

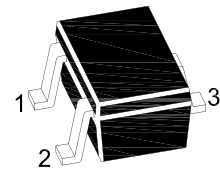
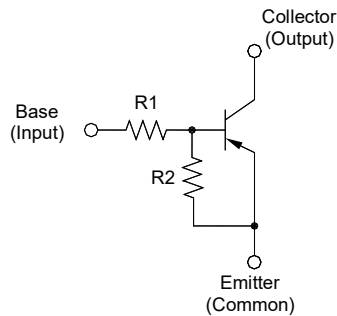
MMBTRA301E...MMBTRA306E

PNP Silicon Epitaxial Planar Digital Transistors

For switching and 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-523 Plastic Package

Resistor Values

Type	R1 (KΩ)	R2 (KΩ)
MMBTRA301E	4.7	4.7
MMBTRA302E	10	10
MMBTRA303E	22	22
MMBTRA304E	47	47
MMBTRA305E	2.2	47
MMBTRA306E	4.7	47

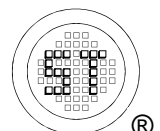
Absolute Maximum Ratings (T_a = 25 °C)

Parameter	Symbol	Value	Unit
Collector Base Voltage	-V _{CBO}	50	V
Collector Emitter Voltage	-V _{CEO}	50	V
Emitter Base Voltage	-V _{EBO}	MMBTRA301E	20, -10
		MMBTRA302E	30, -10
		MMBTRA303E	40, -10
		MMBTRA304E	40, -10
		MMBTRA305E	12, -5
		MMBTRA306E	20, -5
Collector Current	-I _C	100	mA
Total Power Dissipation	P _{tot}	100	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 _{θJA}	1250	°C/W

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

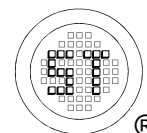


MMBTRA301E...MMBTRA306E

Characteristics at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit	
DC Current Gain at $-V_{CE} = 5\text{ V}$, $-I_C = 10\text{ mA}$	MMBTRA301E	30	-	-	-	
	MMBTRA302E	50	-	-	-	
	MMBTRA303E	70	-	-	-	
	MMBTRA304E	80	-	-	-	
	MMBTRA305E	80	-	-	-	
	MMBTRA306E	80	-	-	-	
Collector Emitter Cutoff Current at $-V_{CE} = 50\text{ V}$	$-I_{CEO}$	-	-	500	nA	
Emitter Base Cutoff Current at $-V_{EB} = 5\text{ V}$	MMBTRA301E	-	-	1.8	mA	
	MMBTRA302E	-	-	0.88		
	MMBTRA303E	-	-	0.36		
	MMBTRA304E	-	-	0.18		
	MMBTRA305E	-	-	3.6		
	MMBTRA306E	-	-	1.8		
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.5\text{ mA}$	$-V_{CE(SAT)}$	-	-	0.3	V	
Input Voltage (ON) at $-V_{CE} = 0.2\text{ V}$, $-I_C = 5\text{ mA}$	MMBTRA301E	-	-	2	V	
	MMBTRA302E	-	-	2.4		
	MMBTRA303E	-	-	3		
	MMBTRA304E	-	-	5		
	MMBTRA305E	-	-	1.1		
	MMBTRA306E	-	-	1.3		
Input Voltage (OFF) at $-V_{CE} = 5\text{ V}$, $-I_C = 0.1\text{ mA}$	MMBTRA301E~304E	1	-	-	V	
	MMBTRA305E~306E	0.5	-	-		
Transition Frequency at $-V_{CE} = 10\text{ V}$, $-I_C = 5\text{ mA}$	$f_T^{1)}$	-	200	-	MHz	
Input Resistance	MMBTRA301E	- 30%	4.7	+ 30%	K Ω	
	MMBTRA302E		10			
	MMBTRA303E		22			
	MMBTRA304E		47			
	MMBTRA305E		2.2			
	MMBTRA306E		4.7			
Resistance Ratio	MMBTRA301E~MMBTRA304E	R2/R1	0.85	1	1.15	-
	MMBTRA305E		18.2	21	24.6	-
	MMBTRA306E		8.5	10	11.5	-

¹⁾ Characteristic of transistor only.



