

TLP721

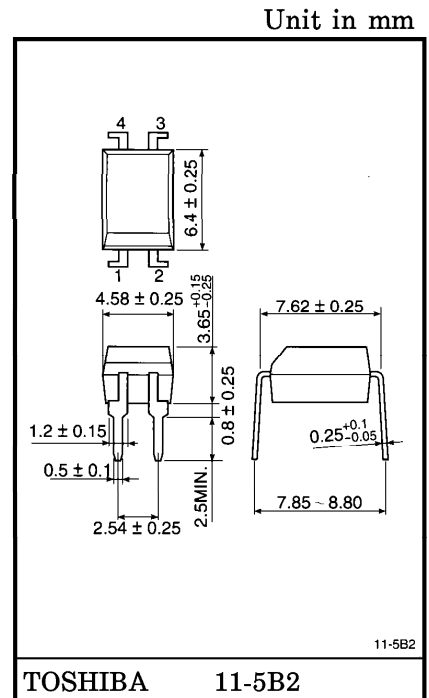
OFFICE MACHINE
 HOUSEHOLD USE EQUIPMENT
 SOLID STATE RELAY
 SWITCHING POWER SUPPLY

The TOSHIBA TLP721 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP.

- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 50% (Min.)
 Rank GB : 100% (Min.)

	MADE IN JAPAN		MADE IN THAILAND	
UL Recognized	E67349	*1	E152349	*1
BSI Approved	7364, 7365	*2	7364, 7365	*2
SEMKO Approved	9325163	*3	9609169	*4
	9522142	*3		

- *1 UL1577
- *2 BS EN60065 : 1994, BS EN60950 : 1992
- *3 SS EN4330784
- *4 SS EN60950



Weight : 0.26g

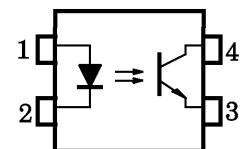
- Option (D4) type VDE Approved

	MADE IN JAPAN	MADE IN THAILAND
VDE Approved	74285, 91835	91868
Maximum Operating Insulation Voltage	630, 890Vpk	890Vpk
Highest Permissible Over Voltage	6000, 8000Vpk	8000Vpk

*5 VDE0884 / 06.92

(Note) When a VDE0884 approved type is needed, please designate the "Option (D4)"

PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE
- 2 : CATHODE
- 3 : EMITTER
- 4 : COLLECTOR

7.62mm pich TLP721 type	10.16mm pich TLP721F type
----------------------------	------------------------------

- Creepage Distance : 7.0mm (Min.) / 8.0mm (Min.)
- Clearance : 7.0mm (Min.) / 8.0mm (Min.)
- Internal Creepage Path : 4.0mm (Min.) / 4.0mm (Min.)
- Insulation Thickness : 0.5mm (Min.) / 0.5mm (Min.)

Current Transfer Ratio

TYPE	CLASSI- FICATION *1	CURRENT TRANSFER RATIO (%) (I_C / I_F)		MARKING OF CLASSIFICATION
		$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$, $T_a = 25^\circ\text{C}$		
		MIN.	MAX.	
TLP721	(None)	50	600	BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB
	Rank GR	50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
	Rank GB	200	600	B, B [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB

*1 : Ex. Rank GB : TLP721 (GB)

Note : Application type name for certification test, please use standard product type name, i. e.

TLP721 (GB) : TLP721

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		STMBOL	RATING	UNIT
LED	Forward Current	I_F	60	mA
	Forward Current Derating ($T_a \geq 39^\circ\text{C}$)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
	Peak Forward Current (100 μs pulse, 100pps)	I_{FP}	1	A
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_j	125	$^\circ\text{C}$
DETECTOR	Collector-Emitter Voltage	V_{CEO}	55	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / $^\circ\text{C}$
	Junction Temperature	T_j	125	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55~125	$^\circ\text{C}$
Operating Temperature Range		T_{opr}	-40~100	$^\circ\text{C}$
Lead Soldering Temperature (10s)		T_{sol}	260	$^\circ\text{C}$
Total Package Power Dissipation		P_T	250	mW
Total Package Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / $^\circ\text{C}$
Isolation Voltage (AC, 1 min., R.H. $\leq 60\%$) (NOTE)		BV_S	4000	Vrms

NOTE. Device considered a two terminal device : pins 1 and 2 shorted together, and pins 3 and 4 shorted together.

