TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TA7522SG,TA7522FG

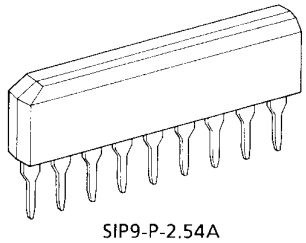
Dual Voltage Comparator

The TA7522SG is an easy-to-use IC incorporating two voltage comparator circuits. Since one channel has an inverted-output buffer, a CR oscillator can be easily built up.

The TA7522FG is in 8-pin dual inline package. The IC incorporating two-circuit package. It does not contain an inverted buffer output.

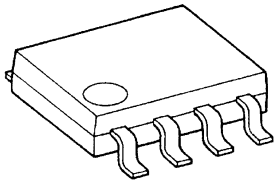
In addition, the TA7522SG/FG have a wide operating temperature range that allows it to be used in a wide variety of applications.

TA7522SG



SIP9-P-2.54A

TA7522FG



SOP8-P-225-1.27

Weight
SIP9-P-2.54A: 0.92 g (typ.)
SOP8-P-225-1.27: 0.08 g (typ.)

Features

- Two-circuit package
- High gain: 95dB (typ.)
- Single 3 V power supply for operation
- Inverted-output also available: TA7522SG only
- 0 V input causes action in the IC with a single power supply.
- Wide common-mode input range
- No latch-up
- Operating temperature range: –40 to 85°C
- Open-collector output
- SIP-9 pin (TA7522SG)
- SOP-8 pin (TA7522FG)
- Lead(Pb)-Free product

About solderability, following conditions were confirmed

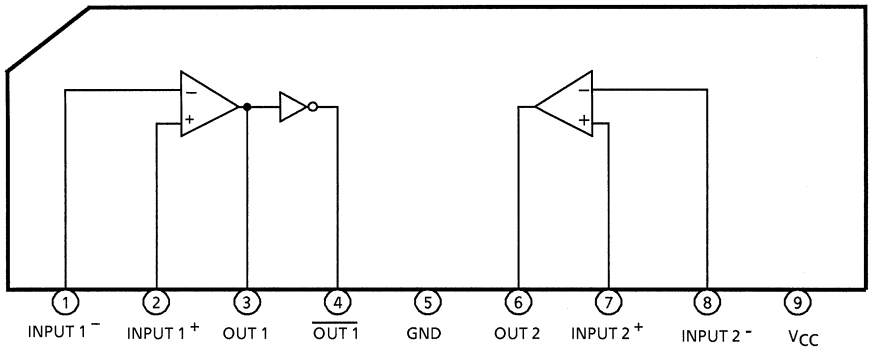
- Solderability

  (1) Use of Sn-37Pb solder Bath
  - solder bath temperature = 230°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux

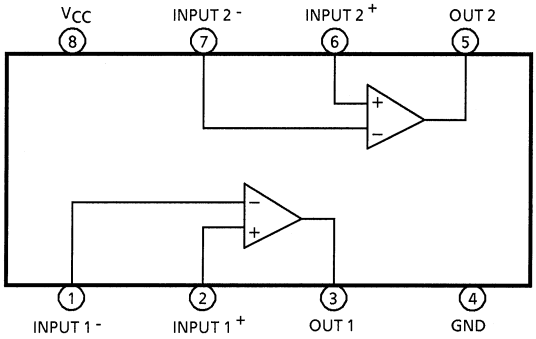
  (2) Use of Sn-3.0Ag-0.5Cu solder Bath
  - solder bath temperature = 245°C
  - dipping time = 5 seconds
  - the number of times = once
  - use of R-type flux

Block Diagram and Pin Layout

TA7522SG



TA7522FG



Note 1: The TA7522SG and TA7522FG are the same chip housed in different packages.

Note 2: Some functional blocks, circuits, or constants are omitted or simplified in the block diagram to clarify the descriptions of the relevant features.

