

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

# RN2114MFV, RN2115MFV, RN2116MFV RN2117MFV, RN2118MFV

## Switching Applications

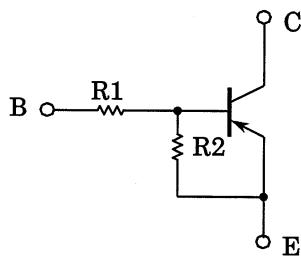
## Inverter Circuit Applications

## Interface Circuit Applications

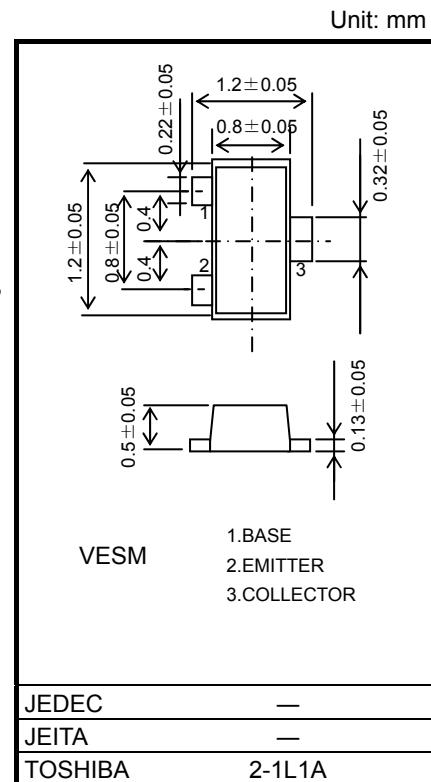
## Driver Circuit Applications

- 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 RN1114MFV to RN1118MFV

## Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2114MFV	1	10
RN2115MFV	2.2	10
RN2116MFV	4.7	10
RN2117MFV	10	4.7
RN2118MFV	47	10



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

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2114MFV to RN2118MFV	$V_{CBO}$	-50	V
Collector-emitter voltage		$V_{CEO}$	-50	V
Emitter-base voltage	RN2114MFV	$V_{EBO}$	-5	V
	RN2115MFV		-6	
	RN2116MFV		-7	
	RN2117MFV		-15	
	RN2118MFV		-25	
Collector current	$I_C$	-100	mA	
Collector power dissipation	RN2114MFV to RN2118MFV	$P_C$ (Note1)	150	mW
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-55 to 150	°C

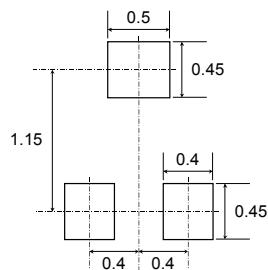
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

Note1: Mounted on FR4 board (25.4 mm × 25.4 mm × 1.6mm)

