Unit: mm

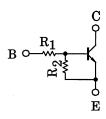
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1414, RN1415, RN1416, RN1417, RN1418

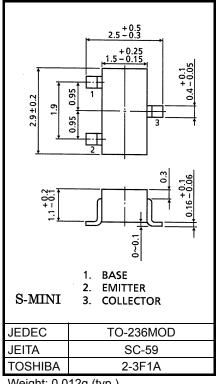
Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- With built-in bias resistors
- Simplified circuit design
- Reduced number of parts and simplified manufacturing process
- Complementary to RN2414~RN2418

Equivalent Circuit and Bias Resistor Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1414	1	10
RN1415	2.2	10
RN1416	4.7	10
RN1417	10	4.7
RN1418	47	10



Weight: 0.012g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characterist	Symbol	Rating	Unit		
Collector-base voltage	RN1414~1418	V_{CBO}	50	V	
Collector-emitter voltage	KIN1414*1410	V _{CEO}	50	٧	
Emitter-base voltage	RN1414		5		
	RN1415		6		
	RN1416	V _{EBO}	7	V	
	RN1417		15		
	RN1418		25		
Collector current		Ic	100	mA	
Collector power dissipation	RN1414~1418	PC	200	mW	
Junction temperature	KIN 14 14~14 18	Tj	150	°C	
Storage temperature range		T _{stg}	−55 to 150	°C	

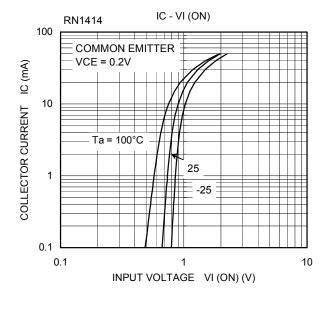
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

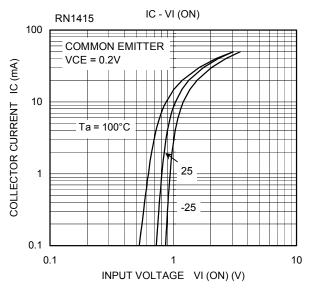
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

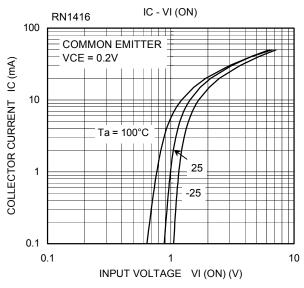


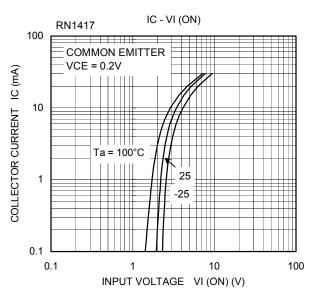
Electrical Characteristics (Ta = 25°C)

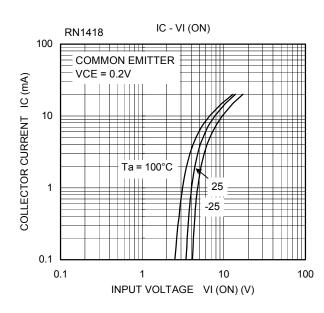
Characte	ristic	Symbol	Test Circuit	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	RN1414~1418	I _{CBO}		V _{CB} = 50V, I _E = 0	_	_	100	nA
	RN1414~1418	I _{CEO}		V _{CE} = 50V, I _B = 0	_	_	500	nA
	RN1414			V _{EB} = 5V, I _C = 0	0.35	_	0.65	
	RN1415			V _{EB} = 6V, I _C = 0	0.37	_	0.71	
Emitter cut-off current	RN1416	I _{EBO}	_	V _{EB} = 7V, I _C = 0	0.36	_	0.68	mA
	RN1417			V _{EB} = 15V, I _C = 0	0.78	_	1.46	
	RN1418			V _{EB} = 25V, I _C = 0	0.33	_	0.63	
DO 1 :	RN1414~16,18			V _{CE} = 5V, I _C = 10mA	50	_	_	
DC current gain	RN1417	h _{FE}	_		30	_	_	1
Collector-emitter saturation voltage	RN1414~1418	V _{CE} (sat)	_	I _C = 5mA, I _B = 0.25mA	_	0.1	0.3	٧
	RN1414				0.6	_	2.0	V
Input voltage (ON)	RN1415				0.7	_	2.5	
	RN1416	VI (ON)	_	V _{CE} = 0.2V, I _C = 5mA	0.8	_	2.5	
	RN1417				1.5	_	3.5	
	RN1418				2.5	_	10.0	
	RN1414				0.3	_	0.9	
Input voltage (OFF)	RN1415		_	V _{CE} = 5V, I _C = 0.1mA	0.3	_	1.0	V
	RN1416	V _{I (OFF)}			0.3	_	1.1	
	RN1417				0.3	_	2.3	
	RN1418				0.5	_	5.7	
Transition frequency	RN1414~1418	f _T	_	V _{CE} = 10V, I _C = 5mA	_	250	_	MHz
Collector Output capacitance	RN1414~1418	C _{ob}	_	V _{CB} = 10V, I _E = 0, f = 1MHz	_	3.0	6.0	pF
Input resistor	RN1414			_	0.7	1.0	1.3	
	RN1415				1.54	2.2	2.86	
	RN1416	R1	_		3.29	4.7	6.11	kΩ
	RN1417				7.0	10.0	13.0	
	RN1418				32.9	47.0	61.1	
Resistor ratio	RN1414				_	0.1	_	
	RN1415		_		_	0.22	_	
	RN1416	R1/R2			_	0.47	_	
	RN1417				_	2.13	_	
	RN1418				_	4.7	_	

