

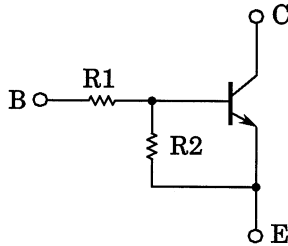
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

**RN1101MFV, RN1102MFV, RN1103MFV  
RN1104MFV, RN1105MFV, RN1106MFV**

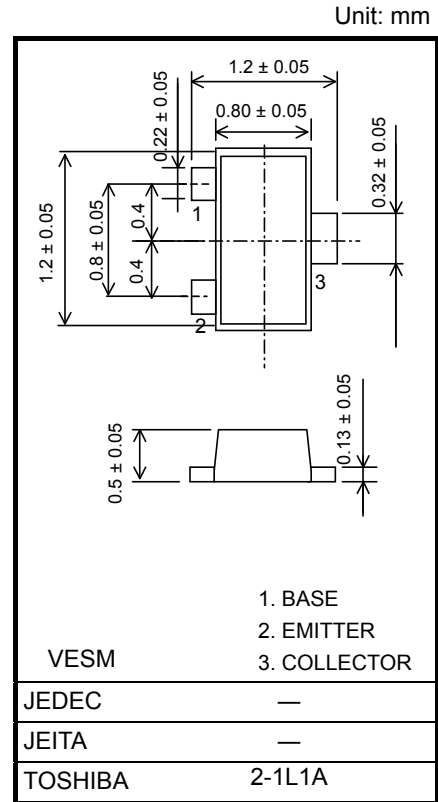
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- 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 RN2101MFV to RN2106MFV

**Equivalent Circuit and Bias Resistor Values**



Type No.	R1 (kΩ)	R2 (kΩ)
RN1101MFV	4.7	4.7
RN1102MFV	10	10
RN1103MFV	22	22
RN1104MFV	47	47
RN1105MFV	2.2	47
RN1106MFV	4.7	47



Weight: 1.5 mg (typ.)

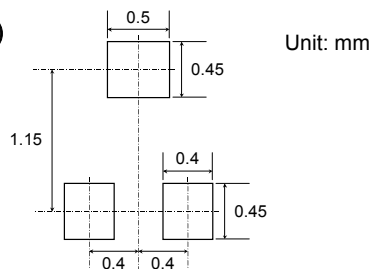
**Absolute Maximum Ratings (Ta = 25°C)**

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	50	V
Collector-emitter voltage			
Emitter-base voltage	V <sub>EBO</sub>	10	V
		5	
Collector current	I <sub>C</sub>	100	mA
Collector power dissipation	P <sub>C</sub> (Note 1)	150	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-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)

