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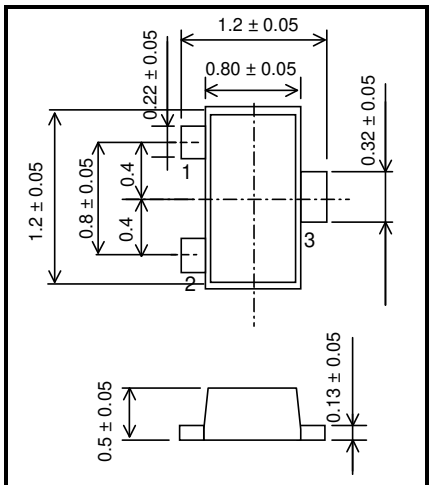
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

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

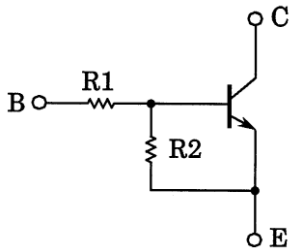
Unit: mm



	1. BASE 2. EMITTER 3. COLLECTOR
VESM	
JEDEC	—
JEITA	—
TOSHIBA	2-1L1A

Weight: 1.5 mg (typ.)

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

Absolute Maximum Ratings (Ta = 25°C)

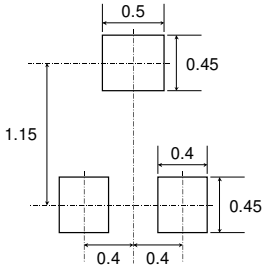
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1101MFV to 1106MFV	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1101MFV to 1104MFV	V_{EBO}	10	V
	RN1105MFV, 1106MFV		5	
Collector current	RN1101MFV to 1106MFV	I_C	100	mA
Collector power dissipation		P_C(Note 1)	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)

Pad Dimension (Reference)

Unit: mm

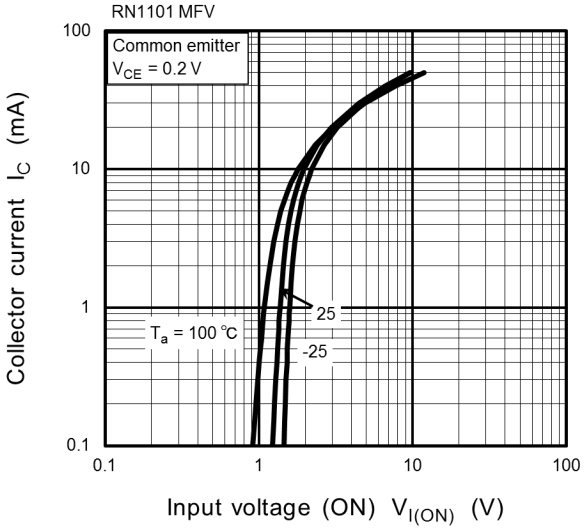


Start of commercial production
2005-02

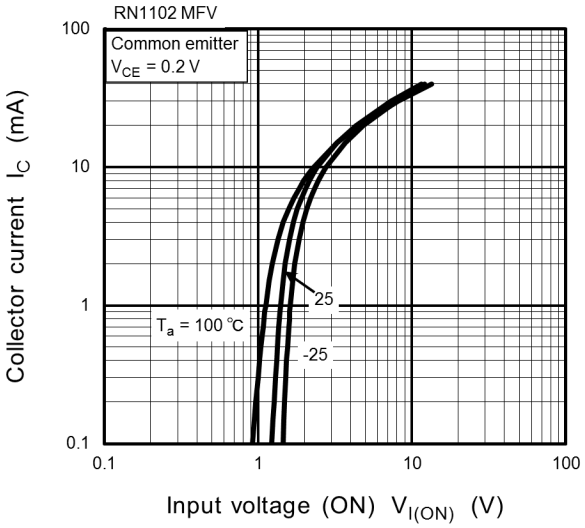
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cutoff current	RN1101MFV to RN1106MFV	I_{CBO}	V_{CB} = 50 V, I_E = 0 A	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0 A	—	—	500	
Emitter cutoff current	RN1101MFV	I_{EBO}	V_{EB} = 10 V, I_C = 0 A	0.82	—	1.52	mA
	RN1102MFV			0.38	—	0.71	
	RN1103MFV			0.17	—	0.33	
	RN1104MFV			0.082	—	0.15	
	RN1105MFV		V_{EB} = 5 V, I_C = 0 A	0.078	—	0.145	
	RN1106MFV			0.074	—	0.138	
DC current gain	RN1101MFV	h_{FE}	V_{CE} = 5 V, I_C = 10 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 mA, I_B = 0.5 mA	—	0.1	0.3	V
Input voltage (ON)	RN1101MFV	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 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 V, I_C = 0.1 mA	1.0	—	1.5	V
	RN1105MFV, RN1106MFV			0.5	—	0.8	
Collector output capacitance	RN1101MFV to RN1106MFV	C_{ob}	V_{CB} = 10 V, I_E = 0 A, f = 1 MH_z	—	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	

