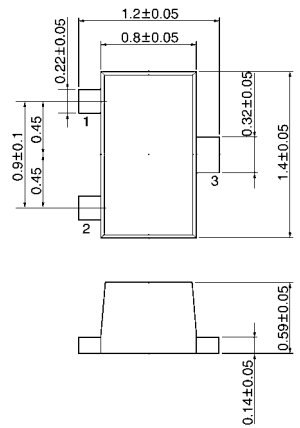
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1101FT, RN1102FT, RN1103FT RN1104FT, RN1105FT, RN1106FT

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- High-density mount is possible because of devices housed in very thin TESM packages.
- 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.
- Wide range of resistor values are available to use in various circuit designs.
- Complementary to RN2101FT~RN2106FT

Unit: mm



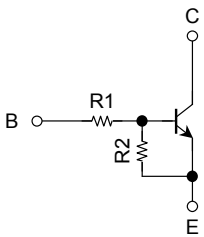
1. BASE
2. EMITTER
3. COLLECTOR

TESM

JEDEC	—
JEITA	—
TOSHIBA	2-1B1A

Weight:0.0022 g (typ.)

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1101FT	4.7	4.7
RN1102FT	10	10
RN1103FT	22	22
RN1104FT	47	47
RN1105FT	2.2	47
RN1106FT	4.7	47

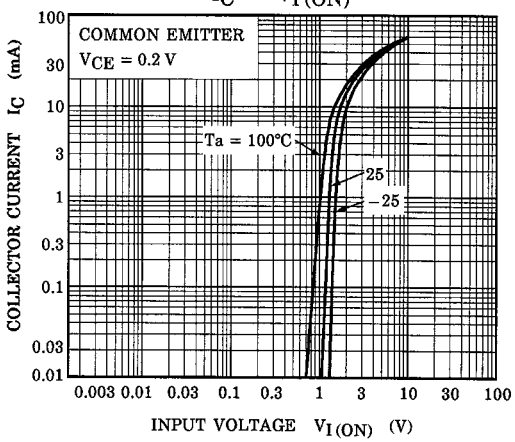
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage	RN1101FT~1106FT	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1101FT~1104FT	V_{EBO}	10	V
	RN1105FT, RN1106FT		5	
Collector current	RN1101FT~1106FT	I_C	100	mA
Collector power dissipation		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

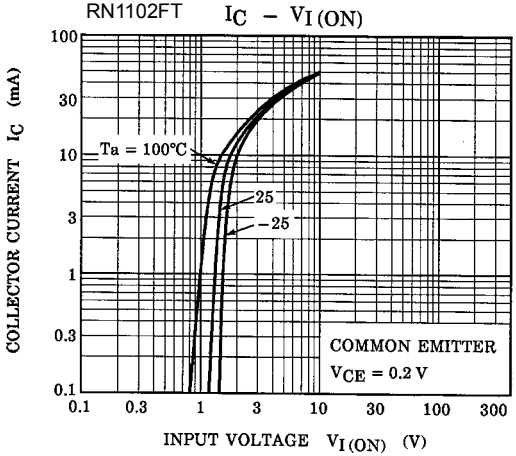
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1101FT~1106FT	I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0	—	—	500	
Emitter cut-off current	RN1101FT	I_{EBO}	V_{EB} = 10 V, I_C = 0	0.82	—	1.52	mA
	RN1102FT			0.38	—	0.71	
	RN1103FT			0.17	—	0.33	
	RN1104FT			0.082	—	0.15	
	RN1105FT		V_{EB} = 5 V, I_C = 0	0.078	—	0.145	
	RN1106FT			0.074	—	0.138	
DC current gain	RN1101FT	h_{FE}	V_{CE} = 5 V, I_C = 10 mA	30	—	—	
	RN1102FT			50	—	—	
	RN1103FT			70	—	—	
	RN1104FT			80	—	—	
	RN1105FT			80	—	—	
	RN1106FT			80	—	—	
Collector-emitter saturation voltage	RN1101FT~1106FT	$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Input voltage (ON)	RN1101FT	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 5 mA	1.1	—	2.0	V
	RN1102FT			1.2	—	2.4	
	RN1103FT			1.3	—	3.0	
	RN1104FT			1.5	—	5.0	
	RN1105FT			0.6	—	1.1	
	RN1106FT			0.7	—	1.3	
Input voltage (OFF)	RN1101FT~1104FT	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	1.0	—	1.5	V
	RN1105FT, 1106FT			0.5	—	0.8	
Transition frequency	RN1101FT~1106FT	f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance	RN1101FT~1106FT	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input resistor	RN1101FT	R1	—	3.29	4.7	6.11	kΩ
	RN1102FT			7	10	13	
	RN1103FT			15.4	22	28.6	
	RN1104FT			32.9	47	61.1	
	RN1105FT			1.54	2.2	2.86	
	RN1106FT			3.29	4.7	6.11	
Resistor ratio	RN1101FT~1104FT	R1/R2	—	0.9	1.0	1.1	
	RN1105FT			0.0421	0.0468	0.0515	
	RN1106FT			0.09	0.1	0.11	

