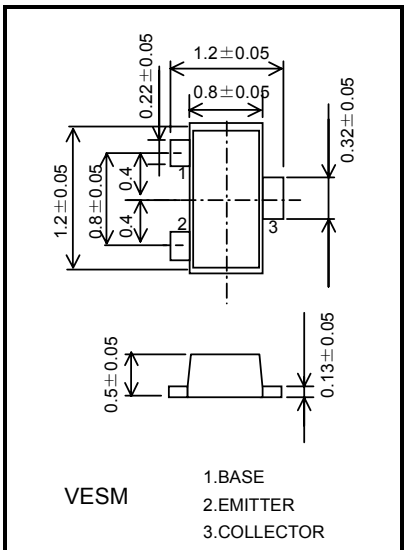
TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process)

RN2114FV,RN2115FV,RN2116FV RN2117FV,RN2118FV

Switching, Inverter Circuit, Interface Circuit and Driver Circuit Applications

- Built-in bias resistors
- Simplified circuit design
- Reduced quantity of parts and manufacturing process
- Complementary to RN2114FV~RN2118FV

Unit: mm



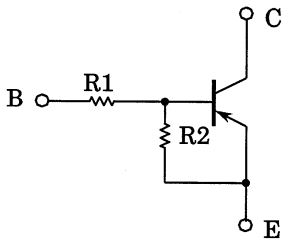
VESM

1.BASE
2.EMITTER
3.COLLECTOR

JEDEC	—
JEITA	—
TOSHIBA	2-1L1A

Weight: 0.0015g (typ.)

Equivalent Circuit and Bias Resistor Values

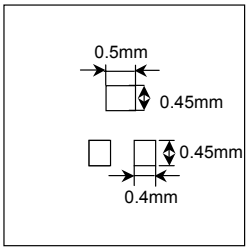


Type No.	R1 (kΩ)	R2 (kΩ)
RN2114FV	1	10
RN2115FV	2.2	10
RN2116FV	4.7	10
RN2117FV	10	4.7
RN2118FV	47	10

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Collector-base voltage	RN2114FV~2118FV	V_{CBO}	−50	V
Collector-emitter voltage		V_{CEO}	−50	V
Emitter-base voltage	RN2114FV	V_{EBO}	−5	V
	RN2115FV		−6	
	RN2116FV		−7	
	RN2117FV		−15	
	RN2118FV		−25	
Collector current	RN2114FV~2118FV	I_C	−100	mA
Collector power dissipation		P_C(Note)	150	mW
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55~150	°C

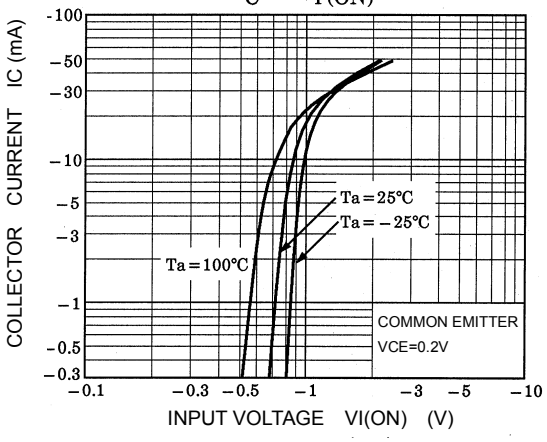
Note: Mounted on FR4 board (25.4 mm × 25.4 mm × 1.6mmt)



