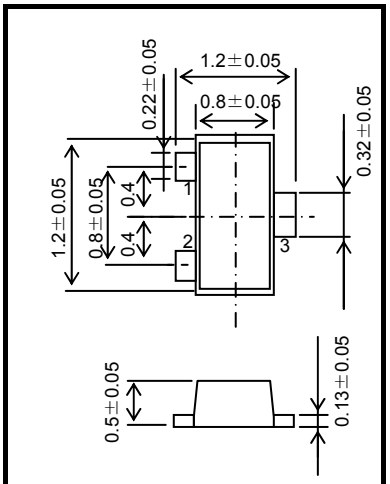
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN2110MFV,RN2111MFV

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 RN1110MFV to RN1111MFV

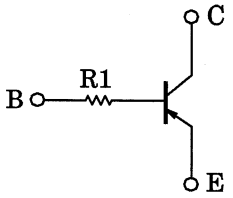
Unit : mm



JEDEC	—
JEITA	—
TOSHIBA	2-1L1A

Weight: 1.5 mg (typ.)

Equivalent Circuit



Absolute Maximum Ratings (Ta = 25°C)

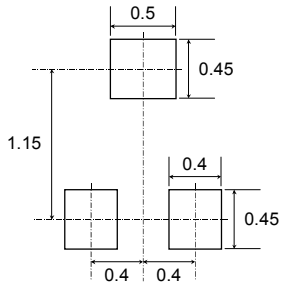
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	−50	V
Collector-emitter voltage	V_{CEO}	−50	V
Emitter-base voltage	V_{EBO}	−5	V
Collector current	I_C	−100	mA
Collector power dissipation	P_C(Note 1)	150	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

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 mm)