Pin Description

Pin No.		Symbol	Description
TA7522SG	TA7522FG		
1	1	$INPUT1^-$	Inverted-input pin
2	2	$INPUT1^+$	Non-inverted-input pin
3	3	OUT1	Output pin corresponding to INPUT1
4	—	$\overline{OUT1}$	Output pin for inversion of OUT1
5	4	GND	Grounded
6	5	OUT2	Output pin corresponding to INPUT2
7	6	$INPUT2^+$	Non-inverted-input pin
8	7	$INPUT2^-$	Inverted-input pin
9	8	V_{CC}	Power supply pin

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	−0.3 to 18	V
Supply voltage surge	$V_{CC\ SURGE}$	+30 (within 1 sec)	V
Power dissipation	P_D	500/440	mW
Differential input voltage	DV_{IN}	±18	V
Input voltage	V_{IN}	−0.3 to 18	V
Output current	I_{SINK}	30	mA
Operating temperature	T_{opr}	−40 to 85	°C
Storage temperature	T_{stg}	−55 to 150	°C

Note 1: The absolute maximum ratings of a semiconductor device are a set of specified parameter values which must not be exceeded during operation, even for an instant.
If any of these levels is exceeded during operation, the device's electrical characteristics may be irreparably altered and the reliability and lifetime of the device can no longer be guaranteed, possibly causing damage to any other equipment with which it is used. Applications using the device should be designed such that the absolute maximum ratings will never be exceeded in any operating conditions.
Ensuring that the parameter values remain within these specified ranges during device operation will help to ensure that the integrity of the device is not compromised.

Note 2: P_D: TA7522SG/TA7522FG

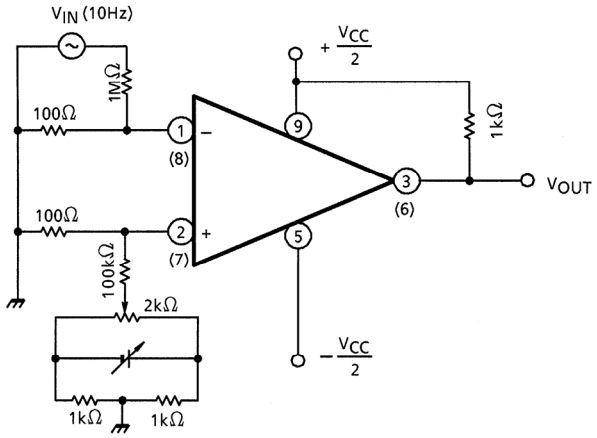
Electrical Characteristics (unless otherwise specified, Ta = –40 to 85°C)

Characteristics	Symbol		Test Circuit	Test Condition	Min	Typ.	Max	Unit
Voltage gain	G_V		1	V_{CC} = 6 V, R_L = 1 kΩ f = 10 Hz	60	95	—	dB
Input offset voltage	V_{IO}		2	V_{CC} = 6 V, R_L = 1 kΩ CMV_{IN} = 3 V	—	2	10	mV
Input bias current	I_I		3	V_{CC} = 6 V, CMV_{IN} = 3 V	—	−0.2	−2	μA
Input offset current	I_{IO}		3	V_{CC} = 6 V, CMV_{IN} = 3 V	—	0.02	0.3	μA
Common-mode input voltage	CMV_{IL}		4	V_{CC} = 6.5 V, R_L = 1 kΩ V_{IO} = 20 mV	—	−0.5	0	V
	CMV_{IH}			V_{CC} = 6.5 V, R_L = 1 kΩ V_{IO} = 20 mV	5.0	5.3	—	V
Zero output voltage	V_{OL}	OUT1 OUT2	5	V_{CC} = 5.5 V, V_{IN} = 0.1 V I_{OL} = 10 mA	—	0.18	0.4	V
		$\overline{OUT1}$		V_{CC} = 5.5 V, V_{IN} = 0.1 V, I_{OL} = 15 mA, V_{OL} (OUT1) ≥ 2 V	—	0.25	0.4	V
Output leakage current	I_{LEAK}	$\underline{OUT1}$ OUT1 OUT2	6	V_{CC} = 6 V, V_{OUT} = 30 V	—	—	10	μA
		OUT1	6	V_{CC} = 6 V, V_{OUT} = 0.4 V	—	−1.5	−10	μA
Current consumption	I_{CC}		7	V_{CC} = 6.5 V, R_L = ∞	—	3	7	mA

Note: An ambient temperature of 25°C is assumed for the typical values.

