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

RN2314/15/16/17/18

1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

2. Features

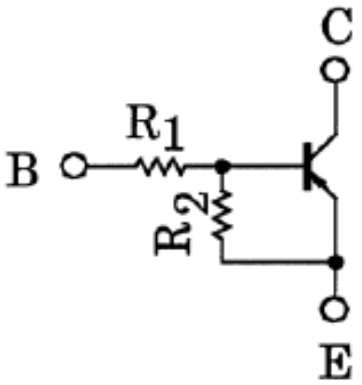
(1) AEC-Q101 qualified (Please see the orderable part number list)

(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 RN1314 to RN1318

3. Equivalent Circuit

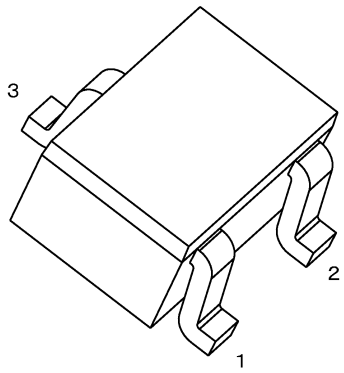


4. Bias Resistor Values

Part No.	R1 (kΩ)	R2 (kΩ)
RN2314	1	10
RN2315	2.2	10
RN2316	4.7	10
RN2317	10	4.7
RN2318	47	10

Start of commercial production
1999-01

5. Packaging and Pin Assignment



1: Base
2: Emitter
3: Collector

USM

6. Orderable part number

Orderable part number		AEC-Q101	Note	Note	
RN2314	RN2314(TE85L,F)	—		General Use	
	—	YES	(Note 1)	Unintended Use	(Note 1)
	—	YES		Automotive Use	
RN2315	RN2315(TE85L,F)	—		General Use	
	—	YES	(Note 1)	Unintended Use	(Note 1)
	—	YES		Automotive Use	
RN2316	RN2316,LF	—		General Use	
	RN2316,LXGF	YES	(Note 1)	Unintended Use	(Note 1)
	RN2316,LXHF	YES		Automotive Use	
RN2317	RN2317(TE85L,F)	—		General Use	
	—	YES	(Note 1)	Unintended Use	(Note 1)
	—	YES		Automotive Use	
RN2318	RN2318(TE85L,F)	—		General Use	
	—	YES	(Note 1)	Unintended Use	(Note 1)
	—	YES		Automotive Use	

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	RN2314 ~ RN2318	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	
Emitter-base voltage	RN2314	V_{EBO}	-5	V
	RN2315		-6	
	RN2316		-7	
	RN2317		-15	
	RN2318		-25	
Collector current	RN2314 ~ RN2318	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	RN2314 ~ RN2318	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	RN2314	I_{EBO}	V_{EB} = -5 V, I_C = 0 mA	-0.35	—	-0.65	mA
	RN2315		V_{EB} = -6 V, I_C = 0 mA	-0.37	—	-0.71	
	RN2316		V_{EB} = -7 V, I_C = 0 mA	-0.36	—	-0.68	
	RN2317		V_{EB} = -15 V, I_C = 0 mA	-0.78	—	-1.46	
	RN2318		V_{EB} = -25 V, I_C = 0 mA	-0.33	—	-0.63	
DC current gain	RN2314 ~ RN2316, RN2318	h_{FE}	V_{CE} = -5 V, I_C = -10 mA	50	—	—	—
	RN2317			30	—	—	
Collector-emitter saturation voltage	RN2314 ~ RN2318	$V_{CE(sat)}$	I_C = -5 mA, I_B = -0.25 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2314	$V_{I(ON)}$	V_{CE} = -0.2 V, I_C = -5 mA	-0.5	—	-2.0	V
	RN2315			-0.6	—	-2.5	
	RN2316			-0.7	—	-2.5	
	RN2317			-1.5	—	-3.5	
	RN2318			-2.5	—	-10.0	
Input voltage (OFF)	RN2314	$V_{I(OFF)}$	V_{CE} = -5 V, I_C = -0.1 mA	-0.3	—	-0.9	V
	RN2315			-0.3	—	-1.0	
	RN2316			-0.3	—	-1.1	
	RN2317			-0.3	—	-3.0	
	RN2318			-0.5	—	-5.7	
Transition frequency	RN2314 ~ RN2318	f_T	V_{CE} = -10 V, I_C = -5 mA	—	200	—	MHz
Collector output capacitance	RN2314 ~ RN2318	C_{ob}	V_{CB} = -10 V, I_E = 0 mA, f = 1 MHz	—	3.0	6.0	pF
Input resistance	RN2314	R_1	—	0.7	1.0	1.3	kΩ
	RN2315			1.54	2.2	2.86	
	RN2316			3.29	4.7	6.11	
	RN2317			7.0	10.0	13.0	
	RN2318			32.9	47.0	61.1	
Resistor ratio	RN2314	R1/R2	—	—	0.1	—	—
	RN2315			—	0.22	—	
	RN2316			—	0.47	—	
	RN2317			—	2.13	—	
	RN2318			—	4.7	—	

