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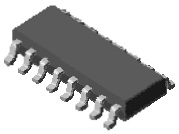
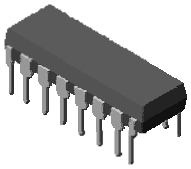
S377x

7CH Darlington TR Sink Driver



SOP-16



DIP-16

ORDERING INFORMATION

Product	Marking	Package
S377x	S377x	SOP-20
S377xP	S377xP	DIP-18

▲ **Marking Detail Information**

S377x….[1]
YWW….[2]

[1] Device Code [x: Item Code]

[2] Year & Week Code

Description

The S377x Series are high-voltage, high-current Darlington transistor arrays. Each consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads. The collector-current rating of a single Darlington pair is 500mA. The Darlington pairs can be paralleled for higher current capability. Applications include relay drivers, hammer drivers, lamp drivers, display drivers (LED and gas discharge), line drivers, and logic buffers.

Application

◈ Relay Controller

◈ Lamp and Display LED Driver

◈ Motor Driver

Features and Benefits

◈ Output Current (single output) 500mA(Max.)

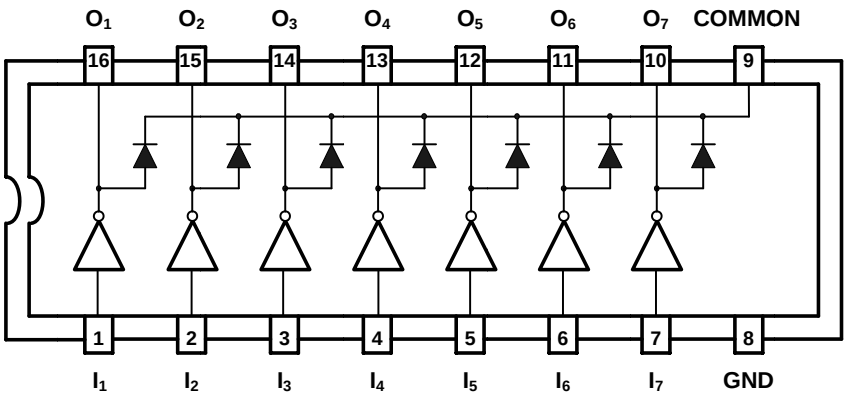
◈ High sustaining voltage output

◈Output clamp diode

◈ Inputs compatible with various types of logic

◈ Package : SOP-16, DIP-16

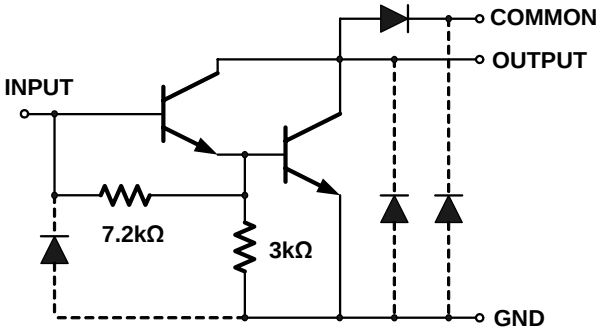
Block Diagram & Pin Configuration



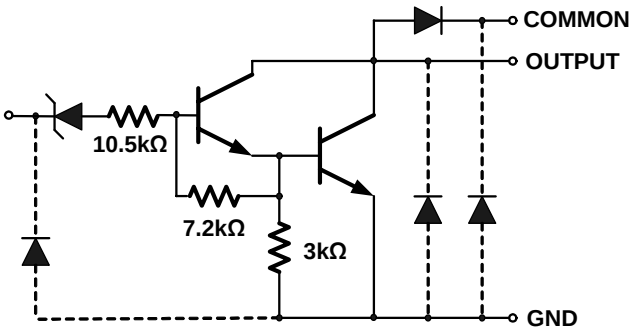
I_X : Input Port **O_X : Output Port**

GND : Ground **COMMON : Common**

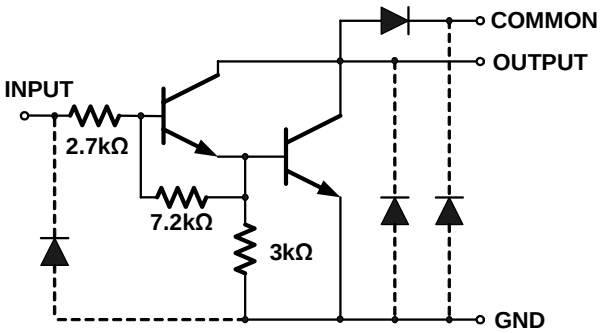
◈ Schematics (Each Driver)



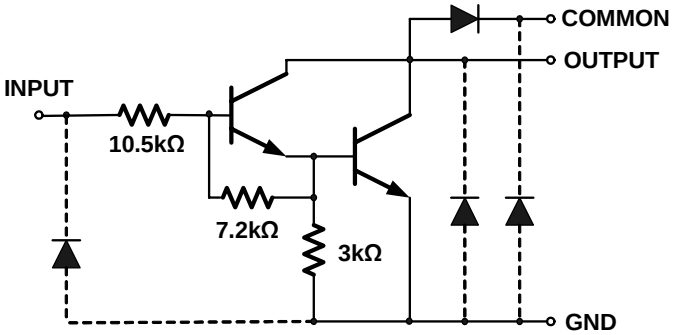
S3771



S3772



S3773



S3774

◈ Product Line-up

Product Name	Input Bias Resistor	Designation	Operating Temperature	Package
S3771	External	General Purpose	-40~85℃	SOP-16
S3772	7V Zener Diode + 10.5KΩ	14~25V PMOS	-40~85℃	SOP-16
S3773	2.7KΩ	TTL, 5V CMOS	-40~85℃	SOP-16
S3774	10.5KΩ	6~15 PMOS, CMOS	-40~85℃	SOP-16
S3771P	External	General Purpose	-40~85℃	DIP-16
S3772P	7V Zener Diode + 10.5KΩ	14~25V PMOS	-40~85℃	DIP-16
S3773P	2.7KΩ	TTL, 5V CMOS	-40~85℃	DIP-16
S3774P	10.5KΩ	6~15 PMOS, CMOS	-40~85℃	DIP-16

