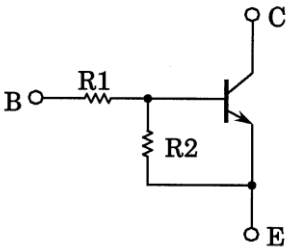
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

RN1107MFV, RN1108MFV, RN1109MFV

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

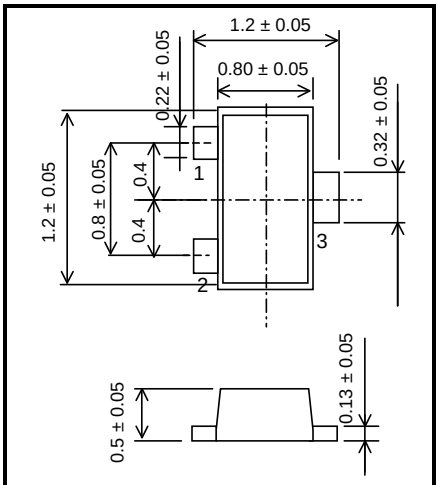
- Ultra-small package, suited to very high density mounting
- Incorporating a bias resistor into the transistor reduces the number of parts, so enabling the manufacture of ever more compact equipment and lowering assembly cost.
- A wide range of resistor values is available for use in various circuits.
- Complementary to the RN2107MFV to RN2109MFV

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1107MFV	10	47
RN1108MFV	22	47
RN1109MFV	47	22

Unit: mm



1. BASE
2. EMITTER
3. COLLECTOR

VESM

JEDEC	―
JEITA	―
TOSHIBA	2-1L1A

Weight: 1.5 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

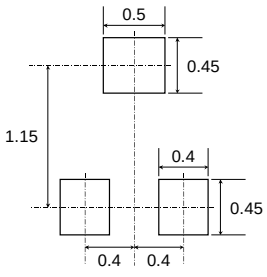
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1107MFV to RN1109MFV	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1107MFV	V_{EBO}	6	V
	RN1108MFV		7	
	RN1109MFV		15	
Collector current	RN1107MFV to RN1109MFV	I_C	100	mA
Collector power dissipation		P_C (Note 1)	150	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

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 mmt)