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA301E

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

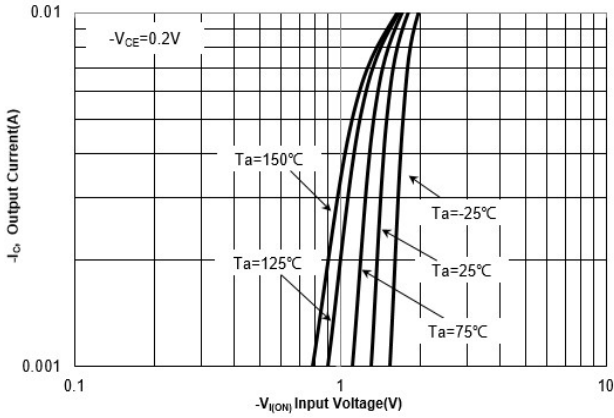


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

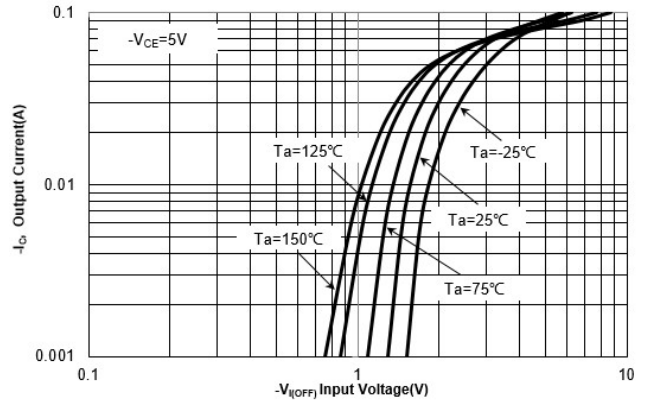


Fig. 3 DC Current Gain vs. Output Current

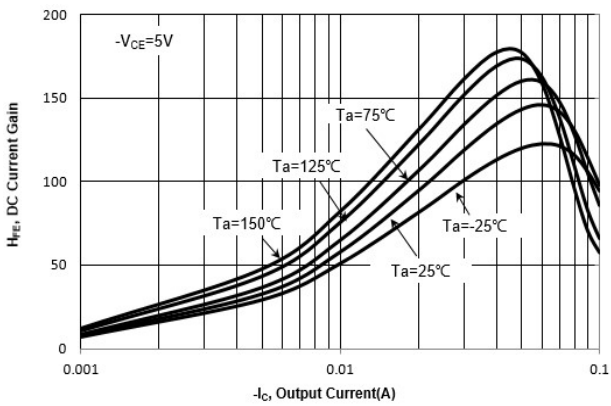
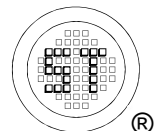
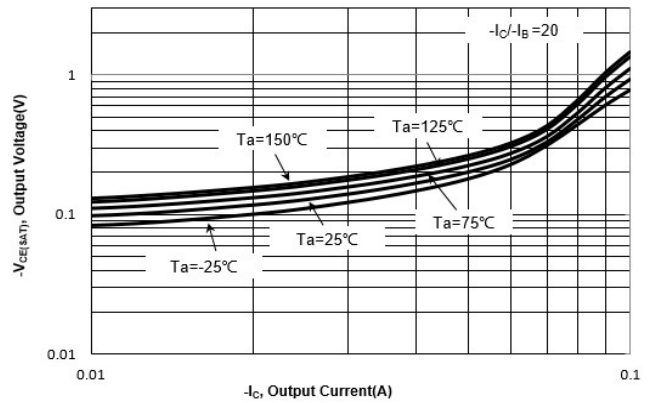


