

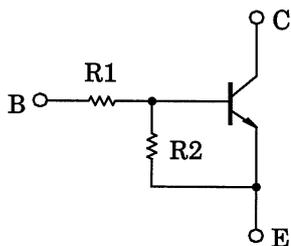
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

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

Switching, Inverter Circuit, Interface Circuit  
and Driver Circuit Applications

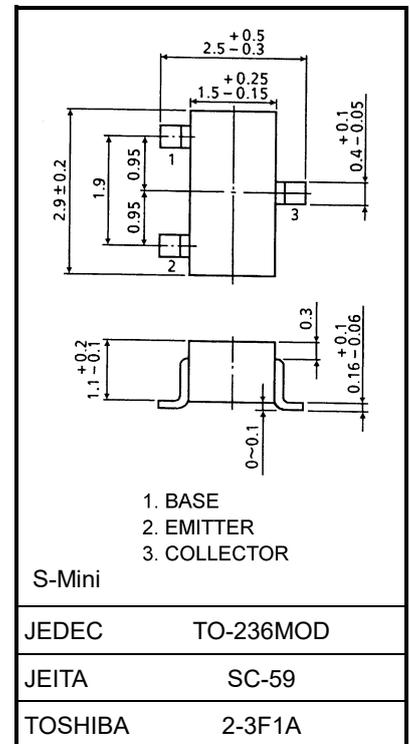
- High current type ( $I_C$  (max) = 800 mA)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Low  $V_{CE}$  (sat)
- Complementary to RN2421 to RN2427

### 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

Unit: mm



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	
		6	
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	$^\circ\text{C}$