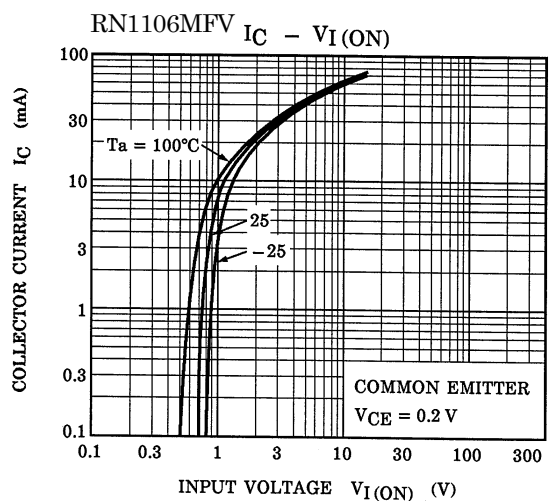
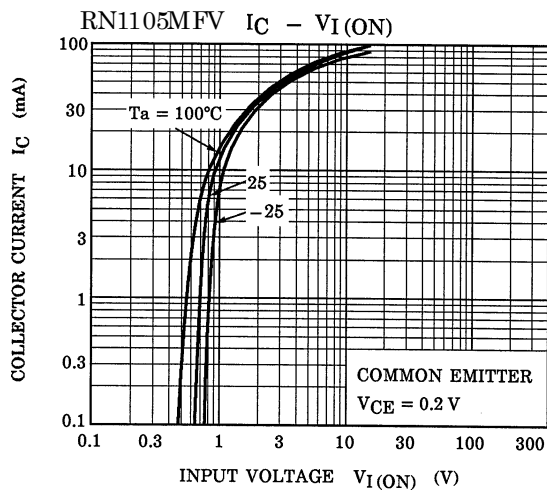
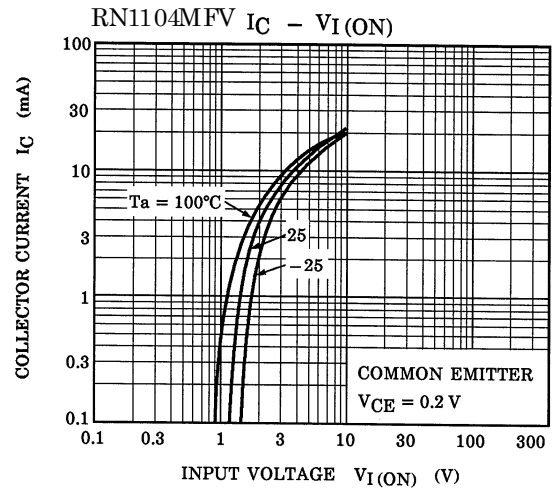
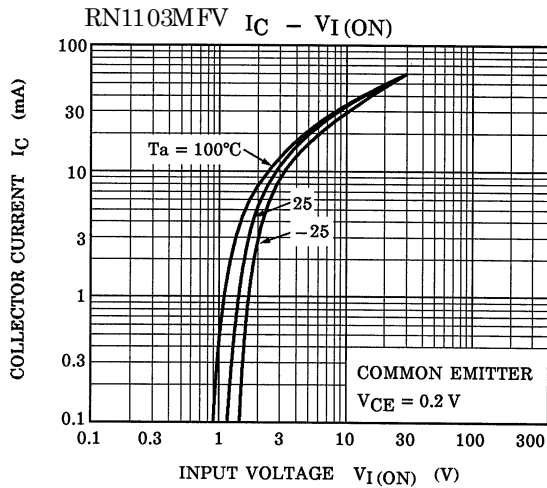
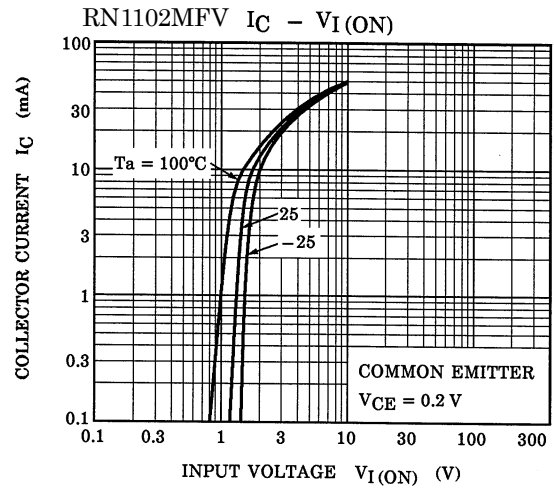
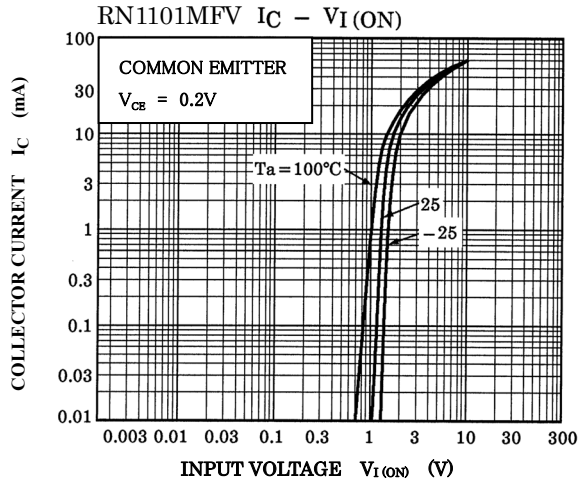
**Pad Dimension (Reference)**