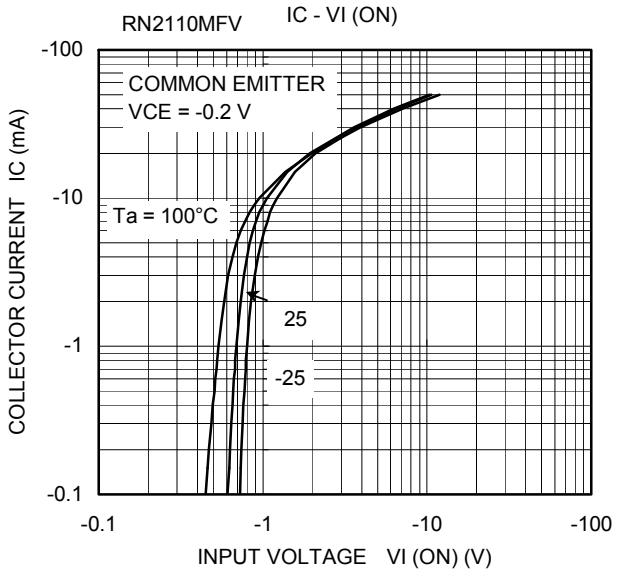
Land Pattern Example

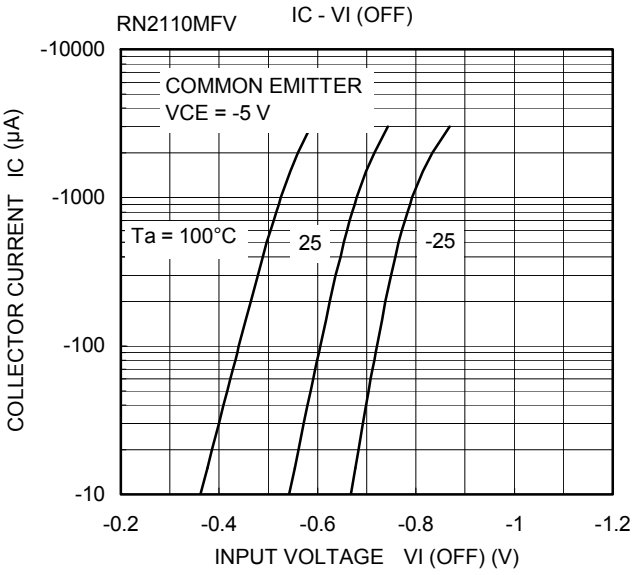
Unit:mm

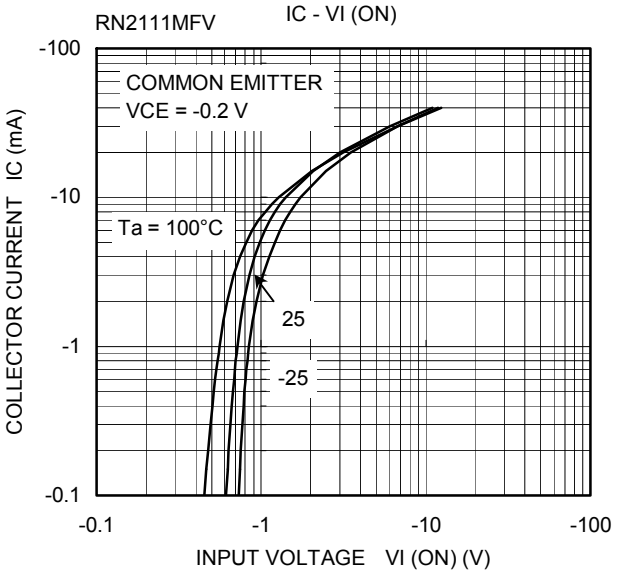


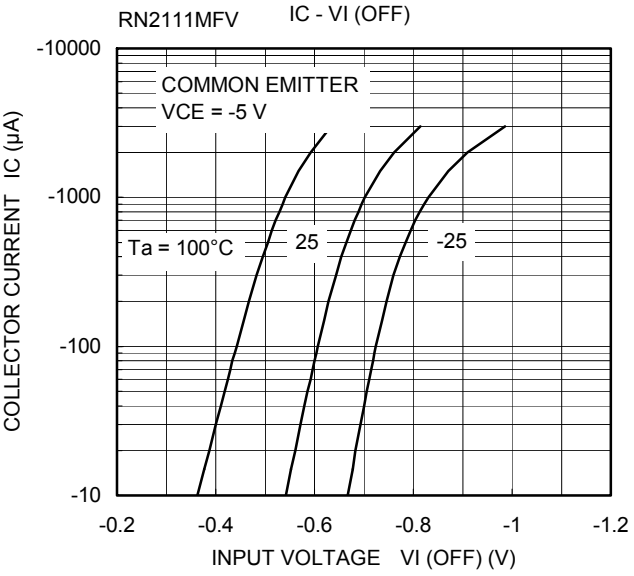
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current		I_{CBO}	—	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
Emitter cutoff current		I_{EBO}	—	V_{EB} = −5 V, I_C = 0	—	—	−100	nA
DC current gain		h_{FE}	—	V_{CE} = −5 V, I_C = −1 mA	120	—	400	—
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, f = 1 MHz	—	0.9	—	pF
Input resistor	RN2110MFV	R1	—	—	3.29	4.7	6.11	kΩ
	RN2111MFV				7	10	13	


RN2110MFV
IC - VI (ON)
COMMON EMITTER
VCE = -0.2 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI (ON) (V)
-100
-10
-1
-0.1
-0.1
-1
-10
-100


RN2110MFV
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI (OFF) (V)
-10000
-1000
-100
-10
-0.2
-0.4
-0.6
-0.8
-1
-1.2


