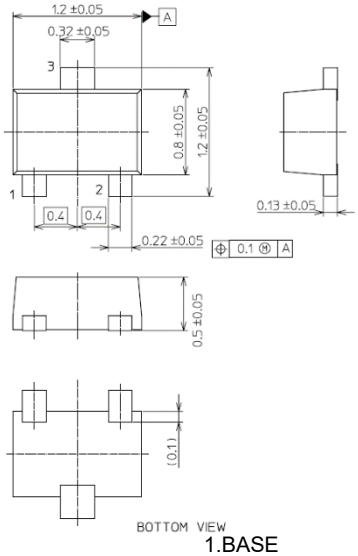
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN1114MFV, RN1115MFV, RN1116MFV, RN1117MFV, RN1118MFV

Switching Applications
Inverter Circuit Applications
Interface Circuit Applications
Driver Circuit Applications

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2114MFV to RN2118MFV

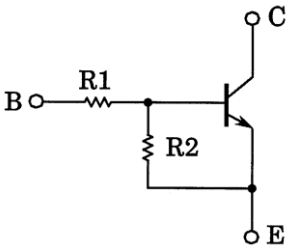
Unit: mm



VESM	1.BASE 2.EMITTER 3.COLLECTOR
JEDEC	—
JEITA	—
TOSHIBA	1-1Q1S

Weight: 1.5 mg (typ.)

Equivalent Circuit and Bias Resister Values



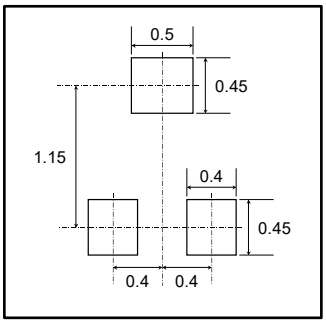
Type No.	R1 (kΩ)	R2 (kΩ)
RN1114MFV	1	10
RN1115MFV	2.2	10
RN1116MFV	4.7	10
RN1117MFV	10	4.7
RN1118MFV	47	10

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1114MFV to 1118MFV	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1114MFV	V_{EBO}	5	V
	RN1115MFV		6	
	RN1116MFV		7	
	RN1117MFV		15	
	RN1118MFV		25	
Collector current	RN1114MFV to 111M8FV	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

Land Pattern Dimensions
(for reference only)

Unit: mm



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).

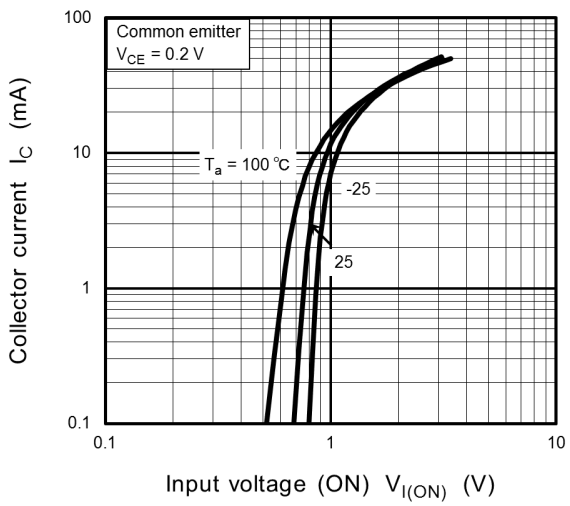
Note 1: Mounted on FR4 board (25.4 mm × 25.4 mm × 1.6 mm)

