

GP1A91LR/GP1A91LC

Subminiature OPIC Photointerrupter

■ Features

1. Compact package ($3.7 \times 2.6 \times 3.1\text{mm}$)
2. Can be directly connected to C-MOS logic and microcomputer
3. Low voltage operation, low dissipation current
(Operating supply voltage : 1.4 to 7.0V
OFF-state consumption current : MAX. 0.5mA)
4. Gap width 1.2mm, slit width 0.23mm
5. General purpose

■ Applications

1. Cameras
2. CD-ROM drives

■ Absolute Maximum Ratings (Ta=25°C)

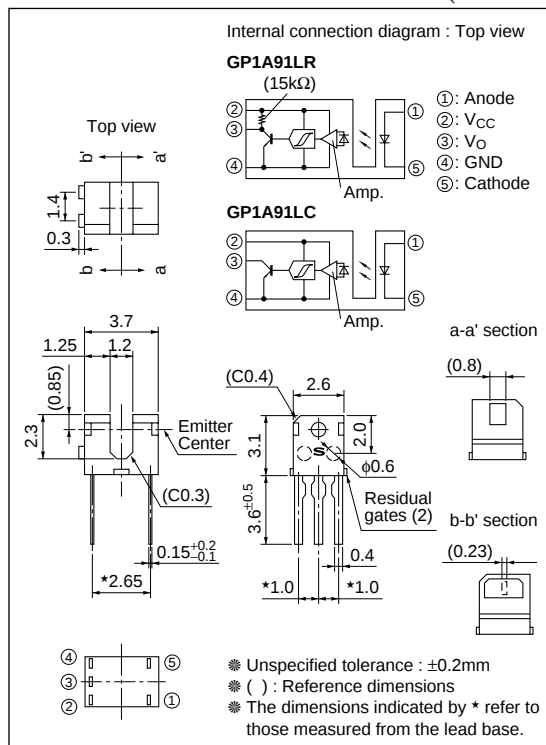
	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P	75	mW
Output	Supply voltage	V_{CC}	7.0	V
	Low level Output current	I_O	2.0	mA
	Power dissipation	P_O	80	mW
	Operating temperature	T_{opr}	-25 to +85	°C
	Storage temperature	T_{stg}	-40 to +100	°C
	*1 Soldering temperature	T_{sol}	260	°C

*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig.3, 4, 5

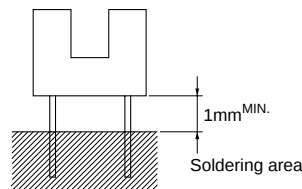
*2 For 5s or less

■ Outline Dimensions

(Unit : mm)



*"OPIC" (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.



■ Electro-optical Characteristics

(Ta=25°C)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F=5\text{mA}$	—	1.15	1.25	V
	Reverse current	I_R	$V_R=3\text{V}$	—	—	10	μA
Output	Operating supply voltage	V_{CC}	—	1.4	—	7.0	V
	Low level output voltage	V_{OL}	$V_{CC}=3\text{V}$, $I_{OL}=1\text{mA}$, $I_F=5\text{mA}$	—	0.1	0.4	V
	High level output voltage	V_{OH}	$V_{CC}=3\text{V}$, $I_F=0\text{mA}$	2.9	—	—	V
	Low level supply current	I_{CCL}	$V_{CC}=3\text{V}$, $I_F=5\text{mA}$	—	0.7	1.2	mA
	High level supply current	I_{CCH}	$V_{CC}=3\text{V}$, $I_F=0\text{mA}$	—	0.3	0.5	mA
Transfer characteristics	*3 "High→Low" threshold input current	I_{FHL}	$V_{CC}=3\text{V}$	—	1.2	3.5	mA
	*4 Hysteresis	I_{FLH}/I_{FHL}	$V_{CC}=3\text{V}$	0.55	0.8	0.95	—
	Response time	"Low→High" propagation delay time	$V_{CC}=3\text{V}$ $I_F=5\text{mA}$ $R_L=3\text{k}\Omega$ (GP1A91LR) $R_L=2.4\text{k}\Omega$ (GP1A91LC)	—	10	30	μs
		"High→Low" propagation delay time		—	3	15	
		Rise time		—	0.6	3.0	
		Fall time		—	0.2	1.0	

*3 I_{FHL} represents forward current when output goes from High to Low.