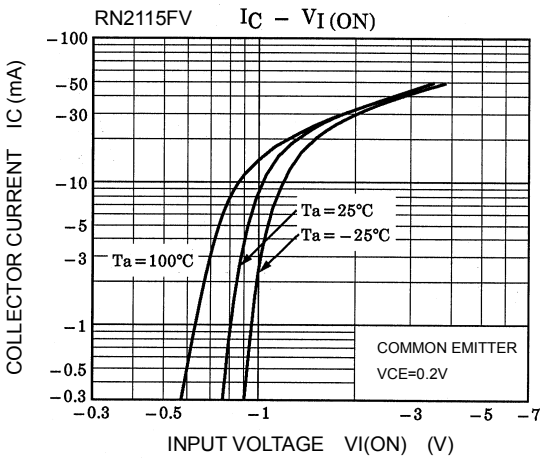
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN2114FV~2118FV	I_{CBO}	—	V_{CB} = −50V, I_E = 0	—	—	−100	nA
		I_{CEO}		V_{CE} = −50V, I_B = 0	—	—	−500	
Emitter cut-off current	RN2114FV	I_{EBO}	—	V_{EB} = −5V, I_C = 0	−0.35	—	−0.65	mA
	RN2115FV			V_{EB} = −6V, I_C = 0	−0.37	—	−0.71	
	RN2116FV			V_{EB} = −7V, I_C = 0	−0.36	—	−0.68	
	RN2117FV			V_{EB} = −15V, I_C = 0	−0.78	—	−1.46	
	RN2118FV			V_{EB} = −25V, I_C = 0	−0.33	—	−0.63	
DC current gain	RN2114FV~16FV,18FV	h_{FE}	—	V_{CE} = −5V, I_C = −10mA	50	—	—	
	RN2117FV				30	—	—	
Collector-emitter saturation voltage	RN2114FV~2118FV	$V_{CE (sat)}$	—	I_C = −5mA, I_B = −0.25mA	—	−0.1	−0.3	V
Input voltage (ON)	RN2114FV	$V_{I (ON)}$	—	V_{CE} = −0.2V, I_C = −5mA	−0.5	—	−2.0	V
	RN2115FV				−0.6	—	−2.5	
	RN2116FV				−0.7	—	−2.5	
	RN2117FV				−1.5	—	−3.5	
	RN2118FV				−2.5	—	−10.0	
Input voltage (OFF)	RN2114FV	$V_{I (OFF)}$	—	V_{CE} = −5V, I_C = −0.1mA	−0.3	—	−0.9	V
	RN2115FV				−0.3	—	−1.0	
	RN2116FV				−0.3	—	−1.1	
	RN2117FV				−0.3	—	−3.0	
	RN2118FV				−0.5	—	−5.7	
Transition frequency	RN2114FV~2118FV	f_T	—	V_{CE} = −10V, I_C = −5mA	—	200	—	MHz
Collector output capacitance	RN2114FV~2118FV	C_{ob}	—	V_{CB} = −10V, I_E = 0, f = 1MHz	—	3.0	—	pF
Input resistor	RN2114FV	R1	—	—	0.7	1.0	1.3	kΩ
	RN2115FV				1.54	2.2	2.86	
	RN2116FV				3.29	4.7	6.11	
	RN2117FV				7	10	13	
	RN2118FV				32.9	47	61.1	
Resistor ratio	RN2114FV	R1/R2	—	—	—	0.1	—	
	RN2115FV				—	0.22	—	
	RN2116FV				—	0.47	—	
	RN2117FV				—	2.13	—	
	RN2118FV				—	4.7	—	

