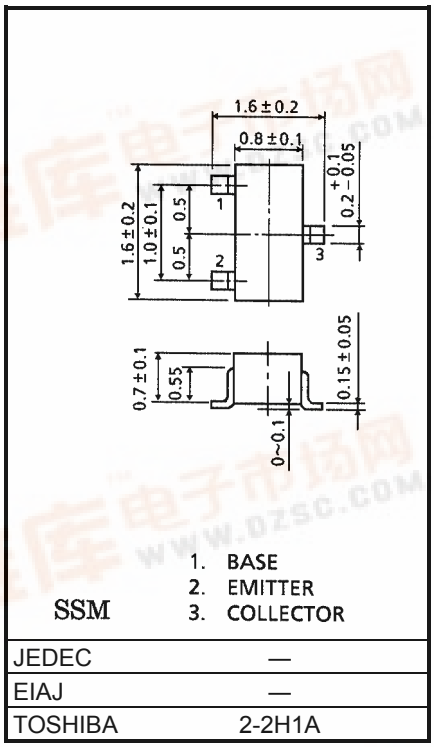
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

RN1114,RN1115,RN1116,RN1117,RN1118

Switching, Inverter Circuit, Interface Circuit And Driver Circuit Applications

- With built-in bias resistors.
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2114~2118

Unit: mm



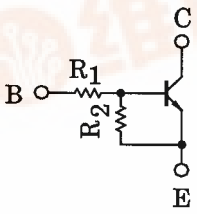
SSM

1. BASE
2. EMITTER
3. COLLECTOR

JEDEC	—
EIAJ	—
TOSHIBA	2-2H1A

Weight: 2.4mg

Equivalent Circuit and Bias Resistor Values



Type No.	R_1 (kΩ)	R_2 (kΩ)
RN1114	1	10
RN1115	2.2	10
RN1116	4.7	10
RN1117	10	4.7
RN1118	47	10

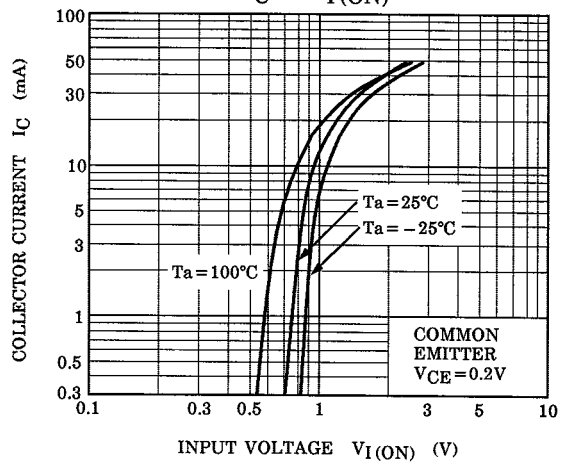
Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN1114~1118	V_{CBO}	50	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage	RN1114	V_{EBO}	5	V
	RN1115		6	
	RN1116		7	
	RN1117		15	
	RN1118		25	
Collector current	RN1114~1118	I_C	100	mA
Collector power dissipation		P_C	100	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