Start of commercial production
2005-09

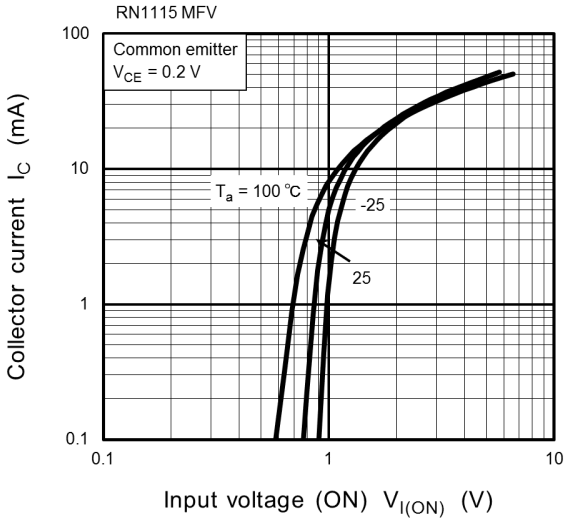
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1114MFV to 1118MFV	I_{CBO}	V_{CB} = 50V, I_E = 0A	—	—	100	nA
		I_{CEO}	V_{CE} = 50V, I_B = 0A	—	—	500	
Emitter cut-off current	RN1114MFV	I_{EBO}	V_{EB} = 5V, I_C = 0A	0.35	—	0.65	mA
	RN1115MFV		V_{EB} = 6V, I_C = 0A	0.37	—	0.71	
	RN1116MFV		V_{EB} = 7V, I_C = 0A	0.36	—	0.68	
	RN1117MFV		V_{EB} = 15V, I_C = 0A	0.78	—	1.46	
	RN1118MFV		V_{EB} = 25V, I_C = 0A	0.33	—	0.63	
DC current gain	RN1114MFV to 16MFV, 18MFV	h_{FE}	V_{CE} = 5V, I_C = 10mA	50	—	—	—
	RN1117MFV			30	—	—	
Collector-emitter saturation voltage	RN1114MFV to 1118MFV	$V_{CE\ (sat)}$	I_C = 5mA, I_B = 0.5mA	—	0.1	0.3	V
Input voltage (ON)	RN1114MFV	$V_{I\ (ON)}$	V_{CE} = 0.2V, I_C = 5mA	0.6	—	2.0	V
	RN1115MFV			0.7	—	2.5	
	RN1116MFV			0.8	—	2.5	
	RN1117MFV			1.5	—	3.5	
	RN1118MFV			2.5	—	10.0	
Input voltage (OFF)	RN1114MFV	$V_{I\ (OFF)}$	V_{CE} = 5V, I_C = 0.1mA	0.3	—	0.9	V
	RN1115MFV			0.3	—	1.0	
	RN1116MFV			0.3	—	1.1	
	RN1117MFV			0.3	—	2.3	
	RN1118MFV			0.5	—	5.7	
Transition frequency	RN1114MFV to 1118MFV	f_T	V_{CE} = 10V, I_C = 5mA	—	250	—	MH_Z
Collector Output capacitance	RN1114MFV to 1118MFV	C_{ob}	V_{CB} = 10V, I_E = 0A, f = $1MH_Z$	—	0.7	—	pF
Input resistor	RN1114MFV	R1	—	0.7	1.0	1.3	kΩ
	RN1115MFV			1.54	2.2	2.86	
	RN1116MFV			3.29	4.7	6.11	
	RN1117MFV			7	10	13	
	RN1118MFV			32.9	47	61.1	
Resistor ratio	RN1114MFV	R1/R2	—	—	0.1	—	—
	RN1115MFV			—	0.22	—	
	RN1116MFV			—	0.47	—	
	RN1117MFV			—	2.13	—	
	RN1118MFV			—	4.7	—	

RN1114 MFV



RN1115 MFV



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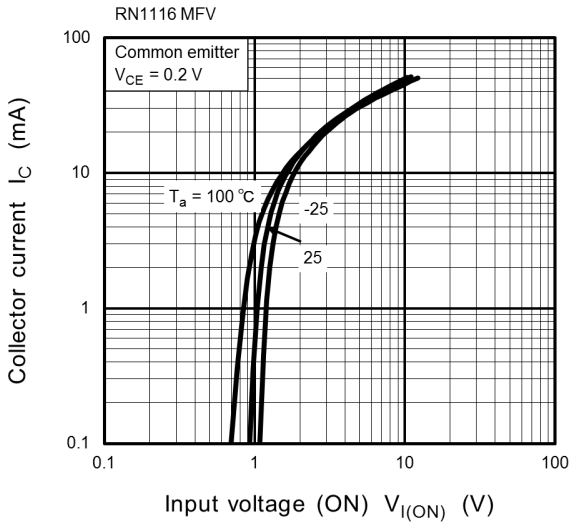
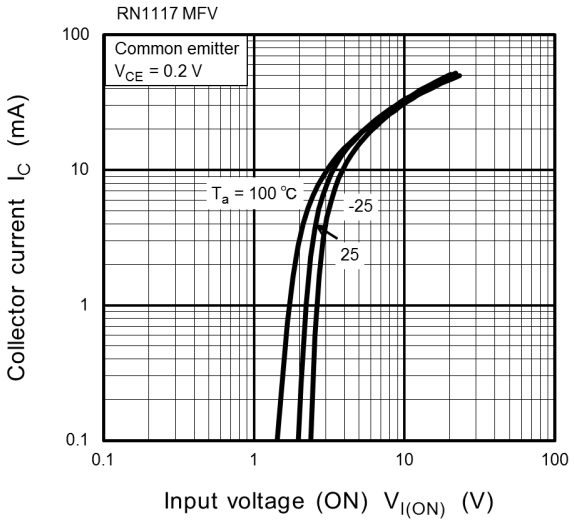
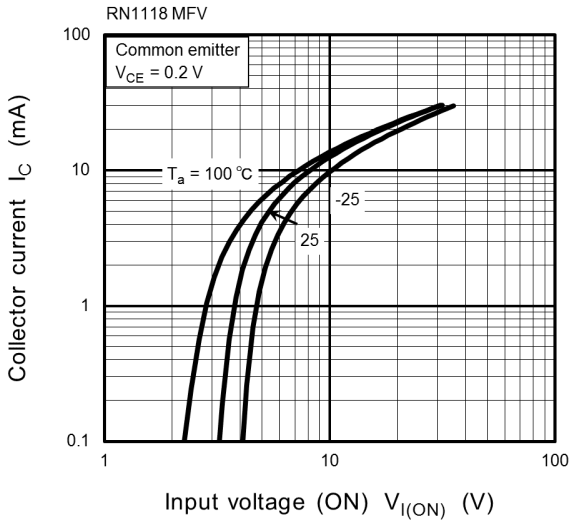