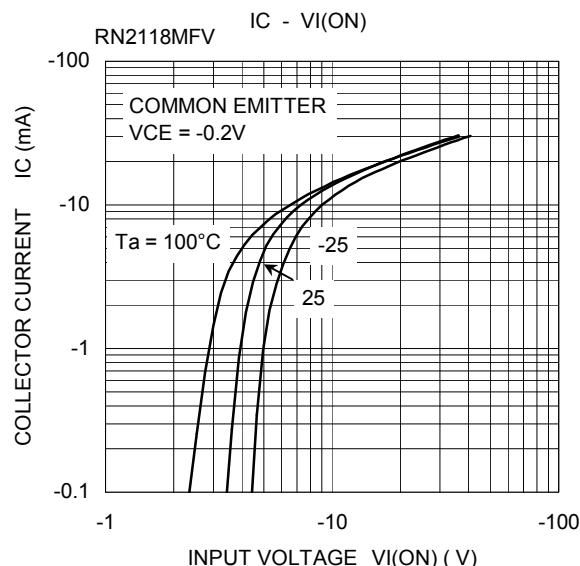
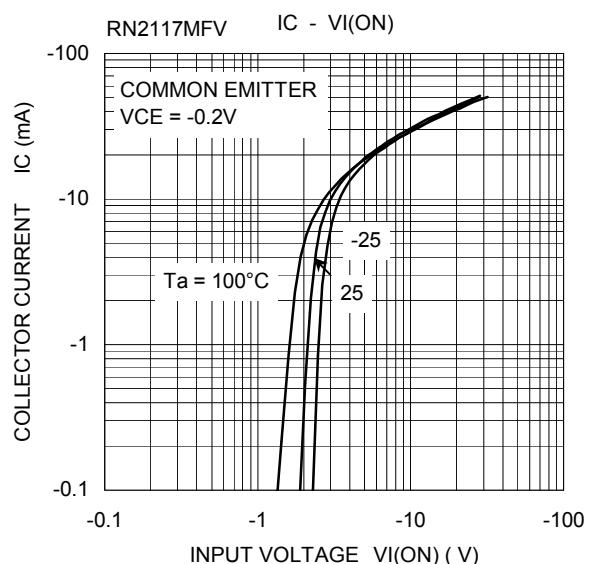
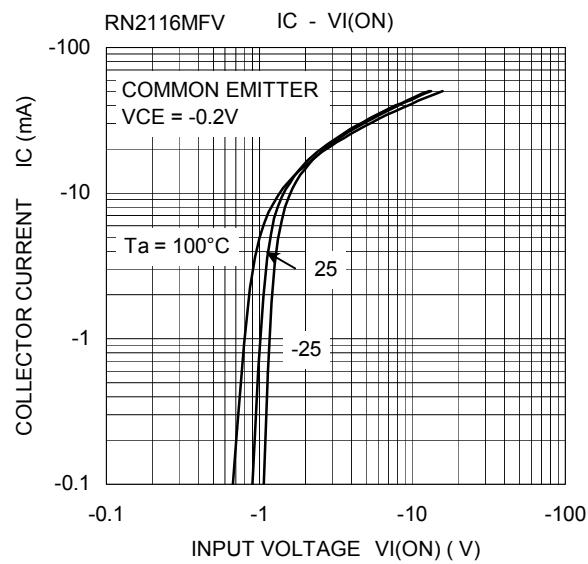
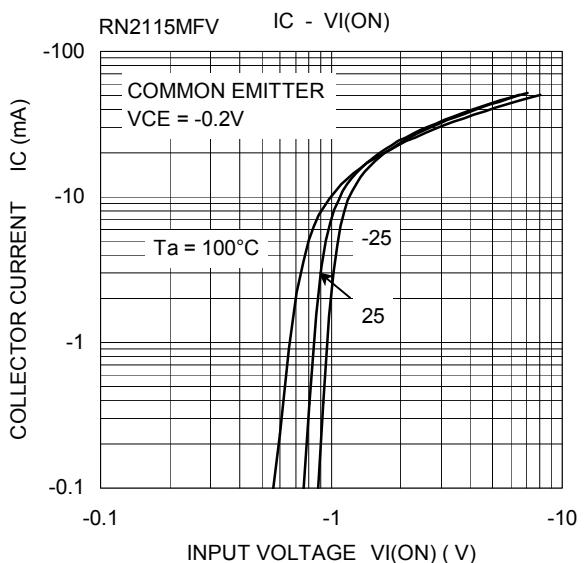
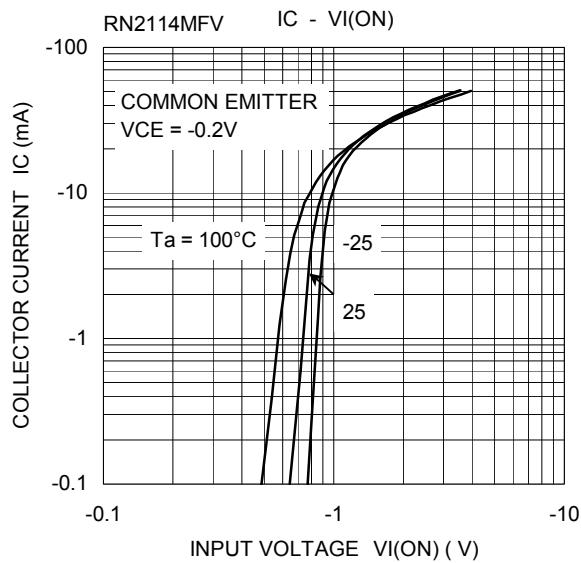
Start of commercial production  
2005-09

