

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

RN2114MFV, RN2115MFV, RN2116MFV RN2117MFV, RN2118MFV

Switching Applications

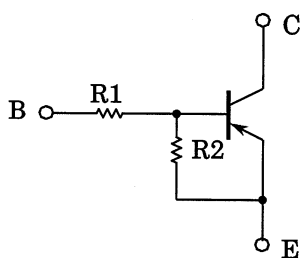
Inverter Circuit Applications

Interface Circuit Applications

Driver Circuit Applications

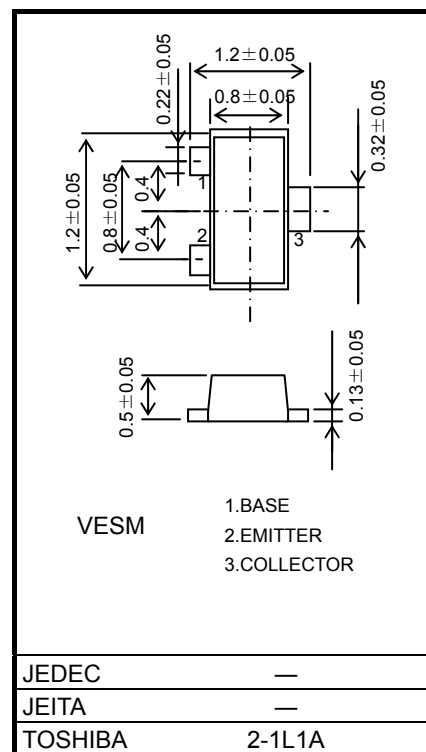
- Ultra-small package, suited to very high density mounting
- Incorporating a bias resistor into the transistor reduces the number of parts, so enabling the manufacture of ever more compact equipment and lowering assembly cost.
- A wide range of resistor values is available for use in various circuits.
- Complementary to RN114MFV to RN118MFV

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

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-1L1A

Weight: 1.5 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

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

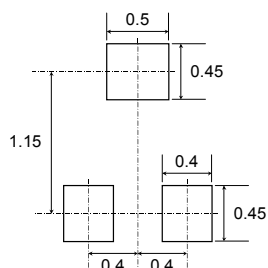
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

