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7CH DARLINGTON SINK DRIVER

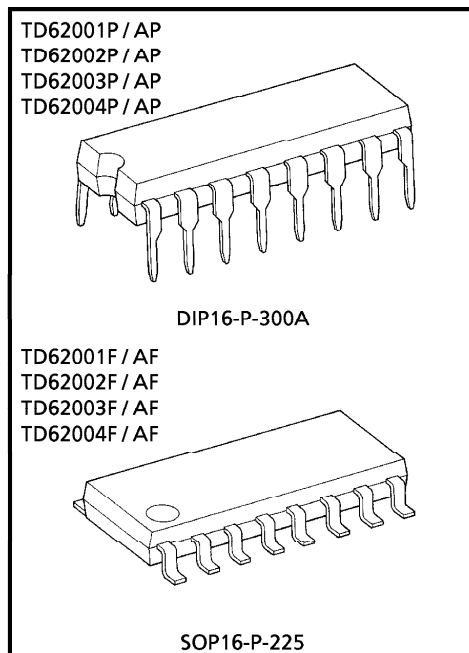
The TD62001P/AP/F/AF Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

All units feature integral clamp diodes for switching inductive loads.

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

FEATURES

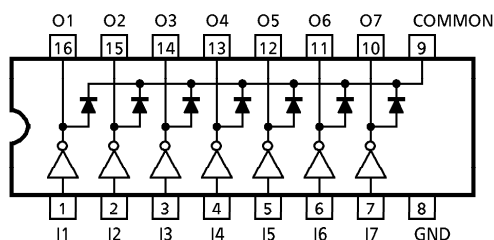
- Output current (single output) 500mA MAX.
- High sustaining voltage output
35V MIN. (TD62001P/F Series)
50V MIN. (TD62001AP/AF Series)
- Output clamp diodes
- Inputs compatible with various types of logic
- Package Type-P, AP : DIP-16pin
- Package Type-F, AF : SOP-16pin



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-kΩ + 7V Zenner diode	14~25V PMOS
TD62003P/AP/F/AF	2.7kΩ	TTL, 5V CMOS
TD62004P/AP/F/AF	10.5kΩ	6~15V PMOS, CMOS

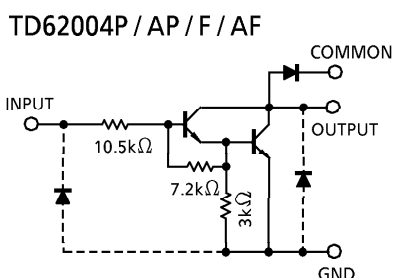
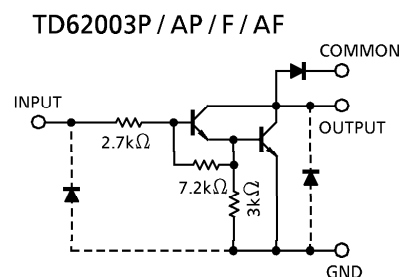
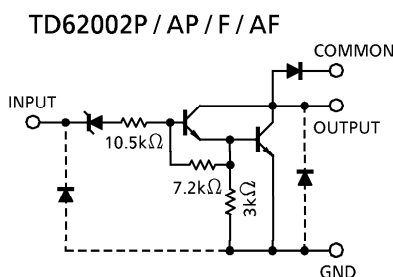
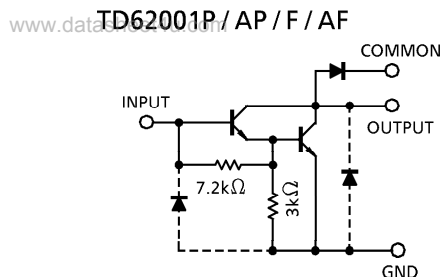
PIN CONNECTION (TOP VIEW)



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SCHEMATICS (EACH DRIVER)



(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%)

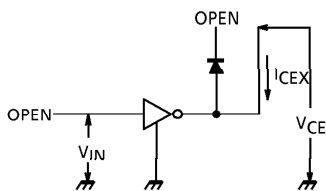
ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

