

## INTRODUCTION

### HIGH VOLTAGE, HIGH CURRENT DARLINGTON ARRAYS

The KA2655, KA2656, KA2657, KA2658 and KA2659 are comprised of seven high voltage, high current NPN darlington transistors arrays with common emitter, open collector outputs. Suppression diodes are included for inductive load driving and the inputs are pinned opposite the outputs to simplify board layout. Peak inrush currents to 600mA permit them to drive incandescent lamps.

The KA2655 is a general purpose array for use with DTL, TTL, PMOS or CMOS logic directly.

The KA2656 version does away with the need for any external discrete resistors, since each unit has a resistor and a zener diode in series with the input. The KA2656 is designed for use with 14 to 25V PMOS devices. The zener diode also gives these devices excellent noise immunity.

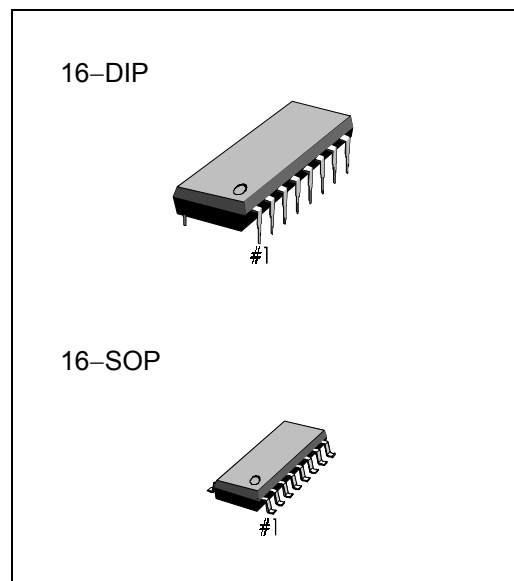
The KA2657 has a series base resistor to each darlington pair, and thus allows operation directly with TTL or CMOS operating at supply voltages of 5V. The KA2657 will handle numerous interfaces needs-particularly those beyond the capabilities of standard logic buffers.

The KA2658 has an appropriate input resistor to allow direct operation from CMOS or PMOS outputs operating supply voltage of 6V to 15V.

The KA2659 is designed for use with standard TTL and Schottky TTL, with which hinger output currents are required and loading of the logic output is not a concern.

These devices will sink a minimum of 350mA when driven from a "totempole" logic output.

These versatile devices are useful for driving a wide range of loads including Solenoids, Relays, DC motors, LED displays, Filament lamps, thermal printheads and high power buffer. Applications requiriing sink currents beyonds the capability of a single output may be accomodated by paralleling the outputs.



## APPLICATIONS

- Relay driver
- DC motor driver
- Solenoids driver
- LED display driver
- Filament lamp driver
- High power buffer
- Thermal print head driver

## OPERATING INFORMATION

Device	Package	Input Level	Operating Temperature
KA2655N	16-DIP	DTL, TTL, PMOS, CMOS	-20 ~ +85°C
KA2655D	16-SOP		
KA2656N	16-DIP	PMOS	
KA2656D	16-SOP		
KA2657N	16-DIP	TTL, CMOS	
KA2657D	16-SOP		
KA2658N	16-DIP	CMOS, PMOS	
KA2658D	16-SOP		
KA2659N	16-DIP	TTL	
KA2659D	16-SOP		

## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Output Voltage	V <sub>o</sub>	50	V
Input Voltage (KA2656/7/8) (KA2659)	V <sub>IN</sub>	30	V
		15	
Continuous Collector Current	I <sub>c</sub>	500	mA
Continuous Input Current	I <sub>IN</sub>	25	mA
Power Dissipation	P <sub>D</sub>	1.0	W
Operating Temperature	T <sub>opr</sub>	- 20 ~ + 85	°C
Storage Temperature	T <sub>stg</sub>	- 55 ~ + 150	°C