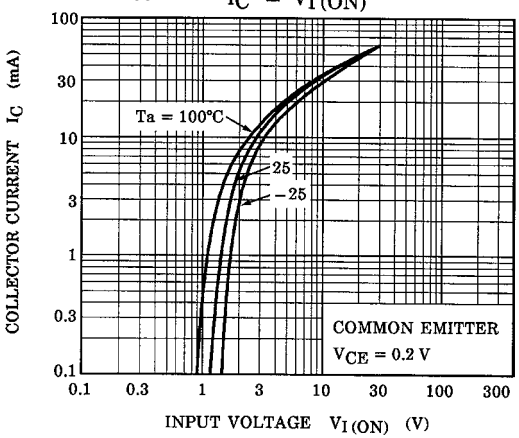
RN1101FT $I_C - V_{I(ON)}$



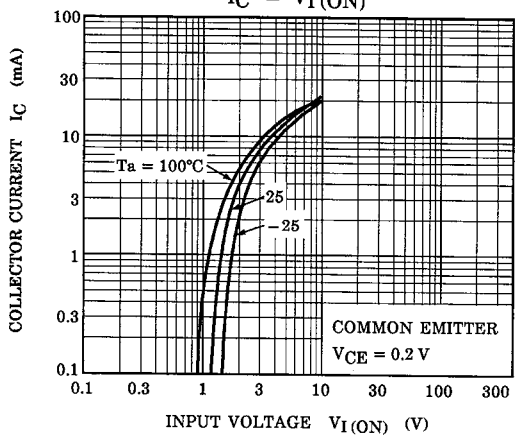
RN1102FT $I_C - V_{I(ON)}$



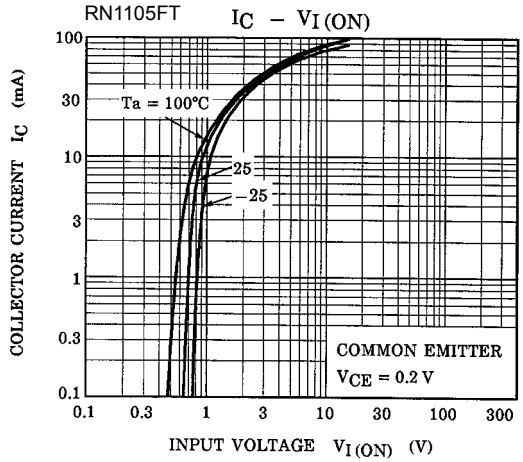
RN1103FT $I_C - V_{I(ON)}$



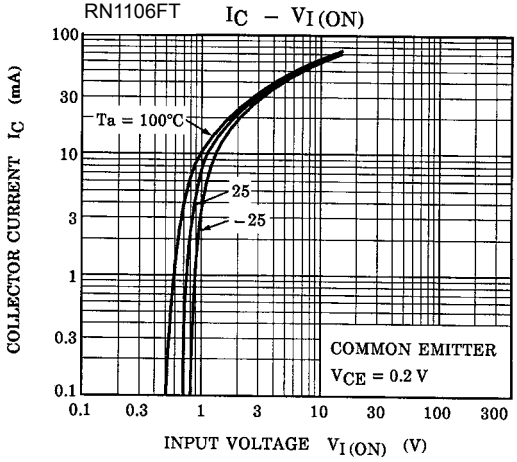
RN1104FT $I_C - V_{I(ON)}$



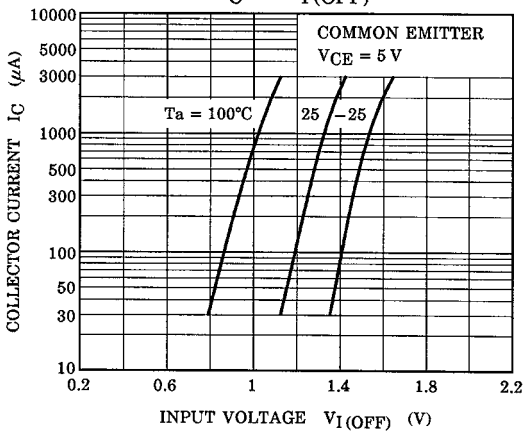
RN1105FT $I_C - V_{I(ON)}$