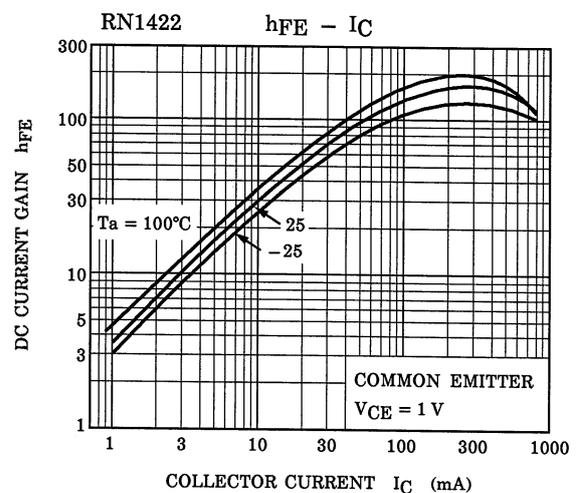
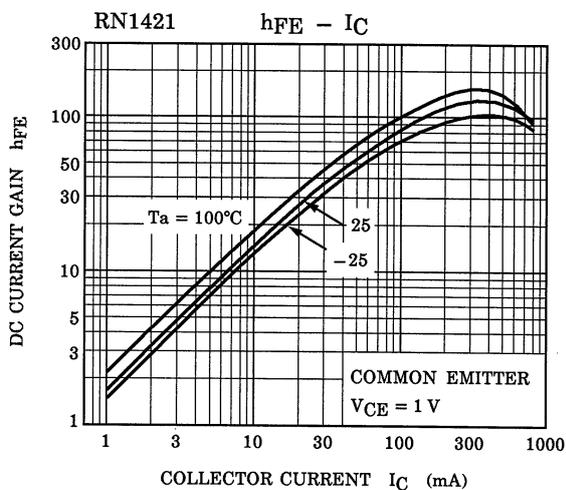
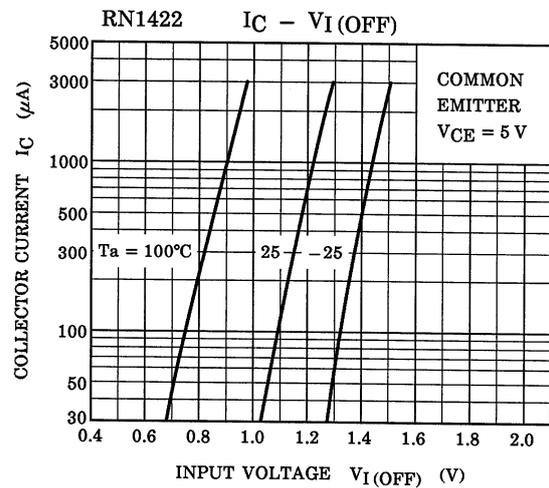
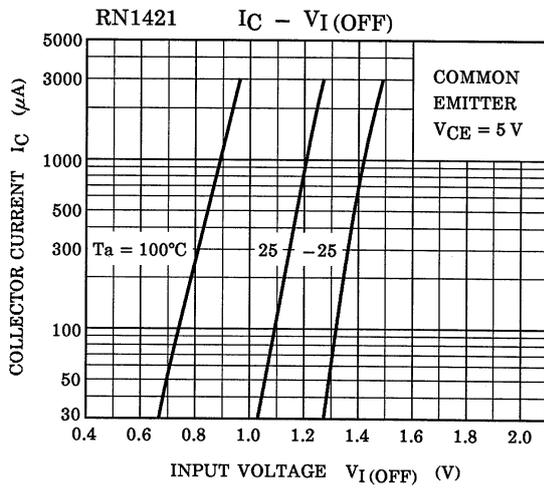
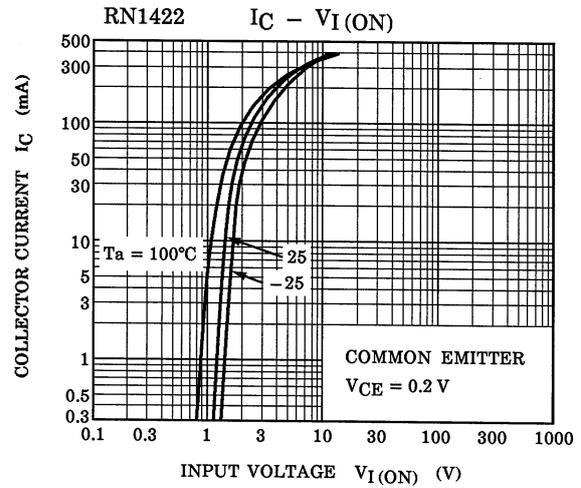
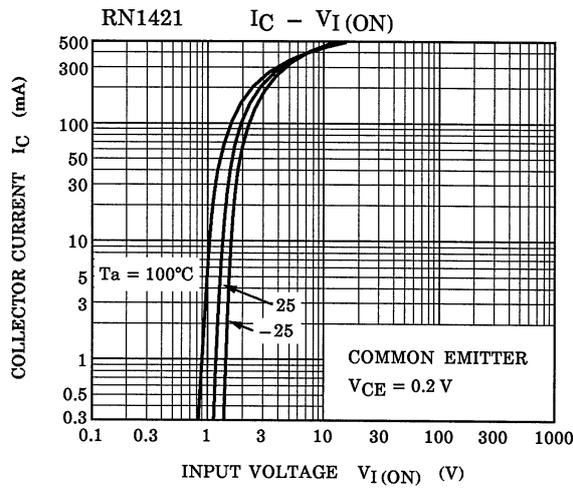
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

