Bipolar Transistors Silicon PNP Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

RN2114/15/16/17/18

1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

2. Features

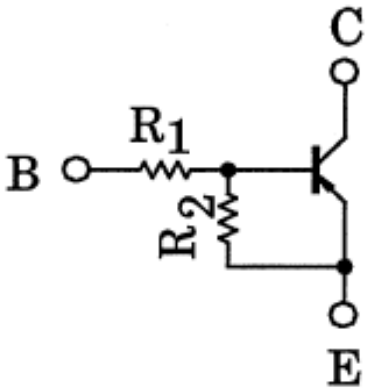
(1) AEC-Q101 qualified (Please see the orderable part number list)

(2) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.

(3) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.

(4) Complementary to RN1114 to RN1118

3. Equivalent Circuit

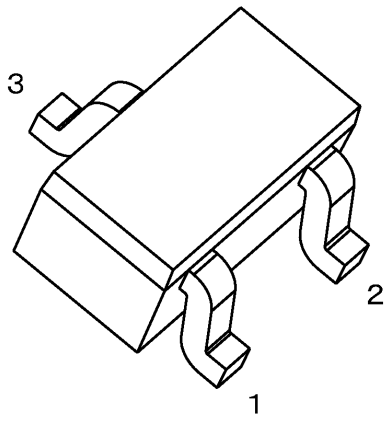


4. Bias Resistor Values

Part No.	R1 (kΩ)	R2 (kΩ)
RN2114	1	10
RN2115	2.2	10
RN2116	4.7	10
RN2117	10	4.7
RN2118	47	10

Start of commercial production
1994-08

5. Packaging and Pin Assignment



SSM

1: Base
2: Emitter
3: Collector

6. Orderable part number

Orderable part number		AEC-Q101	Note	Note	
RN2114	RN2114,LF	—		General Use	
	RN2114,LXGF	YES	(Note 1)	Unintended Use	(Note 1)
RN2115	RN2115,LF	—		General Use	
	RN2115,LXGF	YES	(Note 1)	Unintended Use	(Note 1)
	RN2115,LXHF	YES		Automotive Use	
RN2116	RN2116,LF	—		General Use	
	RN2116,LXGF	YES	(Note 1)	Unintended Use	(Note 1)
	RN2116,LXHF	YES		Automotive Use	
RN2117	RN2117(TE85L,F)	—		General Use	
	—	YES	(Note 1)	Unintended Use	(Note 1)

Note 1: For more information, please contact our sales or use the inquiry form on our website.

7. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2114～RN2118	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	
Emitter-base voltage	RN2114	V_{EBO}	-5	V
	RN2115		-6	
	RN2116		-7	
	RN2117		-15	
	RN2118		-25	
Collector current	RN2114～RN2118	I_C	-100	mA
Collector power dissipation		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	-55 to 150	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

8. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2114～RN2118	I_{CBO}	V_{CB} = -50 V, I_E = 0 mA	—	—	-100	nA
		I_{CEO}	V_{CE} = -50 V, I_B = 0 mA	—	—	-500	
Emitter cut-off current	RN2114	I_{EBO}	V_{EB} = -5 V, I_C = 0 mA	-0.35	—	-0.65	mA
	RN2115		V_{EB} = -6 V, I_C = 0 mA	-0.37	—	-0.71	
	RN2116		V_{EB} = -7 V, I_C = 0 mA	-0.36	—	-0.68	
	RN2117		V_{EB} = -15 V, I_C = 0 mA	-0.78	—	-1.46	
	RN2118		V_{EB} = -25 V, I_C = 0 mA	-0.33	—	-0.63	
DC current gain	RN2114 ~ RN2116, RN2118	h_{FE}	V_{CE} = -5 V, I_C = -10 mA	50	—	—	—
	RN2117			30	—	—	—
Collector-emitter saturation voltage	RN2114～RN2118	$V_{CE(sat)}$	I_C = -5 mA, I_B = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2114	$V_{I(ON)}$	V_{CE} = -0.2 V, I_C = -5 mA	-0.5	—	-2.0	
	RN2115			-0.6	—	-2.5	
	RN2116			-0.7	—	-2.5	
	RN2117			-1.5	—	-3.5	
	RN2118			-2.5	—	-10.0	
Input voltage (OFF)	RN2114	$V_{I(OFF)}$	V_{CE} = -5 V, I_C = -0.1 mA	-0.3	—	-0.9	V
	RN2115			-0.3	—	-1.0	
	RN2116			-0.3	—	-1.1	
	RN2117			-0.3	—	-3.0	
	RN2118			-0.5	—	-5.7	
Transition frequency	RN2114～RN2118	f_T	V_{CE} = -10 V, I_C = -5 mA	—	200	—	MHz
Collector output capacitance	RN2114～RN2118	C_{ob}	V_{CB} = -10 V, I_E = 0 mA, f = 1 MHz	—	3.0	6.0	pF
Input resistance	RN2114	R_1	-	0.7	1.0	1.3	kΩ
	RN2115			1.54	2.2	2.86	
	RN2116			3.29	4.7	6.11	
	RN2117			7.0	10.0	13.0	
	RN2118			32.9	47.0	61.1	
Resistor ratio	RN2114	R1/R2	-	—	0.1	—	—
	RN2115			—	0.22	—	
	RN2116			—	0.47	—	
	RN2117			—	2.13	—	
	RN2118			—	4.7	—	

