

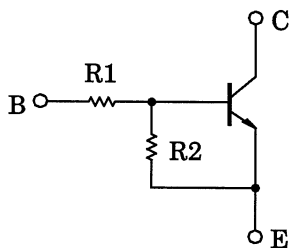
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process) (Bias Resistor built-in Transistor)

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

Switching, Inverter Circuit, Interface Circuit
and Driver Circuit Applications

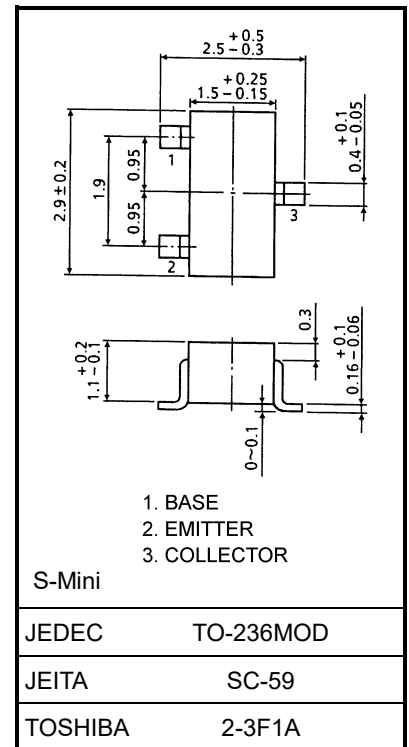
- High current type (I_C (max) = 800 mA)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Low V_{CE} (sat)
- Complementary to RN2421 to RN2427

