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

RN2107MFV/08MFV/09MFV

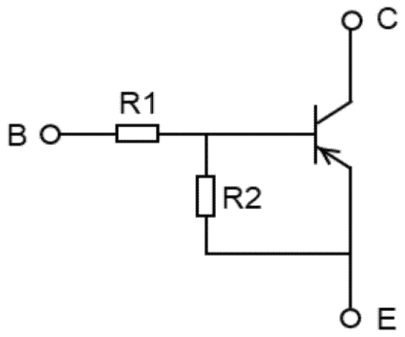
1. Applications

- Switching
- Inverter Circuits
- Interfacing
- Driver Circuits

2. Features

(1) AEC-Q101 qualified (Please see the orderable part number list)
(2) Ultra-small package, suited to very high density mounting
(3) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.
(4) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.
(5) Complementary to RN1107MFV to 1109MFV

3. Equivalent Circuit

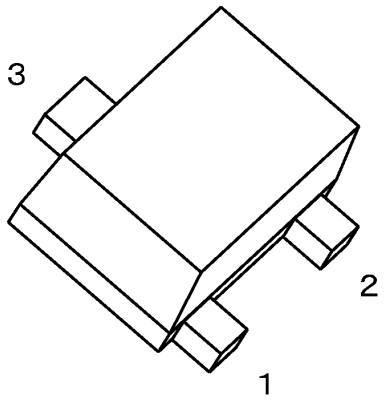


4. Bias Resistor Values

Part No.	R1 (kΩ)	R2 (kΩ)
RN2107MFV	10	47
RN2108MFV	22	47
RN2109MFV	47	22

Start of commercial production
2005-02

5. Packaging and Pin Assignment



1: Base
2: Emitter
3: Collector

VESM

6. Orderable part number

Orderable part number		AEC-Q101	Note
RN2107MFV	RN2107MFV,L3F	—	General Use
	RN2107MFV,L3XGF	YES (Note 1)	Unintended Use (Note 1)
	RN2107MFV,L3XHF	YES	Automotive Use
RN2108MFV	RN2108MFV,L3F	—	General Use
	RN2108MFV,L3XGF	YES (Note 1)	Unintended Use (Note 1)
RN2109MFV	RN2109MFV,L3F	—	General Use
	RN2109MFV,L3XGF	YES (Note 1)	Unintended Use (Note 1)

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

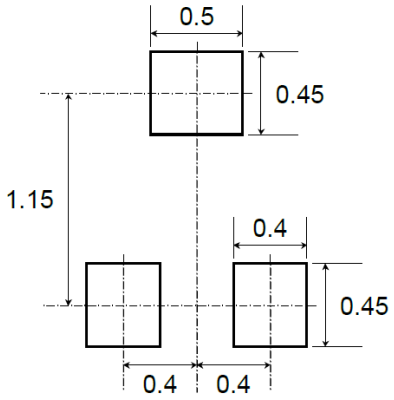
7. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN2107MFV,RN2109MFV	V_{CBO}	-50	V
Collector-emitter voltage		V_{CEO}	-50	
Emitter-base voltage	RN2107MFV	V_{EBO}	-6	V
	RN2108MFV		-7	
	RN2109MFV		-15	
Collector current	RN2107MFV,RN2109MFV	I_C	-100	mA
Collector power dissipation		P_C (Note 1)	150	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).

Note 1: Mounted on an FR4 board (25.4 mm × 25.4 mm × 1.6 mm)