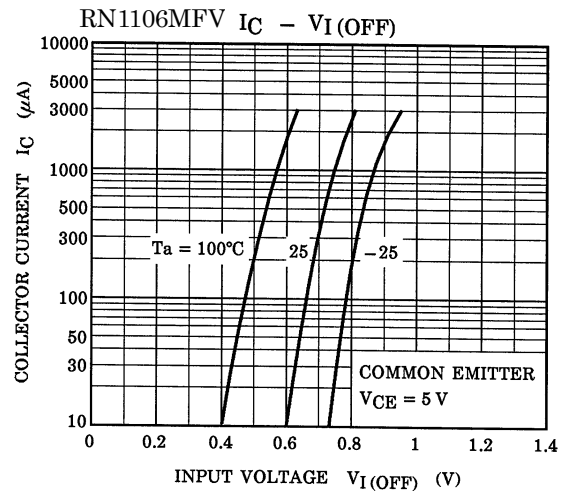
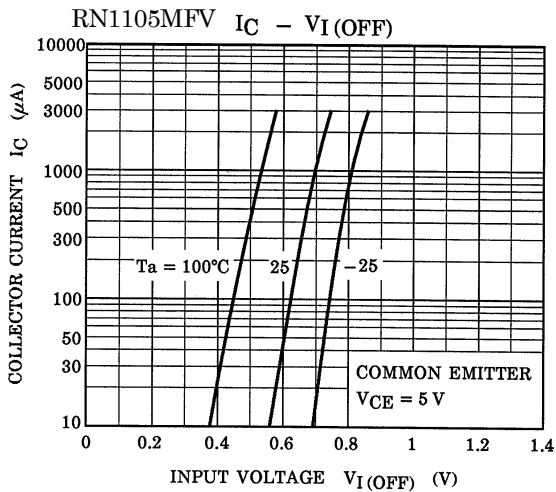
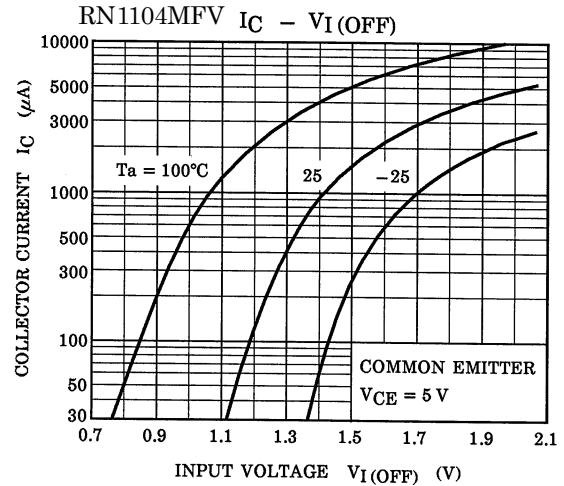
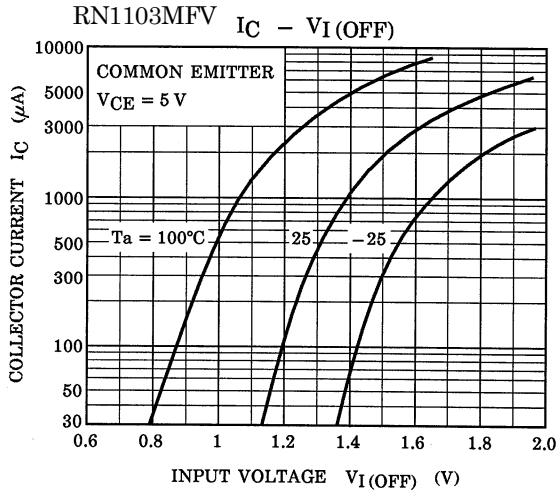
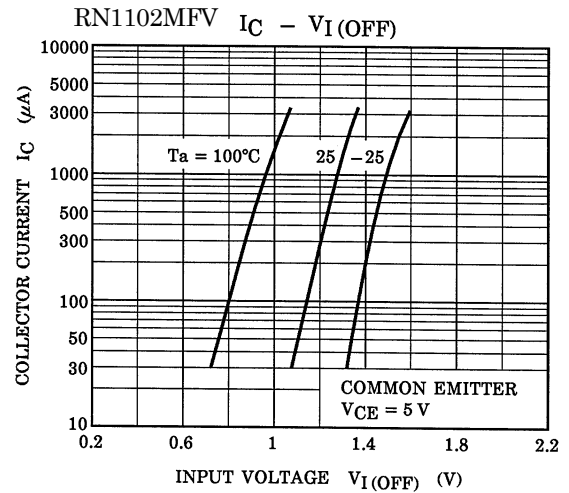
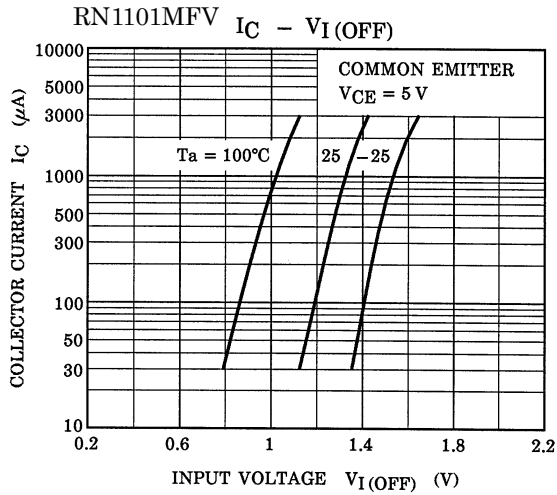


