

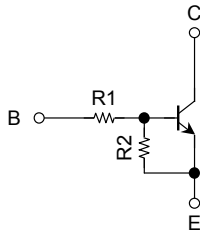
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1101FS, RN1102FS, RN1103FS RN1104FS, RN1105FS, RN1106FS

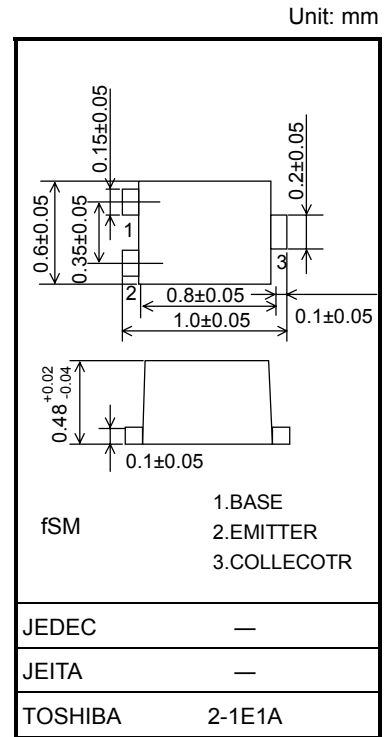
Switching, Inverter Circuit, Interface Circuit and
Driver Circuit Applications

- Incorporating a bias resistor into a transistor reduces parts count. Reducing the parts count enable the manufacture of ever more compact equipment and save assembly cost.
- Complementary to RN2101FS~RN2106FS

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1101FS	4.7	4.7
RN1102FS	10	10
RN1103FS	22	22
RN1104FS	47	47
RN1105FS	2.2	47
RN1106FS	4.7	47