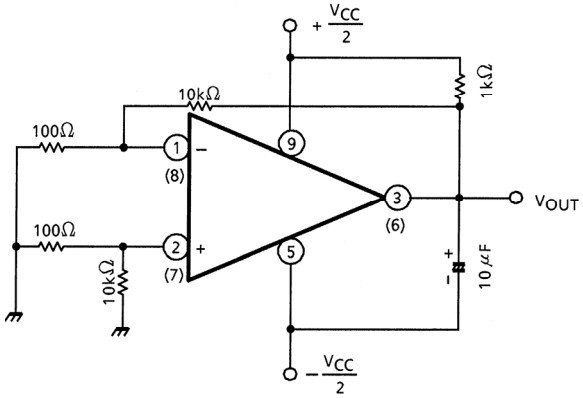
Test Circuit
(Below are examples for the TA7522SG. Note that, for the TA7522FG, pin numbers are different.)

1. G_V



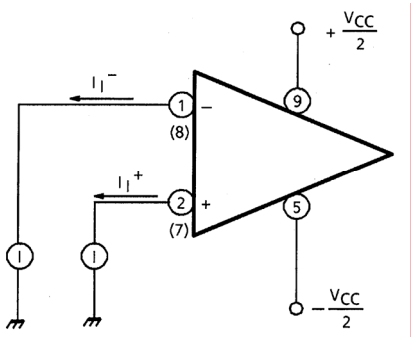
$$G_V = 20 \log \frac{V_{OUT}}{V_{IN}} + 80\,(dB)$$

2. V_{IO}



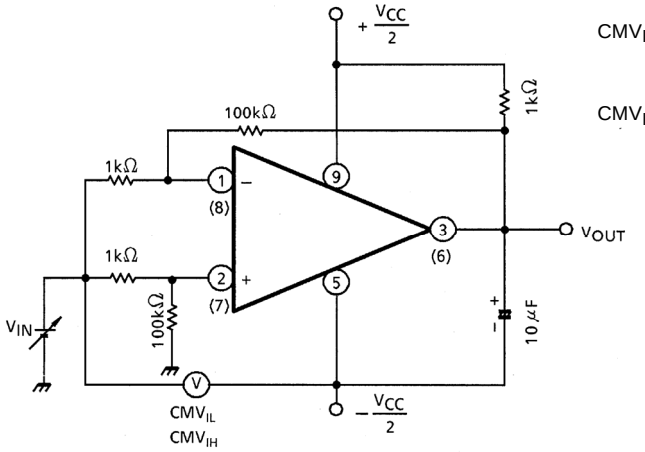
$$V_{IO} = \frac{V_{OUT}}{100}$$

3. I_I, I_{IO}



$$I_{IO} = \left| I_I^- - I_I^+ \right|$$

4. CMV_{IL}, CMV_{IH}

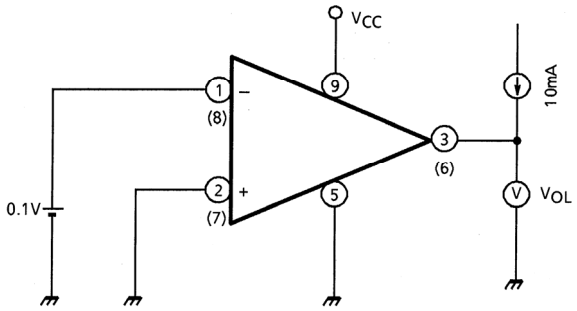


CMV_{IL}: Input voltage relative to pin 5 as it is obtained when V_{IN} is decreased until output V_{OUT} becomes ±2 V.

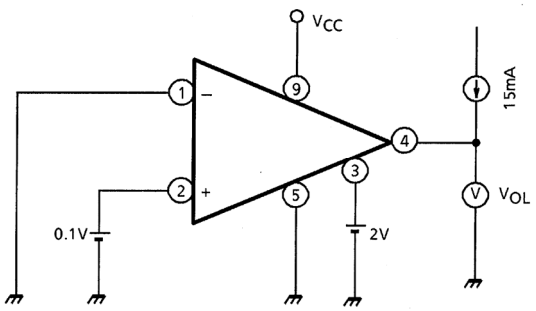
CMV_{IH}: Input voltage relative to pin 5 as it is obtained when V_{IN} is increased until output V_{OUT} becomes ±2 V.