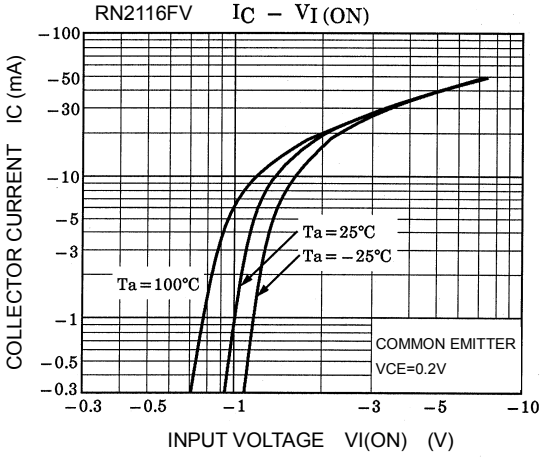
RN2114FV $I_C - V_{I(ON)}$



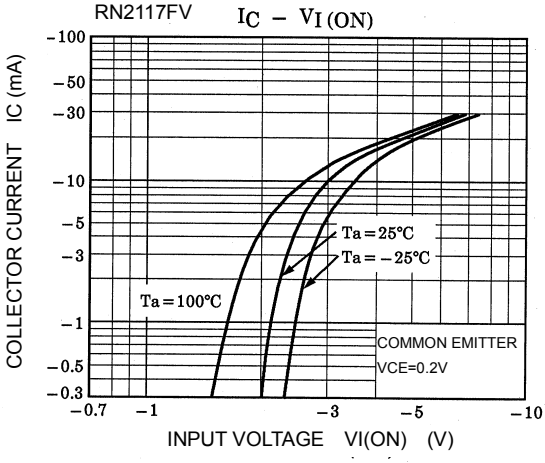
RN2115FV $I_C - V_{I(ON)}$



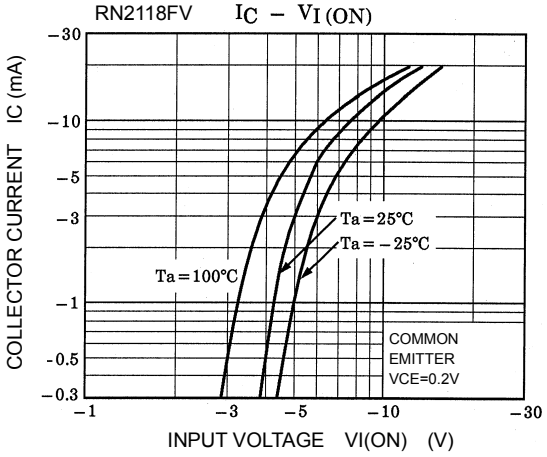
RN2116FV $I_C - V_{I(ON)}$



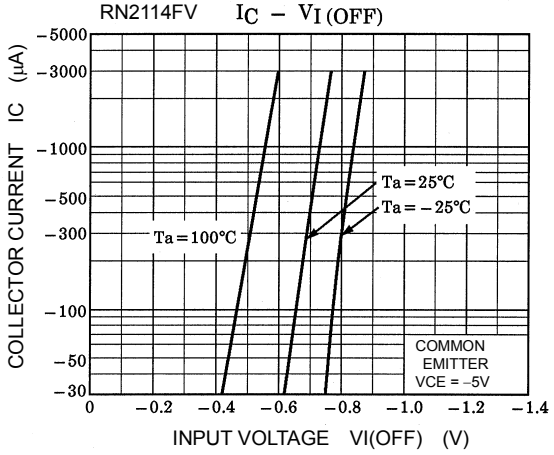
RN2117FV $I_C - V_{I(ON)}$



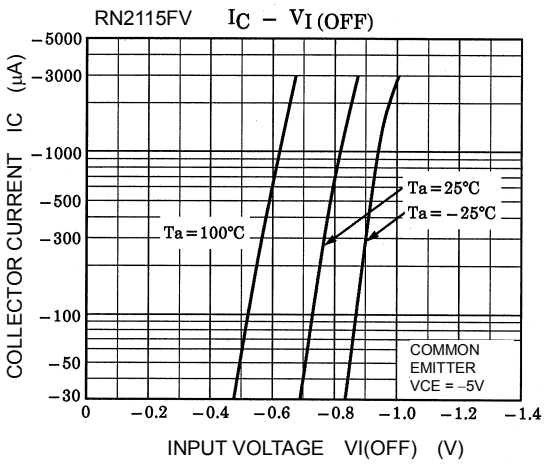
RN2118FV $I_C - V_{I(ON)}$



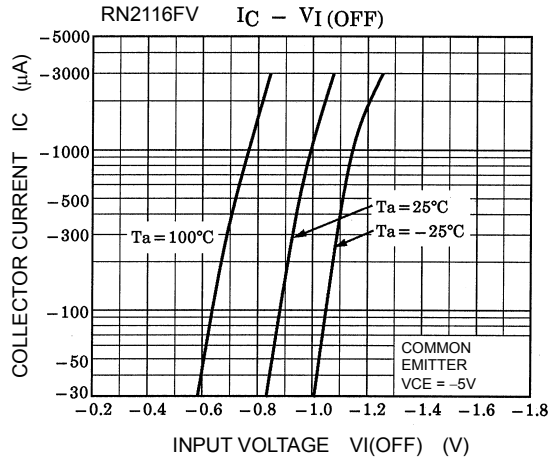
RN2114FV $I_C - V_{I(OFF)}$



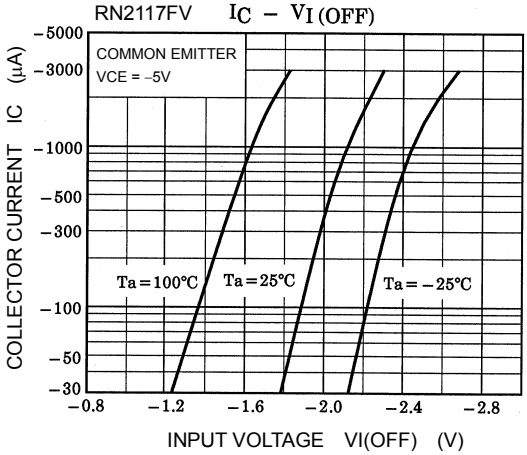
