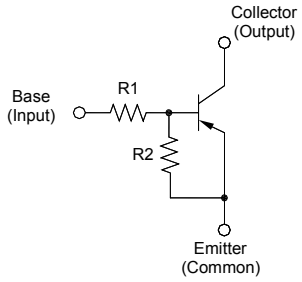
RA116S…RA122S

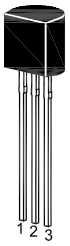
PNP Silicon Epitaxial Planar Transistors

for switching, interface circuit and driver circuit application.

Feature

- With Built-in Bias Resistor
- Simplify Circuit Design
- Reduce a Quantity of Parts and Manufacturing Process





1. Emitter 2. Collector 3. Base
TO-92 Plastic Package

Resistor Values

Type	R1 (KΩ)	R2 (KΩ)
RA116S	1	10
RA117S	2.2	2.2
RA118S	2.2	10
RA119S	4.7	10
RA120S	10	4.7
RA121S	47	10
RA122S	100	100

Absolute Maximum Ratings (T_a = 25 °C)

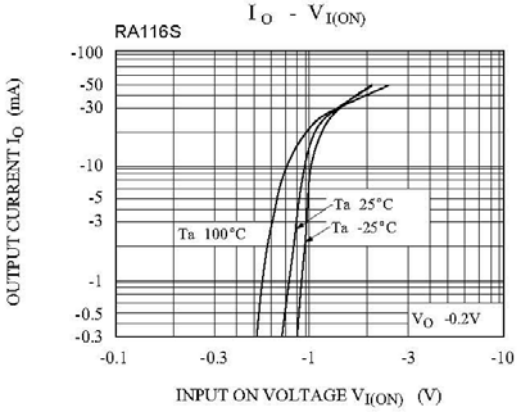
Parameter		Symbol	Value	Unit
Output Voltage		$-V_O$	50	V
Input Voltage	RA116S	$-V_I$	10, -5	V
	RA117S		12, -10	
	RA118S		12, -5	
	RA119S		20, -7	
	RA120S		30, -10	
	RA121S		40, -15	
	RA122S		40, -10	
Output Current		$-I_O$	100	mA
Total Power Dissipation		P_{tot}	200	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	- 55 to + 150	°C

Characteristics at T_a = 25 °C

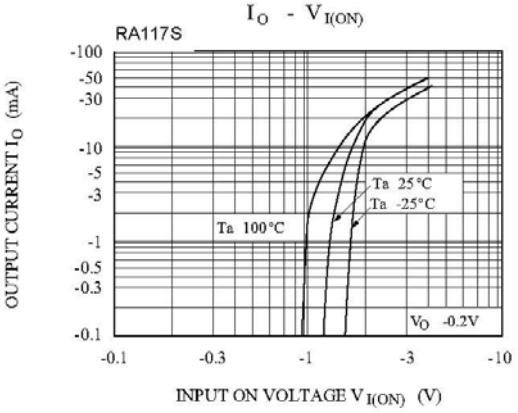
Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at $-V_O$ = 5 V, $-I_O$ = 5 mA	RA116S		33	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 20 mA	RA117S		20	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 10 mA	RA118S	G_I	33	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 10 mA	RA119S		30	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 10 mA	RA120S		24	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 5 mA	RA121S		33	-	-	-
at $-V_O$ = 5 V, $-I_O$ = 5 mA	RA122S		62	-	-	-
Output Cutoff Current						
at $-V_O$ = 50 V		$-I_{O(OFF)}$	-	-	500	nA
Input Current						
at $-V_I$ = 5 V	RA116S		-	-	7.2	
	RA117S		-	-	3.8	
	RA118S		-	-	3.8	
	RA119S	$-I_I$	-	-	1.8	mA
	RA120S		-	-	0.88	
	RA121S		-	-	0.16	
	RA122S				0.15	
Output Voltage						
at $-I_O$ = 10 mA, $-I_I$ = 0.5 mA	RA116S~RA121S	$-V_{O(ON)}$	-	-	0.3	V
at $-I_O$ = 5 mA, $-I_I$ = 0.25 mA	RA122S		-	-	0.3	
Input Voltage (ON)						
at $-V_O$ = 0.3 V, $-I_O$ = 20 mA	RA116S		-	-	3	
at $-V_O$ = 0.3 V, $-I_O$ = 20 mA	RA117S		-	-	3	
at $-V_O$ = 0.3 V, $-I_O$ = 20 mA	RA118S		-	-	3	
at $-V_O$ = 0.3 V, $-I_O$ = 20 mA	RA119S	$-V_{I(ON)}$	-	-	2.5	V
at $-V_O$ = 0.3 V, $-I_O$ = 2 mA	RA120S		-	-	3	
at $-V_O$ = 0.3 V, $-I_O$ = 2 mA	RA121S		-	-	5	
at $-V_O$ = 0.3 V, $-I_O$ = 1 mA	RA122S		-	-	3	
Input Voltage (OFF)						
at $-V_{CC}$ = 5 V, $-I_O$ = 100 µA	RA116S		0.3	-	-	
	RA117S		0.5	-	-	
	RA118S		0.3	-	-	
	RA119S	$-V_{I(OFF)}$	0.3	-	-	V
	RA120S		0.8	-	-	
	RA121S		1	-	-	
	RA122S		0.5	-	-	
Transition Frequency						
at $-V_O$ = 10 V, $-I_O$ = 5 mA		f_T [1)]	-	250	-	MHz