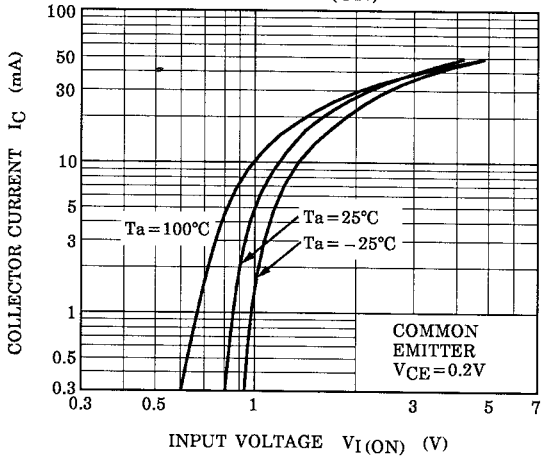
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1114~1118	I_{CBO}	—	V_{CB} = 50V, I_E = 0	—	—	100	nA
	RN1114~1118	I_{CEO}	—	V_{CE} = 50V, I_B = 0	—	—	500	nA
Emitter cut-off current	RN1114	I_{EBO}	—	V_{EB} = 5V, I_C = 0	0.35	—	0.65	mA
	RN1115		—	V_{EB} = 6V, I_C = 0	0.37	—	0.71	
	RN1116		—	V_{EB} = 7V, I_C = 0	0.36	—	0.68	
	RN1117		—	V_{EB} = 15V, I_C = 0	0.78	—	1.46	
	RN1118		—	V_{EB} = 25V, I_C = 0	0.33	—	0.63	
DC current gain	RN1114~16, 18	h_{FE}	—	V_{CE} = 5V, I_C = 10mA	50	—	—	—
	RN1117		—		30	—	—	
Collector-emitter saturation voltage	RN1114~1118	$V_{CE\ (sat)}$	—	I_C = 5mA, I_B = 0.25mA	—	0.1	0.3	V
Input voltage (ON)	RN1114	$V_{I\ (ON)}$	—	V_{CE} = 0.2V, I_C = 5mA	0.6	—	2.0	V
	RN1115		—		0.7	—	2.5	
	RN1116		—		0.8	—	2.5	
	RN1117		—		1.5	—	3.5	
	RN1118		—		2.5	—	10.0	
Input voltage (OFF)	RN1114	$V_{I\ (OFF)}$	—	V_{CE} = 5V, I_C = 0.1mA	0.3	—	0.9	V
	RN1115		—		0.3	—	1.0	
	RN1116		—		0.3	—	1.1	
	RN1117		—		0.3	—	2.3	
	RN1118		—		0.5	—	5.7	
Translation Frequency	RN1114~1118	f_T	—	V_{CE} = 10V, I_C = 5mA	—	250	—	MHz
Collector output capacitance	RN1114~1118	C_{ob}	—	V_{CB} = 10V, I_E = 0, f = 1MHz	—	3.0	6.0	pF
Input Resistor	RN1114	R_1	—	—	0.7	1.0	1.3	kΩ
	RN1115		—		1.54	2.2	2.86	
	RN1116		—		3.29	4.7	6.11	
	RN1117		—		7.0	10.0	13.0	
	RN1118		—		32.9	47.0	61.1	
Resistor Ratio	RN1114	R_1/R_2	—	—	—	0.1	—	—
	RN1115		—		—	0.22	—	
	RN1116		—		—	0.47	—	
	RN1117		—		—	2.13	—	
	RN1118		—		—	4.7	—	