◈ Absolute Maximum Ratings (Ta = 25℃)

Parameter		Symbol	Rating		Unit
			SOP-16	DIP-16	
Output Sustaining Voltage		V_{IN}	-0.5~50		V
Output Current		I_{OUT}	500		mA / ch
Input Voltage*		V_{IN}	-0.5~30		V
Input Current**		I_{IN}	25		mA
Clamp Diode	Reverse Voltage	V_R	50		V
	Forward Current	I_F	500		mA
GND Terminal Current		I_{GND}	2.8		A
Power Dissipation		P_d	0.54	1.47	W
Junction Temperature		T_J	150		°C
Operate Temperature Range		T_{opr}	-40 ~ +85		°C
Storage Temperature Range		T_{stg}	-55 ~ +150		°C

*(Except S3771/P), **(Only S3771/P)

◈ Recommended Operating Conditions (Ta=-40~85°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Sustaining Voltage		$V_{CE(SUS)}$	-	0	-	50	V
Output Current		I_{OUT}	TPW=25ms, DF=10%, 7 Circuits	0	-	400	mA
			TPW=25ms, DF=30%, 7 Circuits	0	-	200	
Input Voltage		V_{IN}	Except S3771/P	0	-	30	V
Input Current		I_{IN}	Only S3771/P	0	-	5	mA
Clamp Diode Reverse Voltage		V_R	-	-	-	50	V
Clamp Diode Forward Current		I_F	-	-	-	400	mA
Power Dissipation	DIP-16	P_D	Ta = 85°C	-	-	0.6	W
	SOP-16		Ta = 85°C*	-	-	0.32	

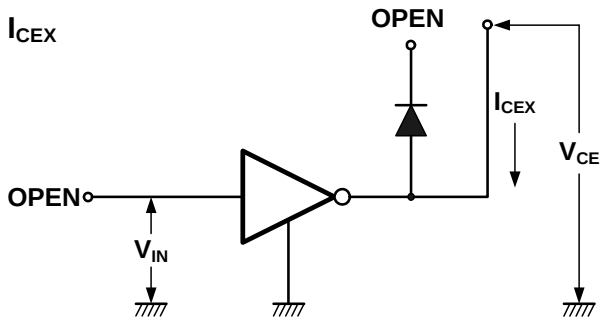
* (On glass epoxy PCB (30 x 30 x 1.6mm Cu50%)

◈ Electrical characteristics (Ta=-40~85°C; unless otherwise specified)

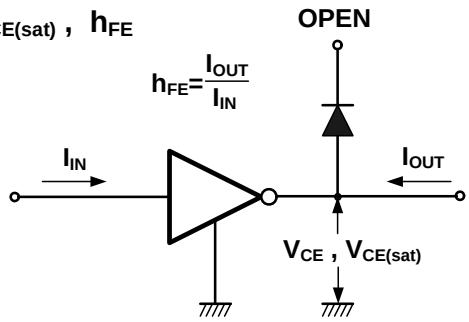
Characteristic		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Output Leakage Current		I_{CEX}	1	V_{CE}=50V, Ta=25°C	-	-	50	uA
				V_{CE}=50V, Ta=85°C	-	-	100	
	S3772/P			V_{CE}=50V, V_{IN}=6V	-	-	500	
	S3774/P			V_{CE}=50V, V_{IN}=1V	-	-	500	
Collector – Emitter Saturation Voltage		$V_{CE(SAT)}$	2	I_{OUT}=350mA, I_{IN}=500uA	-	1.3	1.6	V
				I_{OUT}=200mA, I_{IN}=350uA	-	1.1	1.3	
				I_{OUT}=100mA, I_{IN}=250uA	-	0.9	1.1	
Input Current	S3772/P	$I_{IN(ON)}$	3	V_{IN}=17V	-	0.82	1.25	mA
	S3773/P			V_{IN}=3.85V	-	0.93	1.35	
	S3774/P			V_{IN}=5V	-	0.35	0.5	
				V_{IN}=12V	-	1.0	1.45	
		$I_{IN(OFF)}$	4	I_{OUT}=500uA, Ta=85°C	50	65	-	uA
Input Voltage	S3772/P	$V_{IN(ON)}$	5	V_{CE}=2V, I_{OUT}=300mA	-	-	13	V
	S3773/P			V_{CE}=2V, I_{OUT}=200mA	-	-	2.4	
				V_{CE}=2V, I_{OUT}=250mA	-	-	2.7	
				V_{CE}=2V, I_{OUT}=300mA	-	-	3.0	
	S3774/P			V_{CE}=2V, I_{OUT}=125mA	-	-	5.0	
				V_{CE}=2V, I_{OUT}=200mA	-	-	6.0	
				V_{CE}=2V, I_{OUT}=275mA	-	-	7.0	
				V_{CE}=2V, I_{OUT}=350mA	-	-	8.0	
DC Current Transfer Ratio		h_{FE}	2	V_{CE}=2V, I_{OUT}=350mA	1000	-	-	
Clamp Diode Reverse Current		I_R	6	V_R=50V, Ta=25°C	-	-	50	uA
				V_R=50V, Ta=85°C	-	-	100	
Clamp Diode Forward Voltage		V_F	7	I_F=350mA	-	-	2.0	V
Input Capacitance		C_{IN}		-	-	15	-	pF
Turn-ON Delay		t_{ON}	8	V_{OUT}=50V, R_L=163Ω, C_L=15pF	-	0.1	-	uS
Turn-OFF Delay		t_{OFF}			-	0.2	-	