[1)] Characteristic of transistor only.

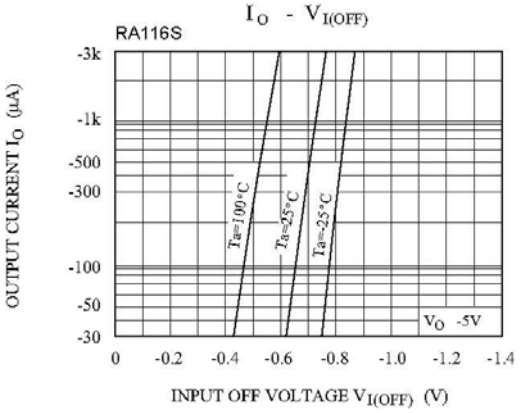
I_O - $V_{I(ON)}$



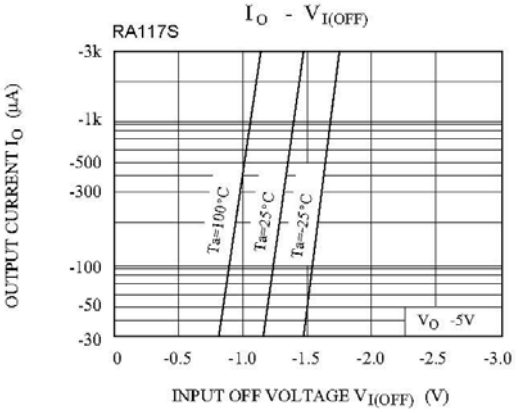
I_O - $V_{I(ON)}$



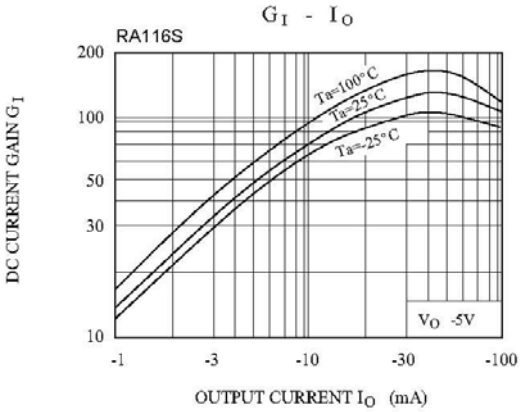
I_O - $V_{I(OFF)}$



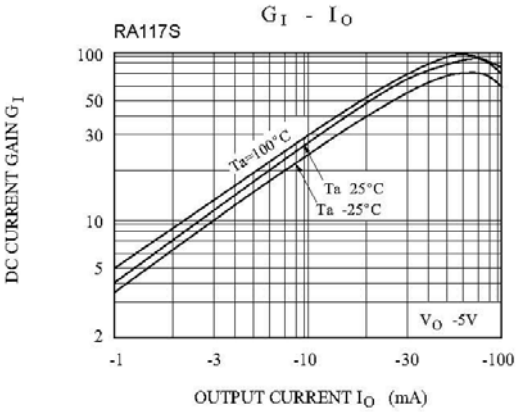
I_O - $V_{I(OFF)}$

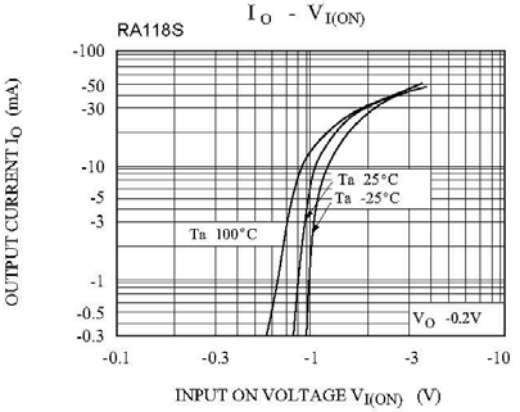


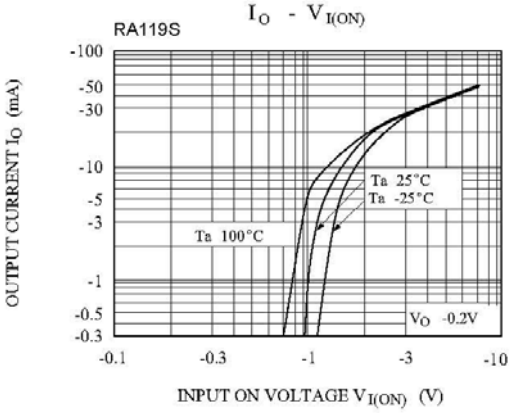
G_I - I_O