9. Marking

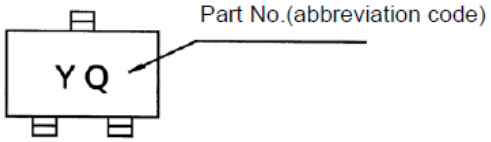


Fig. 9.1 Marking RN2314

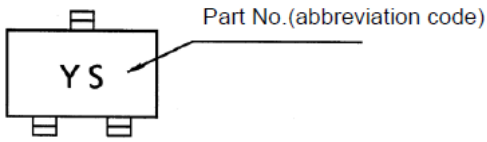


Fig. 9.2 Marking RN2315

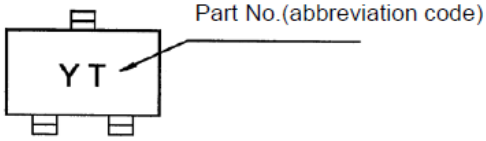


Fig. 9.3 Marking RN2316

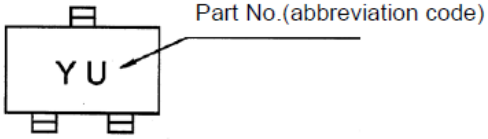


Fig. 9.4 Marking RN2317

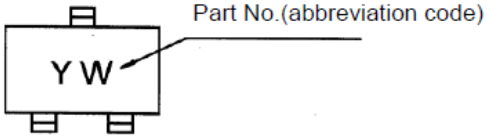


