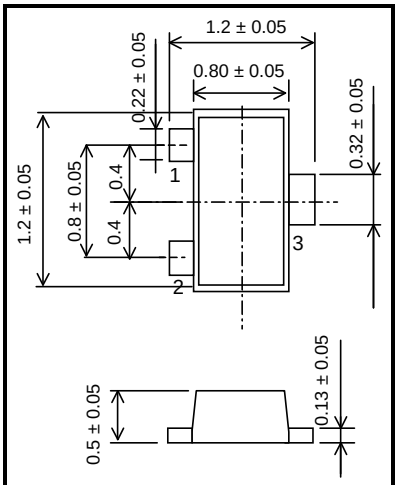
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

RN1110MFV, RN1111MFV

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 RN2110MFV, RN2111MFV

Unit: mm

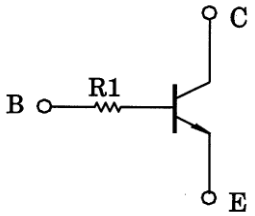


1. BASE
2. EMITTER
3. COLLECTOR

VESM	
JEDEC	—
JEITA	—
TOSHIBA	2-1L1A

Weight: 1.5 mg (typ.)

Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

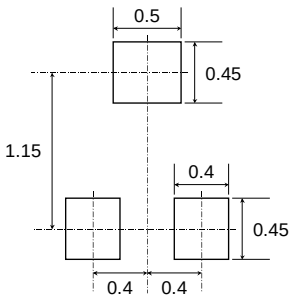
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	100	mA
Collector power dissipation	P_C (Note 1)	150	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