Pad Dimension（Reference）

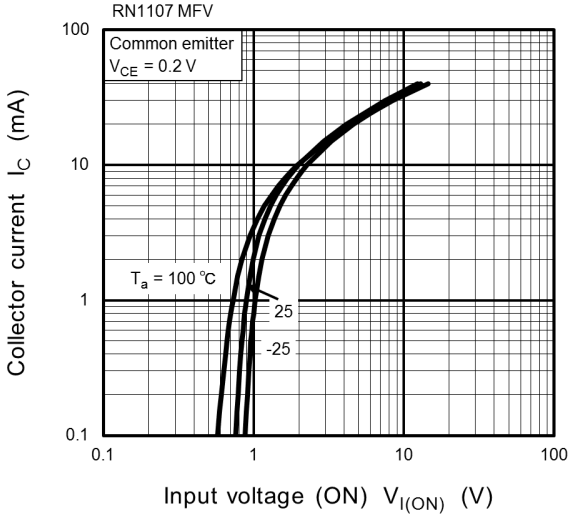
Unit : mm

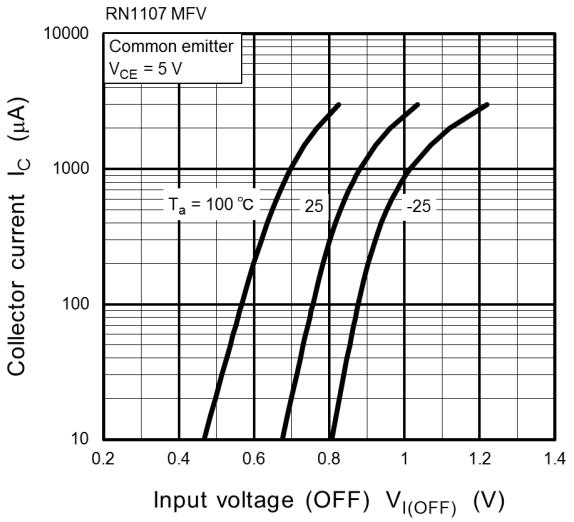


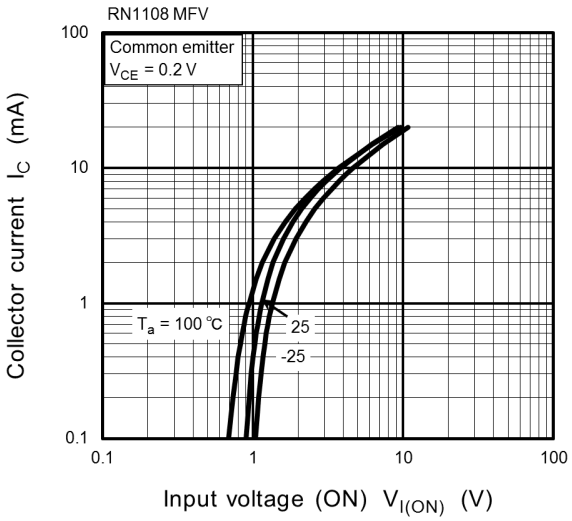
Start of commercial production
2005-02

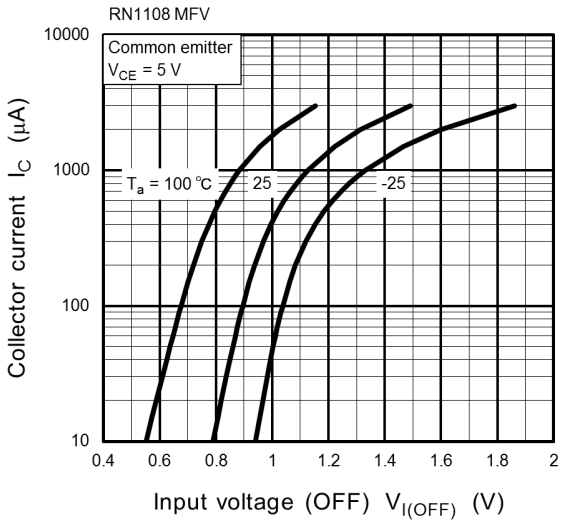
Electrical Characteristics (Ta = 25°C)

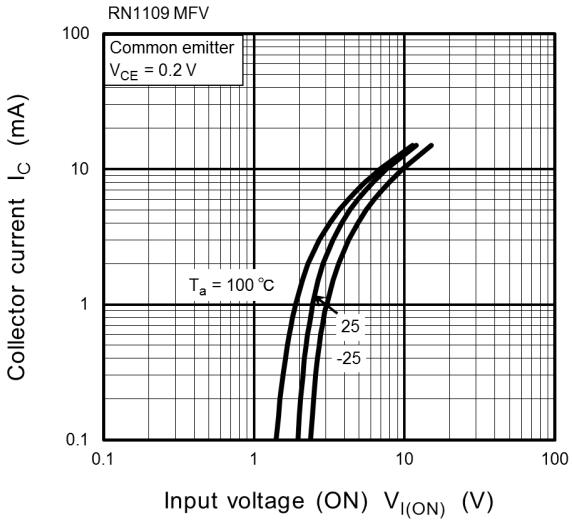
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1107MFV to RN1109MFV	I_{CBO}	V_{CB} = 50 V, I_E = 0 A	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0 A	—	—	500	nA
Emitter cutoff current	RN1107MFV	I_{EBO}	V_{EB} = 6 V, I_C = 0 A	0.081	—	0.15	mA
	RN1108MFV		V_{EB} = 7 V, I_C = 0 A	0.078	—	0.145	
	RN1109MFV		V_{EB} = 15 V, I_C = 0 A	0.167	—	0.311	
DC current gain	RN1107MFV	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	80	—	—	—
	RN1108MFV			80	—	—	
	RN1109MFV			70	—	—	
Collector-emitter saturation voltage	RN1107MFV to RN1109MFV	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.5 mA	—	0.1	0.3	V
Input voltage (ON)	RN1107MFV	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	0.7	—	1.8	V
	RN1108MFV			1.0	—	2.6	
	RN1109MFV			2.2	—	5.8	
Input voltage (OFF)	RN1107MFV	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.5	—	1.0	V
	RN1108MFV			0.6	—	1.16	
	RN1109MFV			1.5	—	2.6	
Collector output capacitance	RN1107MFV to RN1109MFV	C_{ob}	V_{CB} = 10 V, I_E = 0 A, f = 1 MHz	—	0.7	—	pF
Input resistor	RN1107MFV	R1	—	7	10	13	kΩ
	RN1108MFV			15.4	22	28.6	
	RN1109MFV			32.9	47	61.1	
Resistor ratio	RN1107MFV	R1/R2	—	0.17	0.213	0.255	—
	RN1108MFV			0.374	0.468	0.562	
	RN1109MFV			1.71	2.14	2.56	

