

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

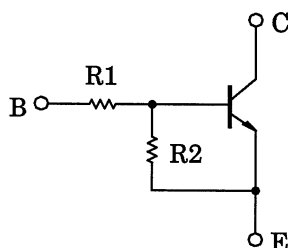
RN1421,RN1422,RN1423,RN1424 RN1425,RN1426,RN1427

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

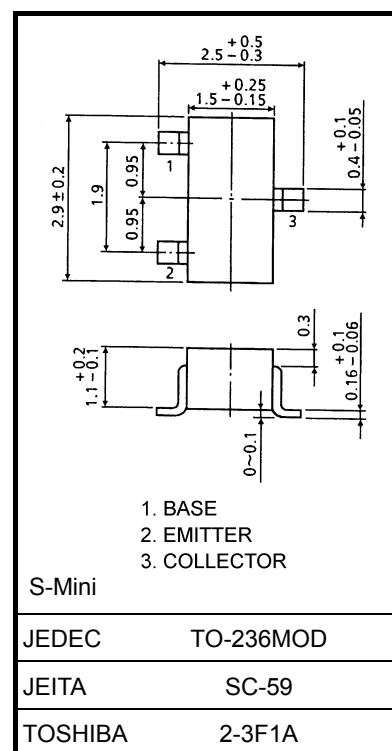
Unit: mm

- High current type (I_C (max) = 800mA)
- 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

Equivalent Circuit and Bias Resistor 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