8. Land Pattern Dimensions (for reference only)



Unit: mm

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2107MFV, RN2109MFV	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	RN2107MFV	I_{EBO}	V_{EB} = -6 V, I_C = 0 mA	-0.081	—	-0.15	mA
	RN2108MFV		V_{EB} = -7 V, I_C = 0 mA	-0.078	—	-0.145	
	RN2109MFV		V_{EB} = -15 V, I_C = 0 mA	-0.167	—	-0.311	
DC current gain	RN2107MFV	h_{FE}	V_{CE} = -5 V, I_C = -10 mA	80	—	—	—
	RN2108MFV			80	—	—	
	RN2109MFV			70	—	—	
Collector-emitter saturation voltage	RN2107MFV, RN2109MFV	$V_{CE(sat)}$	I_C = -5 mA, I_B = -0.5 mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2107MFV	$V_{I(ON)}$	V_{CE} = -0.2 V, I_C = -5 mA	-0.7	—	-1.8	V
	RN2108MFV			-1.0	—	-2.6	
	RN2109MFV			-2.2	—	-5.8	
Input voltage (OFF)	RN2107MFV	$V_{I(OFF)}$	V_{CE} = -5 V, I_C = -0.1 mA	-0.5	—	-1.0	V
	RN2108MFV			-0.6	—	-1.16	
	RN2109MFV			-1.5	—	-2.6	
Collector output capacitance	RN2107MFV, RN2109MFV	C_{ob}	V_{CB} = -10 V, I_E = 0 mA, f = 1 MHz	—	0.9	—	pF
Input resistance	RN2107MFV	R_1	-	7	10	13	kΩ
	RN2108MFV			15.4	22	28.6	
	RN2109MFV			32.9	47	61.1	
Resistor ratio	RN2107MFV	R1/R2	-	0.17	0.213	0.255	—
	RN2108MFV			0.374	0.468	0.562	
	RN2109MFV			1.71	2.14	2.56	

