

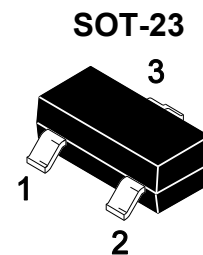


# MMBTRC116SS~MMBTRC122SS

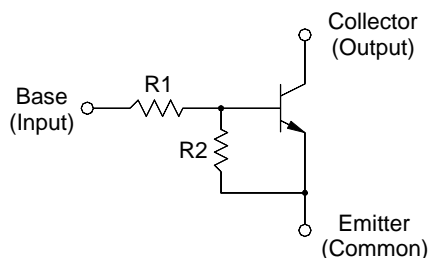
## NPN Digital Transistor

### Features

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



### Equivalent Circuit



1.Base 2.Emitter 3.Collector

### Resistor Values/Marking Code

Type	R1 (K $\Omega$ )			R2 (K $\Omega$ )			Marking Code
	Min.	Typ.	Max.	Min.	Typ.	Max.	
MMBTRC116SS	0.7	1	1.3	7	10	13	16BR
MMBTRC117SS	1.54	2.2	2.86	1.54	2.2	2.86	17BR
MMBTRC118SS	1.54	2.2	2.86	7	10	13	18BR
MMBTRC119SS	3.29	4.7	6.11	7	10	13	19BR
MMBTRC120SS	7	10	13	3.29	4.7	6.11	20BR
MMBTRC121SS	32.9	47	61.1	7	10	13	21BR
MMBTRC122SS	70	100	130	70	100	130	22BR



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## NPN Digital Transistor

### Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ )

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
Maximum Power Dissipation		$P_D$	200	mW
Junction Temperature		$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range		$T_{STG}$	-55 to +150	$^{\circ}\text{C}$