Weight: 12 mg (typ.)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

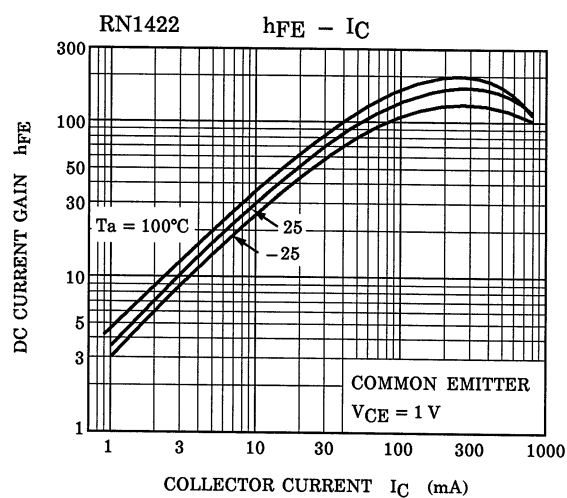
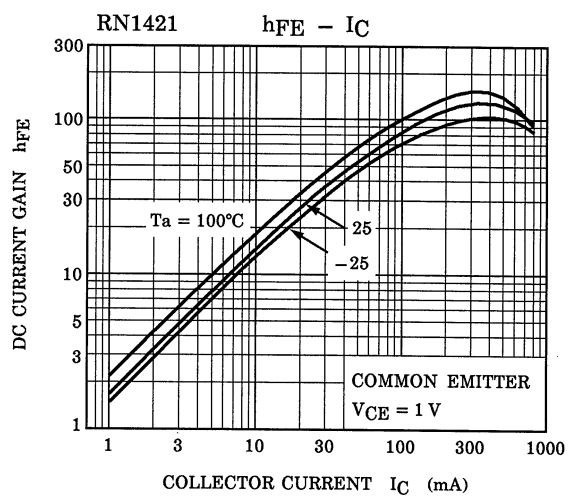
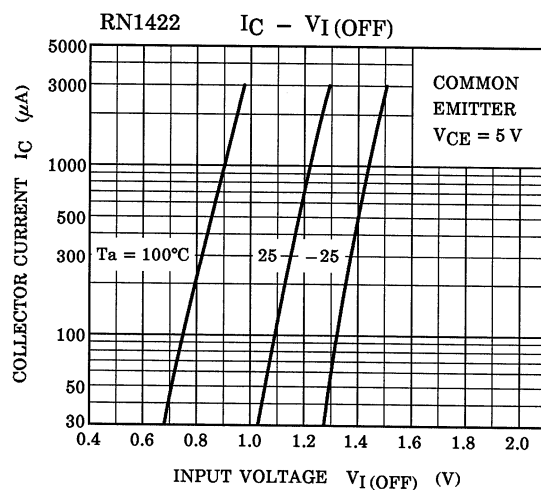
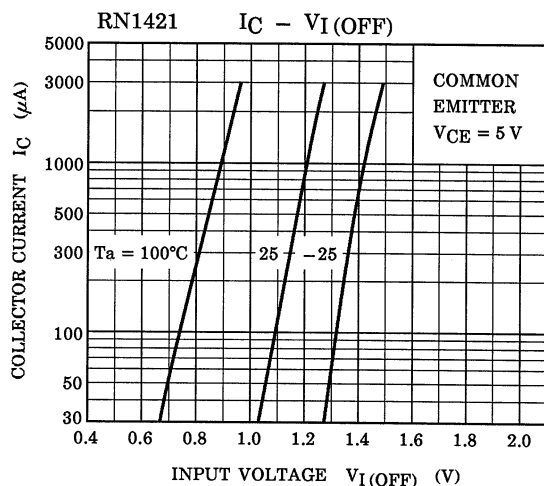
