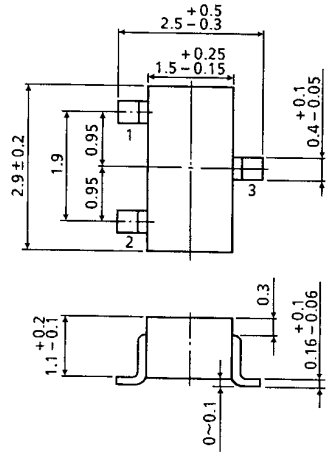
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

RN1421, RN1422, RN1423, RN1424 RN1425, RN1426, RN1427

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- High current type (I_C (max) = 800 mA)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Low V_{CE} (sat)
- Complementary to RN2421 to RN2427

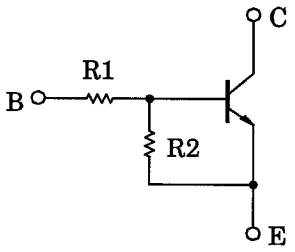
Unit: mm



S-Mini	
JEDEC	TO-236MOD
JEITA	SC-59
TOSHIBA	2-3F1A

Weight: 12 mg (typ.)

Equivalent Circuit and Bias Resister Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1421	1	1
RN1422	2.2	2.2
RN1423	4.7	4.7
RN1424	10	10
RN1425	0.47	10
RN1426	1	10
RN1427	2.2	10

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1421 to 1427	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1421 to 1424	V_{EBO}	10	V
	RN1425, 1426		5	
	RN1427		6	
Collector current	RN1421 to 1427	I_C	800	mA
Collector power dissipation		P_C	200	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

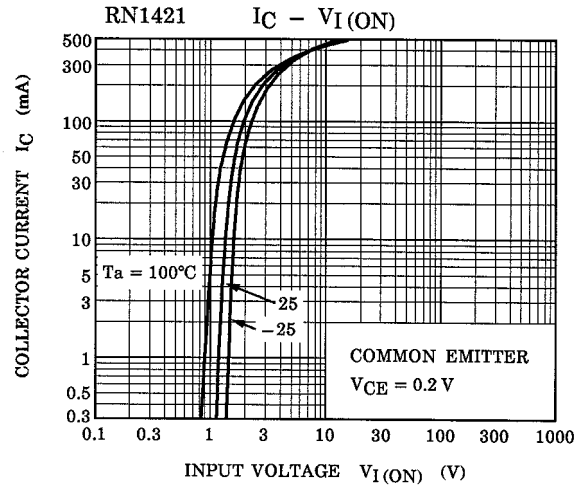
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

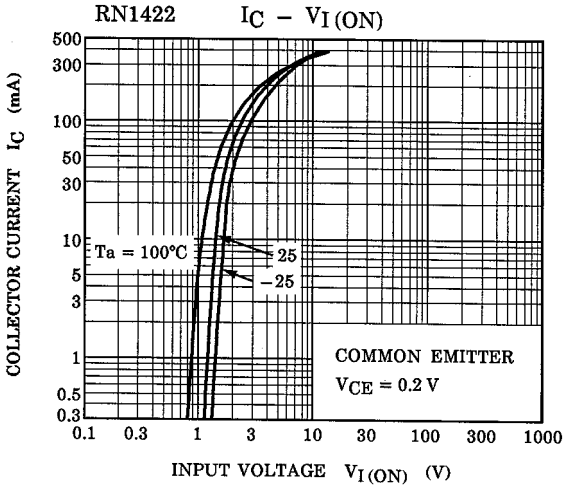
Start of commercial production
1988-03

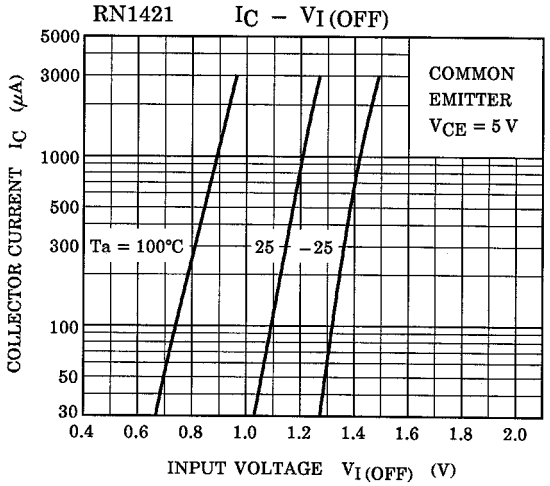
Electrical Characteristics (Ta = 25°C)