Fig. 9.5 Marking RN2318

10. Characteristics Curves (Note)

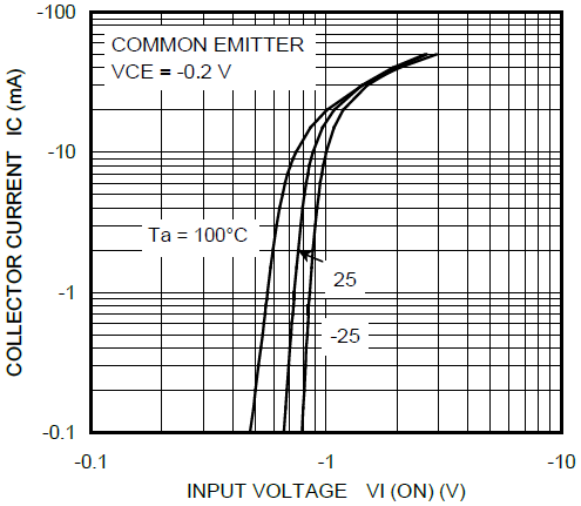


Fig. 10.1 RN2314 I_C-$V_{I(ON)}$

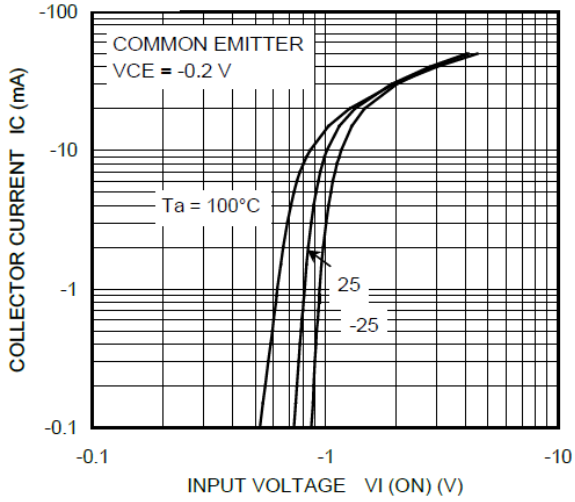


Fig. 10.2 RN2315 I_C-$V_{I(ON)}$

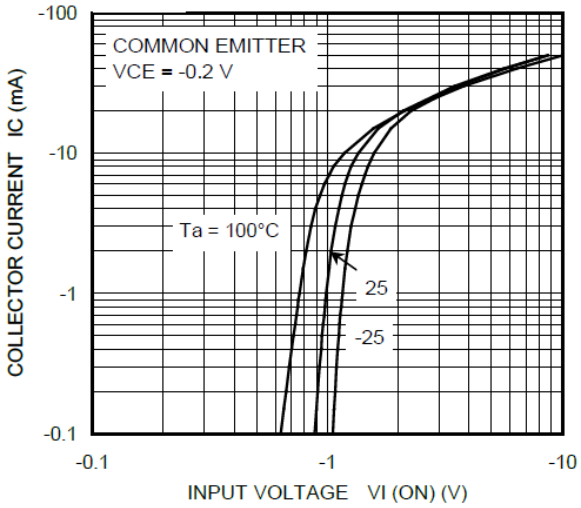


Fig. 10.3 RN2316 I_C-$V_{I(ON)}$

