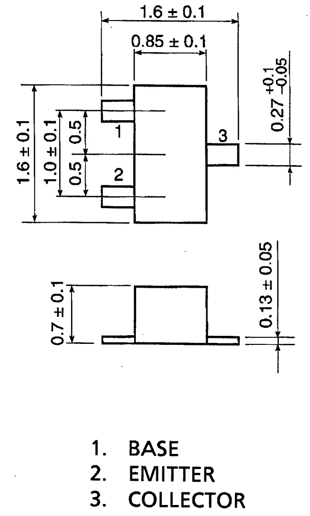
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

RN2101F,RN2102F,RN2103F
RN2104F,RN2105F,RN2106F

Switching, Inverter Circuit, Interface Circuit And Driver Circuit Applications

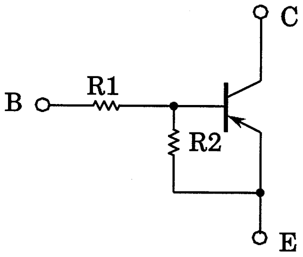
Unit: mm



JEDEC	—
EIAJ	—
TOSHIBA	2-2HA1A

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN1101F~RN1106F

Equivalent Circuit and Bias Resister Values



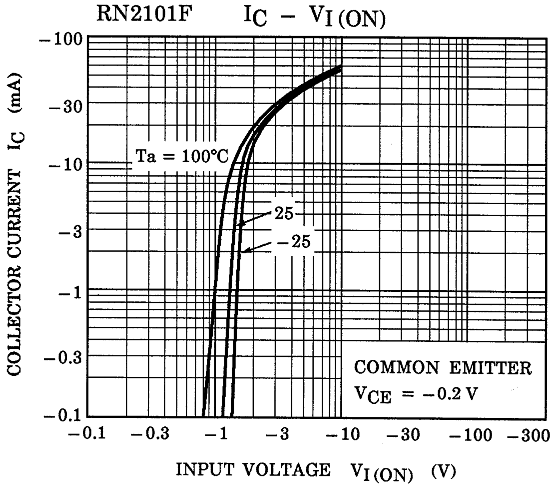
Type No.	R1 (kΩ)	R2 (kΩ)
RN2101F	4.7	4.7
RN2102F	10	10
RN2103F	22	22
RN2104F	47	47
RN2105F	2.2	47
RN2106F	4.7	47

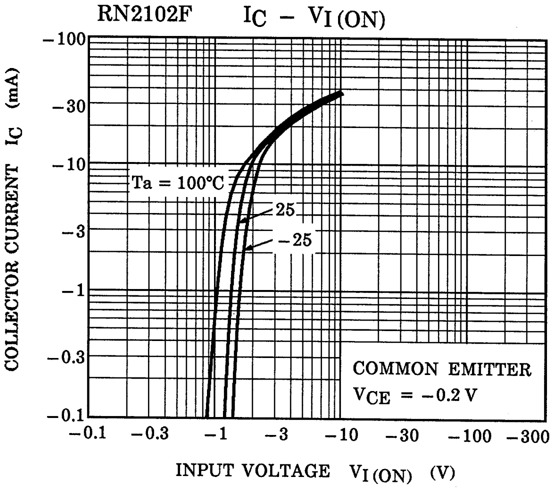
Maximum Ratings (Ta = 25°C)

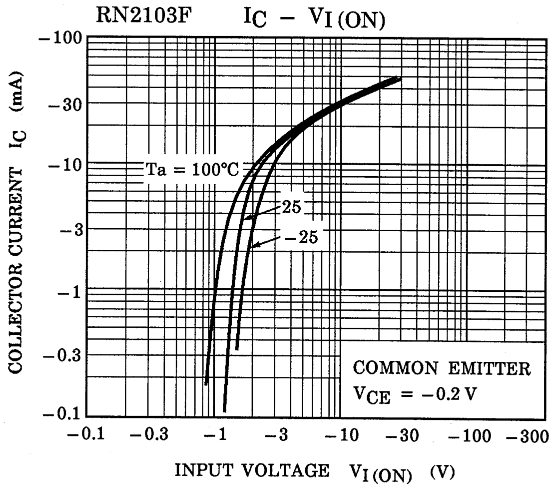
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2101F~2106F	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2101F~2104F	V_{EBO}	−10	V
	RN2105F, 2106F		−5	
Collector current	RN2101F~2106F	I_C	−100	mA
Collector power dissipation		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