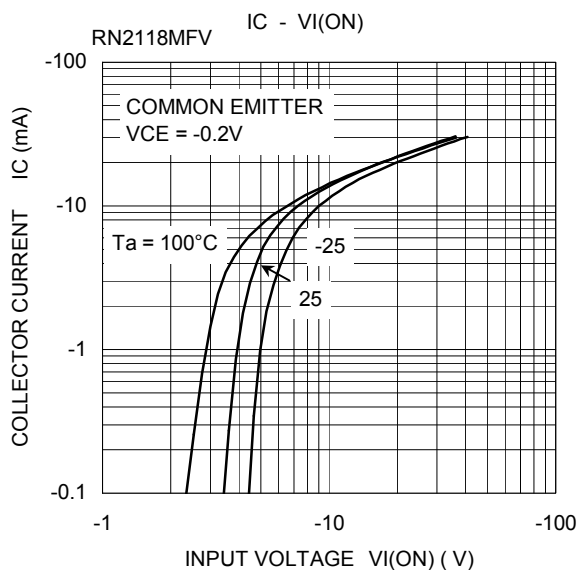
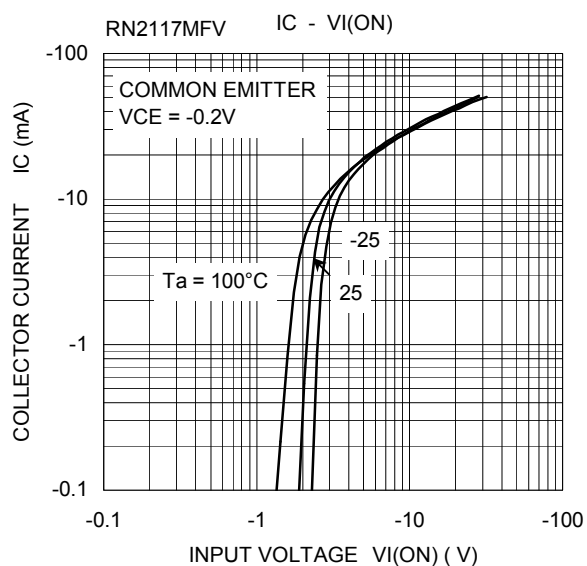
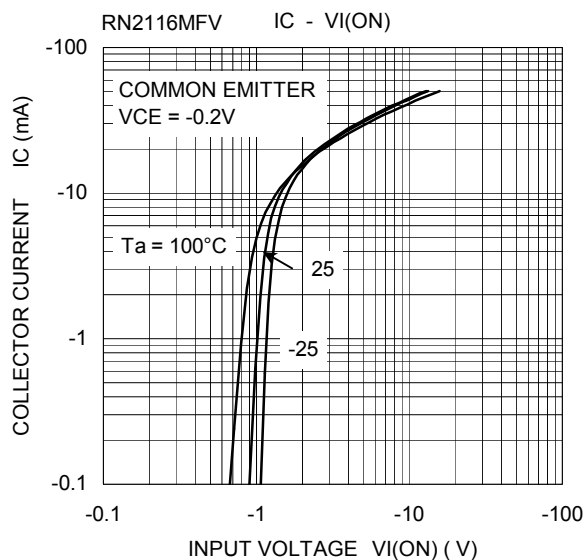
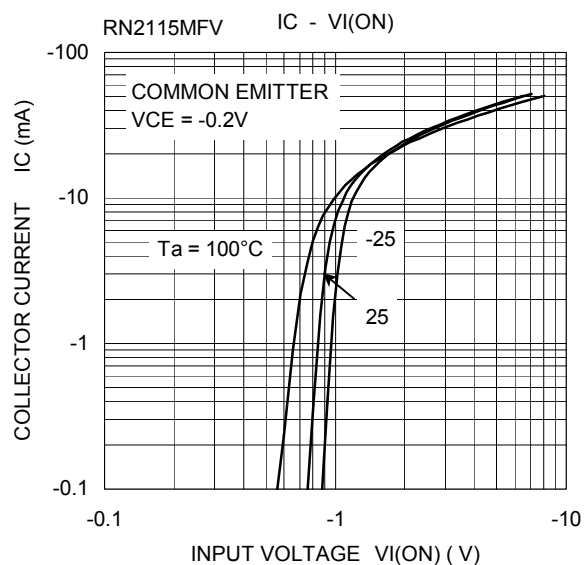
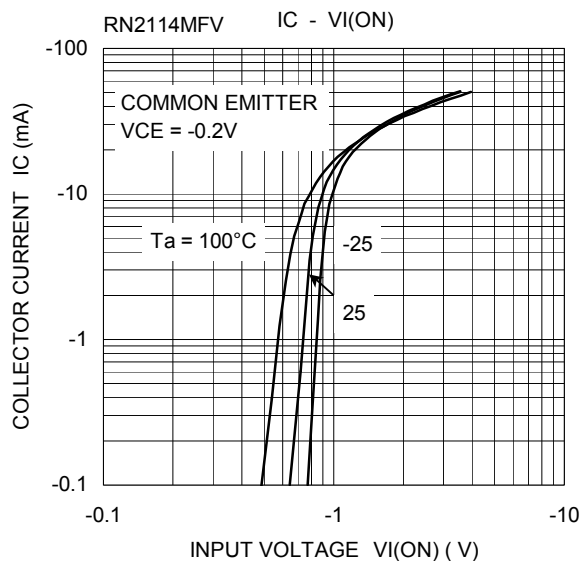
Start of commercial production
2005-09