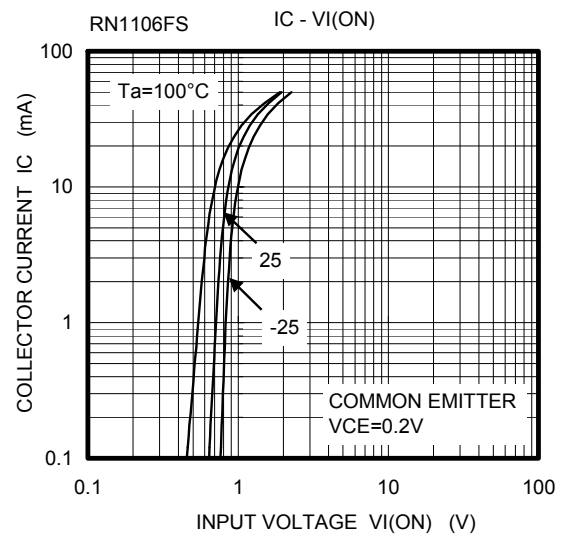
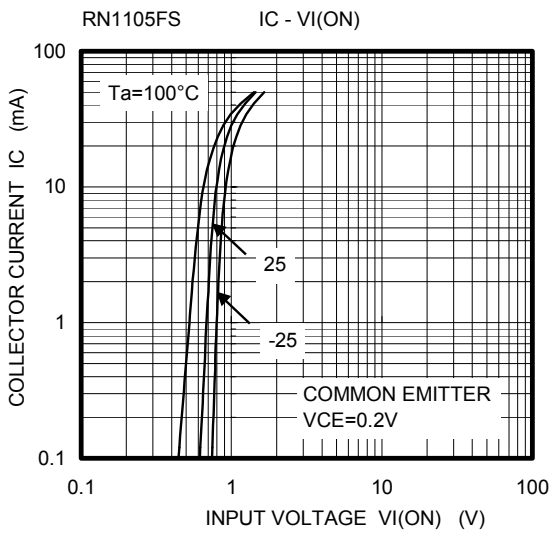
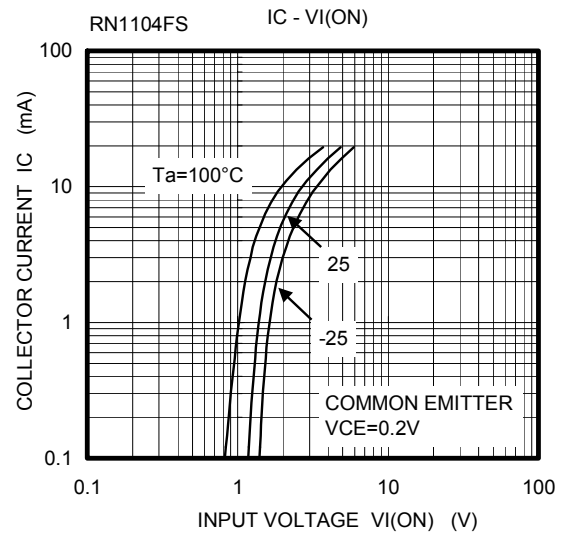
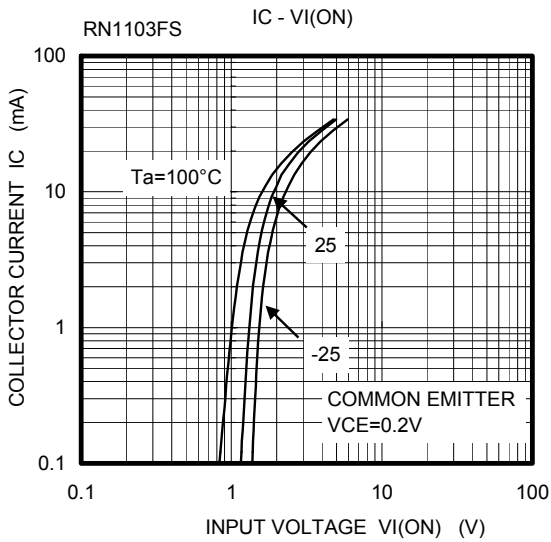
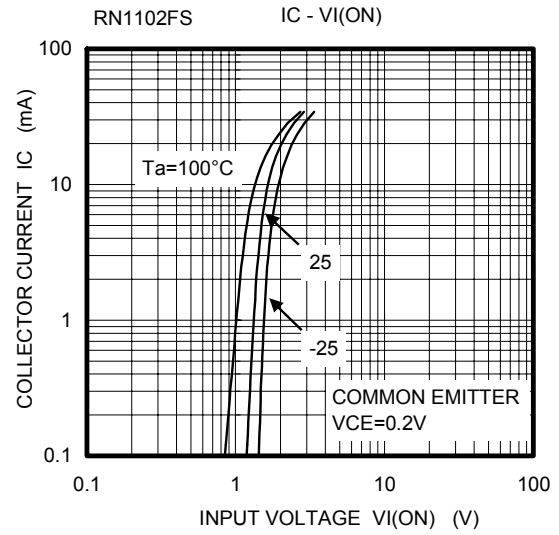
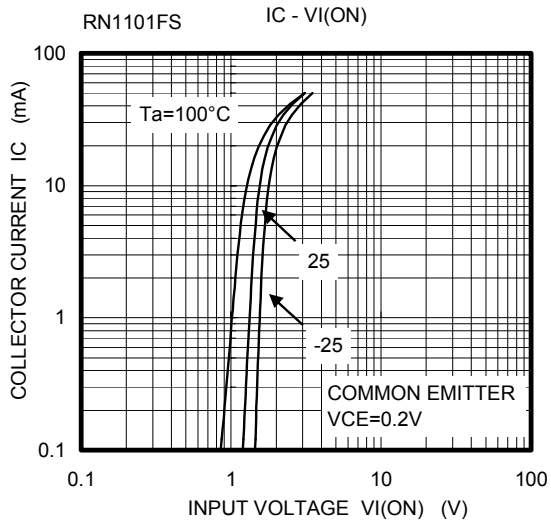
Weight: 0.0006g (typ.)

