

7CH DARLINGTON SINK DRIVER

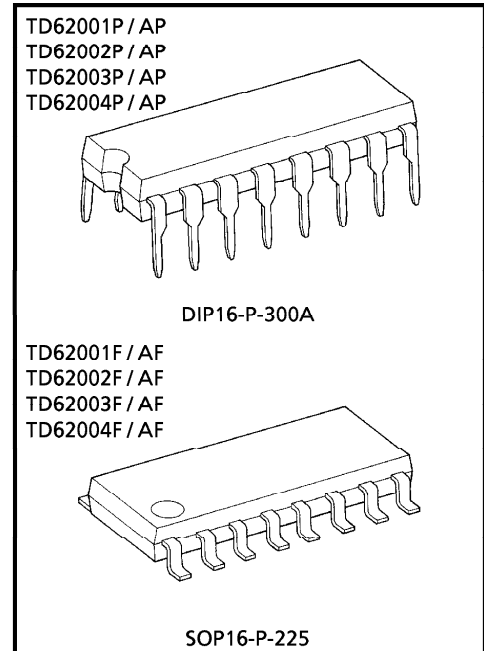
The TD62001P/AP/F/AF Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

All units feature integral clamp diodes for switching inductive loads.

Applications include relay, hammer, lamp and display (LED) drivers.

FEATURES

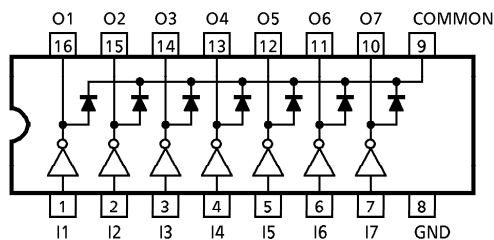
- Output current (single output) 500mA MAX.
- High sustaining voltage output
35V MIN. (TD62001P/F Series)
50V MIN. (TD62001AP/AF Series)
- Output clamp diodes
- Inputs compatible with various types of logic
- Package Type-P, AP : DIP-16pin
- Package Type-F, AF : SOP-16pin



Weight DIP16-P-300A : 1.11g (Typ.)
 SOP16-P-225 : 0.16g (Typ.)

| TYPE | INPUT BASE RESISTOR | DESIGNATION |
|------------------|----------------------------------|------------------|
| TD62001P/AP/F/AF | External | General Purpose |
| TD62002P/AP/F/AF | 10.5-k Ω + 7V Zener diode | 14~25V PMOS |
| TD62003P/AP/F/AF | 2.7k Ω | TTL, 5V CMOS |
| TD62004P/AP/F/AF | 10.5k Ω | 6~15V PMOS, CMOS |

PIN CONNECTION (TOP VIEW)



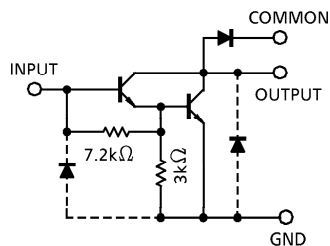
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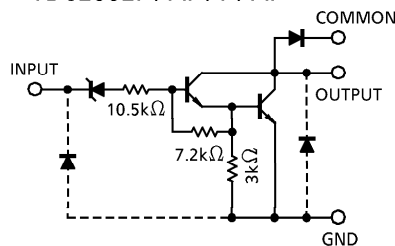
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SCHEMATICS (EACH DRIVER)

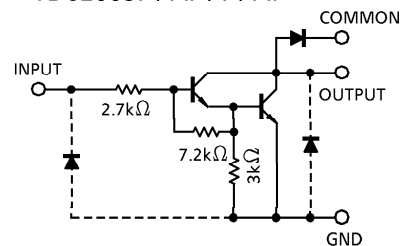
TD62001P / AP / F / AF



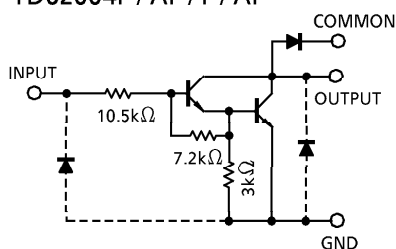
TD62002P / AP / F / AF



TD62003P / AP / F / AF



TD62004P / AP / F / AF



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|-----------------------------|-----------|--------------------------|----------------------|---------|
| Output Sustaining Voltage | P, F | V _{CE (SUS)} | - 0.5~35 | V |
| | AP, AF | | - 0.5~50 | |
| Output Current | | I _{OUT} | 500 | mA / ch |
| Input Voltage | | V _{IN} (Note 1) | - 0.5~30 | V |
| Input Current | | I _{IN} (Note 2) | 25 | mA |
| Clamp Diode Reverse Voltage | P, F | V _R | 35 | V |
| | AP, AF | | 50 | |
| Clamp Diode Forward Current | | I _F | 500 | mA |
| Power Dissipation | P | P _D | 1.0 | W |
| | AP | | 1.47 | |
| | F, AF | | 0.54 / 0.69 (Note 3) | |
| Operating Temperature | P | T _{opr} | - 30~75 | °C |
| | AP, F, AF | | - 40~85 | |
| Storage Temperature | | T _{stg} | - 55~150 | °C |