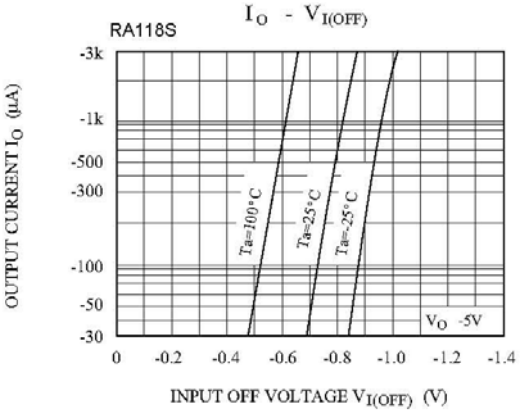


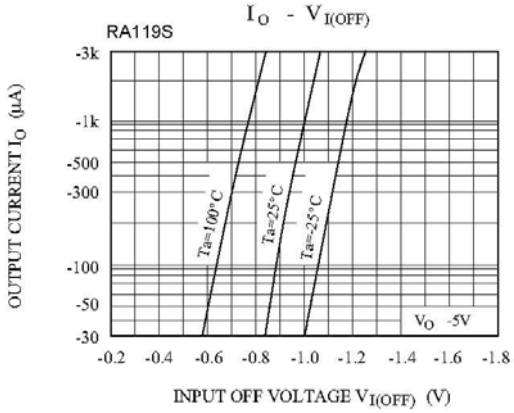
G_I - I_O

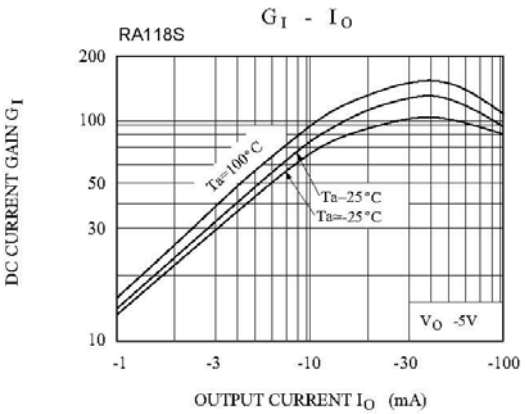


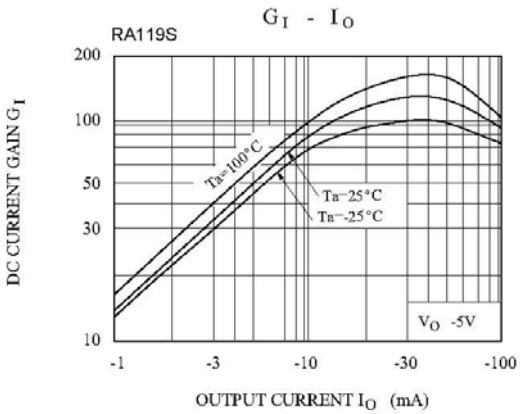

RA118S
I_O - $V_{I(ON)}$
OUTPUT CURRENT I_O (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
Ta 25°C
Ta -25°C
Ta 100°C
V_O -0.2V
-0.1
-0.3
-1
-3
-10
INPUT ON VOLTAGE $V_{I(ON)}$ (V)

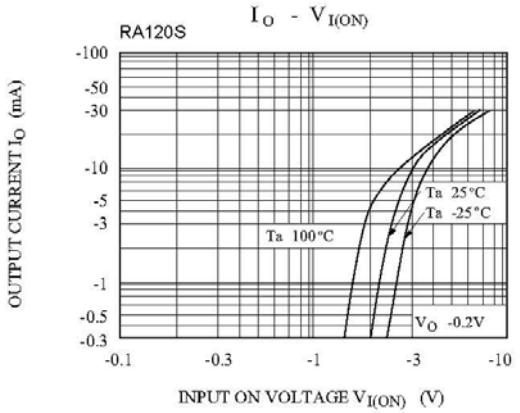

RA119S
I_O - $V_{I(ON)}$
OUTPUT CURRENT I_O (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
Ta 25°C
Ta -25°C
Ta 100°C
V_O -0.2V
-0.1
-0.3
-1
-3
-10
INPUT ON VOLTAGE $V_{I(ON)}$ (V)

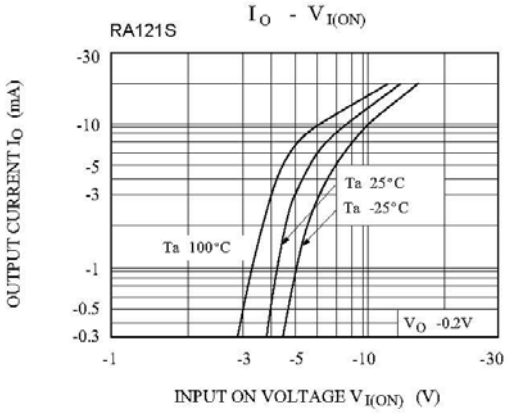

RA118S
I_O - $V_{I(OFF)}$
OUTPUT CURRENT I_O (μA)
-3k
-1k
-500
-300
-100
-50
-30
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)