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	—		

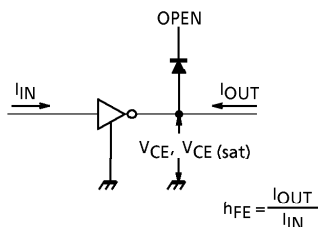
TEST CIRCUIT

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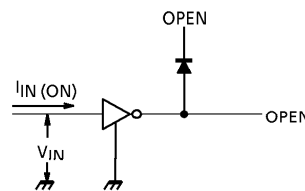
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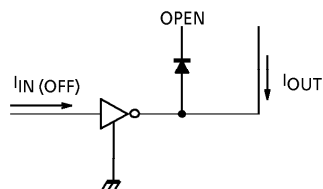
2. $V_{CE(sat)}$, h_{FE}



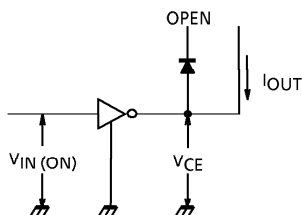
3. $I_{IN(ON)}$



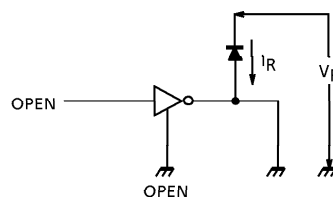
4. $I_{IN(OFF)}$



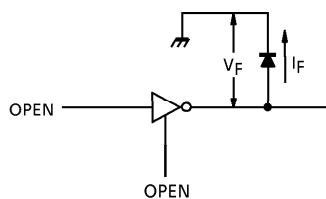
5. $V_{IN(ON)}$



6. I_R

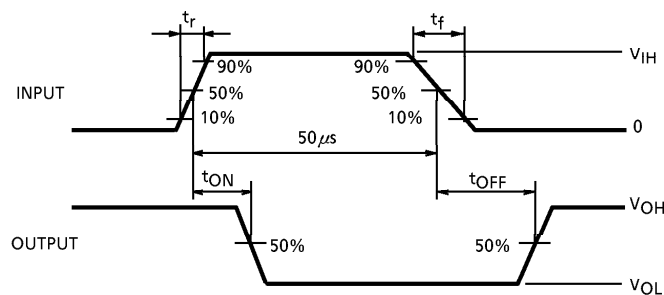
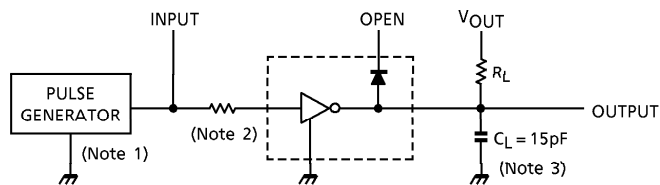