(Note 1) Except TD62001P / AP / F / AF

(Note 2) Only TD62001P / AP / F / AF

(Note 3) On glass epoxy PCB (30×30×1.6mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS ($T_a = -40 \sim 85^\circ\text{C}$ and $T_a = -30 \sim 75^\circ\text{C}$ for only Type-P)

| CHARACTERISTIC | | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT | |
|-----------------------------|-------------------------------|---------------|---|------------|------|------|------|---------|
| Output Sustaining Voltage | P, F | $V_{CE(SUS)}$ | | 0 | — | 35 | V | |
| | AP, AF | | | 0 | — | 50 | | |
| Output Current | AP | I_{OUT} | $T_{pw} = 25\text{ms}$ 7 Circuits $T_a = 85^\circ\text{C}$ $T_j = 120^\circ\text{C}$ | Duty = 10% | 0 | — | 370 | mA / ch |
| | | | | Duty = 50% | 0 | — | 130 | |
| | P | | | Duty = 10% | 0 | — | 295 | |
| | | | | Duty = 50% | 0 | — | 95 | |
| | F, AF | | | Duty = 10% | 0 | — | 233 | |
| | | | | Duty = 50% | 0 | — | 70 | |
| Input Voltage | Except TD62001P / AP / F / AF | V_{IN} | | 0 | — | 24 | V | |
| Input Voltage (Output On) | TD62002 | $V_{IN(ON)}$ | $I_{OUT} = 400\text{mA}$ $h_{FE} = 800$ | 14.5 | — | 24 | V | |
| | TD62003 | | | 2.8 | — | 24 | | |
| | TD62004 | | | 6.2 | — | 24 | | |
| Input Voltage (Output Off) | TD62001 | $V_{IN(OFF)}$ | | 0 | — | 0.6 | V | |
| | TD62002 | | | 0 | — | 7.4 | | |
| | TD62003 | | | 0 | — | 0.7 | | |
| | TD62004 | | | 0 | — | 1.0 | | |
| Input Current | Only TD62001 | I_{IN} | | 0 | — | 10 | mA | |
| Clamp Diode Reverse Voltage | P, F | V_R | | — | — | 35 | V | |
| | AP, AF | | | — | — | 50 | | |
| Clamp Diode Forward Current | | I_F | | — | — | 350 | mA | |
| Power Dissipation | P | P_D | $T_a = 85^\circ\text{C}$ (Note) $T_a = 85^\circ\text{C}$ | — | — | 0.6 | W | |
| | AP | | | — | — | 0.76 | | |
| | AF, F | | | — | — | 0.36 | | |

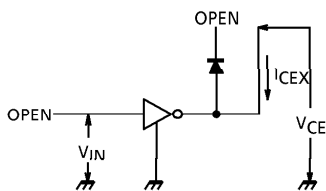
(Note) On glass epoxy PCB (30×30×1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