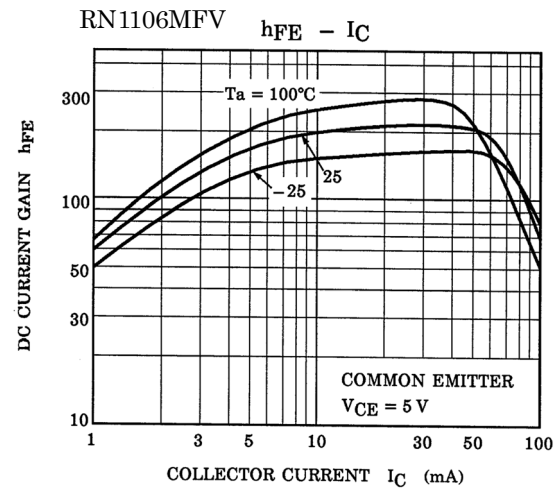
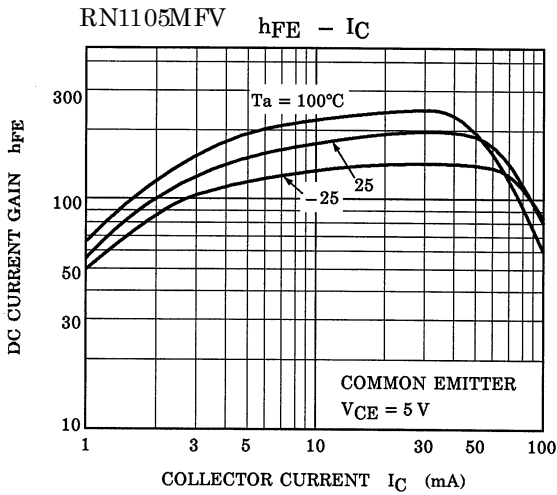
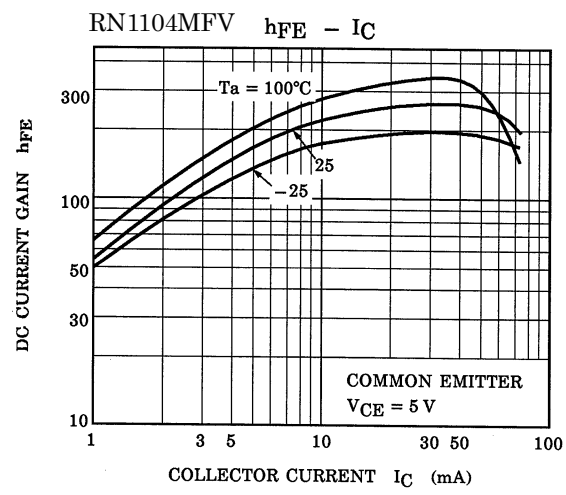
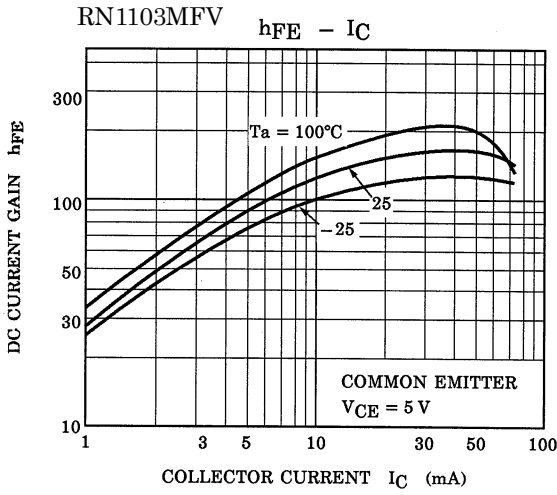
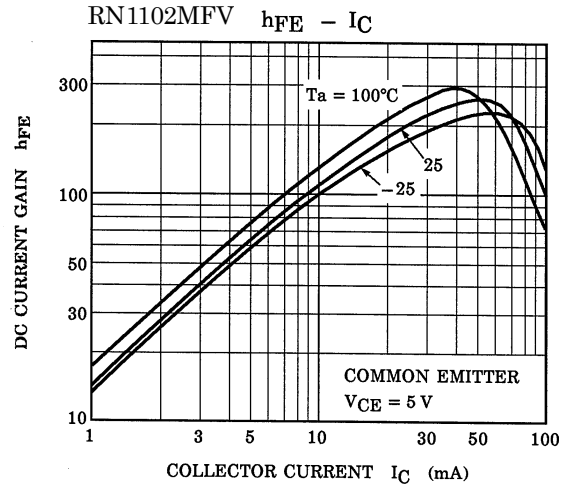
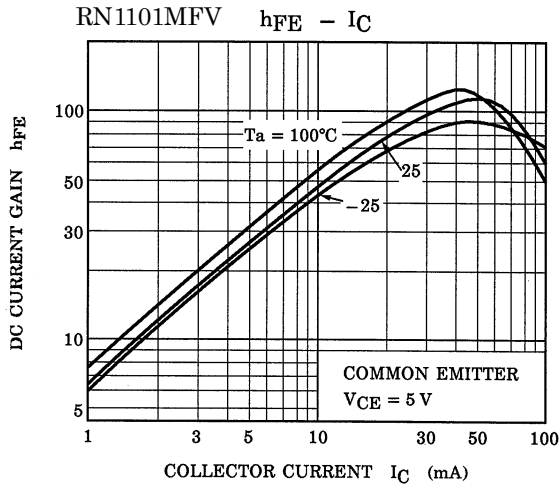
Start of commercial production  
2005-02

