

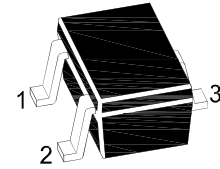
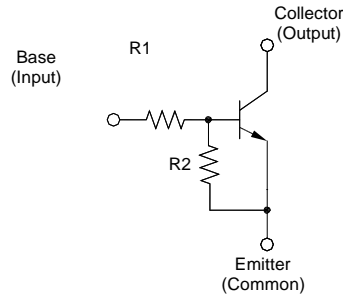


NPN Silicon Epitaxial Planar Transistor

for switching, 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.Emltter 3.Collector
SOT-523 Plastic Package

Resistor Values

Type	R1 (K)	R2 (K)
MMBTRC416E	1	10
MMBTRC417E	2.2	2.2
MMBTRC418E	2.2	10
MMBTRC419E	4.7	10
MMBTRC420E	10	4.7
MMBTRC421E	47	10
MMBTRC422E	100	100

Absolute Maximum Ratings (T_a = 25 °C)

Parameter		Symbol	Value	Unit
Output Voltage		V _O	50	V
Input Voltage	MMBTRC416E	V _I	10, - 5	V
	MMBTRC417E		12, - 10	
	MMBTRC418E		12, - 5	
	MMBTRC419E		20, - 7	
	MMBTRC420E		30, - 10	
	MMBTRC421E		40, - 15	
	MMBTRC422E		40, - 10	
Output Current		I _O	100	mA
Total Power Dissipation		P _{tot}	100	mW
Junction Temperature		T _j	150	°C
Storage Temperature Range		T _{stg}	- 55 to + 150	°C



MMBTRC416E...MMBTRC422E

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain					
at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$	MMBTRC416E	33	-	-	-
at $V_O = 5\text{ V}$, $I_O = 20\text{ mA}$	MMBTRC417E	20	-	-	-
at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$	MMBTRC418E	33	-	-	-
at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$	MMBTRC419E	30	-	-	-
at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$	MMBTRC420E	24	-	-	-
at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$	MMBTRC421E	33	-	-	-
at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$	MMBTRC422E	62	-	-	-
Output Cutoff Current at $V_O = 50\text{ V}$	$I_{O(OFF)}$	-	-	500	nA
Input Current at $V_I = 5\text{ V}$					
	MMBTRC416E	-	-	7.2	mA
	MMBTRC417E	-	-	3.8	
	MMBTRC418E	-	-	3.8	
	MMBTRC419E	-	-	1.8	
	MMBTRC420E	-	-	0.88	
	MMBTRC421E	-	-	0.16	
	MMBTRC422E	-	-	0.15	
Output Voltage					
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC416E	-	-	0.3	V
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC417E	-	-	0.3	
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC418E	-	-	0.3	
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC419E	-	-	0.3	
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC420E	-	-	0.3	
at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$	MMBTRC421E	-	-	0.3	
at $I_O = 5\text{ mA}$, $I_I = 0.25\text{ mA}$	MMBTRC422E	-	-	0.3	
Input Voltage (ON)					
at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$	MMBTRC416E	-	-	3	V
at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$	MMBTRC417E	-	-	3	
at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$	MMBTRC418E	-	-	3	
at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$	MMBTRC419E	-	-	2.5	
at $V_O = 0.3\text{ V}$, $I_O = 2\text{ mA}$	MMBTRC420E	-	-	3	
at $V_O = 0.3\text{ V}$, $I_O = 2\text{ mA}$	MMBTRC421E	-	-	5	
at $V_O = 0.3\text{ V}$, $I_O = 1\text{ mA}$	MMBTRC422E	-	-	3	
Input Voltage (OFF)					
at $V_{CC} = 5\text{ V}$, $I_O = 100\text{ }\mu\text{A}$	MMBTRC416E	0.3	-	-	V
	MMBTRC417E	0.5	-	-	
	MMBTRC418E	0.3	-	-	
	MMBTRC419E	0.3	-	-	
	MMBTRC420E	0.8	-	-	
	MMBTRC421E	1	-	-	
	MMBTRC422E	0.5	-	-	
Transition Frequency at $V_O = 10\text{ V}$, $I_O = 5\text{ mA}$	f_T ¹⁾	-	250	-	

¹⁾ Characteristic of transistor only.