Test Circuit

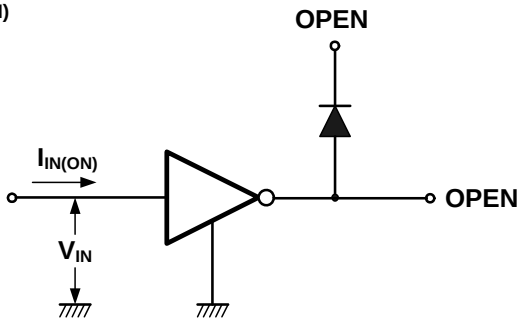
1. I_{CEX}



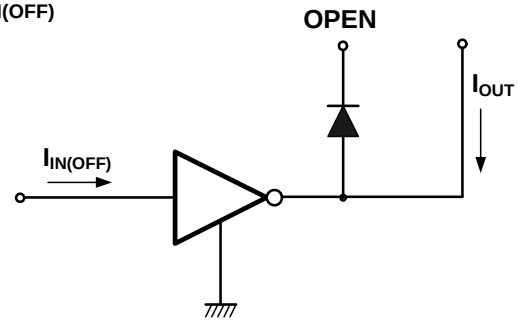
2. $V_{CE(sat)}$, h_{FE}



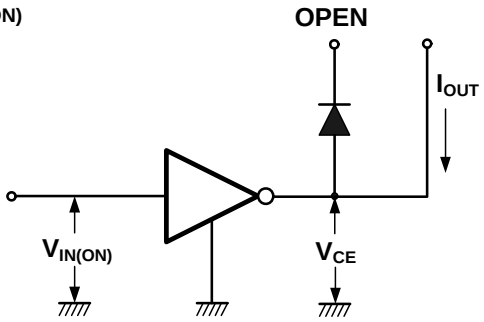
3. $I_{IN(ON)}$



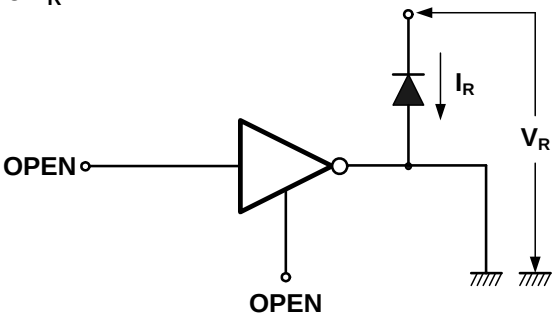
4. $I_{IN(OFF)}$



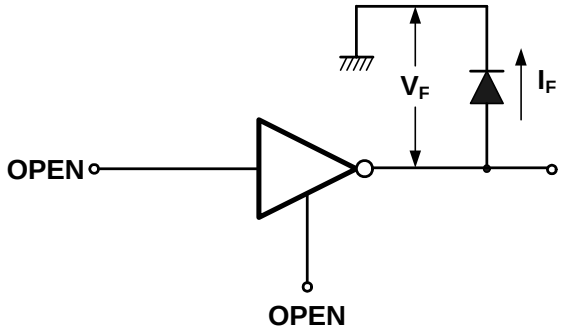
5. $V_{IN(ON)}$



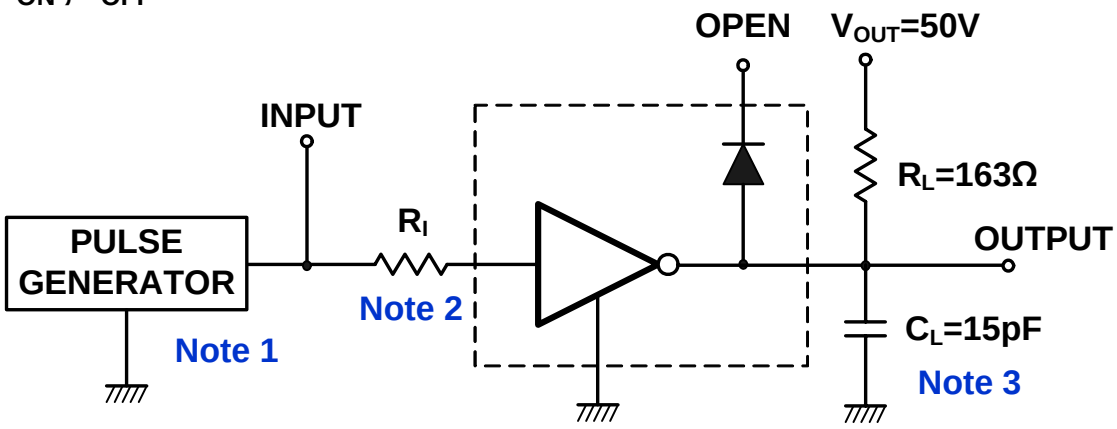
6. I_R

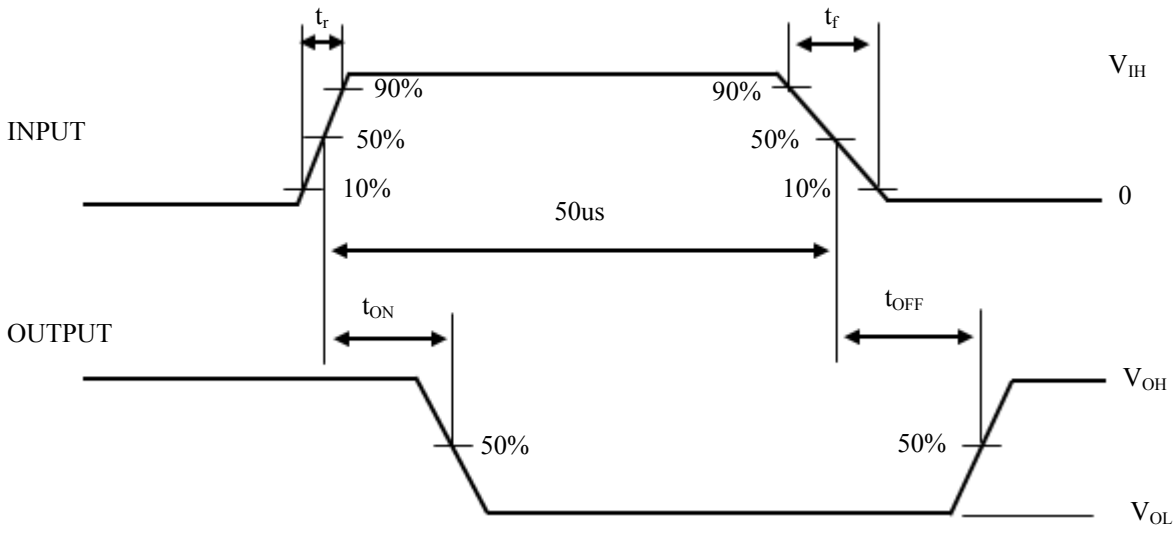


7. V_F



8. t_{ON} , t_{OFF}





Note 1 : Pulse width 50us, duty cycle 10%

Output impedance 50Ω, tr ≤ 5ns, tf ≤ 10ns

Note 2 : See below