Fig. 4 V_{CESAT} vs. Output Current



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA302E

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

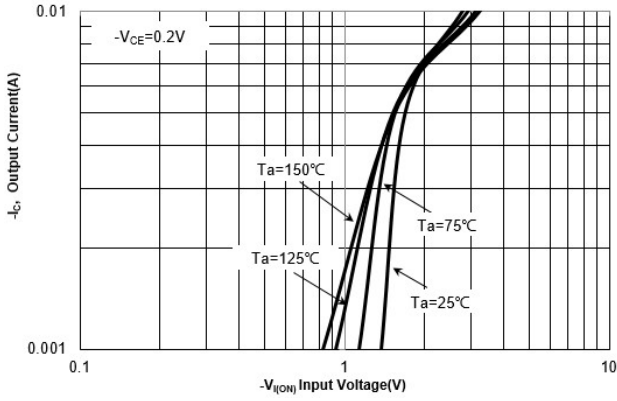


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

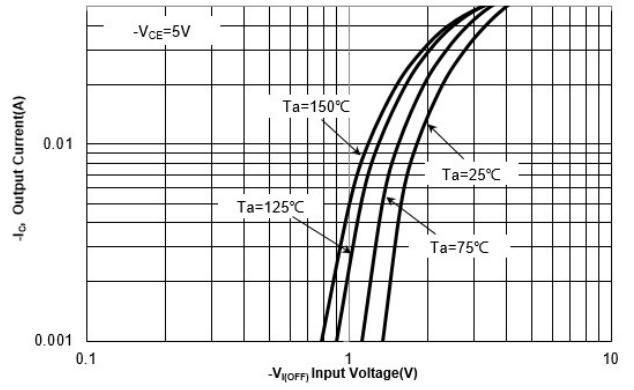


Fig. 3 DC Current Gain vs. Output Current

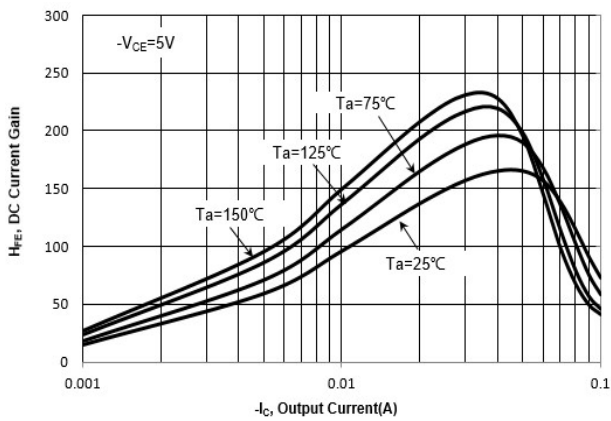
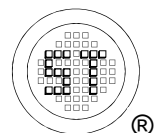
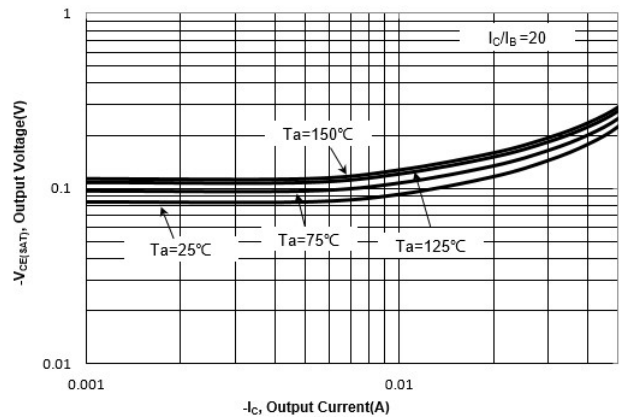