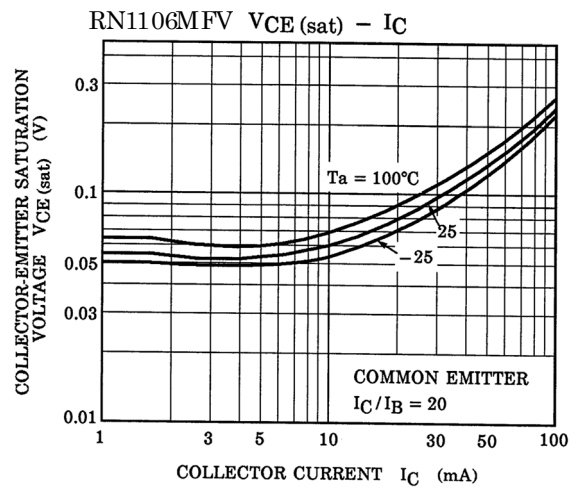
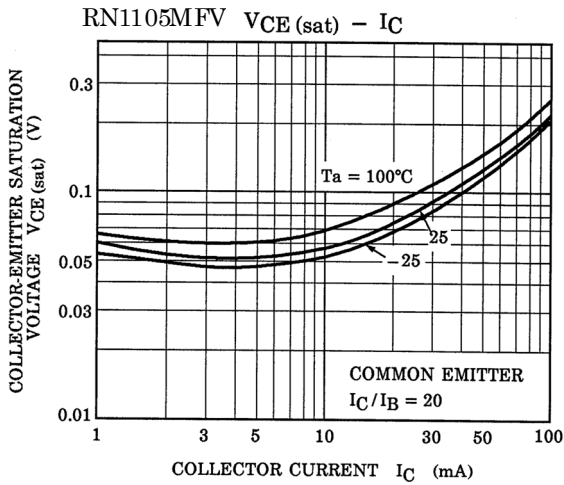
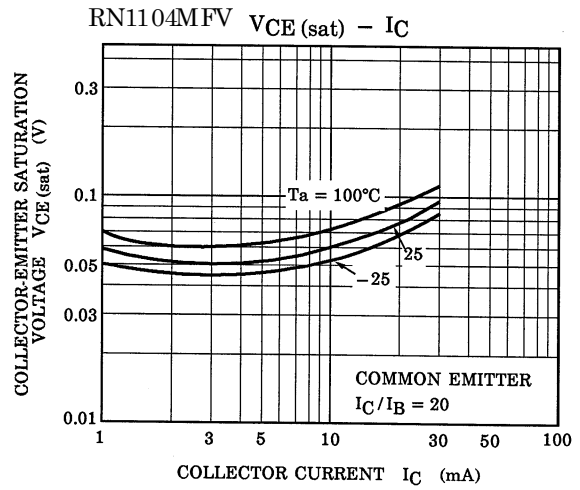
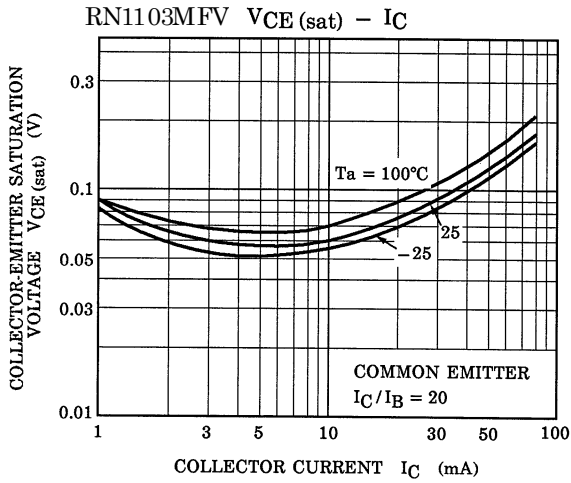