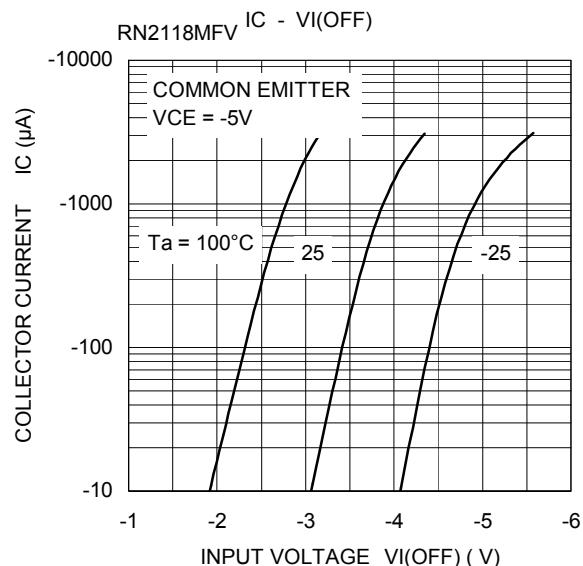
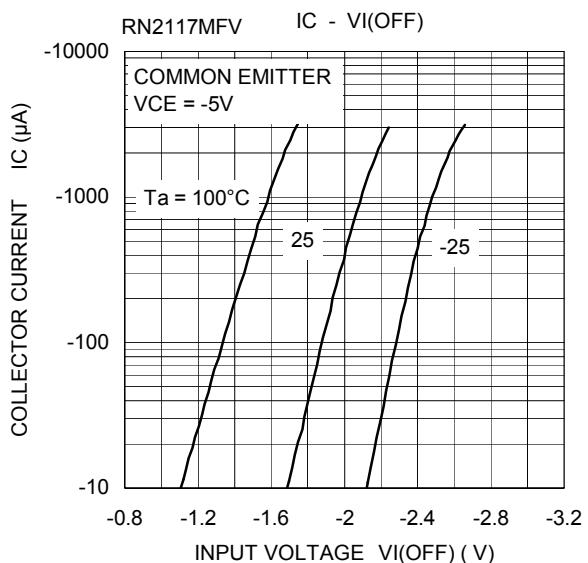
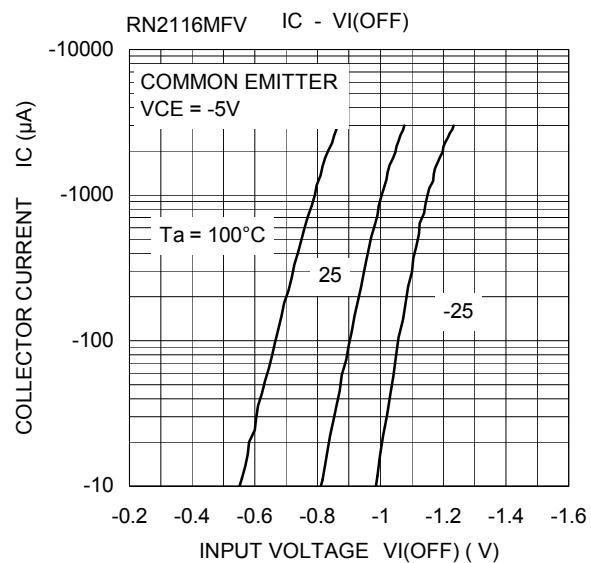
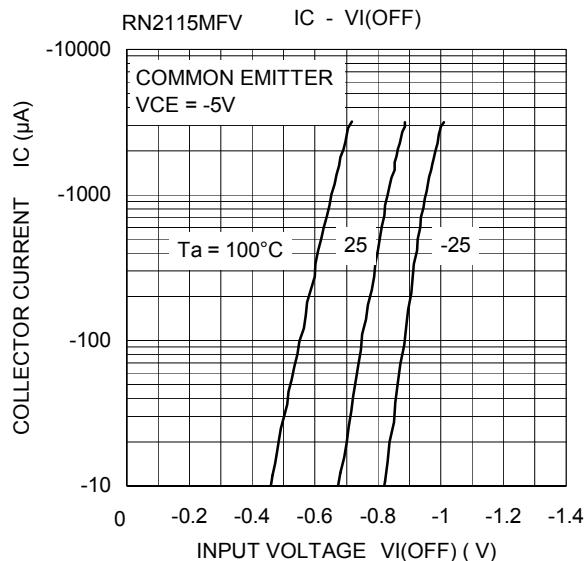
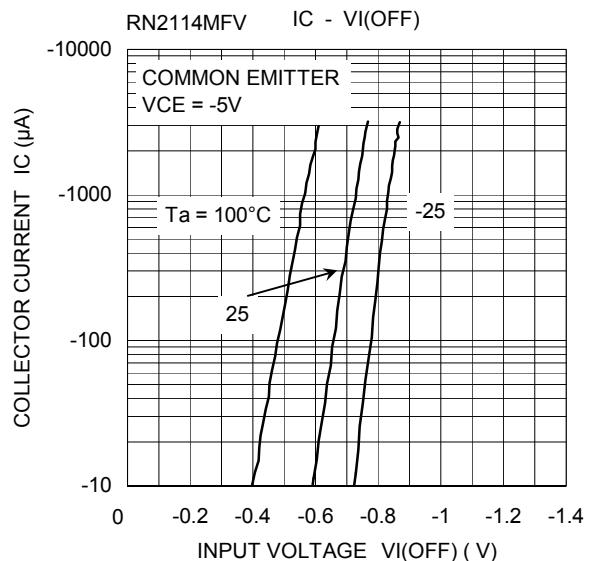
## Land Pattern Example unit: mm