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{CC}	—	5	24	V
Forward Current	I _F	—	16	25	mA
Collector Current	I _C	—	1	10	mA
Operating Temperature	T _{opr}	-25	—	85	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V _F	I _F = 10mA	1.0	1.15	1.3	V
	Reverse Current	I _R	V _R = 5V	—	—	10	μA
	Capacitance	C _T	V = 0, f = 1MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V _{(BR) CEO}	I _C = 0.5mA	55	—	—	V
	Emitter-Collector Breakdown Voltage	V _{(BR) ECO}	I _E = 0.1mA	7	—	—	V
	Collector Dark Current	I _{CEO}	V _{CE} = 24V (Ambient Light Below 1000 lx)	—	0.01 (2)	0.1 (10)	μA
			V _{CE} = 24V (Ambient Light Below 1000 lx) Ta = 85°C	—	2 (4)	50 (50)	μA
Capacitance (Collector to Emitter)	C _{CCE}	V = 0, f = 1MHz	—	10	—	pF	

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I _C / I _F	I _F = 5mA, V _{CE} = 5V Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	I _C / I _F (sat)	I _F = 1mA, V _{CE} = 0.4V Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	I _C = 2.4mA, I _F = 8mA	—	—	0.4	V
		I _C = 0.2mA, I _F = 1mA Rank GB	—	0.2	—	
			—	—	0.4	

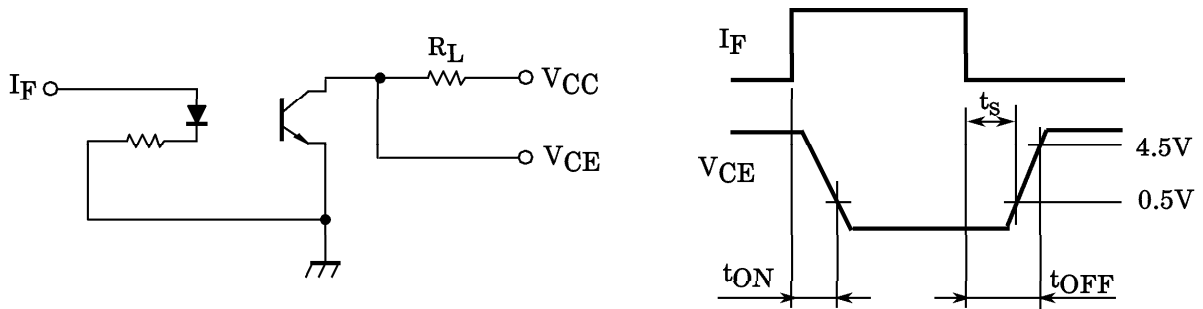
ISOLATION CHARACTERISTICS (Ta = 25°C)