5. V_{OL}

5.1 OUT1, OUT2

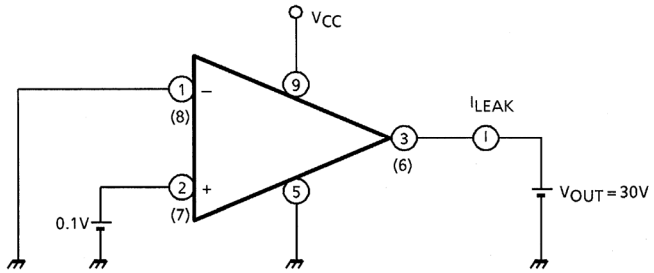


5.2 $\overline{OUT1}$

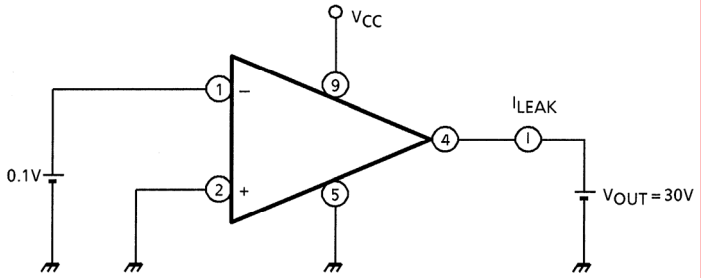


6. I_{LEAK}

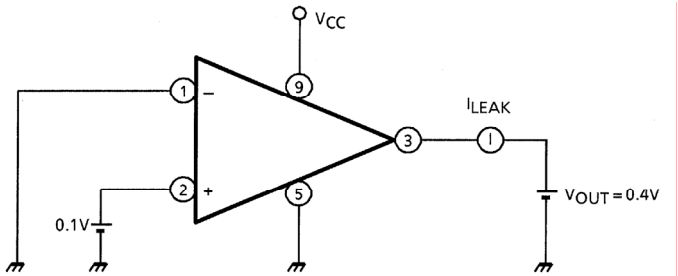
6.1 OUT1, OUT2



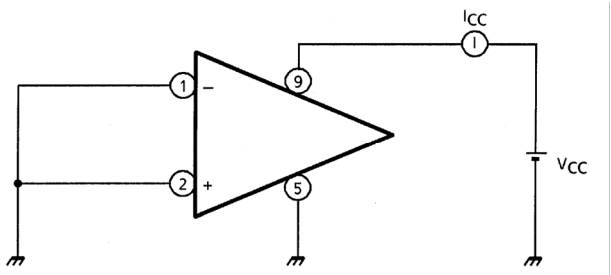
6.2 $\overline{OUT1}$



6.3 OUT1



7. I_{CC}

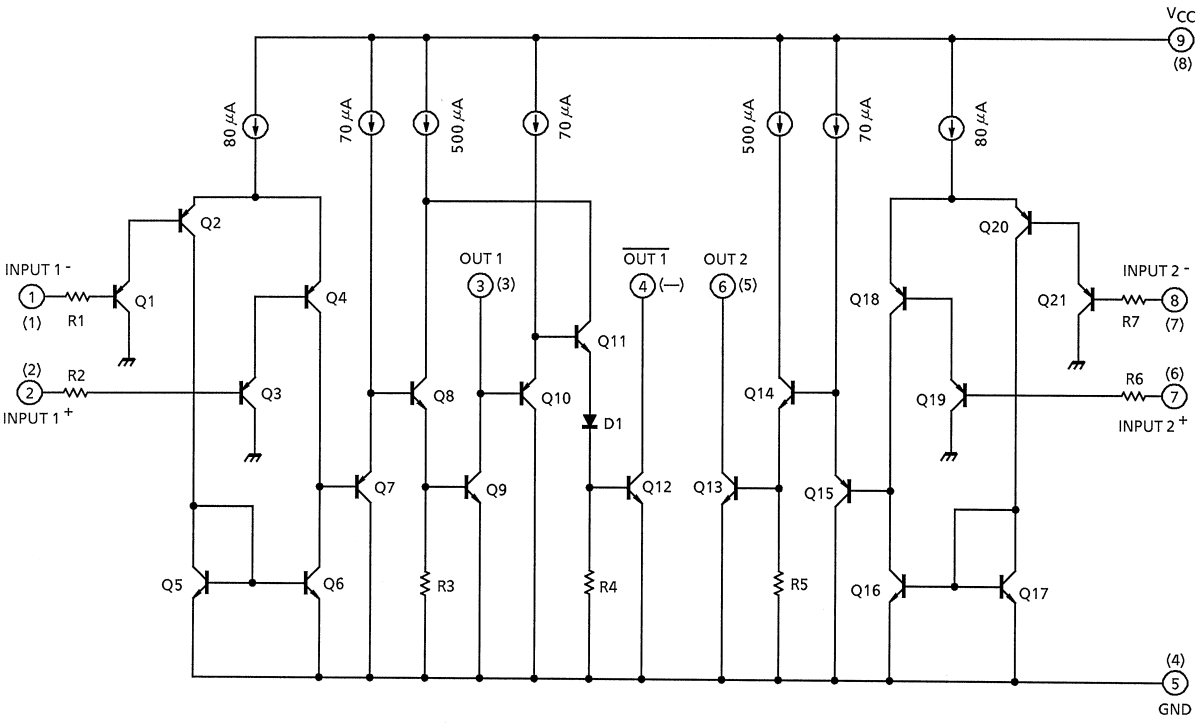


All inputs are grounded.

Note: The components illustrated in the test circuit diagrams are intended only to confirm