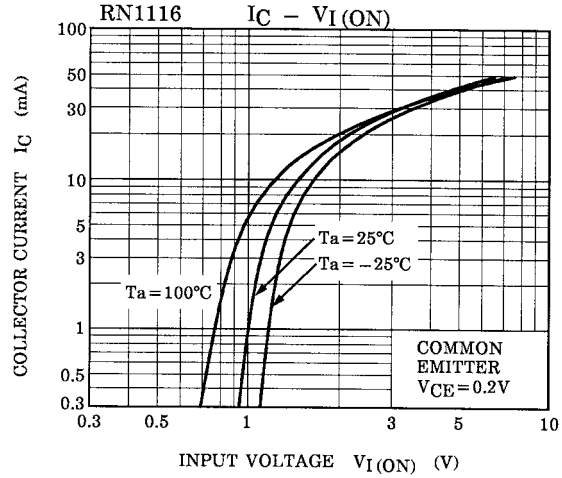
RN1114 $I_C - V_{I(ON)}$



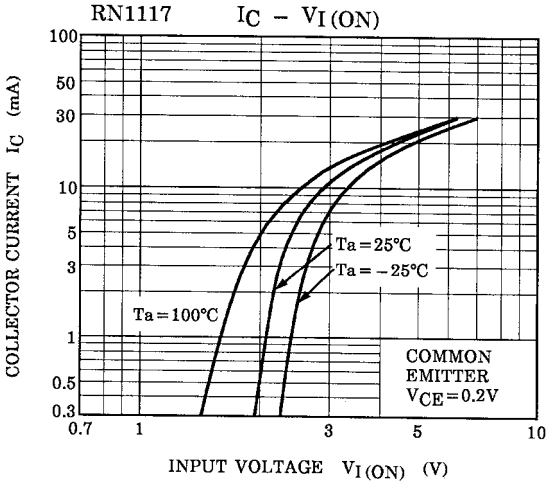
RN1115 $I_C - V_{I(ON)}$



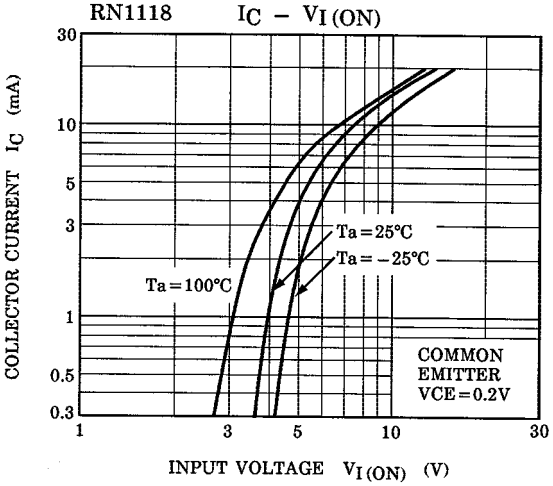
RN1116 $I_C - V_{I(ON)}$



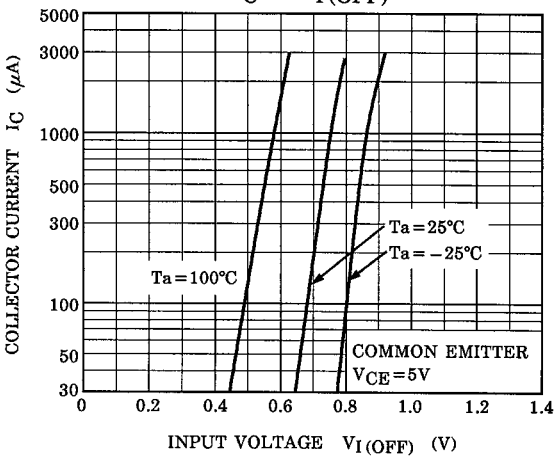
RN1117 $I_C - V_{I(ON)}$



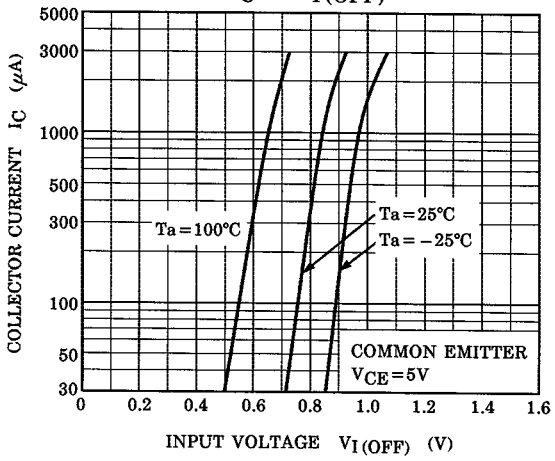
RN1118 $I_C - V_{I(ON)}$



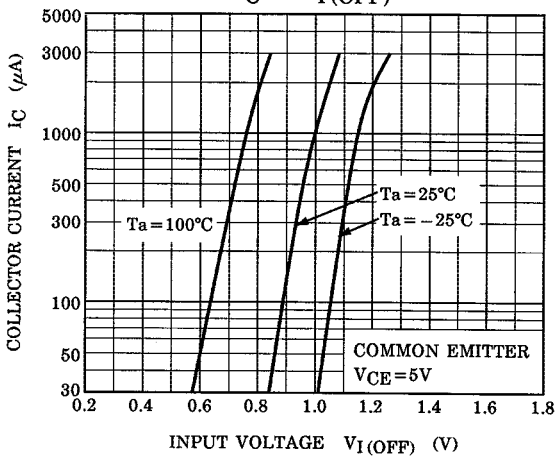
RN1114 $I_C - V_{I(OFF)}$