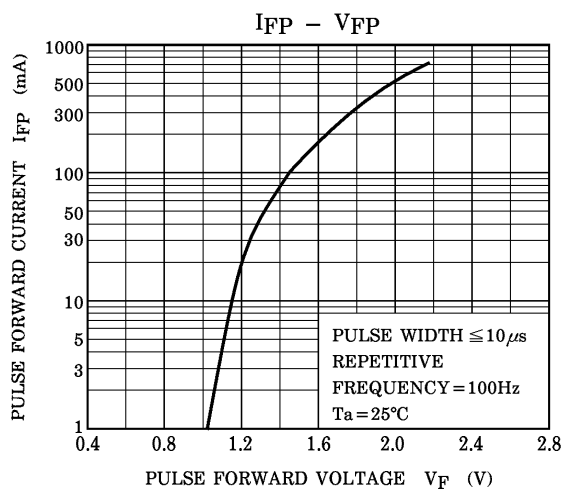
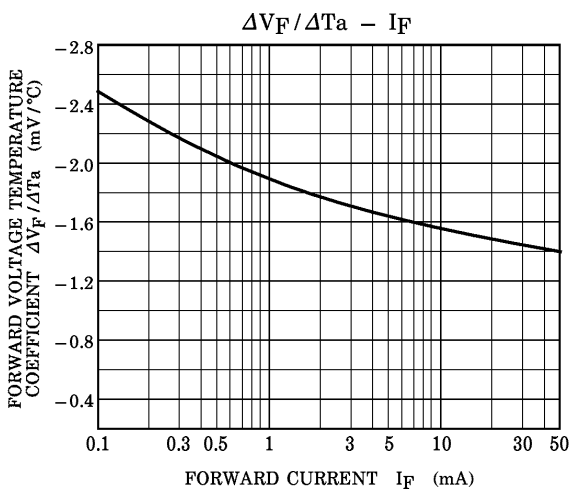
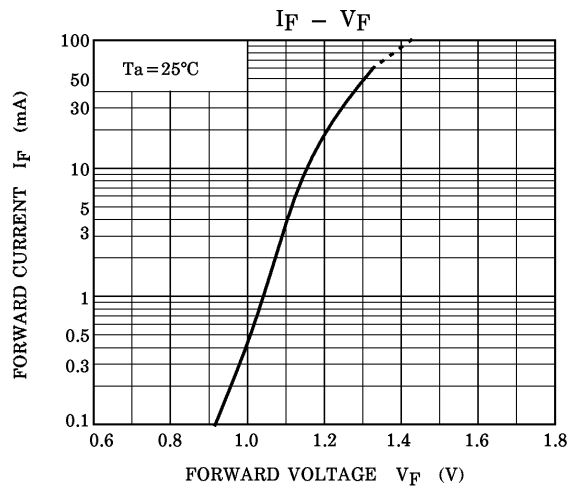
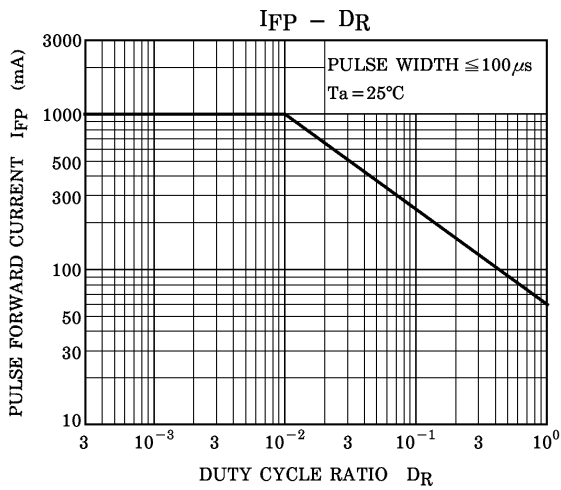
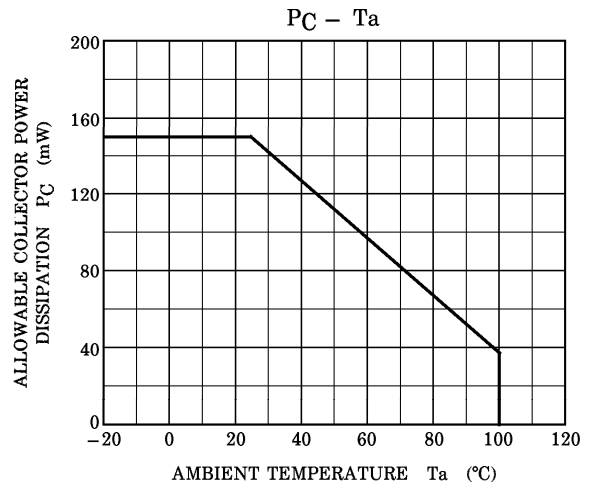
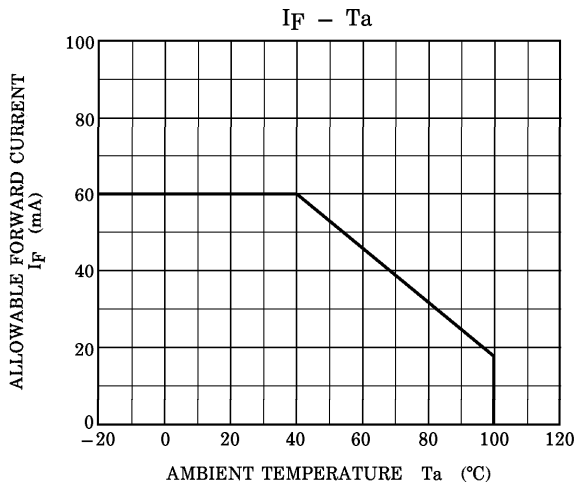
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C _S	V _S =0, f=1MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S =500V, R.H.≤60%	1×10 ¹²	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 1 minute	4000	—	—	V _{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V _{dc}