7. V_F



8. t_{ON} , t_{OFF}

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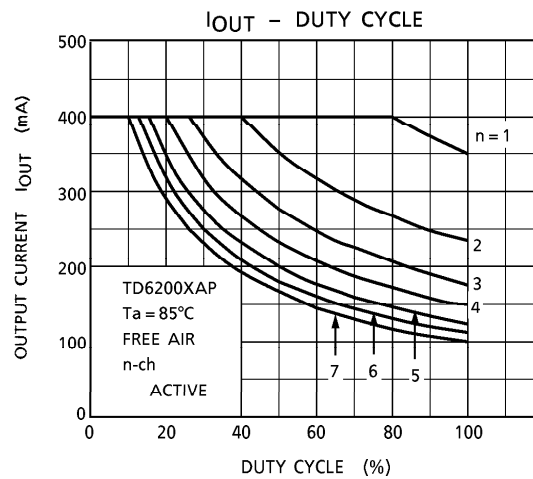
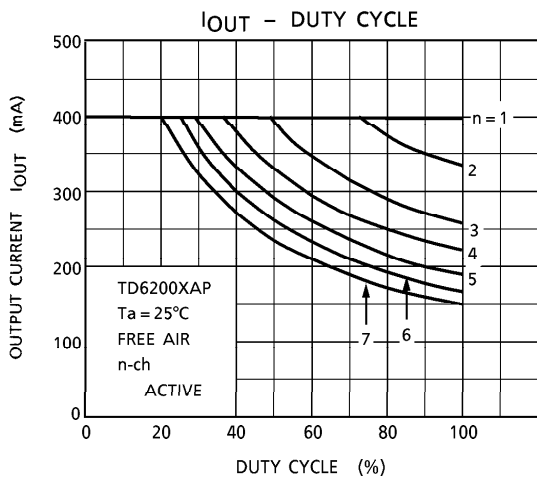
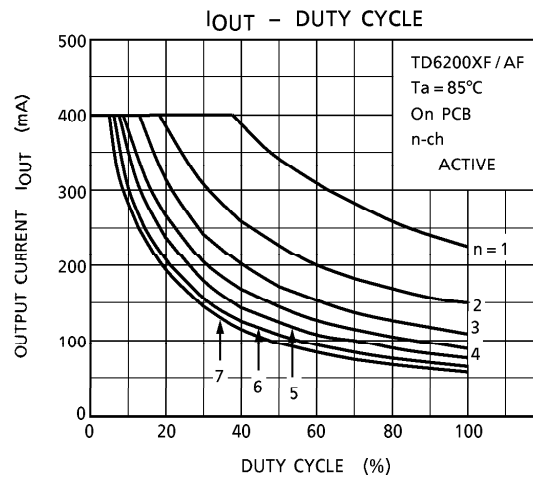
