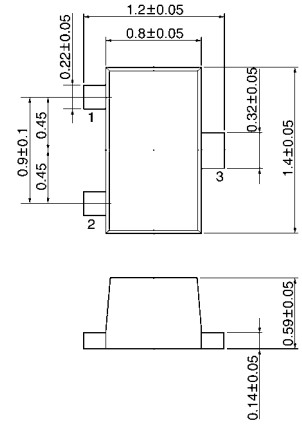
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process) (Bias Resistor built-in Transistor)

RN1112FT,RN1113FT

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 RN2112FT, RN2113FT

Unit: mm



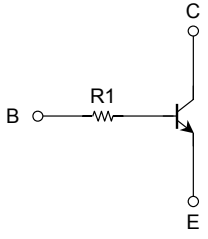
1. BASE
2. EMITTER
3. COLLECTOR

TESM

JEDEC	—
JEITA	—
TOSHIBA	2-1B1A

Weight: 0.0022 g (typ.)

Equivalent Circuit and Bias Resistor Values

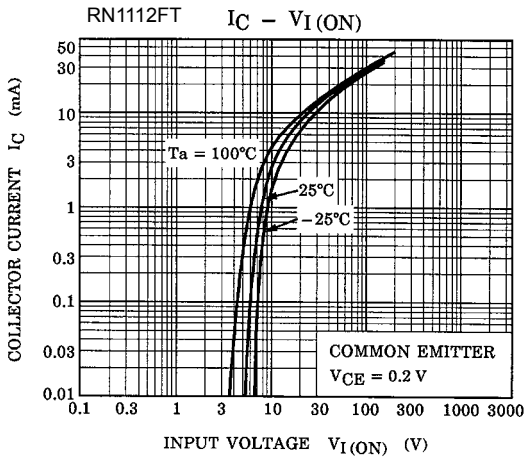


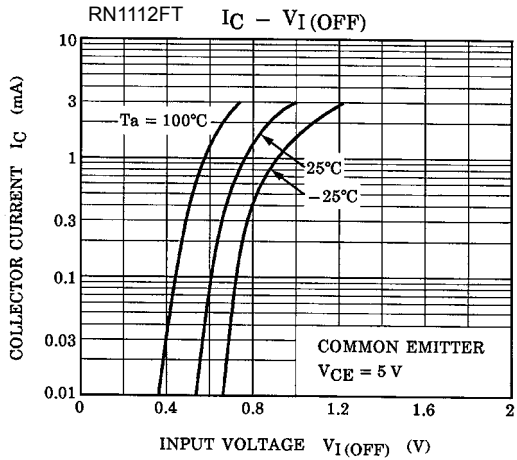
Maximum Ratings (Ta = 25°C)

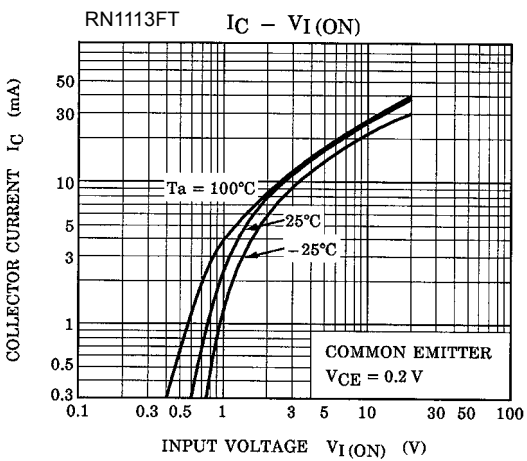
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	100	mA
Collector poser dissipation	P_C	100	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55~150	°C

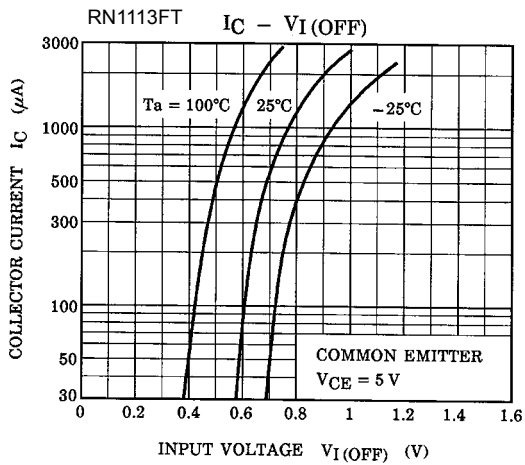
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 50 V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = 5 V, I_C = 0	—	—	100	nA
DC current gain		h_{FE}	V_{CE} = 5 V, I_C = 1 mA	120	—	700	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 5 mA, I_B = 0.25 mA	—	0.1	0.3	V
Transition frequency		f_T	V_{CE} = 10 V, I_C = 5 mA	—	250	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	3	6	pF
Input resistor	RN1112FT	R1	—	15.4	22	28.6	kΩ
	RN1113FT			32.9	47	61.1	


RN1112FT
I_C – $V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
50
30
10
3
1
0.3
0.1
0.03
0.01
Ta = 100°C
25°C
−25°C
COMMON EMITTER
V_{CE} = 0.2 V
0.1 0.3 1 3 10 30 100 300 1000 3000
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN1112FT
I_C – $V_{I(OFF)}$
COLLECTOR CURRENT I_C (mA)
10
3
1
0.3
0.1
0.03
0.01
Ta = 100°C
25°C
−25°C
COMMON EMITTER
V_{CE} = 5 V
0 0.4 0.8 1.2 1.6 2
INPUT VOLTAGE $V_{I(OFF)}$ (V)


RN1113FT
I_C – $V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
50
30
10
5
3
1
0.5
0.3
Ta = 100°C
25°C
−25°C
COMMON EMITTER
V_{CE} = 0.2 V
0.1 0.3 0.5 1 3 5 10 30 50 100
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN1113FT
I_C – $V_{I(OFF)}$
COLLECTOR CURRENT I_C (μA)
3000
1000
500
300
100
50
30
Ta = 100°C
25°C
−25°C
COMMON EMITTER
V_{CE} = 5 V
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6
INPUT VOLTAGE $V_{I(OFF)}$ (V)