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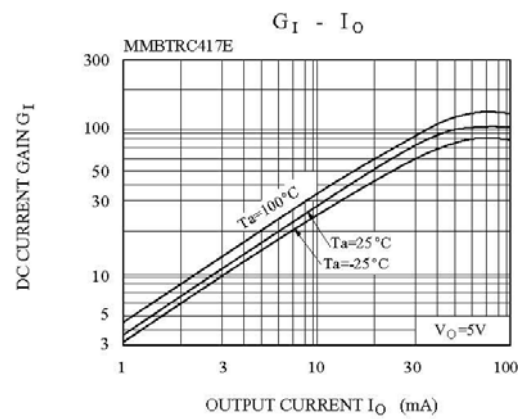
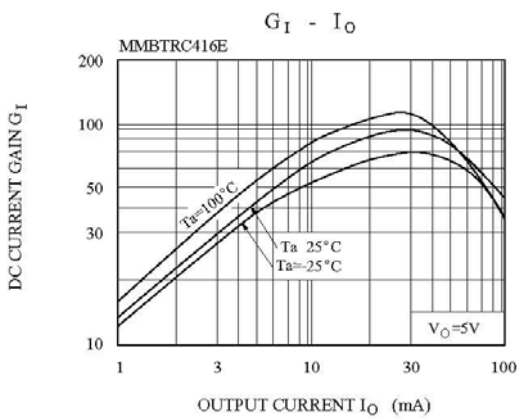
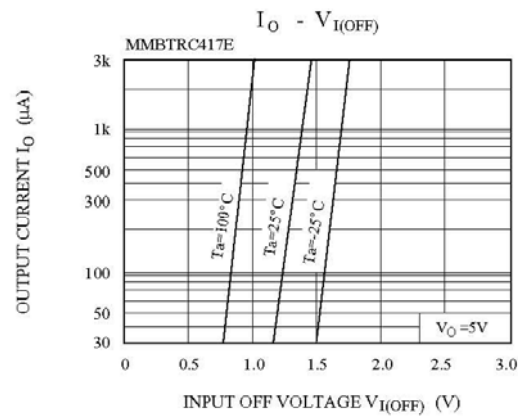
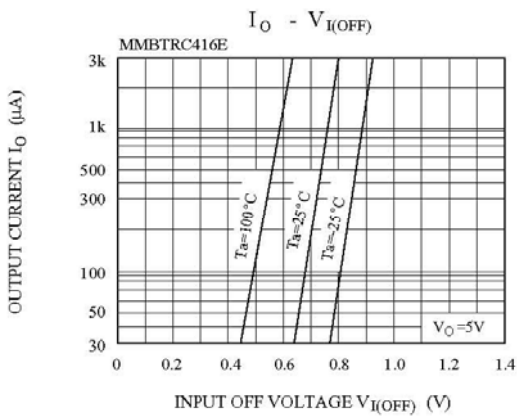
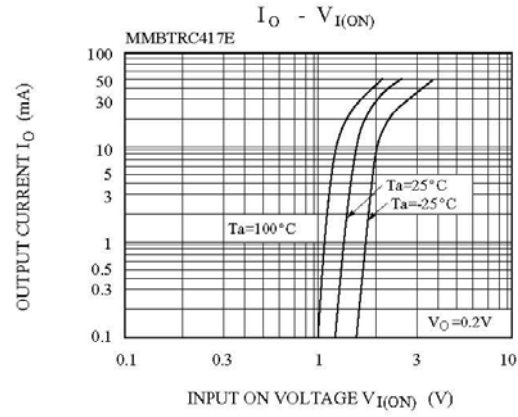
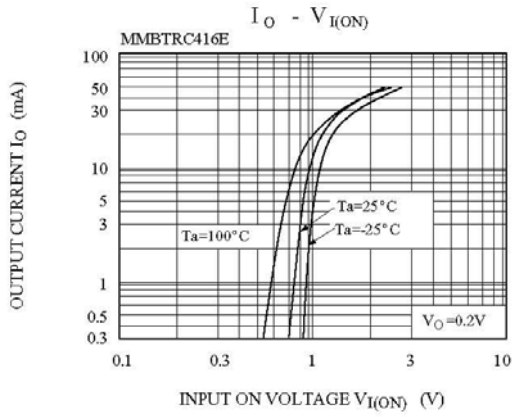
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MMBTRC416E-MMBTRC422E