Fig. 4 V_{CESAT} vs. Output Current



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA303E

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

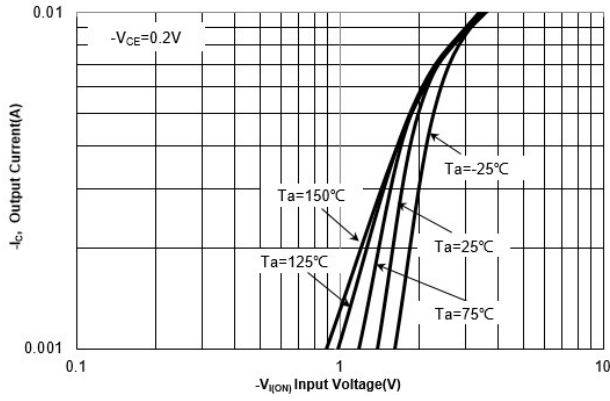


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

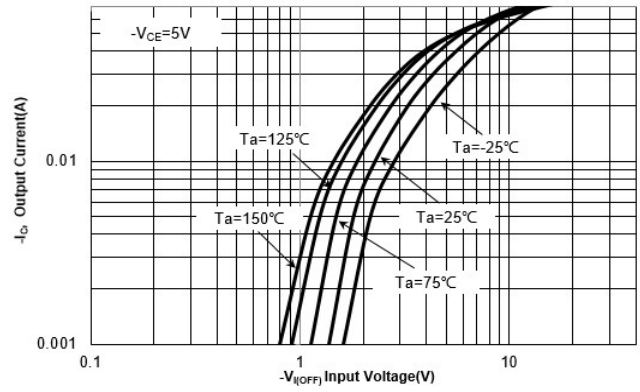


Fig. 3 DC Current Gain vs. Output Current

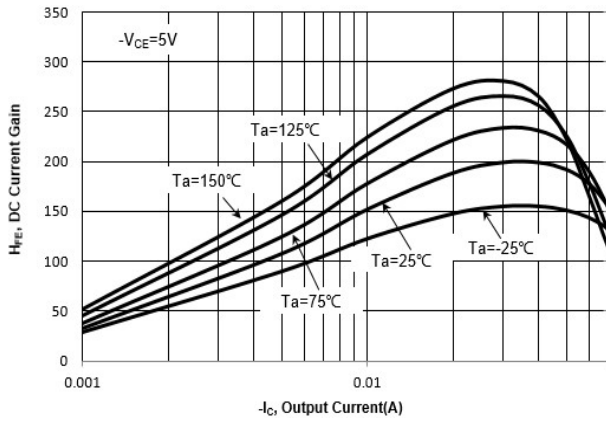
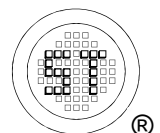
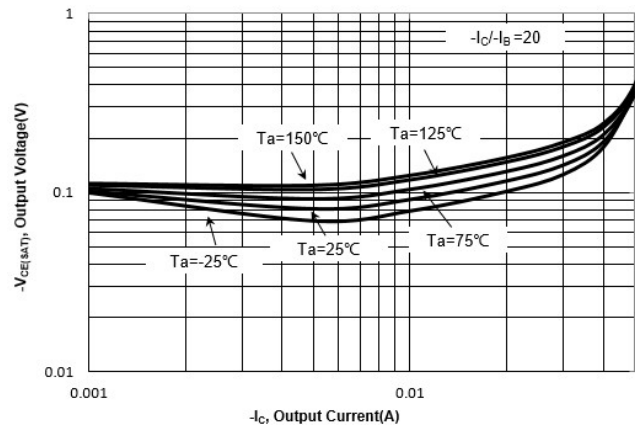


