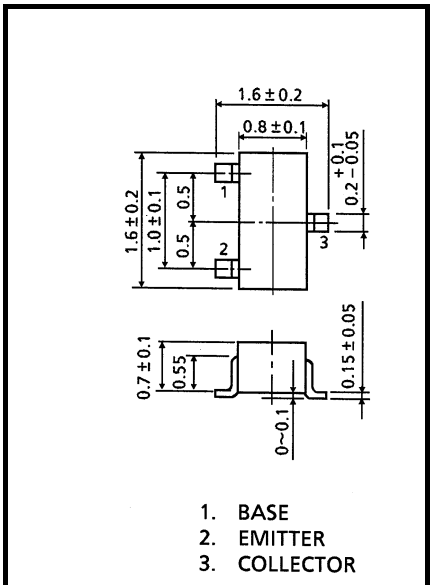
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

RN2114, RN2115, RN2116, RN2117, RN2118

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

Unit: mm

- Built-in bias resistors
- Simplified circuit design
- Fewer parts and simplified manufacturing process
- Complementary to RN1107 ~ RN1109

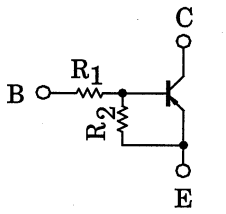


1. BASE
2. EMITTER
3. COLLECTOR

SSM	
JEDEC	—
JEITA	—
TOSHIBA	2−2H1A

Weight: 2.4mg (typ.)

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN2114	1	10
RN2115	2.2	10
RN2116	4.7	10
RN2117	10	4.7
RN2118	47	10

Absolute Maximum Ratings (Ta = 25°C)

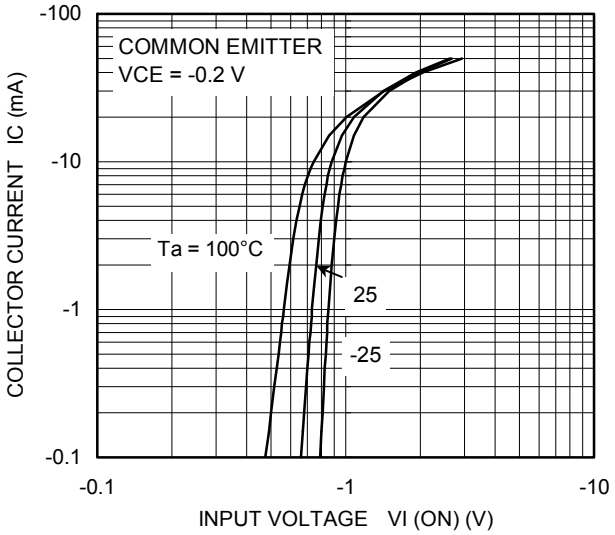
Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2114~2118	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2114	V_{EBO}	−5	V
	RN2115		−6	
	RN2116		−7	
	RN2117		−15	
	RN2118		−25	
Collector current	RN2114~2118	I_C	−100	mA
Collector power dissipation		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

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).