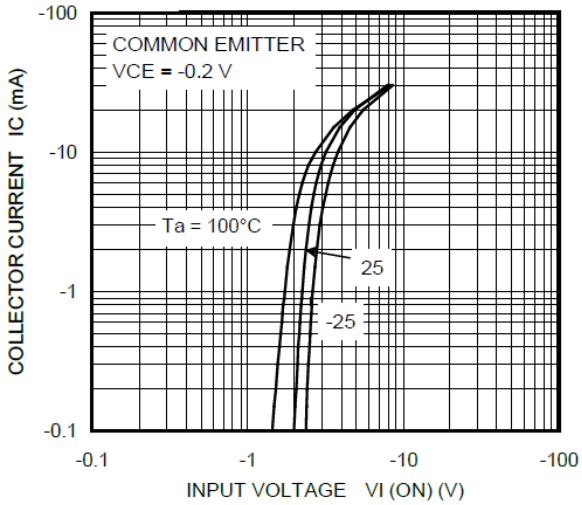


Fig. 10.4 RN2317 I_C-$V_{I(ON)}$

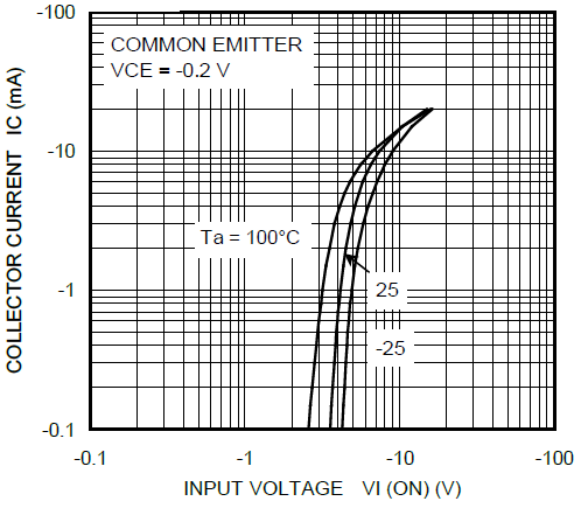


Fig. 10.5 RN2318 I_C-$V_{I(ON)}$

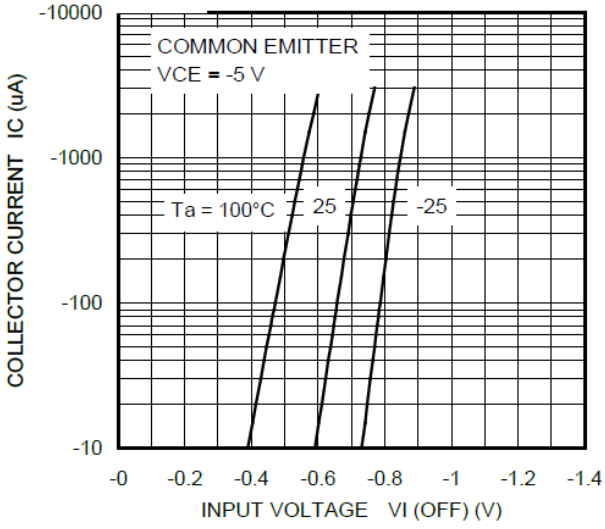


Fig. 10.6 RN2314 I_C-$V_{I(OFF)}$

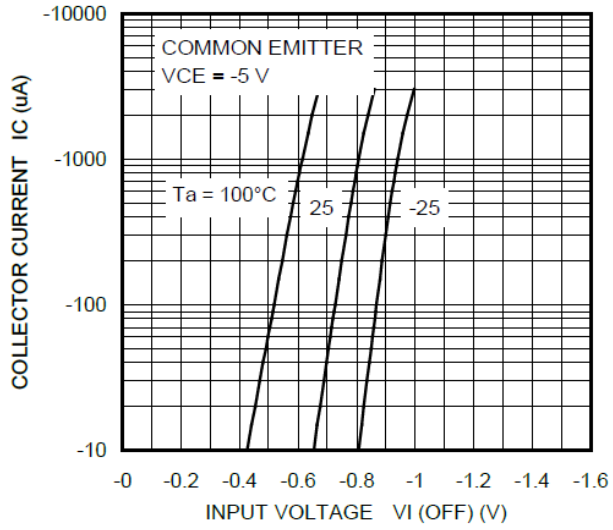


Fig. 10.7 RN2315 I_C-$V_{I(OFF)}$