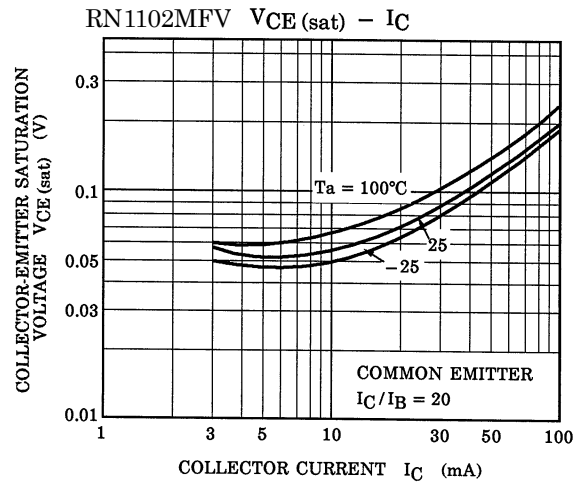
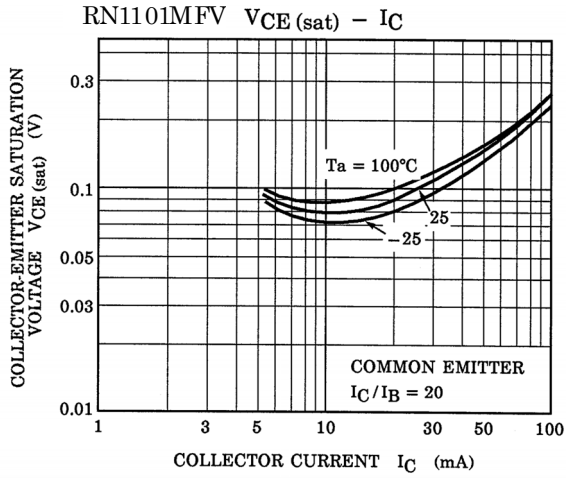
## Electrical Characteristics (Ta = 25°C)