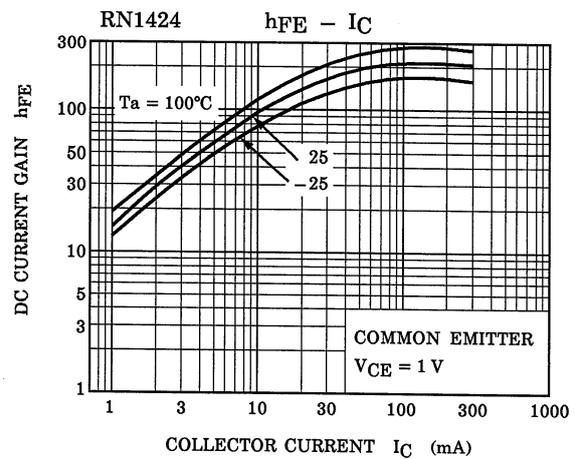
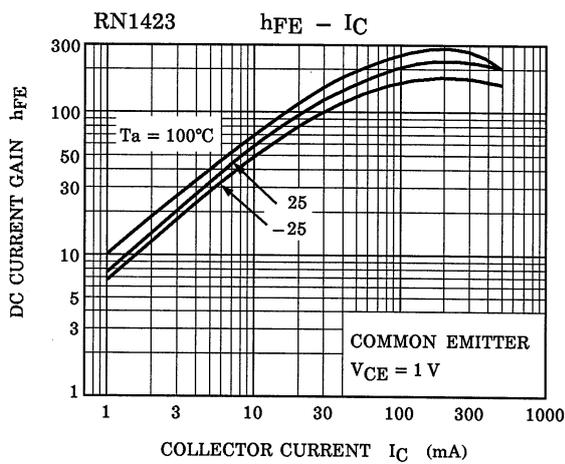
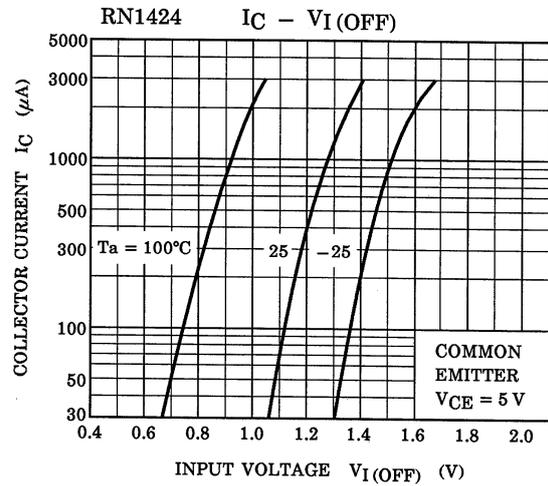
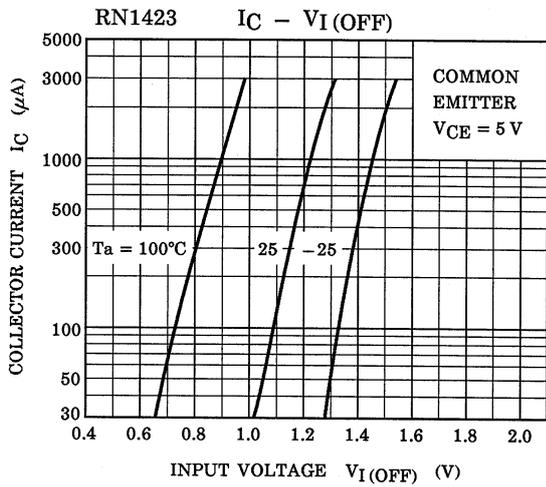
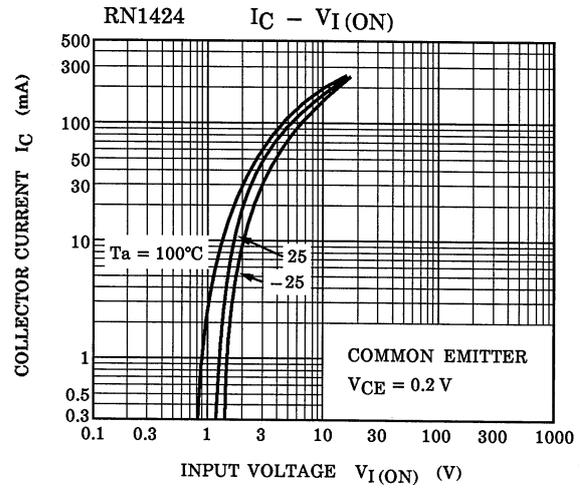
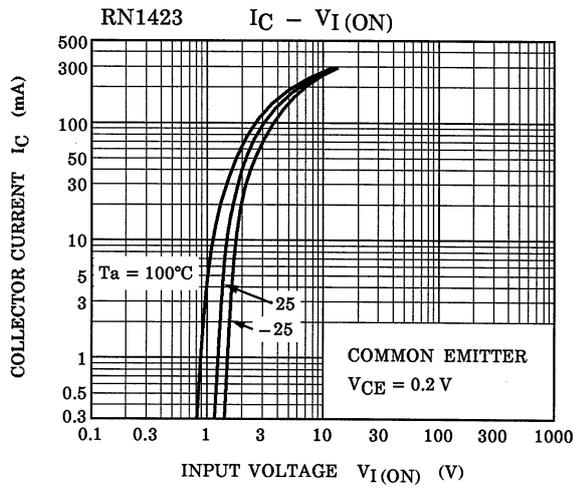
Start of commercial production  
1988-03