9. Marking

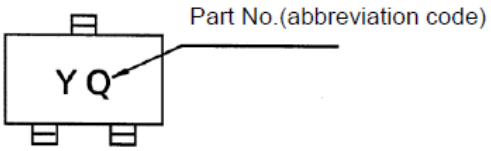


Fig. 9.1 Marking RN2114

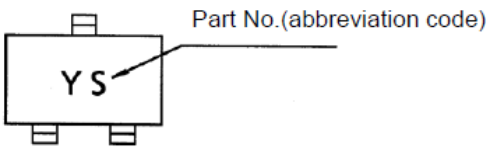


Fig. 9.2 Marking RN2115

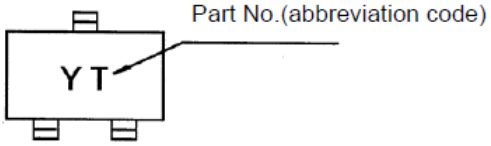


Fig. 9.3 Marking RN2116

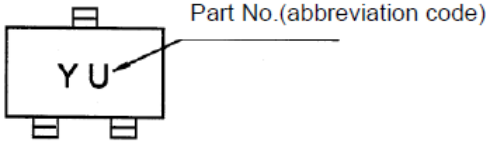


Fig. 9.4 Marking RN2117

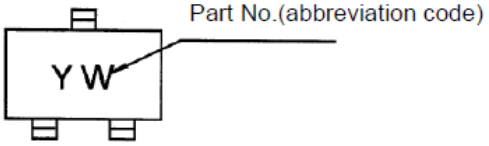


Fig. 9.5 Marking RN2118