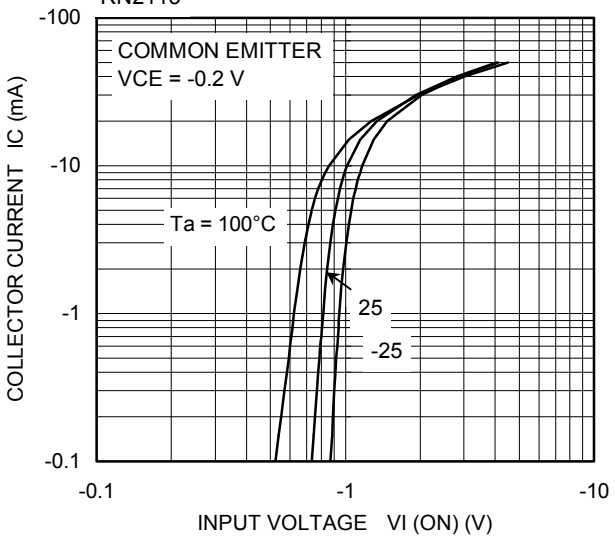
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2114~2118	I_{CBO}	—	V_{CB} = −50 V, I_E = 0	—	—	−100	nA
	RN2114~2118	I_{CEO}		V_{CE} = −50 V, I_B = 0	—	—	−500	nA
Emitter cut-off current	RN2114	I_{EBO}	—	V_{EB} = −5 V, I_C = 0	−0.35	—	−0.65	mA
	RN2115			V_{EB} = −6 V, I_C = 0	−0.37	—	−0.71	
	RN2116			V_{EB} = −7 V, I_C = 0	−0.36	—	−0.68	
	RN2117			V_{EB} = −15 V, I_C = 0	−0.78	—	−1.46	
	RN2118			V_{EB} = −25 V, I_C = 0	−0.33	—	−0.63	
DC current gain	RN2114~16, 18	h_{FE}	—	V_{CE} = −5 V, I_C = −10 mA	50	—	—	—
	RN2117				30	—	—	
Collector-emitter saturation voltage	RN2114~2118	$V_{CE\ (sat)}$	—	I_C = −5 mA, I_B = −0.25 mA	—	−0.1	−0.3	V
Input voltage (ON)	RN2114	$V_{I\ (ON)}$	—	V_{CE} = −0.2 V, I_C = −5 mA	−0.5	—	−2.0	V
	RN2115				−0.6	—	−2.5	
	RN2116				−0.7	—	−2.5	
	RN2117				−1.5	—	−3.5	
	RN2118				−2.5	—	−10.0	
Input voltage (OFF)	RN2114	$V_{I\ (OFF)}$	—	V_{CE} = −5 V, I_C = −0.1 mA	−0.3	—	−0.9	V
	RN2115				−0.3	—	−1.0	
	RN2116				−0.3	—	−1.1	
	RN2117				−0.3	—	−3.0	
	RN2118				−0.5	—	−5.7	
Transition frequency	RN2114~2118	f_T	—	V_{CE} = −10 V, I_C = −5 mA	—	200	—	MHz
Collector Output capacitance	RN2114~2118	C_{ob}	—	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	3.0	6.0	pF
Input resistor	RN2114	R1	—	—	0.7	1.0	1.3	kΩ
	RN2115				1.54	2.2	2.86	
	RN2116				3.29	4.7	6.11	
	RN2117				7.0	10.0	13.0	
	RN2118				32.9	47.0	61.1	
Resistor ratio	RN2114	R1/R2	—	—	—	0.1	—	—
	RN2115				—	0.22	—	
	RN2116				—	0.47	—	
	RN2117				—	2.13	—	
	RN2118				—	4.7	—	

RN2114 IC - VI (ON)



RN2115 IC - VI (ON)



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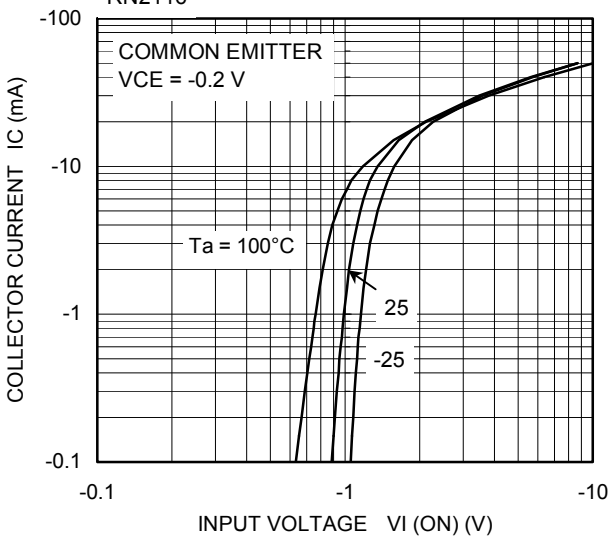