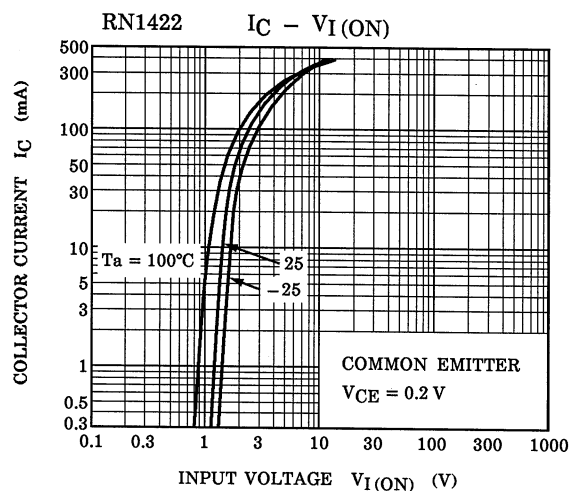
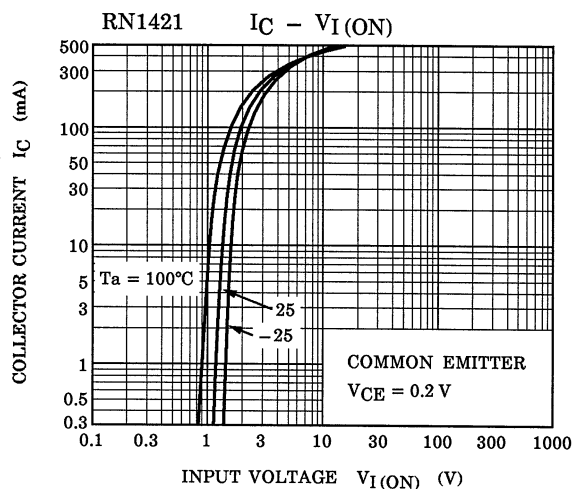
Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	10	V
		5	V
		6	V
Collector current	I_C	800	mA
Collector power dissipation	P_C	200	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