*4 Hysteresis stands for I_{FLH}/I_{FHL} .

GP1A91LC— R_L (15k Ω) is applied to $V_{CC}-V_O$ (Condition during measuring response time : $R_L=2.4\text{k}\Omega$)

Fig.1 Test Circuit for Response Time

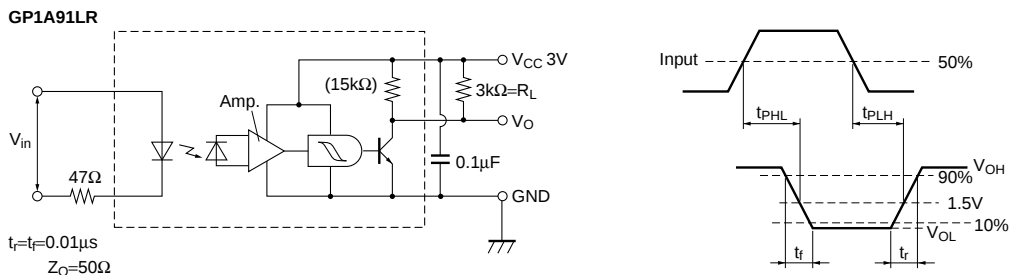


Fig.2 Test Circuit for Response Time

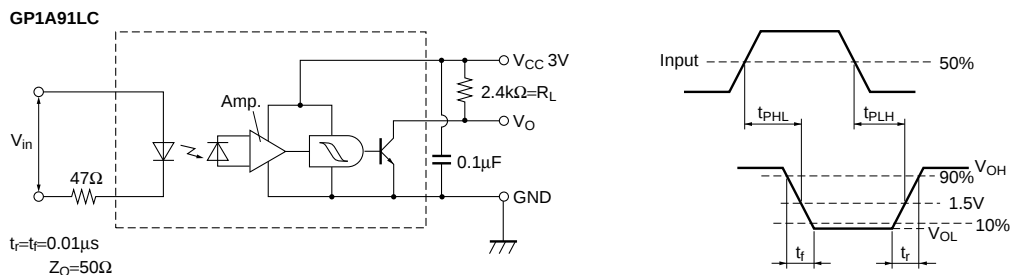


Fig.3 Forward Current vs. Ambient Temperature

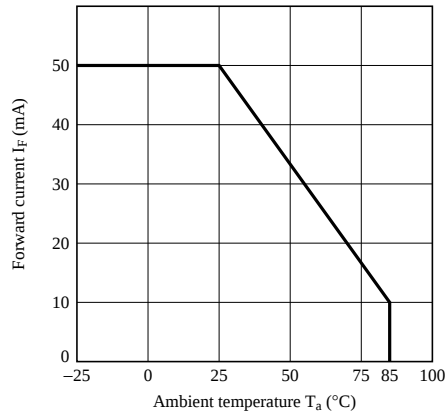


Fig.4 Output Current vs. Ambient Temperature

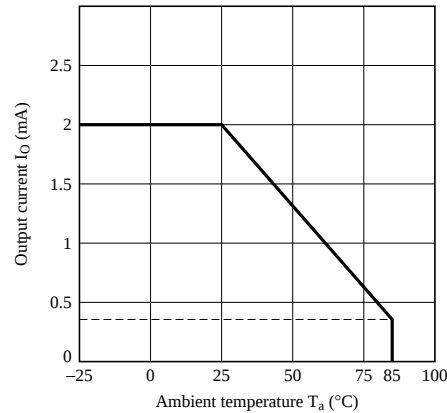


Fig.5 Output Power Dissipation vs. Ambient Temperature

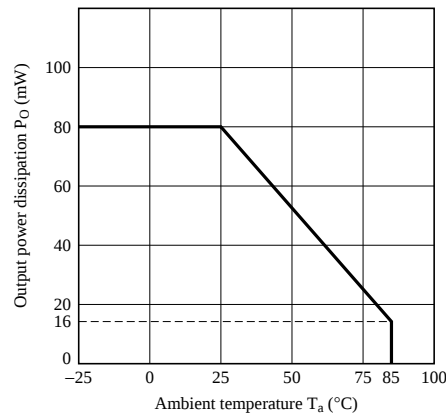