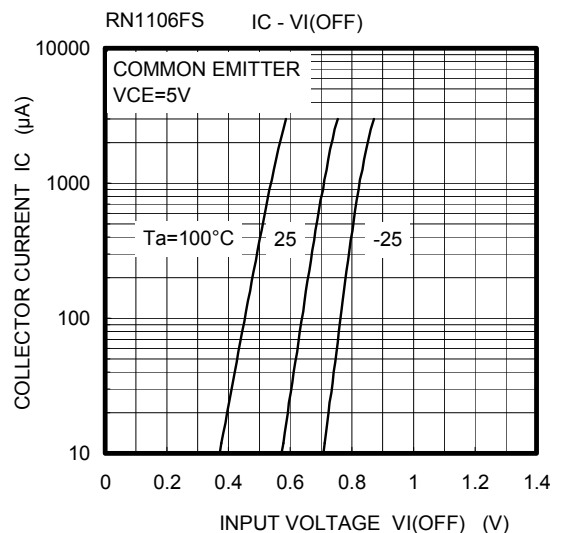
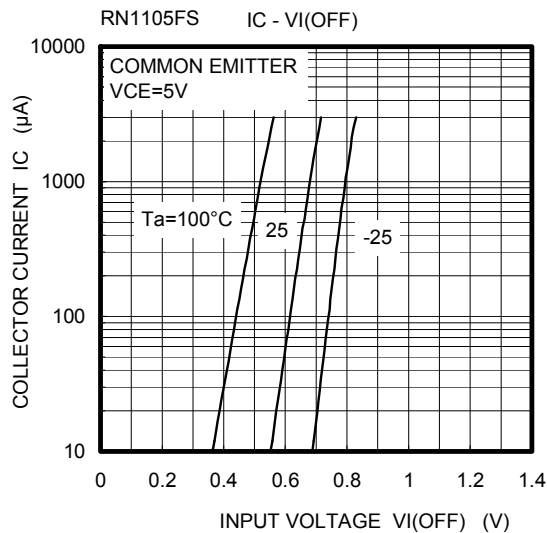
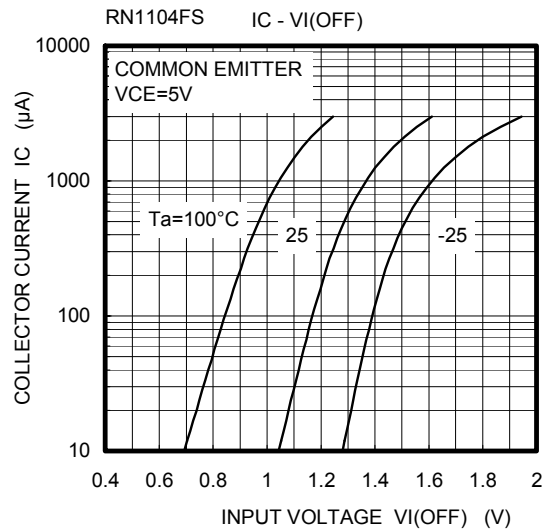
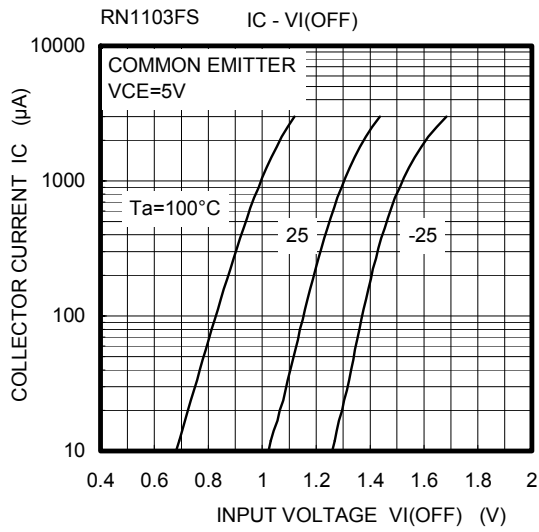
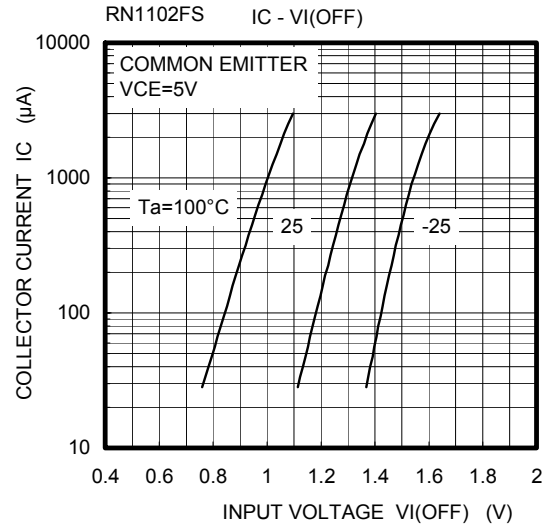
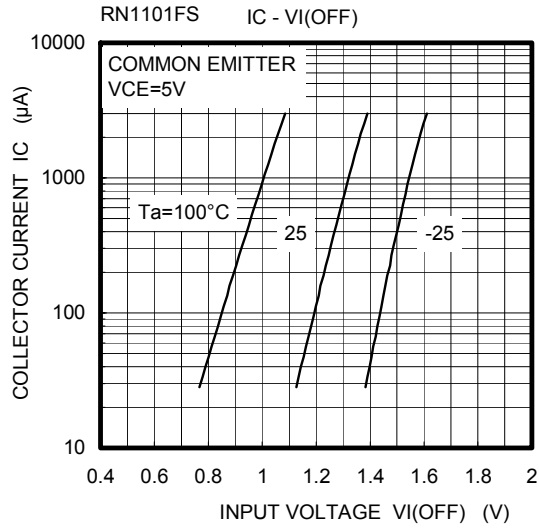
Maximum Ratings (Ta = 25°C)