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## NPN Digital Transistor

### Electrical Characteristics (T<sub>A</sub>=25°C)

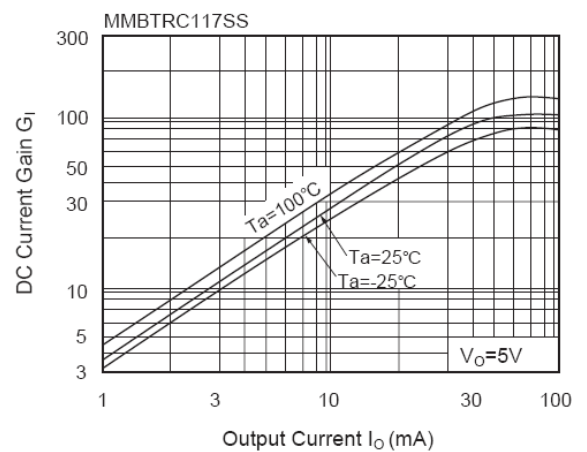
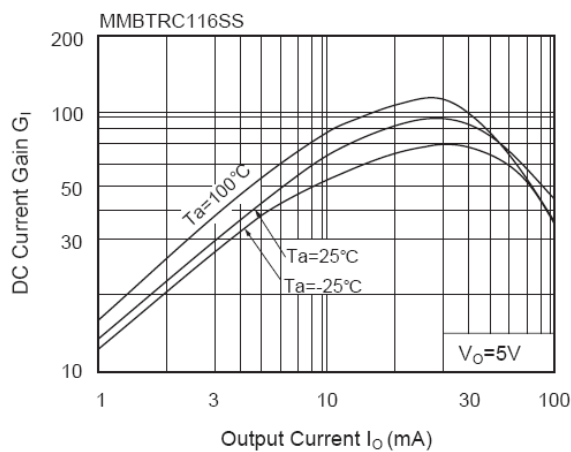
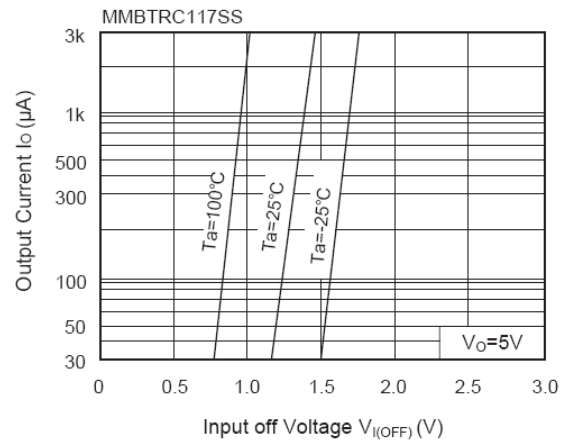
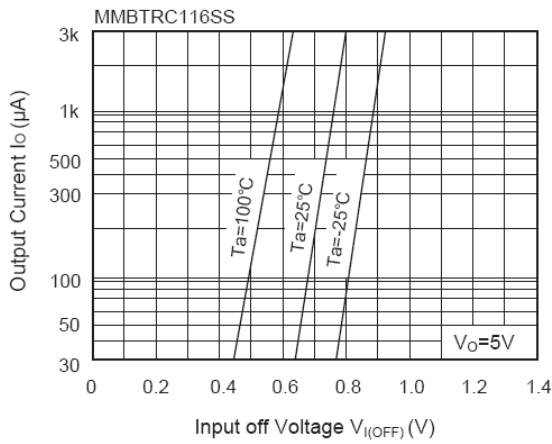
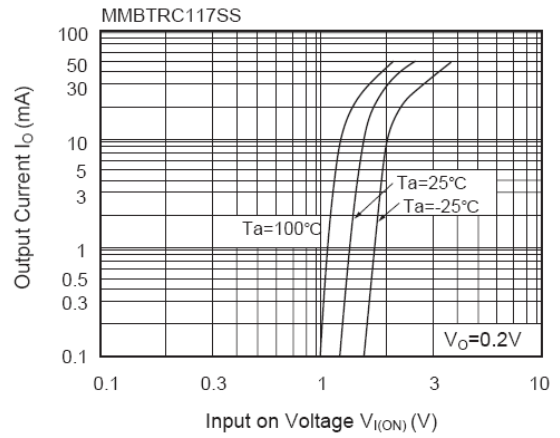
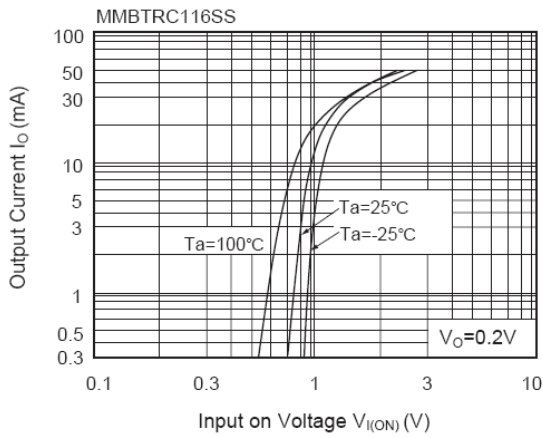
Parameter	Symbol	Min.	Typ.	Max.	Unit	
DC Current Gain						
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 5 mA	MMBTRC116SS	33	--	--		
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 20 mA	MMBTRC117SS	20	--	--		
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 10 mA	MMBTRC118SS	33	--	--		
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 10 mA	MMBTRC119SS	30	--	--	--	
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 10 mA	MMBTRC120SS	24	--	--		
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 5 mA	MMBTRC121SS	33	--	--		
at V <sub>O</sub> = 5 V, I <sub>O</sub> = 5 mA	MMBTRC122SS	62	--	--		
Output Cutoff Current						
at V <sub>O</sub> = 50 V	I <sub>O(OFF)</sub>	--	--	500	nA	
Input Current						
at V <sub>I</sub> = 5 V	MMBTRC116SS	--	--	7.2		
	MMBTRC117SS	--	--	3.8		
	MMBTRC118SS	--	--	3.8		
	MMBTRC119SS	--	--	1.8	mA	
	MMBTRC120SS	--	--	0.88		
	MMBTRC121SS	--	--	0.16		
	MMBTRC122SS	--	--	0.15		
Output Voltage (ON)						
at I <sub>O</sub> = 10 mA, I <sub>I</sub> = 0.5 mA	MMBTRC116SS~121SS	V <sub>O(ON)</sub>	--	--	0.3	V
at I <sub>O</sub> = 5 mA, I <sub>I</sub> = 0.25 mA	MMBTRC122SS		--	--	0.3	
Input Voltage (ON)						
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 20 mA	MMBTRC116SS	V <sub>I(ON)</sub>	--	--	3	
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 20 mA	MMBTRC117SS		--	--	3	
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 20 mA	MMBTRC118SS		--	--	3	
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 20 mA	MMBTRC119SS		--	--	2.5	V
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 2 mA	MMBTRC120SS		--	--	3	
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 2 mA	MMBTRC121SS		--	--	5	
at V <sub>O</sub> = 0.3 V, I <sub>O</sub> = 1 mA	MMBTRC122SS		--	--	3	
Input Voltage (OFF)						
at V <sub>CC</sub> = 5 V, I <sub>O</sub> = 100 μA	MMBTRC116SS	V <sub>I(OFF)</sub>	0.3	--	--	
	MMBTRC117SS		0.5	--	--	
	MMBTRC118SS		0.3	--	--	
	MMBTRC119SS		0.3	--	--	V
	MMBTRC120SS		0.8	--	--	
	MMBTRC121SS		1	--	--	
	MMBTRC122SS		0.5	--	--	
Transition Frequency						
at V <sub>O</sub> = 10 V, I <sub>O</sub> = 5 mA	f <sub>T</sub>	--	250	--	MHz	