10. Marking

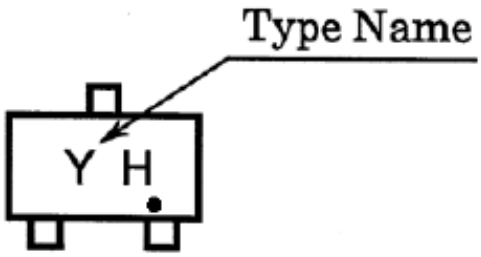


Fig. 10.1 Marking RN2107MFV

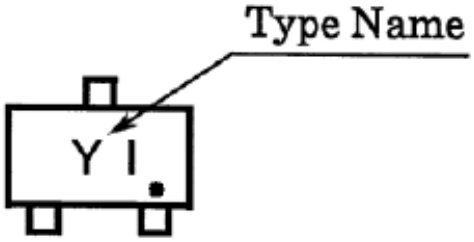


Fig. 10.2 Marking RN2108MFV

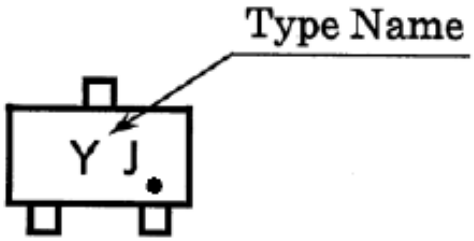


Fig. 10.3 Marking RN2109MFV

11. Characteristics Curves (Note)

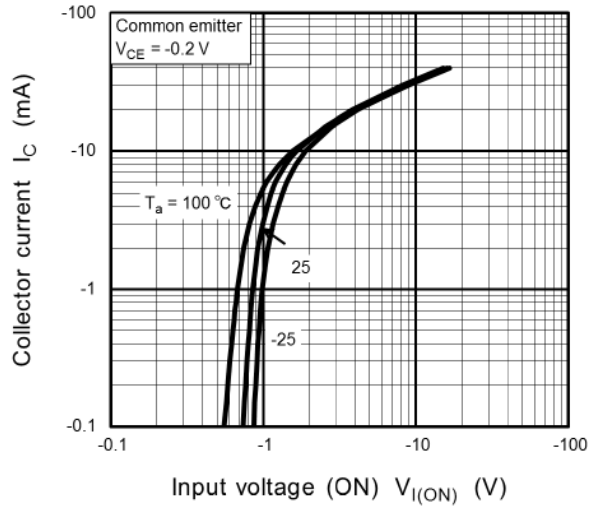


Fig. 11.1 RN2107MFV I_C-$V_{I(ON)}$

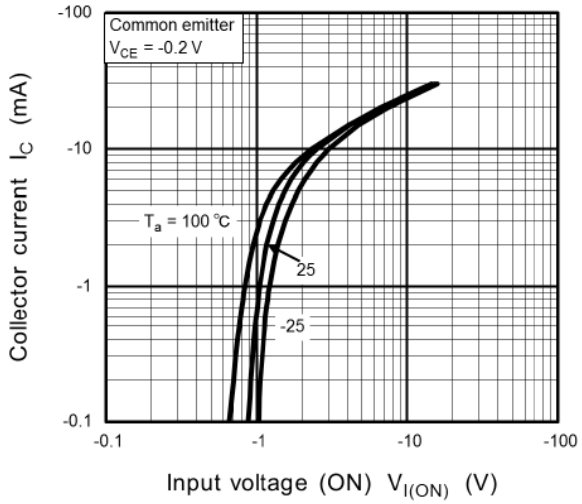