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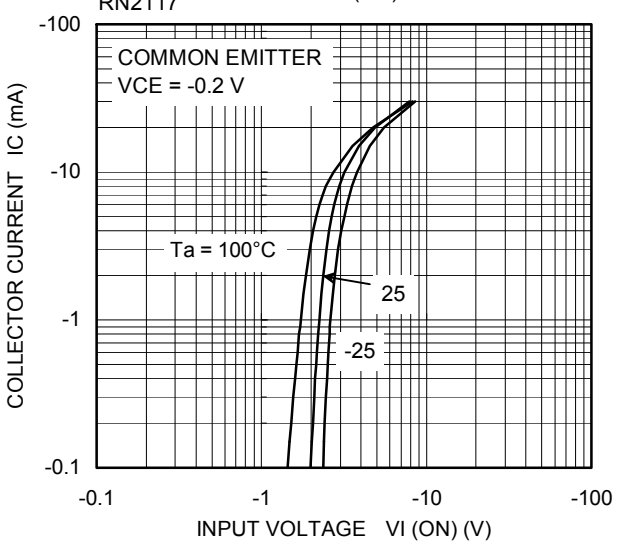
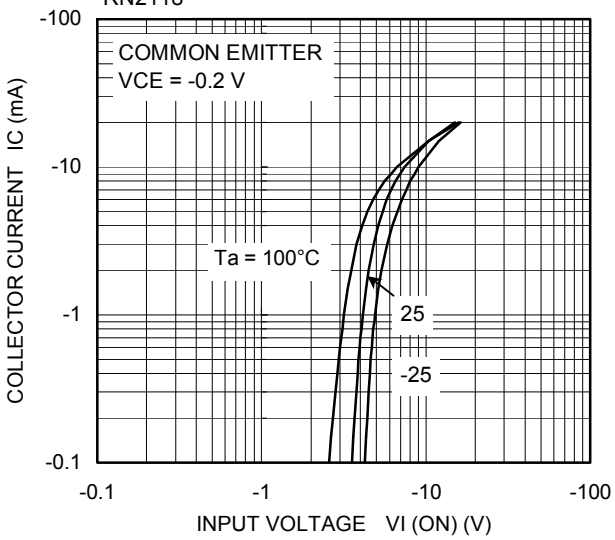
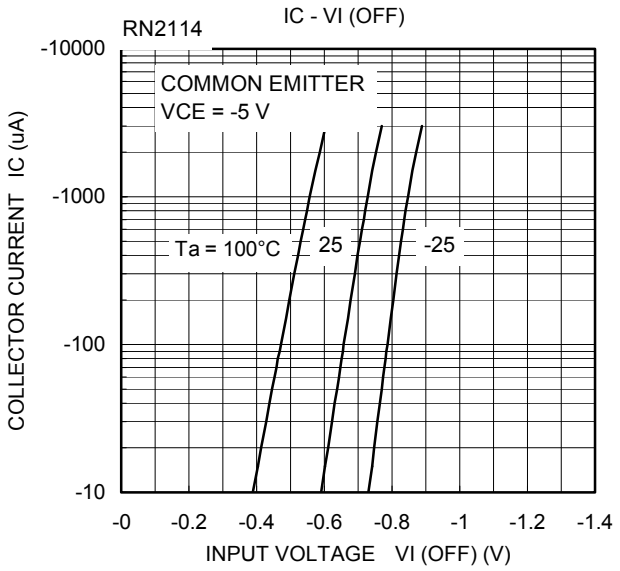
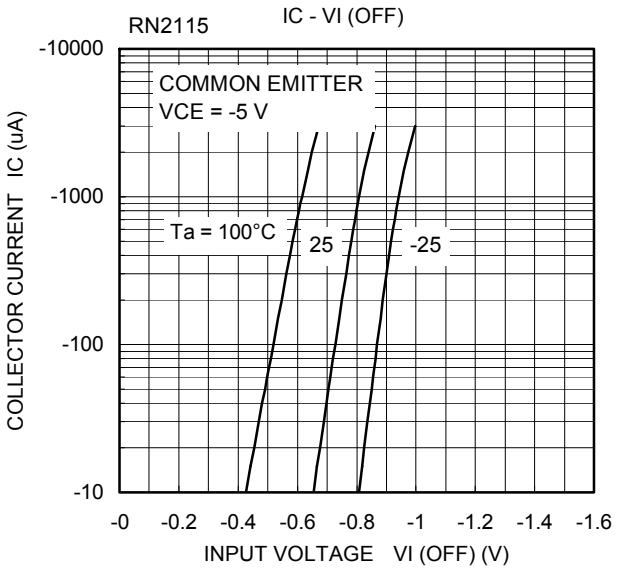
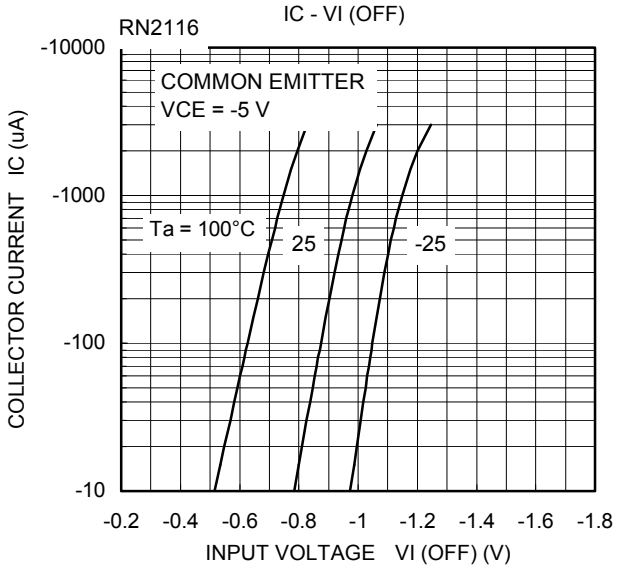