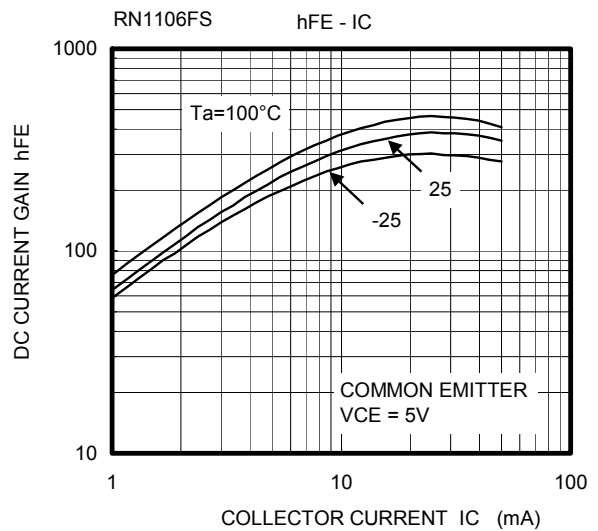
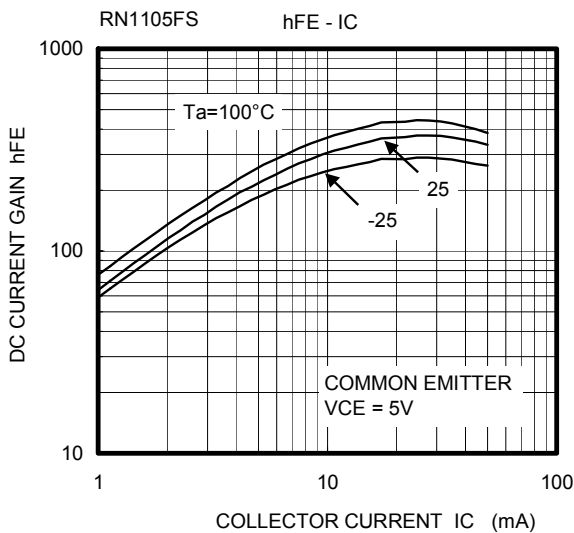
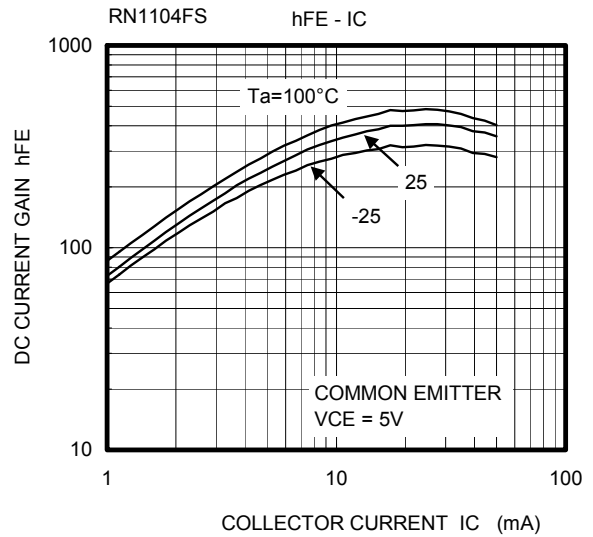
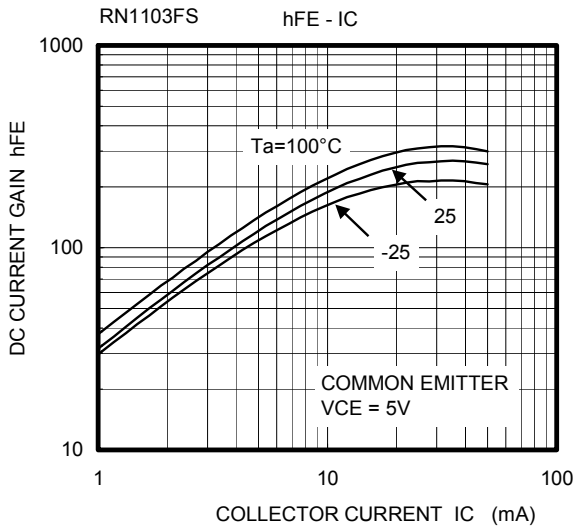
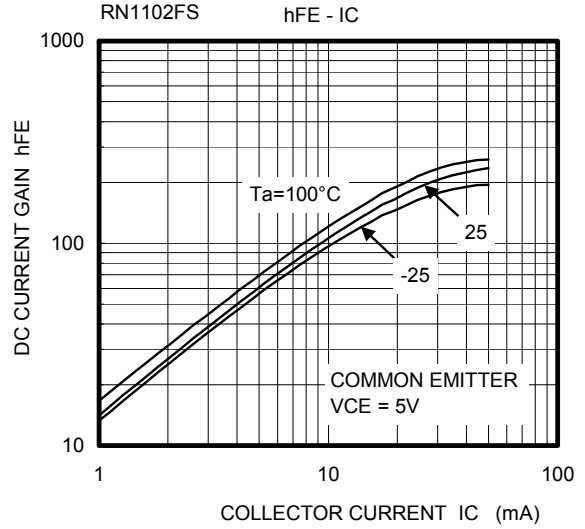
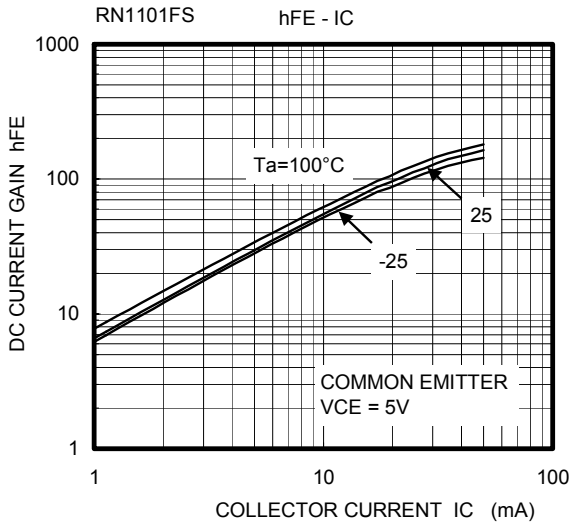
Characteristics	Symbol	Rating	Unit	
Collector-base voltage	RN1101FS~1106FS	V _{CB0}	20	V
Collector-emitter voltage		V _{CEO}	20	V
Emitter-base voltage	RN1101FS~1104FS	V _{EBO}	10	V
	RN1105FS, 1106FS		5	
Collector current	RN1101FS~RN1106FS	I _C	50	mA
Collector power dissipation		P _C	50	mW
Junction temperature		T _j	150	°C
Storage temperature range		T _{stg}	-55~150	°C

