TOSHIBA Bi−CMOS INTEGRATED CIRCUIT SILICON MONOLITHIC

**TB62003PG,TB62003FG,TB62004PG,TB62004FG**
**TB62006PG, TB62006FG,TB62007PG,TB62007FG**
**TB62008PG,TB62008FG, TB62009PG,TB62009FG**

# 8CH DMOS TRANSISTOR ARRAY WITH GATE

TB62003PG, TB62003FG
INVERTER & DMOS DRIVER

TB62004PG, TB62004FG
THROUGH & DMOS DRIVER

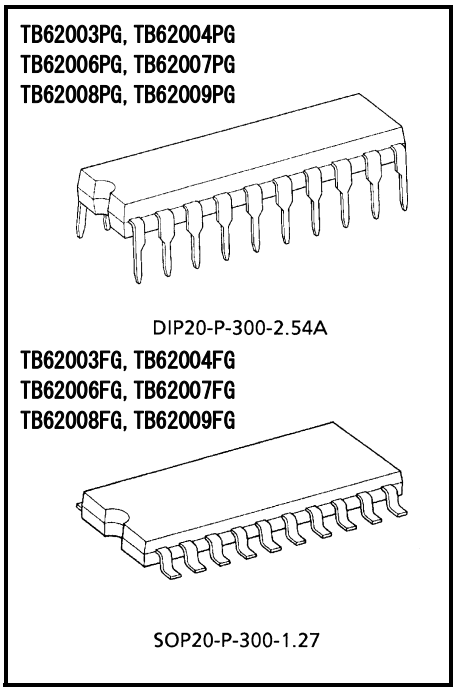
TB62006PG, TB62006FG
NAND & DMOS DRIVER

TB62007PG, TB62007FG
AND & DMOS DRIVER

TB62008PG, TB62008FG
NOR & DMOS DRIVER

TB62009PG, TB62009FG
OR & DMOS DRIVER

The TB62003 Series are high−voltage, high−current arrays comprised of eight N−ch DMOS pairs.
This devices are a product for the Pb free(Sn-Ag).



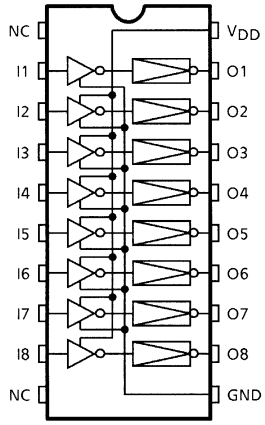

Weight
DIP20−P−300−2.54 A : 2.25 g (Typ.)
SOP20−P−300−1.27 : 0.25 g (Typ.)

## FEATURES

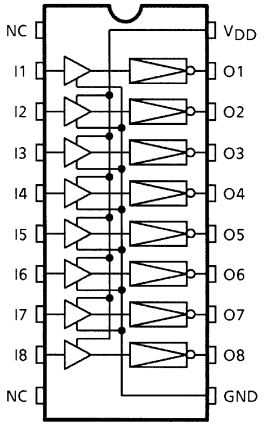
- Package : Type−PG DIP−20 pin
  Type−FG SOP−20 pin (200 mil)
- Output rating : 35 V (Min.) / 200 mA (Max.)
- Low power