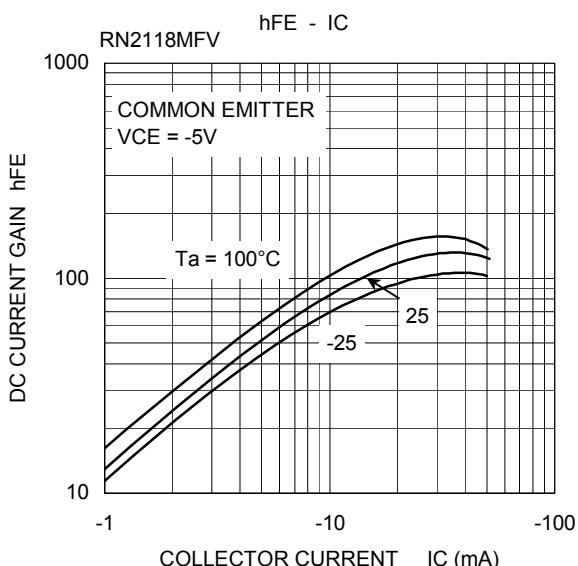
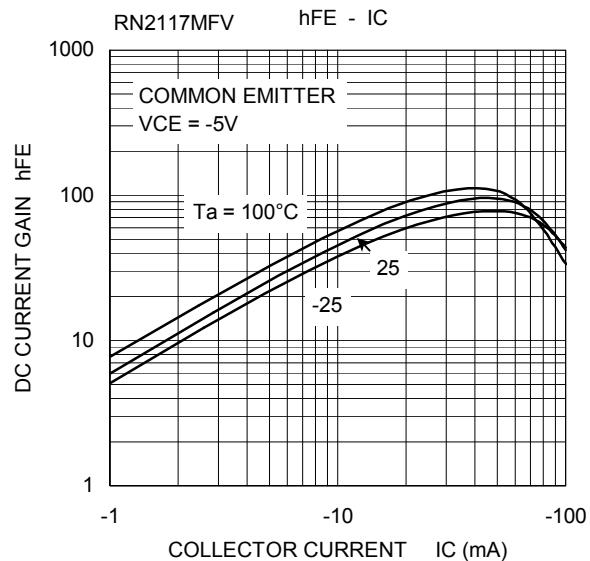
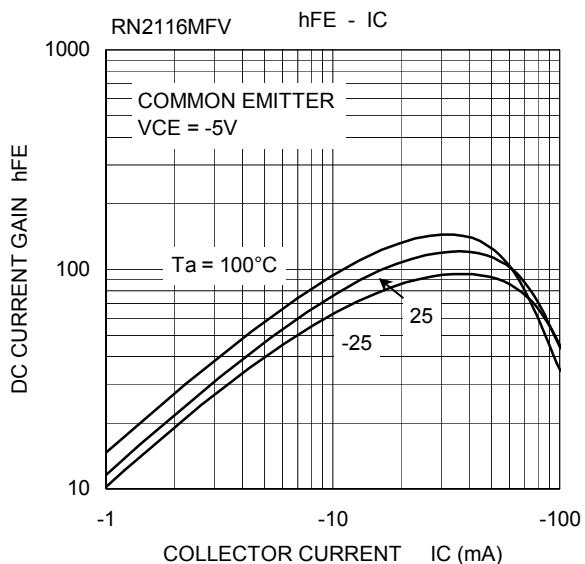
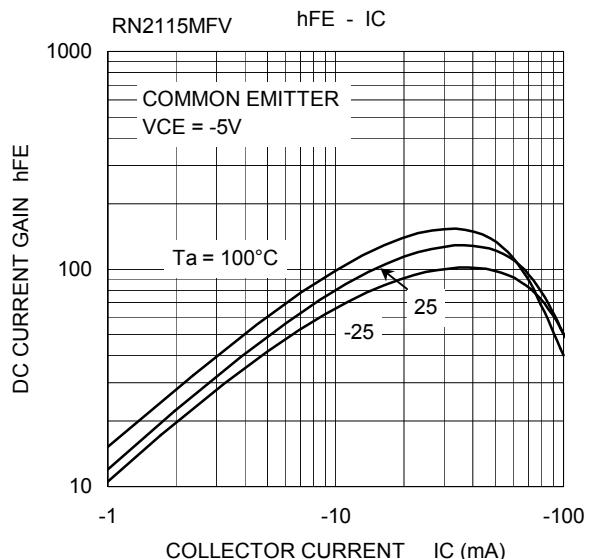
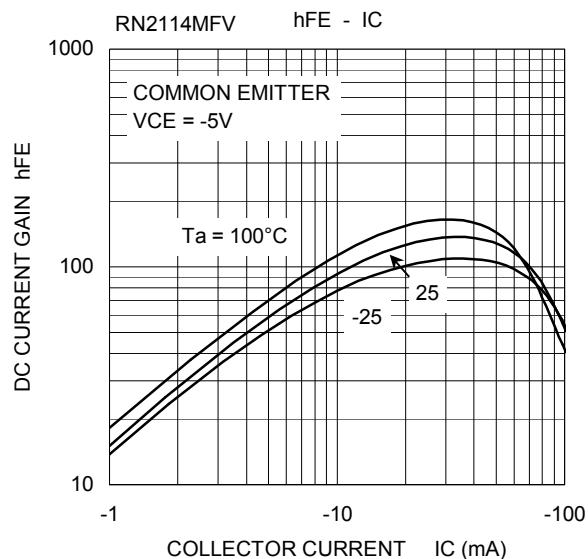