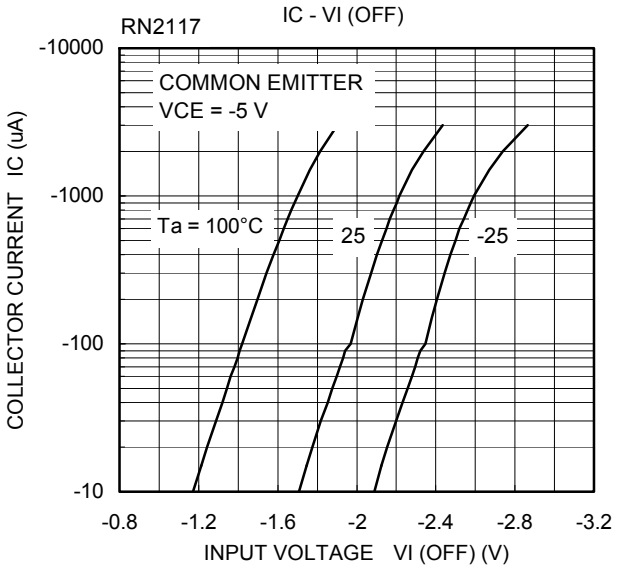
RN2118 IC - VI(ON)

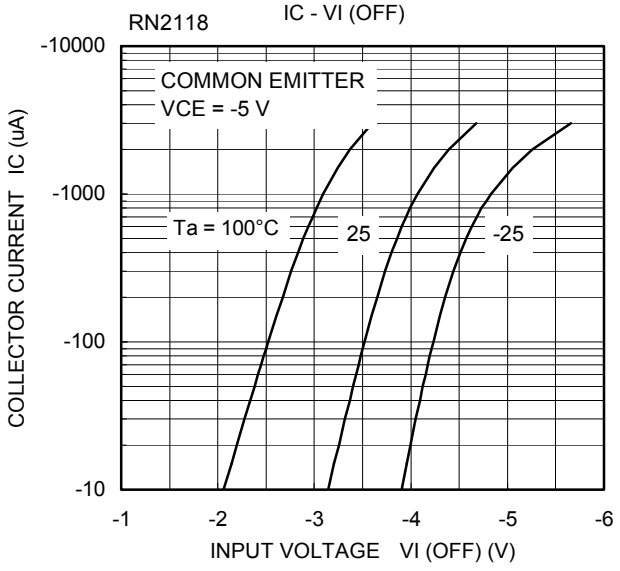



RN2114
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (uA)
-10000
-1000
-100
-10
-0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
INPUT VOLTAGE VI (OFF) (V)

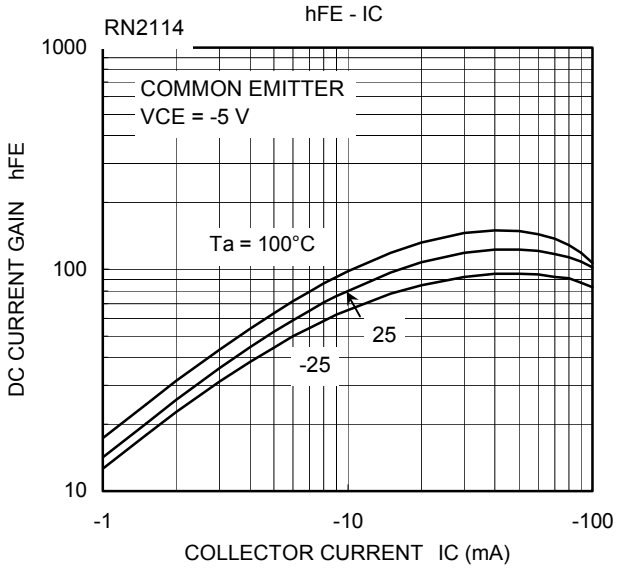

RN2115
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (uA)
-10000
-1000
-100
-10
-0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
INPUT VOLTAGE VI (OFF) (V)