Fig. 11.2 RN2108MFV I_C-$V_{I(ON)}$

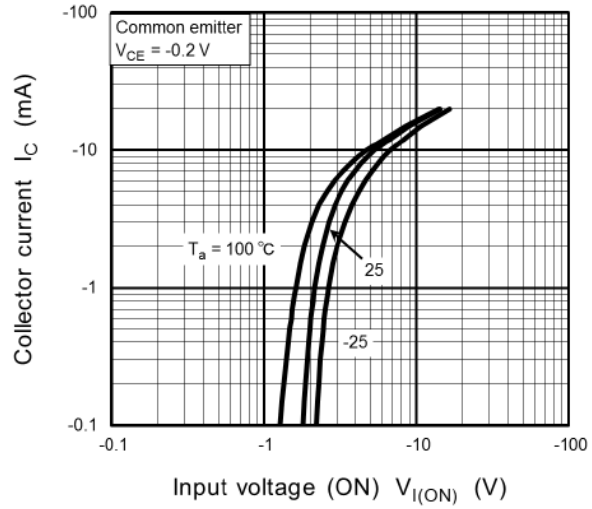


Fig. 11.3 RN2109MFV I_C-$V_{I(ON)}$

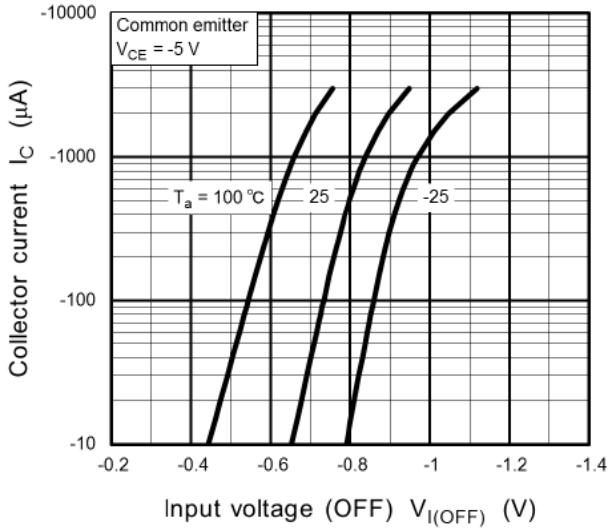


Fig. 11.4 RN2107MFV I_C-$V_{I(OFF)}$

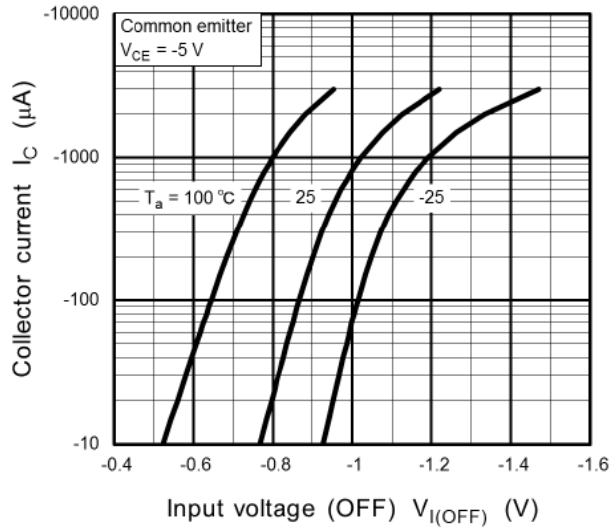


Fig. 11.5 RN2108MFV I_C-$V_{I(OFF)}$

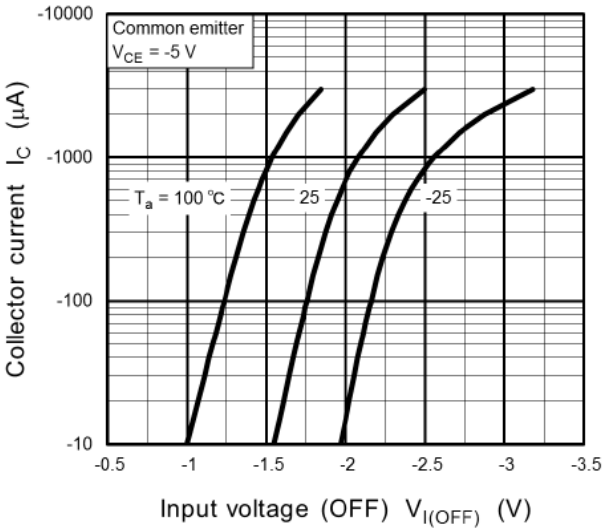


Fig. 11.6 RN2109MFV I_C-$V_{I(OFF)}$

