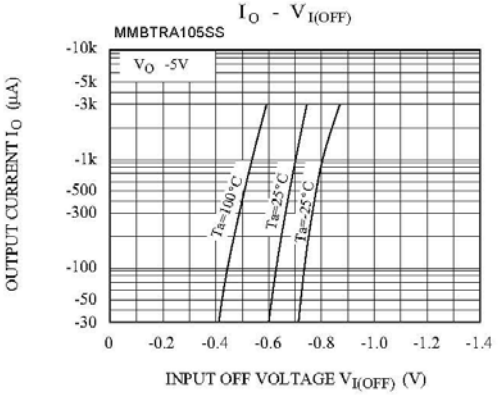


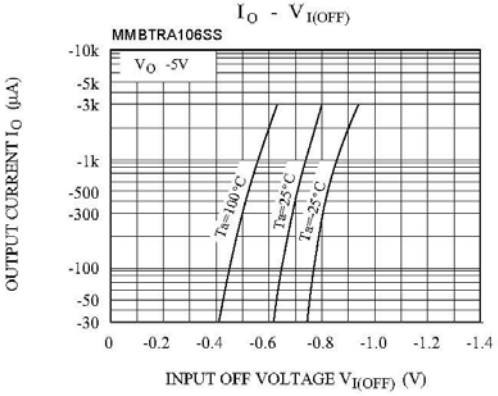

I_O - $V_{I(OFF)}$
MMBTRA101SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
OUTPUT CURRENT I_O (μA)
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)


I_O - $V_{I(OFF)}$
MMBTRA102SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
OUTPUT CURRENT I_O (μA)
-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
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)

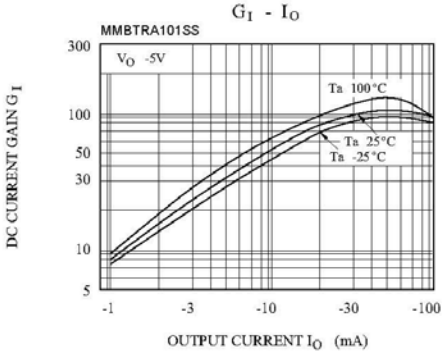

I_O - $V_{I(OFF)}$
MMBTRA103SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
OUTPUT CURRENT I_O (μA)
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)


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

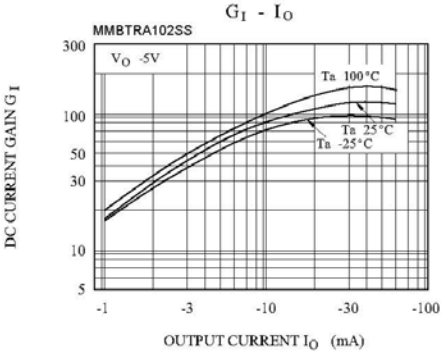

I_O - $V_{I(OFF)}$
MMBTRA105SS
V_O -5V
Ta=100°C
Ta=25°C
Ta=-25°C
OUTPUT CURRENT I_O (μA)
-10k
-5k
-3k
-1k
-500
-300
-100
-50
-30
0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)