# MMBTRC116SS~MMBTRC122SS

## NPN Digital Transistor

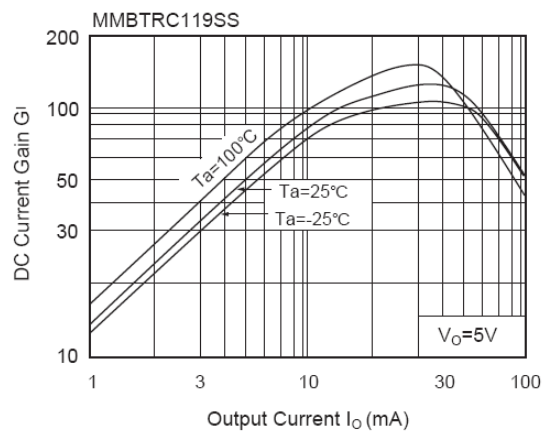
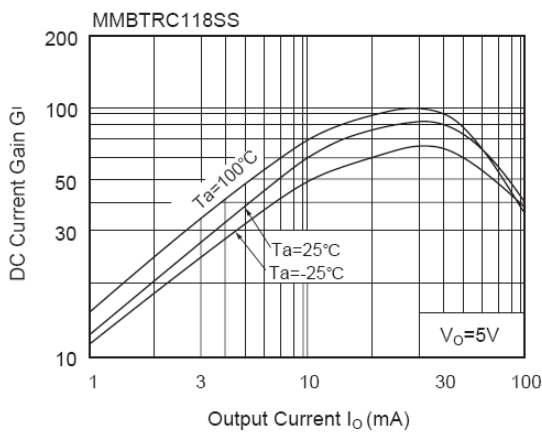
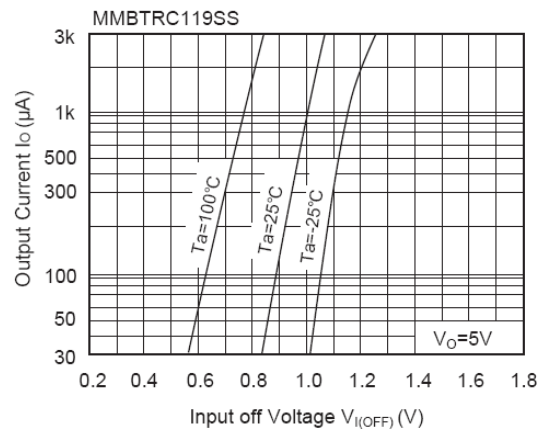
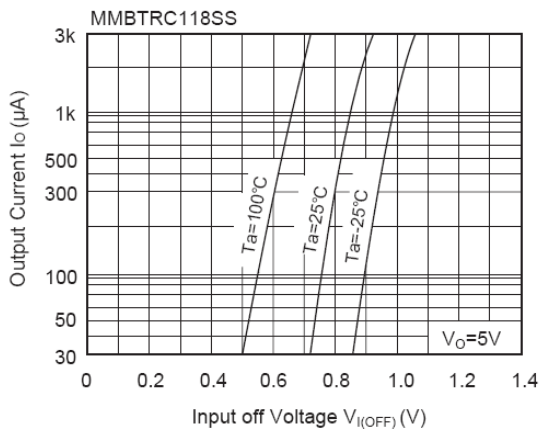
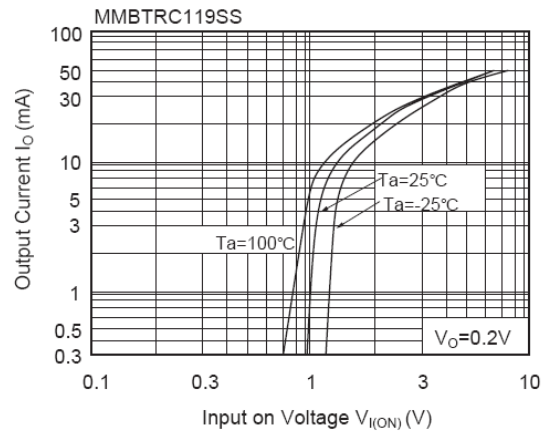
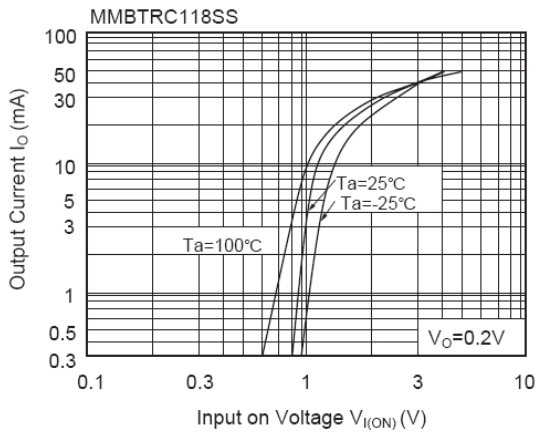
### Typical Characteristic Curves