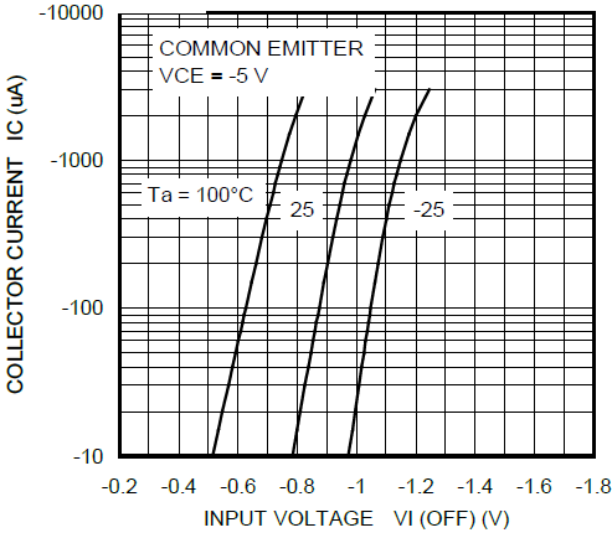


Fig. 10.8 RN2316 I_C-$V_{I(OFF)}$

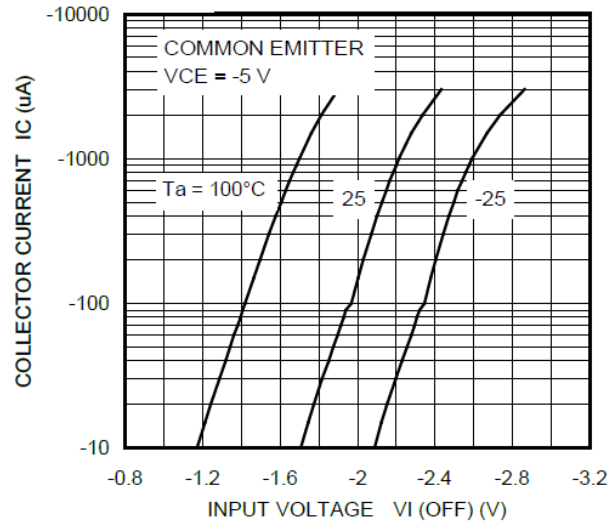


Fig. 10.9 RN2317 I_C-$V_{I(OFF)}$

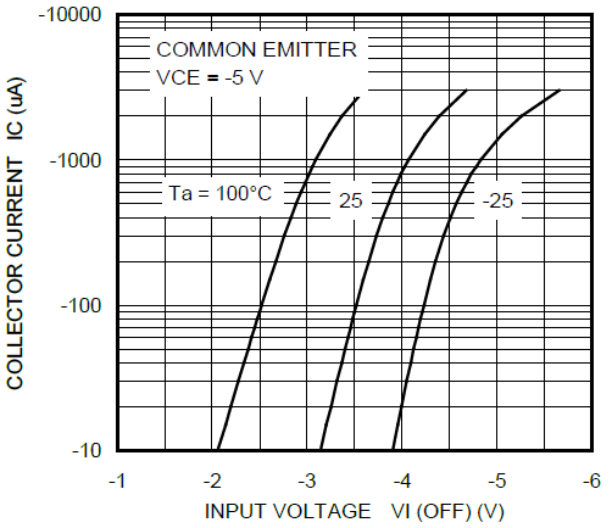


Fig. 10.10 RN2318 I_C-$V_{I(OFF)}$

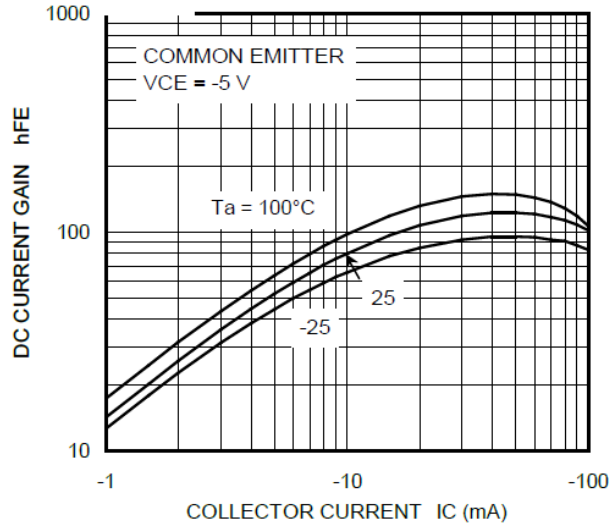


Fig. 10.11 RN2314 h_{FE}-I_C