## PIN CONNECTION (TOP VIEW)

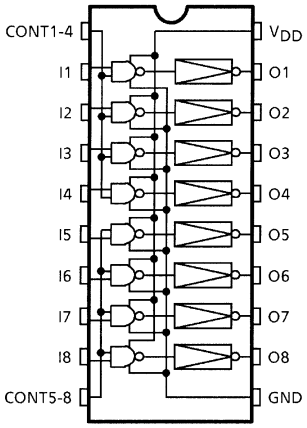
### TB62003PG / FG



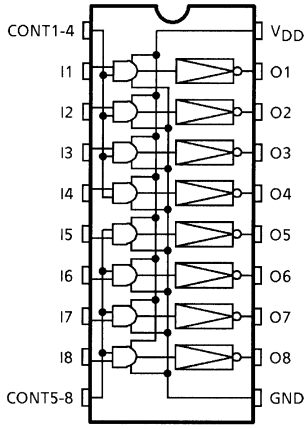

### TB62004PG / FG



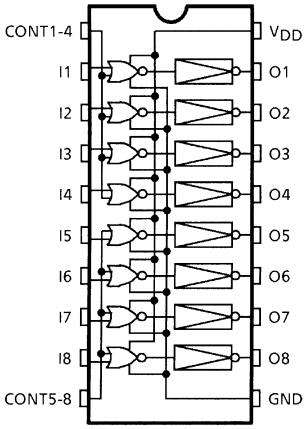

### TB62003PG / FG



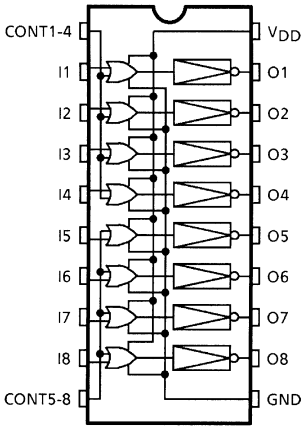

### TB62007PG / FG




### TB62008PG / FG




### TB62009PG / FG



## TRUTH TABLE

### TB62006PG / FG

| INPUT | | | | OUTPUT | |
|---|---|---|---|---|---|
| I1~4 | I5~8 | CONT1~4 | CONT5~8 | O3~4 | O5~8 |
| H | X | H | X | OFF | NOT FIX |
| H | X | L | X | ON | NOT FIX |
| L | X | H | X | ON | NOT FIX |
| L | X | L | X | ON | NOT FIX |
| X | H | X | H | NOT FIX | OFF |
| X | H | X | L | NOT FIX | ON |
| X | L | X | H | NOT FIX | ON |
| X | L | X | L | NOT FIX | ON |

X: Don't Care

### TB62007PG / FG

| INPUT | | | | OUTPUT | |
|---|---|---|---|---|---|
| I1~4 | I5~8 | CONT1~4 | CONT5~8 | O3~4 | O5~8 |
| H | X | H | X | ON | NOT FIX |
| H | X | L | X | OFF | NOT FIX |
| L | X | H | X | OFF | NOT FIX |
| L | X | L | X | OFF | NOT FIX |
| X | H | X | H | NOT FIX | ON |
| X | H | X | L | NOT FIX | OFF |
| X | L | X | H | NOT FIX | OFF |
| X | L | X | L | NOT FIX | OFF |

X: Don't Care

**TB62008PG / FG**

| INPUT | | | | OUTPUT | |
|---|---|---|---|---|---|
| I1~4 | I5~8 | CONT1~4 | CONT5~8 | O3~4 | O5~8 |
| H | X | H | X | OFF | NOT FIX |
| H | X | L | X | OFF | NOT FIX |
| L | X | H | X | OFF | NOT FIX |
| L | X | L | X | ON | NOT FIX |
| X | H | X | H | NOT FIX | OFF |
| X | H | X | L | NOT FIX | OFF |
| X | L | X | H | NOT FIX | OFF |
| X | L | X | L | NOT FIX | ON |

X: Don't Care

**TB62009PG / FG**

| INPUT | | | | OUTPUT | |
|---|---|---|---|---|---|
| I1~4 | I5~8 | CONT1~4 | CONT5~8 | O3~ 4 | O5~8 |
| H | X | H | X | ON | NOT FIX |
| H | X | L | X | ON | NOT FIX |
| L | X | H | X | ON | NOT FIX |
| L | X | L | X | OFF | NOT FIX |
| X | H | X | H | NOT FIX | ON |
| X | H | X | L | NOT FIX | ON |
| X | L | X | H | NOT FIX | ON |
| X | L | X | L | NOT FIX | OFF |

X: Don't Care

## MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Supply Voltage | | $V_{DD}$ | 7 | V |
| DC Output Voltage | | $V_{DS}$ | −0.5~35 | V |
| DC Output Current | | $I_{DS}$ | 200 | mA / ch |
| DC Input Voltage | | $V_{IN}$ | $-0.4+V_{DD}+0.4$ | V |
| DC Input Current | | $I_{IN}$ | ±5 | mA |
| Input Diode Current | | $I_{ID}$ | ±5 | mA |
| Output Diode Current | | $I_{OK}$ | 5 | mA |
| Power Dissipation | PG | $P_D$ (Note 1) | 1.47 | W |
| | FG | | 0.96 (Note 2) | |
| Operating Temperature | | $T_{opr}$ | −40~85 | °C |
| Storage Temperature | | $T_{stg}$ | −55~150 | °C |

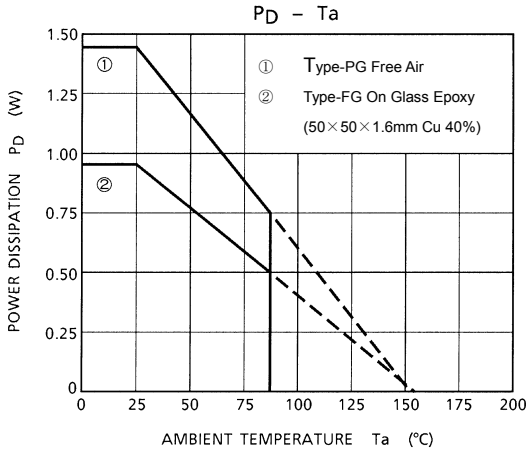
Note 1: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 40%)
Note 2: Delated above 25°C in the proportion of 7.7 mW / °C (F Type)