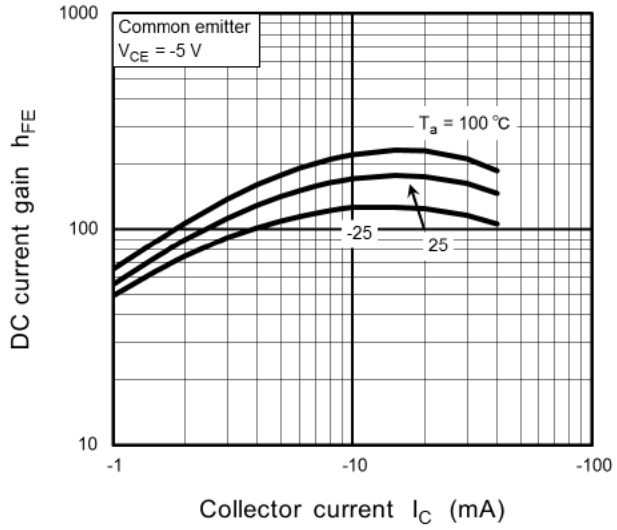


Fig. 11.7 RN2107MFV h_{FE}-I_C

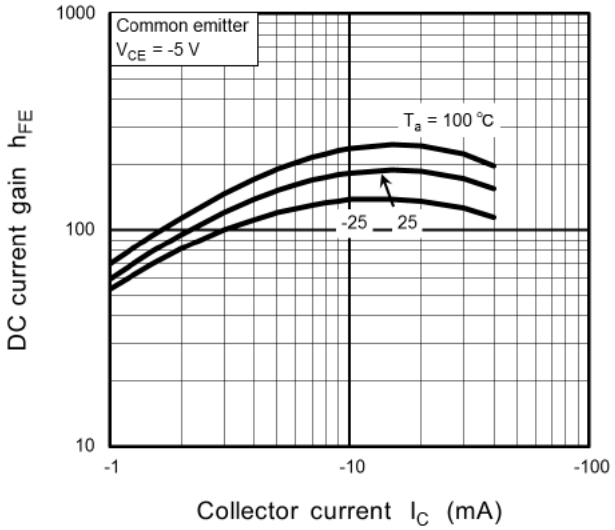


Fig. 11.8 RN2108MFV h_{FE}-I_C

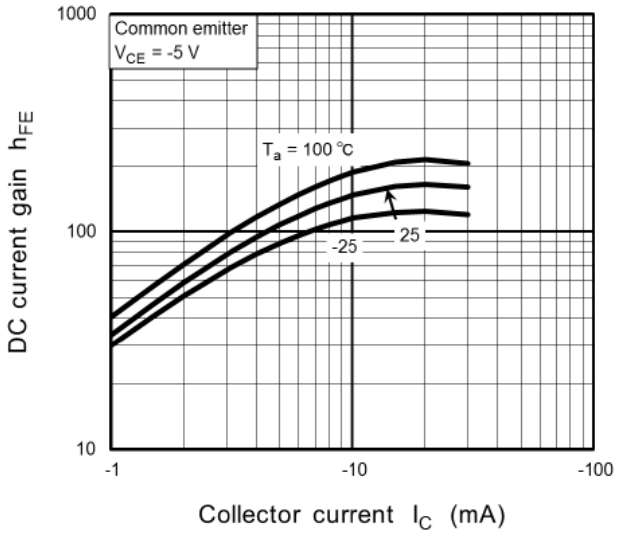


Fig. 11.9 RN2109MFV h_{FE}-I_C

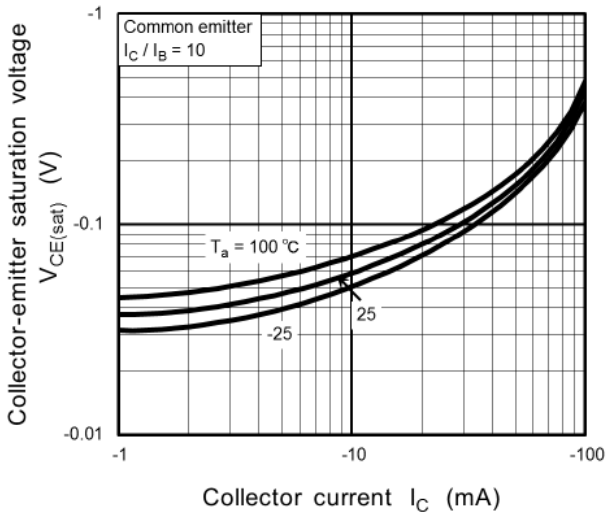


Fig. 11.10 RN2107MFV $V_{CE(sat)}$-I_C

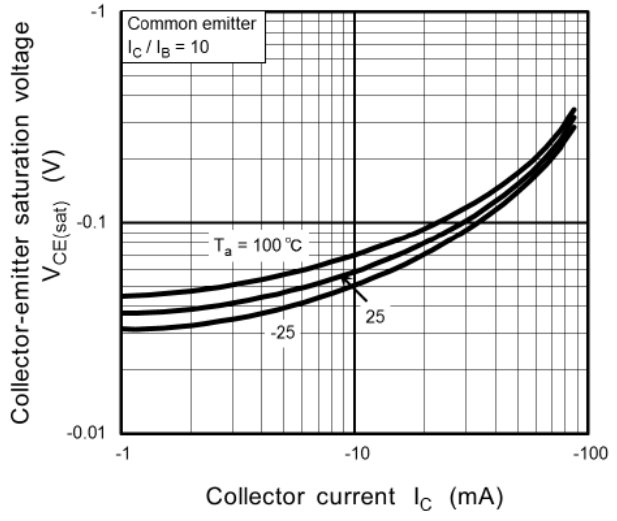