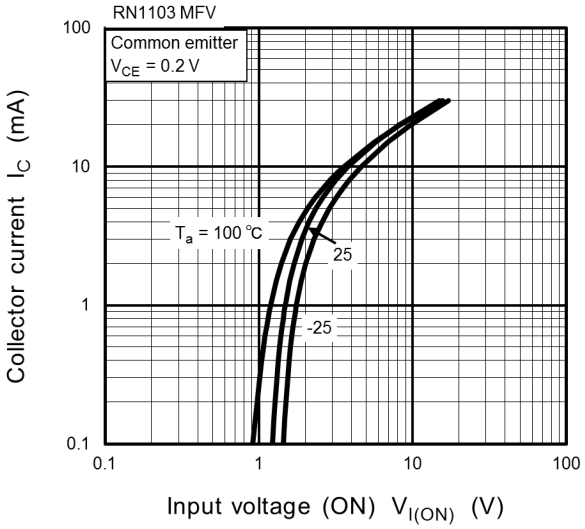
RN1101 MFV



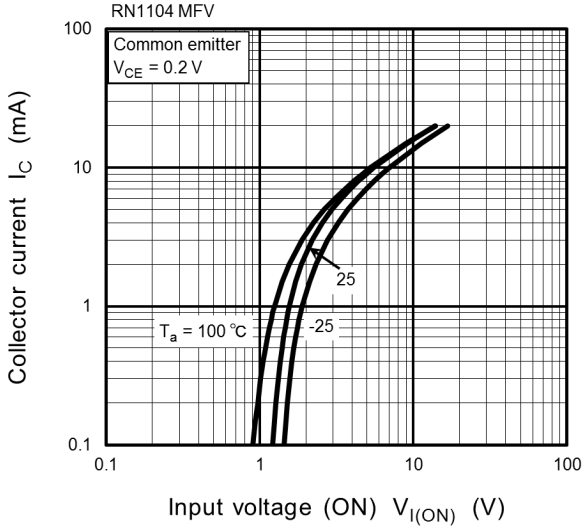
RN1102 MFV



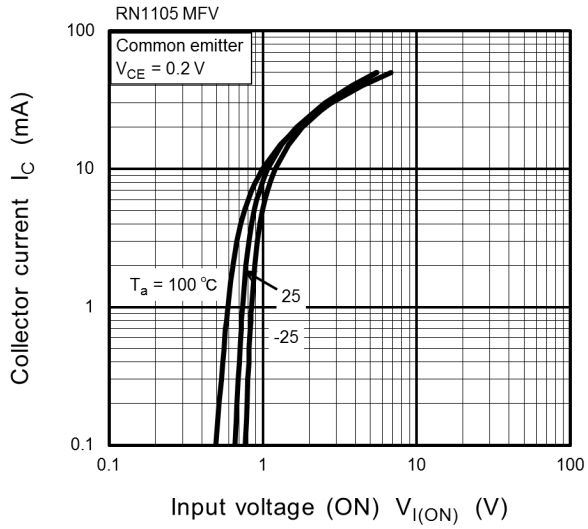
RN1103 MFV



RN1104 MFV



RN1105 MFV



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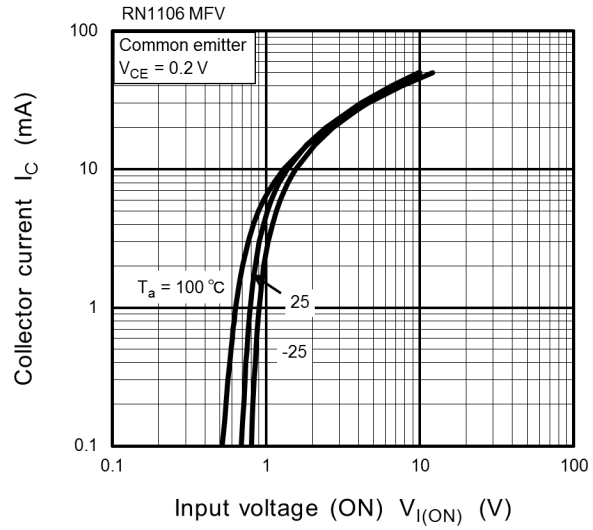