Fig.6 Forward Current vs. Forward Voltage

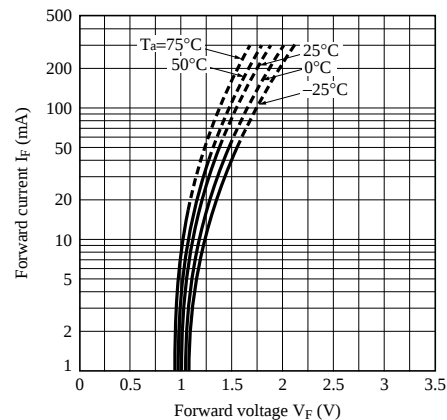


Fig.7 Relative Threshold Input Current vs. Supply Voltage

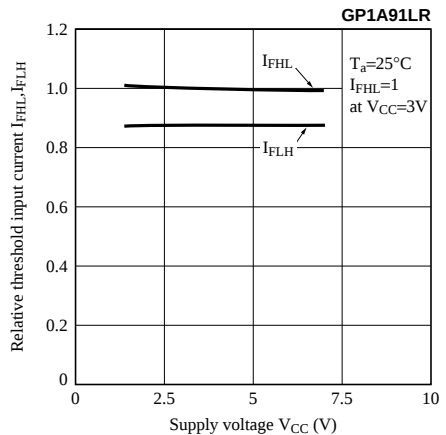


Fig.8 Relative Threshold Input Current vs. Supply Voltage

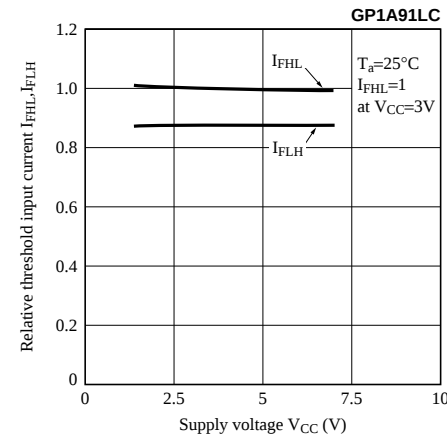


Fig.9 Relative Threshold Input Current vs. Ambient Temperature

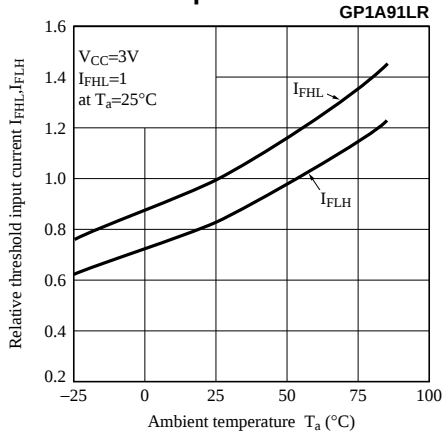


Fig.10 Relative Threshold Input Current vs. Ambient Temperature

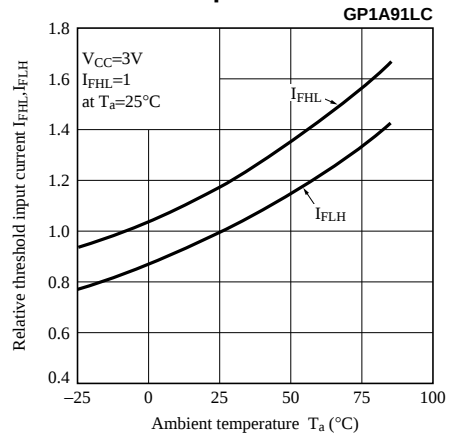


Fig.11 Low Level, High Level Supply Current vs. Supply Voltage (1)