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

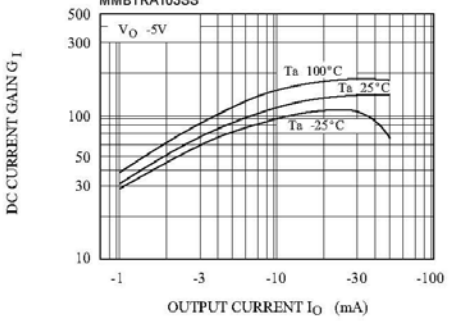
G_I - I_O



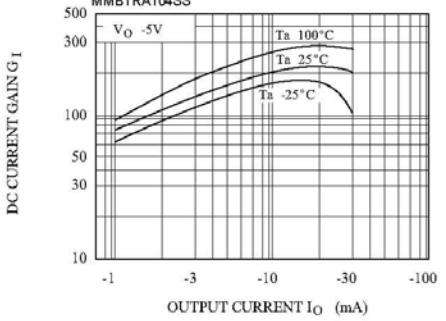
G_I - I_O



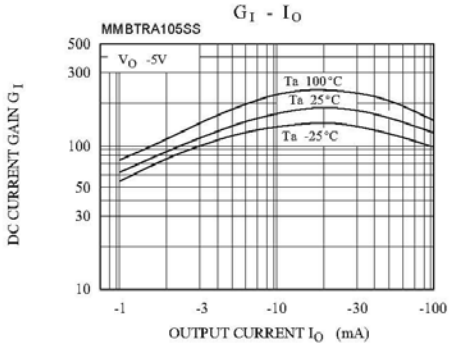
G_I - I_O



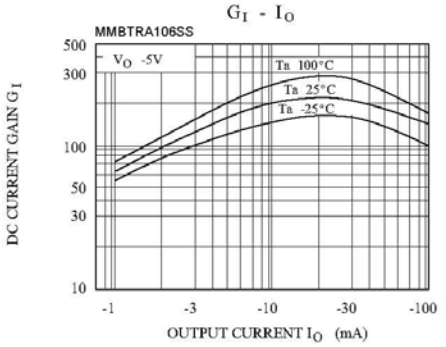
G_I - I_O



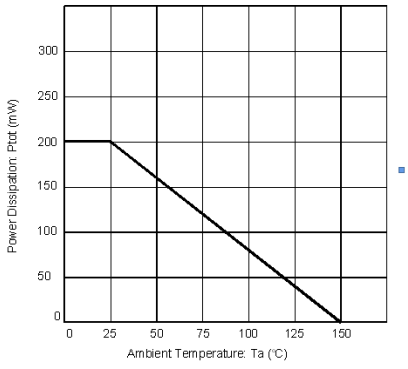
G_I - I_O



G_I - I_O

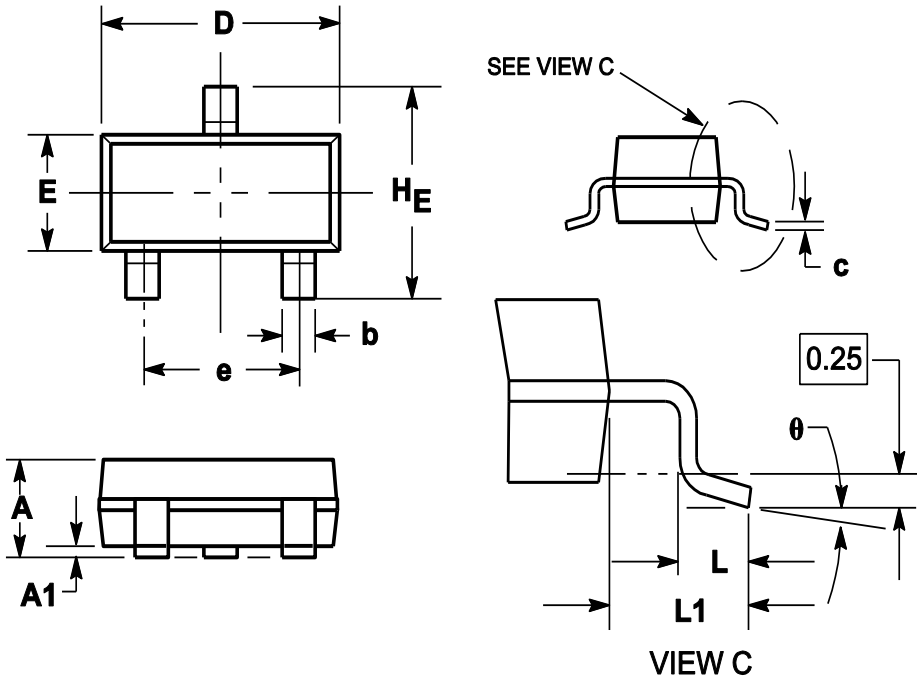


P_C-T_A

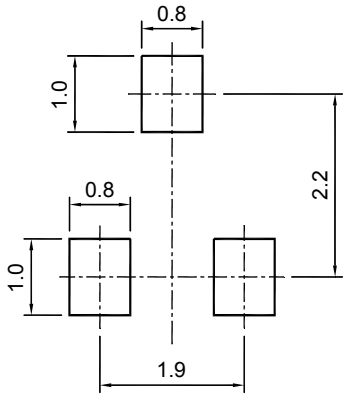


Package Outline

SOT-23（TO-236)
Dimensions in mm



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
H_E	2.250	2.400	2.550
e	1.800	1.900	2.000
L1	0.550REF		
L	0.300		0.500
θ	0^o		8^o



SOT-23 (TO-236)

Recommended soldering pad