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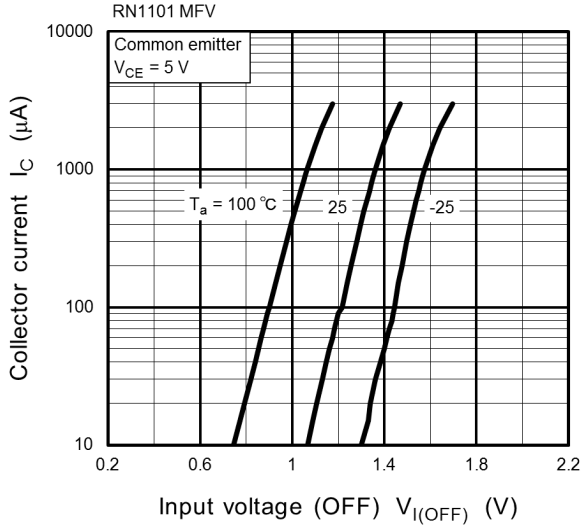

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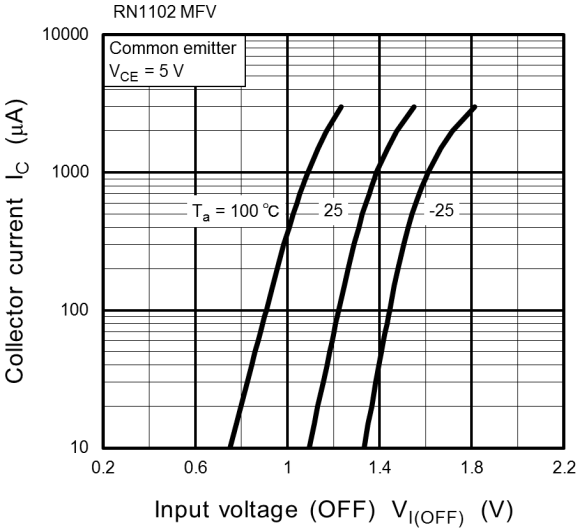

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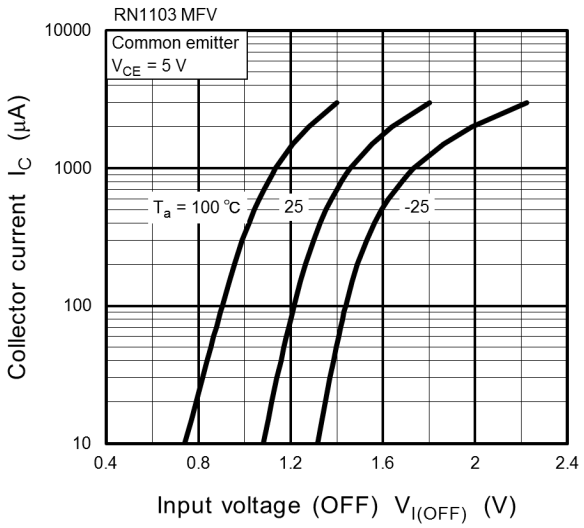