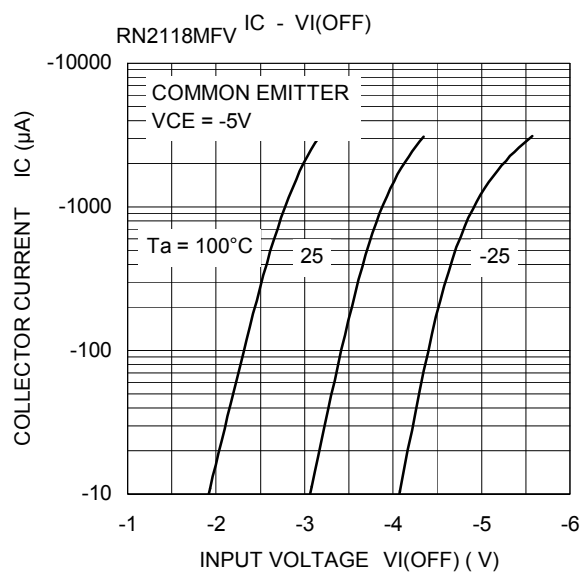
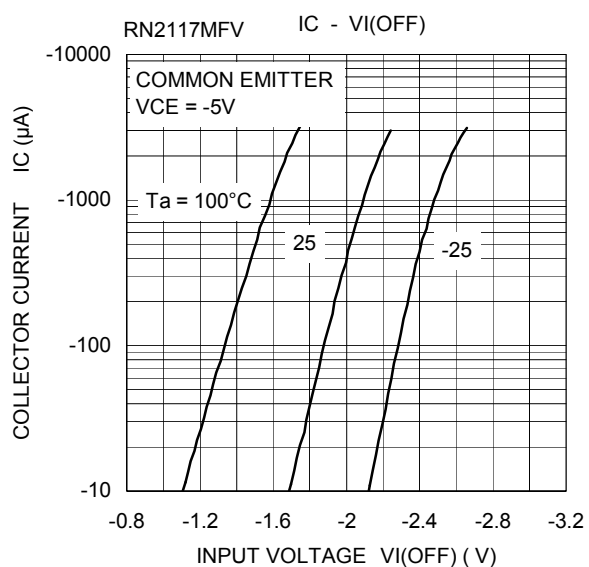
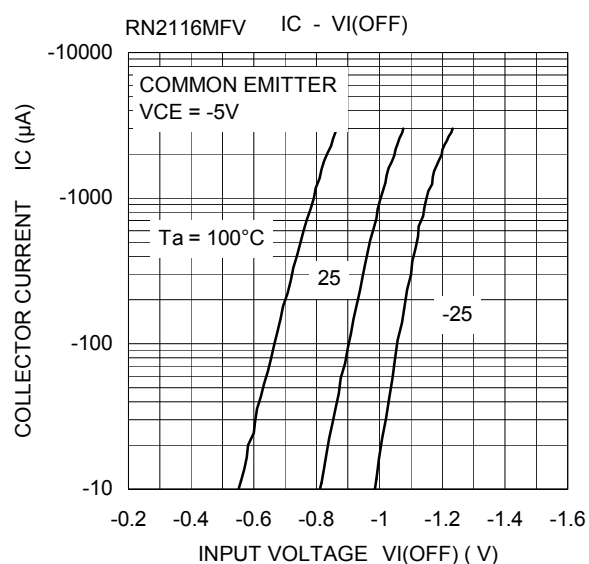
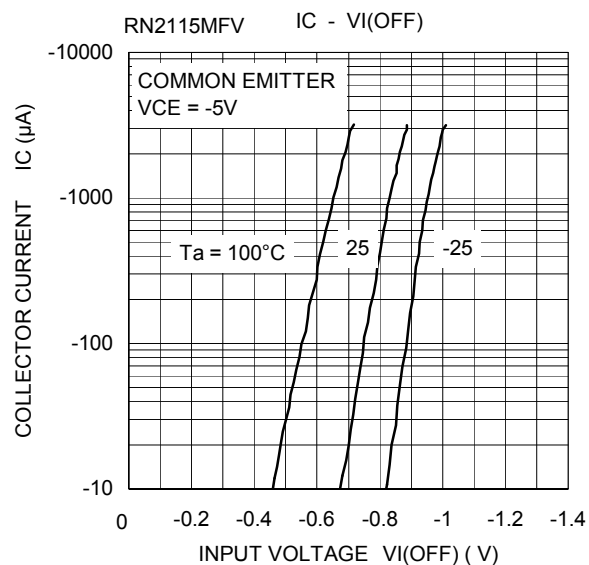
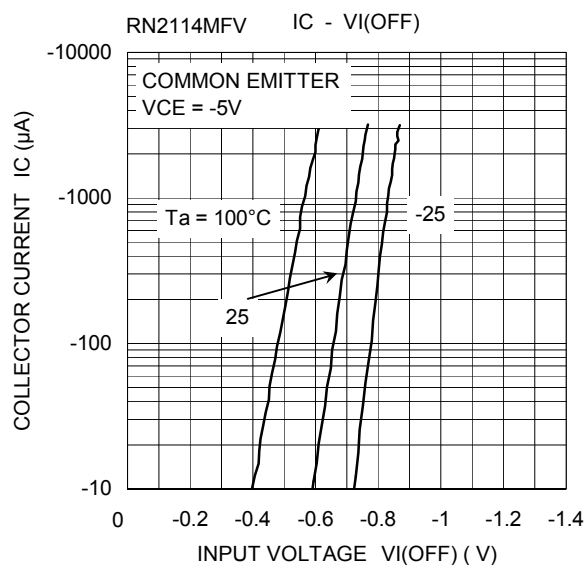
Land Pattern Example unit: mm