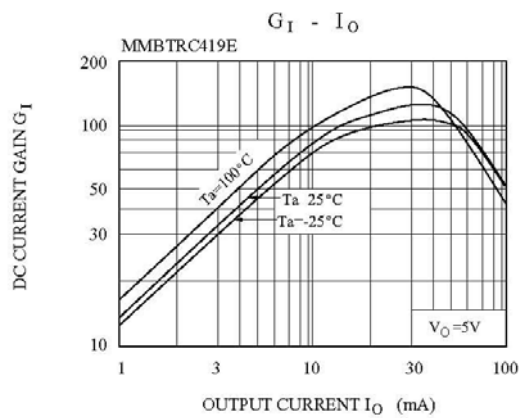
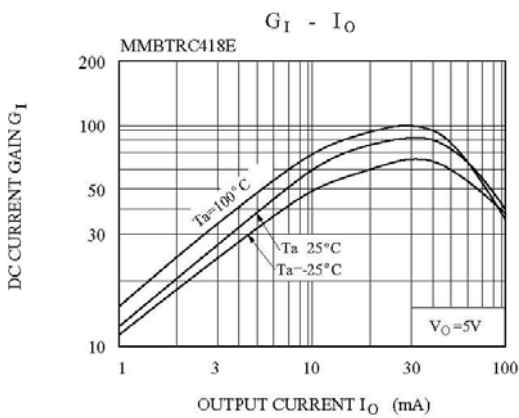
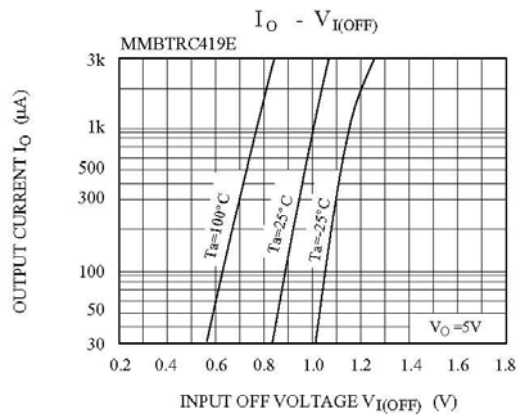
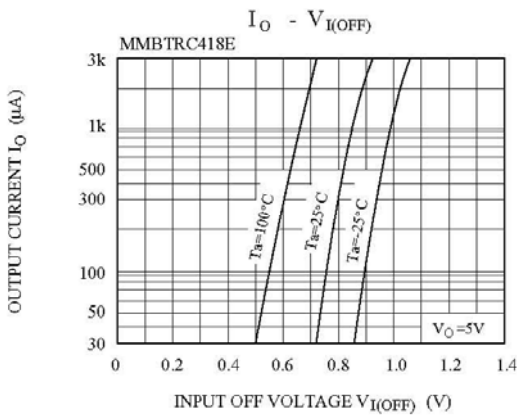
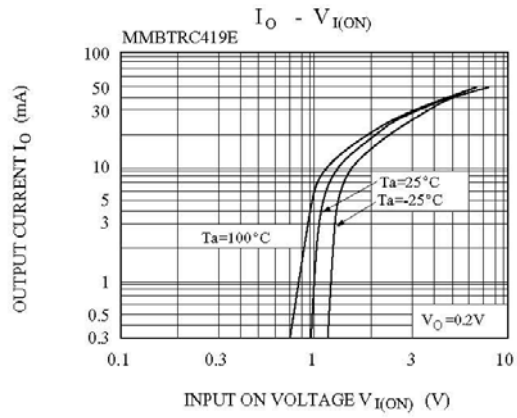
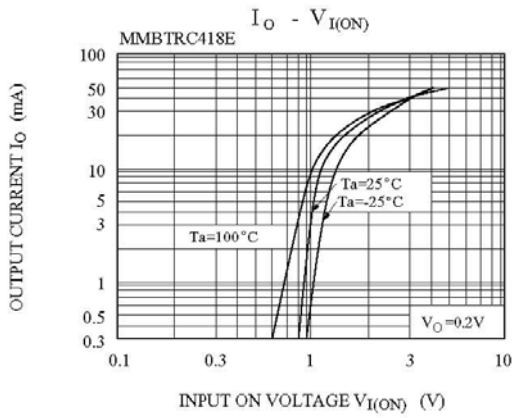