RN2115FV $I_C - V_{I(OFF)}$



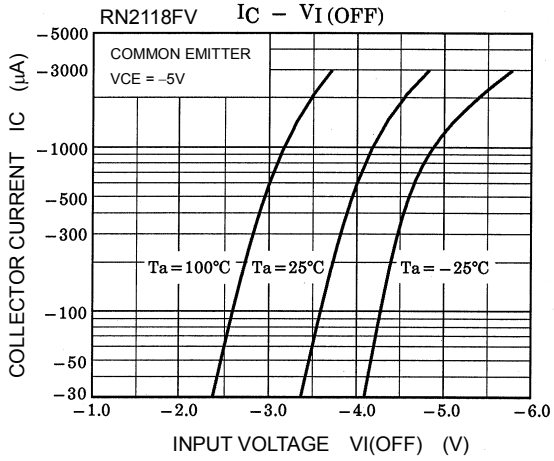
RN2116FV $I_C - V_{I(OFF)}$



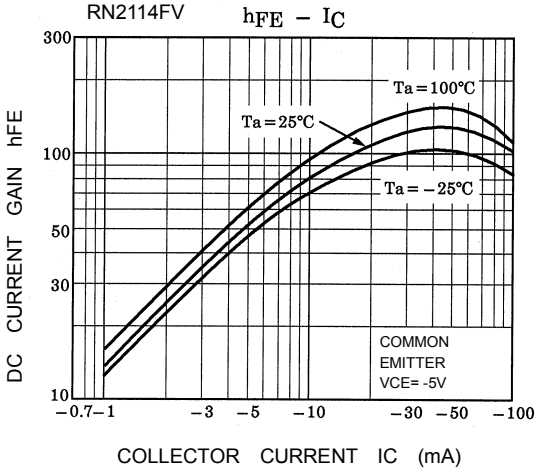
RN2117FV $I_C - V_{I(OFF)}$



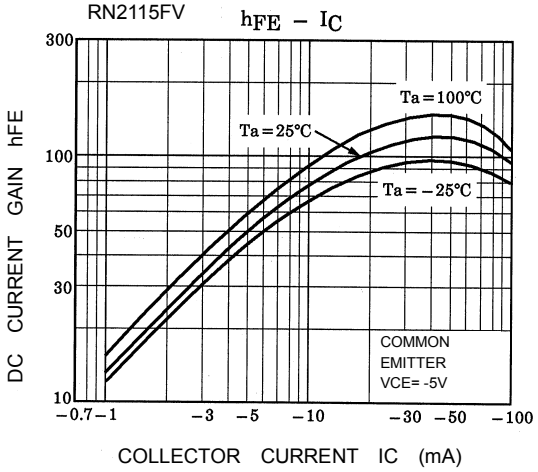
RN2118FV $I_C - V_{I(OFF)}$



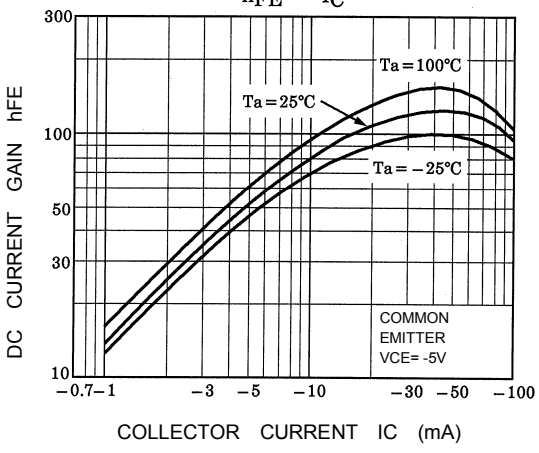
RN2114FV h_{FE} – I_C



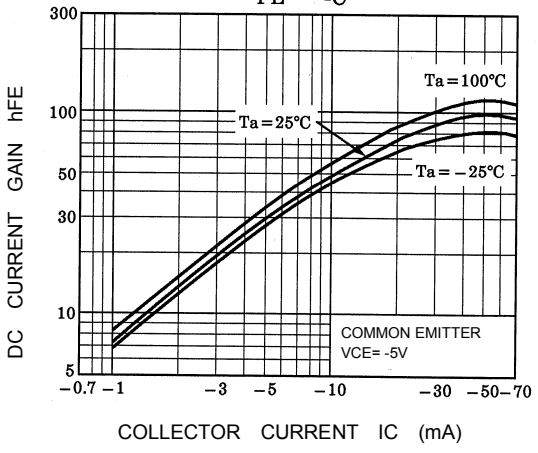
RN2115FV h_{FE} – I_C



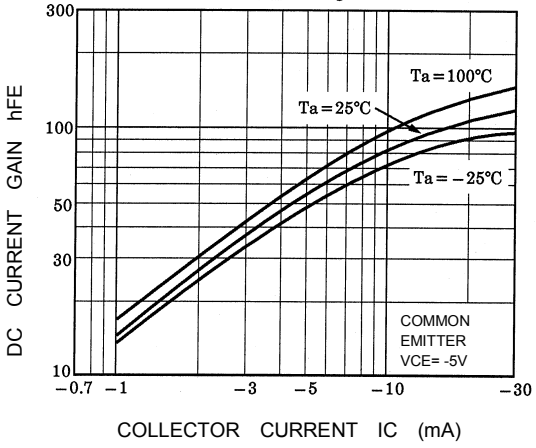
RN2116FV h_{FE} – I_C