device characteristics. Toshiba does not guarantee that these components will prevent malfunction or failure in your particular application device.

Equivalent Circuit

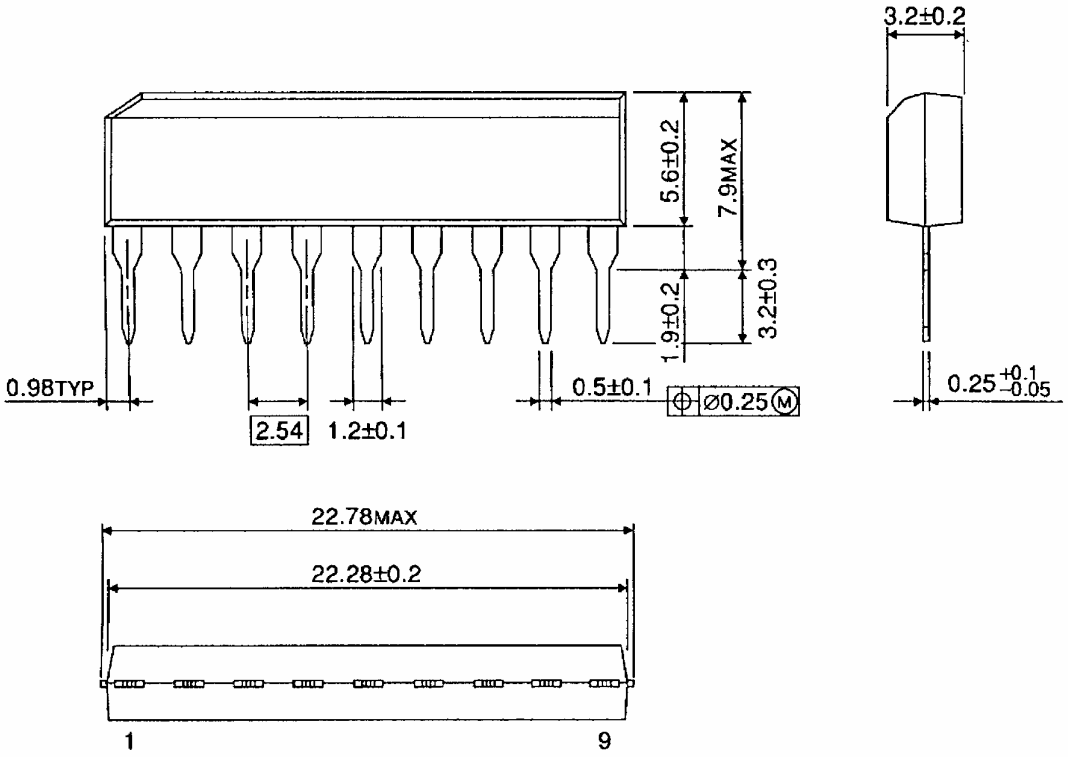
(The Circles O indicate the pin numbers on the TA7522SG.
The parentheses ( ) indicate the pin numbers on the TA7522FG.)



Note: The equivalent circuit diagrams may be simplified or some parts of them may be omitted for explanatory purposes.