Fig. 4 $V_{CE(SAT)}$ vs. Output Current



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA304E

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

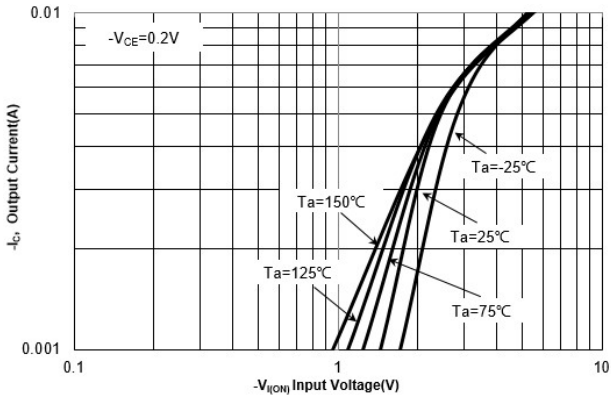


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

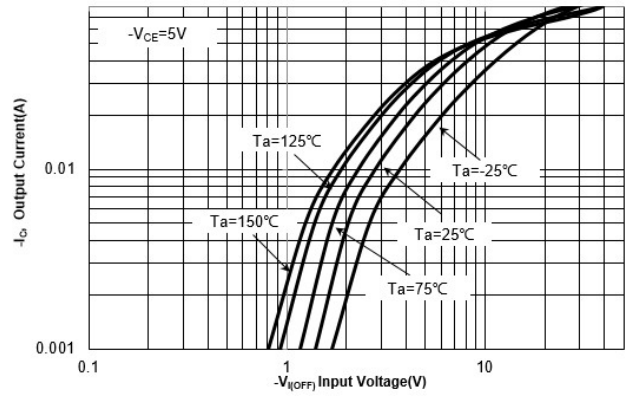


Fig. 3 DC Current Gain vs. Output Current

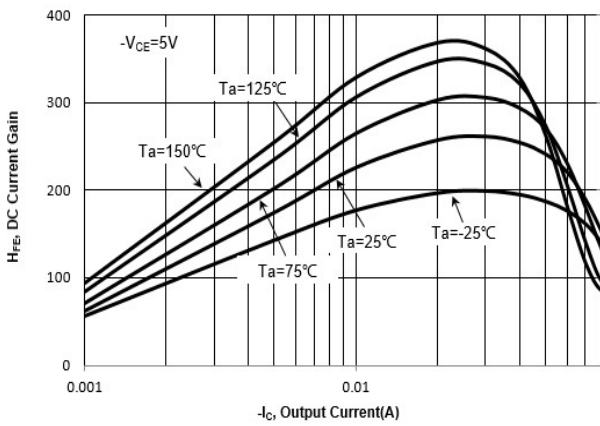
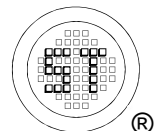
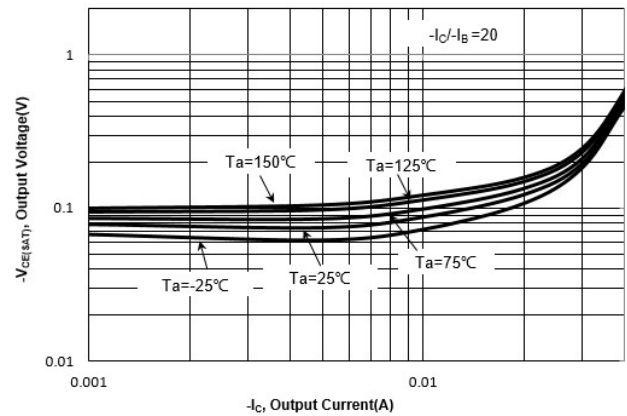