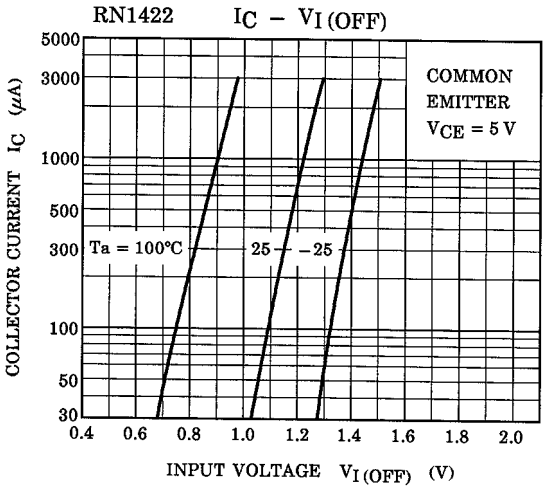
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1421 to 1427	I_{CBO}	V_{CB} = 50 V, I_E = 0 mA	—	—	100	nA
		I_{CEO}	V_{CE} = 50 V, I_B = 0 mA	—	—	500	
Emitter cut-off current	RN1421	I_{EBO}	V_{EB} = 10 V, I_C = 0 mA	3.85	—	7.14	mA
	RN1422			1.75	—	3.25	
	RN1423			0.82	—	1.52	
	RN1424			0.38	—	0.71	
	RN1425		V_{EB} = 5 V, I_C = 0 mA	0.365	—	0.682	
	RN1426			0.35	—	0.65	
	RN1427		V_{EB} = 6 V, I_C = 0 mA	0.378	—	0.703	
DC current gain	RN1421	h_{FE}	V_{CE} = 1 V, I_C = 100 mA	60	—	—	—
	RN1422			65	—	—	
	RN1423			70	—	—	
	RN1424			90	—	—	
	RN1425			90	—	—	
	RN1426			90	—	—	
	RN1427			90	—	—	
Collector-emitter saturation voltage	RN1421	$V_{CE\ (sat)}$	I_C = 50 mA, I_B = 2 mA	—	—	0.25	V
	RN1422 to 1427		I_C = 50 mA, I_B = 1 mA				
Input voltage (ON)	RN1421	$V_{I\ (ON)}$	V_{CE} = 0.2 V, I_C = 100 mA	1.0	—	3.5	V
	RN1422			1.4	—	4.5	
	RN1423			2.0	—	6.5	
	RN1424			3.0	—	12.0	
	RN1425			0.6	—	2.0	
	RN1426			0.7	—	2.5	
	RN1427			1.0	—	3.0	
Input voltage (OFF)	RN1421 to 1424	$V_{I\ (OFF)}$	V_{CE} = 5 V, I_C = 0.1 mA	0.8	—	1.3	V
	RN1425, 1426			0.4	—	0.8	
	RN1427			0.5		1.0	
Transition frequency	RN1421 to 1427	f_T	V_{CE} = 5 V, I_C = 20 mA	—	300	—	MHz
Collector Output capacitance	RN1421 to 1427	C_{ob}	V_{CB} = 10 V, I_E = 0 mA, f = 1 MHz	—	7	—	pF
Input resistor	RN1421	R1	—	0.7	1.0	1.3	kΩ
	RN1422			1.54	2.2	2.86	
	RN1423			3.29	4.7	6.11	
	RN1424			7	10	13	
	RN1425			0.329	0.47	0.61	
	RN1426			0.7	1.0	1.3	
	RN1427			1.54	2.2	2.86	
Resistor ratio	RN1421 to 1424	R1/R2	—	0.9	1.0	1.1	—
	RN1425			0.0423	0.047	0.0517	
	RN1426			0.09	0.1	0.11	
	RN1427			0.2	0.22	0.24	