10. Characteristics Curves (Note)

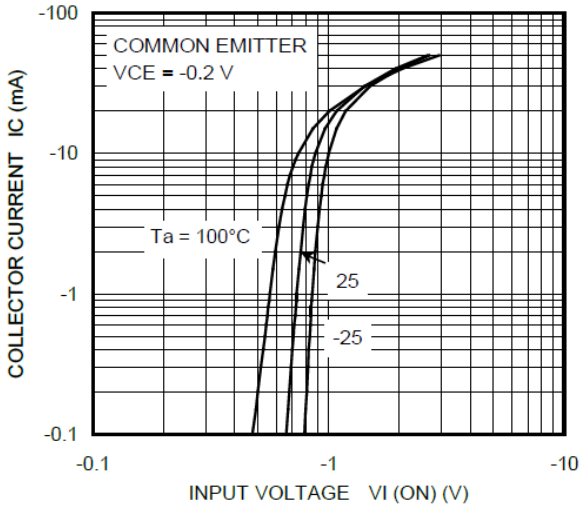


Fig. 10.1 RN2114 I_C-$V_{I(ON)}$

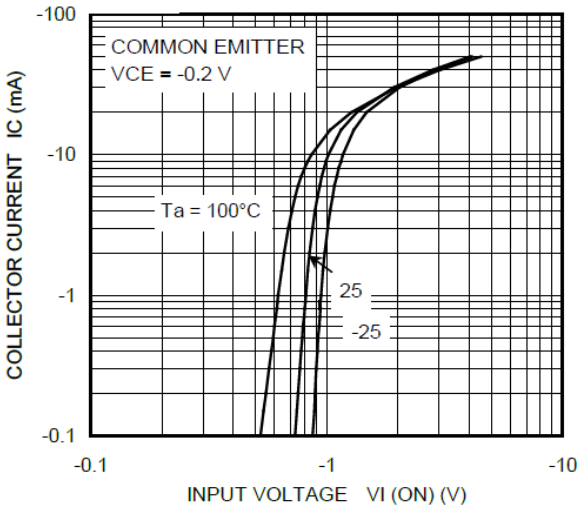


Fig. 10.2 RN2115 I_C-$V_{I(ON)}$

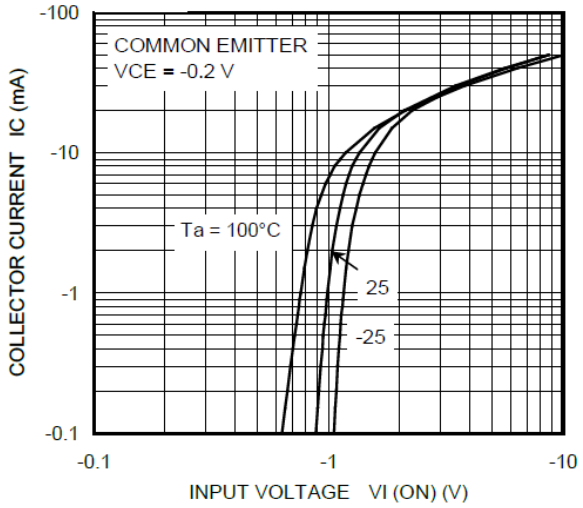


Fig. 10.3 RN2116 I_C-$V_{I(ON)}$

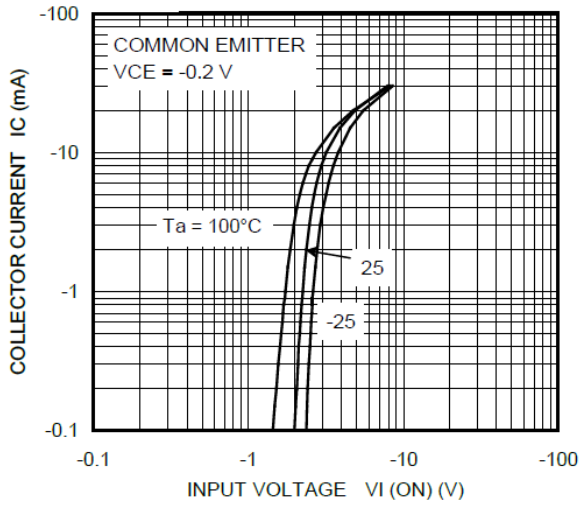


Fig. 10.4 RN2117 I_C-$V_{I(ON)}$