Fig. 4 V_{CESAT} vs. Output Current



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA305E

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

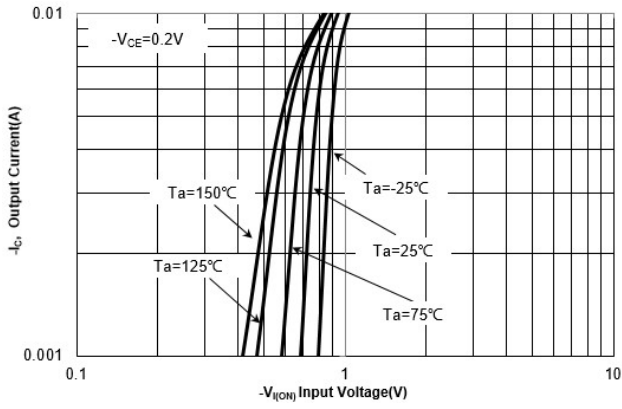


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

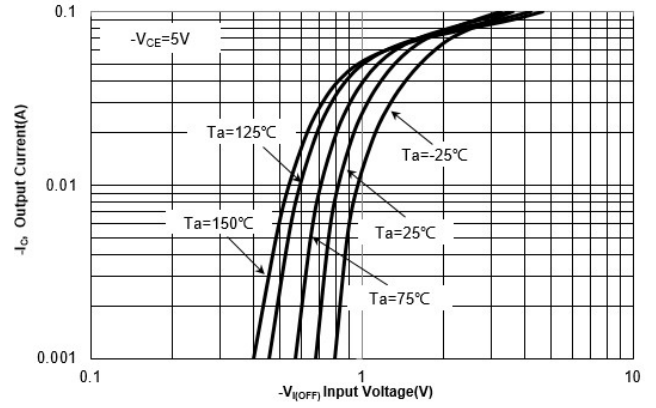


Fig. 3 DC Current Gain vs. Output Current

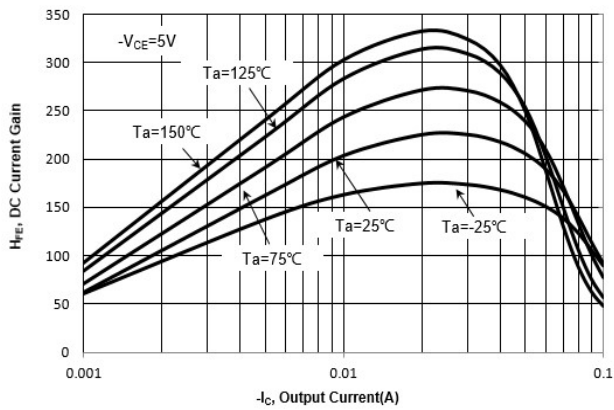
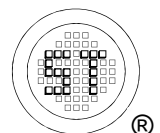
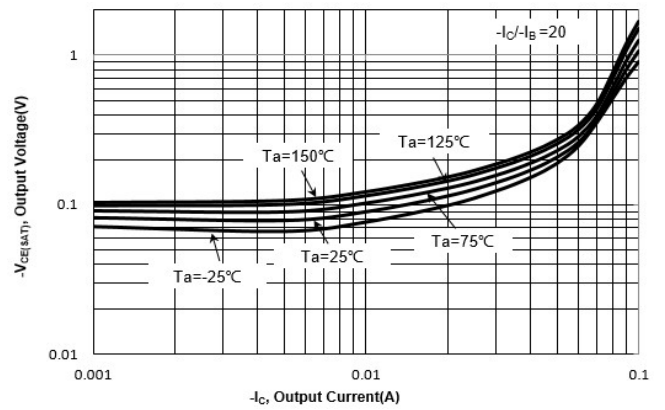