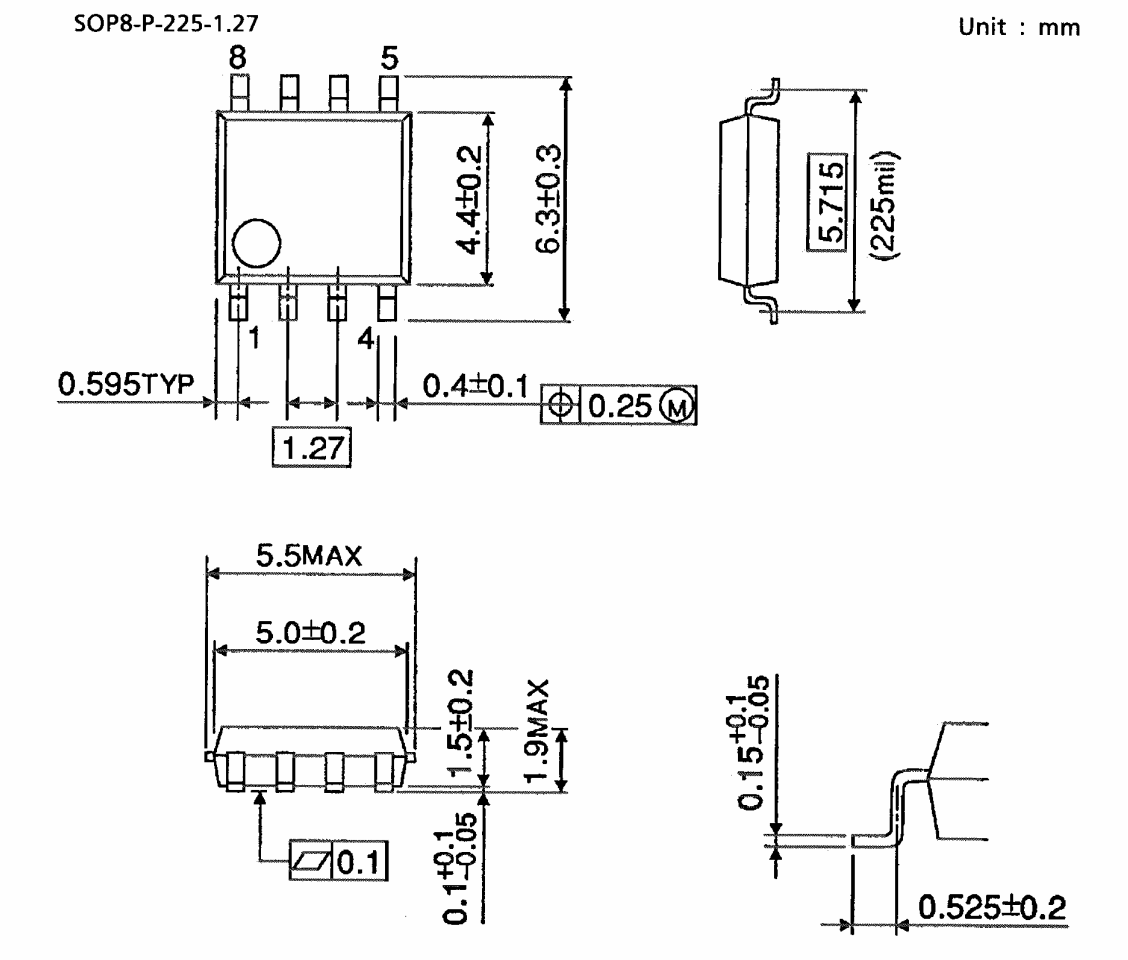
Package Dimensions

SIP9-P-2.54A Unit : mm



Weight: 0.92 g (typ.)

Package Dimensions



Weight: 0.08 g (typ.)

RESTRICTIONS ON PRODUCT USE

070403EBA_S_R6

- The information contained herein is subject to change without notice. 021023_D
- 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. 021023_A
- The TOSHIBA products listed in this document are designed and manufactured for usage in automotive electronic equipment. These TOSHIBA products are neither intended nor warranted for usage in equipment other than automotive electronic 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 includes atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. TOSHIBA products listed in this document shall not be used for other than automotive electronic equipment such as the applications listed above. 070313_AG
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations. 060106_Q
- 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 patents or other rights of TOSHIBA or the third parties. 070122_C
- Please use this product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances.
  Toshiba assumes no liability for damage or losses occurring as a result of noncompliance with applicable laws and regulations. 060819_AF
- The products described in this document are subject to foreign exchange and foreign trade control laws. 060925_E