Input Condition

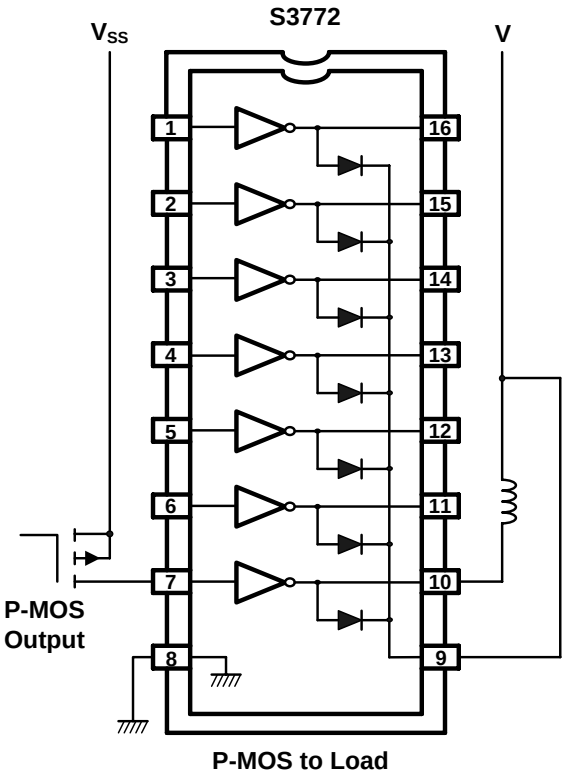
Item Code	R_I	V_{IH}
S3771/P	2.7KΩ	3V
S3772/P	0	13V
S3773/P	0	3V
S3774/P	0	8V

Note 3 : CL includes probe and jig capacitance

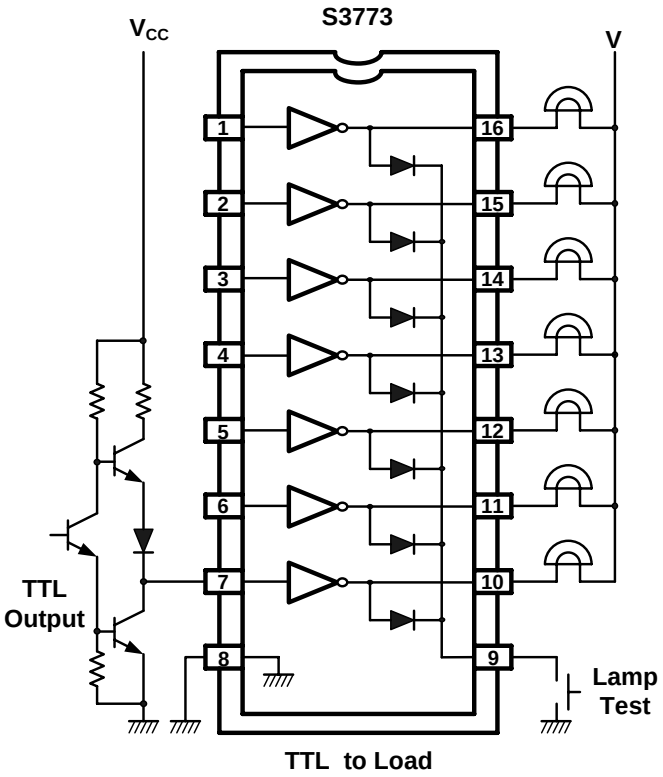
Precautions for using

This IC does not include built-in protection circuits for excess current or overvoltage. If this IC is subjected to excess current or overvoltage, it may be destroyed. Hence, the utmost care must be taken when systems which incorporate this IC are designed. Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