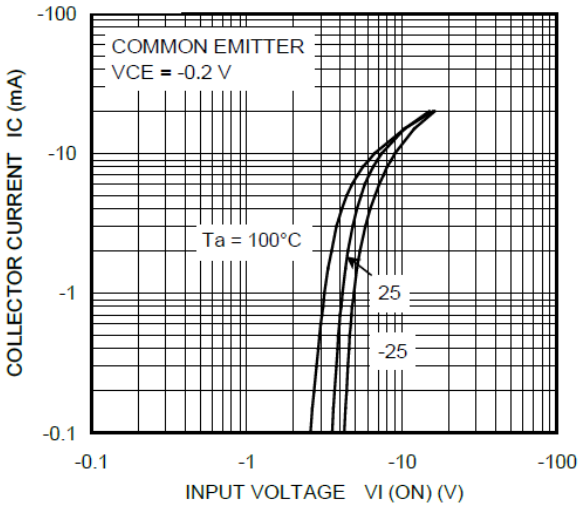


Fig. 10.5 RN2118 I_C-$V_{I(ON)}$

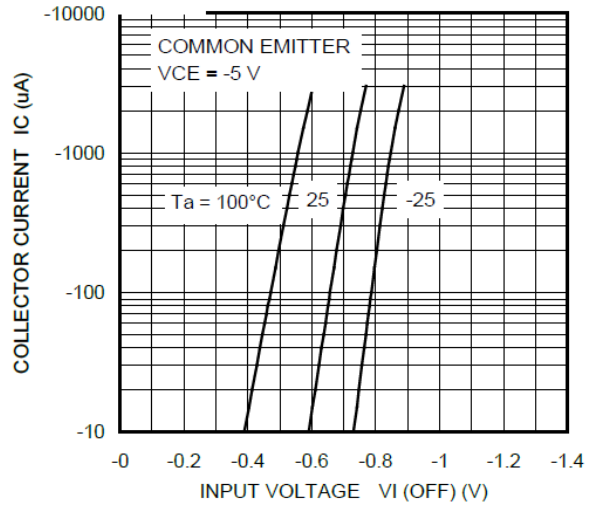


Fig. 10.6 RN2114 I_C-$V_{I(OFF)}$

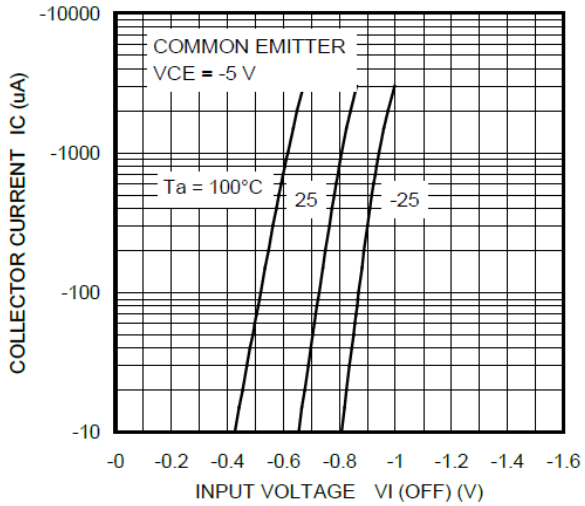


Fig. 10.7 RN2115 I_C-$V_{I(OFF)}$

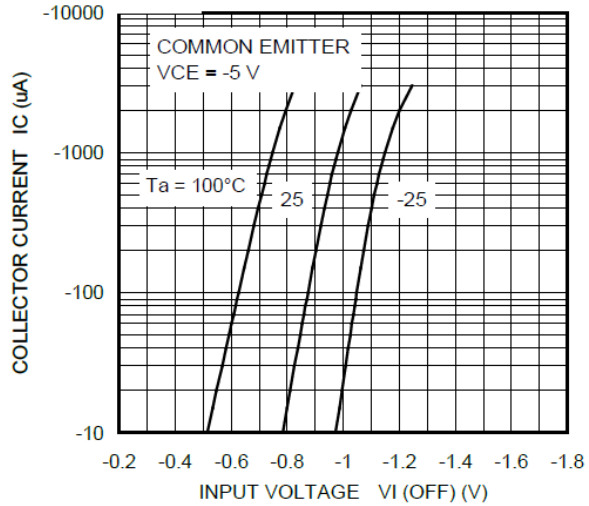


Fig. 10.8 RN2116 I_C-$V_{I(OFF)}$

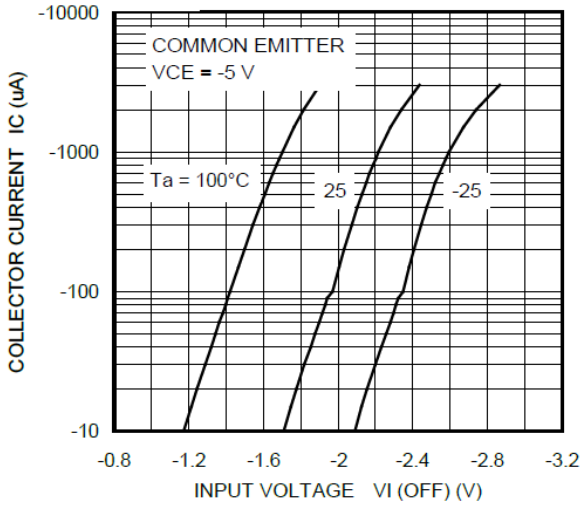


Fig. 10.9 RN2117 I_C-$V_{I(OFF)}$