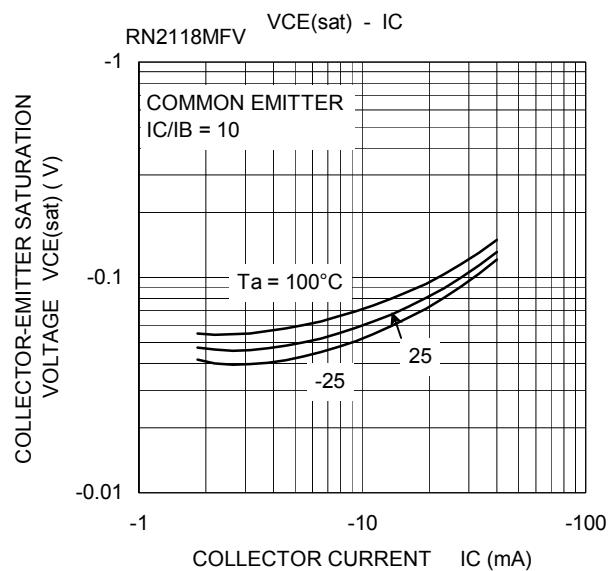
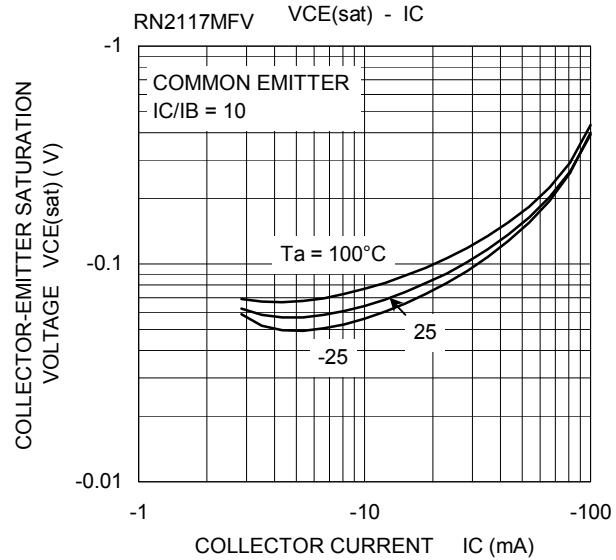
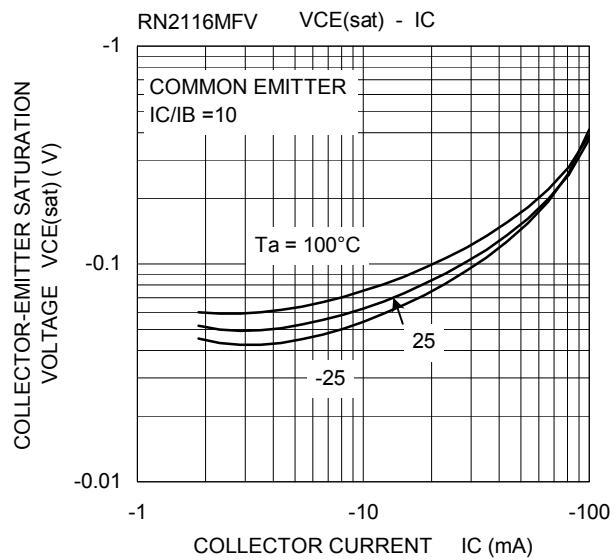