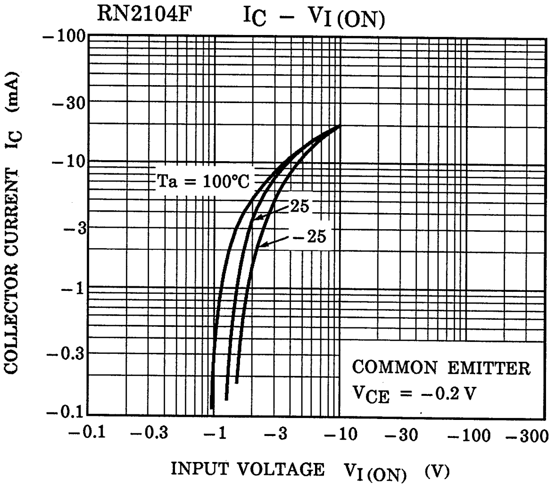
Electrical Characteristics (Ta = 25°C)

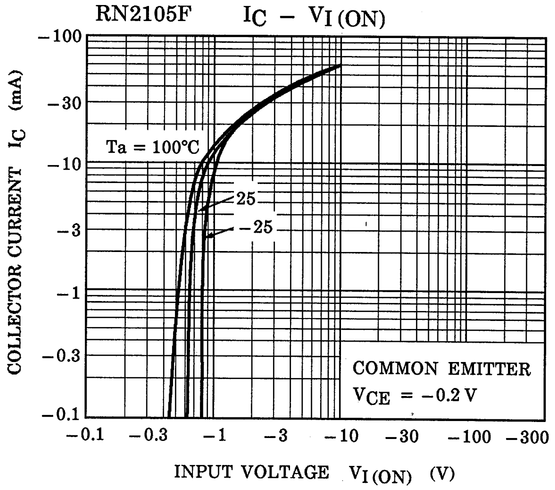
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2101F ~2106F	I_{CBO}	—	$V_{CB} = -50V$, $I_E = 0$	—	—	−100	nA
		I_{CEO}		$V_{CE} = -50V$, $I_B = 0$	—	—	−500	
Emitter cut-off current	RN2101F	I_{EBO}	—	$V_{EB} = -10V$, $I_C = 0$	−0.82	—	−1.52	mA
	RN2102F				−0.38	—	−0.71	
	RN2103F				−0.17	—	−0.33	
	RN2104F				−0.082	—	−0.15	
	RN2105F			$V_{EB} = -5V$, $I_C = 0$	−0.078	—	−0.145	
	RN2106F				−0.074	—	−0.138	
DC current gain	RN2101F	h_{FE}	—	$V_{CE} = -5V$, $I_C = -10mA$	30	—	—	
	RN2102F				50	—	—	
	RN2103F				70	—	—	
	RN2104F				80	—	—	
	RN2105F				80	—	—	
	RN2106F				80	—	—	
Collector-emitter saturation voltage	RN2101F ~2106F	$V_{CE\ (sat)}$	—	$I_C = -5mA$, $I_B = -0.25mA$	—	−0.1	−0.3	V
Input voltage (ON)	RN2101F	$V_{I\ (ON)}$	—	$V_{CE} = -0.2V$, $I_C = -5mA$	−1.1	—	−2.0	V
	RN2102F				−1.2	—	−2.4	
	RN2103F				−1.3	—	−3.0	
	RN2104F				−1.5	—	−5.0	
	RN2105F				−0.6	—	−1.1	
	RN2106F				−0.7	—	−1.3	
Input voltage (OFF)	RN2101F ~2104F	$V_{I\ (OFF)}$	—	$V_{CE} = -5V$, $I_C = -0.1mA$	−1.0	—	−1.5	V
	RN2105F, 2106F				−0.5	—	−0.8	
Transition frequency	RN2101F ~2106F	f_T	—	$V_{CE} = -10V$, $I_C = -5mA$	—	200	—	MHz
Collector Output capacitance	RN2101F ~2106F	C_{ob}	—	$V_{CB} = -10V$, $I_E = 0$, f = 1MHz	—	3	6	pF
Input resistor	RN2101F	R1	—		3.29	4.7	6.11	kΩ
	RN2102F				7	10	13	
	RN2103F				15.4	22	28.6	
	RN2104F				32.9	47	61.1	
	RN2105F				1.54	2.2	2.86	
	RN2106F				3.29	4.7	6.11	
Resistor ratio	RN2101F ~2104F	R1/R2	—		0.9	1.0	1.1	
	RN2105F				0.0421	0.0468	0.0515	
	RN2106F				0.09	0.1	0.11	