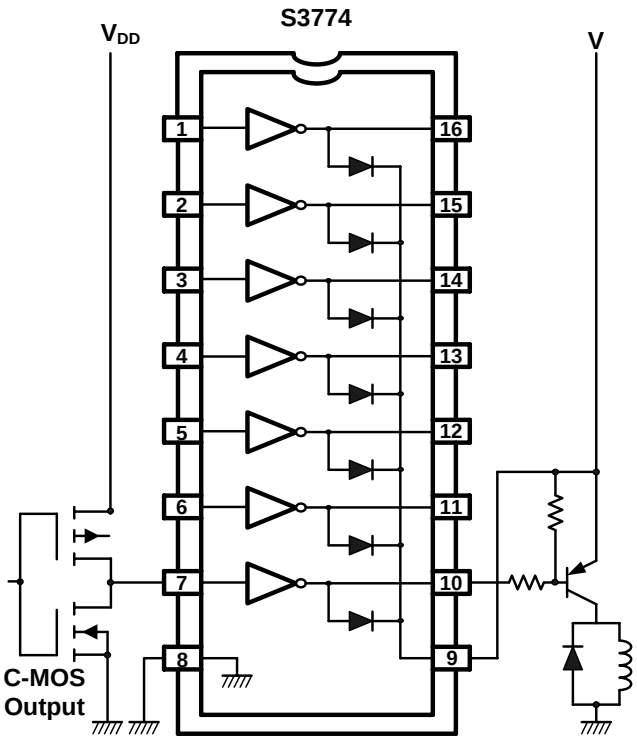
Application Circuit



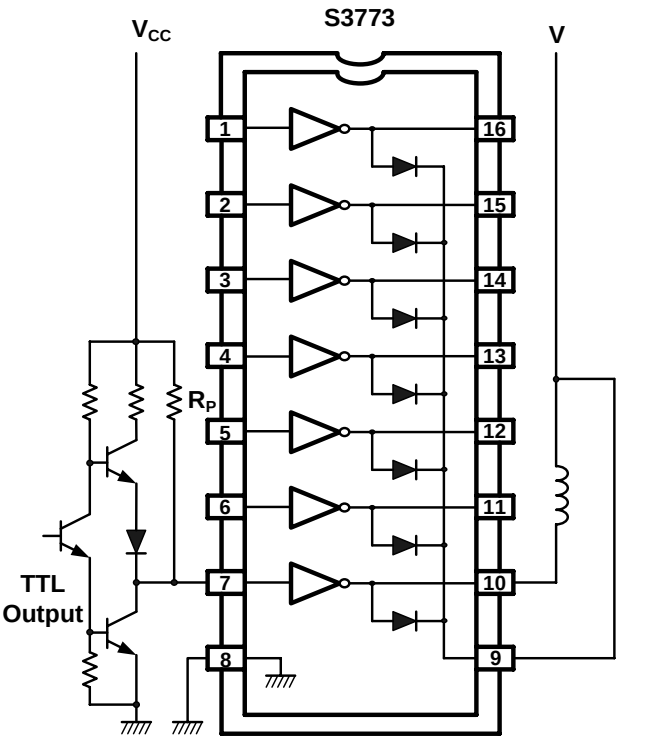
P-MOS to Load



TTL to Load

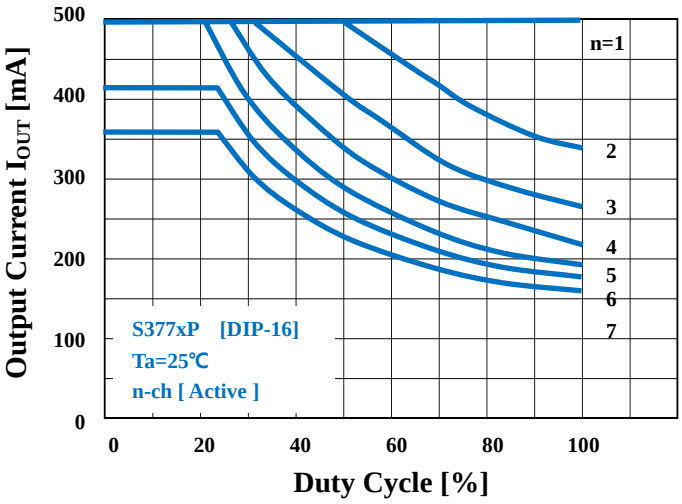


Buffer for Higher Current Loads

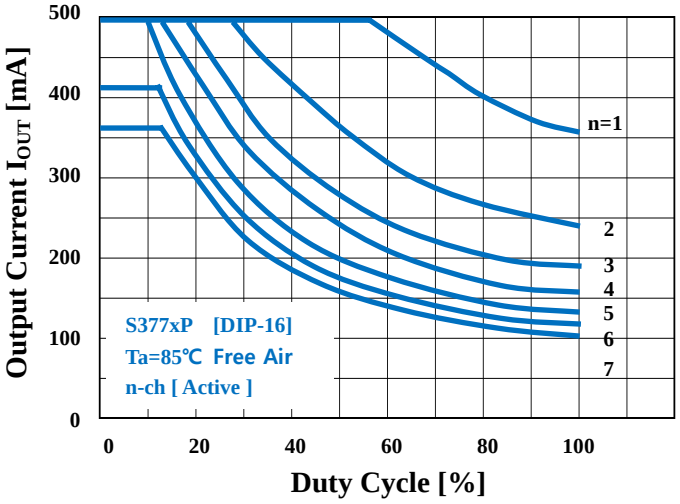


Use of Pullup Resistors to Increase Drive Current

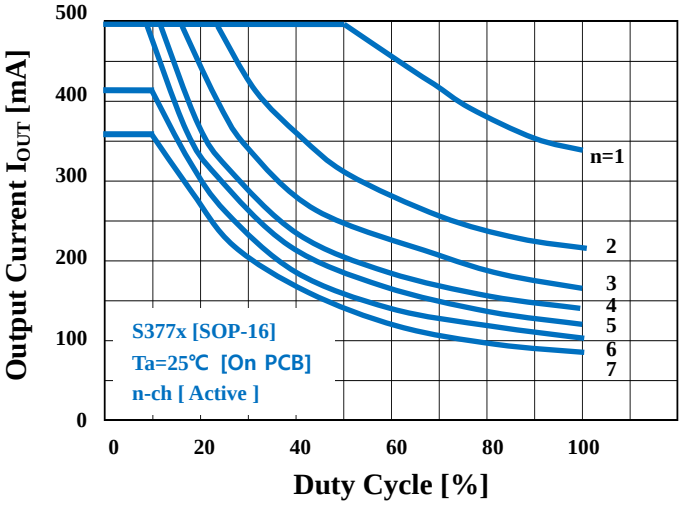
I_{OUT} – Duty Cycle



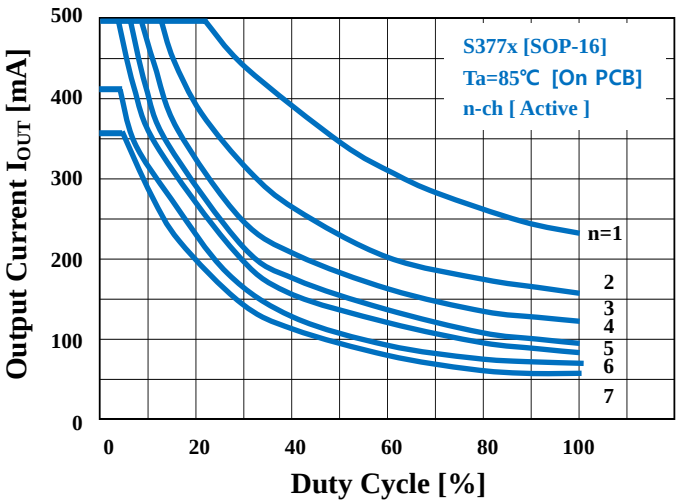
I_{OUT} – Duty Cycle