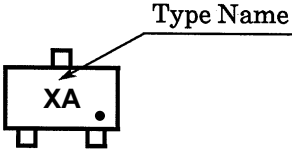
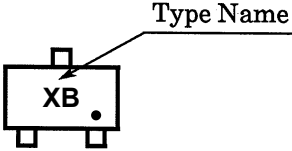
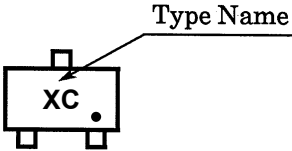
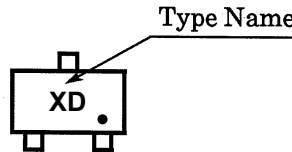
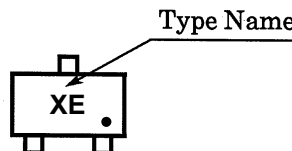
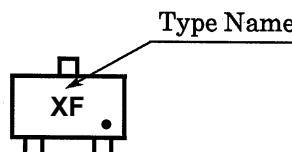
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1101MFV to RN1106MFV	$I_{CBO}$	—	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
		$I_{CEO}$		$V_{CE} = 50\text{ V}, I_B = 0$	—	—	500	
Emitter cutoff current	RN1101MFV	$I_{EBO}$	—	$V_{EB} = 10\text{ V}, I_C = 0$	0.82	—	1.52	mA
	RN1102MFV				0.38	—	0.71	
	RN1103MFV				0.17	—	0.33	
	RN1104MFV				0.082	—	0.15	
	RN1105MFV			$V_{EB} = 5\text{ V}, I_C = 0$	0.078	—	0.145	
	RN1106MFV				0.074	—	0.138	
DC current gain	RN1101MFV	$h_{FE}$	—	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	30	—	—	
	RN1102MFV				50	—	—	
	RN1103MFV				70	—	—	
	RN1104MFV				80	—	—	
	RN1105MFV				80	—	—	
	RN1106MFV				80	—	—	
Collector-emitter saturation voltage	RN1101MFV to RN1106MFV	$V_{CE(sat)}$	—	$I_C = 5\text{ mA}, I_B = 0.5\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	RN1101MFV	$V_I(ON)$	—	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	1.1	—	2.0	V
	RN1102MFV				1.2	—	2.4	
	RN1103MFV				1.3	—	3.0	
	RN1104MFV				1.5	—	5.0	
	RN1105MFV				0.6	—	1.1	
	RN1106MFV				0.7	—	1.3	
Input voltage (OFF)	RN1101MFV to RN1104MFV	$V_I(OFF)$	—	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	1.0	—	1.5	V
	RN1105MFV, RN1106MFV				0.5	—	0.8	
Collector output capacitance	RN1101MFV to RN1106MFV	$C_{ob}$	—	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	0.7	—	pF
Input resistor	RN1101MFV	R1	—	—	3.29	4.7	6.11	kΩ
	RN1102MFV				7	10	13	
	RN1103MFV				15.4	22	28.6	
	RN1104MFV				32.9	47	61.1	
	RN1105MFV				1.54	2.2	2.86	
	RN1106MFV				3.29	4.7	6.11	
Resistor ratio	RN1101MFV to RN1104MFV	R1/R2	—	—	0.8	1.0	1.2	
	RN1105MFV				0.0376	0.0468	0.0562	
	RN1106MFV				0.08	0.1	0.12	









Type Name	Marking
RN1101MFV	
RN1102MFV	
RN1103MFV	
RN1104MFV	
RN1105MFV	
RN1106MFV	

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