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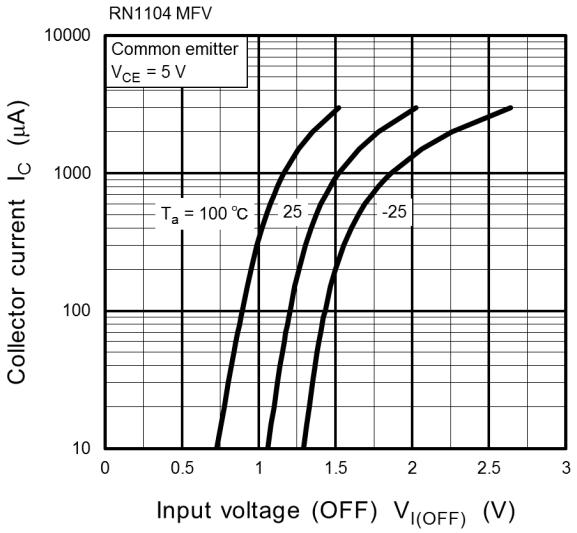

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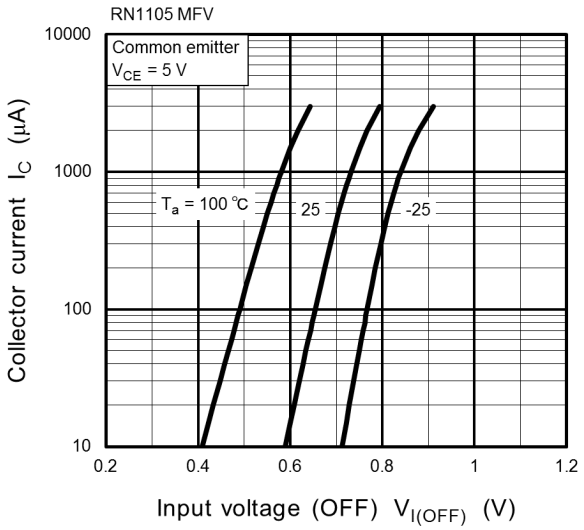