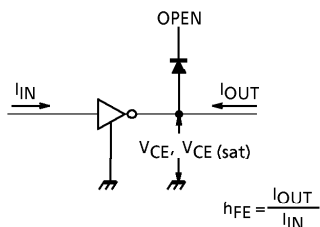
| CHARACTERISTIC | | SYMBOL | TEST CIRCUIT | TEST CONDITION | MIN. | TYP. | MAX. | UNIT | |
|--------------------------------------|-----------|-----------|--------------|-------------------------------------|--------------|------|------|------|---|
| Output Leakage Current | AP, AF | ICEX | 1 | VCE = 50V, Ta = 25°C | — | — | 50 | μA | |
| | | | | VCE = 50V, Ta = 85°C | — | — | 100 | | |
| | F | | | VCE = 35V, Ta = 25°C | — | — | 50 | | |
| | | | | VCE = 35V, Ta = 85°C | — | — | 100 | | |
| | P | | | VCE = 35V, Ta = 25°C | — | — | 50 | | |
| | | | | VCE = 35V, Ta = 75°C | — | — | 100 | | |
| Collector-Emitter Saturation Voltage | | VCE (sat) | 2 | IOUT = 350mA, IIN = 500μA | — | 1.3 | 1.6 | V | |
| | | | | IOUT = 200mA, IIN = 350μA | — | 1.1 | 1.3 | | |
| | | | | IOUT = 100mA, IIN = 250μA | — | 0.9 | 1.1 | | |
| DC Current Transfer Ratio | | hFE | 2 | VCE = 2V, IOUT = 350mA | 1000 | — | — | | |
| Input Current (Output On) | TD62002 | IIN (ON) | 3 | VIN = 20V, IOUT = 350mA | — | 1.1 | 1.7 | mA | |
| | TD62003 | | | VIN = 2.4V, IOUT = 350mA | — | 0.4 | 0.7 | | |
| | TD62004 | | | VIN = 9.5V, IOUT = 350mA | — | 0.8 | 1.2 | | |
| Input Current (Output Off) | P | IIN (OFF) | 4 | IOUT = 500μA, Ta = 75°C | 50 | 65 | — | μA | |
| | AP, F, AF | | | IOUT = 500μA, Ta = 85°C | 50 | 65 | — | | |
| Input Voltage (Output On) | TD62002 | VIN (ON) | 5 | VCE = 2V hFE = 800 | IOUT = 350mA | — | — | 13.7 | V |
| | | | | | IOUT = 200mA | — | — | 11.4 | |
| | TD62003 | | | | IOUT = 350mA | — | — | 2.6 | |
| | | | | | IOUT = 200mA | — | — | 2.0 | |
| | TD62004 | | | | IOUT = 350mA | — | — | 4.7 | |
| | | | | | IOUT = 200mA | — | — | 4.4 | |
| Clamp Diode Reverse Current | AP, AF | IR | 6 | VR = 50V, Ta = 25°C | — | — | 50 | μA | |
| | | | | VR = 50V, Ta = 85°C | — | — | 100 | | |
| | F | | | VR = 35V, Ta = 25°C | — | — | 50 | | |
| | | | | VR = 35V, Ta = 85°C | — | — | 100 | | |
| | P | | | VR = 35V, Ta = 25°C | — | — | 50 | | |
| | | | | VR = 35V, Ta = 75°C | — | — | 100 | | |
| Clamp Diode Forward Voltage | | VF | 7 | IF = 350mA | — | — | 2.0 | V | |
| Input Capacitance | | CIN | — | | — | 15 | — | pF | |
| Turn-On Delay | P, F | tON | 8 | VOUT = 35V, RL = 87.5Ω CL = 15pF | — | 0.1 | — | μs | |
| | AP, AF | | | VOUT = 50V, RL = 125Ω CL = 15pF | — | 0.1 | — | | |
| Turn-Off Delay | P, F | tOFF | 8 | VOUT = 35V, RL = 87.5Ω CL = 15pF | — | 0.2 | — | | |
| | AP, AF | | | VOUT = 50V, RL = 125Ω CL = 15pF | — | 0.2 | — | | |