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	$^\circ\text{C}$

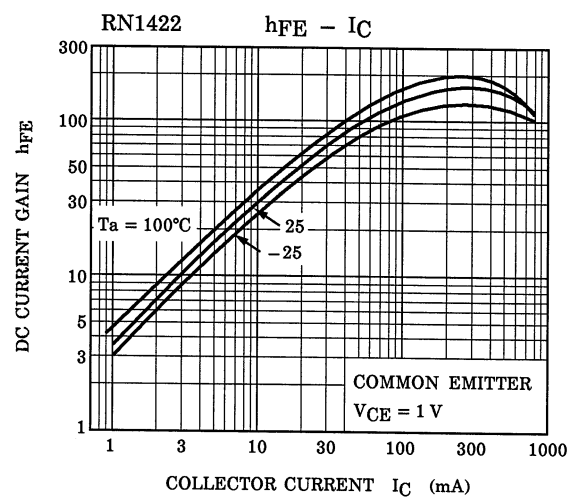
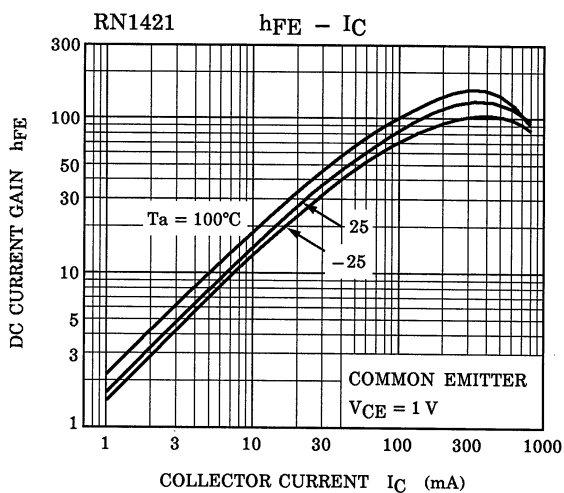
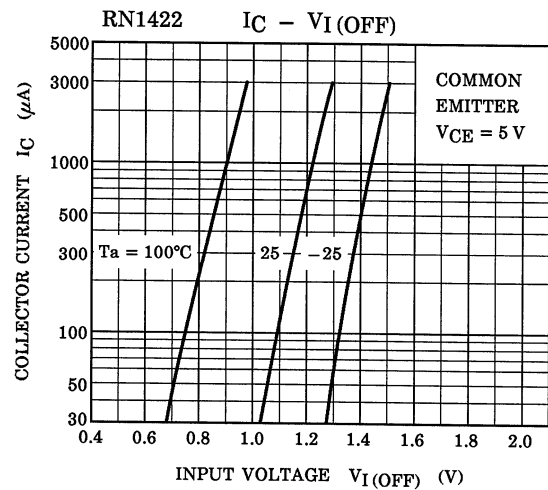
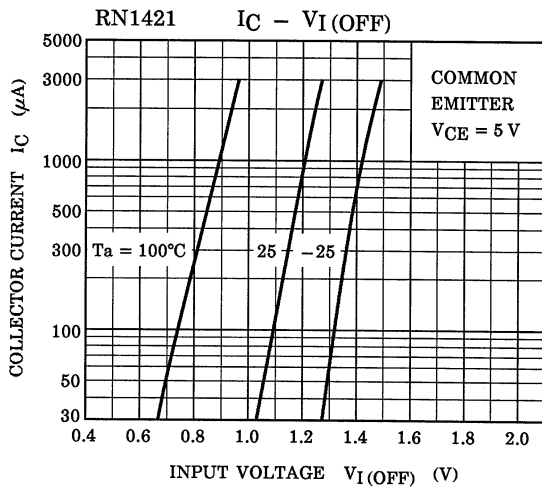
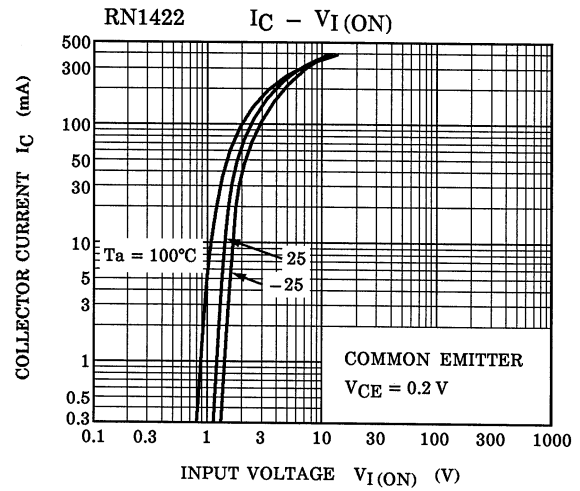
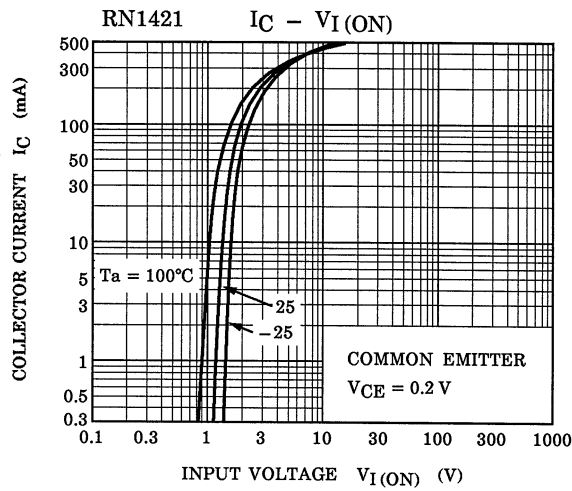
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