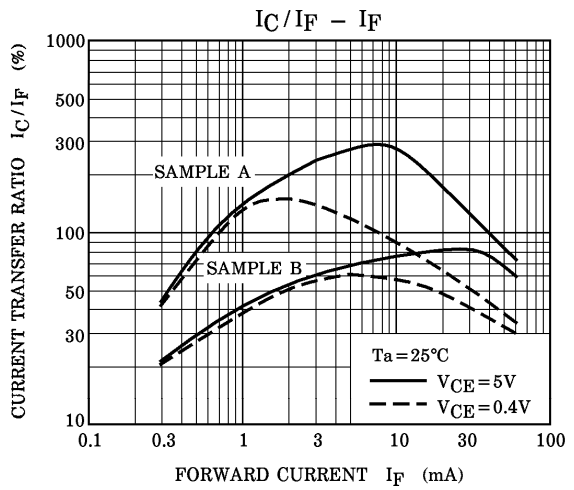
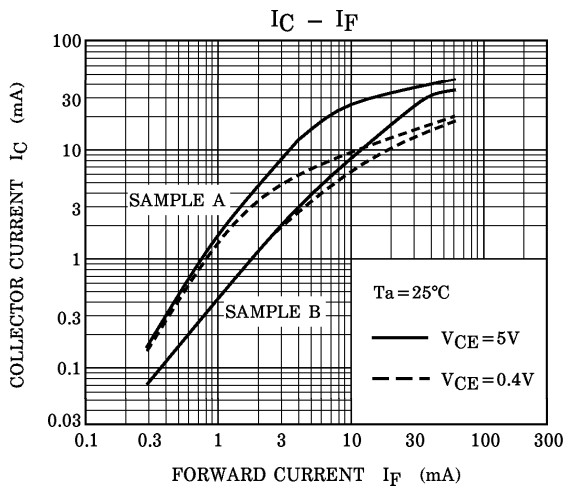
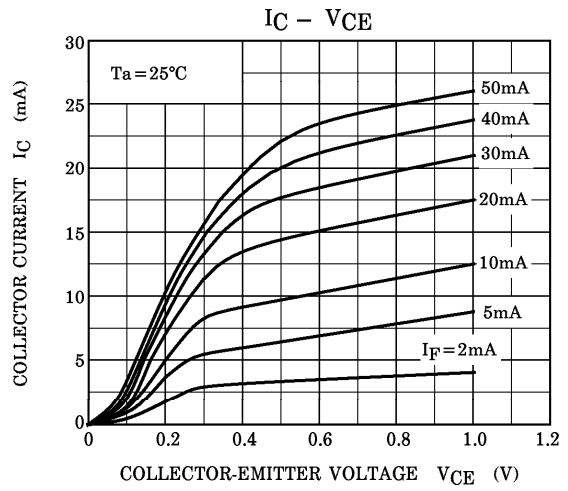
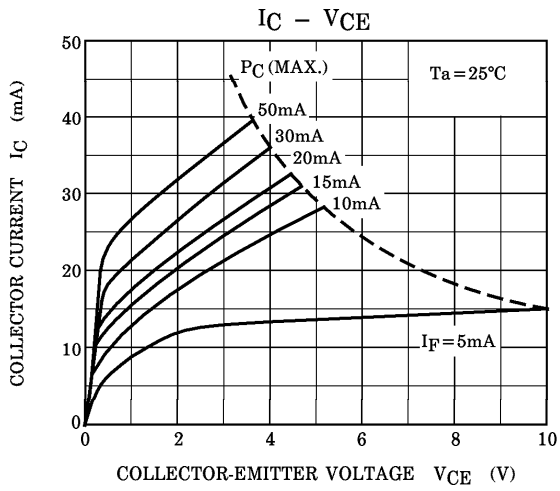
SWITCHING CHARACTERISTICS (Ta = 25°C)