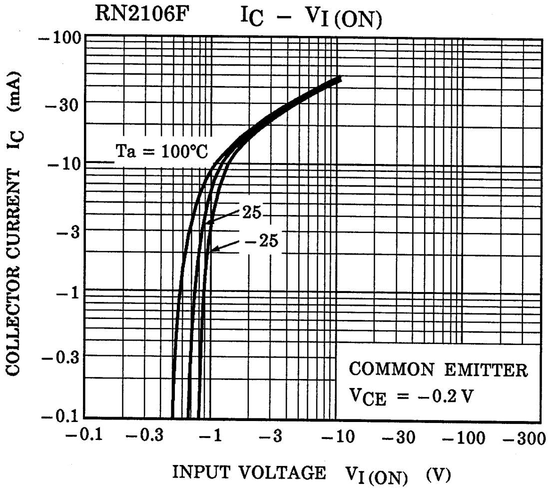

RN2101F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN2102F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)

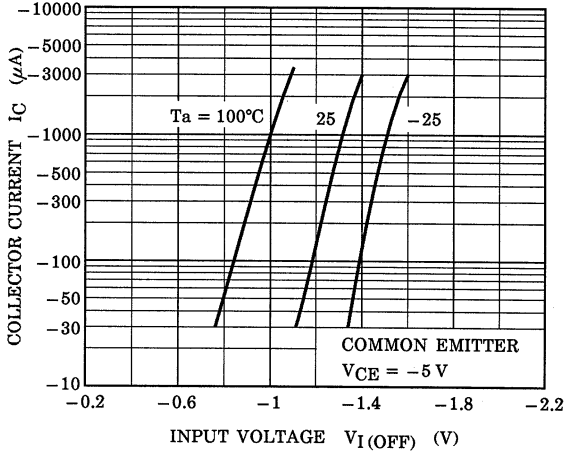

RN2103F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN2104F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)

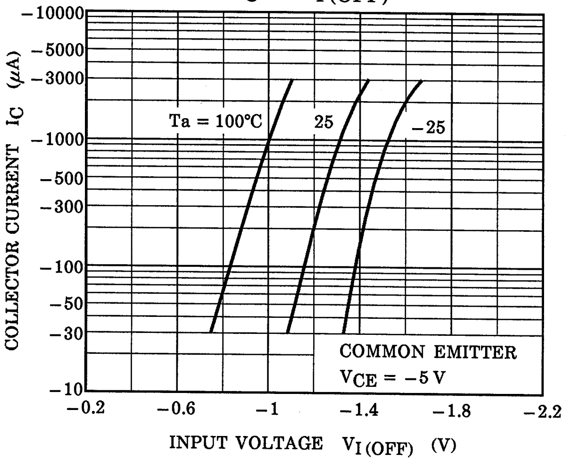

RN2105F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)


RN2106F
$I_C - V_{I(ON)}$
COLLECTOR CURRENT I_C (mA)
−100
−30
−10
−3
−1
−0.3
−0.1
Ta = 100°C
25
−25
COMMON EMITTER
V_{CE} = −0.2 V
−0.1
−0.3
−1
−3
−10
−30
−100
−300
INPUT VOLTAGE $V_{I(ON)}$ (V)