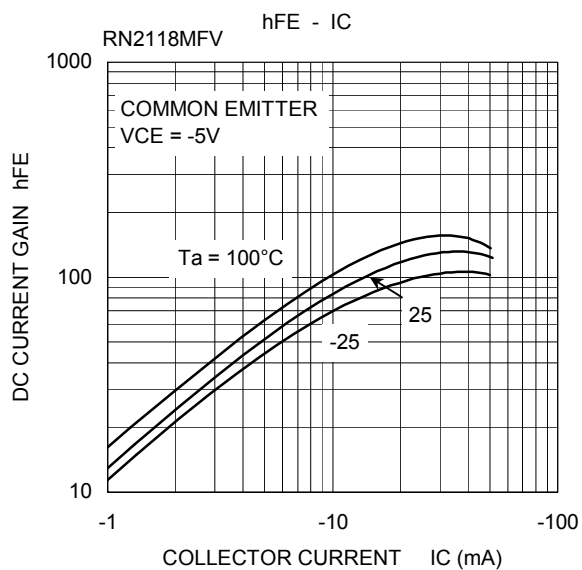
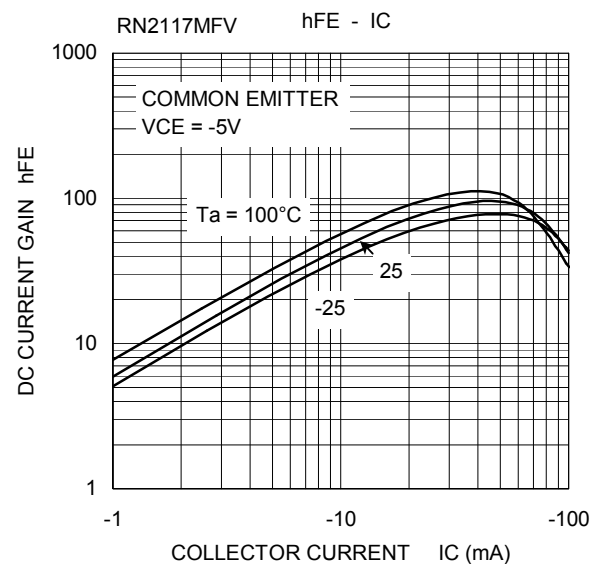
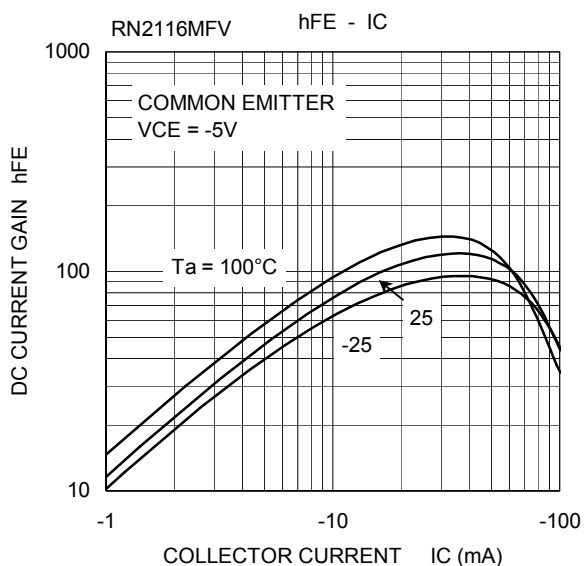
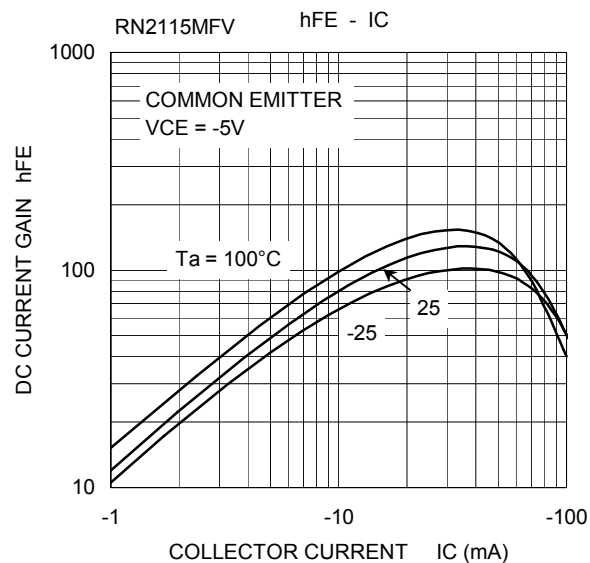
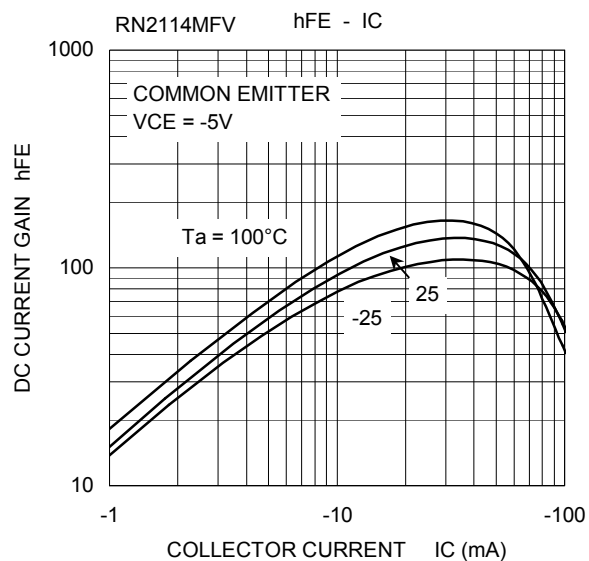