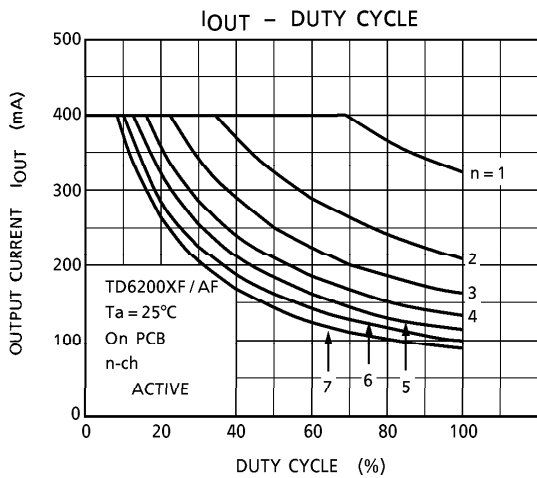
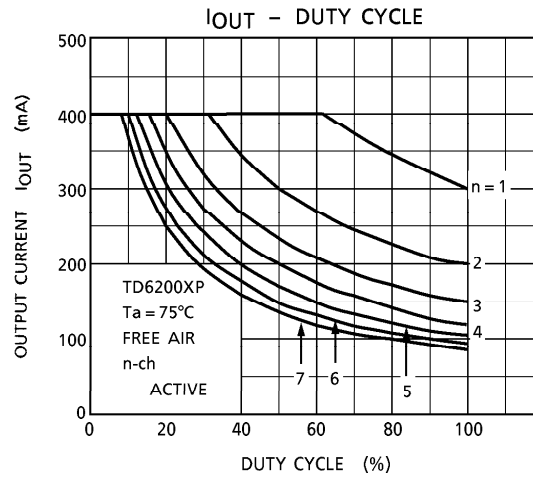
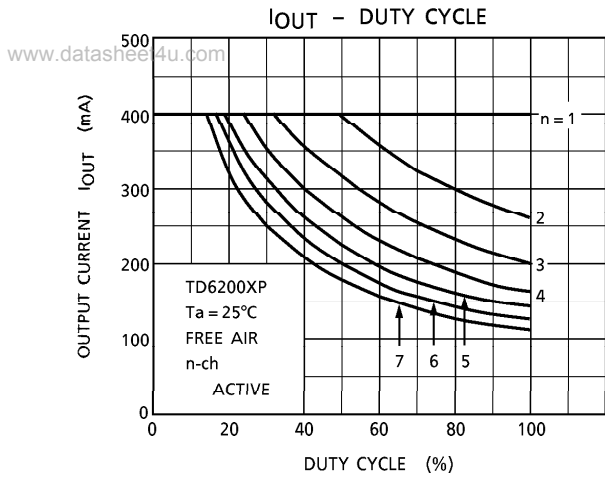
(Note 1) Pulse width $50\mu s$, duty cycle 10%
Output impedance 50Ω , $t_r \leq 5ns$, $t_f \leq 10ns$