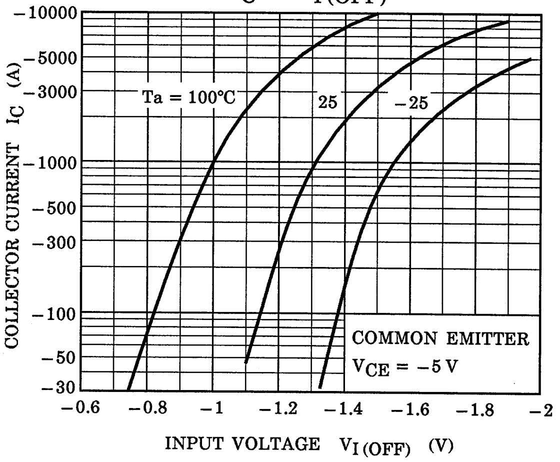
RN2101F $I_C - V_{I(OFF)}$



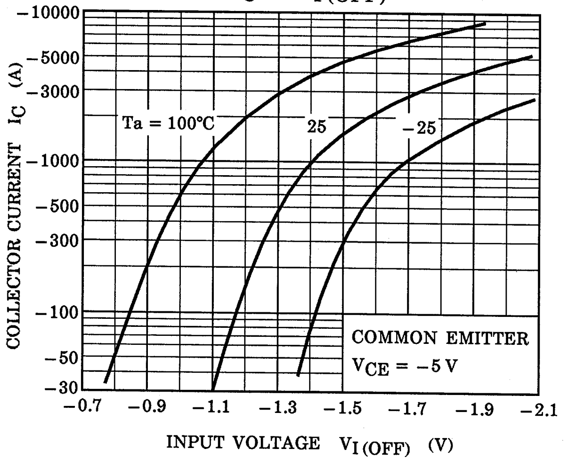
RN2102F $I_C - V_{I(OFF)}$



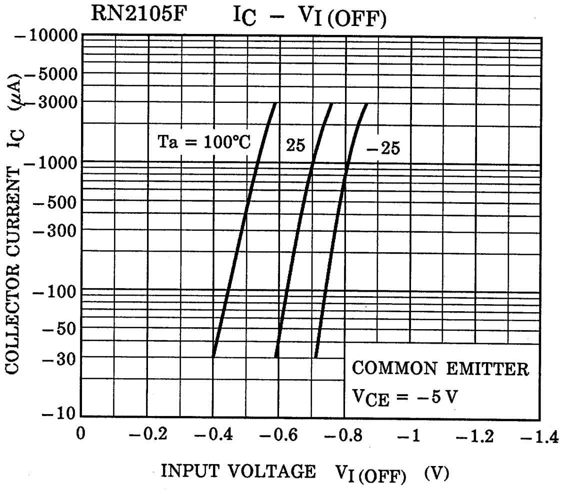
RN2103F $I_C - V_{I(OFF)}$



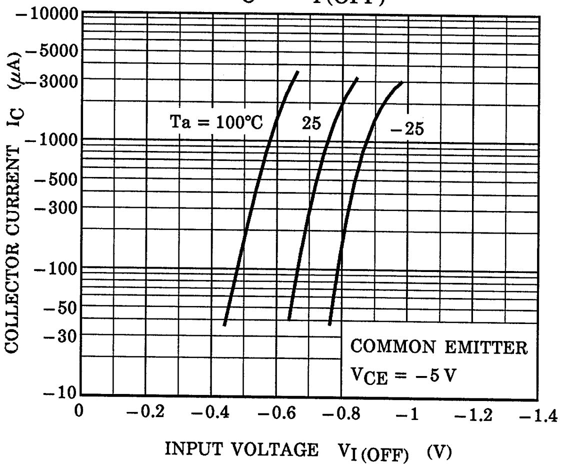
RN2104F $I_C - V_{I(OFF)}$



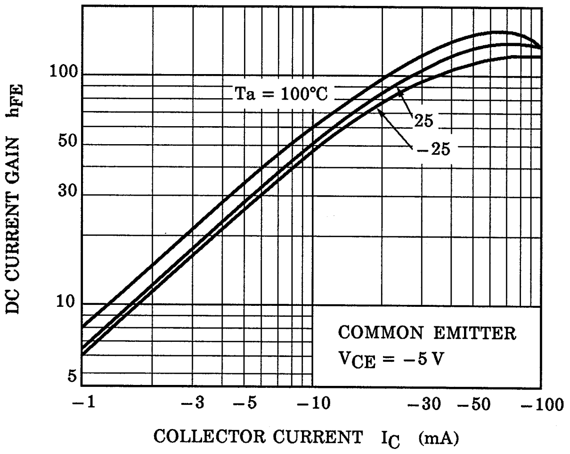
RN2105F $I_C - V_{I(OFF)}$



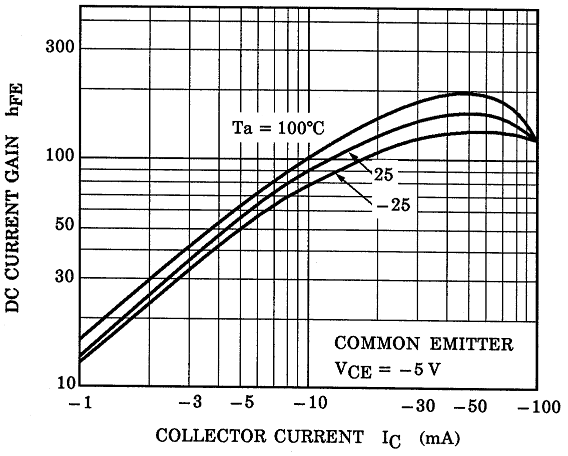
RN2106F $I_C - V_{I(OFF)}$



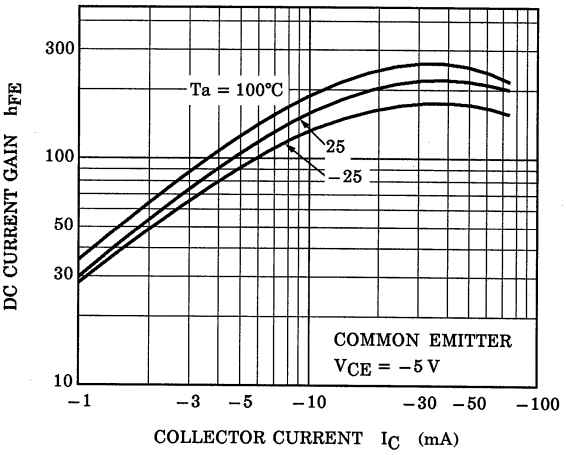