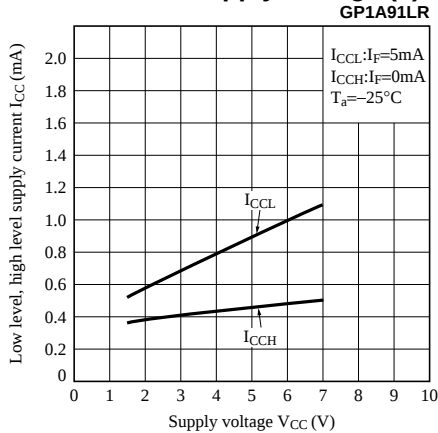


Fig.12 Low Level, High Level Supply Current vs. Supply Voltage (1)

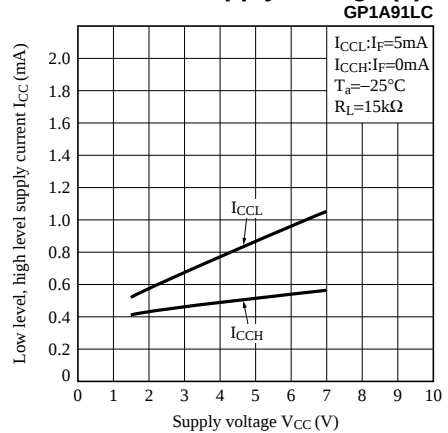


Fig.13 Low Level, High Level Supply Current vs. Supply Voltage (2)

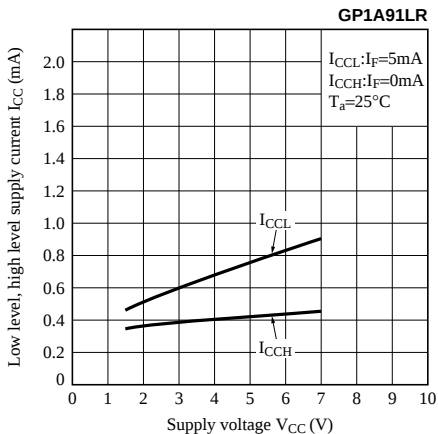


Fig.14 Low Level, High Level Supply Current vs. Supply Voltage (2)

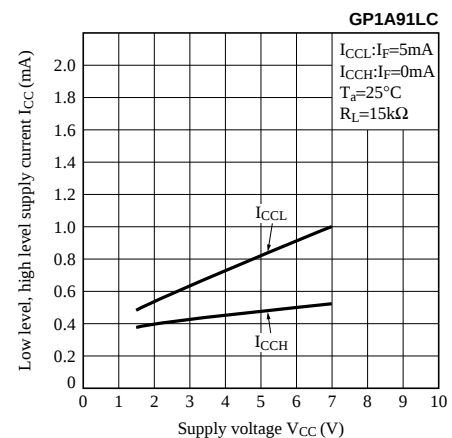


Fig.15 Low Level, High Level Supply Current vs. Supply Voltage (3)

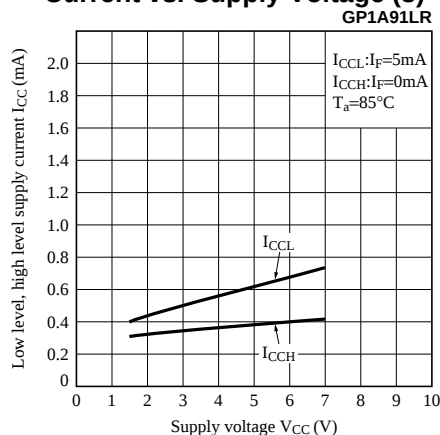


Fig.16 Low Level, High Level Supply Current vs. Supply Voltage (3)