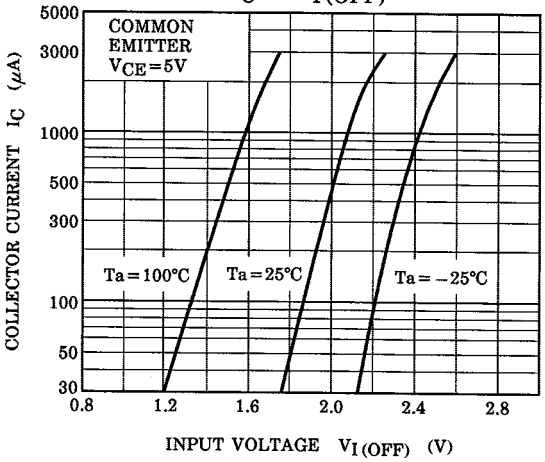
RN1115 $I_C - V_{I(OFF)}$



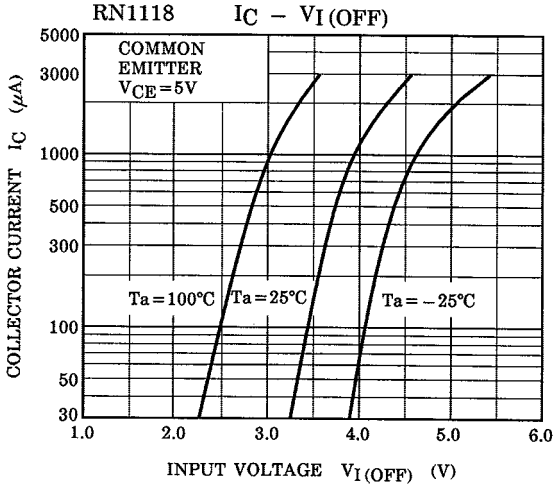
RN1116 $I_C - V_{I(OFF)}$



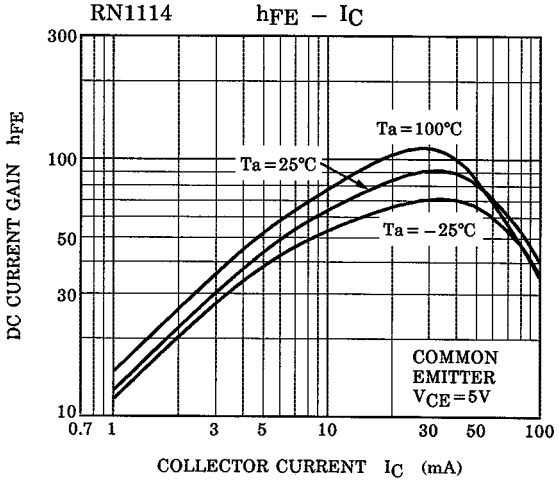
RN1117 $I_C - V_{I(OFF)}$



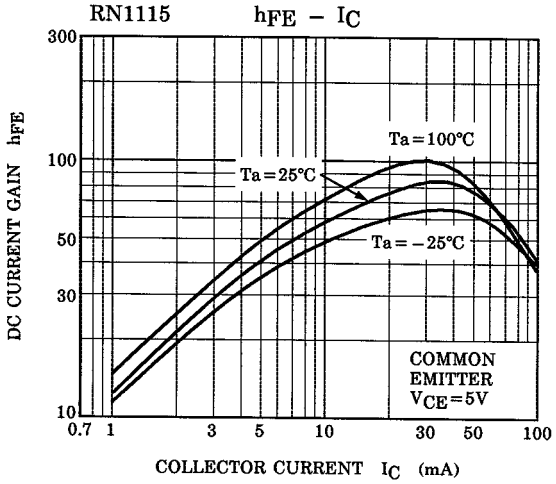
RN1118 $I_C - V_{I(OFF)}$



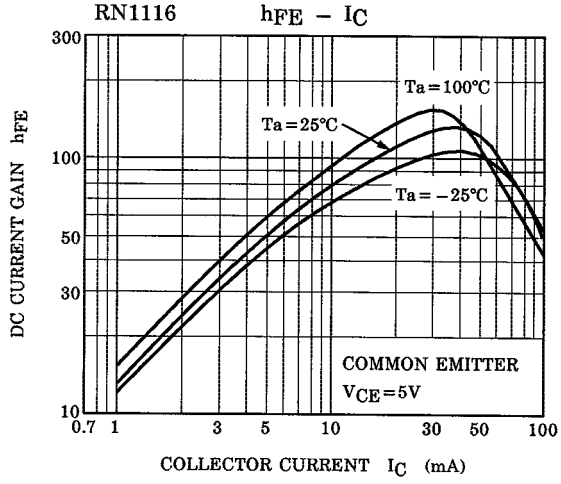
RN1114 h_{FE} – I_C



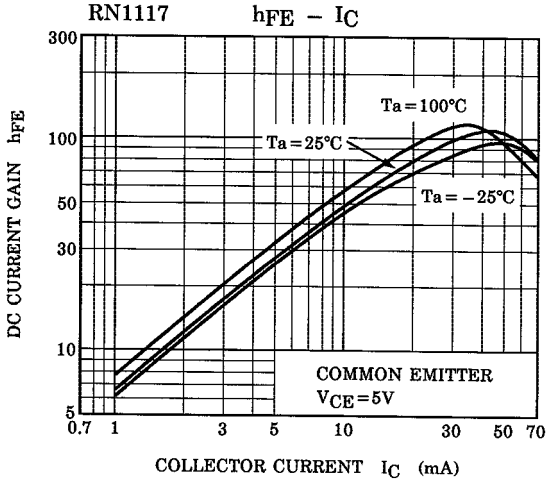
RN1115 h_{FE} – I_C