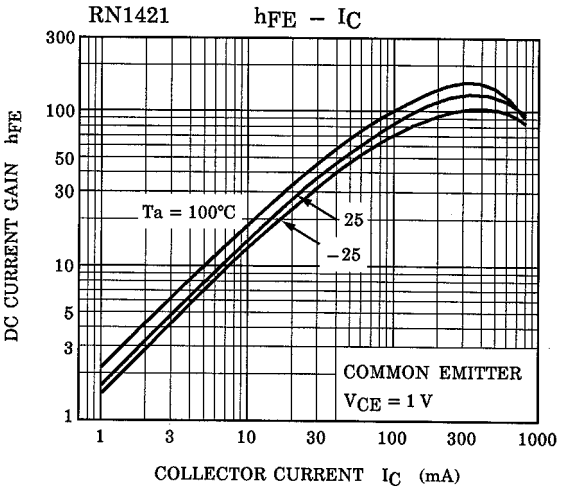
Characteristics Curves

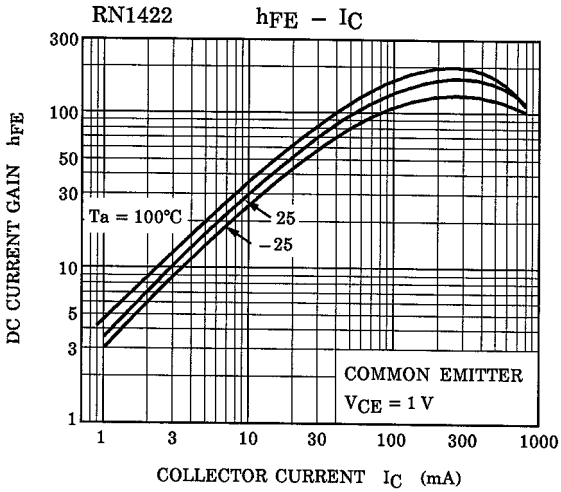




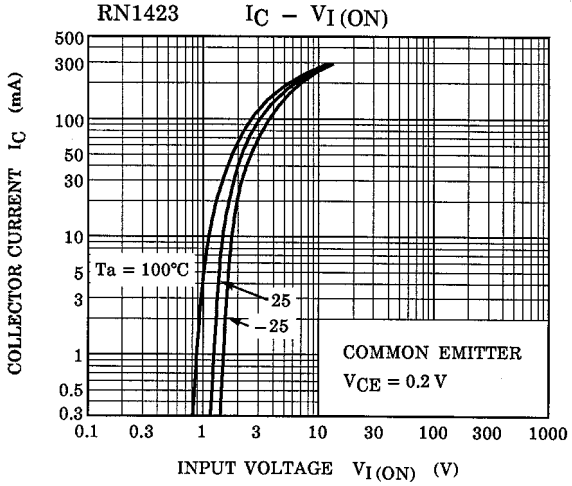




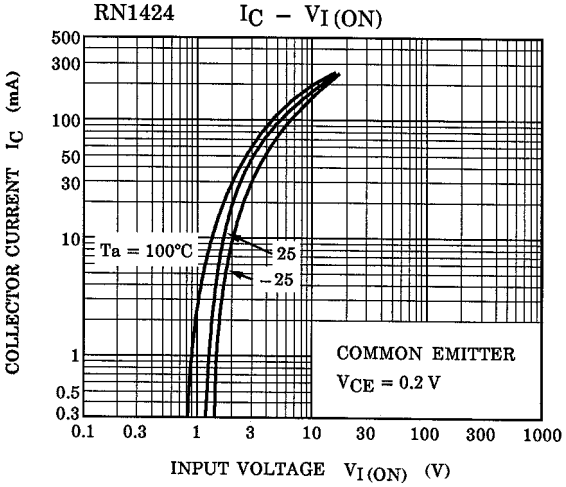




RN1423 $I_C - V_{I(ON)}$



RN1424 $I_C - V_{I(ON)}$



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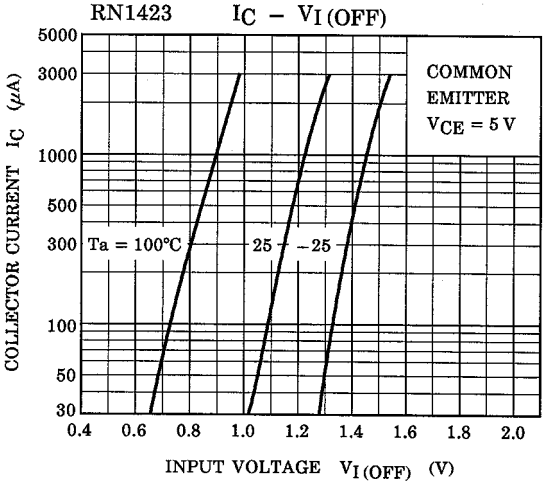