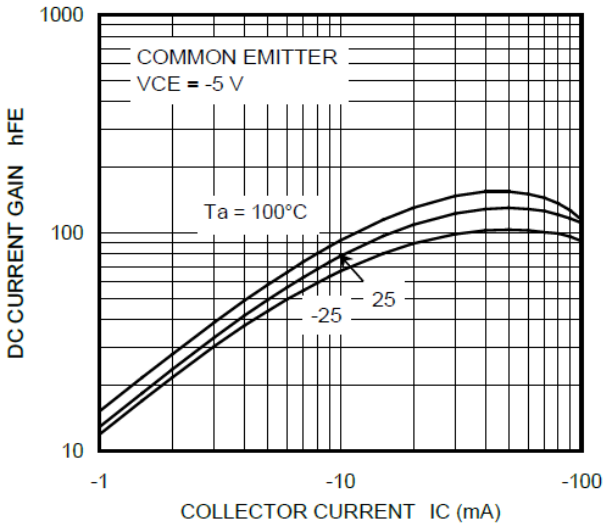


Fig. 10.12 RN2315 h_{FE}-I_C

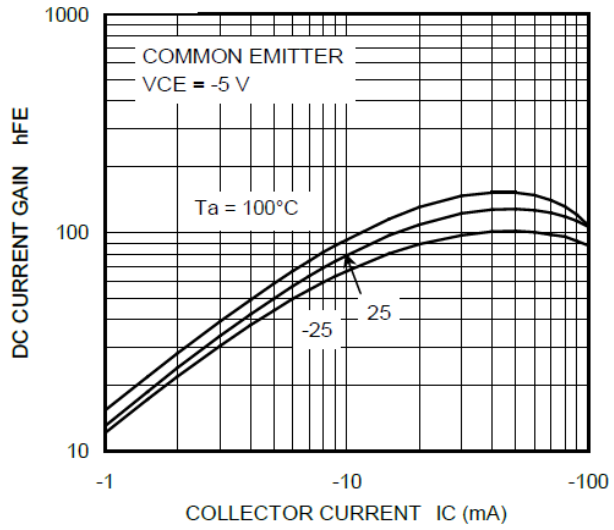


Fig. 10.13 RN2316 h_{FE}-I_C

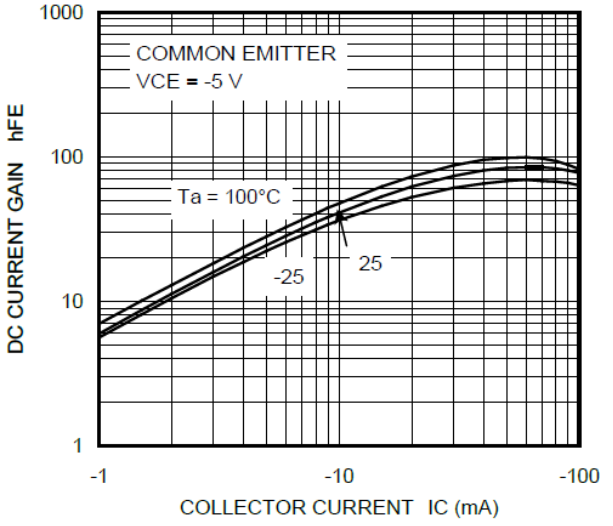


Fig. 10.14 RN2317 h_{FE}-I_C

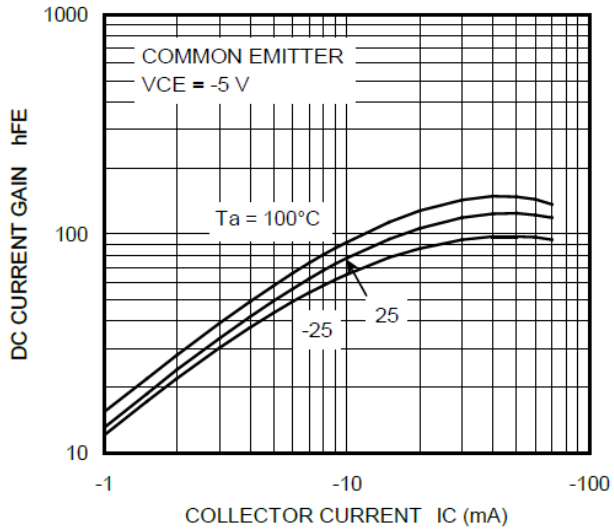


Fig. 10.15 RN2318 h_{FE}-I_C

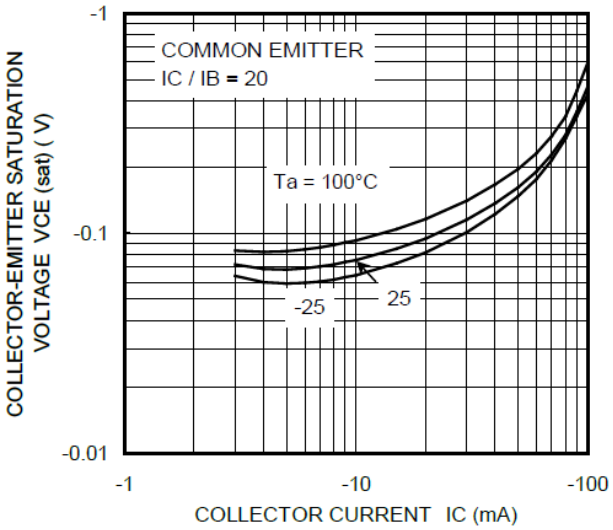