RN2116
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (uA)
-10000
-1000
-100
-10
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
INPUT VOLTAGE VI (OFF) (V)


RN2117
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (uA)
-10000
-1000
-100
-10
-0.8
-1.2
-1.6
-2
-2.4
-2.8
-3.2
INPUT VOLTAGE VI (OFF) (V)


RN2118
IC - VI (OFF)
COMMON EMITTER
VCE = -5 V
Ta = 100°C
25
-25
COLLECTOR CURRENT IC (uA)
-10000
-1000
-100
-10
-1
-2
-3
-4
-5
-6
INPUT VOLTAGE VI (OFF) (V)

RN2114



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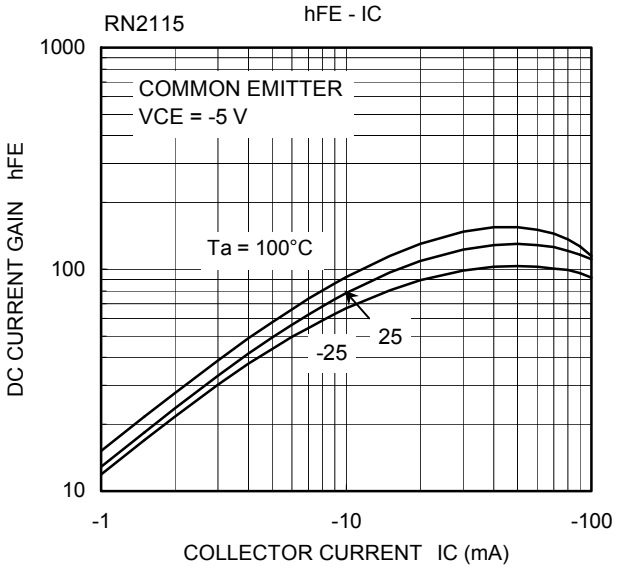

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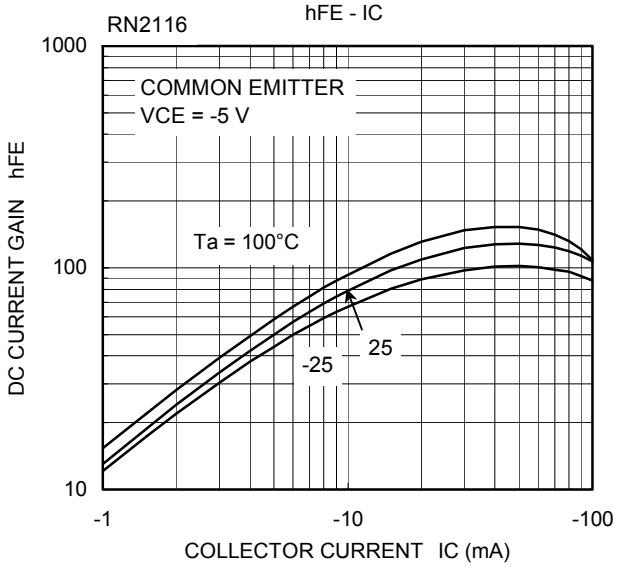

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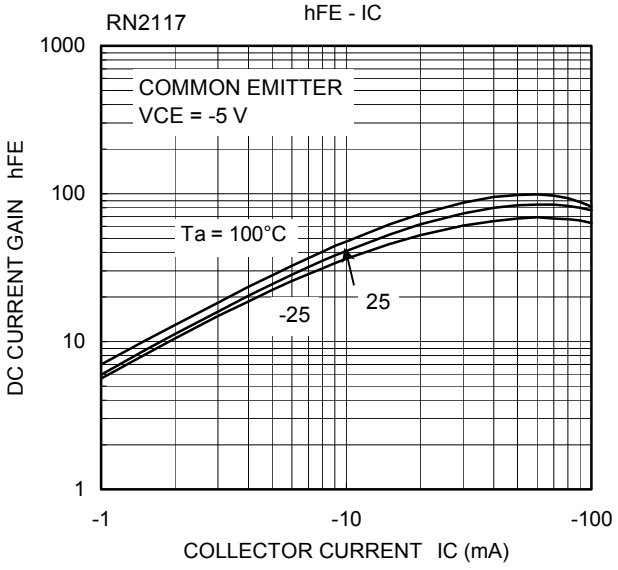

