

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

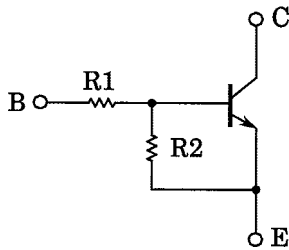
## RN1501,RN1502,RN1503 RN1504,RN1505,RN1506

Unit: mm

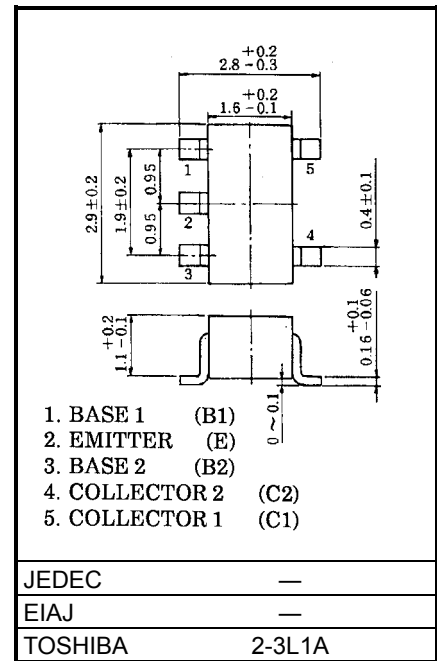
Switching, Inverter Circuit, Interface Circuit  
And Driver Circuit Applications

- Including two devices in SMV (super mini type with 5 leads) With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process
- Complementary to RN2501~RN2506

### Equivalent Circuit and Bias Resister Values



Type No.	R1 (kΩ)	R2 (kΩ)
RN1501	4.7	4.7
RN1502	10	10
RN1503	22	22
RN1504	47	47
RN1505	2.2	47
RN1506	4.7	47



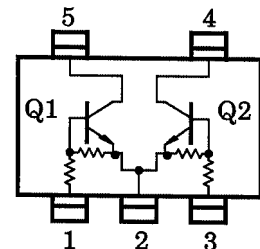
Weight: 6.8mg

### Equivalent Circuit (Top View)

### Maximum Ratings (Ta = 25°C) (Q1, Q2 Common)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V <sub>CB0</sub>	50	V
Collector-emitter voltage			
Emitter-base voltage	V <sub>EB0</sub>	10	V
		5	
Collector current	I <sub>C</sub>	100	mA
Collector power dissipation	P <sub>C</sub> *	300	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature range	T <sub>stg</sub>	-55~150	°C