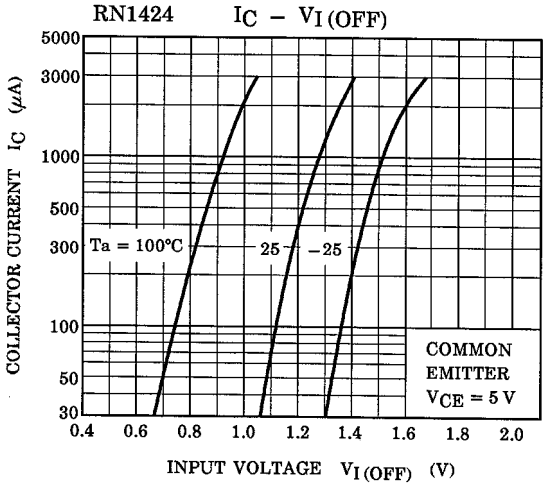
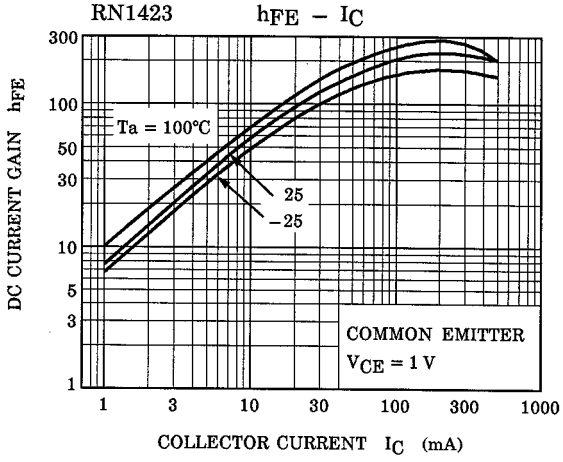


RN1424 $I_C - V_{I(OFF)}$



RN1423 $h_{FE} - I_C$



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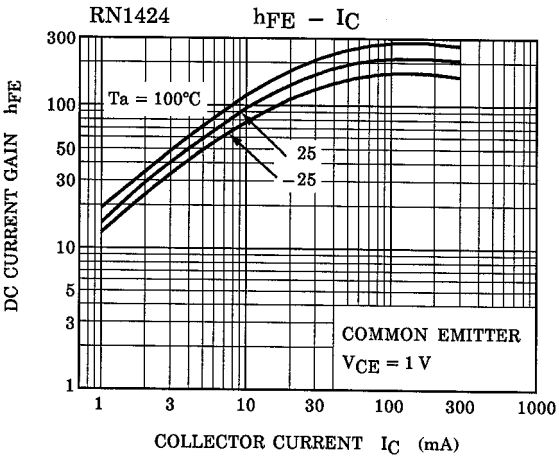
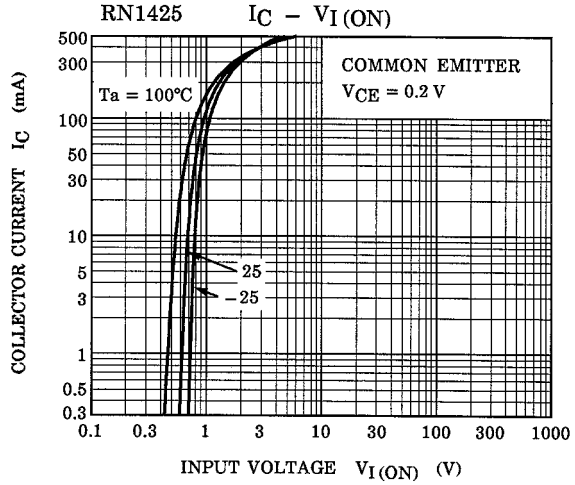
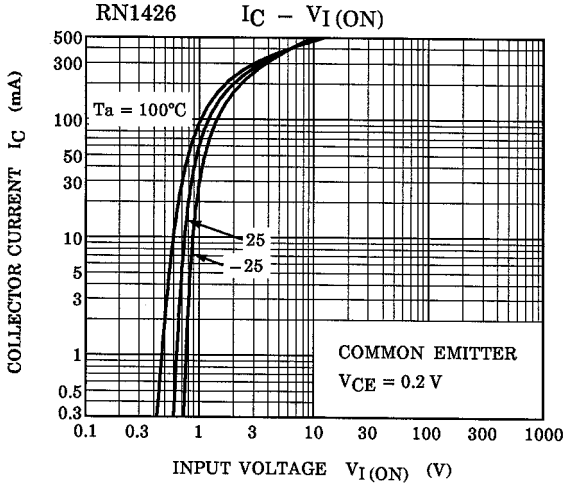