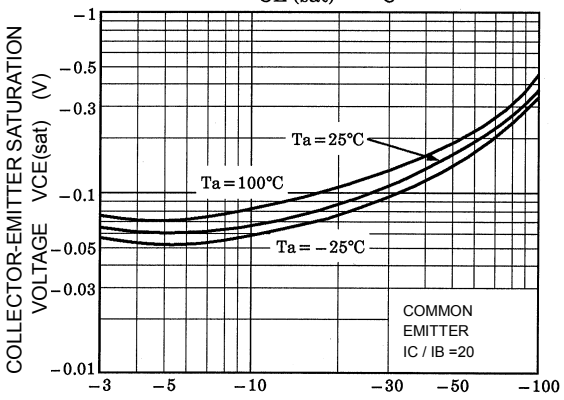
RN2117FV h_{FE} – I_C



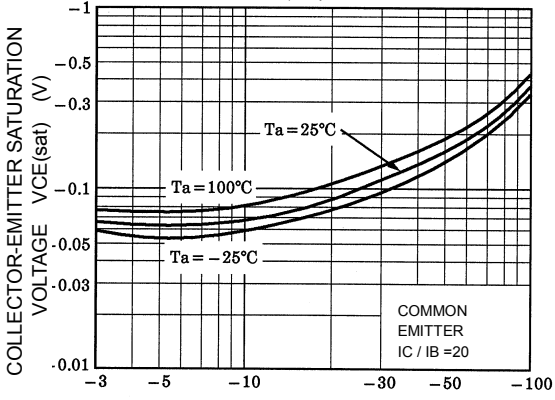
RN2118FV h_{FE} – I_C



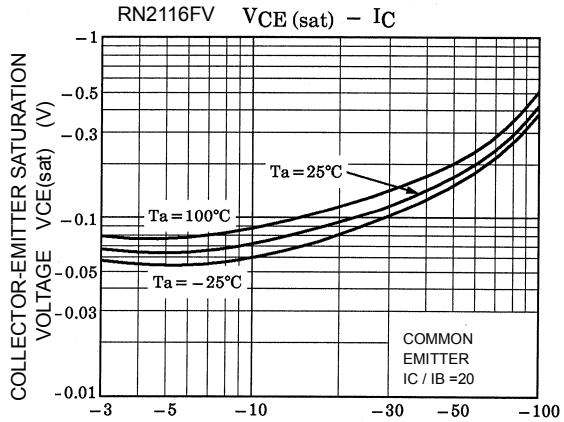
RN2114FV $V_{CE\,(sat)} - I_C$



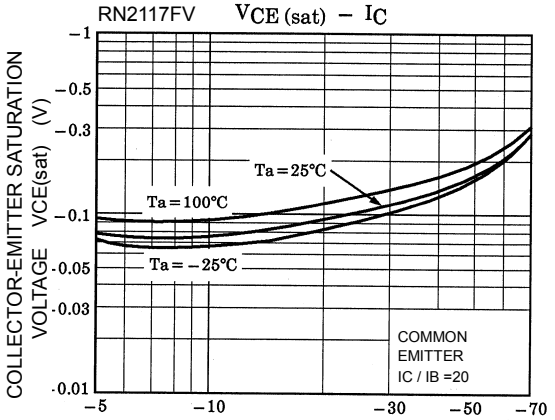
RN2115FV $V_{CE\,(sat)} - I_C$



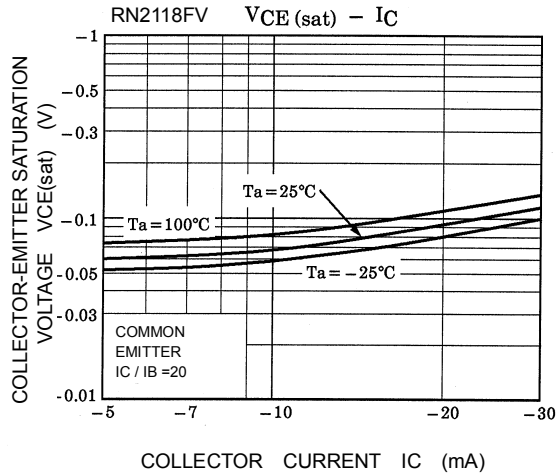
RN2116FV $V_{CE\,(sat)} - I_C$

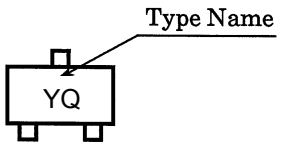
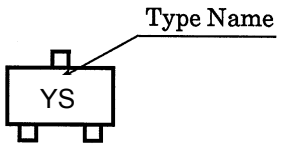
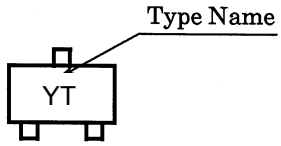
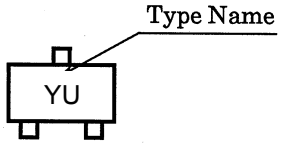
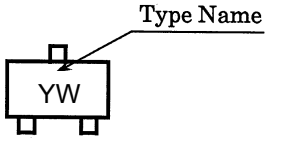


RN2117FV $V_{CE\,(sat)} - I_C$



RN2118FV $V_{CE\,(sat)} - I_C$



Type Name	Marking
RN2114FV	
RN2115FV	
RN2116FV	
RN2117FV	
RN2118FV	

RESTRICTIONS ON PRODUCT USE

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- 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.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.