Fig. 10.16 RN2314 $V_{CE(sat)}$-I_C

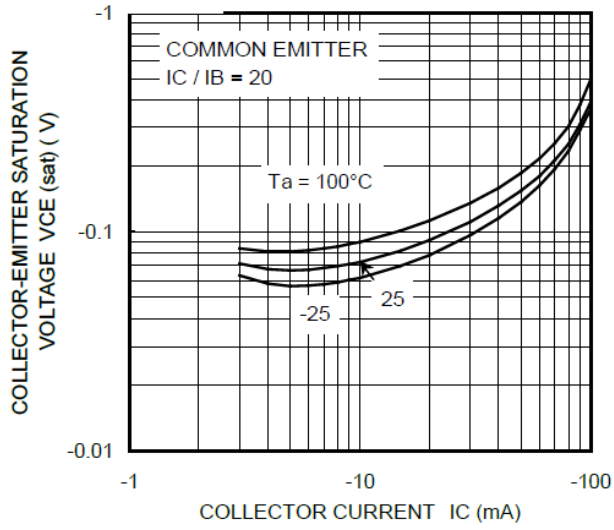


Fig. 10.17 RN2315 $V_{CE(sat)}$-I_C

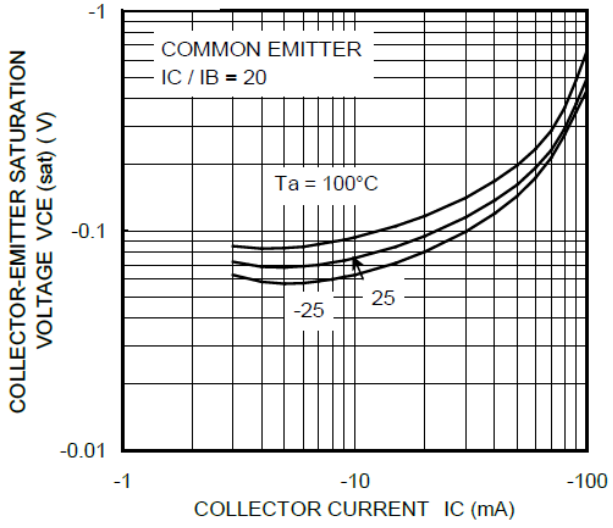


Fig. 10.18 RN2316 $V_{CE(sat)}$-I_C

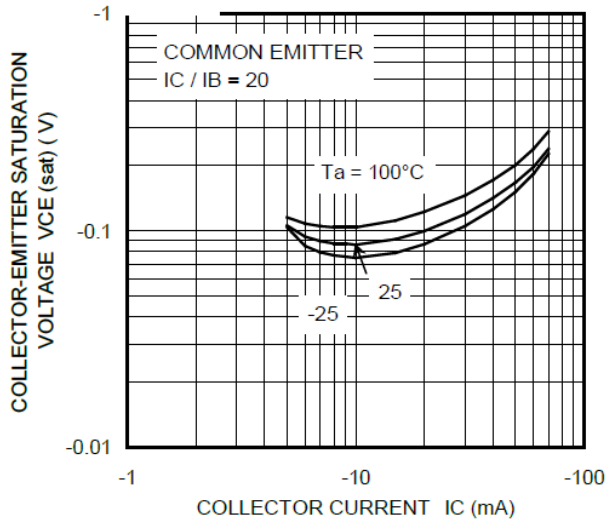


Fig. 10.19 RN2317 $V_{CE(sat)}$-I_C