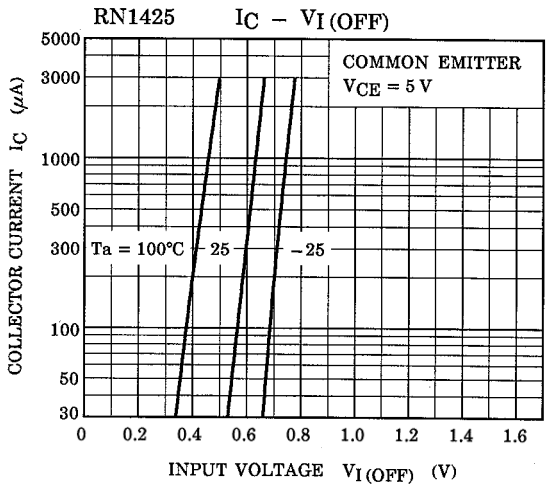
RN1425 I_C – $V_{I(ON)}$



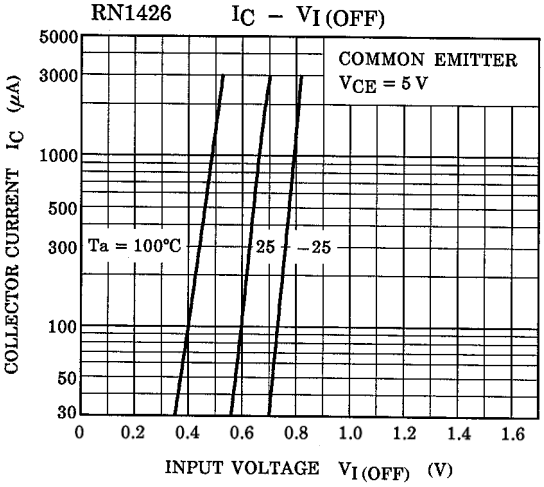
RN1426 I_C – $V_{I(ON)}$



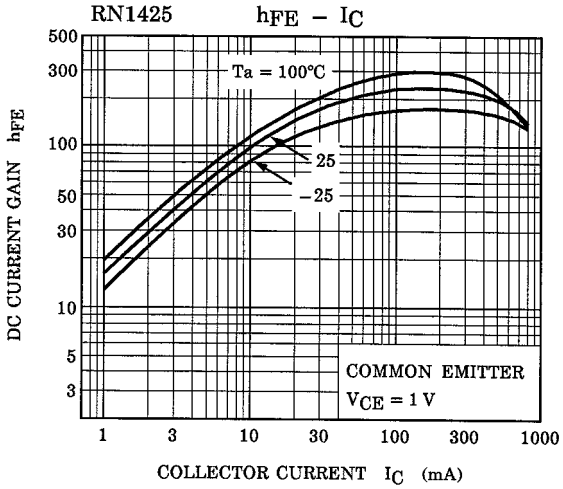
RN1425 I_C – $V_{I(OFF)}$



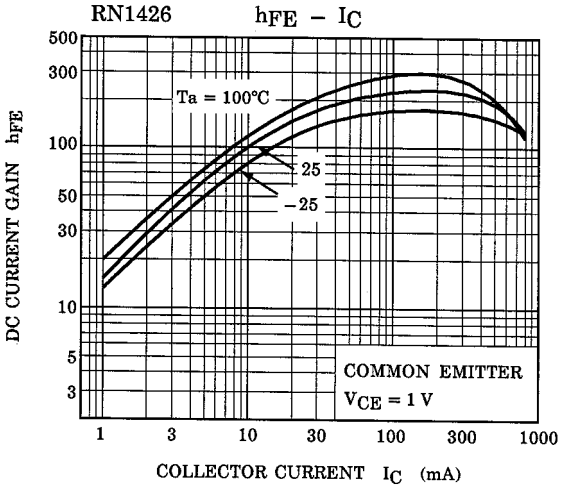
RN1426 I_C – $V_{I(OFF)}$

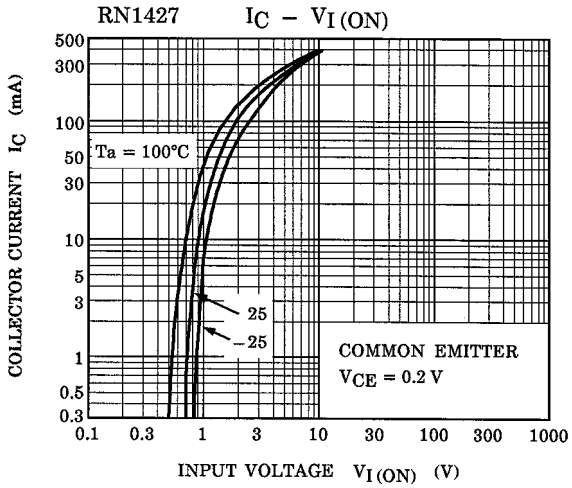


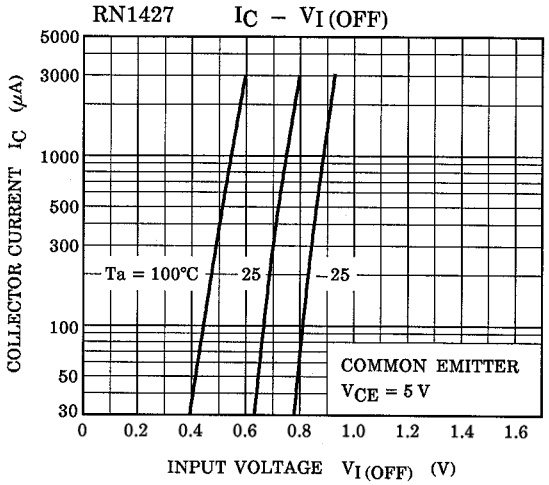
RN1425 h_{FE} – I_C

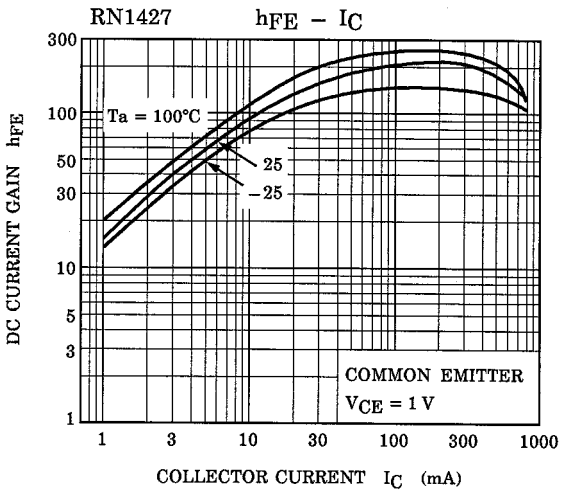


RN1426 h_{FE} – I_C