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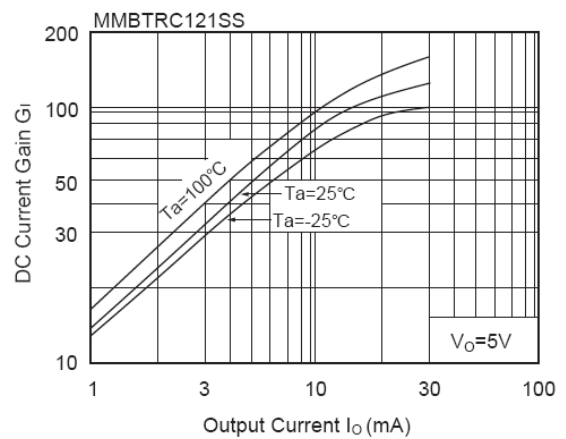
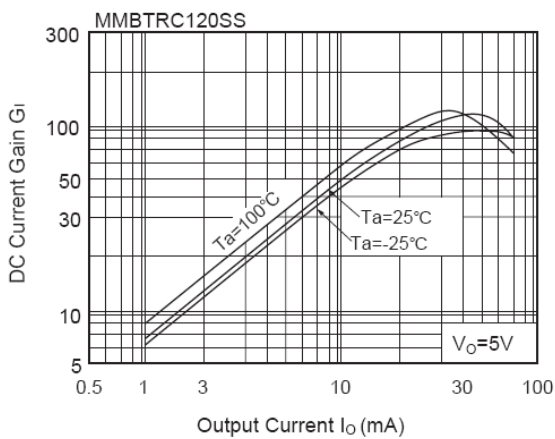
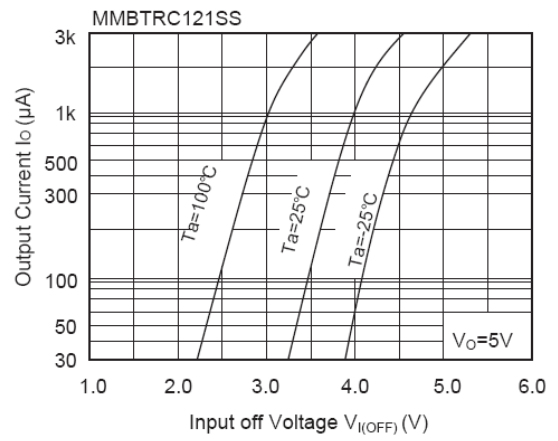
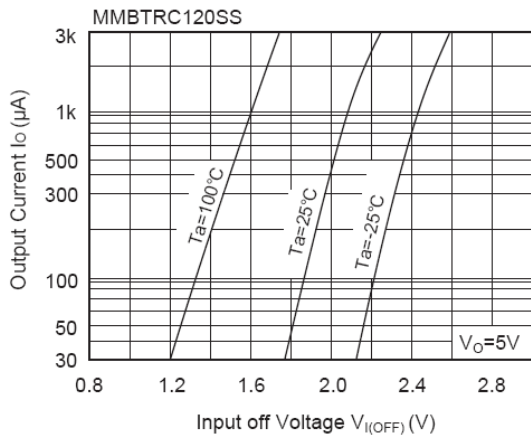
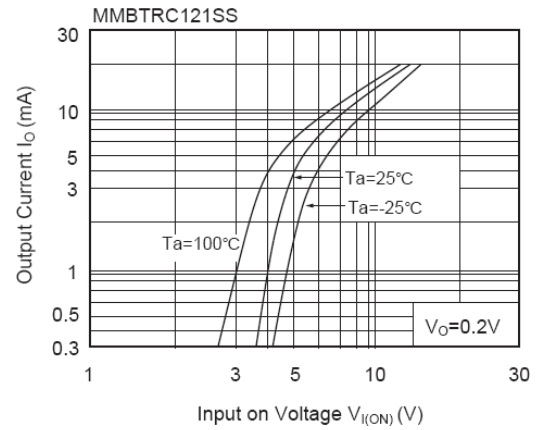
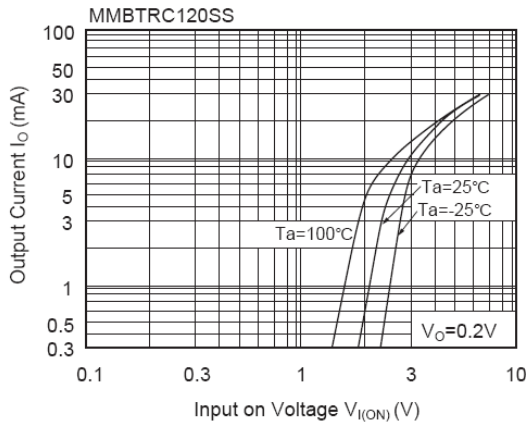
## NPN Digital Transistor