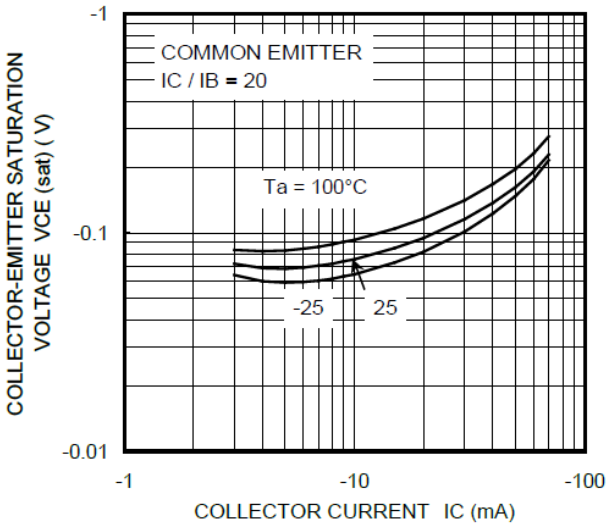
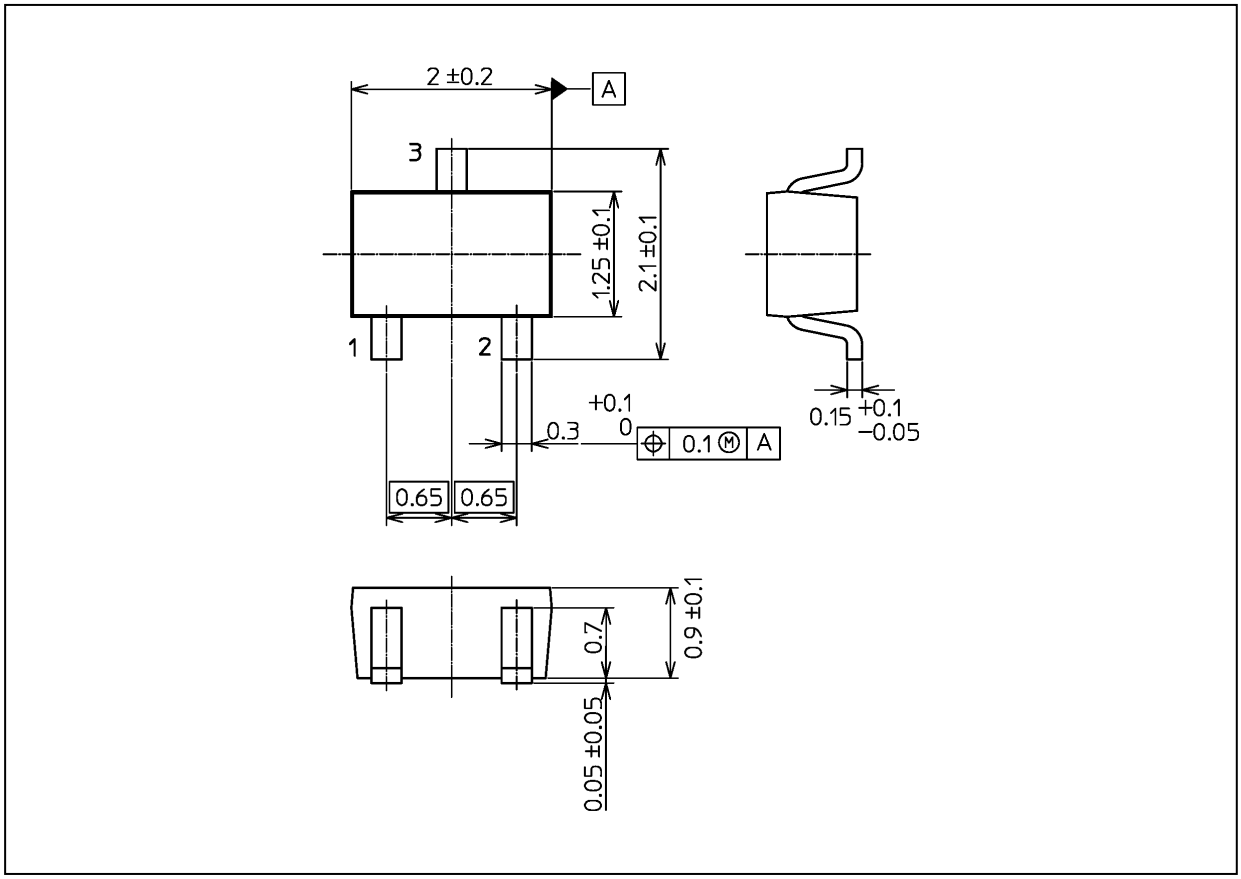


Fig. 10.20 RN2318 $V_{CE(sat)}$-I_C

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

Package Dimensions

Unit: mm



Weight: 6.0 mg (typ.)

Package Name(s)
TOSHIBA: 2-2E1S
Nickname: USM

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