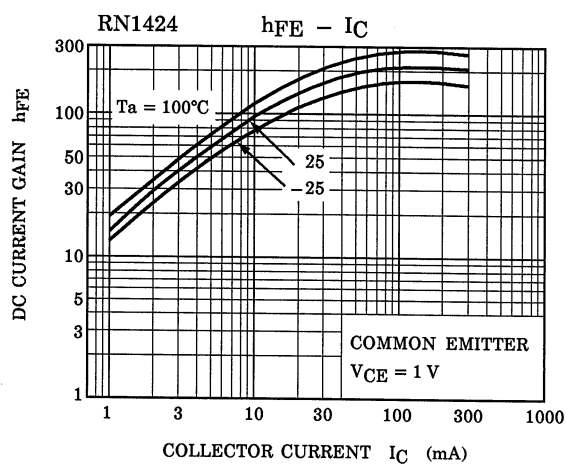
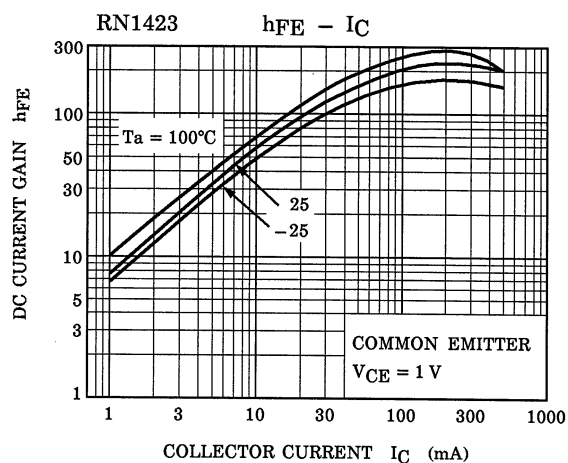
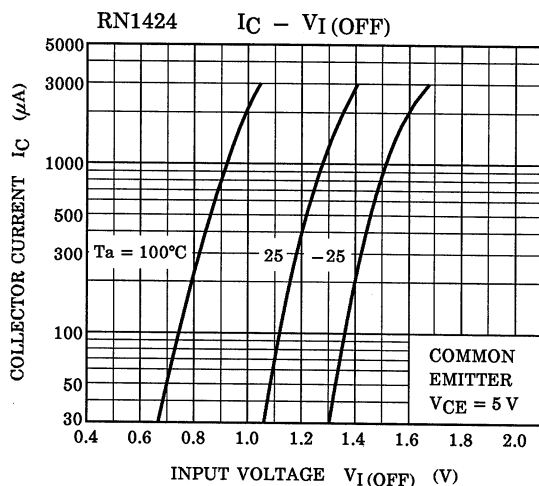
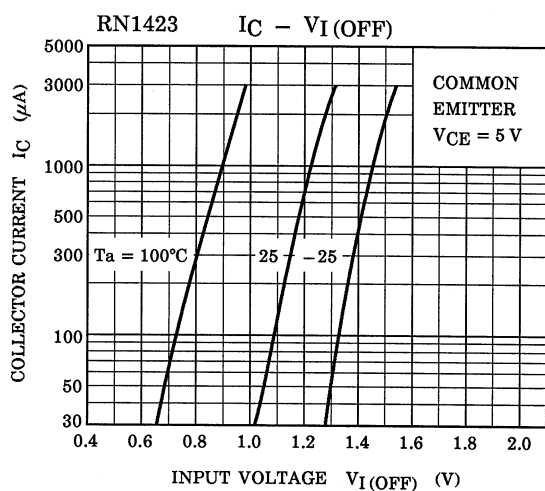
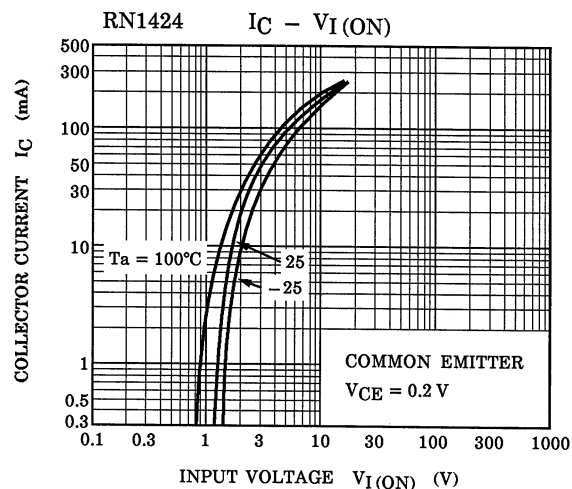
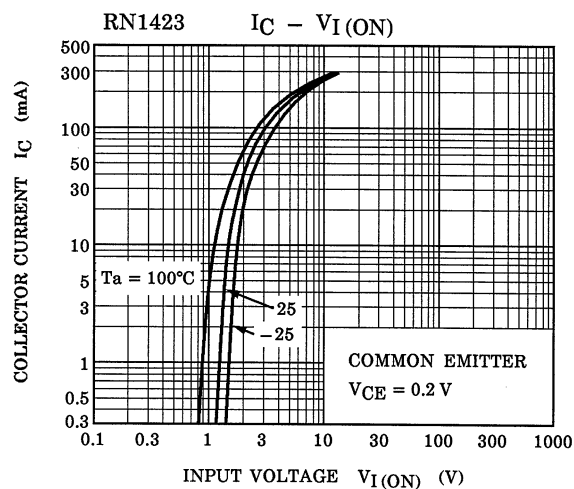
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