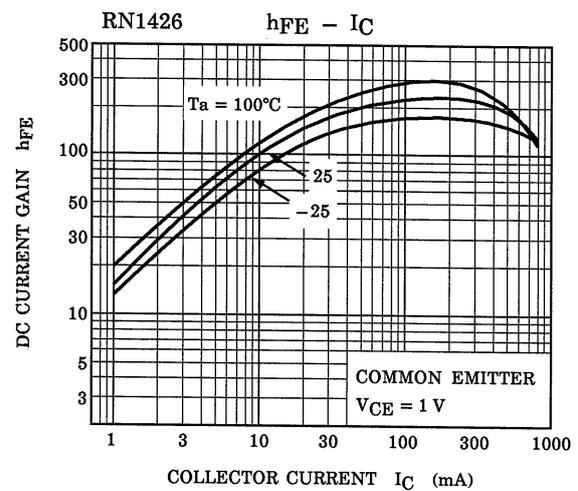
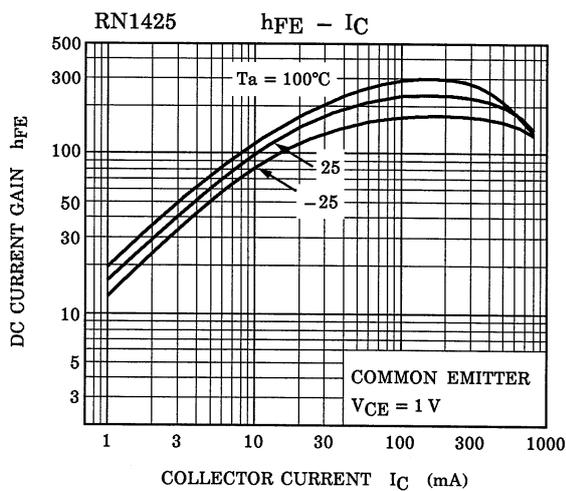
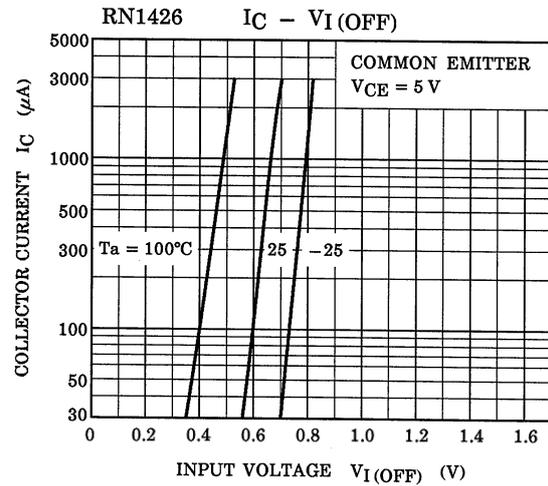
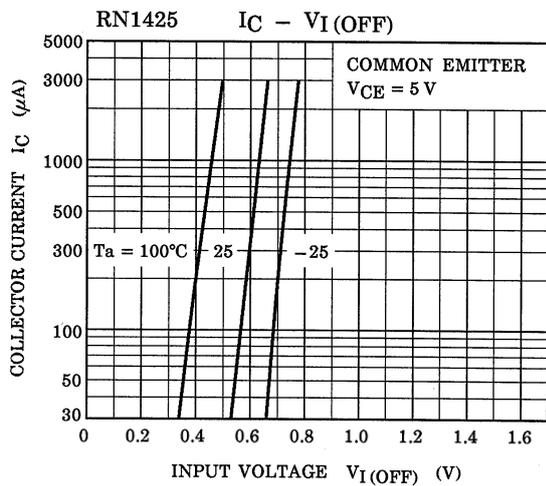
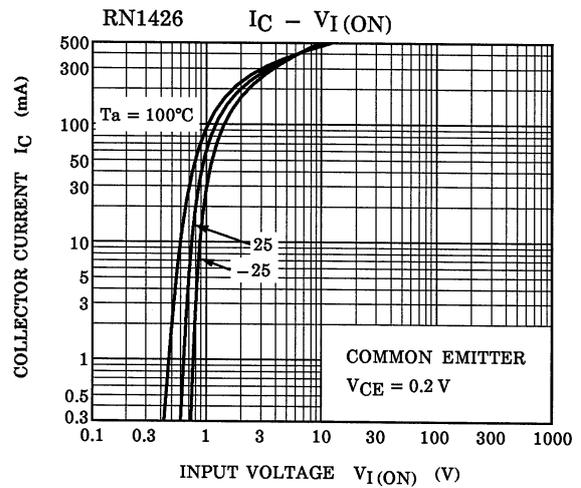
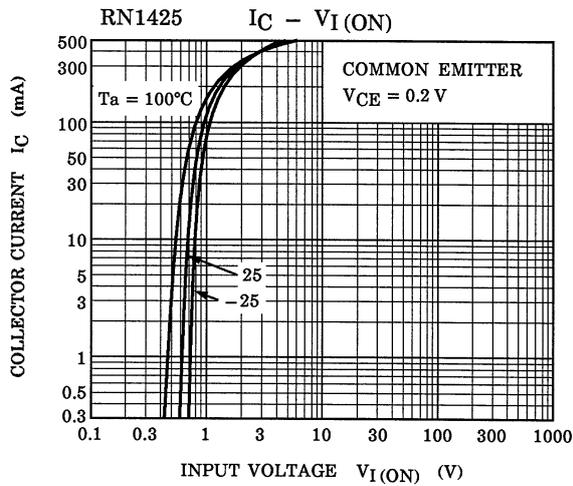
### Electrical Characteristics (Ta = 25°C)