RN2101F h_{FE} – I_C



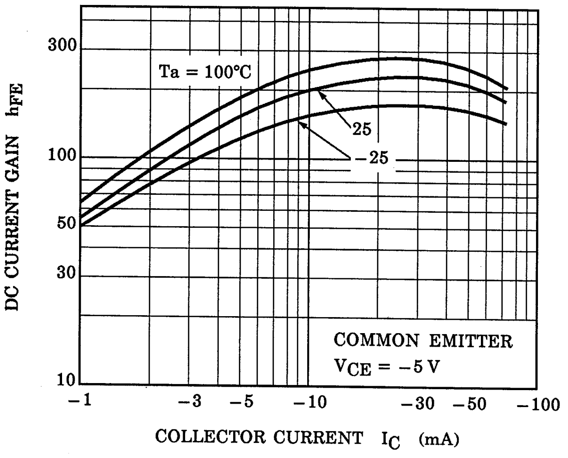
RN2102F h_{FE} – I_C



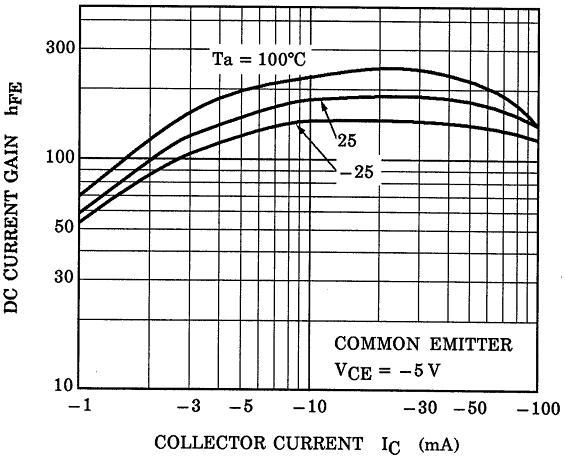
RN2103F h_{FE} – I_C



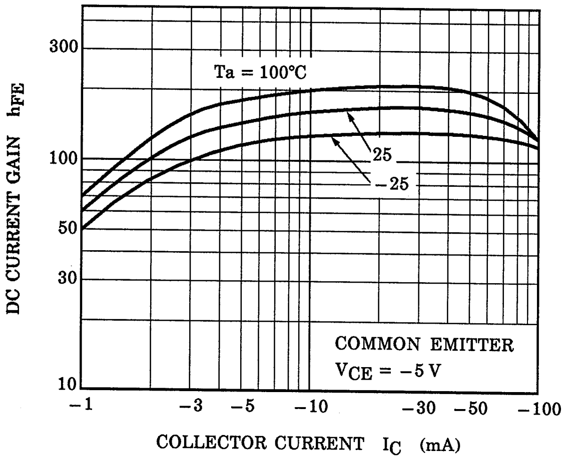
RN2104F h_{FE} – I_C

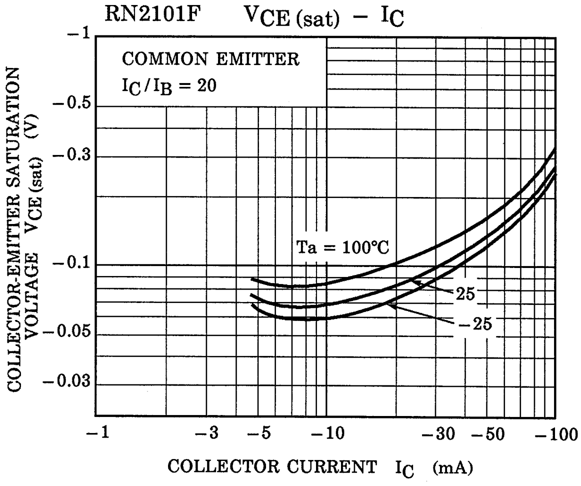


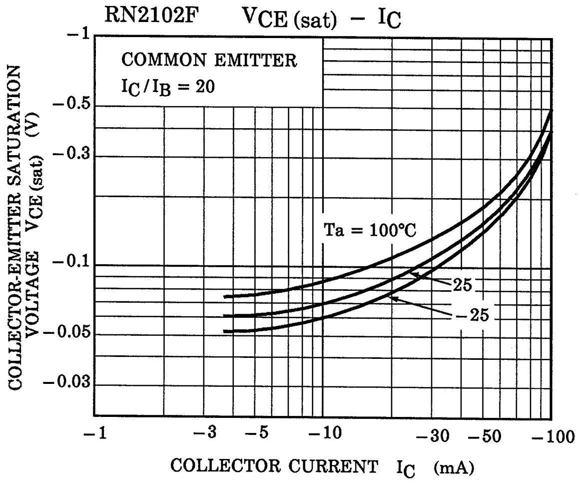
RN2105F h_{FE} – I_C

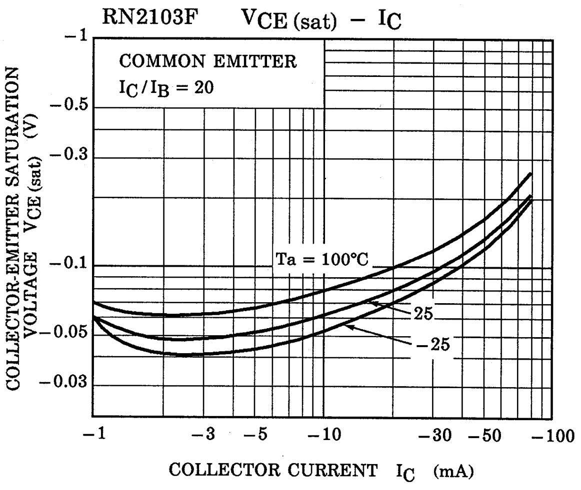


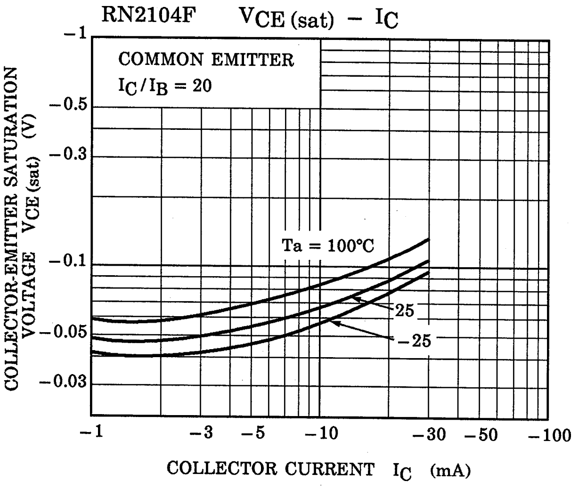
RN2106F h_{FE} – I_C

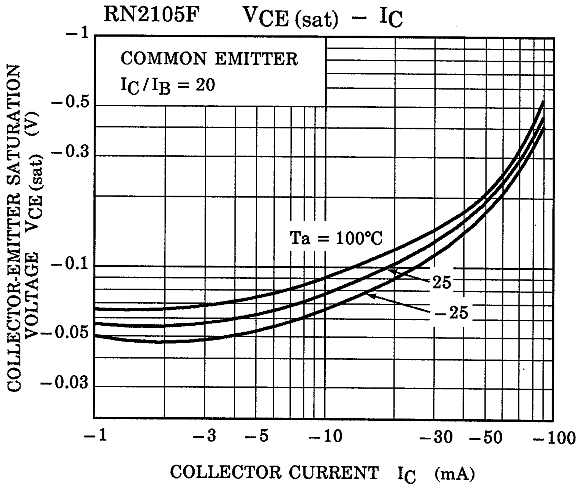