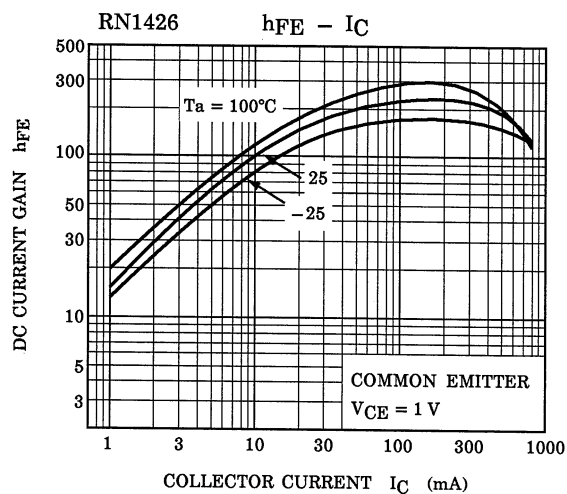
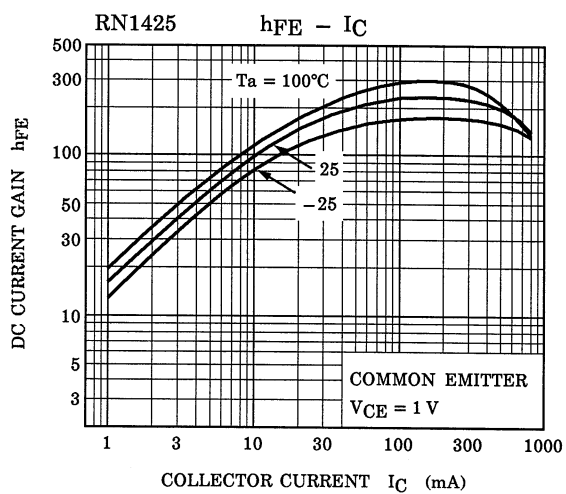
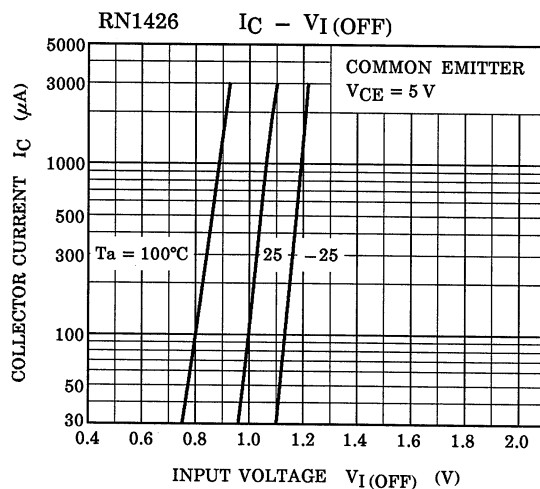
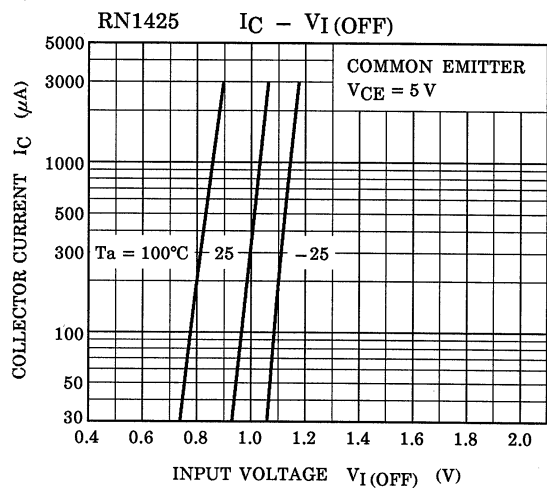
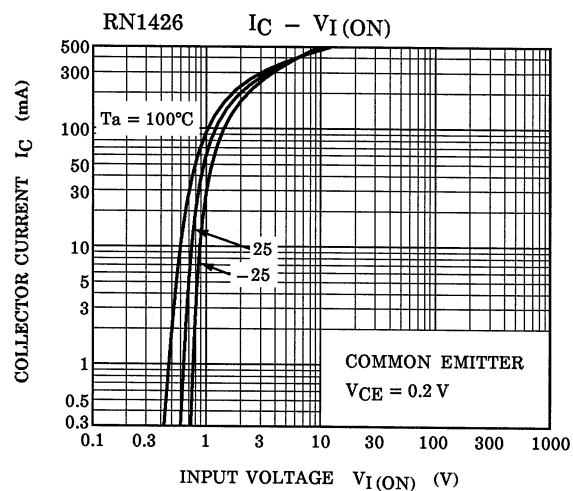
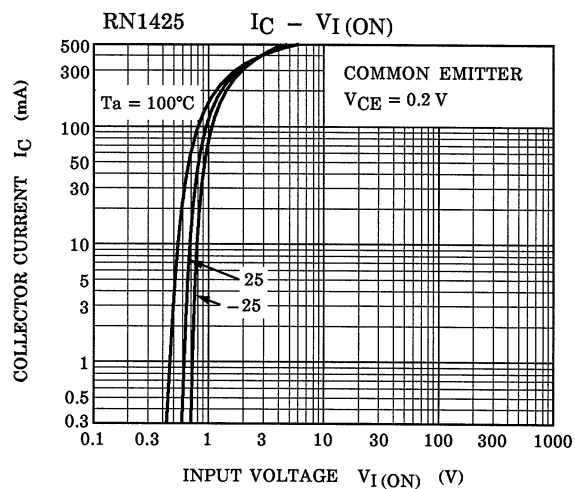
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