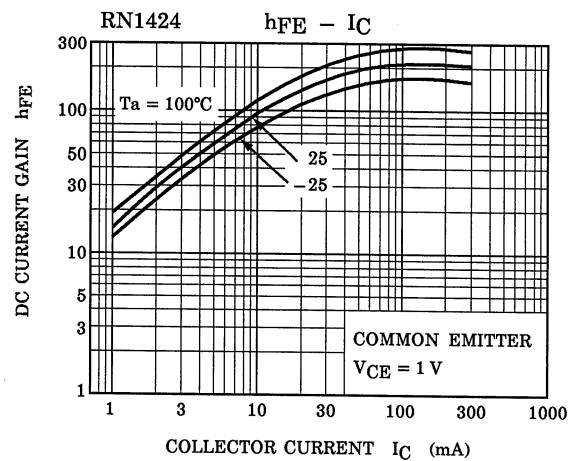
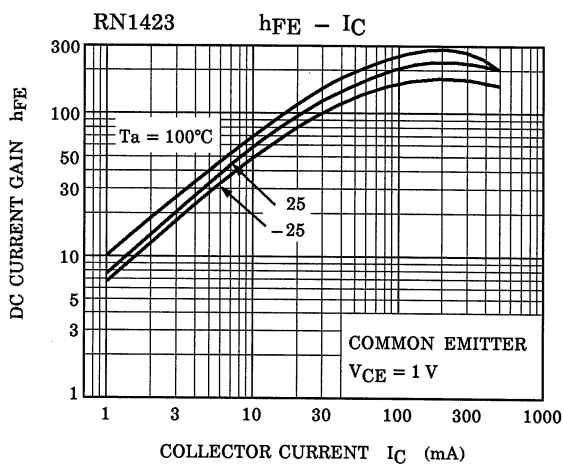
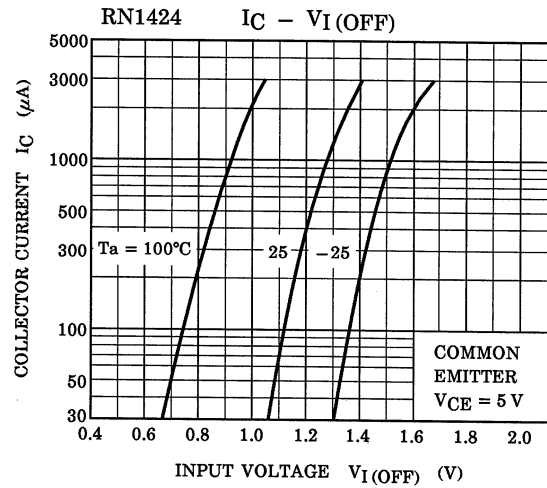
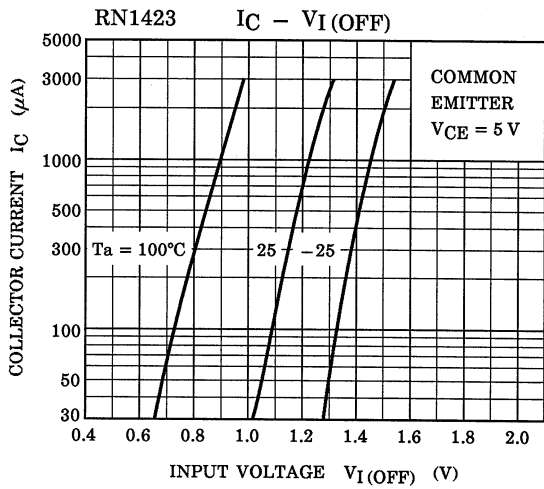
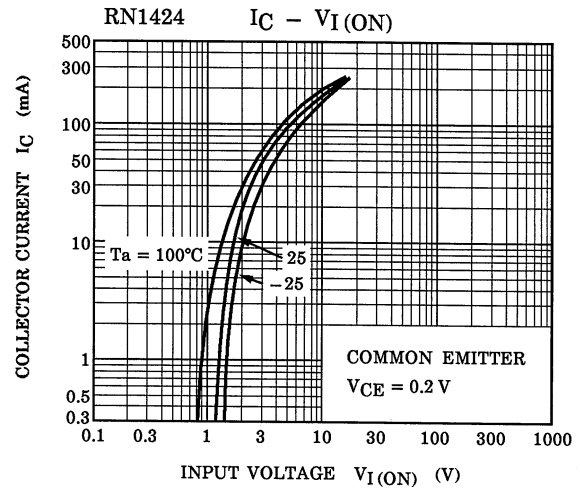
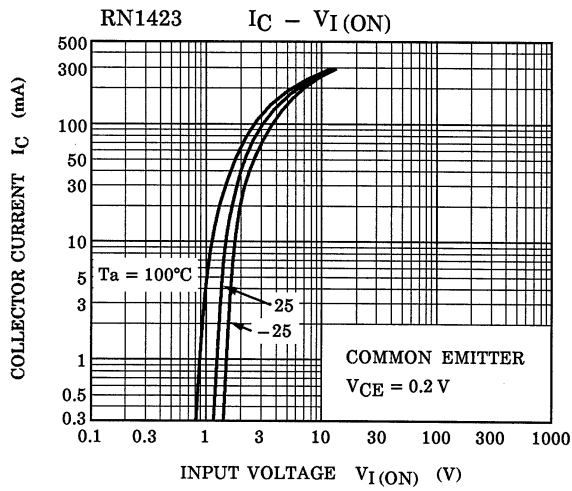
Start of commercial production
1988-03