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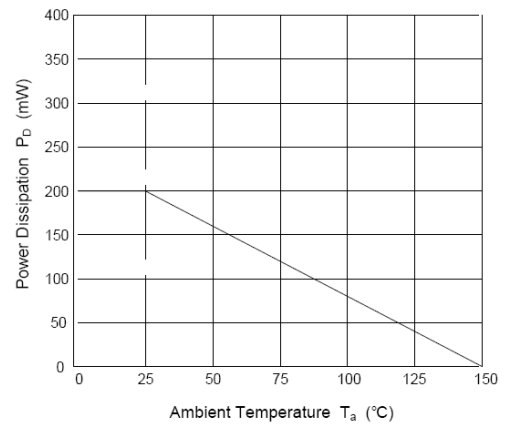
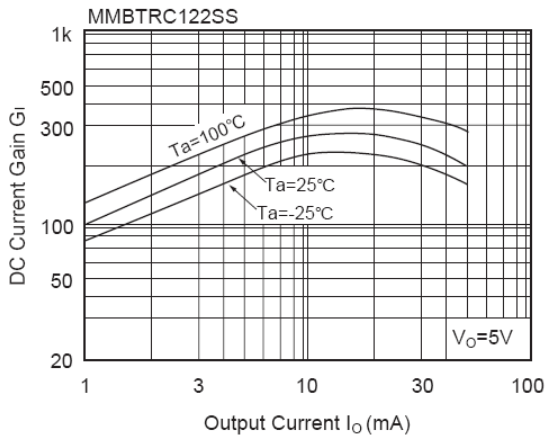
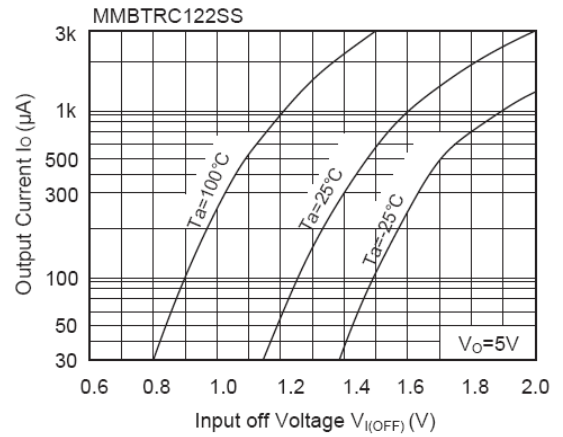
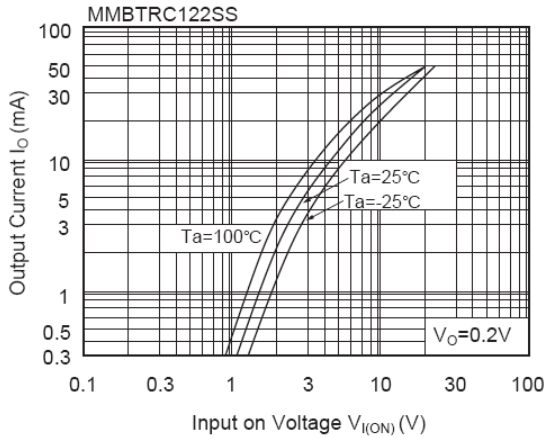
## NPN Digital Transistor