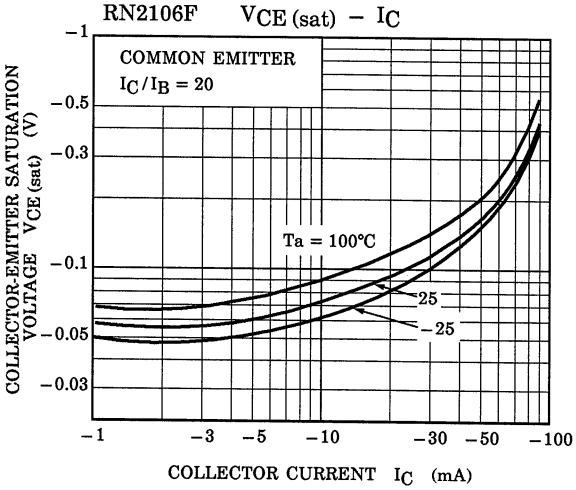

RN2101F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100

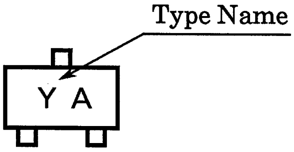
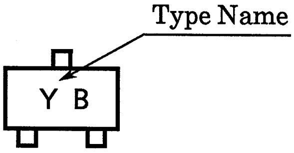
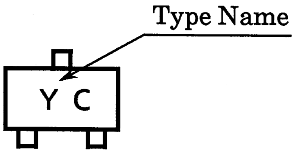
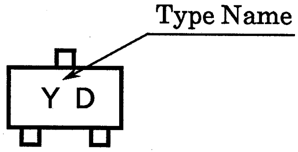
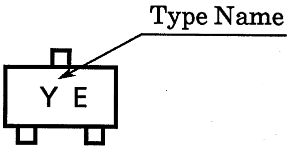
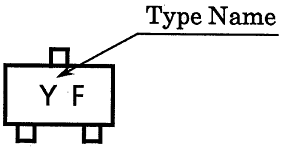

RN2102F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100


RN2103F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100


RN2104F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100


RN2105F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100


RN2106F $V_{CE\,(sat)} - I_C$
COMMON EMITTER
$I_C/I_B = 20$
Ta = 100°C
25
−25
COLLECTOR-EMITTER SATURATION VOLTAGE $V_{CE\,(sat)}$ (V)
−1
−0.5
−0.3
−0.1
−0.05
−0.03
COLLECTOR CURRENT I_C (mA)
−1
−3
−5
−10
−30
−50
−100

Type Name	Marking
RN2101F	
RN2102F	
RN2103F	
RN2104F	
RN2105F	
RN2106F	

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