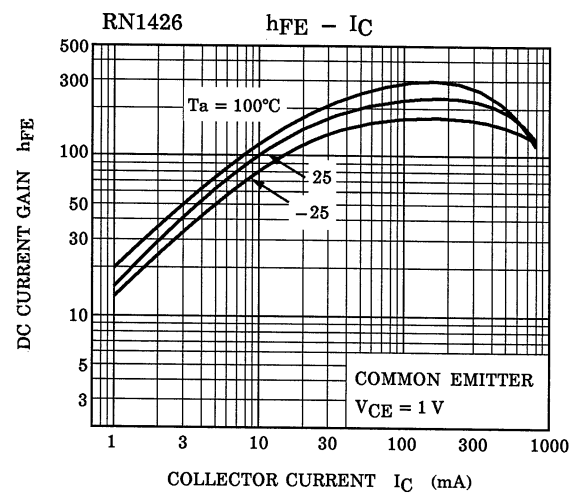
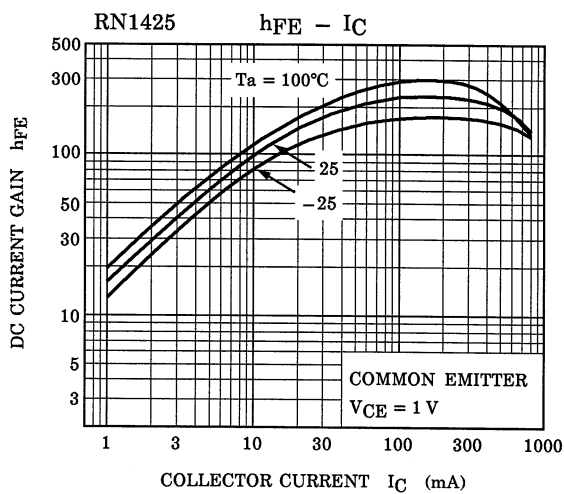
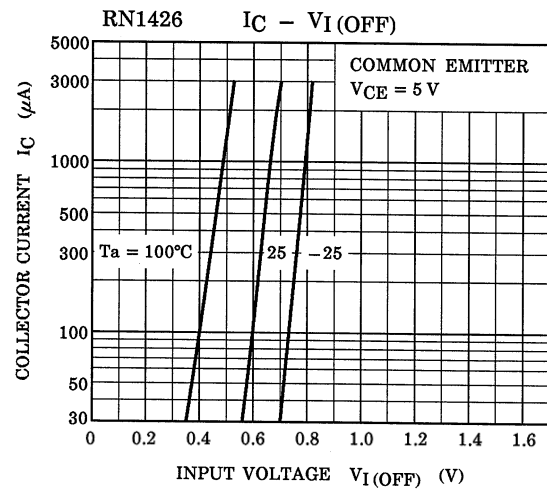
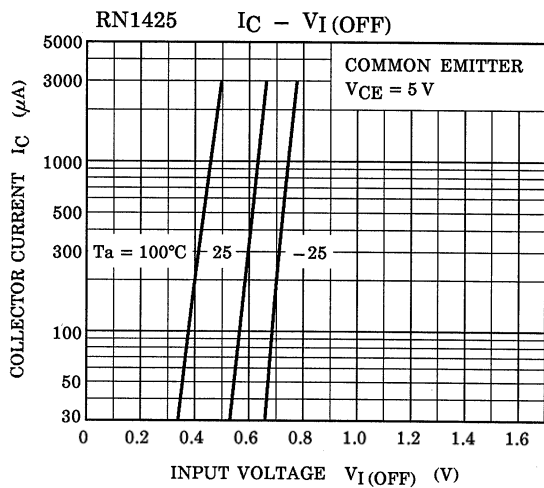
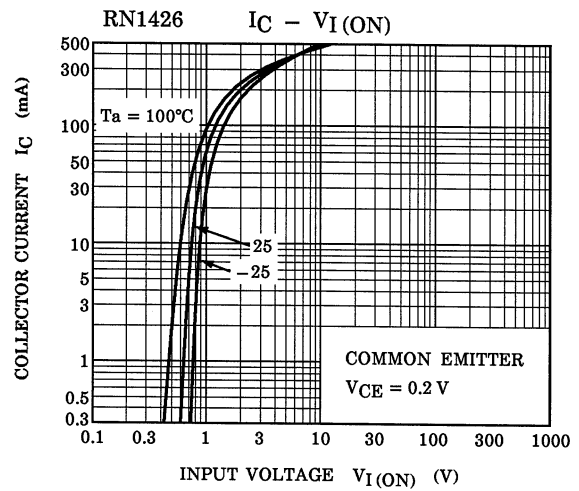
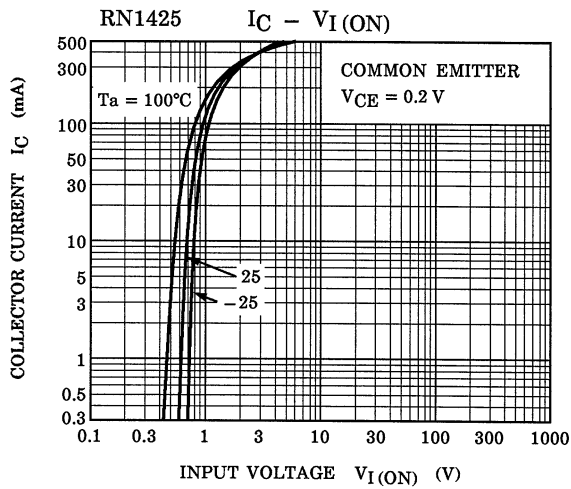
Electrical Characteristics (Ta = 25°C)