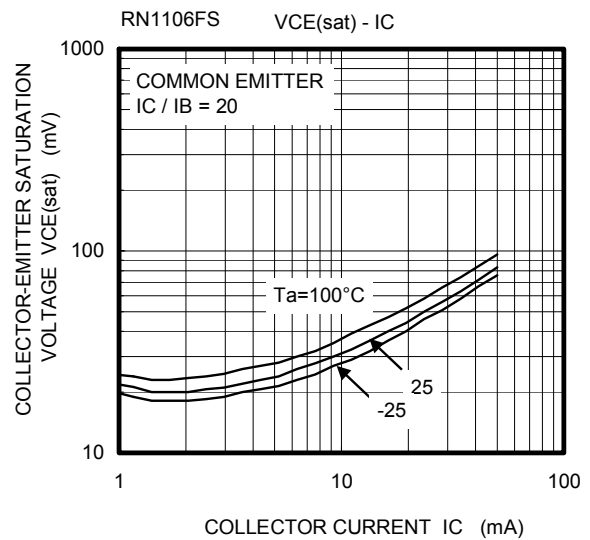
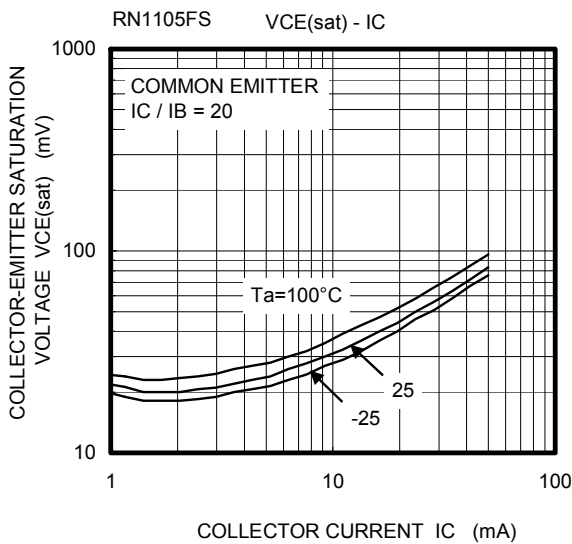
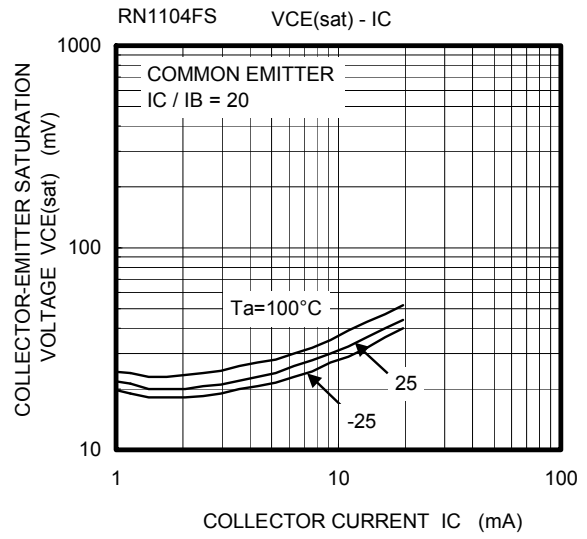
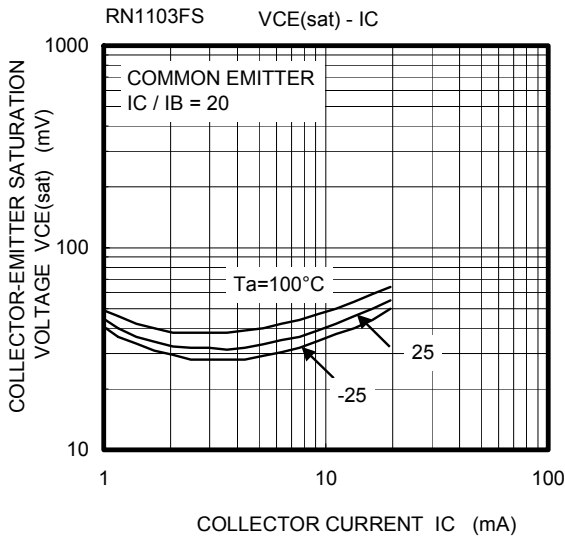
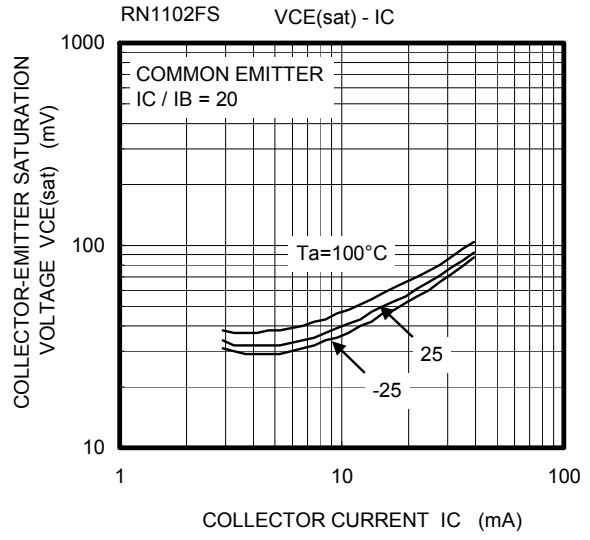
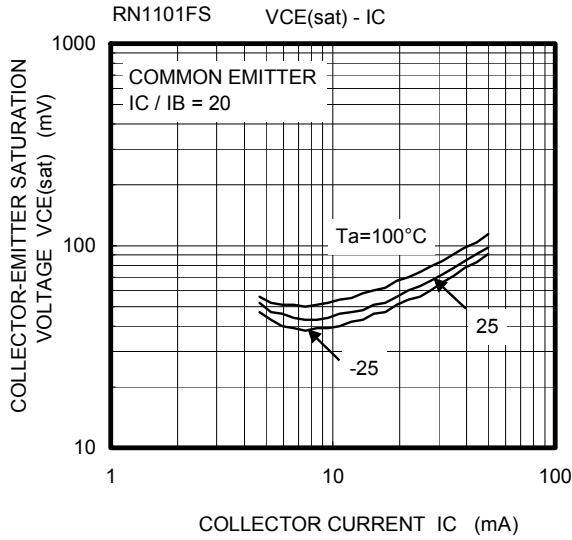
Electrical Characteristics (Ta = 25°C)