TEST CIRCUIT

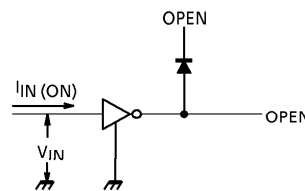
1. I_{CEX}



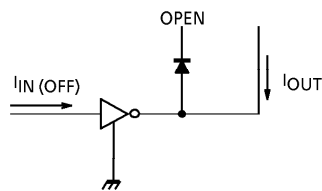
2. $V_{CE(sat)}$, h_{FE}



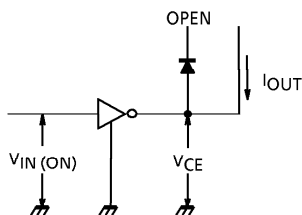
3. $I_{IN(ON)}$



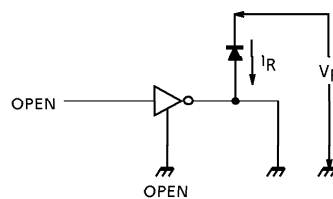
4. $I_{IN(OFF)}$



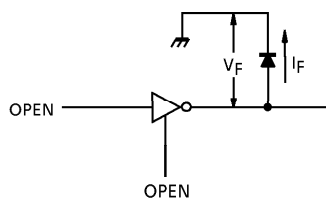
5. $V_{IN(ON)}$



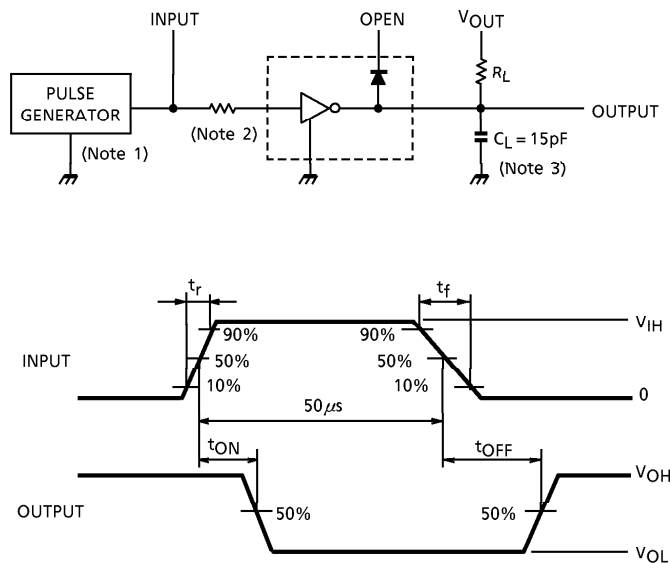
6. I_R



7. V_F



8. t_{ON} , t_{OFF}

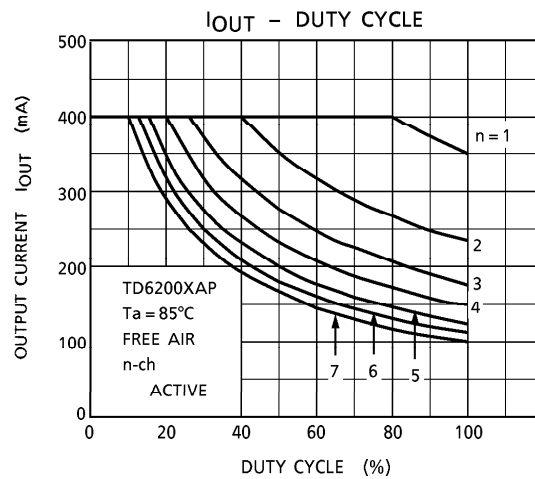
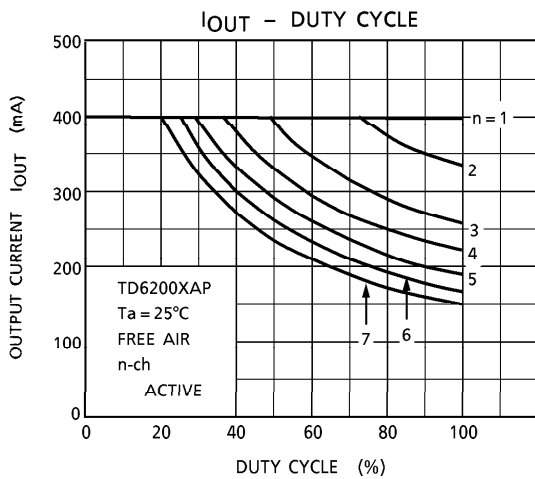
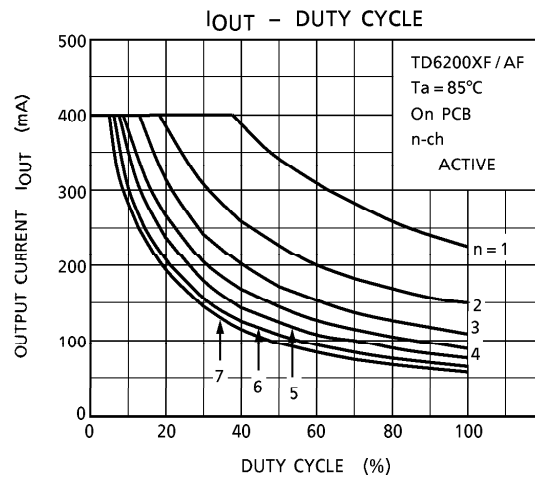
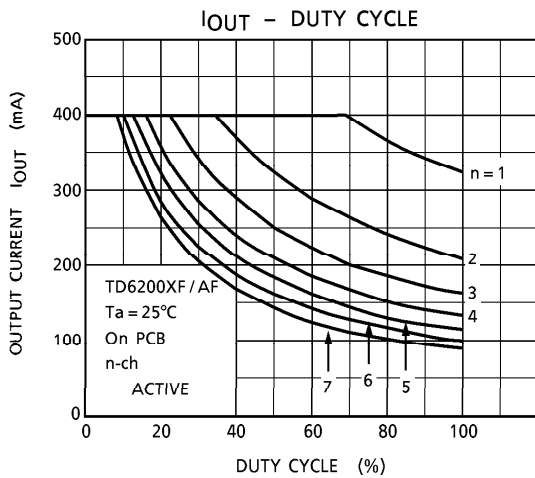
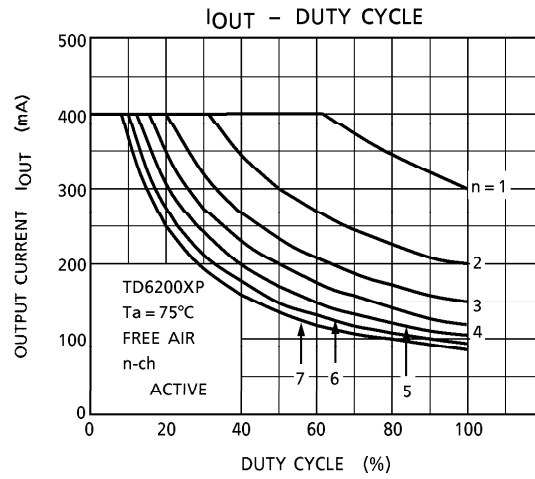
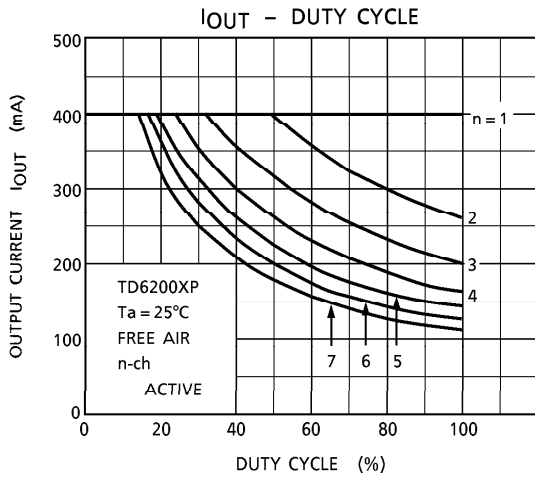


