Unit: mm



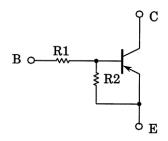
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)(Bias Resistor built-in Transistor)

# 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 the 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

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

Weight: 1.5 mg (typ.)

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

Characteristic		Symbol	Rating	Unit	
Collector-base voltage	RN2114MFV	Vсво	-50	V	
Collector-emitter voltage	to RN2118MFV	VCEO	-50	V	
Emitter-base voltage	RN2114MFV		-5		
	RN2115MFV		-6		
	RN2116MFV	VEBO	-7	V	
	RN2117MFV		-15		
	RN2118MFV		-25		
Collector current		Ic	-100	mA	
Collector power dissipation	RN2114MFV	Pc(Note1)	150	mW	
Junction temperature	to RN2118MFV	Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	-55 to 150	°C	

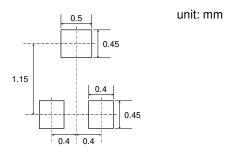
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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  $\times$  25.4 mm  $\times$  1.6 mm)

Start of commercial production 2005-02



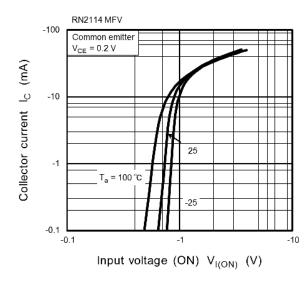
# **Land Pattern Dimensions (for reference only)**

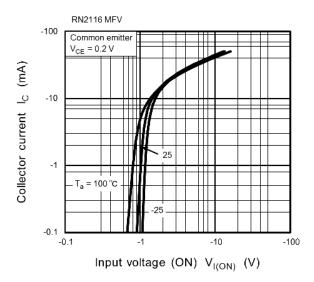


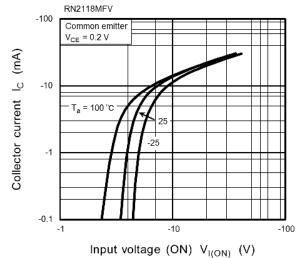
## **Electrical Characteristics (Ta = 25°C)**

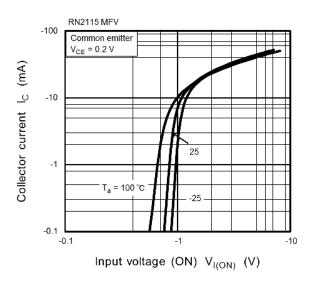
Characteristic		Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	DN0114MEV/+0 0110MEV/	I <sub>CBO</sub>	V <sub>CB</sub> = -50 V, I <sub>E</sub> = 0 A	_	_	-100	nΛ
	RN2114MFV to 2118MFV		$V_{CE} = -50 \text{ V}, I_{B} = 0 \text{ A}$	_	_	-500	nA
Emitter cut-off current	RN2114MFV	lebo	$V_{EB} = -5 \text{ V}, I_{C} = 0 \text{ A}$	-0.35	_	-0.65	mA
	RN2115MFV		$V_{EB} = -6 \text{ V}, I_{C} = 0 \text{ A}$	-0.37	_	-0.71	
	RN2116MFV		$V_{EB} = -7 \text{ V}, I_{C} = 0 \text{ A}$	-0.36	_	-0.68	
	RN2117MFV		$V_{EB} = -15 \text{ V}, I_{C} = 0 \text{ A}$	-0.78	_	-1.46	
	RN2118MFV		$V_{EB} = -25 \text{ V}, I_{C} = 0 \text{ A}$	-0.33	_	-0.63	
DC current gain	RN2114MFV to 16MFV, 18MFV	hFE	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	50	_	_	_
	RN2117MFV			30	_	_	
Collector-emitter saturation voltage	RN2114MFV to 2118MFV	VCE(sat)	$I_C = -5 \text{ mA}, I_B = -0.5 \text{ mA}$	_	-0.1	-0.3	V
	RN2114MFV			-0.5	_	-2.0	V
	RN2115MFV	VI (ON)		-0.6	_	-2.5	
Input voltage (ON)	RN2116MFV		$V_{CE} = -0.2 \text{ V}, I_{C} = -5 \text{ mA}$	-0.7	_	-2.5	
	RN2117MFV			-1.5	_	-3.5	
	RN2118MFV			-2.5	_	-10.0	
	RN2114MFV	VI (OFF)	$V_{CE} = -5 \text{ V}, I_{C} = -0.1 \text{ mA}$	-0.3	_	-0.9	V
	RN2115MFV			-0.3	_	-1.0	
Input voltage (OFF)	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> = -10 V, I <sub>E</sub> = 0 A, f = 1 MHz	_	0.9	_	pF
	RN2114MFV	R1	_	0.7	1.0	1.3	
	RN2115MFV			1.54	2.2	2.86	
Input resistor	RN2116MFV			3.29	4.7	6.11	kΩ
	RN2117MFV			7.0	10.0	13.0	
	RN2118MFV			32.9	47	61.1	
Resistor ratio	RN2114MFV	R1/R2	_	_	0.1	_	
	RN2115MFV			_	0.22	_	
	RN2116MFV			_	0.47	_	_
	RN2117MFV			_	2.13	_	
	RN2118MFV			_	4.7	_	