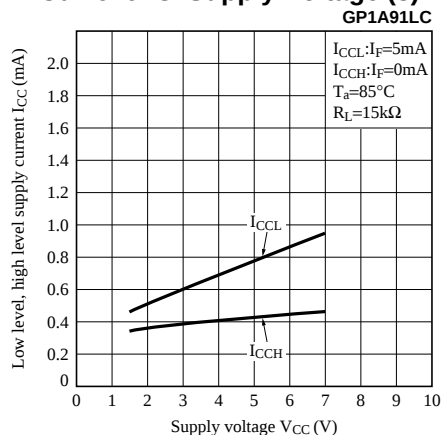


Fig.17 Low Level Output Voltage vs. Low Level Output Current

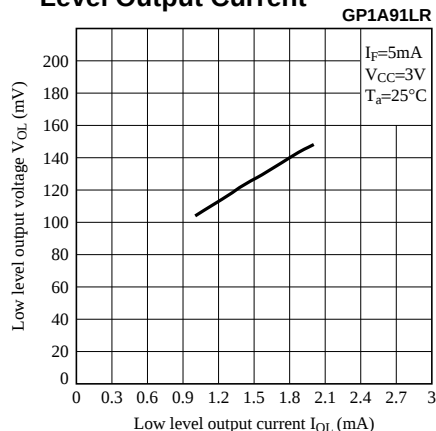


Fig.18 Low Level Output Voltage vs. Low Level Output Current

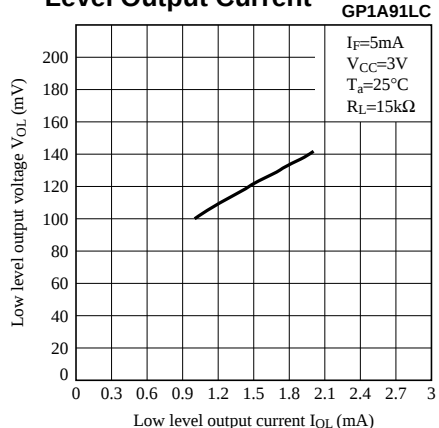


Fig.19 Low Level Output Voltage vs. Ambient Temperature

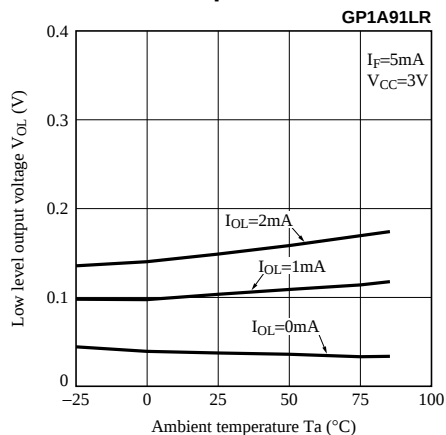


Fig.20 Low Level Output Voltage vs. Ambient Temperature

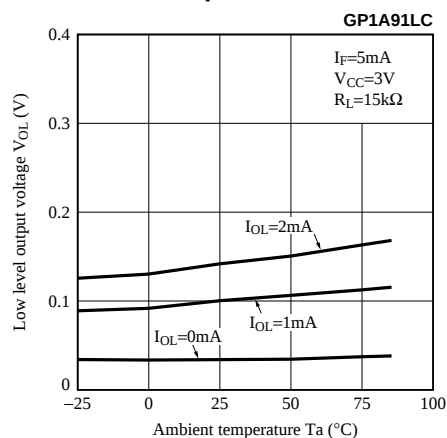


Fig.21 Rise Time, Fall Time vs. Load Resistance

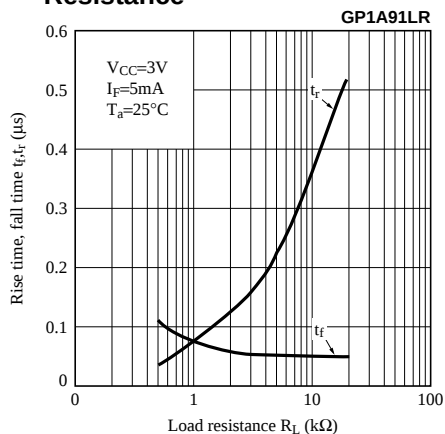


Fig.22 Rise Time, Fall Time vs. Load Resistance

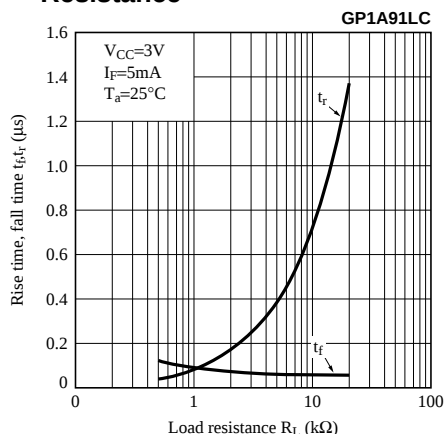


Fig.23 Propagation Delay Time vs. Forward Current

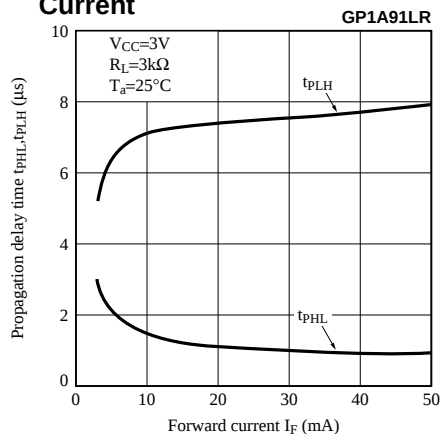


Fig.24 Propagation Delay Time vs. Forward Current

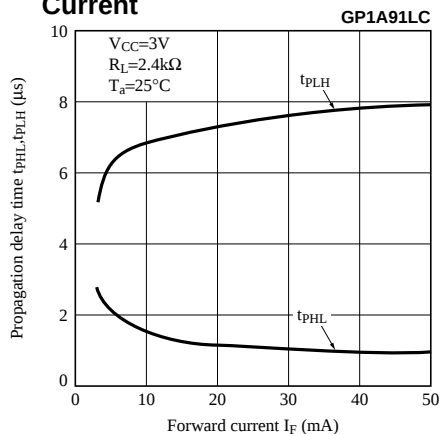


Fig.25 Low, High Level Output vs. Shield Distance (1) (Typical Value)

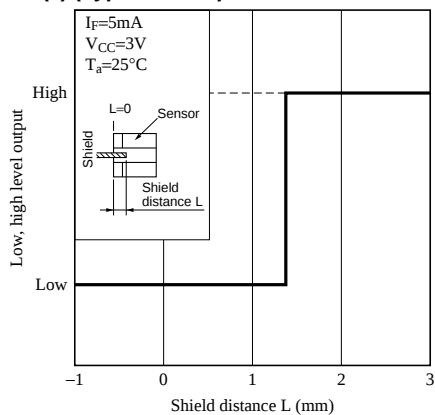
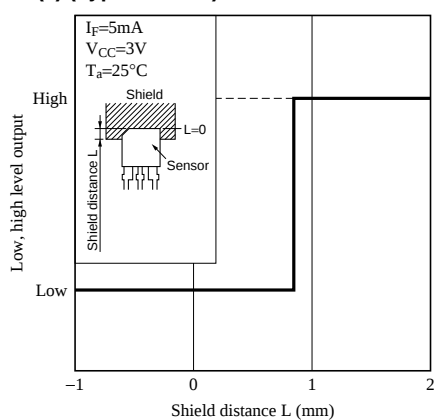


Fig.26 Low, High Level Output vs. Shield Distance (2) (Typical Value)



NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:
 - (i) The devices in this publication are designed for use in general electronic equipment designs such as:
 - Personal computers
 - Office automation equipment
 - Telecommunication equipment [terminal]
 - Test and measurement equipment
 - Industrial control
 - Audio visual equipment
 - Consumer electronics
 - (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
 - Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
 - Traffic signals
 - Gas leakage sensor breakers
 - Alarm equipment
 - Various safety devices, etc.
 - (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
 - Space applications
 - Telecommunication equipment [trunk lines]
 - Nuclear power control equipment
 - Medical and other life support equipment (e.g., scuba).
- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
- This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.
- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.