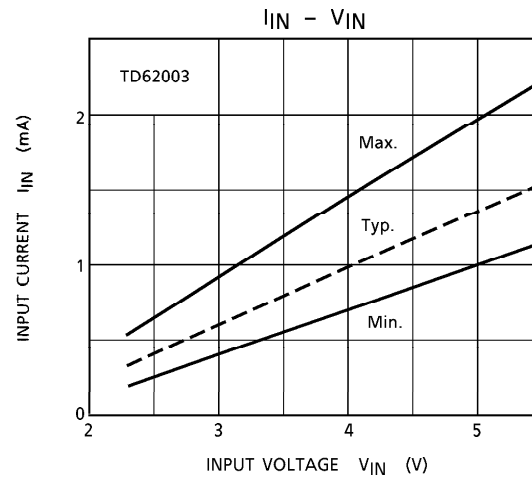
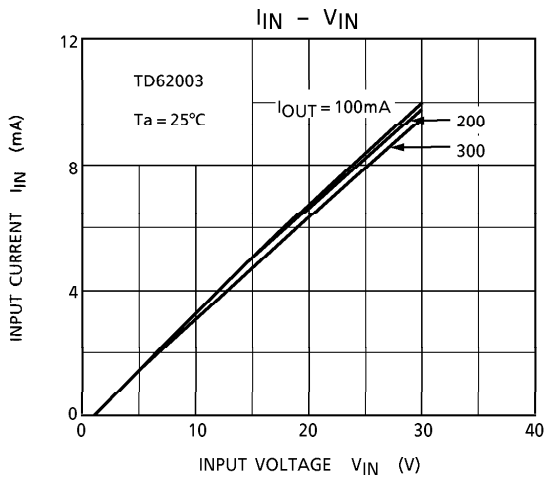
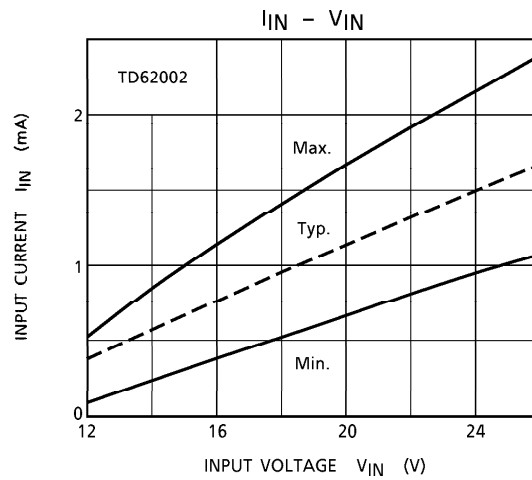
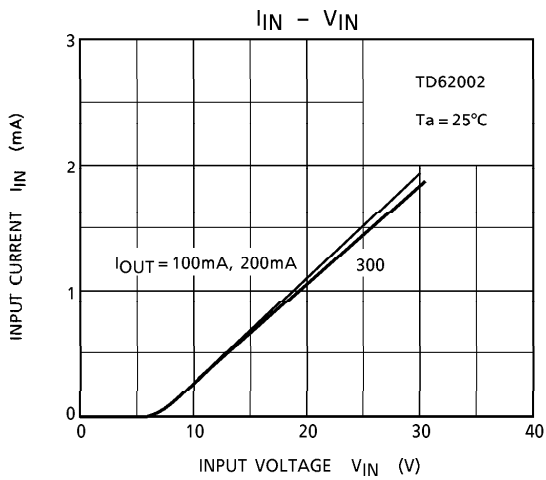
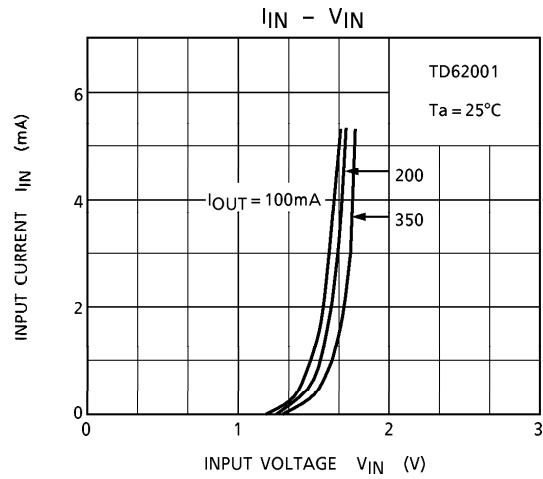
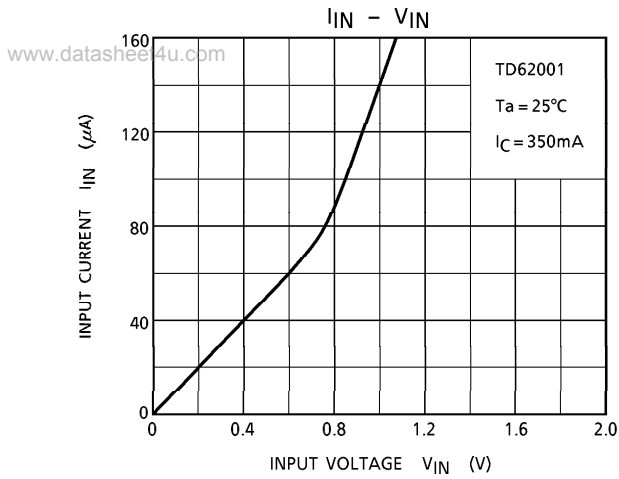
(Note 2) See below