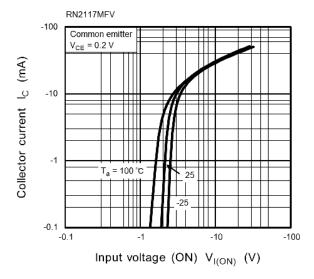




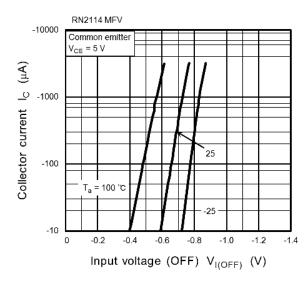


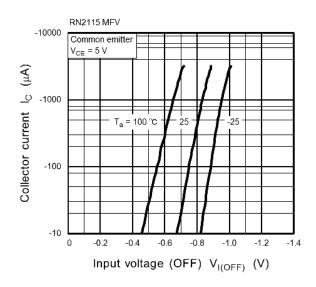


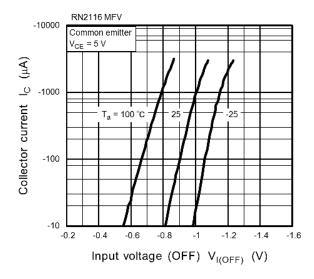


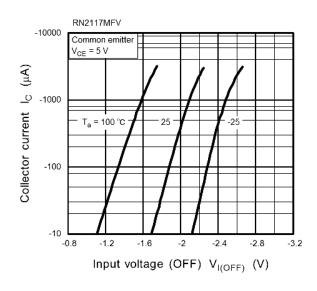


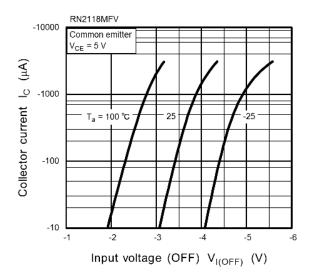




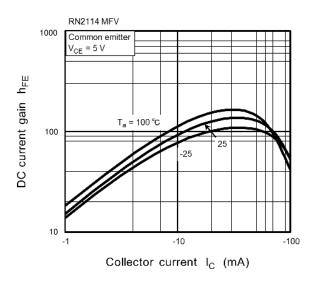


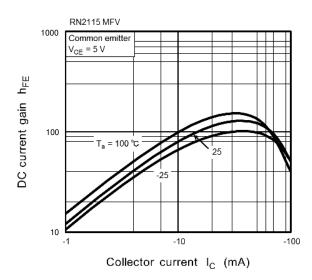


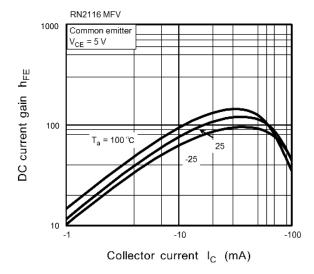


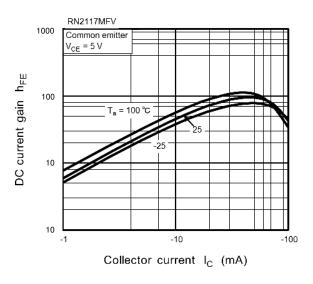


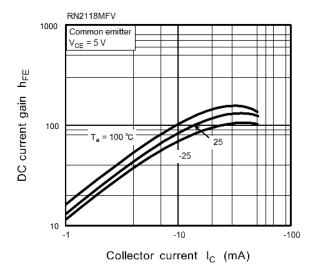




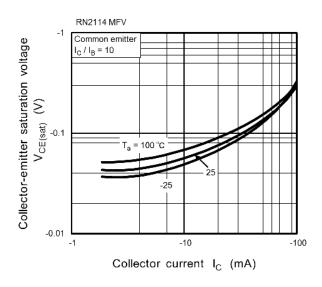


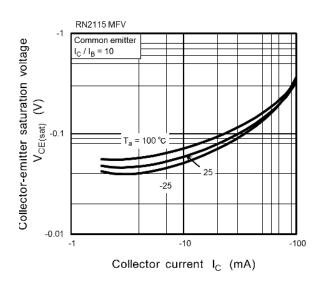


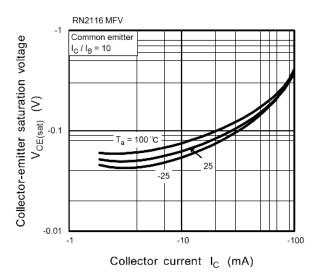


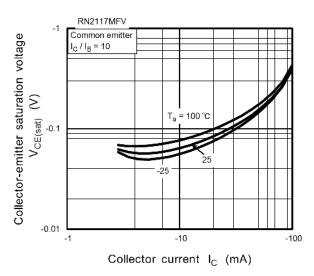


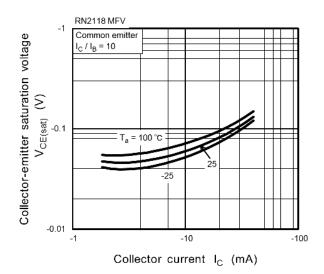














# Marking

Type Name	Marking
RN2114MFV	Type Name YQ
RN2115MFV	Type Name  YS •
RN2116MFV	Type Name  YT
RN2117MFV	Type Name
RN2118MFV	Type Name YW



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