## RECOMMENDED OPERATING CONDITION (Ta = −40~85°C)

| CHARACTERISTIC | | SYMBOL | CONDITION | | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|---|
| Supply Voltage Range | | $V_{DD}$ | — | | 4.5 | — | 5.5 | V |
| DC Output Voltage | | $V_{DS}$ | — | | — | — | 30 | V |
| DC Output Current | PG | $I_{DS}$ | Duty 80% | 8ch On $V_{DD}$ = 5.0 V | — | — | 170 | mA / ch |
| | FG | | | | — | — | 90 | |
| | PG | | Duty 100% | | — | — | 150 | |
| | FG | | | | — | — | 80 | |
| DC Input Voltage | | $V_{IN}$ | — | | GND | — | $V_{DD}$ | V |

## ELECTRICAL CHARACTERISTICS (Ta = 25°C, $V_{DD}$ = 5.0 V)

| CHARACTERISTIC | SYMBOL | TEST CIR-CUIT | TEST CONDITION | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Output Leakage Current | $I_{OZ}$ | — | $V_{DS}$ = 35 V | — | — | 50 | μA |
| Low-Level Output Voltage | $V_{DS}$ | — | $I_{DS}$ = 150 mA | — | 0.70 | 0.8 | V |
| | | — | $I_{DS}$ = 200 mA | — | 0.94 | 1.2 | |
| Output Resistance | $R_{ON}$ | — | $I_{DS}$ = 200 mA | — | 4.7 | 6.0 | Ω |
| DC Input Current | $I_{IN}$ | — | $V_{IN}$ = GND, $V_{IN}$ = $V_{DD}$ | — | — | ±1.0 | μA |
| High-Level Input Voltage | $V_{IN\ (H)}$ | — | — | 3.5 | — | $V_{DD}$ +0.4 | V |
| | $V_{IN\ (L)}$ | — | — | −0.4 | — | 1.5 | |
| Operating Supply Current | $I_{DDopr}$ | — | 8ch On, Output open<br>$f_{IN}$ = 1MHz | — | 2 | — | μA |
| Output Diode Forward Voltage | $V_{FK}$ | — | $I_{OK}$ = 5 mA | — | 0.6 | — | V |
| Turn-On Delay | $t_{ON}$ | — | $I_{OUT}$ = 170 mA | — | 300 | — | ns |
| Turn-Off Delay | $t_{OFF}$ | — | — | — | 300 | — | |
| Supply Current | $I_{DD}$ | — | — | — | — | 10 | μA |
| Input Capacitance | $C_{IN}$ | — | — | — | 15 | — | pF |