RN1117 MFV



RN1118 MFV



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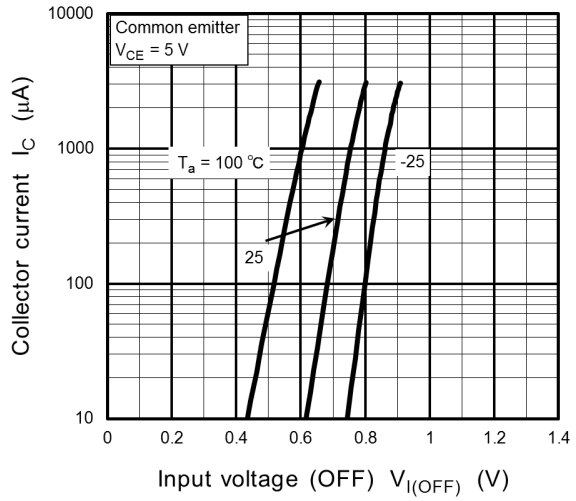

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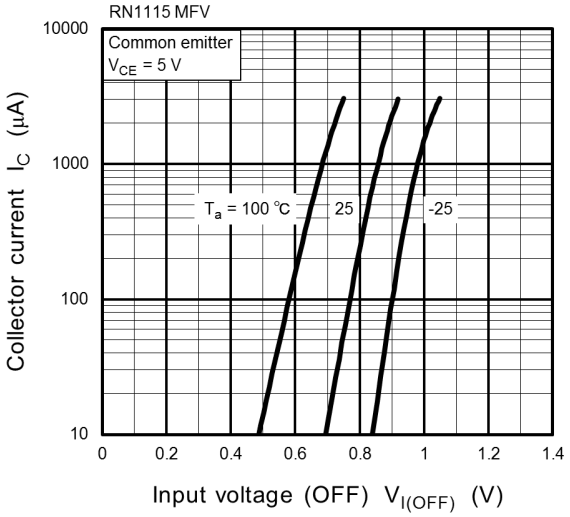

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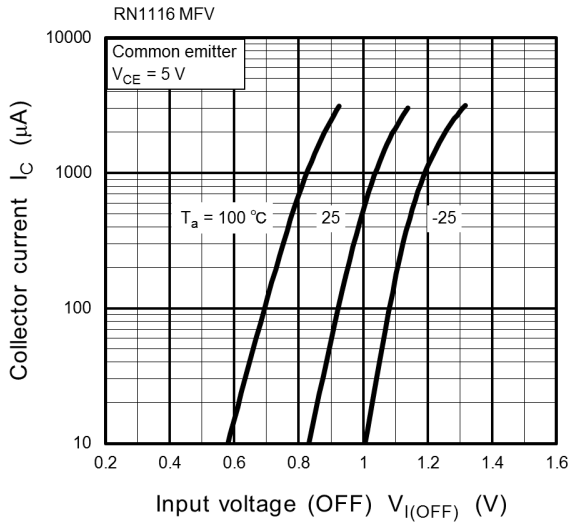