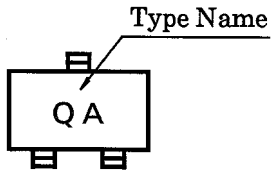
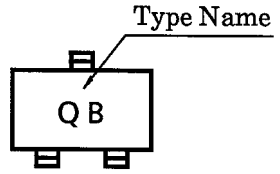
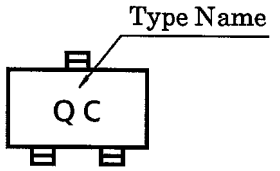
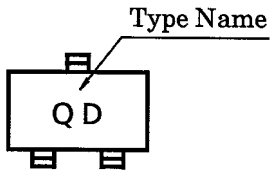
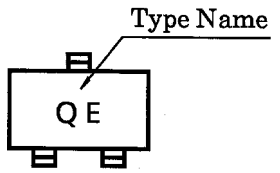
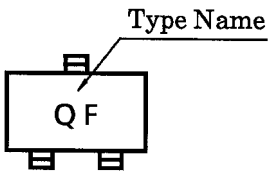
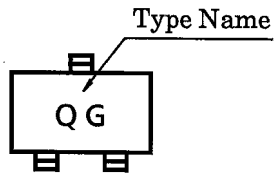






The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Marking

Type Name	Marking
RN1421	
RN1422	
RN1423	
RN1424	
RN1425	
RN1426	
RN1427	

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