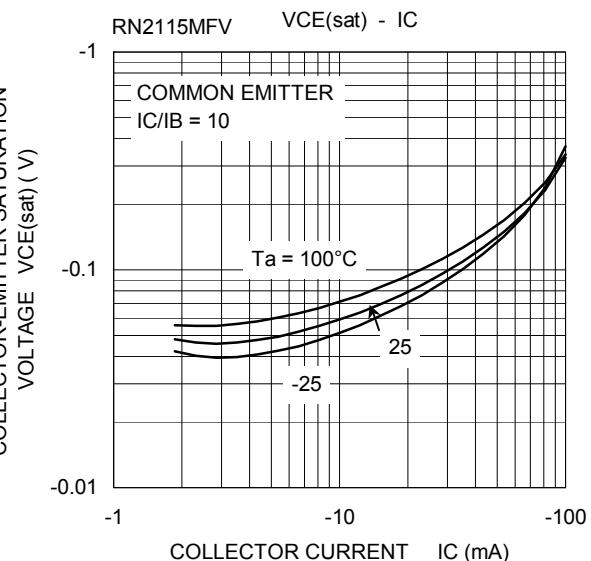
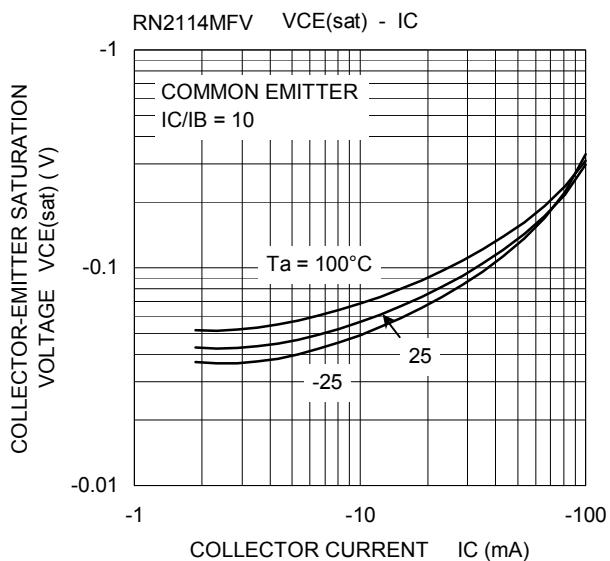
## Electrical Characteristics (Ta = 25°C)