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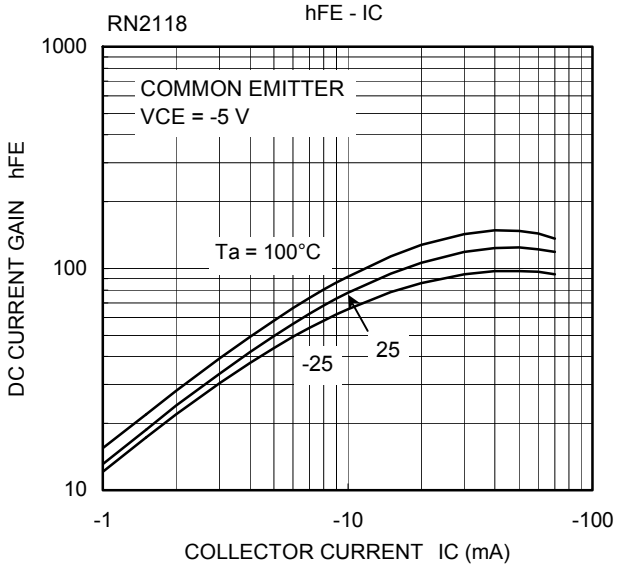
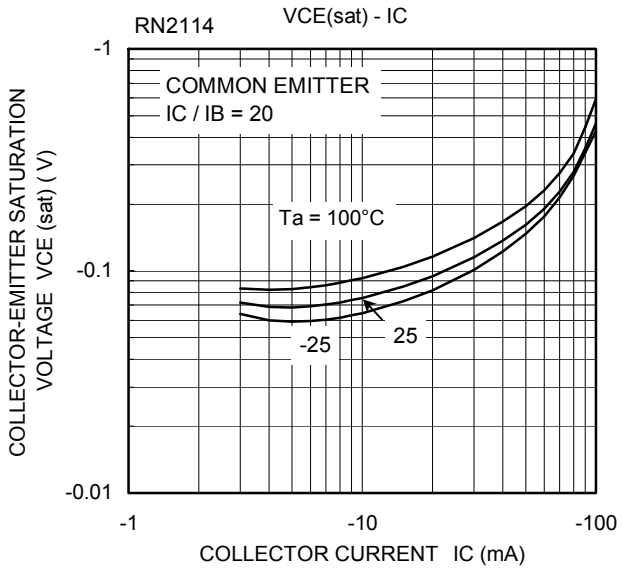
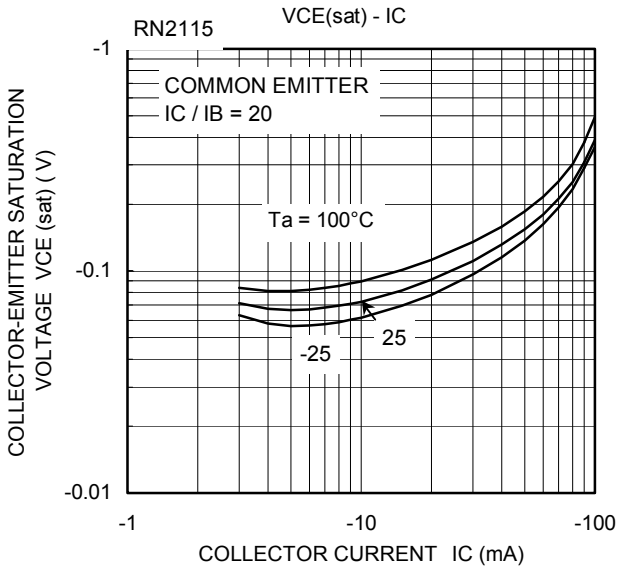
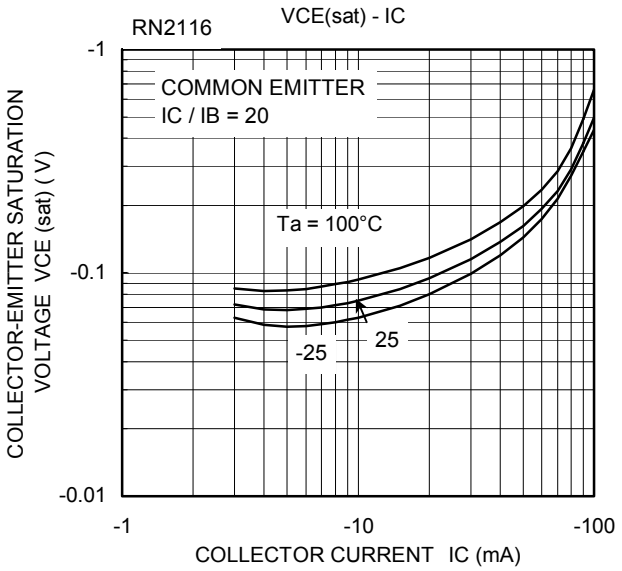
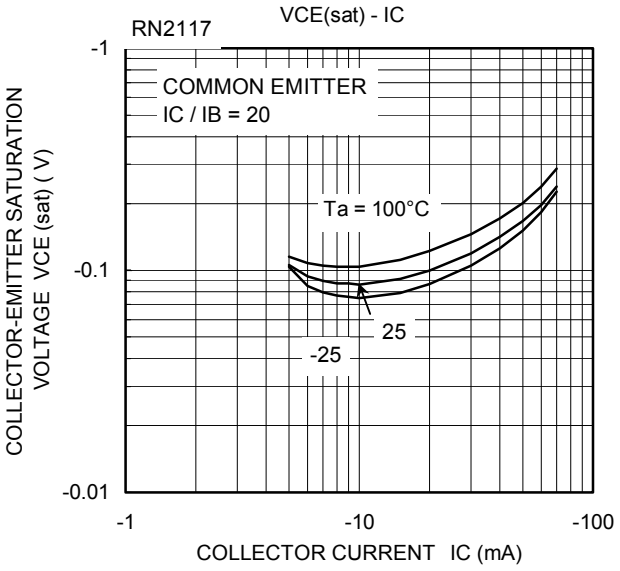
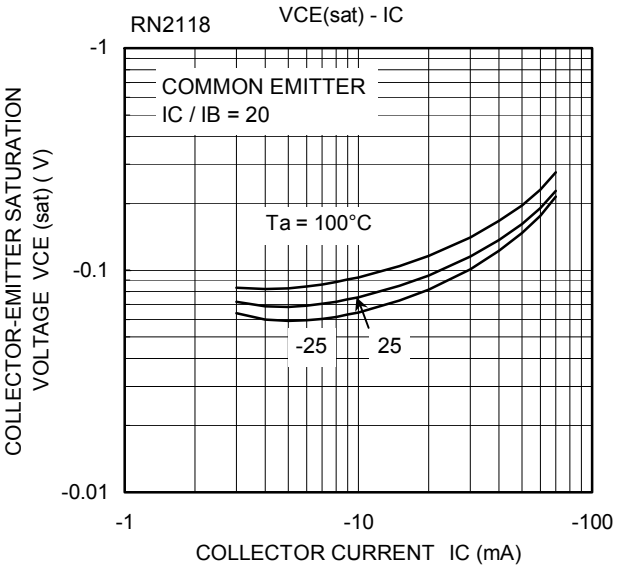