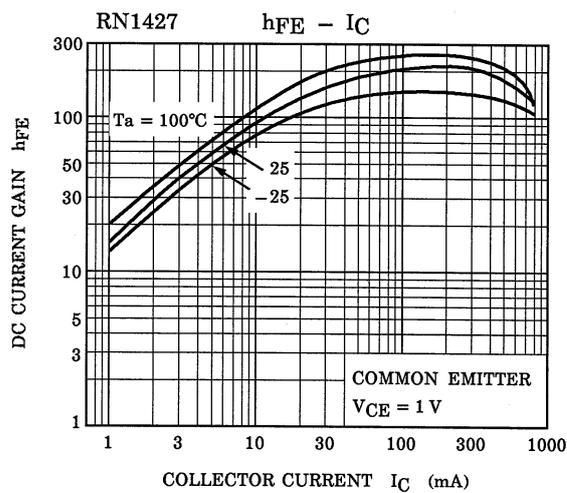
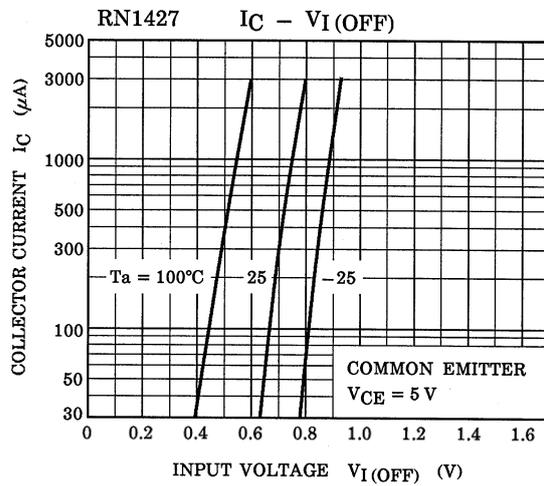
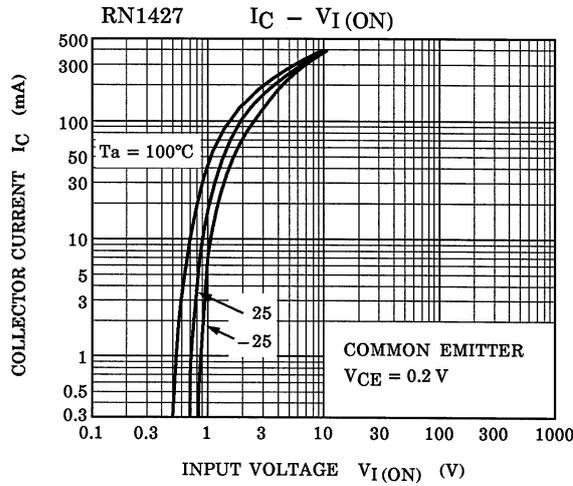
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1421 to 1427	ICBO	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0 mA	—	—	100	nA
		ICEO	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0 mA	—	—	500	
Emitter cut-off current	RN1421	IEBO	V <sub>EB</sub> = 10 V, I <sub>C</sub> = 0 mA	3.85	—	7.14	mA
	RN1422			1.75	—	3.25	
	RN1423			0.82	—	1.52	
	RN1424		0.38	—	0.71		
	RN1425		V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0 mA	0.365	—	0.682	
	RN1426			0.35	—	0.65	
	RN1427		V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0 mA	0.378	—	0.703	
DC current gain	RN1421	h <sub>FE</sub>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 100 mA	60	—	—	—
	RN1422			65	—	—	
	RN1423			70	—	—	
	RN1424			90	—	—	
	RN1425			90	—	—	
	RN1426			90	—	—	
	RN1427			90	—	—	
Collector-emitter saturation voltage	RN1421	V <sub>CE (sat)</sub>	I <sub>C</sub> = 50 mA, I <sub>B</sub> = 2 mA	—	—	0.25	V
	RN1422 to 1427		I <sub>C</sub> = 50 mA, I <sub>B</sub> = 1 mA				