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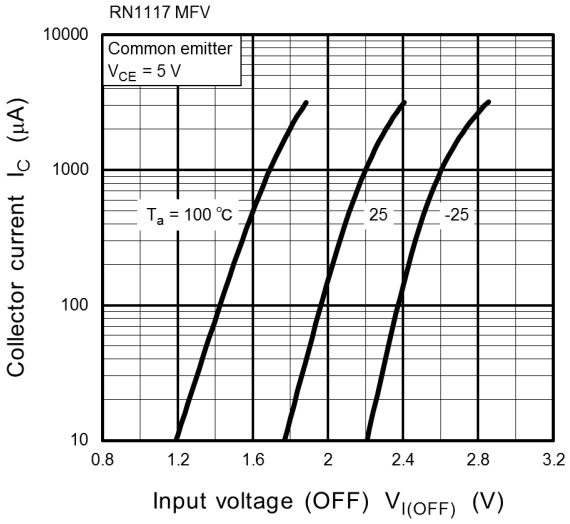

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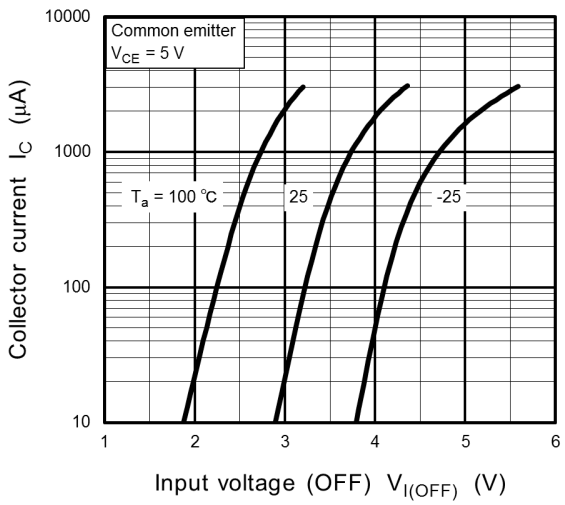

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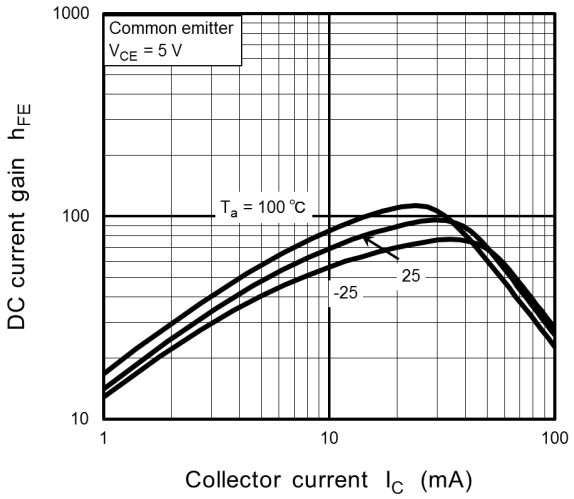

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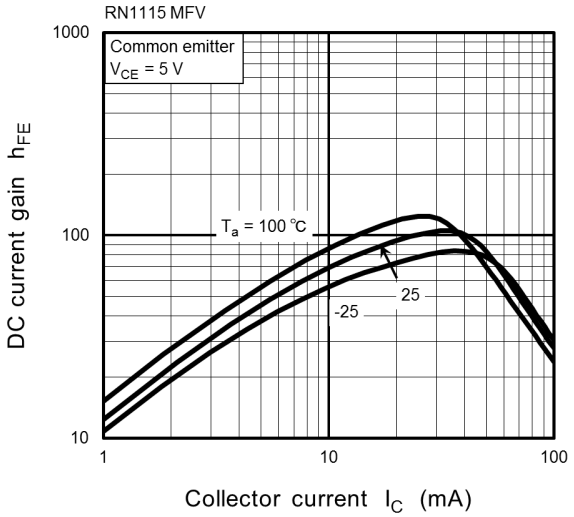