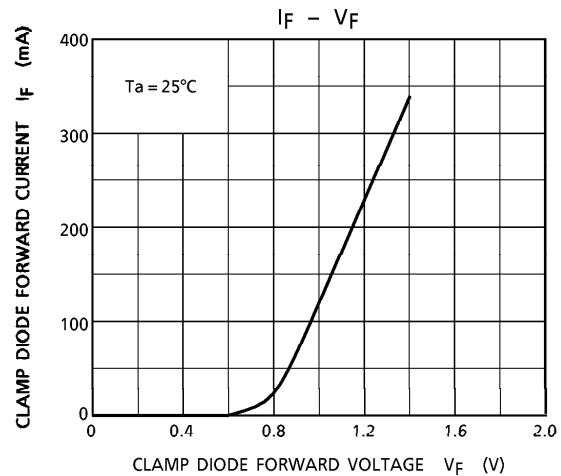
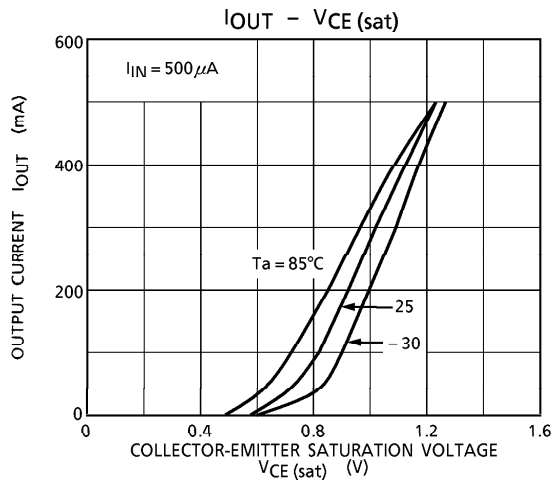
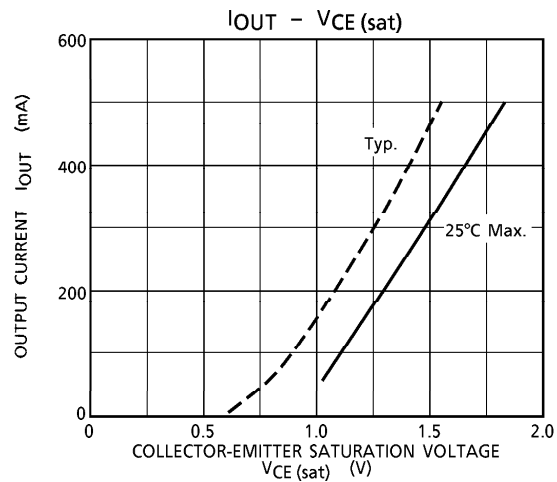
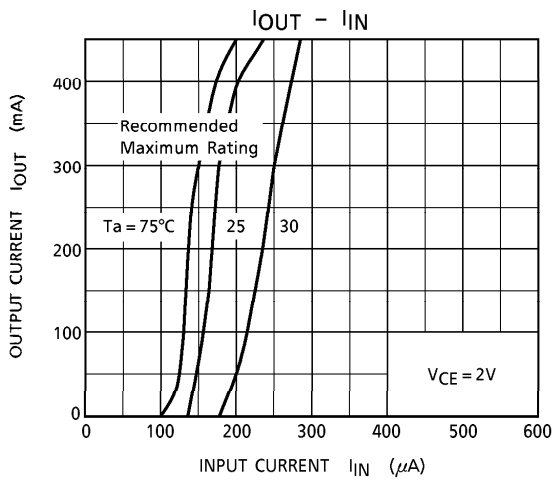
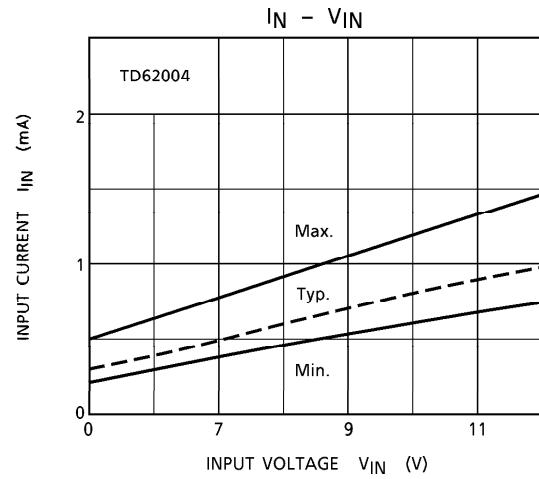
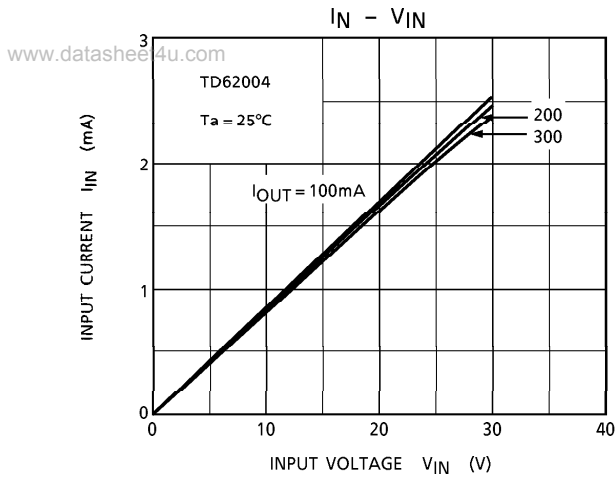
INPUT CONDITION