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）

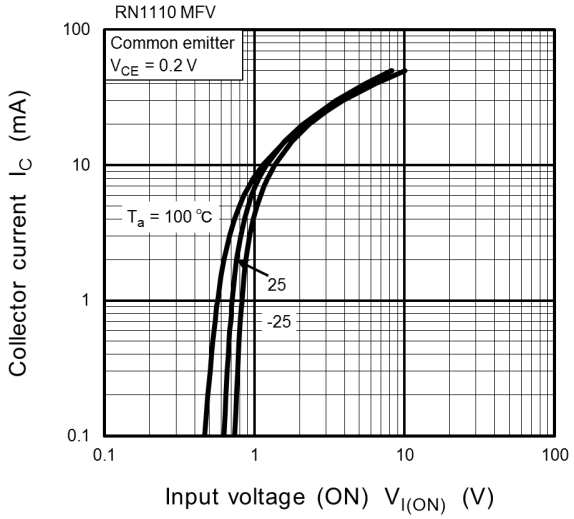
Unit : mm

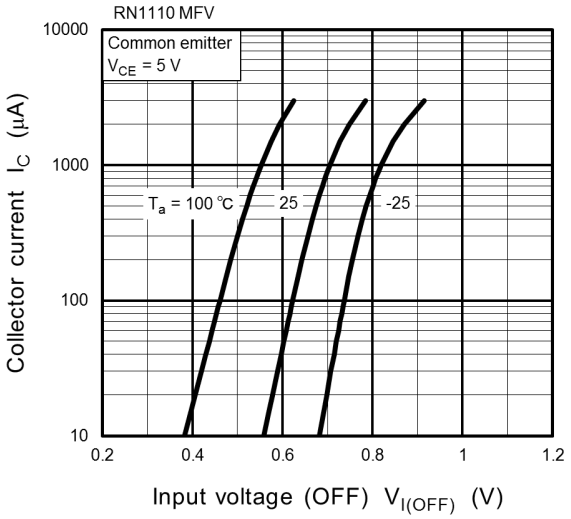


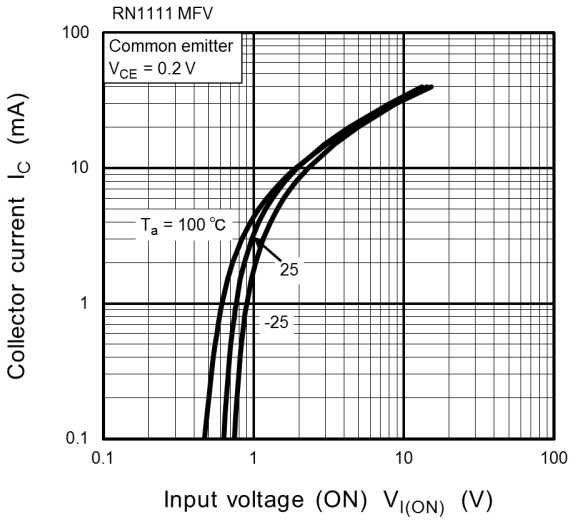
Start of commercial production
2005-02

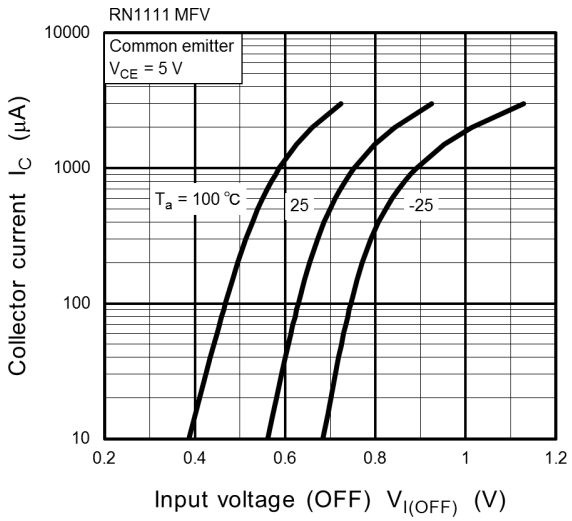
Electrical Characteristics (Ta = 25°C)

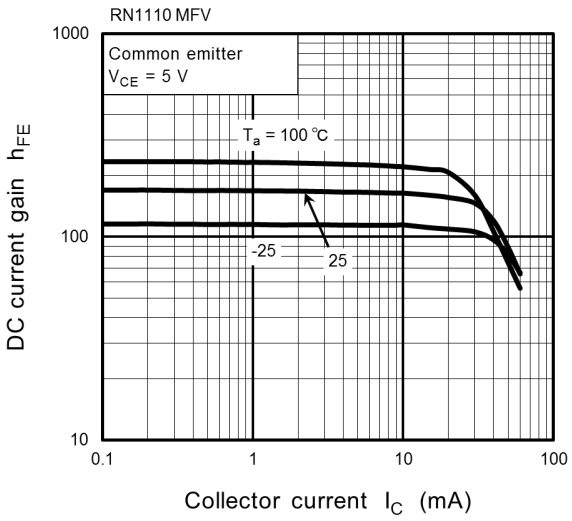
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		I_{CBO}	V_{CB} = 50 V, I_E = 0 A	—	—	100	nA
Emitter cutoff current		I_{EBO}	V_{EB} = 5 V, I_C = 0 A	—	—	100	nA
DC current gain		h_{FE}	V_{CE} = 5 V, I_C = 1 mA	120	—	700	—
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.5 mA	—	0.1	0.3	V
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0 A, f = 1 MHz	—	0.7	—	pF
Input resistor	RN1110MFV	R1	—	3.29	4.7	6.11	kΩ
	RN1111MFV			7	10	13	