# MMBTRC116SS~MMBTRC122SS

## NPN Digital Transistor





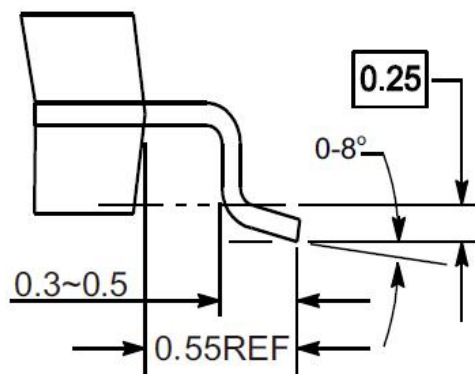
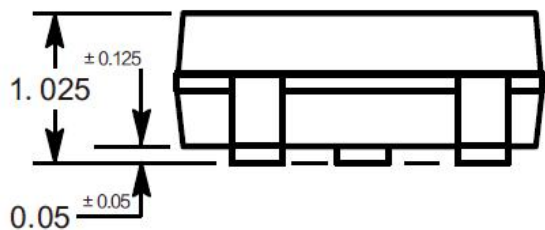
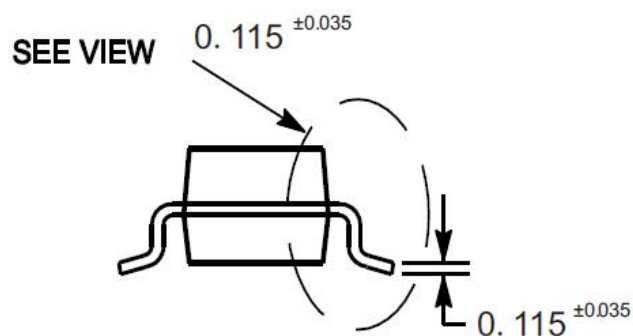
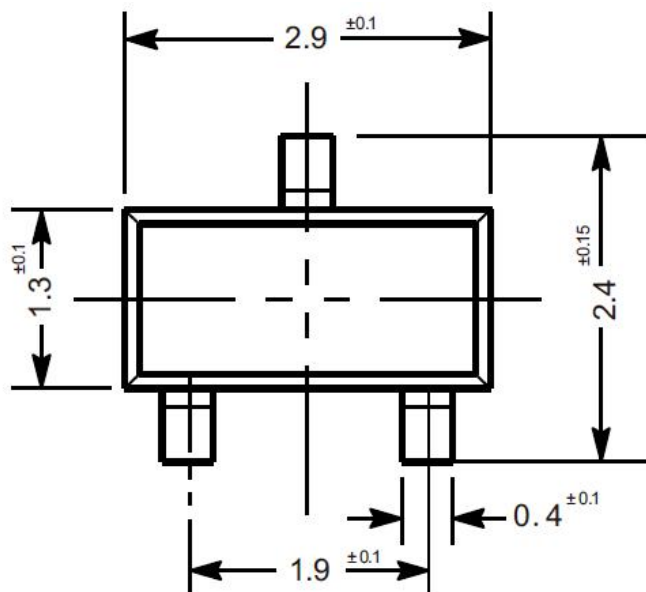
# MMBTRC116SS~MMBTRC122SS