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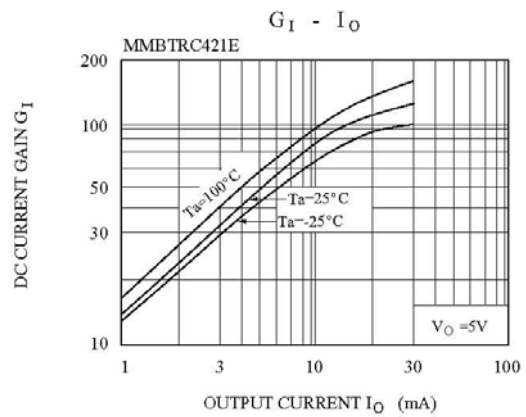
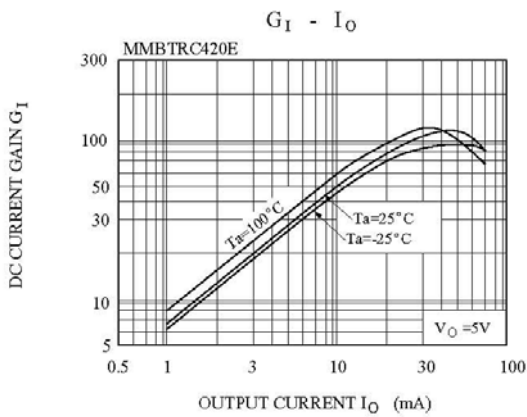
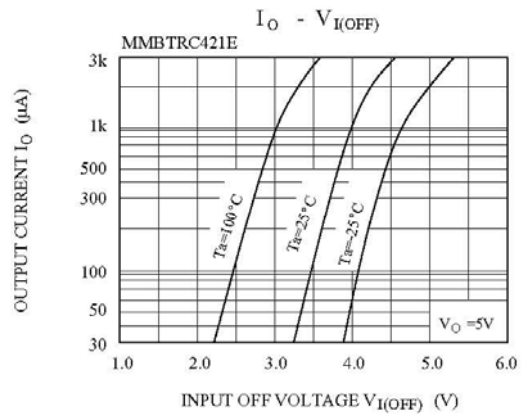
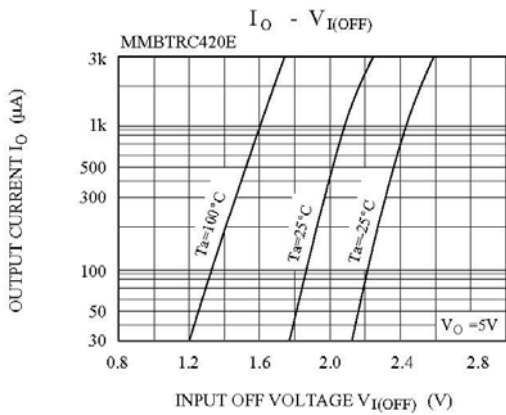
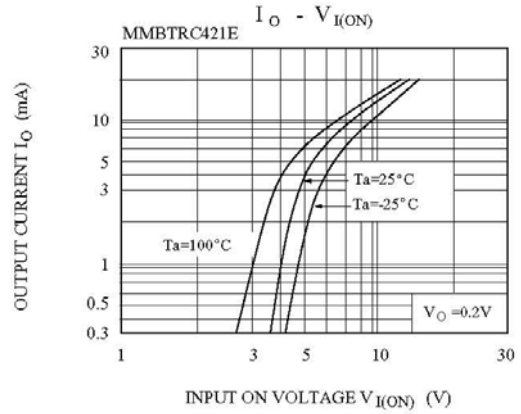
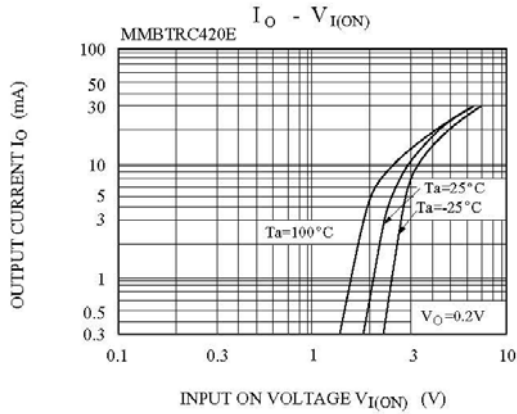