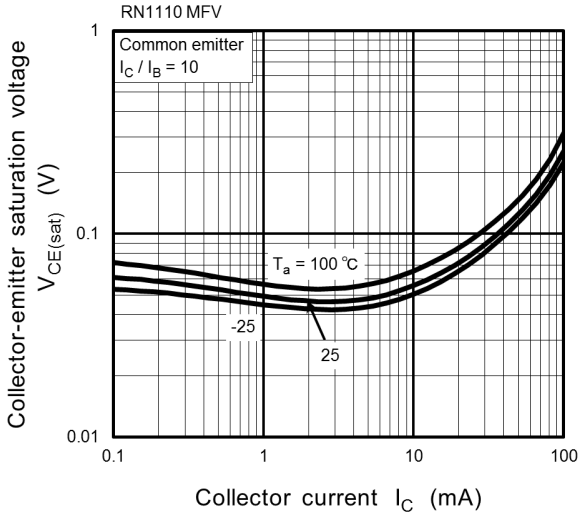

RN1110 MFV
Common emitter
V_{CE} = 0.2 V
T_a = 100 °C
25
-25
Collector current I_C (mA)
Input voltage (ON) $V_{I(ON)}$ (V)
100
10
1
0.1
0.1
1
10
100

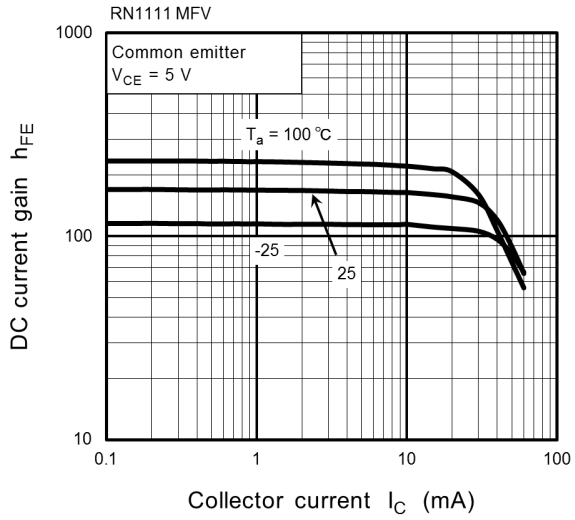

RN1110 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
Collector current I_C (μA)
Input voltage (OFF) $V_{I(OFF)}$ (V)
10000
1000
100
10
0.2
0.4
0.6
0.8
1
1.2

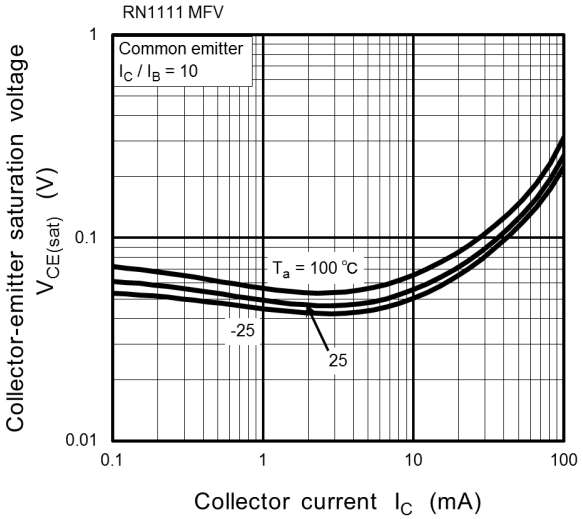

RN1111 MFV
Common emitter
V_{CE} = 0.2 V
T_a = 100 °C
25
-25
Collector current I_C (mA)
Input voltage (ON) $V_{I(ON)}$ (V)
100
10
1
0.1
0.1
1
10
100


RN1111 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

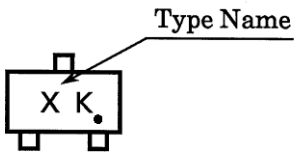
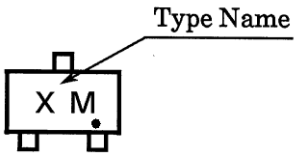

RN1110 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
0.1
1
10
100


RN1110 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
0.1
1
10
100


RN1111 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
0.1
1
10
100


RN1111 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
0.1
1
10
100

Marking

Type Name	Marking
RN1110MFV	
RN1111MFV	

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