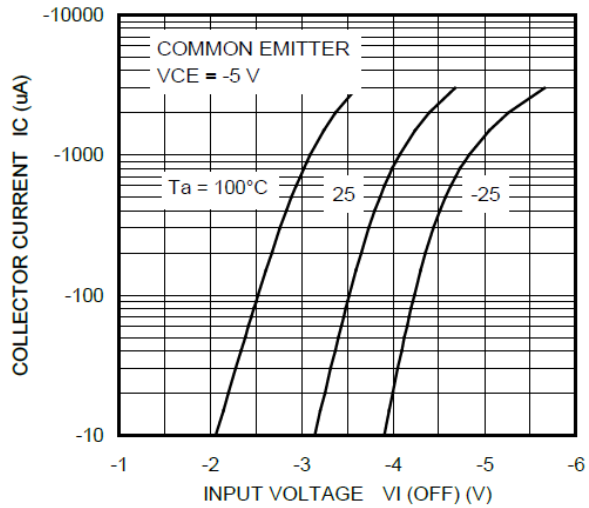


Fig. 10.10 RN2118 I_C-$V_{I(OFF)}$

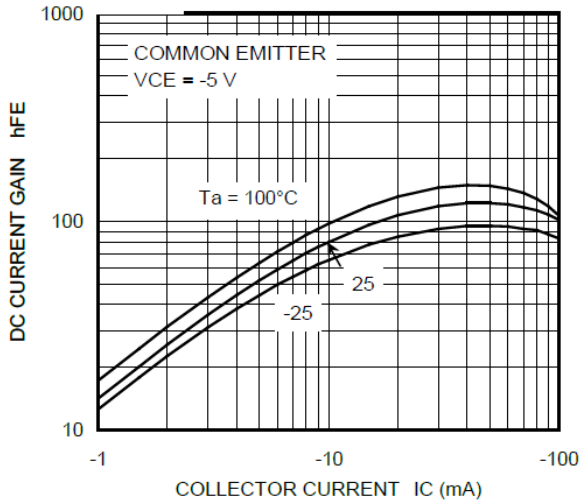


Fig. 10.11 RN2114 h_{FE}-I_C

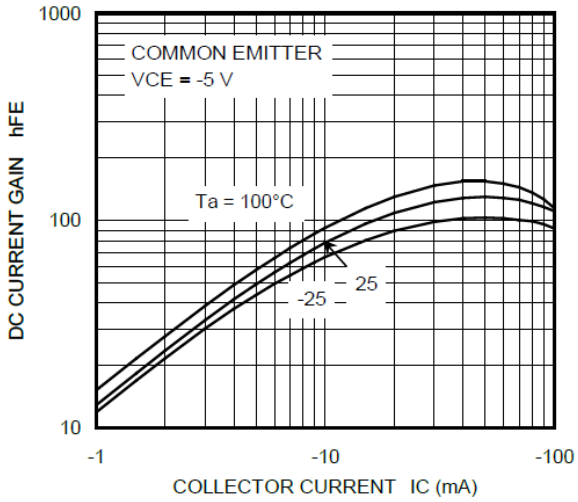


Fig. 10.12 RN2115 h_{FE}-I_C

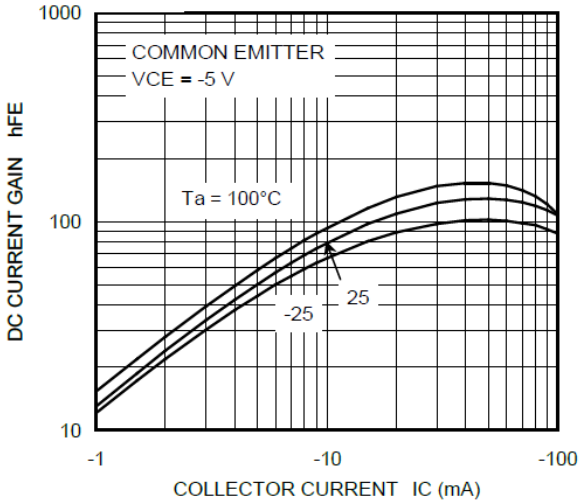


Fig. 10.13 RN2116 h_{FE}-I_C

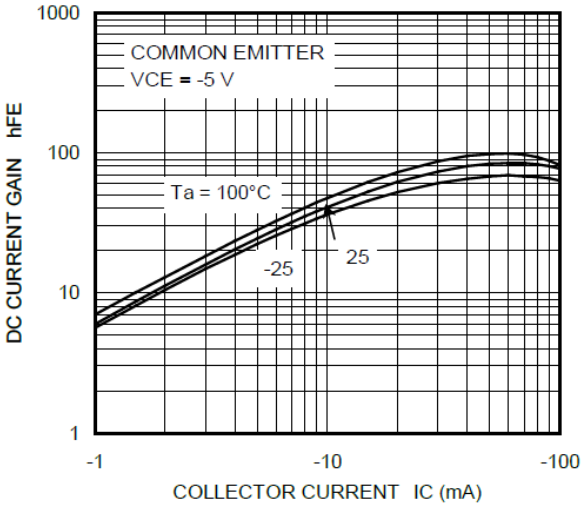