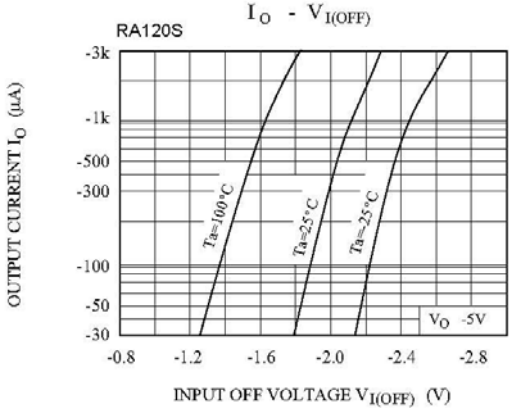

RA119S
I_O - $V_{I(OFF)}$
OUTPUT CURRENT I_O (μA)
-3k
-1k
-500
-300
-100
-50
-30
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)

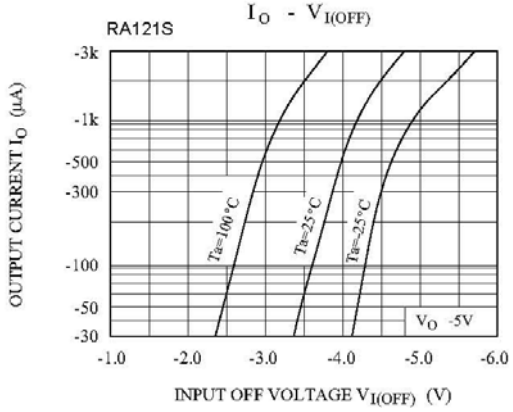

RA118S
G_I - I_O
DC CURRENT GAIN G_I
200
100
50
30
10
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
-1
-3
-10
-30
-100
OUTPUT CURRENT I_O (mA)

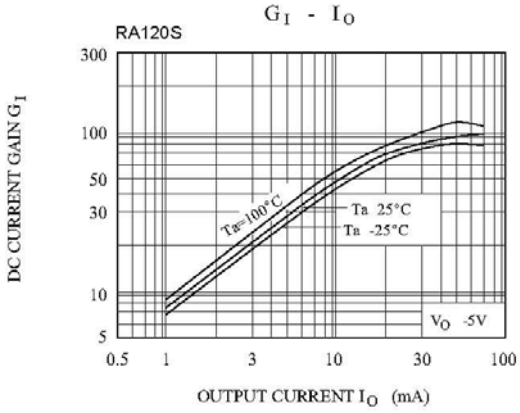

RA119S
G_I - I_O
DC CURRENT GAIN G_I
200
100
50
30
10
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
-1
-3
-10
-30
-100
OUTPUT CURRENT I_O (mA)

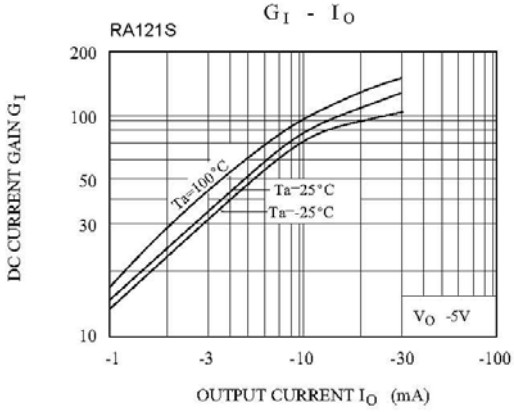

RA120S
I_O - $V_{I(ON)}$
OUTPUT CURRENT I_O (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
-0.1
-0.3
-1
-3
-10
Ta 25°C
Ta -25°C
Ta 100°C
V_O -0.2V
INPUT ON VOLTAGE $V_{I(ON)}$ (V)