**ELECTRICAL CHARACTERISTICS**

(Ta = 25°C, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Leakage Current	I <sub>LK</sub>	V <sub>CE</sub> = 50V, Ta = 25°C, V <sub>IN</sub> = open	–	–	50	μA
		V <sub>CE</sub> = 50V, Ta = 70°C, V <sub>IN</sub> = open	–	–	100	
		V <sub>CE</sub> = 50V, Ta = 70°C, V <sub>IN</sub> = 6.0V (KA2656)	–	–	500	
		V <sub>CE</sub> = 50V, Ta = 70°C, V <sub>IN</sub> = 1.0V (KA2658)	–	–	500	
Output Saturation Voltage	V <sub>sat</sub>	I <sub>C</sub> = 100mA, I <sub>IN</sub> = 250μA	–	0.9	1.1	V
		I <sub>C</sub> = 200mA, I <sub>IN</sub> = 350μA	–	1.1	1.3	
		I <sub>C</sub> = 350mA, I <sub>IN</sub> = 500μA	–	1.25	1.6	
Input Current 1 (Off Condition)	I <sub>IN1</sub>	I <sub>C</sub> = 500mA, Ta = 70°C	50	65	–	μA
Input Current 2 (On Condition)	I <sub>IN2</sub>	V <sub>IN</sub> = 17V (KA2656), V <sub>o</sub> = open	–	0.85	1.3	mA
		V <sub>IN</sub> = 3.85V (KA2657), V <sub>o</sub> = open	–	0.93	1.35	
		V <sub>IN</sub> = 5V (KA2658), V <sub>o</sub> = open	–	0.35	0.5	
		V <sub>IN</sub> = 12V (KA2658), V <sub>o</sub> = open	–	1.0	1.45	
		V <sub>IN</sub> = 3.0V (KA2659), V <sub>o</sub> = open	–	1.5	2.4	
Input Voltage	V <sub>IN</sub>	V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 300mA (KA2656)	–	–	13	V
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 200mA (KA2657)	–	–	2.4	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 250mA (KA2657)	–	–	2.7	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 300mA (KA2657)	–	–	3.0	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 125mA (KA2658)	–	–	5.0	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 200mA (KA2658)	–	–	6.0	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 275mA (KA2658)	–	–	7.0	
		V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 350mA (KA2658)	–	–	8.0	
V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 350mA (KA2659)	–	–	2.4			
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 2.0V, I <sub>c</sub> = 350mA (KA2655)	1000	–	–	–
Input Capacitance	C <sub>IN</sub>	–	–	15	30	pF
Preparation Delay Time	t <sub>ON</sub>	0.5 V <sub>IN</sub> to 0.5 V <sub>o</sub>	–	0.25	1.0	μs
	t <sub>OFF</sub>	0.5 V <sub>IN</sub> to 0.5 V <sub>o</sub>	–	0.25	1.0	μs
Clamp Diode Leakage Current	I <sub>R</sub>	V <sub>IN</sub> = open, V <sub>o</sub> = GND, V <sub>R</sub> = 50V, Ta = 25°C	–	–	50	μA
		V <sub>IN</sub> = open, V <sub>o</sub> = GND, V <sub>R</sub> = 50V, Ta = 70°C	–	–	100	μA
Clamp Diode Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 350mA	–	1.7	2.0	V