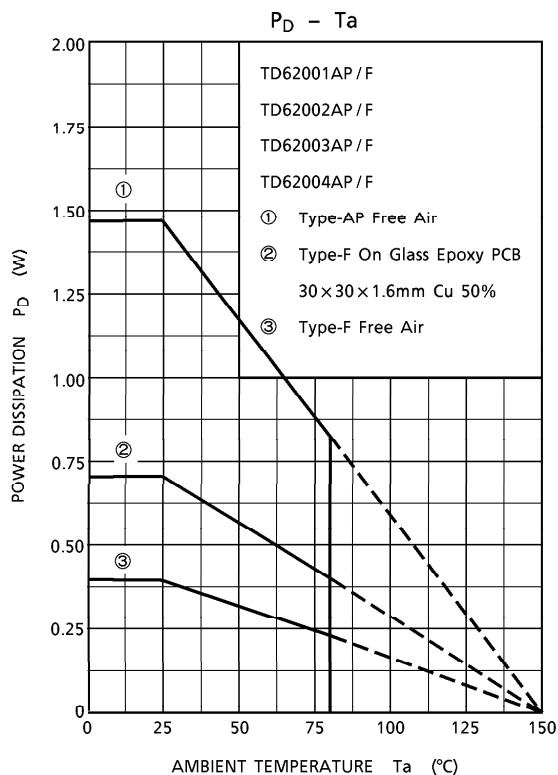
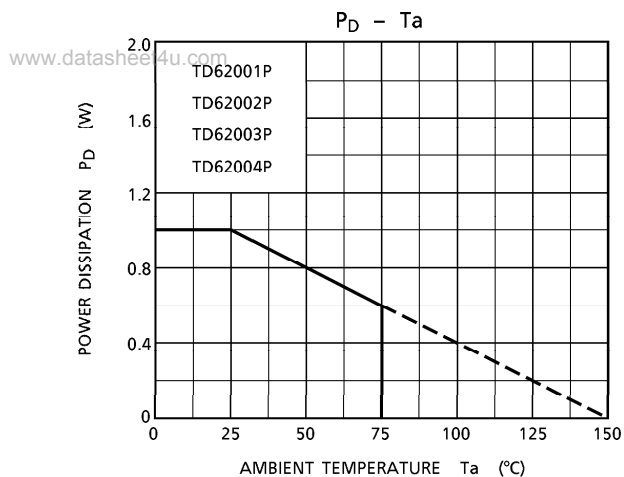
TYPE NUMBER	R1	V_{IH}
TD62001P/AP/F/AF	$2.7k\Omega$	3V
TD62002P/AP/F/AF	0	13V
TD62003P/AP/F/AF	0	3V
TD62004P/AP/F/AF	0	8V