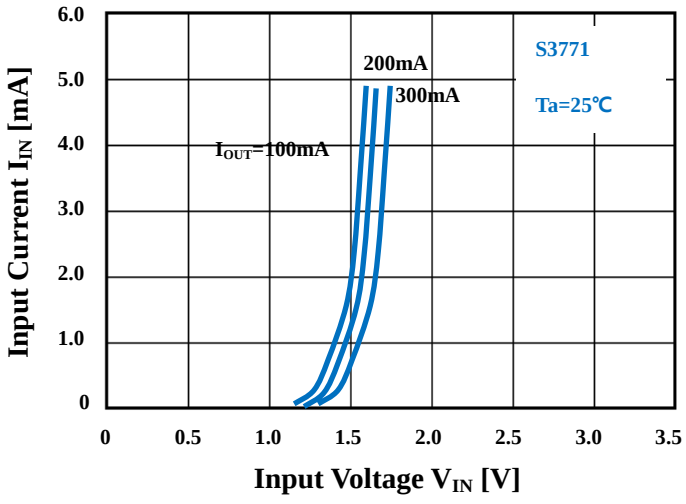
I_{OUT} – Duty Cycle



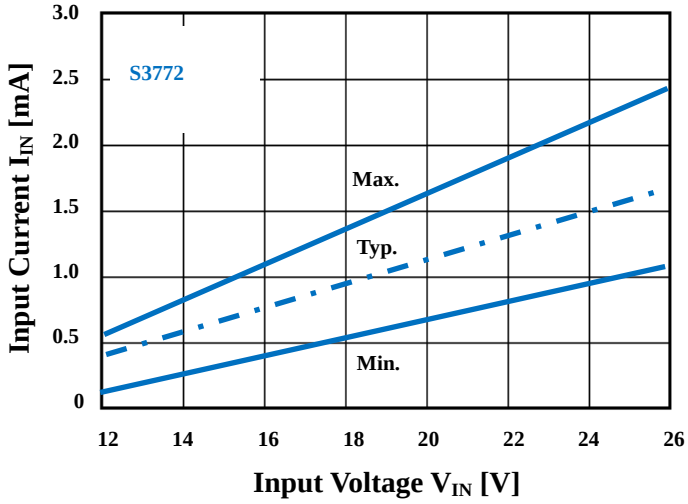
I_{OUT} – Duty Cycle



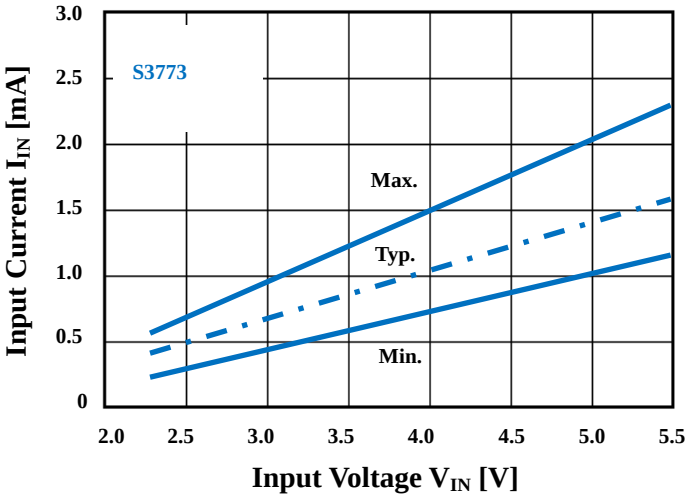
I_{IN} – V_{IN}



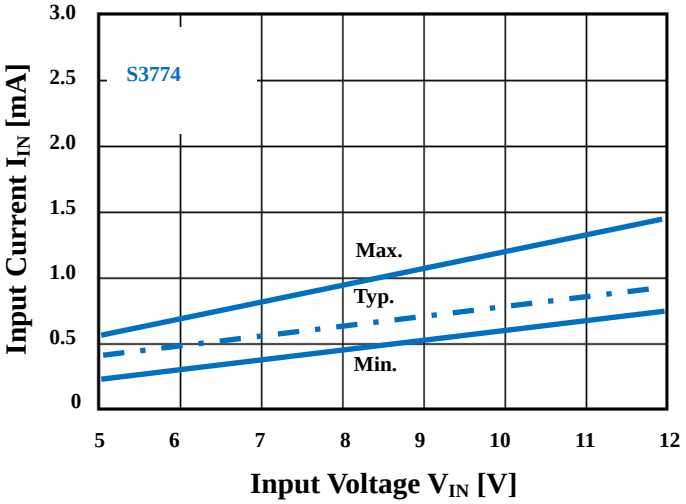
I_{IN} – V_{IN}



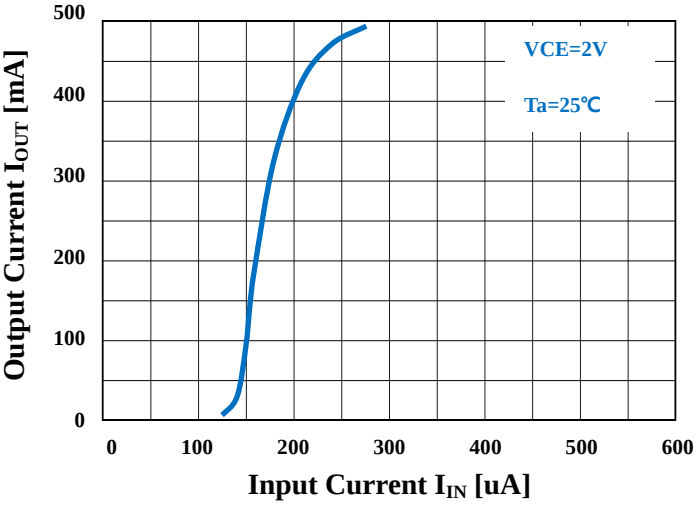
$I_{IN} - V_{IN}$



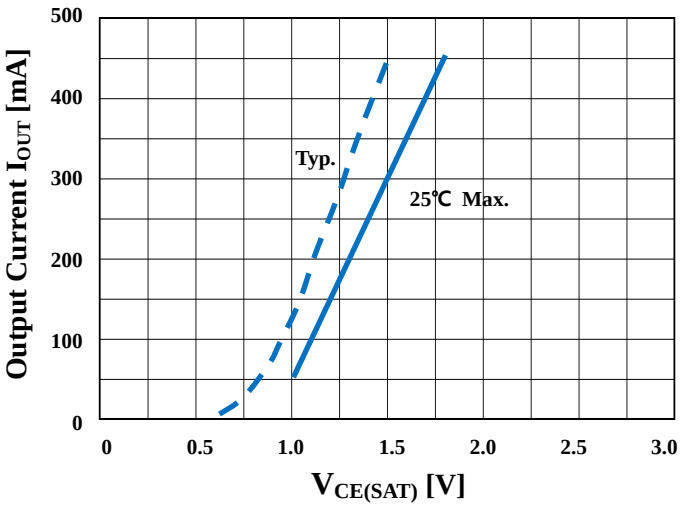
$I_{IN} - V_{IN}$



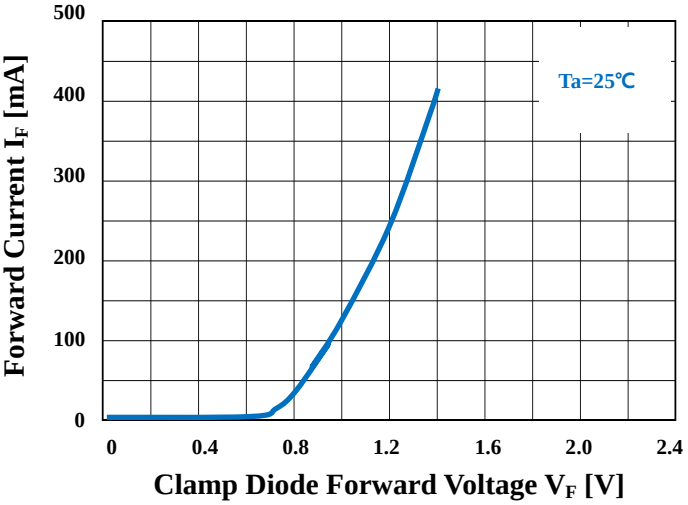
$I_{OUT} - I_{IN}$