Fig. 10.14 RN2117 h_{FE}-I_C

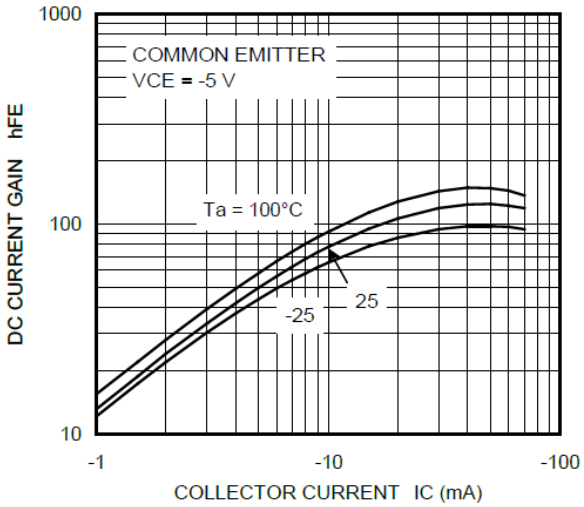


Fig. 10.15 RN2118 h_{FE}-I_C

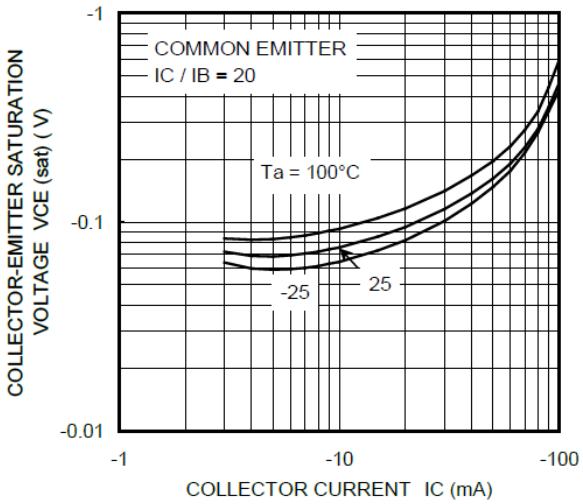


Fig. 10.16 RN2114 $V_{CE(sat)}$-I_C

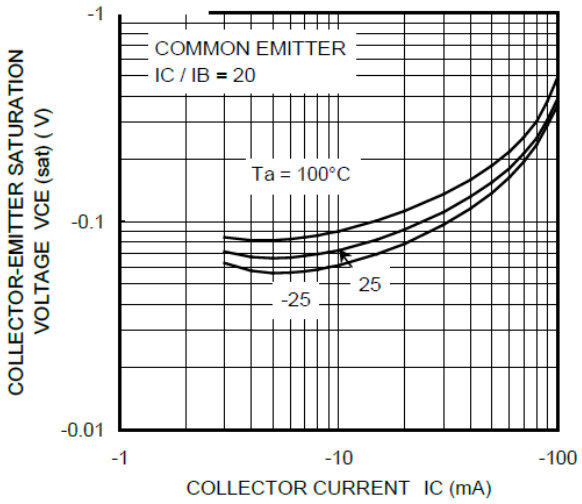


Fig. 10.17 RN2115 $V_{CE(sat)}$-I_C

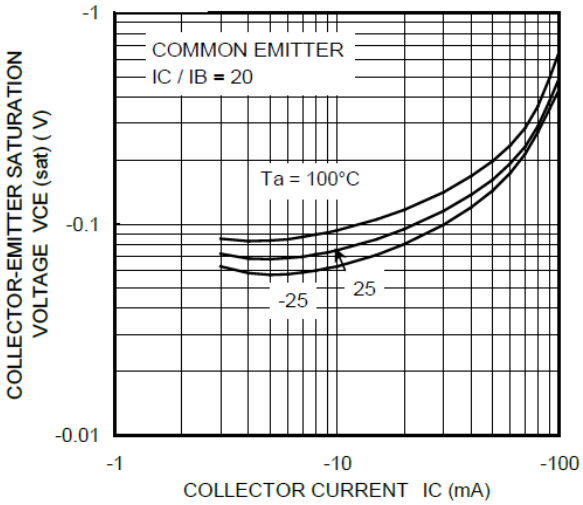


Fig. 10.18 RN2116 $V_{CE(sat)}$-I_C