(Note 3) C_L includes probe and jig capacitance.





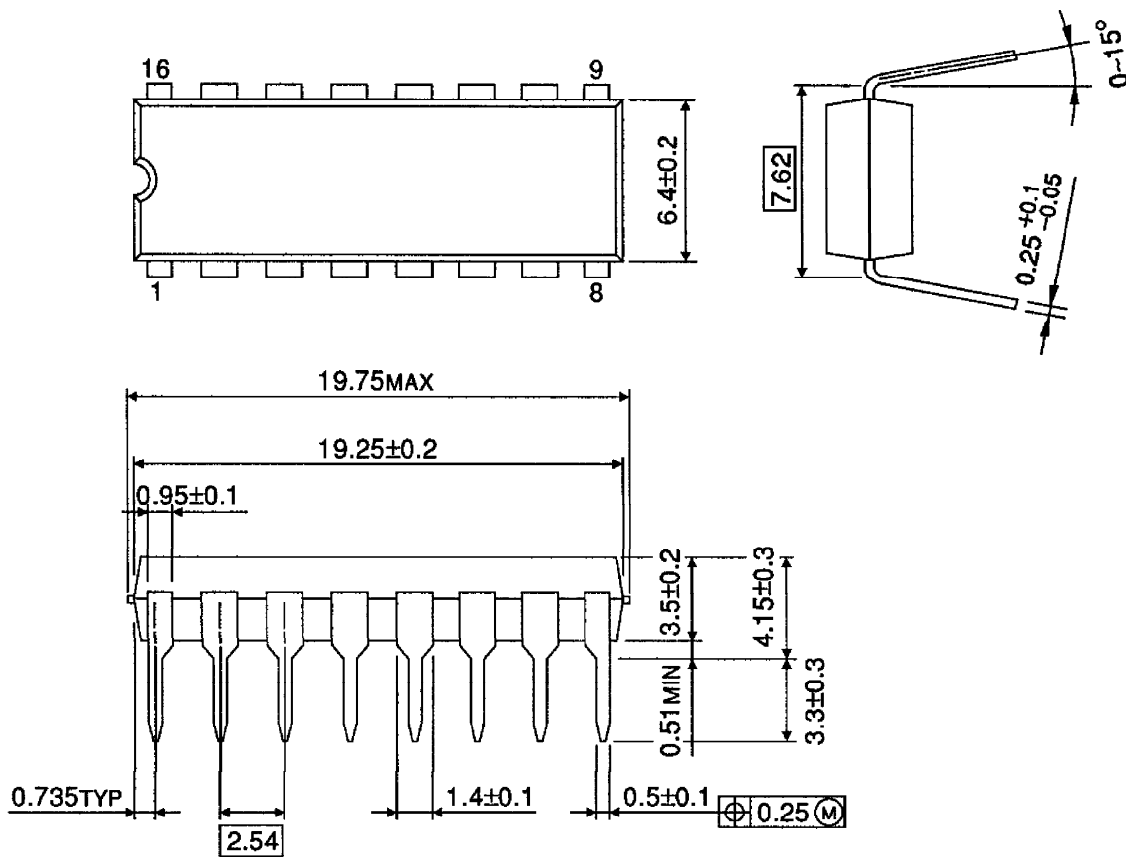




OUTLINE DRAWING
DIP16-P-300A

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Unit : mm



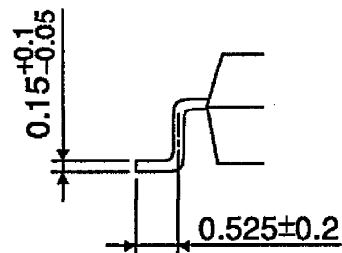
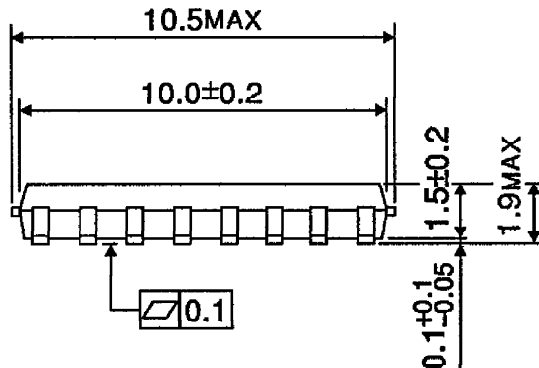
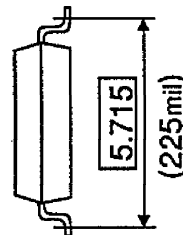
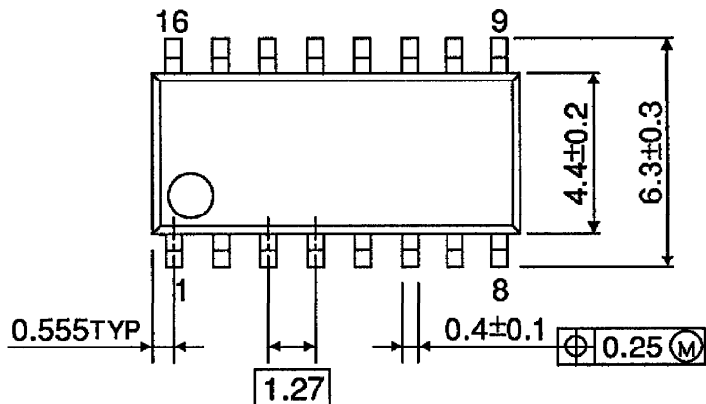
Weight : 1.11g (Typ.)

OUTLINE DRAWING

SOP16-P-225

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Unit : mm



Weight : 0.16g (Typ.)