MMBTRC416E...MMBTRC422E





MMBTRC416E...MMBTRC422E





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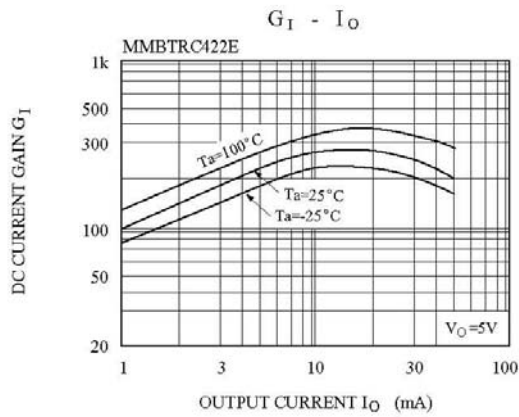
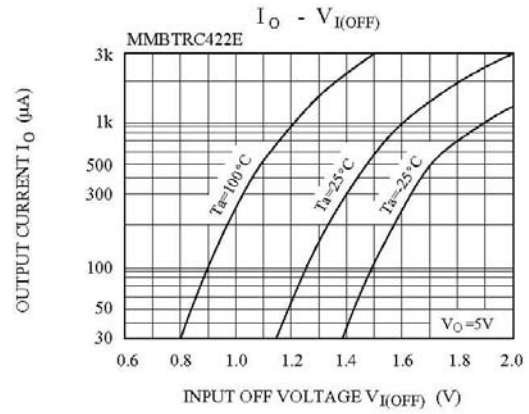
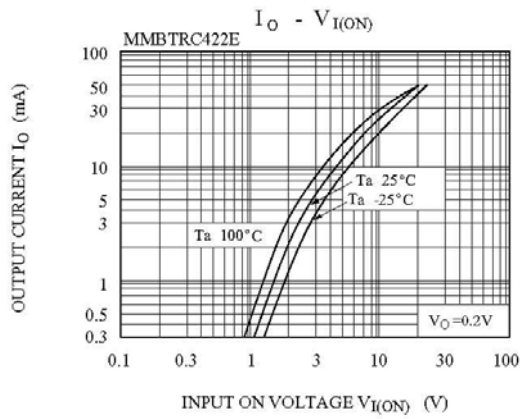
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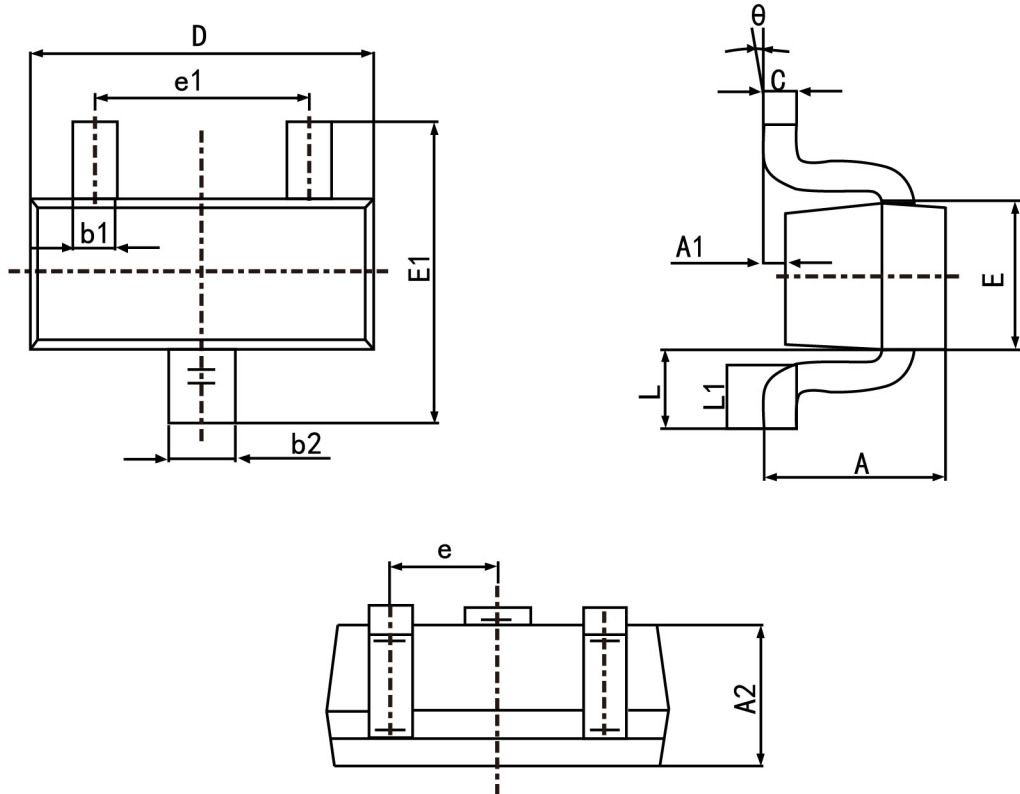




PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-523



Symbol	Dimension in Millimeters	
	Min	Max
A	0.700	0.900
A1	0.000	0.100
A2	0.700	0.800
b1	0.150	0.250
b2	0.250	0.350
c	0.100	0.200
D	1.500	1.700
E	0.700	0.900
E1	1.450	1.750
e	0.500	TYP.
e1	0.900	1.100
L	0.400 REF.	
L1	0.260	0.460
θ	0°	8°