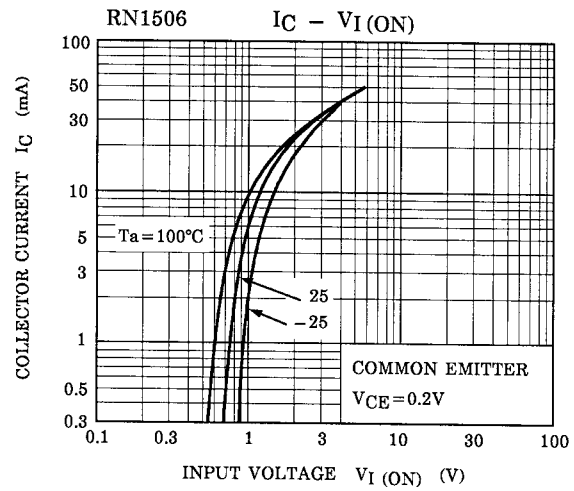
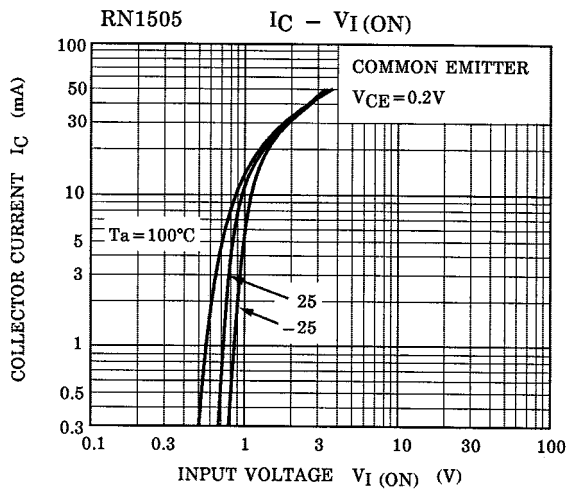
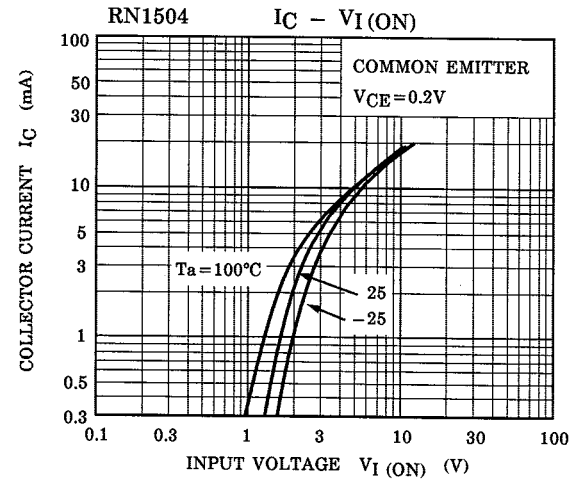
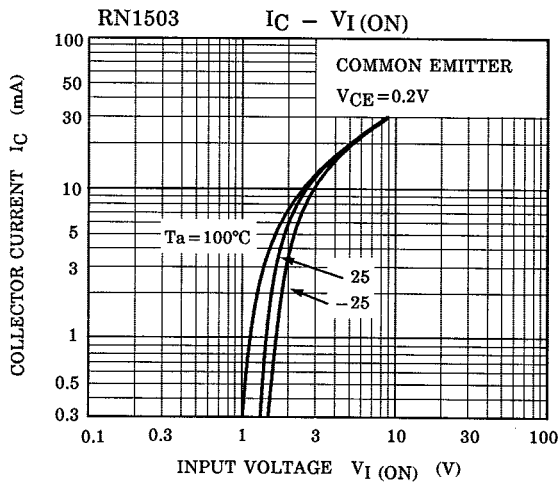
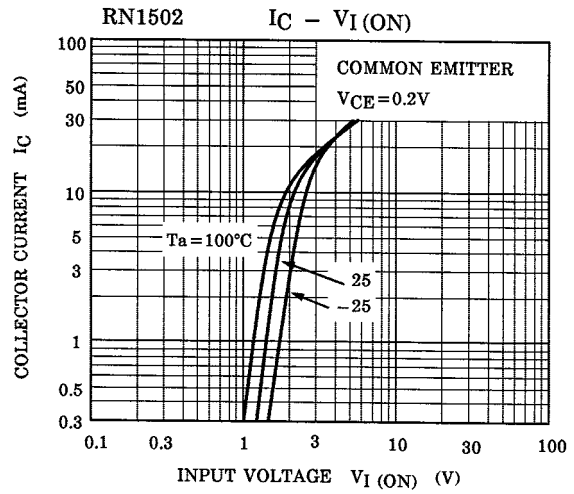
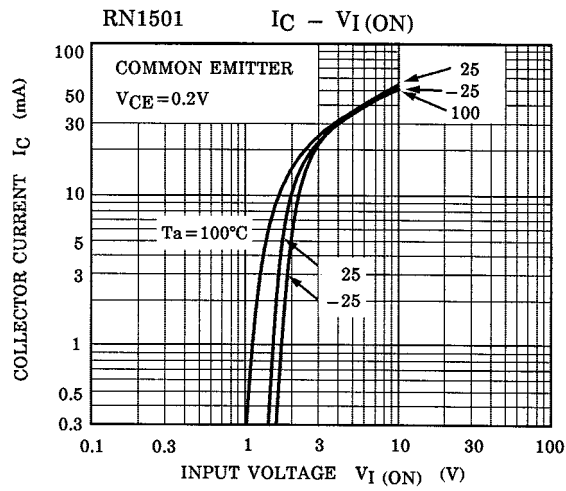
\* Total rating