RN2111MFV
IC - VI (ON)
COMMON EMITTER
VCE = -0.2 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (mA)
INPUT VOLTAGE VI (ON) (V)
-100
-10
-1
-0.1
-0.1
-1
-10
-100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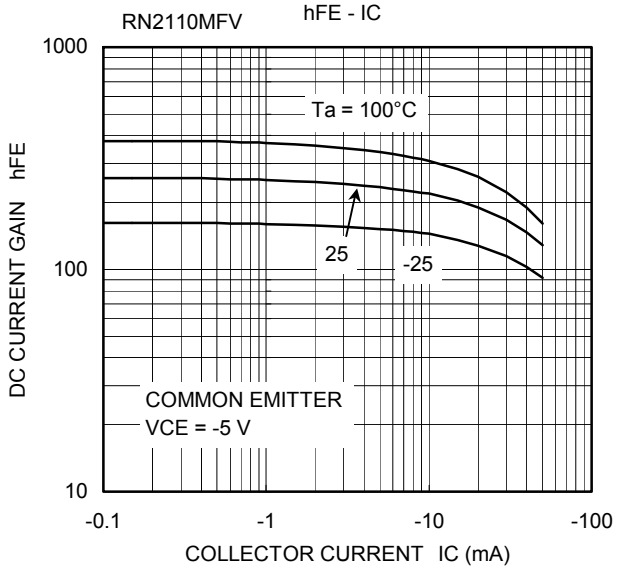
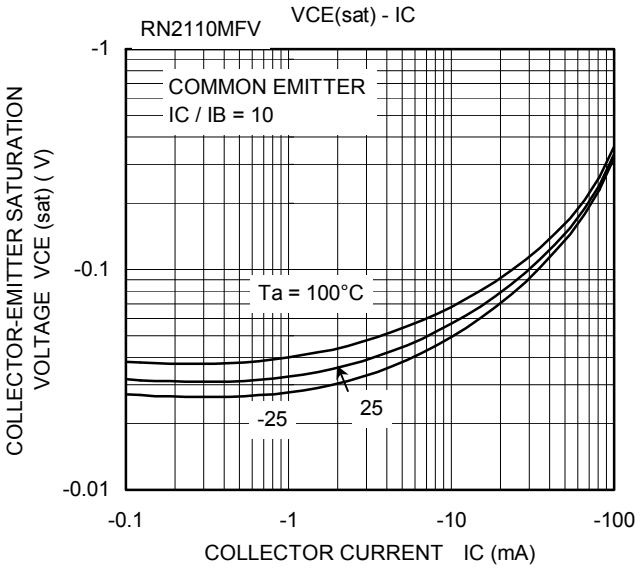
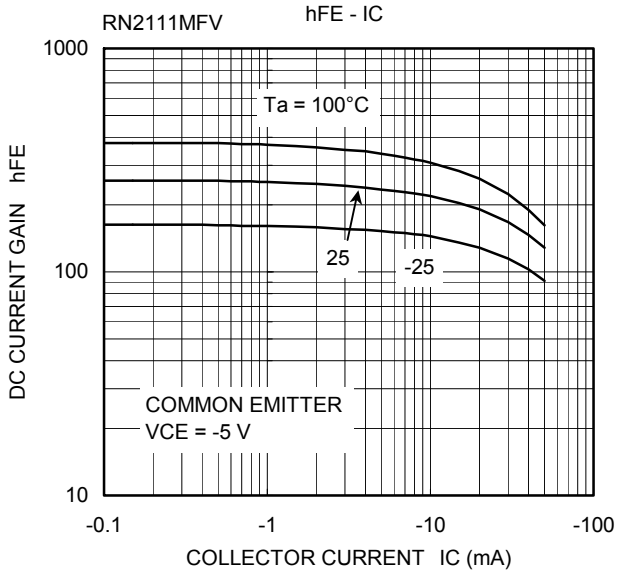
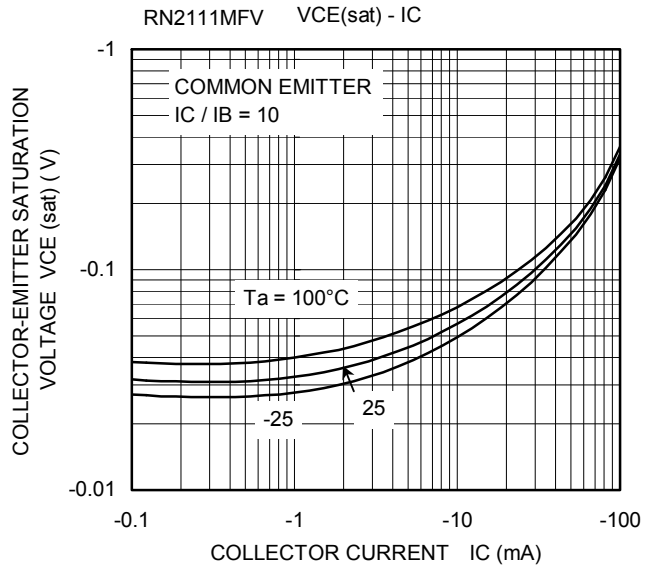
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (μA)
INPUT VOLTAGE VI (OFF) (V)
-10000
-1000
-100
-10
-0.2
-0.4
-0.6
-0.8
-1
-1.2

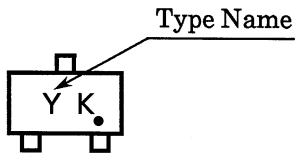
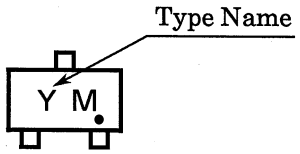

RN2110MFV
hFE - IC
1000
100
10
DC CURRENT GAIN hFE
Ta = 100°C
25
-25
COMMON EMITTER
VCE = -5 V
-0.1
-1
-10
-100
COLLECTOR CURRENT IC (mA)


RN2110MFV
VCE(sat) - IC
-1
-0.1
-0.01
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COMMON EMITTER
IC / IB = 10
Ta = 100°C
-25
25
-0.1
-1
-10
-100
COLLECTOR CURRENT IC (mA)


RN2111MFV
hFE - IC
1000
100
10
DC CURRENT GAIN hFE
Ta = 100°C
25
-25
COMMON EMITTER
VCE = -5 V
-0.1
-1
-10
-100
COLLECTOR CURRENT IC (mA)


RN2111MFV
VCE(sat) - IC
-1
-0.1
-0.01
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COMMON EMITTER
IC / IB = 10
Ta = 100°C
-25
25
-0.1
-1
-10
-100
COLLECTOR CURRENT IC (mA)

Marking

Type Name	Marking
RN2110MFV	
RN2111MFV	

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