Input voltage (ON)	RN1421	V <sub>I (ON)</sub>	V <sub>CE</sub> = 0.2 V, I <sub>C</sub> = 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 <sub>I (OFF)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 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 <sub>T</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 20 mA	—	300	—	MHz
Collector Output capacitance	RN1421 to 1427	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 mA, f = 1 MHz	—	7	—	pF
Input resistor	RN1421	R <sub>1</sub>	—	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	R <sub>1</sub> /R <sub>2</sub>	—	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



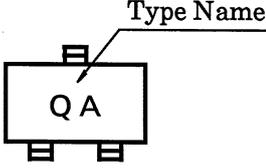
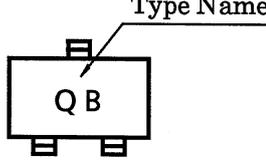
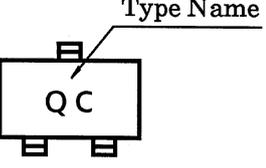
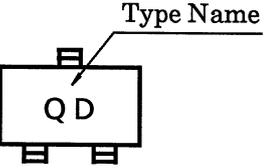
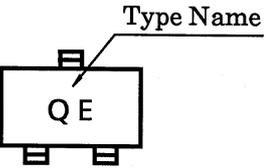
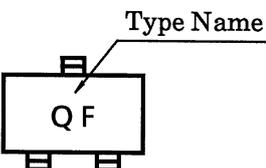
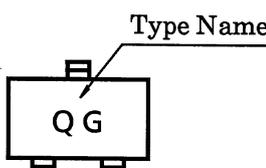






The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

### Marking

Type Name	Marking
RN1421	
RN1422	
RN1423	
RN1424	
RN1425	
RN1426	
RN1427	

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