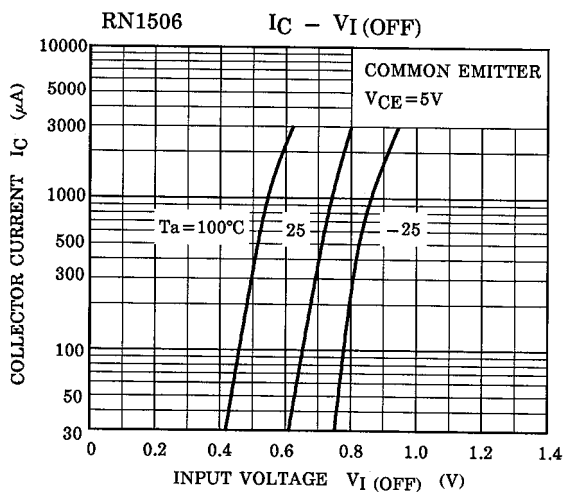
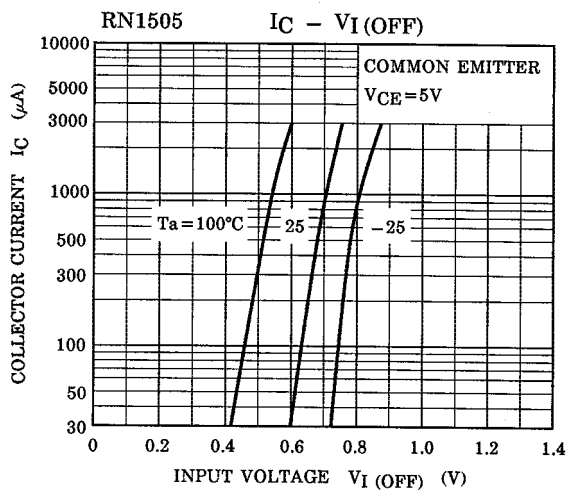
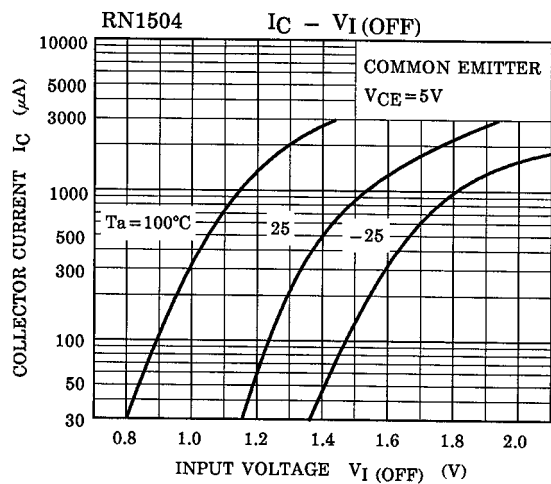
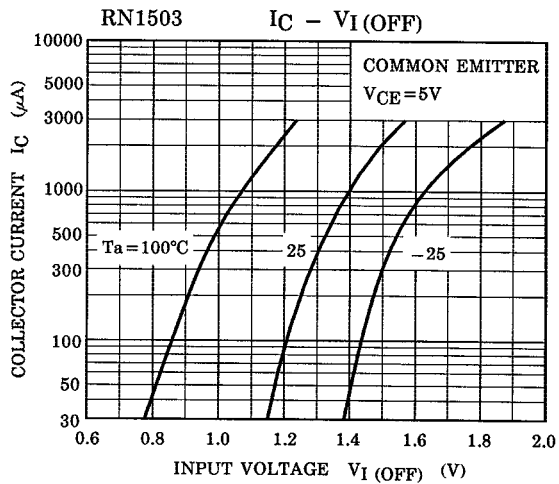
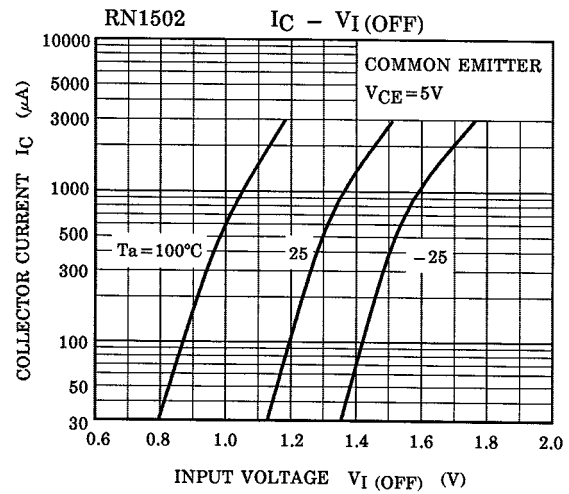
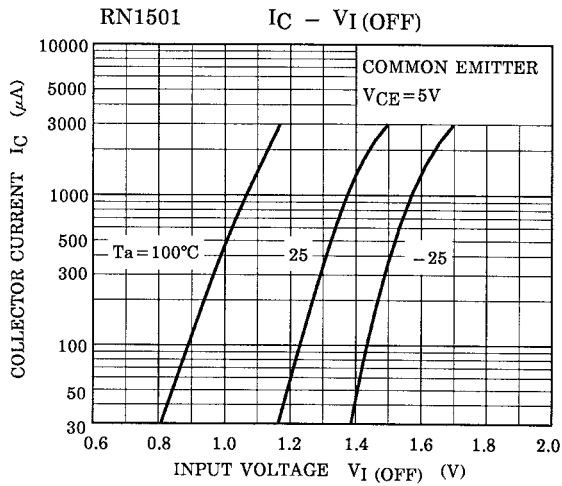
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 Common)

Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	RN1501~1506	$I_{CBO}$	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
		$I_{CEO}$	—	$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	RN1501	$I_{EBO}$	—	$V_{EB} = 10V, I_C = 0$	0.82	—	1.52	mA
	RN1502				0.38	—	0.71	
	RN1503				0.17	—	0.33	
	RN1504			0.082	—	0.15		
	RN1505			$V_{EB} = 5V, I_C = 0$	0.078	—	0.145	
	RN1506				0.074	—	0.138	
DC current gain	RN1501	$h_{FE}$	—	$V_{CE} = 5V, I_C = 10mA$	30	—	—	
	RN1502				50	—	—	
	RN1503				70	—	—	
	RN1504				80	—	—	
	RN1505				80	—	—	
	RN1506				80	—	—	
Collector-emitter saturation voltage	RN1501~1506	$V_{CE(sat)}$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	RN1501	$V_{I(ON)}$	—	$V_{CE} = 0.2V, I_C = 5mA$	1.1	—	2.0	V
	RN1502				1.2	—	2.4	
	RN1503				1.3	—	3.0	
	RN1504				1.5	—	5.0	
	RN1505				0.6	—	1.1	
	RN1506				0.7	—	1.3	
Input voltage (OFF)	RN1501~1504	$V_{I(OFF)}$	—	$V_{CE} = 5V, I_C = 0.1mA$	1.0	—	1.5	V
	RN1505, 1506				0.5	—	0.8	
Transition frequency	RN1501~1506	$f_T$	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector Output capacitance	RN1501~1506	$C_{ob}$	—	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	3	6	pF
Input resistor	RN1501	R1	—		3.29	4.7	6.11	kΩ
	RN1502				7	10	13	
	RN1503				15.4	22	28.6	
	RN1504				32.9	47	61.1	
	RN1505				1.54	2.2	2.86	
	RN1506				3.29	4.7	6.11	
Resistor ratio	RN1501~1504	R1/R2	—		0.9	1.0	1.1	
	RN1505				0.0421	0.0468	0.0515	
	RN1506				0.09	0.1	0.11	