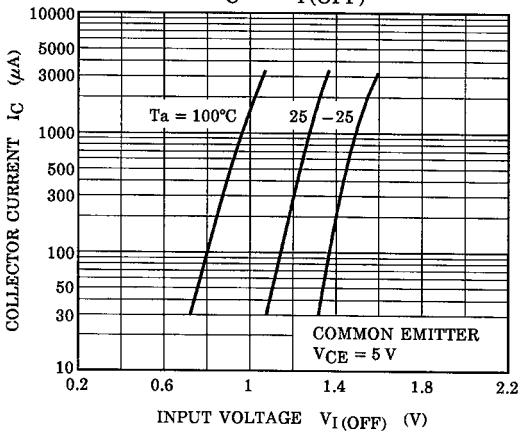
RN1106FT $I_C - V_{I(ON)}$



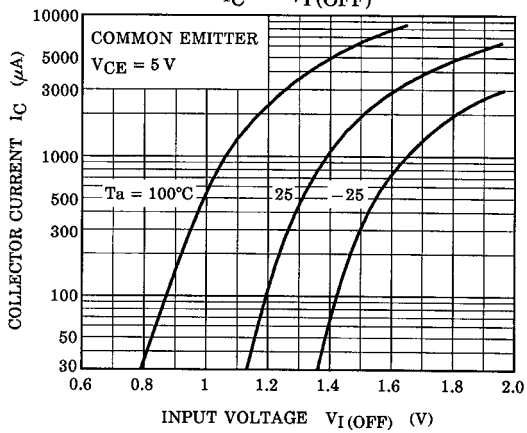
RN1101FT $I_C - V_{I(OFF)}$



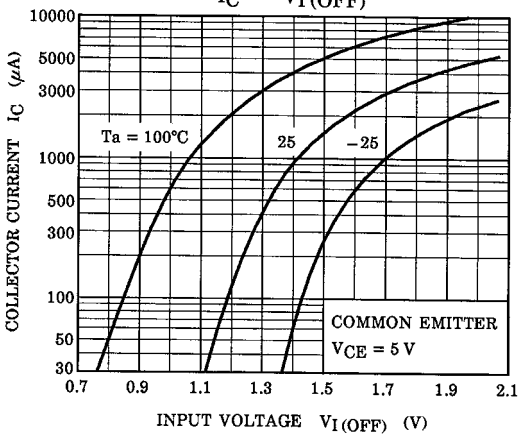
RN1102FT $I_C - V_{I(OFF)}$



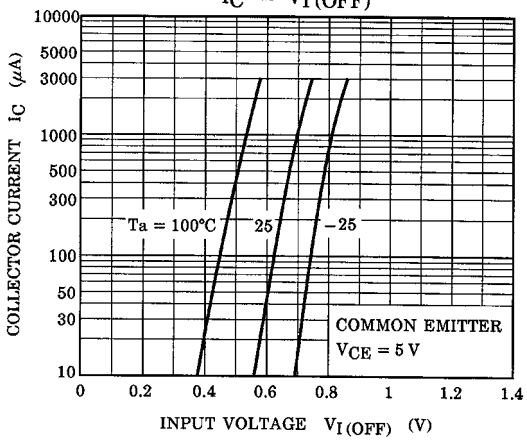
RN1103FT $I_C - V_{I(OFF)}$



RN1104FT $I_C - V_{I(OFF)}$



RN1105FT $I_C - V_{I(OFF)}$



RN1106FT $I_C - V_{I(OFF)}$