Fig. 4 V_{CESAT} vs. Output Current



MMBTRA301E...MMBTRA306E

Electrical Characteristics Curves: MMBTRA306E

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

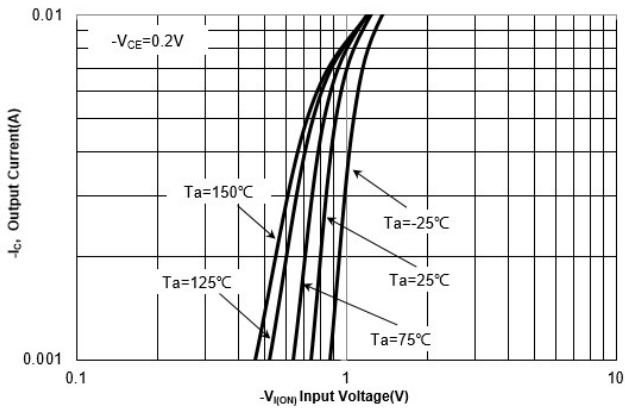


Fig. 2 Output Current vs. $V_{I(OFF)}$, Input Voltage

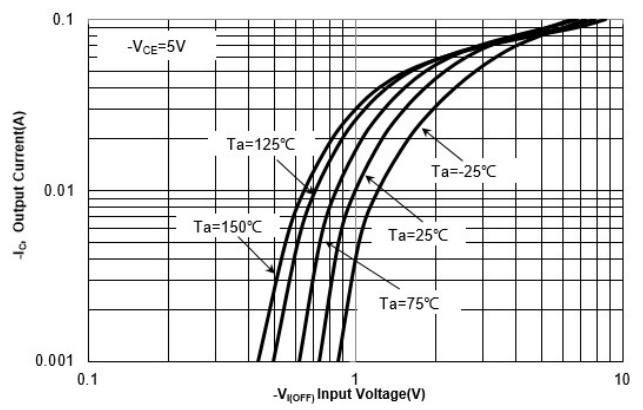


Fig. 3 DC Current Gain vs. Output Current

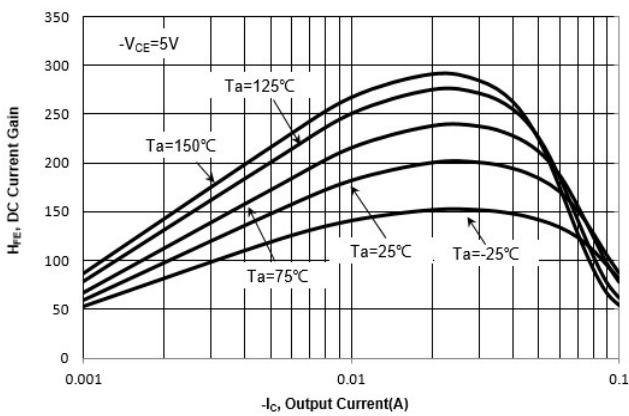
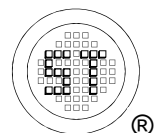
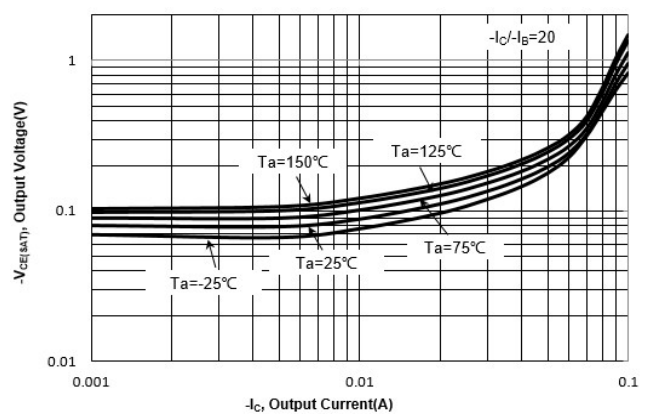


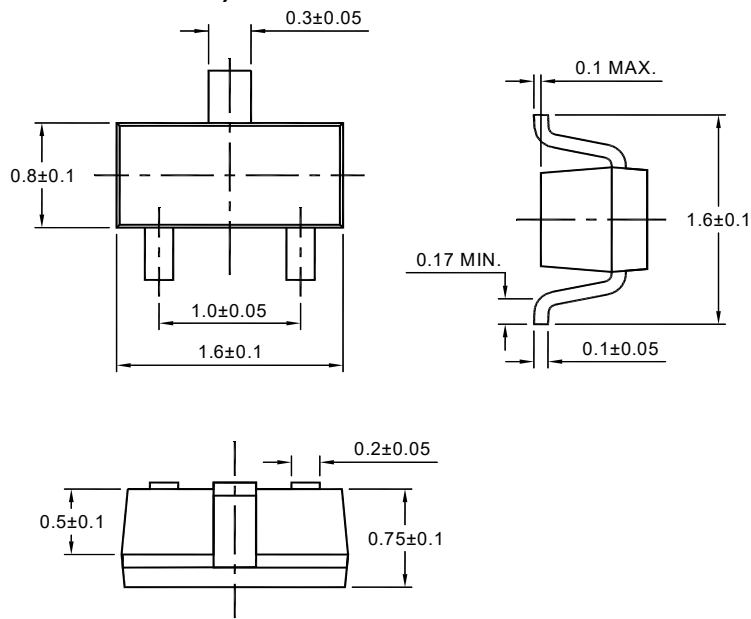
Fig. 4 $V_{CE(SAT)}$ vs. Output Current



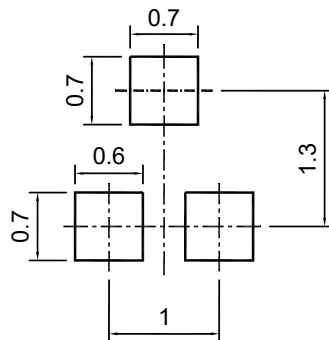
MMBTRA301E...MMBTRA306E

Package Outline (Dimensions in mm)

SOT-523



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-523	8	4 ± 0.1	0.157 ± 0.004	178	7	4,000

Marking information

"**" = Part No.

Type	Marking	Type	Marking	Type	Marking
MMBTRA301E	RA	MMBTRA303E	RC	MMBTRA305E	RE
MMBTRA302E	RB	MMBTRA304E	RD	MMBTRA306E	RF

"YM" = Date Code Marking

"Y" = Year

"M" = Month

Font type: Arial