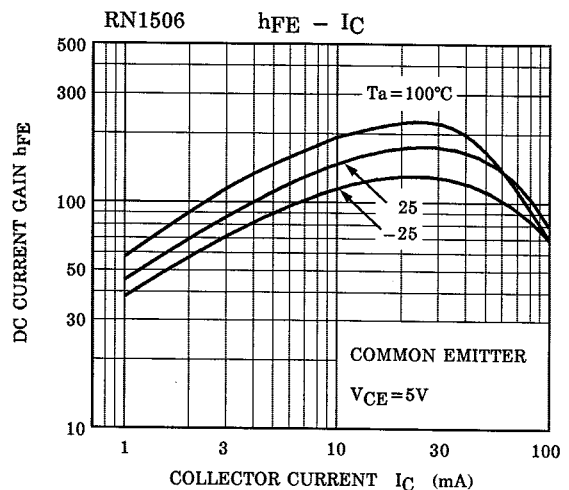
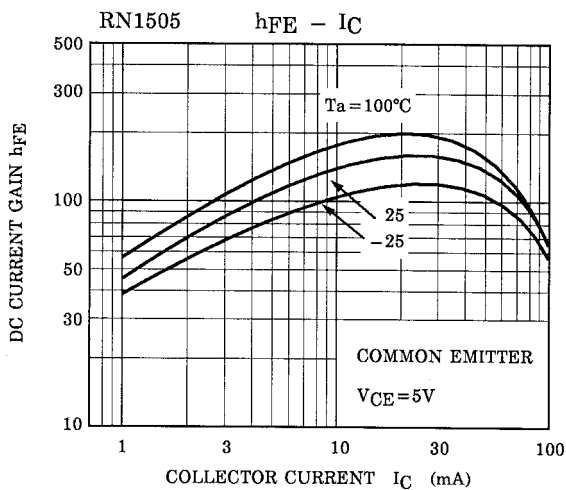
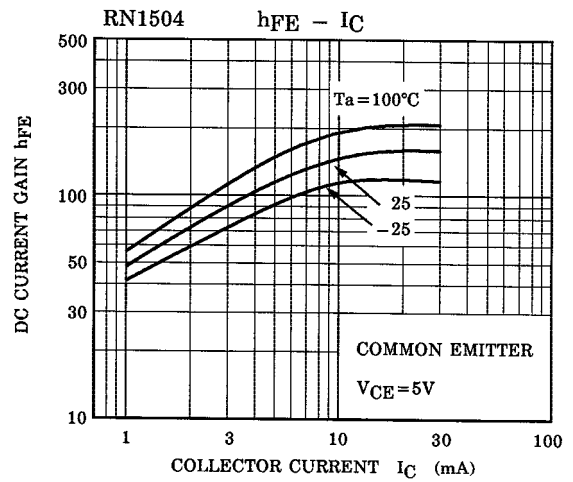
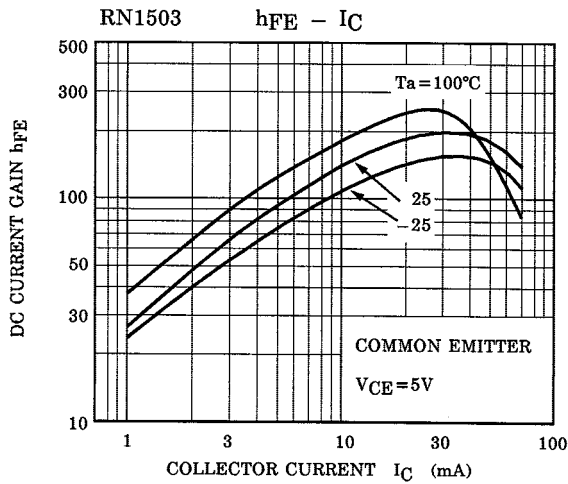
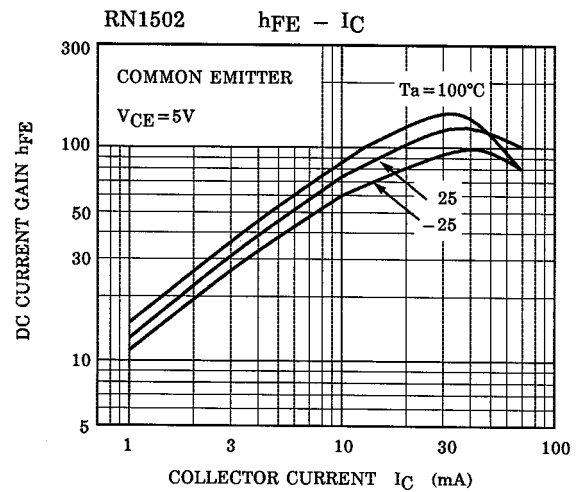
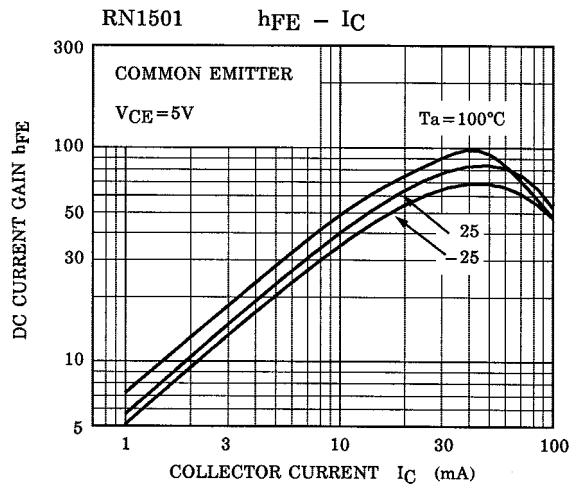
(Q1, Q2 COMMON)

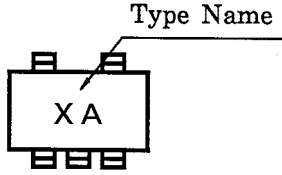
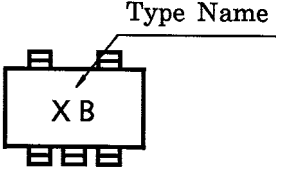
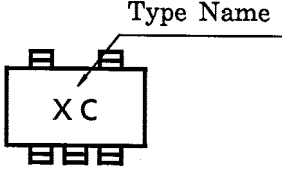
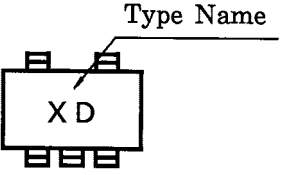
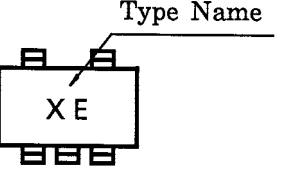
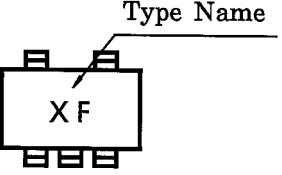


(Q1, Q2 COMMON)



(Q1, Q2 COMMON)



Type Name	Marking
RN1501	
RN1502	
RN1503	
RN1504	
RN1505	
RN1506	

**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.