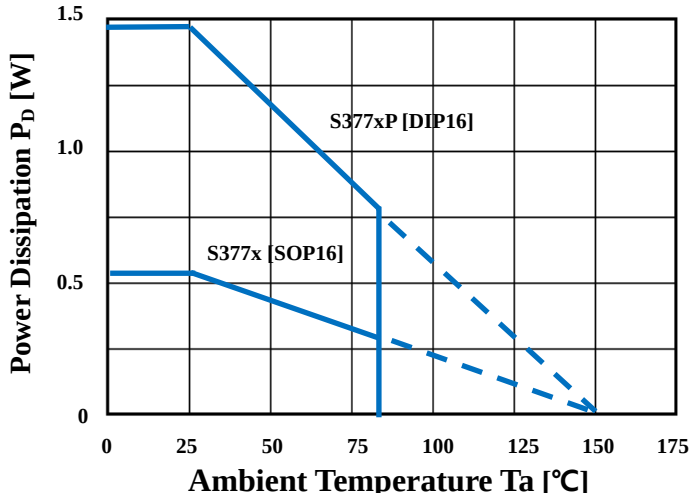
$I_{OUT} - V_{CE(SAT)}$



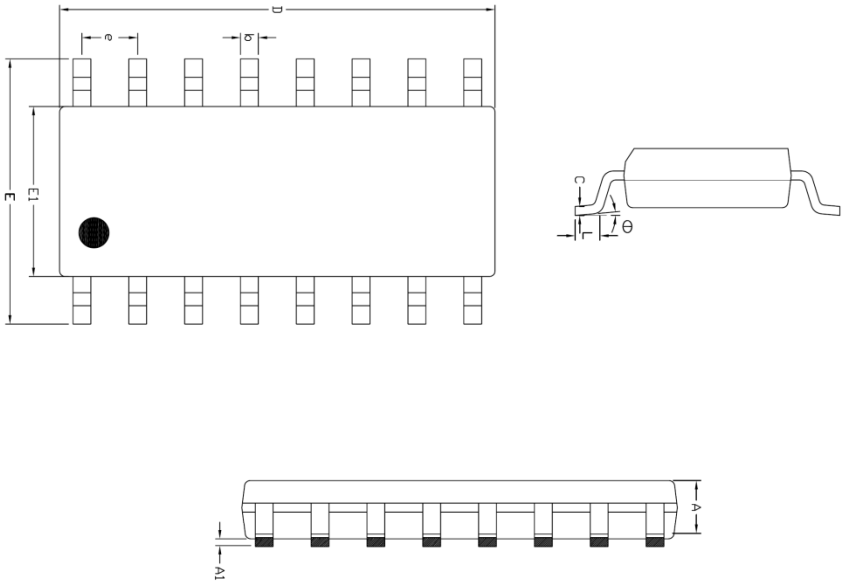
$I_F - V_F$



$P_D - T_a$

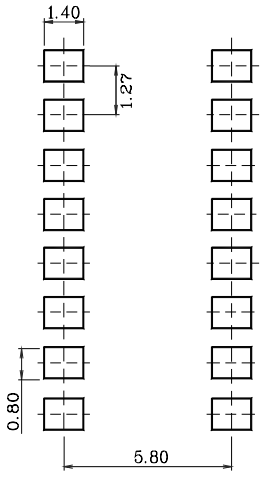


◈ SOP-16 Outline Dimension (Unit : mm)

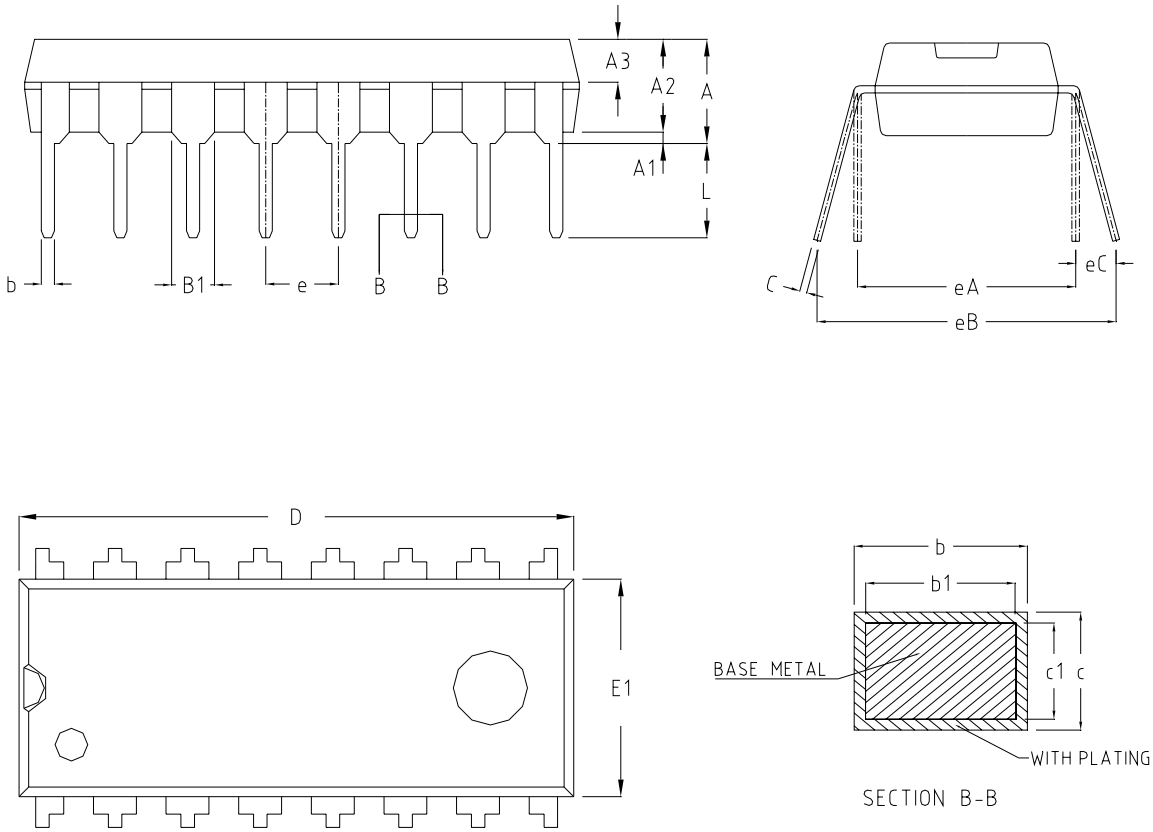


SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	–	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	9.806	9.906	10.006	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
θ	0 °	–	8 °	

※ Recommend PCB solder land [Unit: mm]



◈ DIP-16(CS) Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS		
	MINIMUM	NOMINAL	MAXIMUM
A	3.60	3.80	4.00
A1	0.51	-	-
A2	3.10	3.30	3.50
A3	1.42	1.52	1.62
b	0.44	-	0.53
b1	0.43	0.46	0.48
B1	1.52BSC		
c	0.25	-	0.31
c1	0.24	0.25	0.26
D	18.90	19.10	19.30
E1	6.15	6.35	6.55
e	2.54BSC		
eA	7.62BSC		
eB	7.62	-	9.50
eC	0	-	0.94
L	3.00	-	-

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