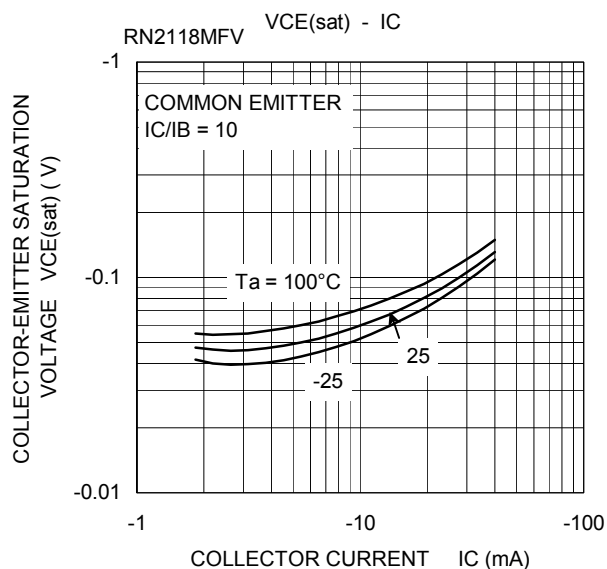
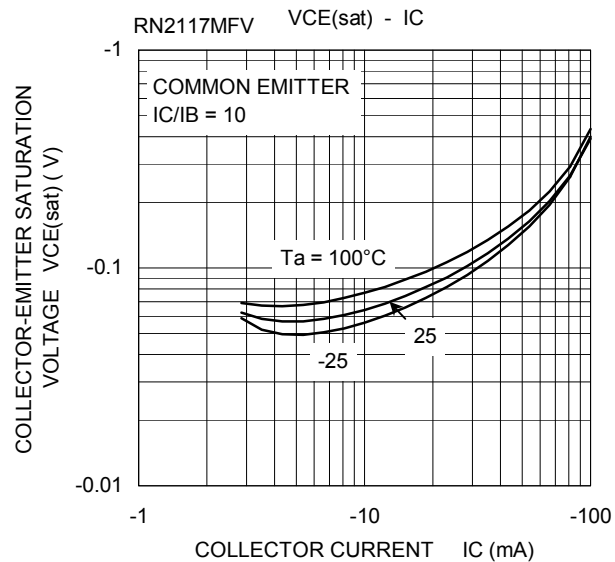
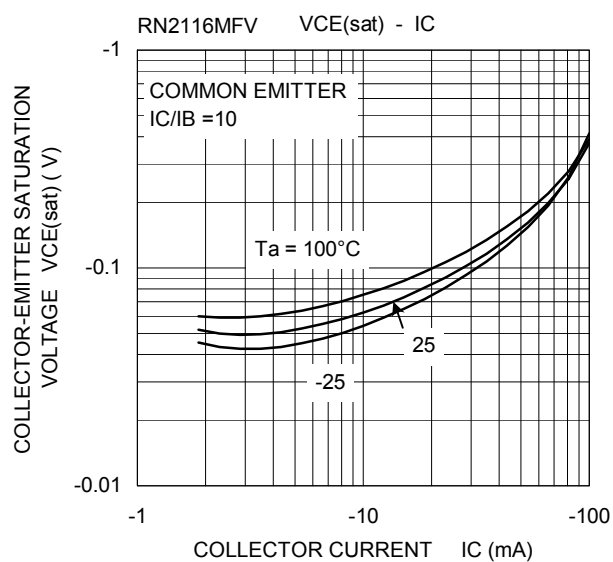