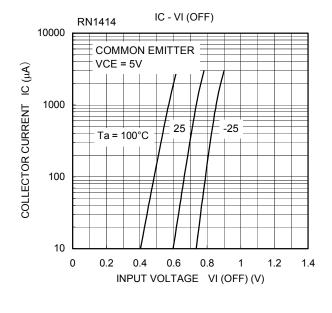


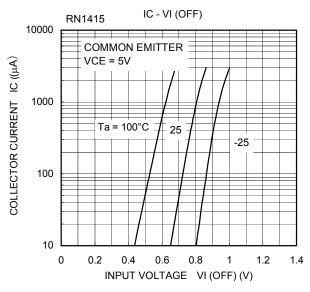


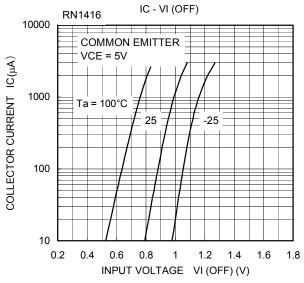


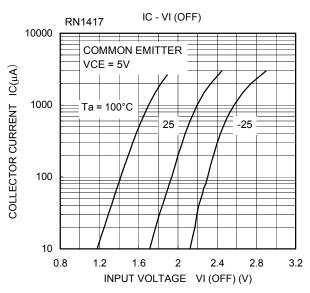


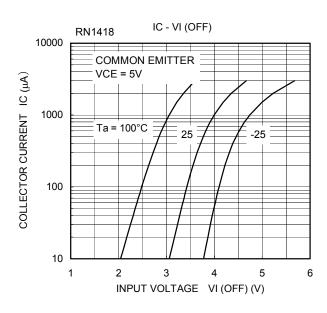


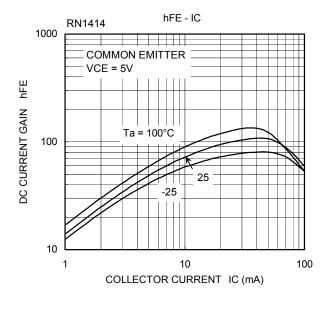


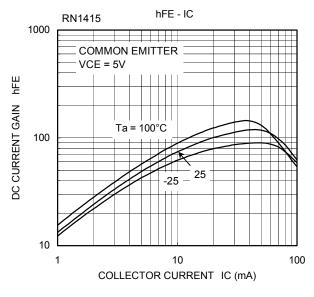


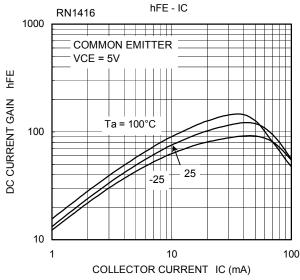


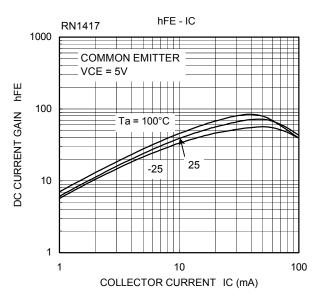


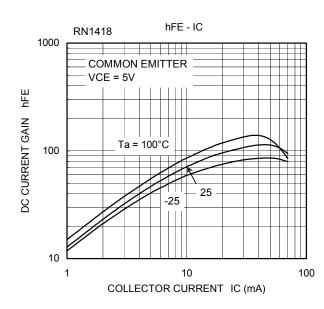




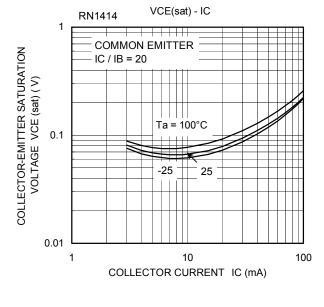


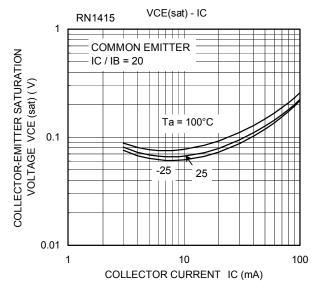


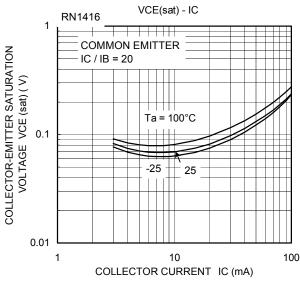


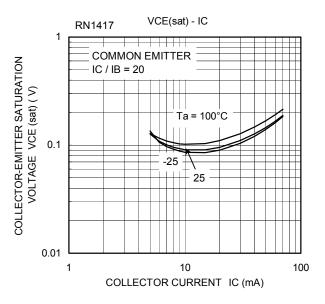


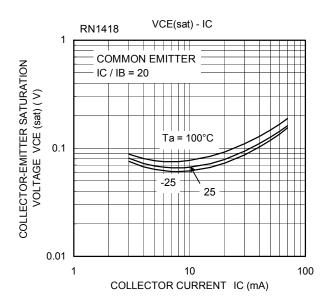
5 2009-11-16











6 2009-11-16

Type Name	Marking
RN1414	Type Name
RN1415	Type Name
RN1416	Type Name
RN1417	Type Name
RN1418	Type Name

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