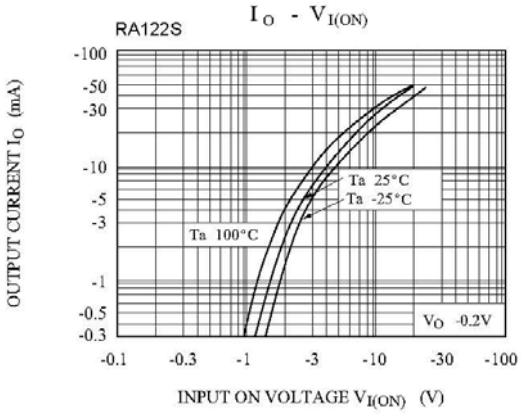

RA121S
I_O - $V_{I(ON)}$
OUTPUT CURRENT I_O (mA)
-30
-10
-5
-3
-1
-0.5
-0.3
-1
-3
-5
-10
-30
Ta 25°C
Ta -25°C
Ta 100°C
V_O -0.2V
INPUT ON VOLTAGE $V_{I(ON)}$ (V)

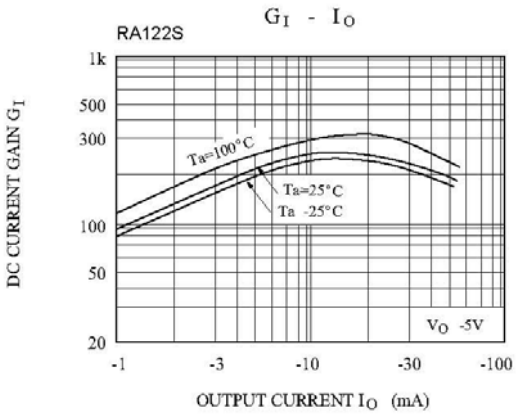

RA120S
I_O - $V_{I(OFF)}$
OUTPUT CURRENT I_O (μA)
-3k
-1k
-500
-300
-100
-50
-30
-0.8
-1.2
-1.6
-2.0
-2.4
-2.8
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)

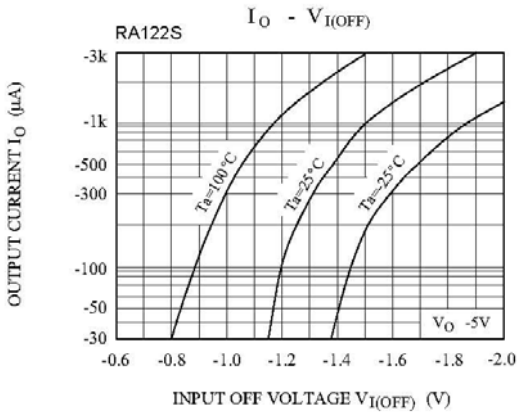

RA121S
I_O - $V_{I(OFF)}$
OUTPUT CURRENT I_O (μA)
-3k
-1k
-500
-300
-100
-50
-30
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)


RA120S
G_I - I_O
DC CURRENT GAIN G_I
300
100
50
30
10
5
0.5
1
3
10
30
100
Ta=100°C
Ta 25°C
Ta -25°C
V_O -5V
OUTPUT CURRENT I_O (mA)


RA121S
G_I - I_O
DC CURRENT GAIN G_I
200
100
50
30
10
-1
-3
-10
-30
-100
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
OUTPUT CURRENT I_O (mA)


I_O - $V_{I(ON)}$
RA122S
OUTPUT CURRENT I_O (mA)
-100
-50
-30
-10
-5
-3
-1
-0.5
-0.3
Ta 25°C
Ta -25°C
Ta 100°C
V_O -0.2V
-0.1
-0.3
-1
-3
-10
-30
-100
INPUT ON VOLTAGE $V_{I(ON)}$ (V)


G_I - I_O
RA122S
DC CURRENT GAIN G_I
1k
500
300
100
50
20
Ta=100°C
Ta=25°C
Ta -25°C
V_O -5V
-1
-3
-10
-30
-100
OUTPUT CURRENT I_O (mA)


I_O - $V_{I(OFF)}$
RA122S
OUTPUT CURRENT I_O (μA)
-3k
-1k
-500
-300
-100
-50
-30
Ta=100°C
Ta=25°C
Ta=-25°C
V_O -5V
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
-1.8
-2.0
INPUT OFF VOLTAGE $V_{I(OFF)}$ (V)