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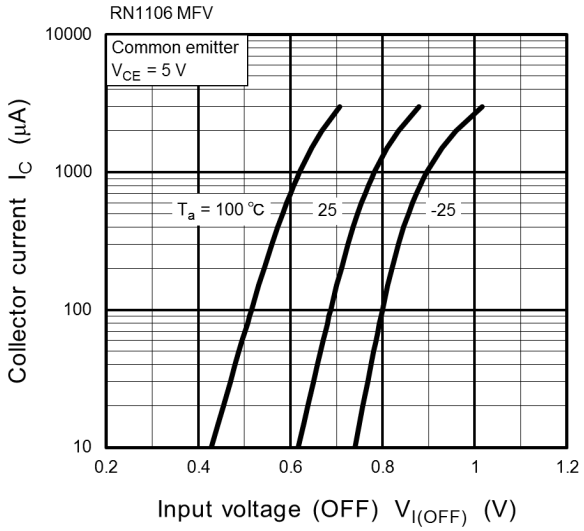
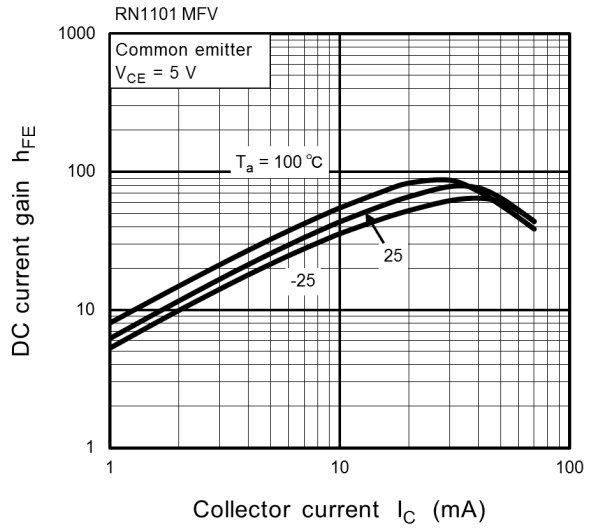
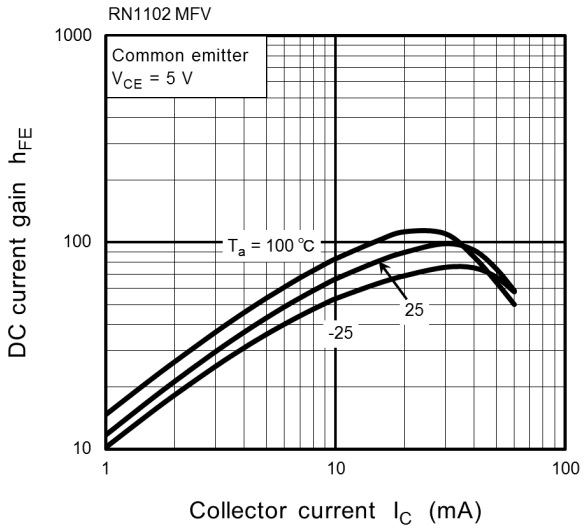
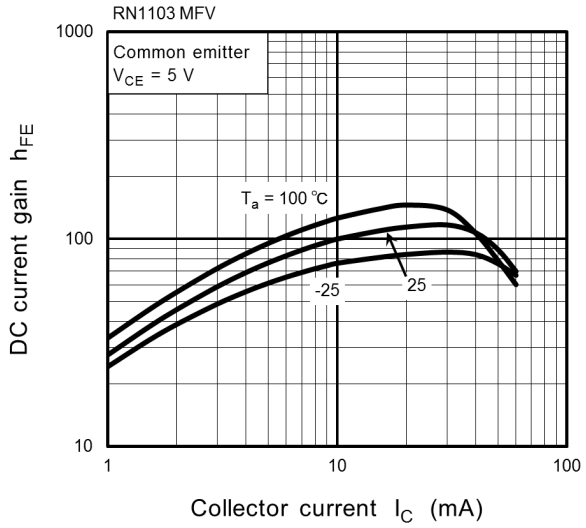
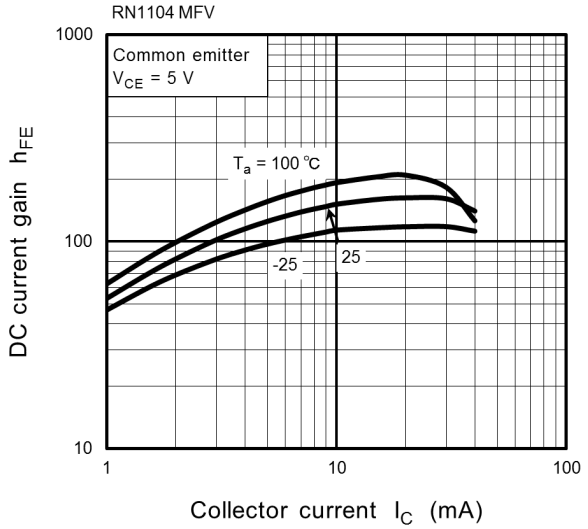
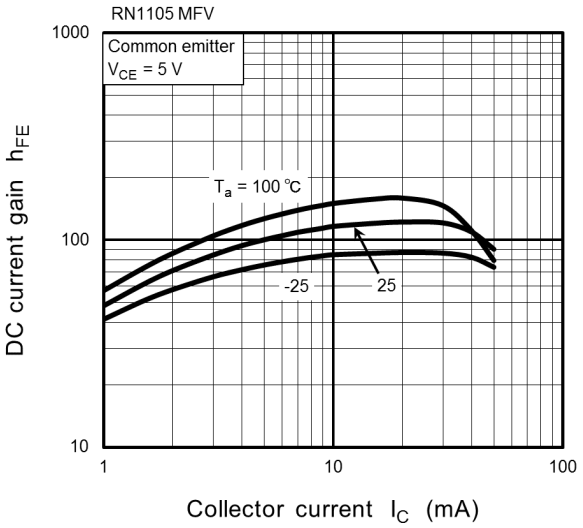