## NPN Digital Transistor

### Package Outline

SOT-23

Dimensions in mm



VIEW C

### Ordering Information

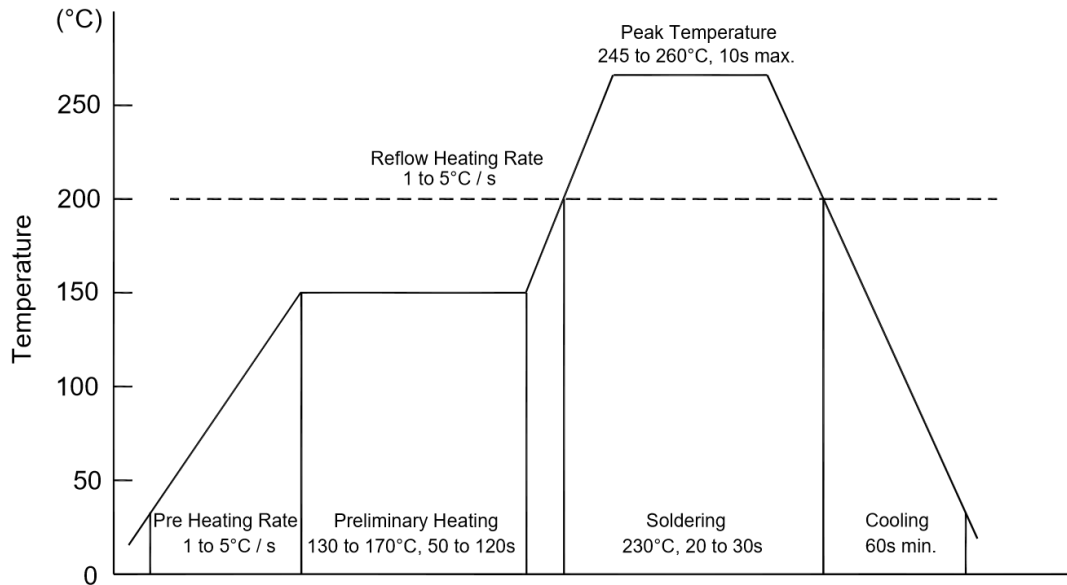
Device	Package	Shipping
MMBTRC116SS~MMBTRC122SS	SOT-23	3,000PCS/Reel&7inches