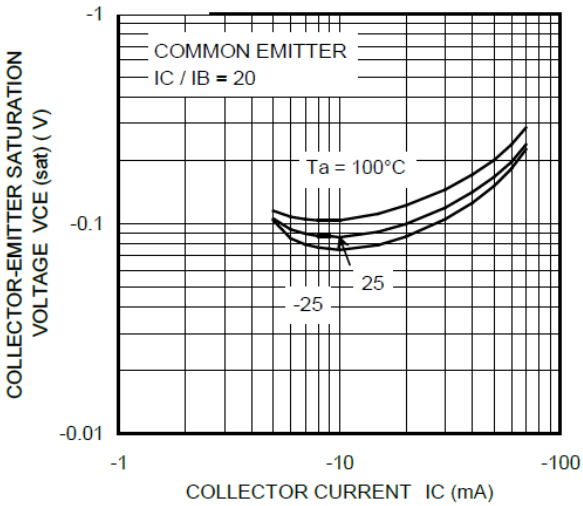


Fig. 10.19 RN2117 $V_{CE(sat)}$-I_C

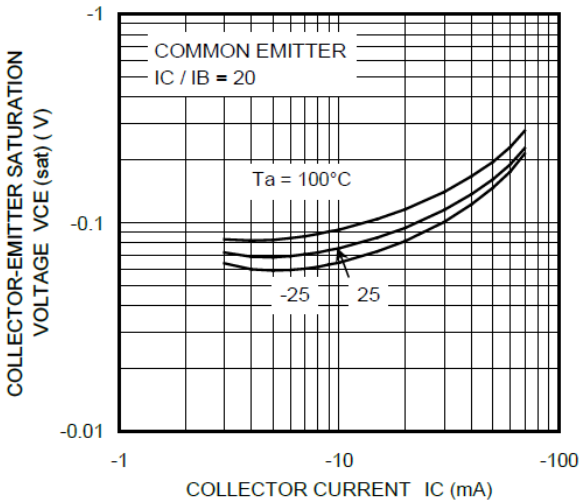
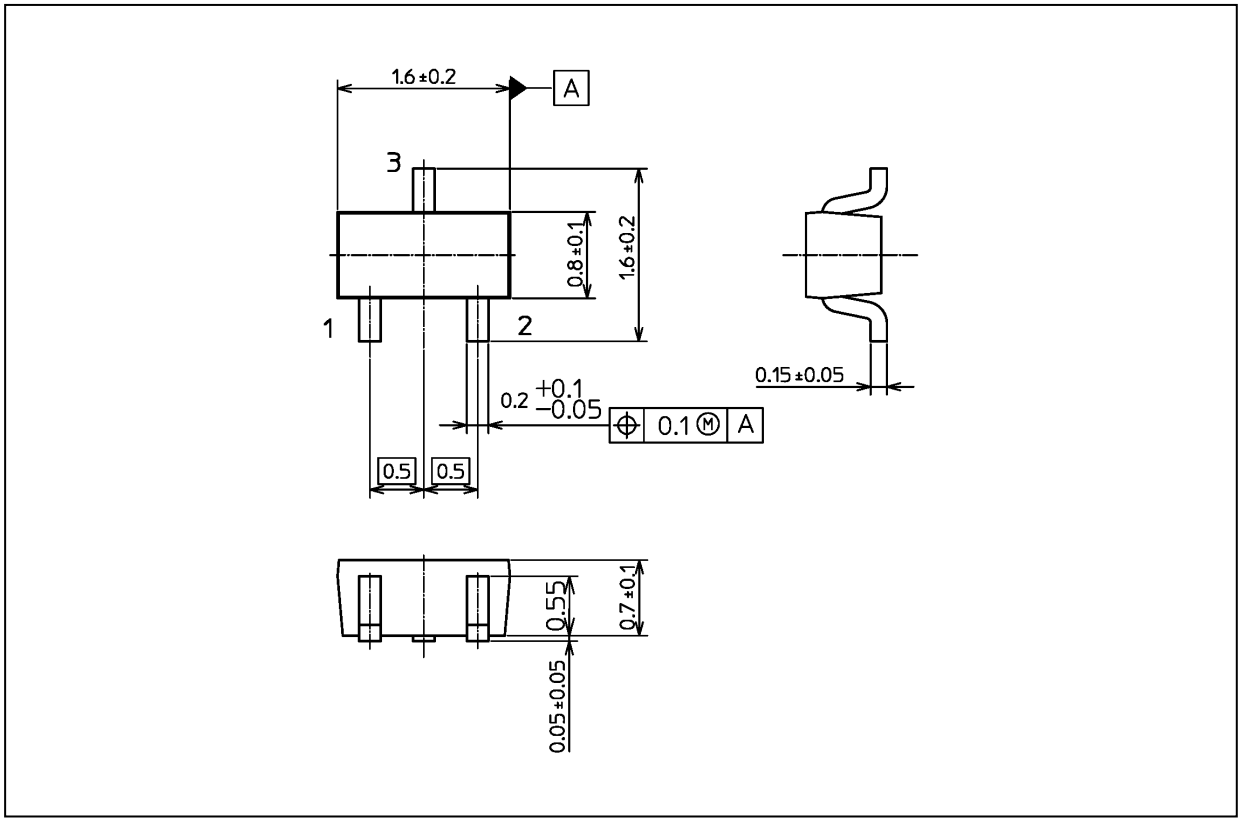


Fig. 10.20 RN2118 $V_{CE(sat)}$-I_C

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 2.4 mg (typ.)

Package Name(s)
TOSHIBA: 2-2H1S
Nickname: SSM

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