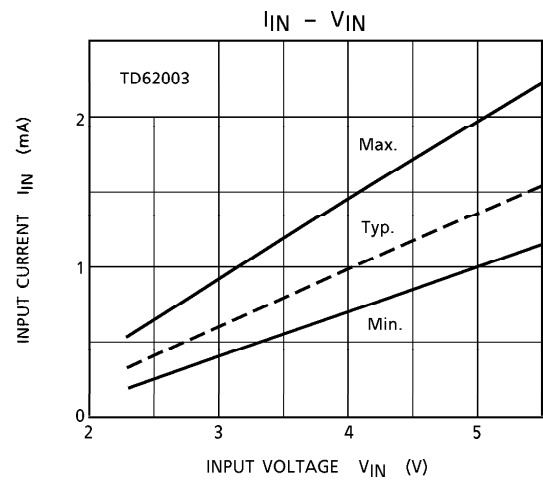
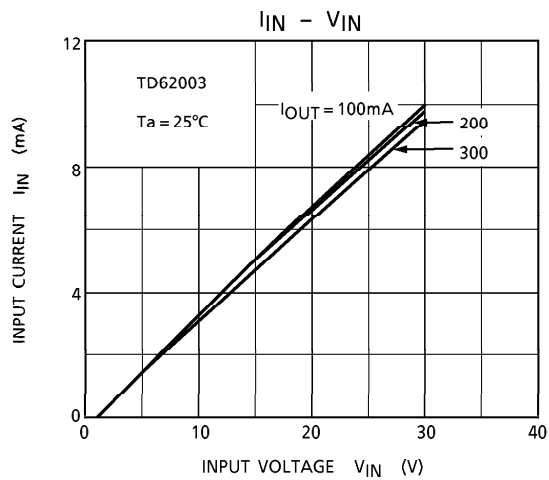
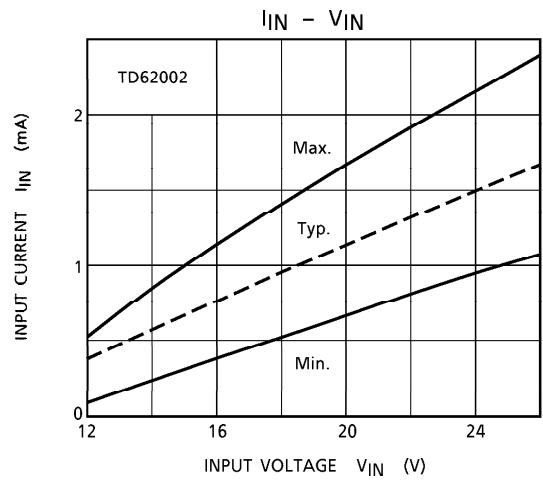
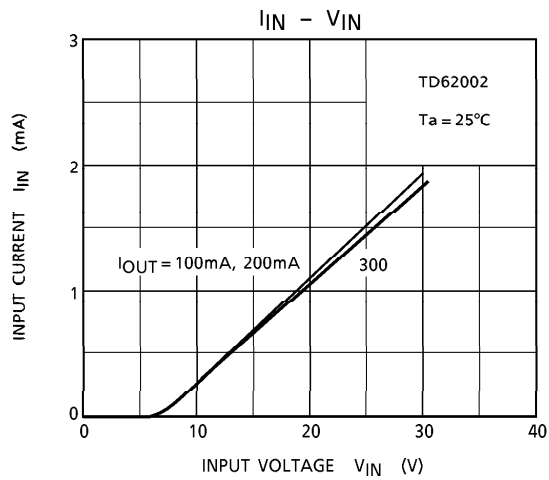
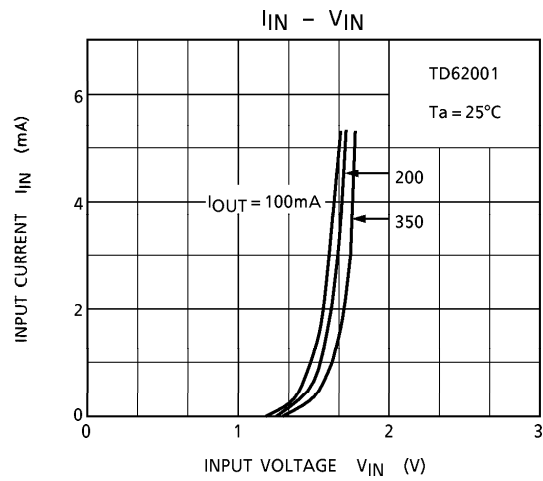
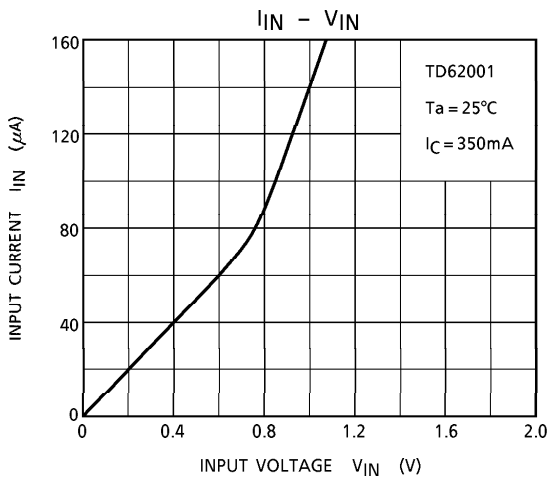
- (Note 1) Pulse width $50\mu s$, duty cycle 10%
Output impedance 50Ω , $t_r \leq 5ns$, $t_f \leq 10ns$
(Note 2) See below