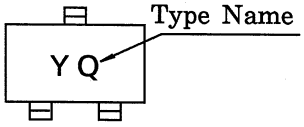
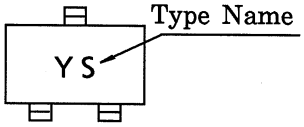
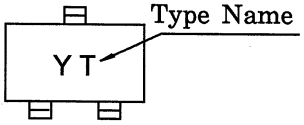
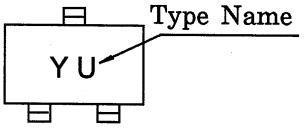
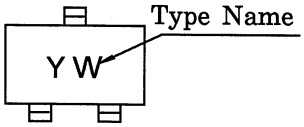

RN2114
VCE(sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
-1
-0.1
-0.01
-1
-10
-100


RN2115
VCE(sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
-1
-0.1
-0.01
-1
-10
-100


RN2116
VCE(sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
-1
-0.1
-0.01
-1
-10
-100


RN2117
VCE(sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
-1
-0.1
-0.01
-1
-10
-100


RN2118
VCE(sat) - IC
COMMON EMITTER
IC / IB = 20
Ta = 100°C
25
-25
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (mA)
-1
-0.1
-0.01
-1
-10
-100

Type Name	Marking
RN2114	
RN2115	
RN2116	
RN2117	
RN2118	

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