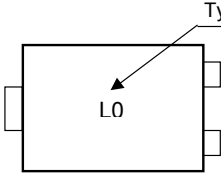
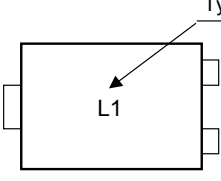
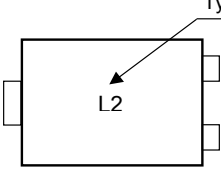
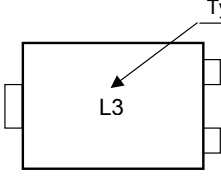
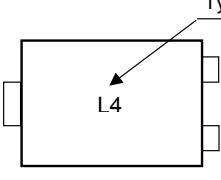
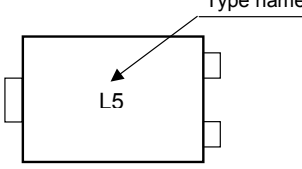
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1101FS~1106FS	I_{CBO}	$V_{CB} = 20\text{ V}, I_E = 0$	—	—	100	nA
		I_{CEO}	$V_{CE} = 20\text{ V}, I_B = 0$	—	—	500	
Emitter cut-off current	RN1101FS	I_{EBO}	$V_{EB} = 10\text{ V}, I_C = 0$	0.89	—	1.33	mA
	RN1102FS			0.41	—	0.63	
	RN1103FS			0.18	—	0.29	
	RN1104FS			0.088	—	0.133	
	RN1105FS		$V_{EB} = 5\text{ V}, I_C = 0$	0.085	—	0.127	
	RN1106FS			0.08	—	0.121	
DC current gain	RN1101FS	h_{FE}	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	30	—	—	
	RN1102FS			60	—	—	
	RN1103FS			100	—	—	
	RN1104FS			120	—	—	
	RN1105FS			120	—	—	
	RN1106FS			120	—	—	
Collector-emitter saturation voltage	RN1101FS~1106FS	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	—	0.15	V
Input voltage (ON)	RN1101FS	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	1.0	—	2.0	V
	RN1102FS			1.0	—	2.2	
	RN1103FS			1.1	—	2.7	
	RN1104FS			1.2	—	3.6	
	RN1105FS			0.6	—	1.1	
	RN1106FS			0.6	—	1.2	
Input voltage (OFF)	RN1101FS~1104FS	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.8	—	1.5	V
	RN1105FS, 1106FS			0.4	—	0.8	
Collector output capacitance	RN1101FS~1106FS	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	1.2	—	pF
Input resistor	RN1101FS	R1	—	3.76	4.7	5.64	kΩ
	RN1102FS			8	10	12	
	RN1103FS			17.6	22	26.4	
	RN1104FS			37.6	47	56.4	
	RN1105FS			1.76	2.2	2.64	
	RN1106FE			3.76	4.7	5.64	
Resistor ratio	RN1101FS~1104FS	R1/R2	—	0.8	1.0	1.2	
	RN1105FS			0.0376	0.0468	0.0562	
	RN1106FS			0.08	0.1	0.12	









Type Name	Marking
RN1101FS	
RN1102FS	
RN1103FS	
RN1104FS	
RN1105FS	
RN1106FS	

HANDLING PRECAUTION

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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030619EAA

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