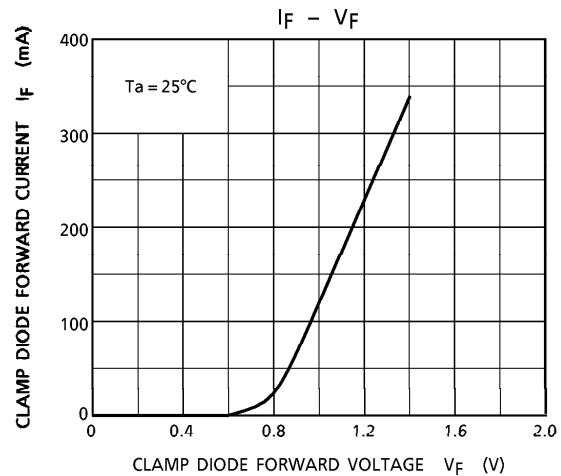
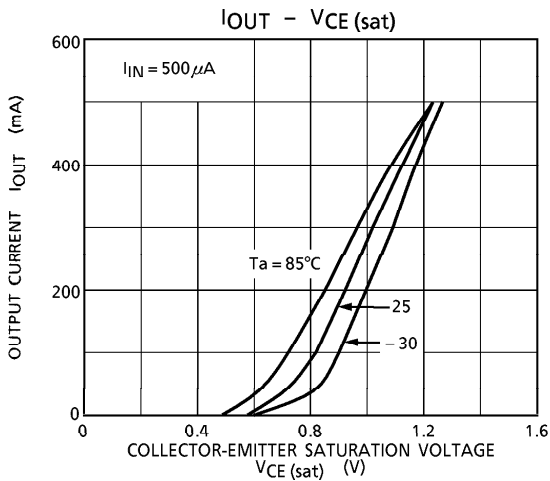
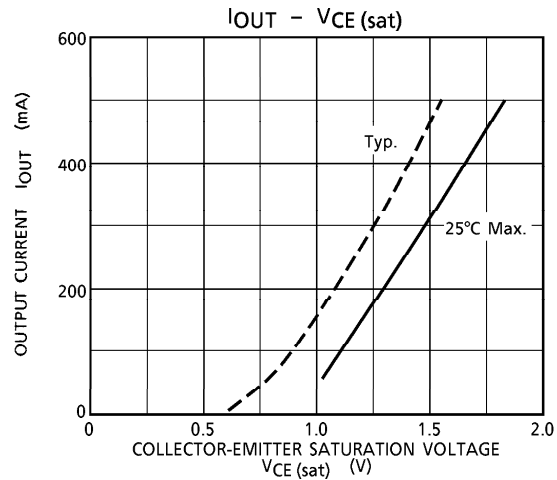
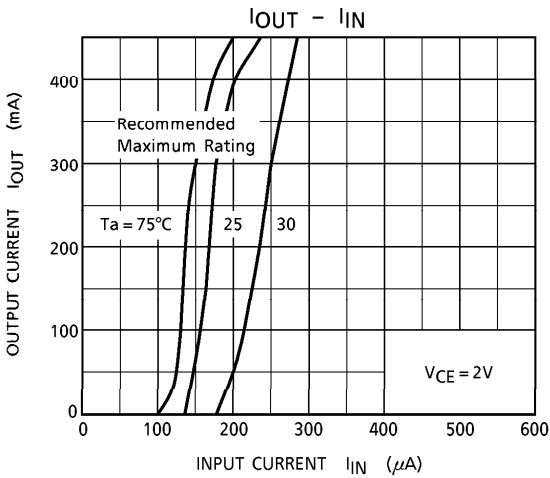
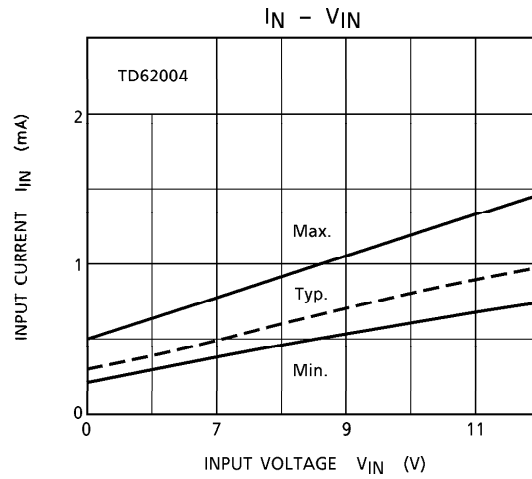
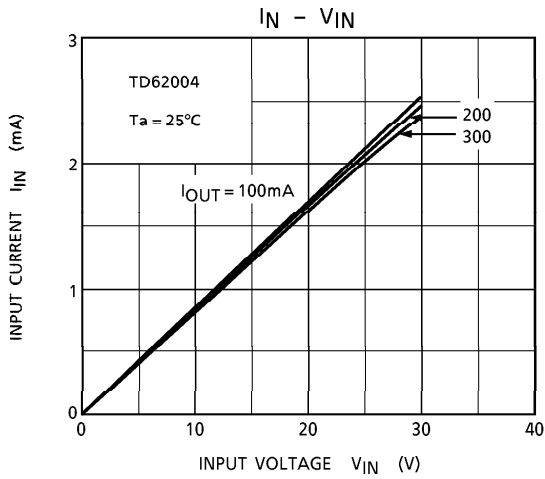
INPUT CONDITION