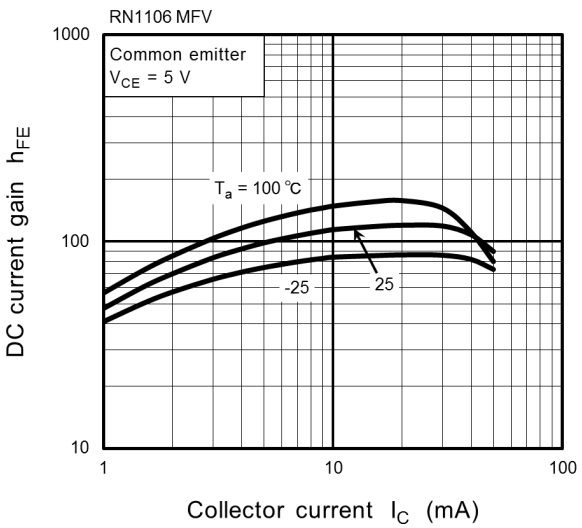

RN1101 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
25
-25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
1
10
100


RN1102 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

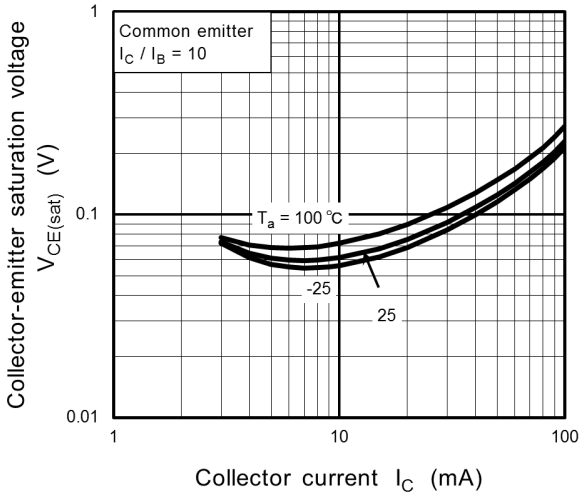

RN1103 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
-25
25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
10
100


RN1104 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

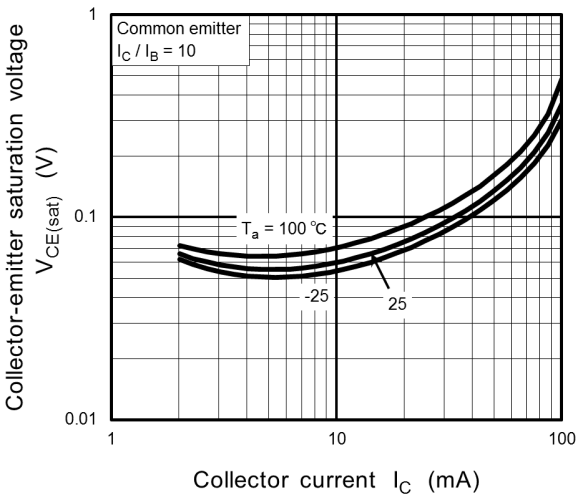

RN1105 MFV
Common emitter
V_{CE} = 5 V
T_a = 100 °C
-25
25
DC current gain h_{FE}
Collector current I_C (mA)
1000
100
10
1
10
100