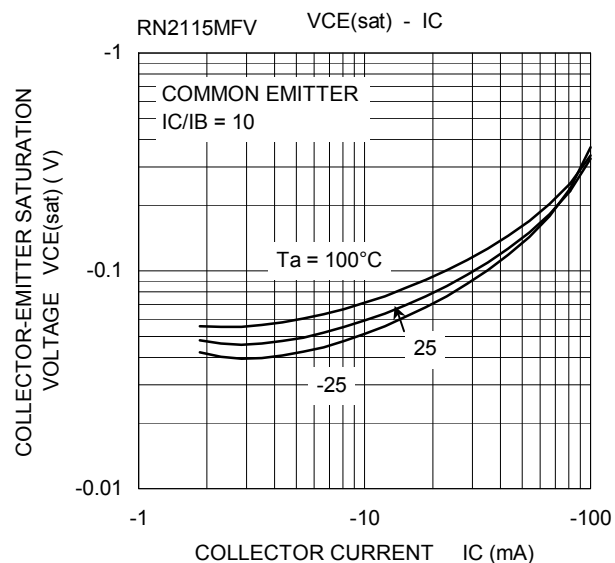
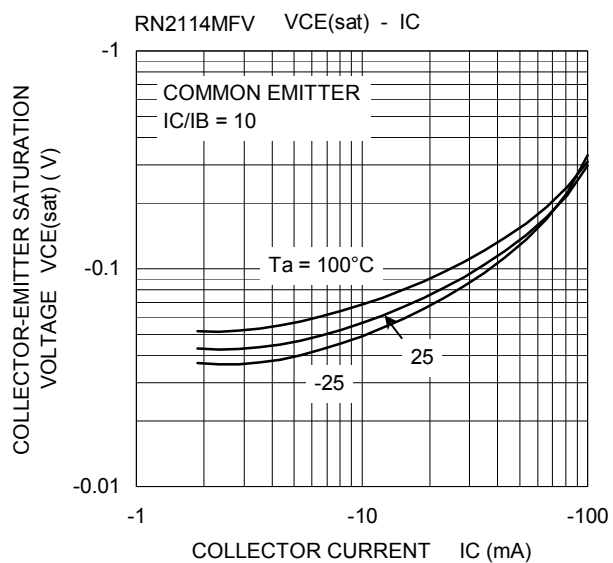
Electrical Characteristics (Ta = 25°C)