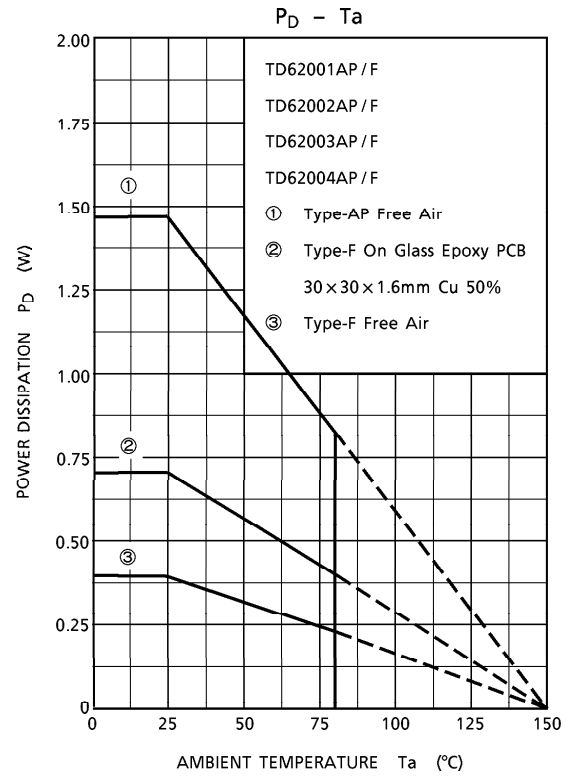
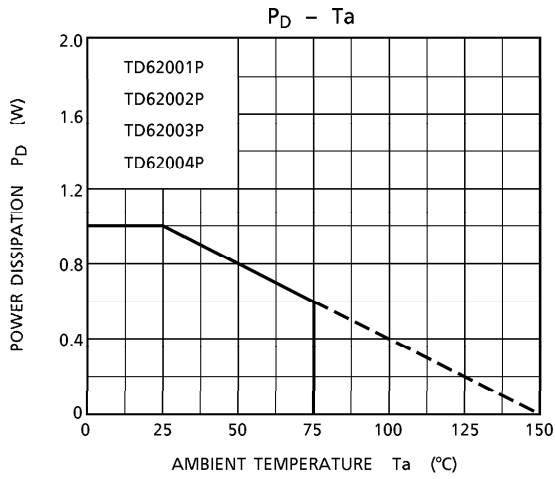
| TYPE NUMBER | R1 | V_{IH} |
|------------------|--------------|----------|
| TD62001P/AP/F/AF | $2.7k\Omega$ | 3V |
| TD62002P/AP/F/AF | 0 | 13V |
| TD62003P/AP/F/AF | 0 | 3V |
| TD62004P/AP/F/AF | 0 | 8V |

- (Note 3) C_L includes probe and jig capacitance.