## PIN CONFIGURATION

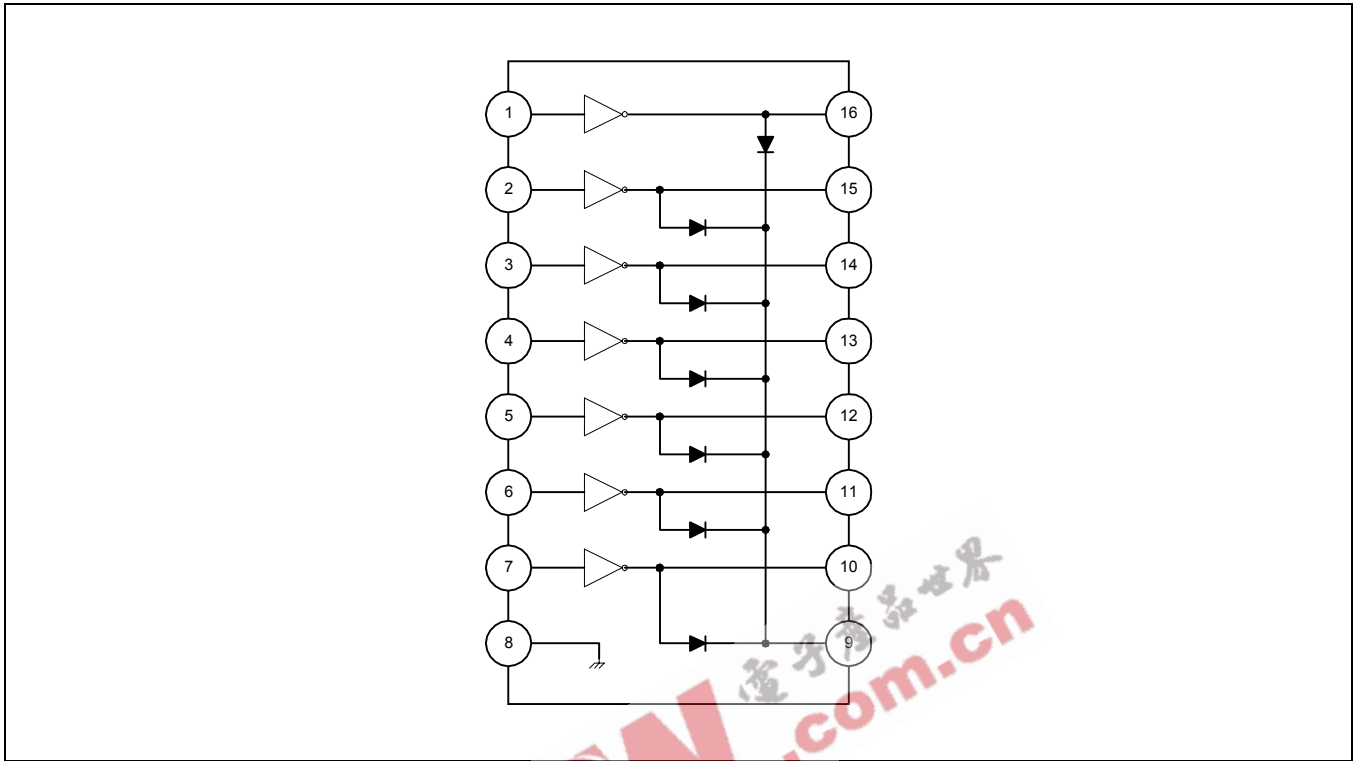


Figure 1.

SCHEMATIC DIAGRAMS

KA2655 (each driver)

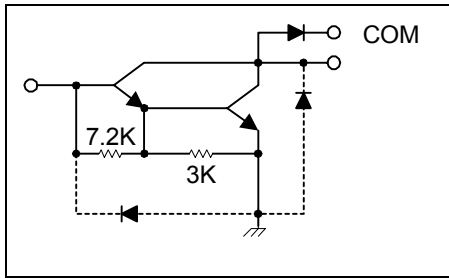


Figure 2.

KA2656 (each driver)

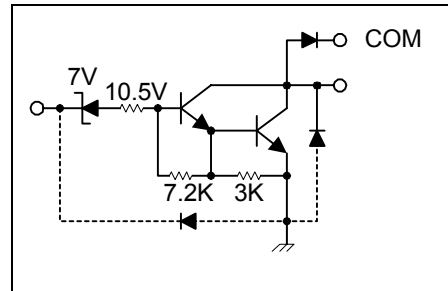


Figure 3.

KA2657 (each driver)

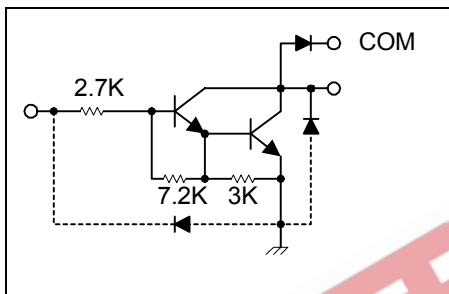


Figure 4.

KA2658 (each driver)

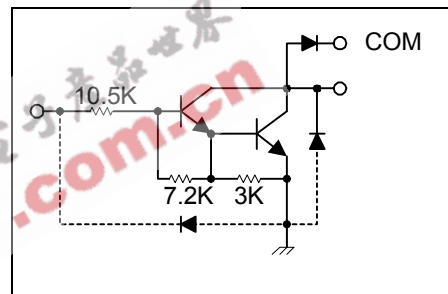


Figure 5.

KA2659 (each driver)

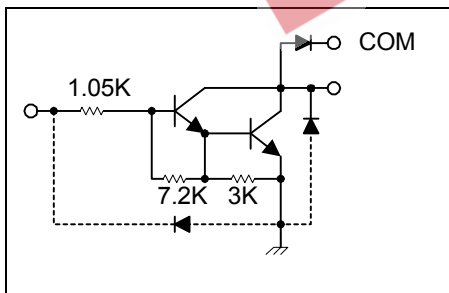


Figure 6.

TYPICAL APPLICATIONS

PMOS TO LOAD  
KA2656

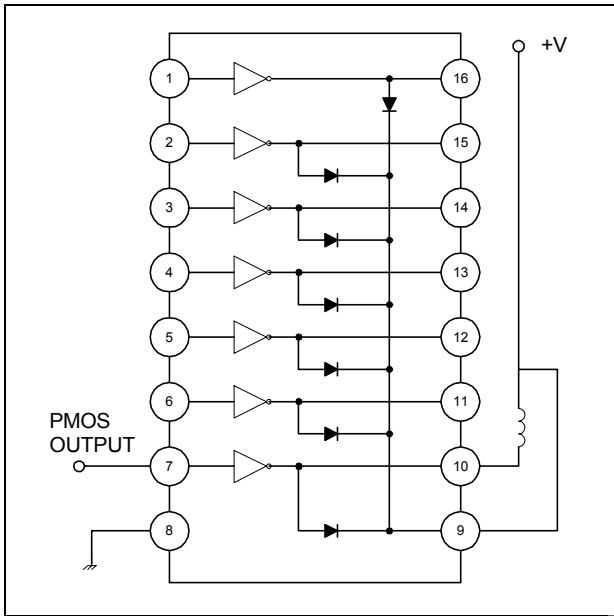


Figure 7.