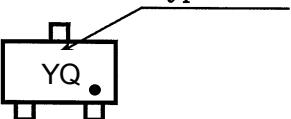
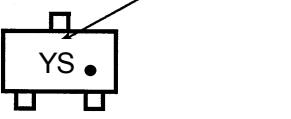
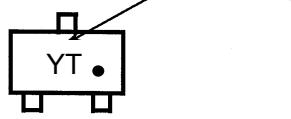
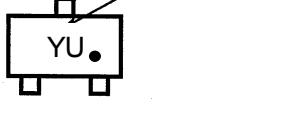
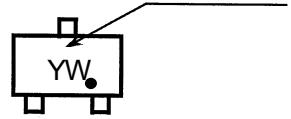
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2114MFV to 2118MFV	I <sub>CBO</sub>	—	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0	—	—	-100	nA
		I <sub>CEO</sub>		V <sub>CE</sub> = -50V, I <sub>B</sub> = 0	—	—	-500	
Emitter cut-off current	RN2114MFV	I <sub>EBO</sub>	—	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0	-0.35	—	-0.65	mA
	RN2115MFV			V <sub>EB</sub> = -6V, I <sub>C</sub> = 0	-0.37	—	-0.71	
	RN2116MFV			V <sub>EB</sub> = -7V, I <sub>C</sub> = 0	-0.36	—	-0.68	
	RN2117MFV			V <sub>EB</sub> = -15V, I <sub>C</sub> = 0	-0.78	—	-1.46	
	RN2118MFV			V <sub>EB</sub> = -25V, I <sub>C</sub> = 0	-0.33	—	-0.63	
DC current gain	RN2114MFV to 16MFV, 18MFV	h <sub>FE</sub>	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -10mA	50	—	—	
	RN2117MFV				30	—	—	
Collector-emitter saturation voltage	RN2114MFV to 2118MFV	V <sub>CE(sat)</sub>	—	I <sub>C</sub> = -5mA, I <sub>B</sub> = -0.5mA	—	-0.1	-0.3	V
Input voltage (ON)	RN2114MFV	V <sub>I</sub> (ON)	—	V <sub>CE</sub> = -0.2V, I <sub>C</sub> = -5mA	-0.5	—	-2.0	V
	RN2115MFV				-0.6	—	-2.5	
	RN2116MFV				-0.7	—	-2.5	
	RN2117MFV				-1.5	—	-3.5	
	RN2118MFV				-2.5	—	-10.0	
Input voltage (OFF)	RN2114MFV	V <sub>I</sub> (OFF)	—	V <sub>CE</sub> = -5V, I <sub>C</sub> = -0.1mA	-0.3	—	-0.9	V
	RN2115MFV				-0.3	—	-1.0	
	RN2116MFV				-0.3	—	-1.1	
	RN2117MFV				-0.3	—	-3.0	
	RN2118MFV				-0.5	—	-5.7	
Collector output capacitance	RN2114MFV to 2118MFV	C <sub>ob</sub>	—	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0, f = 1MHz	—	0.9	—	pF
Input resistor	RN2114MFV	R <sub>1</sub>	—	—	0.7	1.0	1.3	kΩ
	RN2115MFV				1.54	2.2	2.86	
	RN2116MFV				3.29	4.7	6.11	
	RN2117MFV				7	10	13	
	RN2118MFV				32.9	47	61.1	
Resistor ratio	RN2114MFV	R <sub>1/R2</sub>	—	—	—	0.1	—	
	RN2115MFV				—	0.22	—	
	RN2116MFV				—	0.47	—	
	RN2117MFV				—	2.13	—	
	RN2118MFV				—	4.7	—	









Type Name	Marking
RN2114MFV	 Type Name
RN2115MFV	 Type Name
RN2116MFV	 Type Name
RN2117MFV	 Type Name
RN2118MFV	 Type Name

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