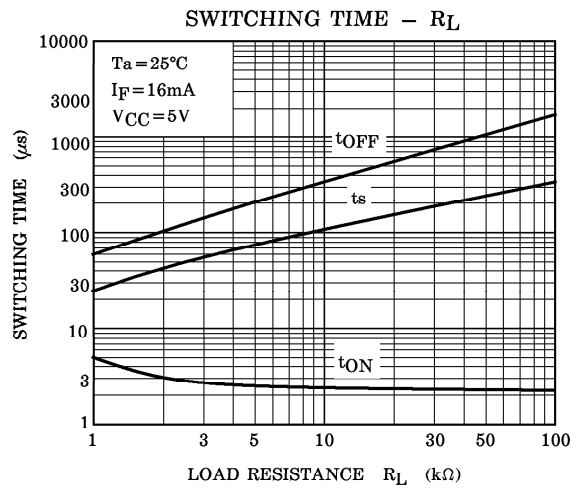
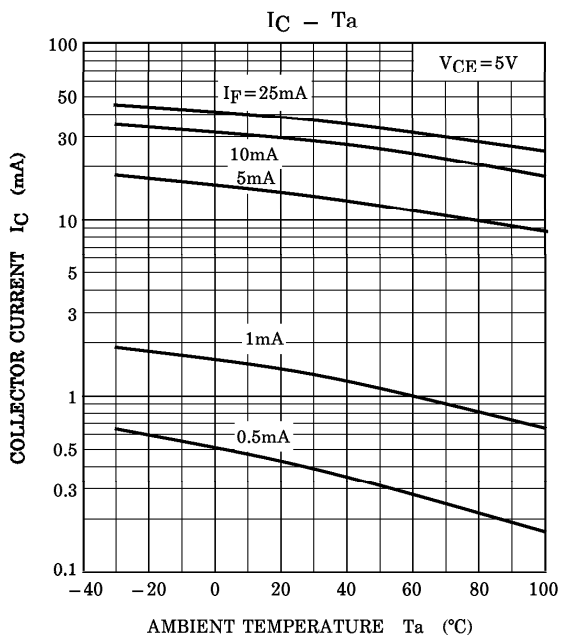
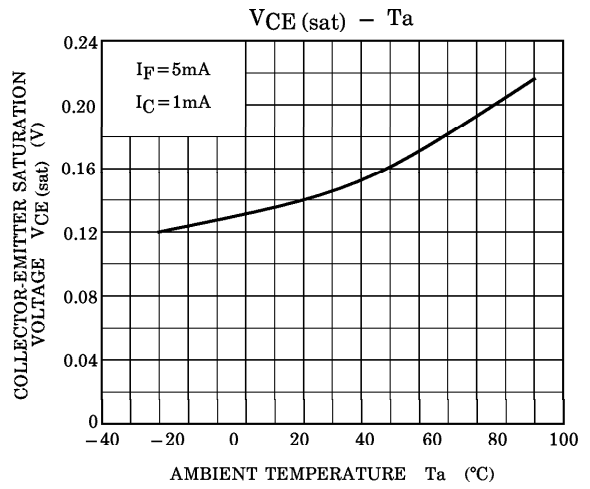
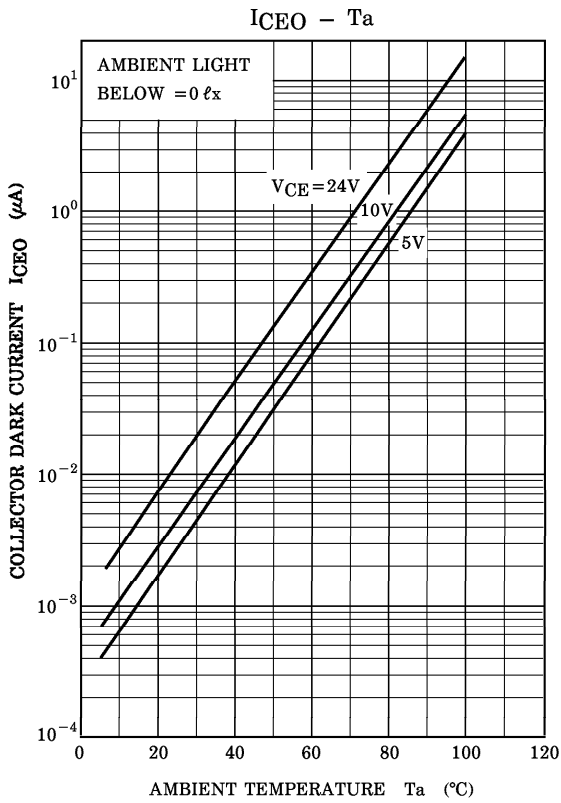
CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t _r	V _{CC} =10V, I _C =2mA R _L =100Ω	—	2	—	μs
Fall Time	t _f		—	3	—	
Turn-on Time	t _{on}		—	3	—	
Turn-off Time	t _{off}		—	3	—	
Turn-on Time	t _{ON}	R _L =1.9kΩ (Fig.1) V _{CC} =5V, I _F =16mA	—	3	—	μs
Storage Time	t _s		—	40	—	
Turn-off Time	t _{OFF}		—	90	—	

Fig.1 Switching Time Test Circuit









RESTRICTIONS ON PRODUCT USE

000707EBC

- 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.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- 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.