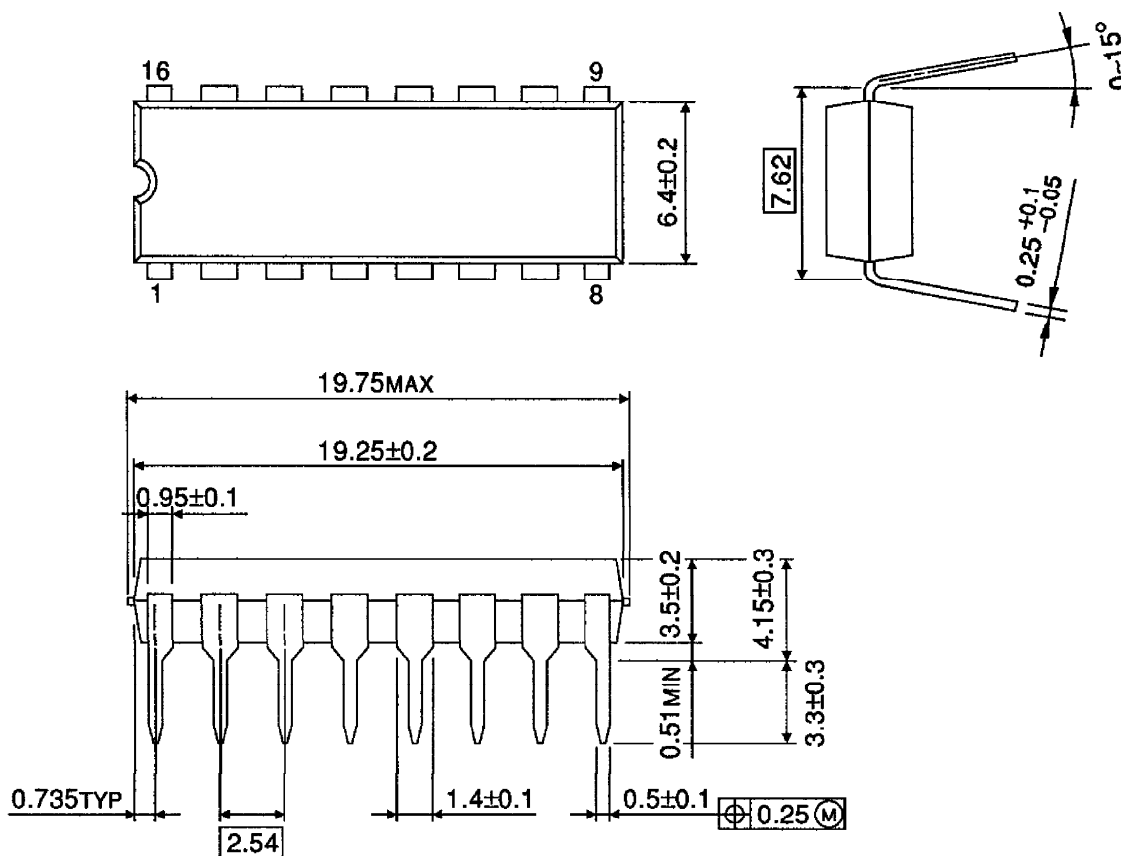






OUTLINE DRAWING
DIP16-P-300A

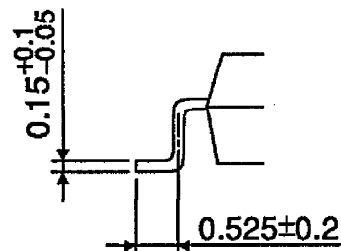
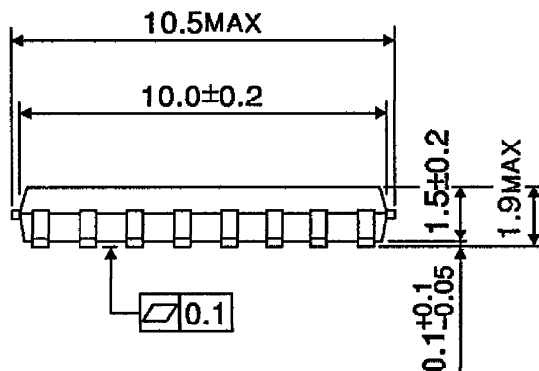
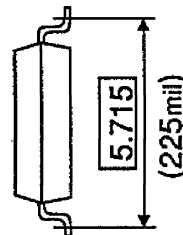
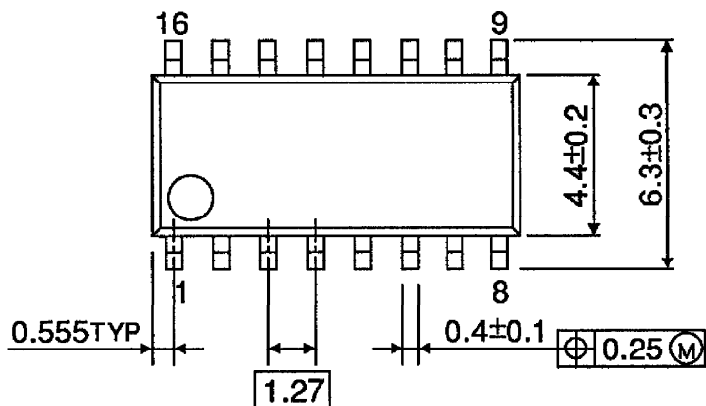
Unit : mm



Weight : 1.11g (Typ.)

OUTLINE DRAWING
SOP16-P-225

Unit : mm



Weight : 0.16g (Typ.)