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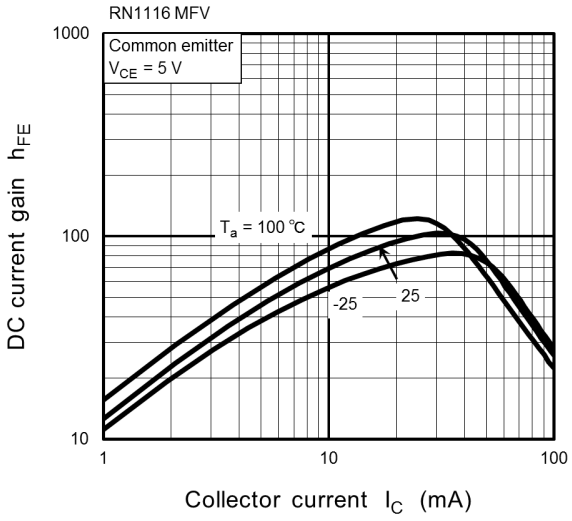

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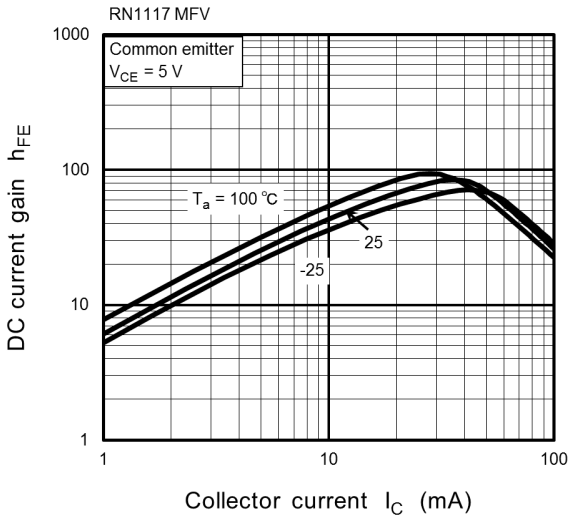

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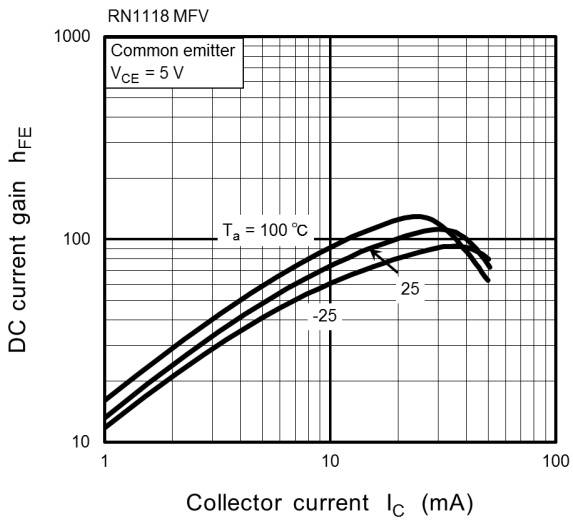

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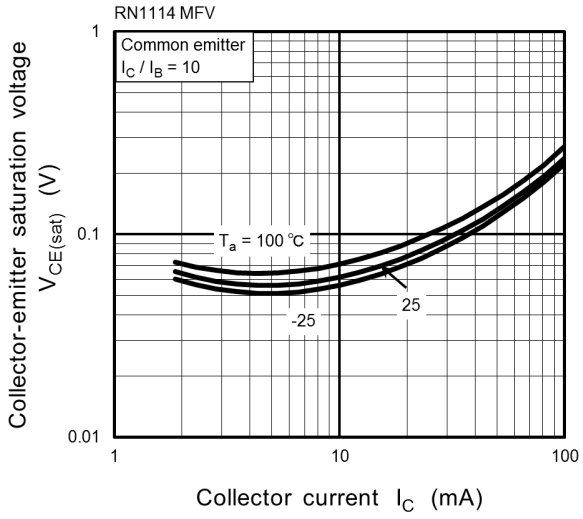

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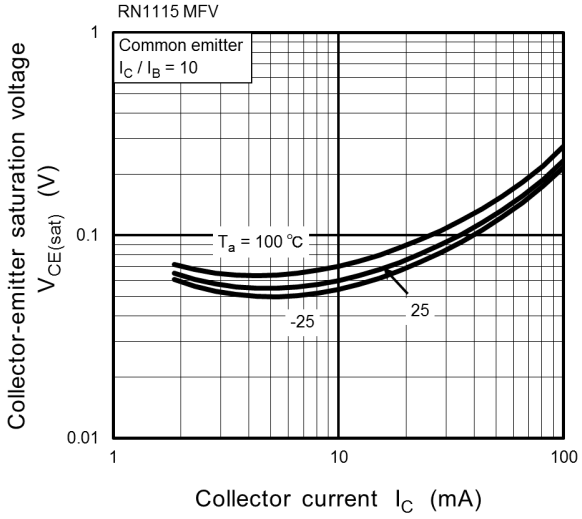