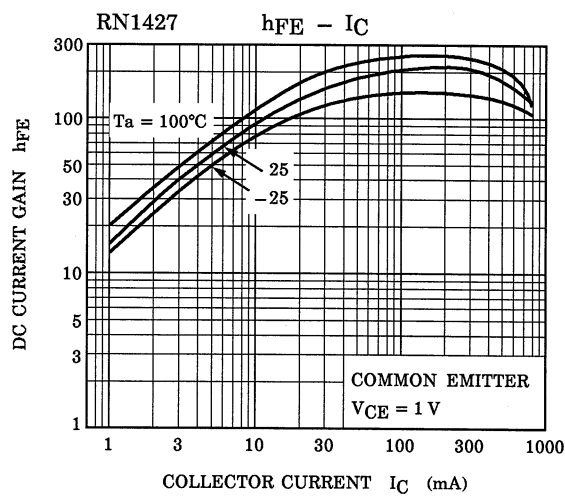
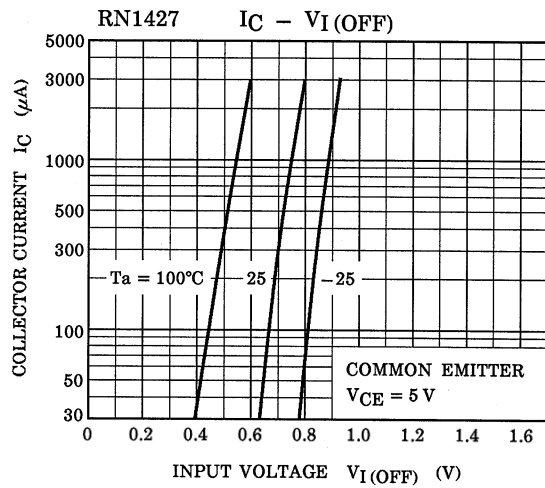
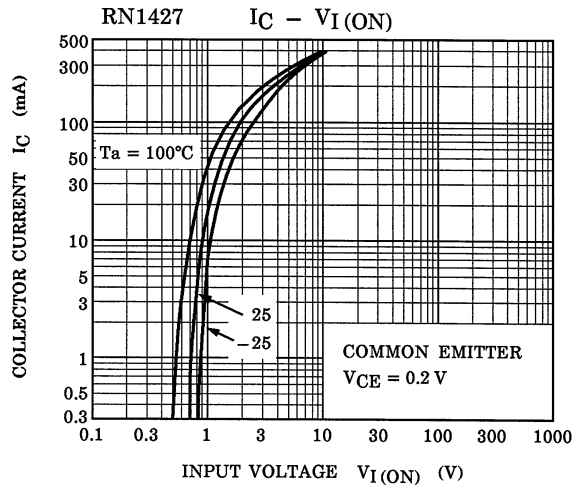
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1421 to 1427	ICBO	V _{CB} = 50 V, I _E = 0 mA	—	—	100	nA
		ICEO	V _{CE} = 50 V, I _B = 0 mA	—	—	500	
Emitter cut-off current	RN1421	IEBO	V _{EB} = 10 V, I _C = 0 mA	3.85	—	7.14	mA
	RN1422			1.75	—	3.25	
	RN1423			0.82	—	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









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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