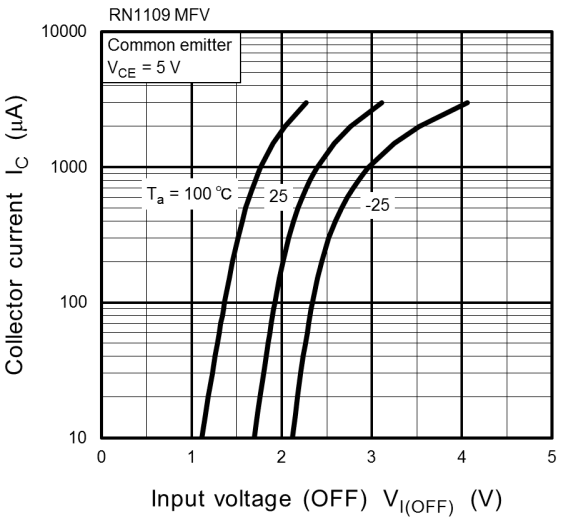

RN1107 MFV
Common emitter
V_{CE} = 0.2 V
T_a = 100 °C
25
-25
Collector current I_C (mA)
Input voltage (ON) $V_{I(ON)}$ (V)
100
10
1
0.1
0.1
1
10
100

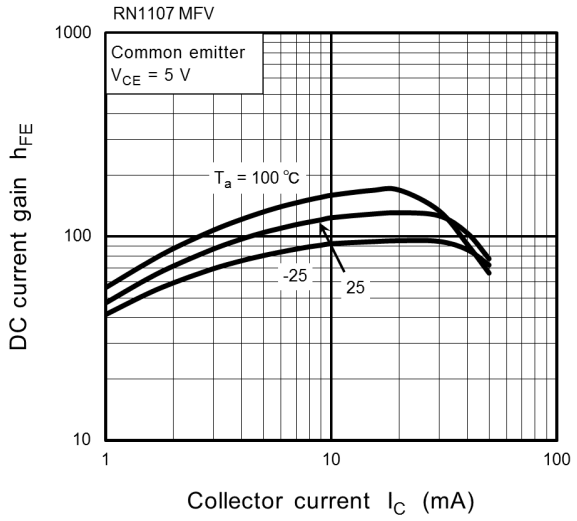

RN1107 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
Collector current I_C (μA)
Input voltage (OFF) $V_{I(OFF)}$ (V)
10000
1000
100
10
0.2
0.4
0.6
0.8
1
1.2
1.4

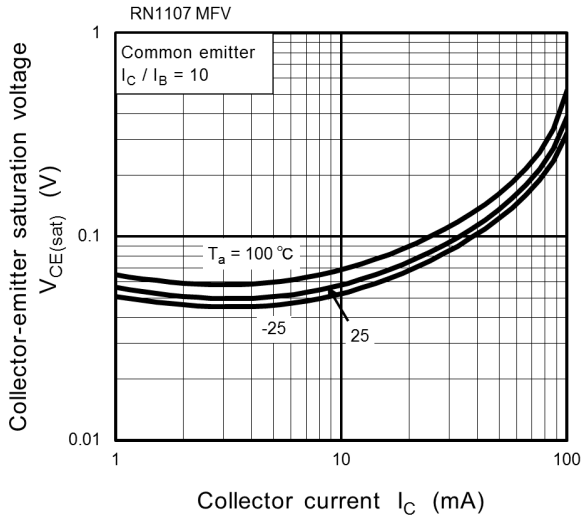

RN1108 MFV
Common emitter
V_{CE} = 0.2 V
T_a = 100 °C
25
-25
Collector current I_C (mA)
Input voltage (ON) $V_{I(ON)}$ (V)
100
10
1
0.1
0.1
1
10
100

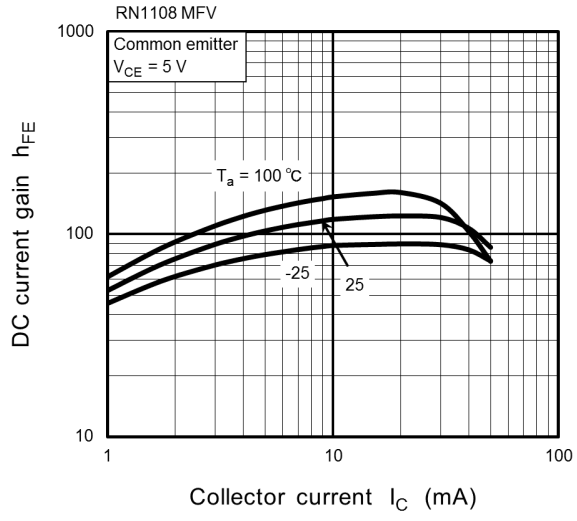

RN1108 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
Collector current I_C (μA)
Input voltage (OFF) $V_{I(OFF)}$ (V)
10000
1000
100
10
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