Fig. 11.11 RN2108MFV $V_{CE(sat)}$-I_C

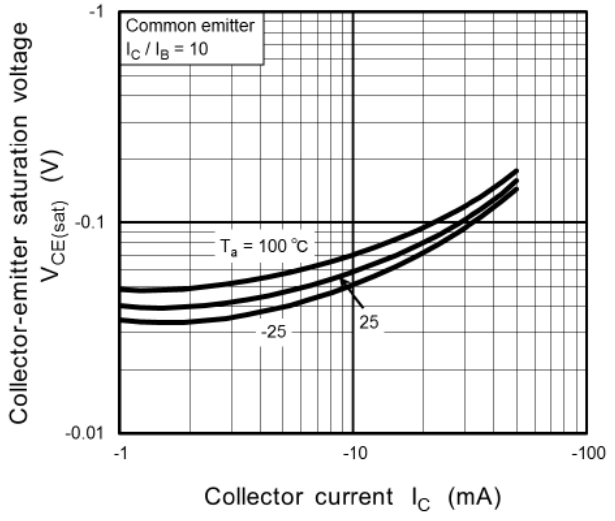
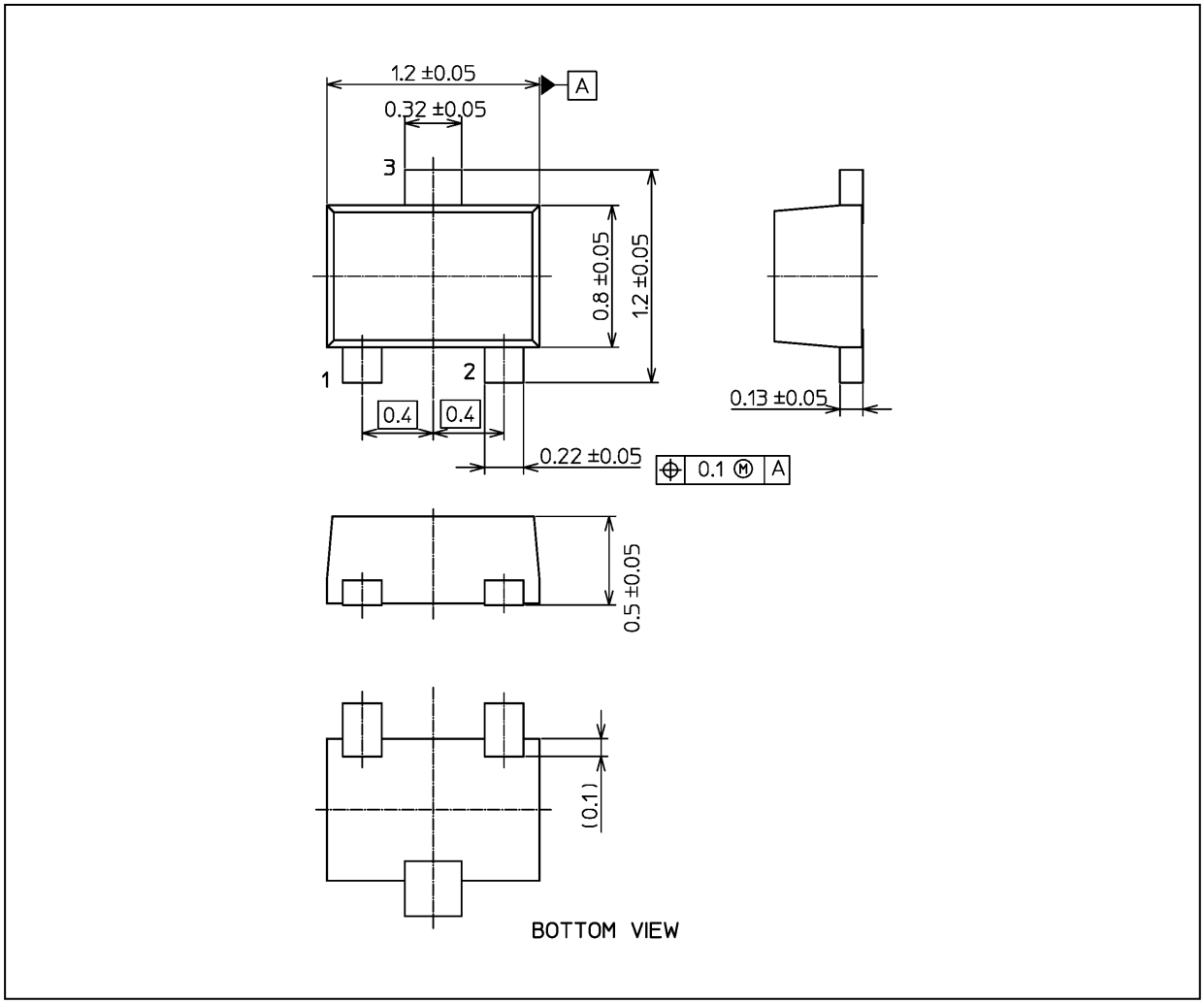


Fig. 11.12 RN2109MFV $V_{CE(sat)}$-I_C

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

Package Dimensions

Unit: mm



Weight: 1.5 mg (typ.)

Package Name(s)
TOSHIBA: 1-1Q1S
Nickname: VESM

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