TTL TO LOAD  
KA2657/9

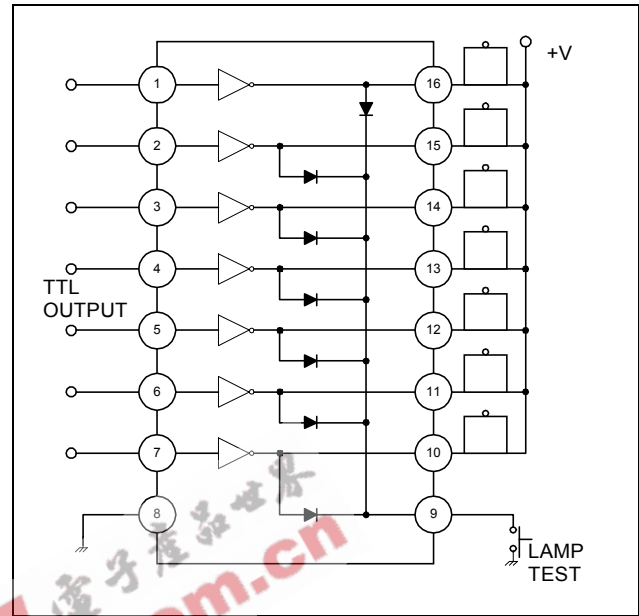


Figure 8.

Buffer for High-current Load  
KA2658

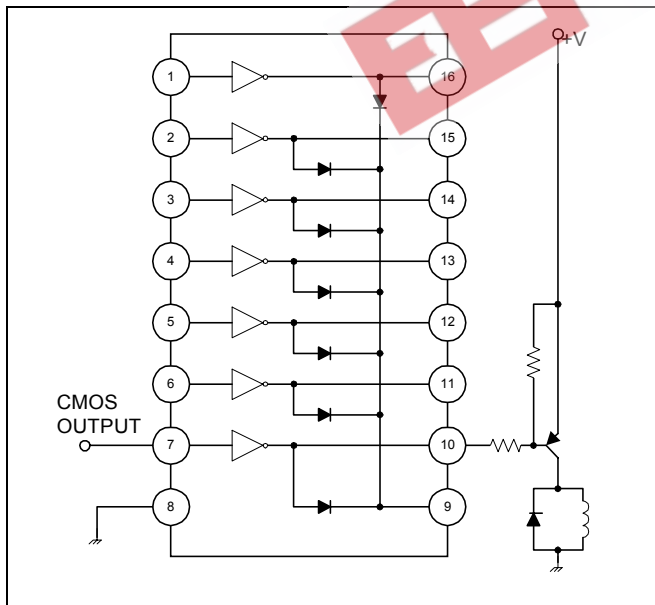


Figure 9.

USE of Pull-up Resistors to Increase Drive Current  
KA2657

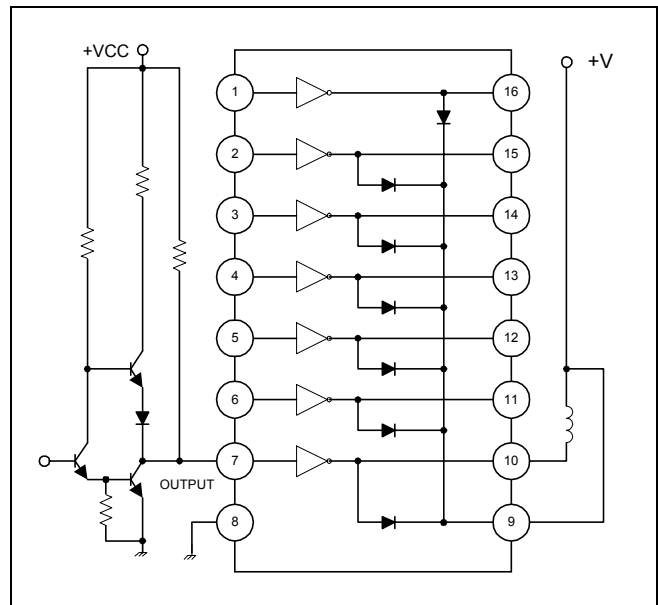


Figure 10.