### Conditions of Soldering and Storage

#### ◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

#### ◆ Conditions of hand soldering

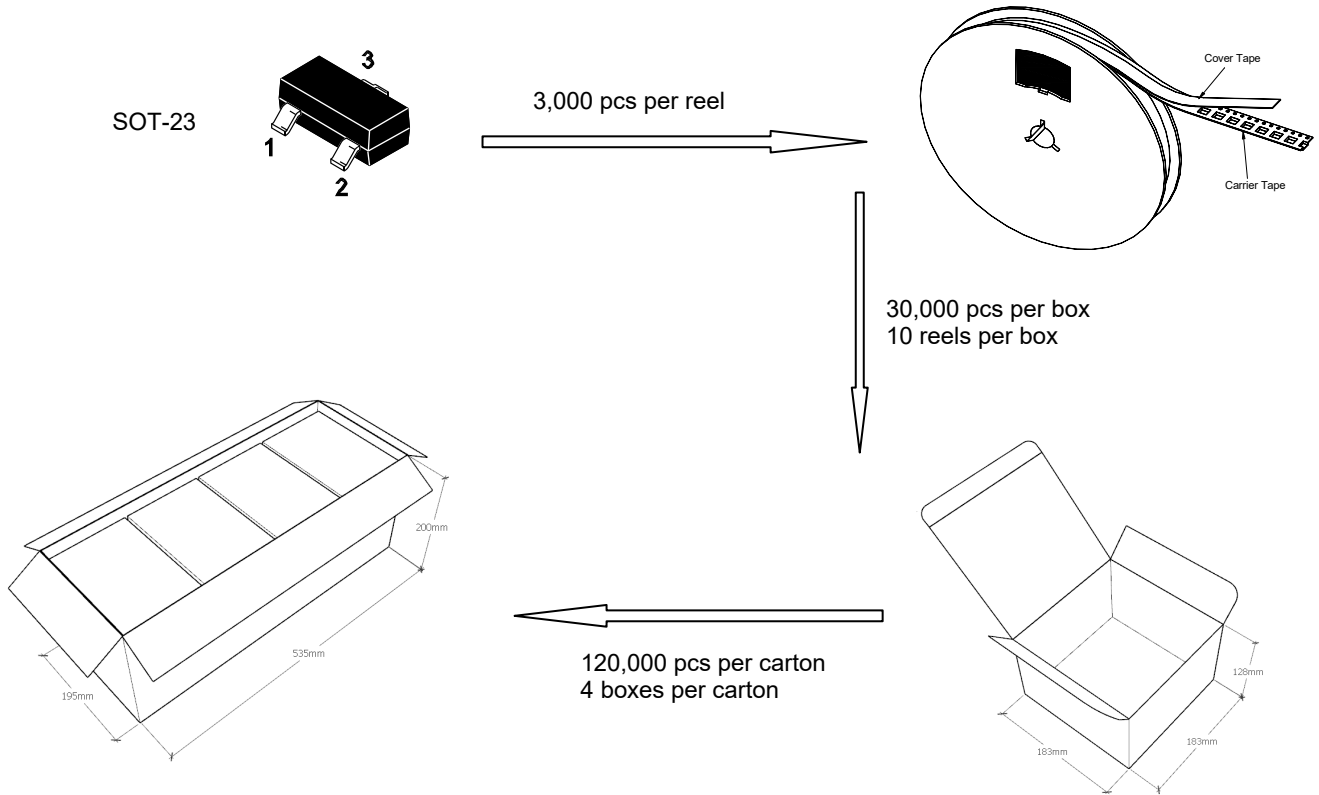
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

#### ◆ Storage conditions

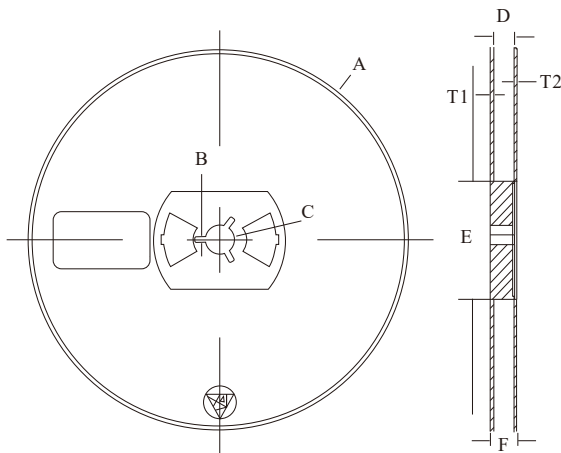
- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing

### Package Specifications

- The method of packaging



### ◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Reel (7")