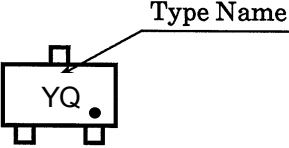
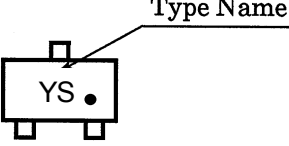
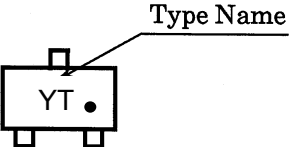
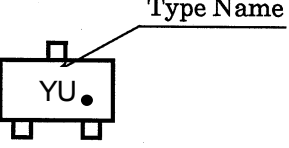
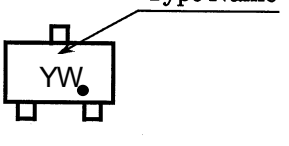
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2114MFV to 2118MFV	I_{CBO}	—	$V_{CB} = -50V, I_E = 0$	—	—	-100	nA
		I_{CEO}		$V_{CE} = -50V, I_B = 0$	—	—	-500	
Emitter cut-off current	RN2114MFV	I_{EBO}	—	$V_{EB} = -5V, I_C = 0$	-0.35	—	-0.65	mA
	RN2115MFV			$V_{EB} = -6V, I_C = 0$	-0.37	—	-0.71	
	RN2116MFV			$V_{EB} = -7V, I_C = 0$	-0.36	—	-0.68	
	RN2117MFV			$V_{EB} = -15V, I_C = 0$	-0.78	—	-1.46	
	RN2118MFV			$V_{EB} = -25V, I_C = 0$	-0.33	—	-0.63	
DC current gain	RN2114MFV to 16MFV, 18MFV	h_{FE}	—	$V_{CE} = -5V, I_C = -10mA$	50	—	—	
	RN2117MFV				30	—	—	
Collector-emitter saturation voltage	RN2114MFV to 2118MFV	$V_{CE(sat)}$	—	$I_C = -5mA, I_B = -0.5mA$	—	-0.1	-0.3	V
Input voltage (ON)	RN2114MFV	$V_{I(ON)}$	—	$V_{CE} = -0.2V, I_C = -5mA$	-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	$V_{I(OFF)}$	—	$V_{CE} = -5V, I_C = -0.1mA$	-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_{ob}	—	$V_{CB} = -10V, I_E = 0, f = 1MHz$	—	0.9	—	pF
Input resistor	RN2114MFV	R1	—	—	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	R1/R2	—	—	—	0.1	—	
	RN2115MFV				—	0.22	—	
	RN2116MFV				—	0.47	—	
	RN2117MFV				—	2.13	—	
	RN2118MFV				—	4.7	—	









Type Name	Marking
RN2114MFV	
RN2115MFV	
RN2116MFV	
RN2117MFV	
RN2118MFV	

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