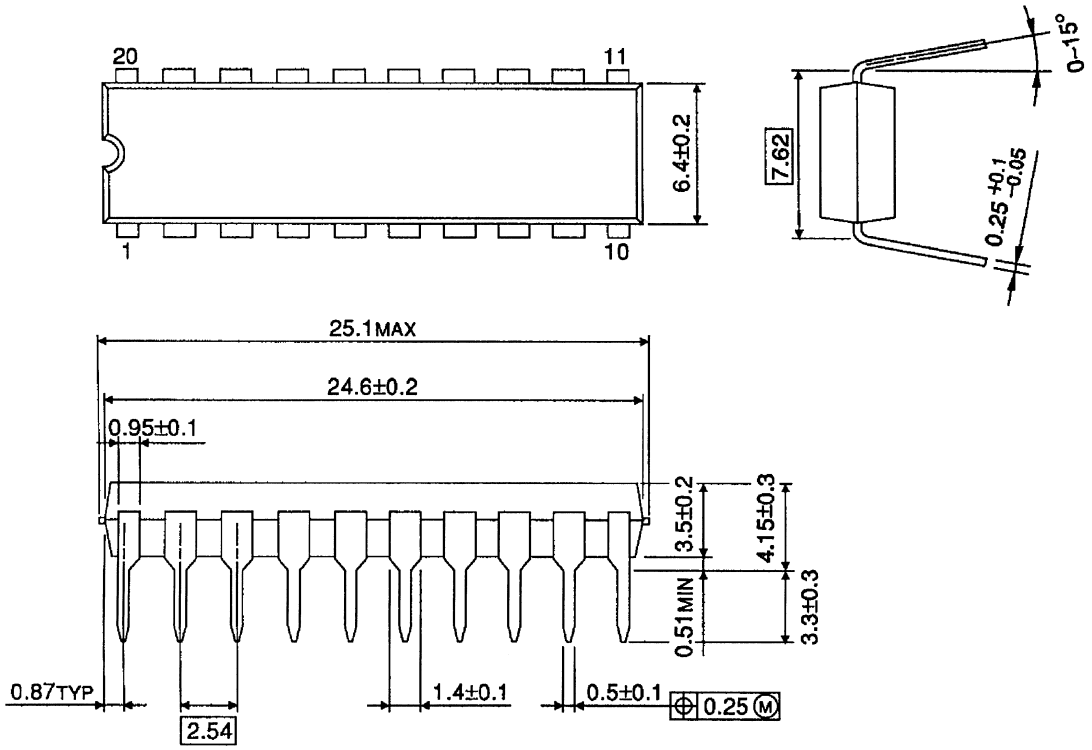



### PRECAUTIONS for USING

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.
Utmost care is necessary in the design of the output line, $V_{CC}$ ($V_{DD}$) and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

## PACKAGE DIMENSIONS

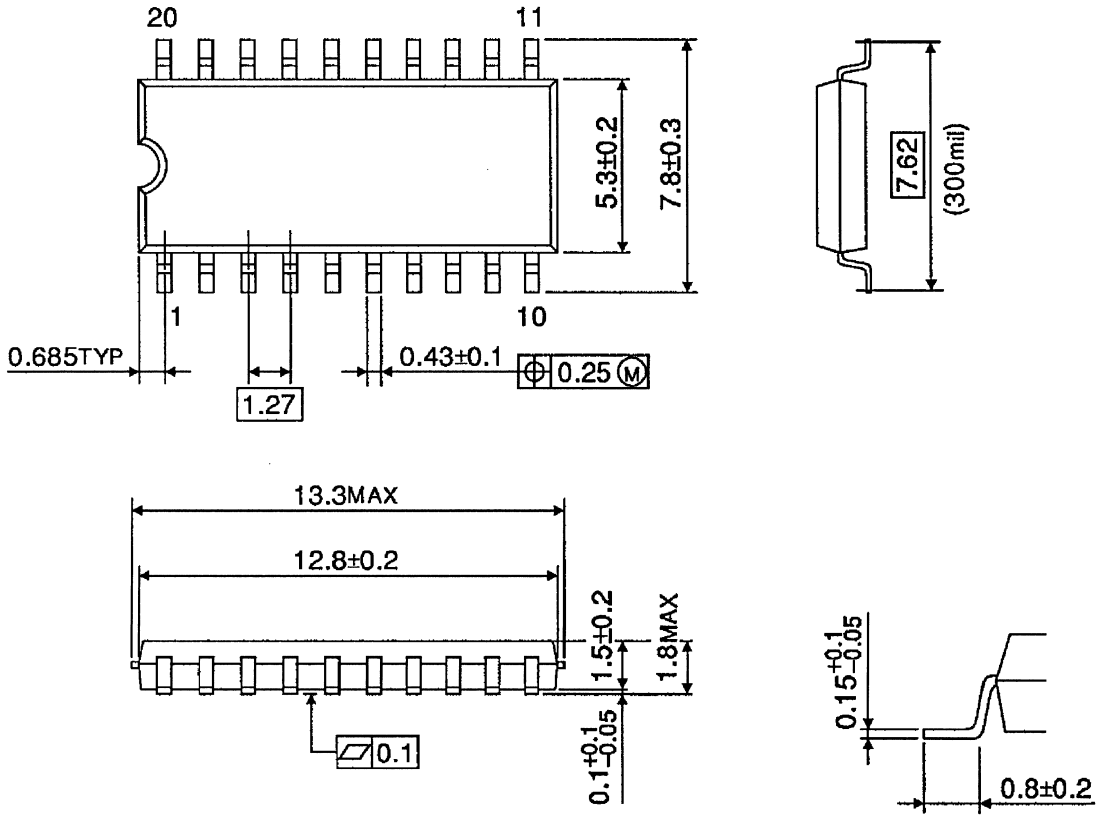
DIP20-P-300-2.54A Unit: mm




Weight: 2.25 g (Typ.)

## PACKAGE DIMENSIONS

SOP20−P−300−1.27 Unit: mm




Weight: 0.25 g (Typ.)

About solderability, following conditions were confirmed

- Solderability

(1) Use of Sn-63Pb 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

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