RN1106 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

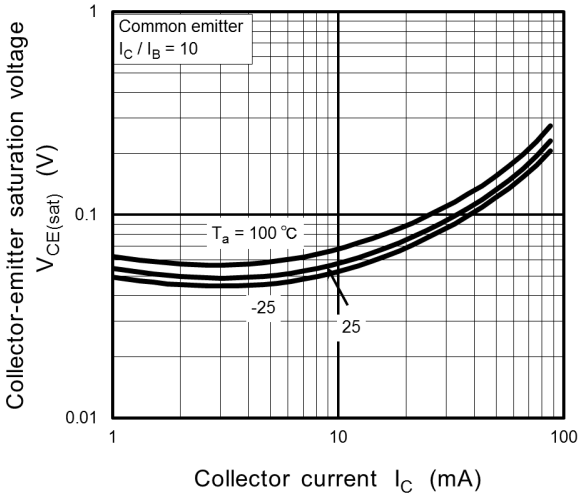
RN1101 MFV



RN1102 MFV



RN1103 MFV



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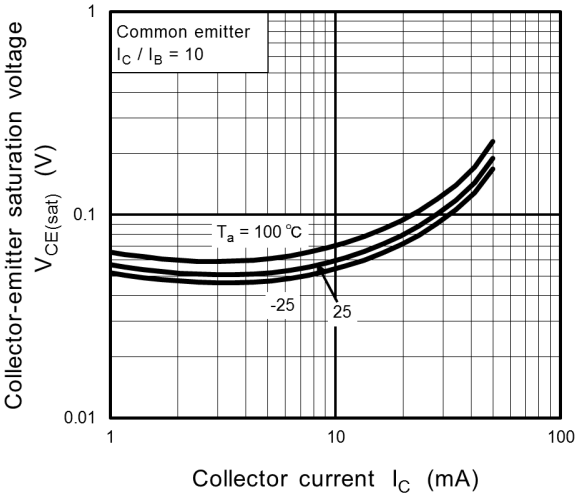

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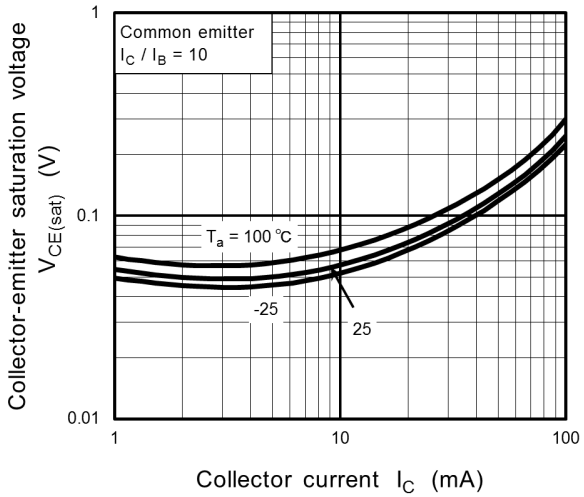

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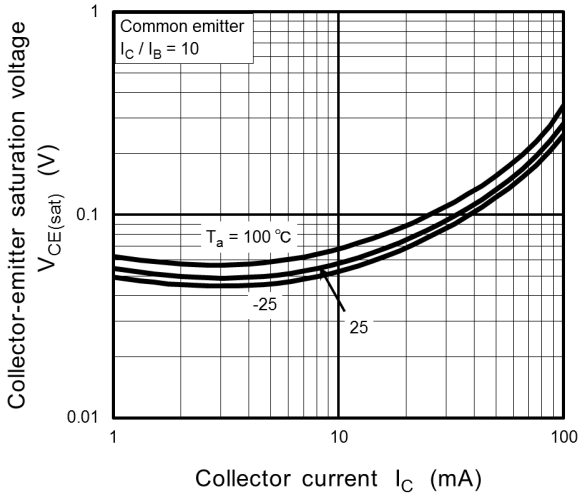

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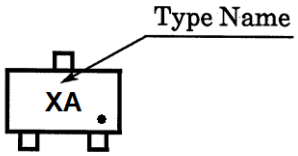
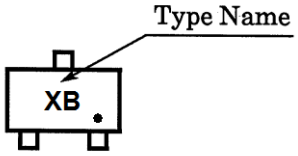
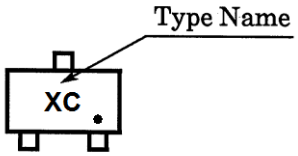
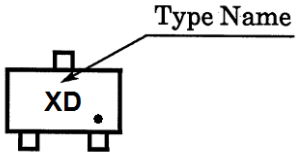
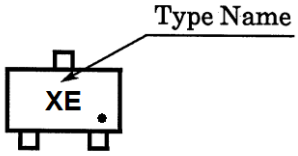
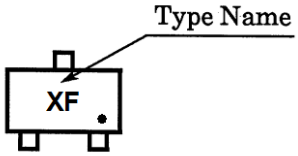
RN1101MFV	
RN1102MFV	
RN1103MFV	
RN1104MFV	
RN1105MFV	
RN1106MFV	

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