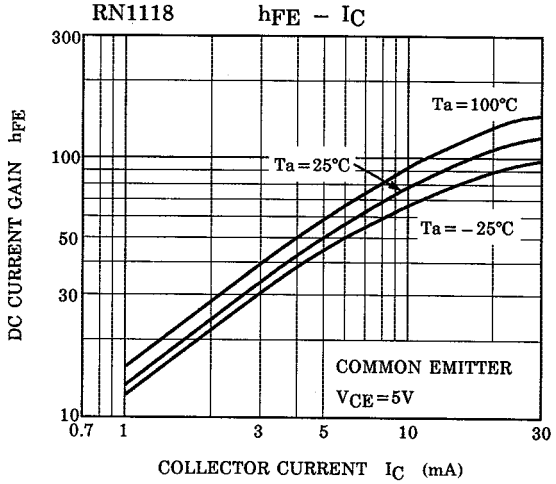
RN1116 h_{FE} – I_C



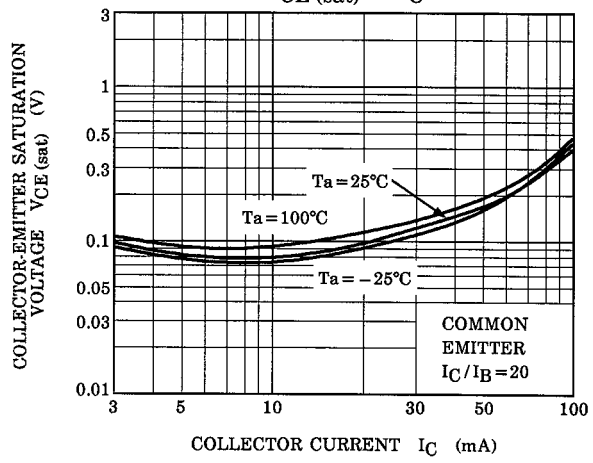
RN1117 h_{FE} – I_C



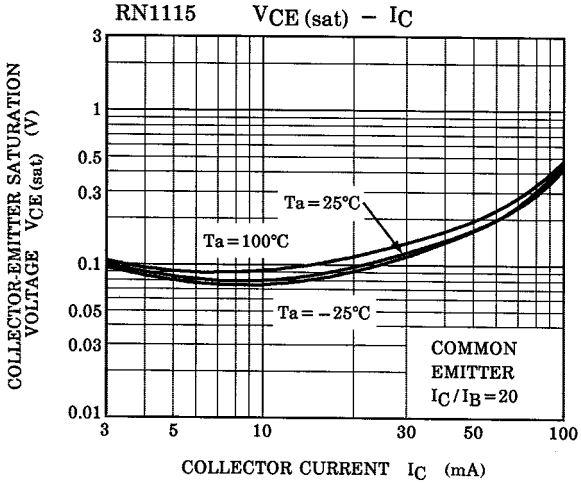
RN1118 h_{FE} – I_C



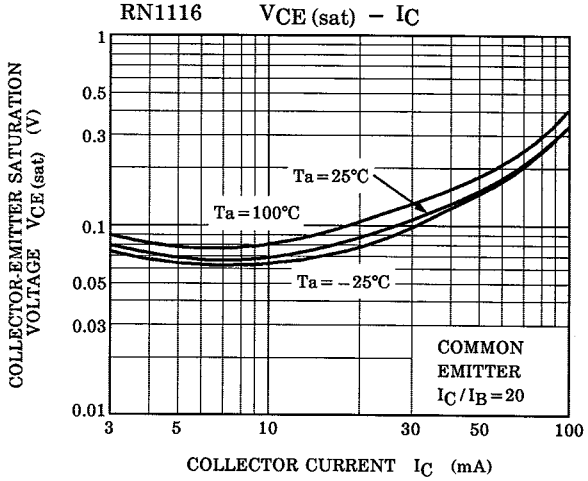
RN1114 $V_{CE\,(sat)}$ – I_C



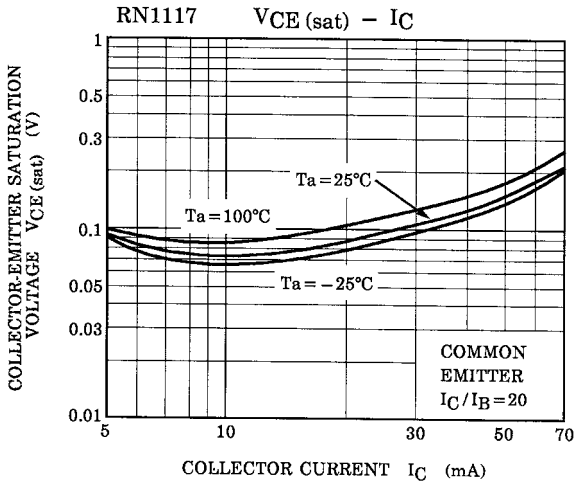
RN1115 $V_{CE\,(sat)}$ – I_C



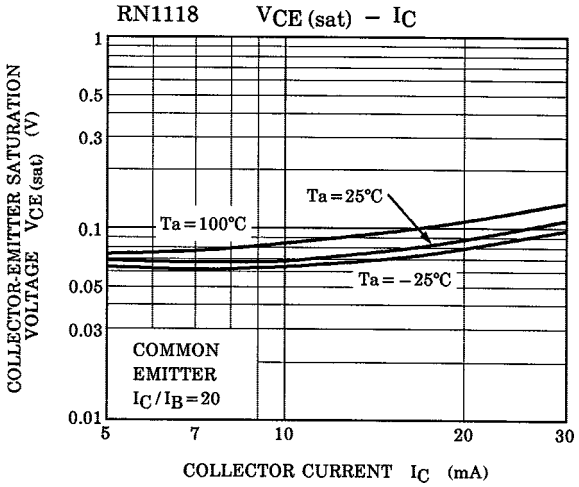
RN1116 $V_{CE\,(sat)}$ – I_C

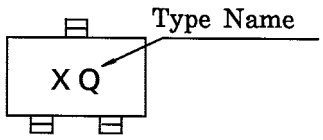
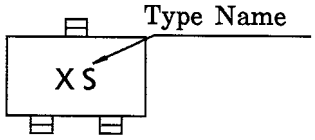
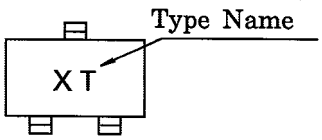
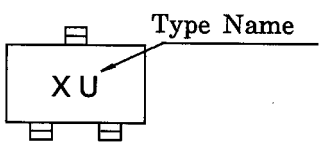
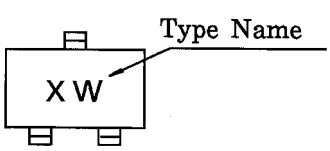


RN1117 $V_{CE\,(sat)}$ – I_C



RN1118 $V_{CE\,(sat)}$ – I_C



Type Name	Marking
RN1114	
RN1115	
RN1116	
RN1117	
RN1118	

RESTRICTIONS ON PRODUCT USE

000707EAA

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.