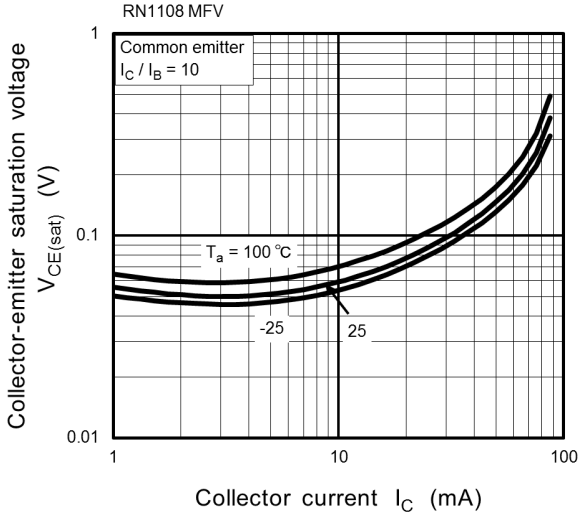

RN1109 MFV
Common emitter
V_{CE} = 0.2 V
T_a = 100 °C
25
-25
Collector current I_C (mA)
Input voltage (ON) $V_{I(ON)}$ (V)
100
10
1
0.1
0.1
1
10
100

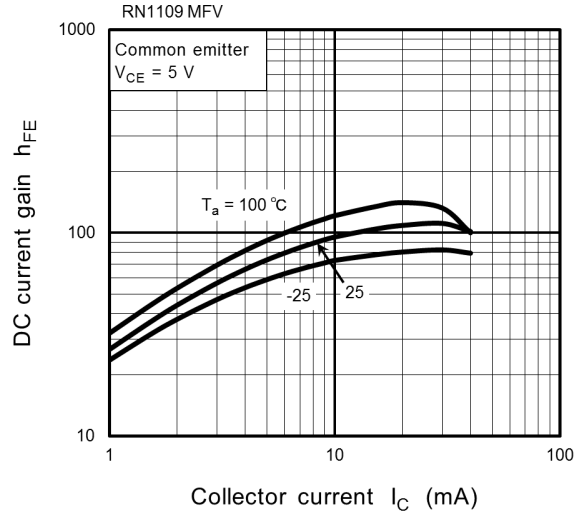

RN1109 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
Collector current I_C (μA)
Input voltage (OFF) $V_{I(OFF)}$ (V)
10000
1000
100
10
0
1
2
3
4
5

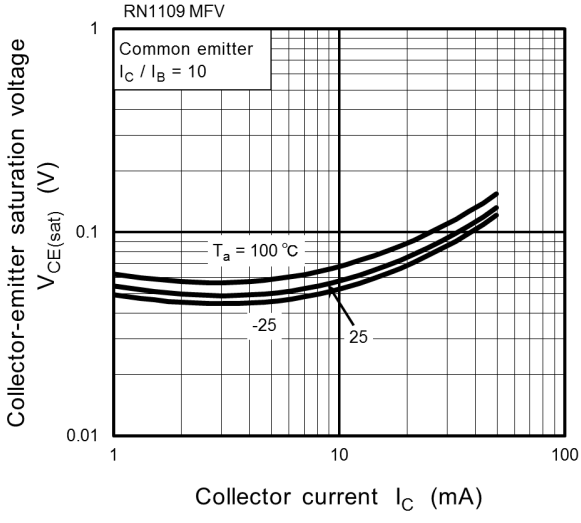

RN1107 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
-25
25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
10
100


RN1107 MFV
Common emitter
I_C / I_B = 10
T_a = 100 °C
-25
25
Collector-emitter saturation voltage $V_{CE(sat)}$ (V)
Collector current I_C (mA)
1
0.1
0.01
1
10
100

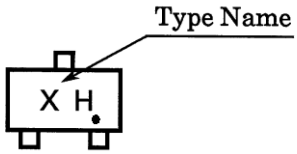
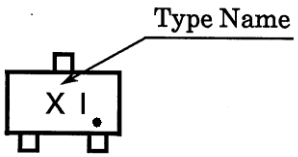
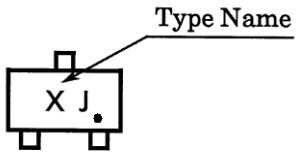

RN1108 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
-25
25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
10
100


RN1108 MFV
Common emitter
I_C / I_B = 10
T_a = 100 °C
-25
25
Collector-emitter saturation voltage $V_{CE(sat)}$ (V)
Collector current I_C (mA)
1
0.1
0.01
1
10
100


RN1109 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
-25
25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
10
100


RN1109 MFV
Common emitter
I_C / I_B = 10
T_a = 100 °C
-25
25
Collector-emitter saturation voltage $V_{CE(sat)}$ (V)
Collector current I_C (mA)
1
0.1
0.01
1
10
100

Marking

Type Name	Marking
RN1107MFV	
RN1108MFV	
RN1109MFV	

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