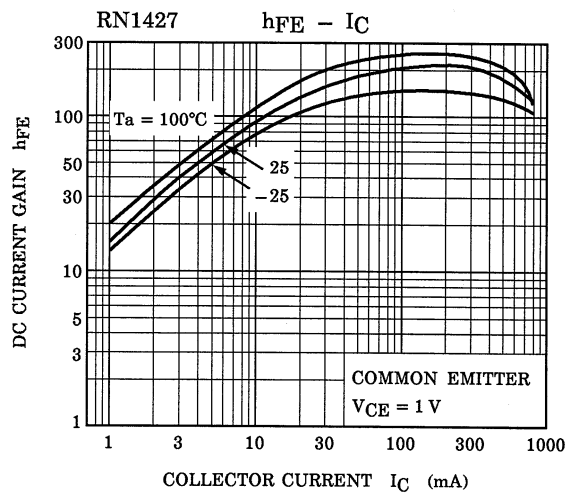
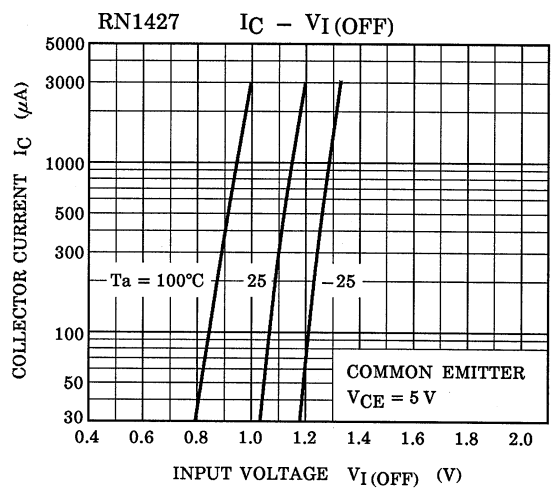
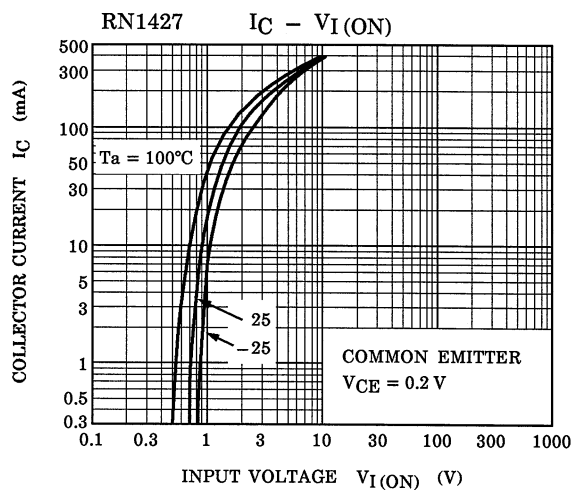
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1421 to 1427	I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		I_{CEO}		$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1421	I_{EBO}	—	$V_{EB} = 10V, I_C = 0$	3.85	—	7.14	mA
	RN1422				1.75	—	3.25	
	RN1423				0.82	—	1.52	
	RN1424			$V_{EB} = 5V, I_C = 0$	0.38	—	0.71	
	RN1425				0.365	—	0.682	
	RN1426			$V_{EB} = 6V, I_C = 0$	0.35	—	0.65	
	RN1427				0.378	—	0.703	
DC current gain	RN1421	h_{FE}	—	$V_{CE} = 1V, I_C = 100mA$	60	—	—	—
	RN1422				65	—	—	
	RN1423				70	—	—	
	RN1424				90	—	—	
	RN1425				90	—	—	
	RN1426				90	—	—	
	RN1427				90	—	—	
Collector-emitter saturation voltage	RN1421	$V_{CE(sat)}$	—	$I_C = 50mA, I_B = 2mA$	—	—	0.25	V
	RN1422 to 1427			$I_C = 50mA, I_B = 1mA$				
Input voltage (ON)	RN1421	$V_{I(ON)}$	—	$V_{CE} = 0.2V, I_C = 100mA$	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	$V_{I(OFF)}$	—	$V_{CE} = 5V, I_C = 0.1mA$	0.8	—	1.3	V
	RN1425, 1426				0.4	—	0.8	
	RN1427				0.5	—	1.0	
Transition frequency	RN1421 to 1427	f_T	—	$V_{CE} = 5V, I_C = 20mA$	—	300	—	MHz
Collector Output capacitance	RN1421 to 1427	C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	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	

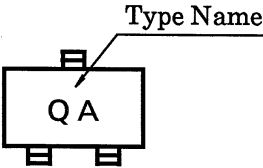
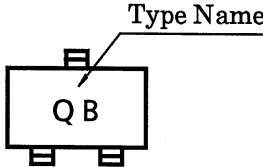
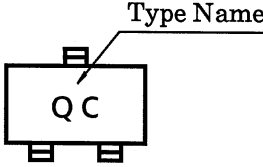
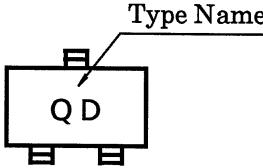
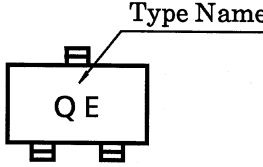
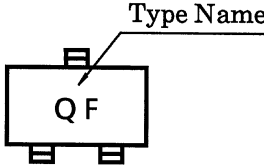








Marking

Type Name	Marking
RN1421	
RN1422	
RN1423	
RN1424	
RN1425	
RN1426	
RN1427	