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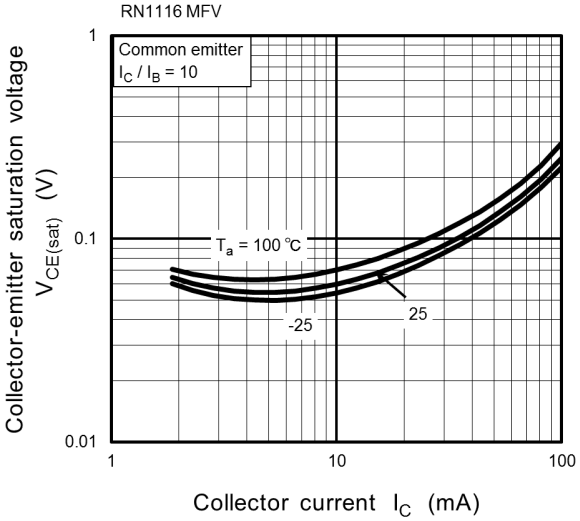

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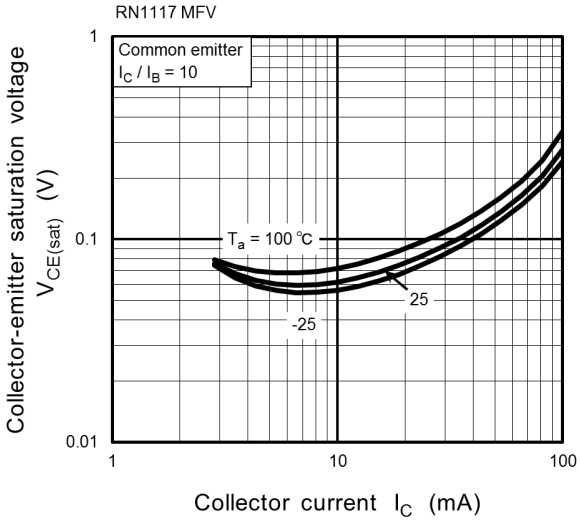

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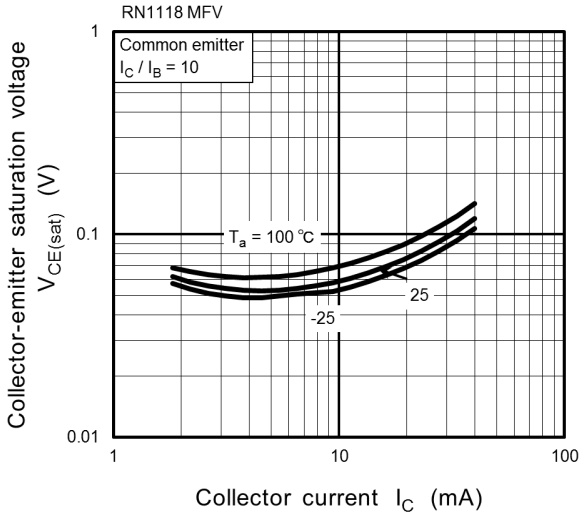
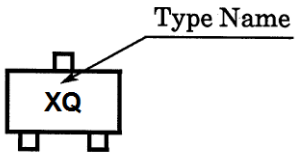
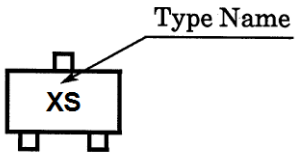
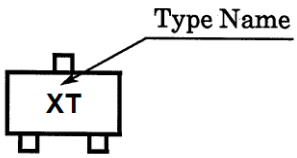
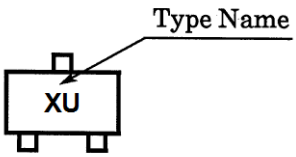
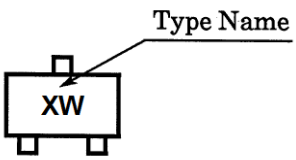


Marking

Type Name	Marking
RN1114MFV	
RN1115MFV	
RN1116MFV	
RN1117MFV	
RN1118MFV	

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