409753. ULN 2003L

USMikroChips

ULN 2003A&L/2803A High-Voltage, High-Current Darlington Arrays

General Description

The Series ULN2003 and the ULN2803 are High-Voltage, High-Current Darlington Arrays that are comprised of silicon NPN Darlington pairs on a common monolithic substrate (The 2003 has seven Darlington pairs and the 2803 has eight Darlington pairs). All units have open-collector outputs and integral diodes for inductive load transient suppression

The Series 2003 and 2803 have a 2.7k Ω series base resistor for each Darlington pair, allowing operation directly with TTL or CMOS Operating at a voltage of 5 V. These devices will handle numerous interface needs, particularly those beyond the capabilities of standard logic buffers

These devices will sink a minimum of 350 mA when driven from a "totem pole" logic output. Peak inrush current of 600 mA are permissible, making them ideal for driving tungsten filament lamps.

The output transistors are capable of sinking 500 mA and will sustain at least 50 V in the OFF state.

Datasheet.Cloud

2003/2803 SERIES TABLE 1

PART #	FUNCTION	PACKAGE*
ULN2003A	7 CHANNEL	16 PIN DIP
ULN2003L	7 CHANNEL	16 PIN SOIC
ULN2803A	8 CHANNEL	18 PIN DIP

*PACKAGE CONFORMS TO JEDEC STANDARDS

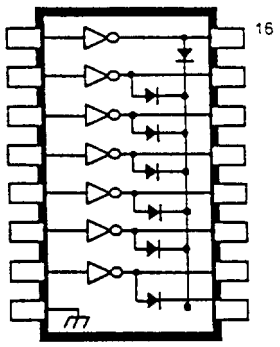
Absolute Maximum Ratings

Output Voltage, V_{CE}.....50V
Input Voltage, V_{IN}.....30V
Continuous Collector Current, I_C.....500mA
Continuous Input Current, I_{IN}.....25mA
Power Dissipation, P_D.....
(One Darlington Pair).....1.0W
(Total Package).....2.0W*
Operating Temperature Range, T_A.....
-20°C to +85°C
Storage Temperature Range, Ts.....
-55°C to +150°C

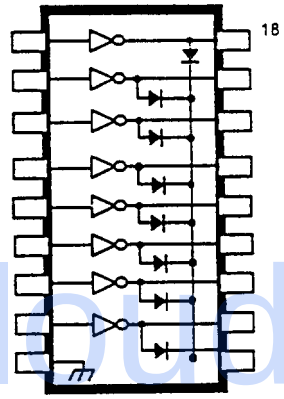
* Derate at a rate of 16 67mW/°C above +25°C in DIP package under normal operating conditions, these devices will sustain 350mA per output with $V_{CE(SAT)}$ = 1 6V at +70°C with a pulse width of 20ms and a duty cycle of 34%

Functional Diagram

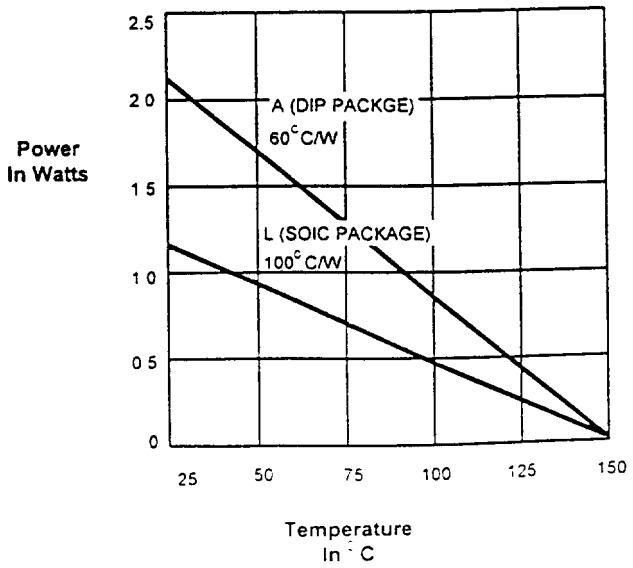
2003



2803



Allowable Average Power Dissipation As A Function Of Ambient Temperature



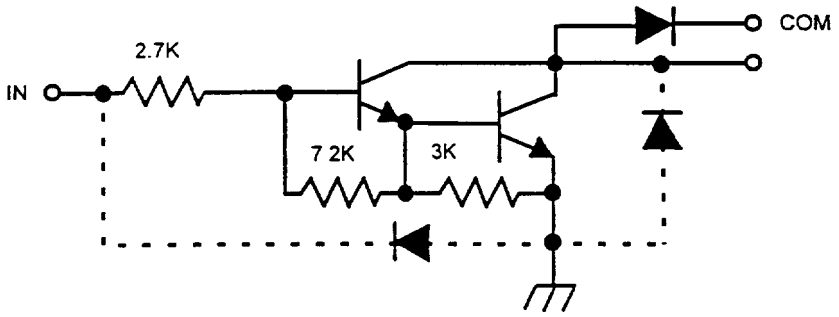
ELECTRICAL CHARACTERISTICS @ 25°C*

*Unless Otherwise Noted

Characteristics	Symbol	Test Fig.	Test Conditions	Limits Min	Typ	Max	Units
Output Leakage Current	I_{CEX}	1	V_{CE} =50V, T_A =25° C	-	-	50	µA
			V_{CE} =50V, T_A =70° C	-	-	100	µA
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	2	I_C =100mA, I_B =250µA	-	0 9	1 1	V
			I_C =200mA, I_B =350µA	-	1 1	1.3	V
			I_C =350mA, I_B =500µA	-	1 3	1 6	V
Input Current	$I_{IN(ON)}$	3	V_{IN} =3 85V	-	9 3	1 35	mA
	$I_{IN(OFF)}$	4	I_C =500 µA, T_A =70° C	50	65	-	µA
Input Voltage	$V_{IN(ON)}$	5	V_{CE} =2 0V,I_C =200mA	-	-	2 4	V
			V_{CE} =2 0V ,I_C =250mA	-	-	2 7	V
			V_{CE} =2 0V,I_C =300mA	-	-	3 0	V
Input Capacitance	C_{IN}	-		-	15	25	pF
Turn-On Delay	t_{PLH}	-	0 5E_{IN} to 0 5E_{OUT}	-	0.25	1 0	µS
Turn-On Delay	t_{PHL}	-	0 5E_{IN} to 0 5E_{OUT}	-	0.25	1 0	µS
Clamp Diode Leakage Current	I_R	6	V_R =50V ,T_A =25° C	-	-	50	µA
			V_R =50V ,T_A =70° C	-	-	100	µA
Clamp Diode Forward Voltage	V_F	7	I_F =350 mA	-	1 7	2 0	V

Partial Schematic*

*Each Driver



Test Figures

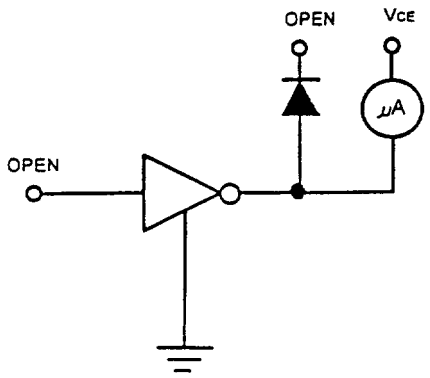


FIGURE 1

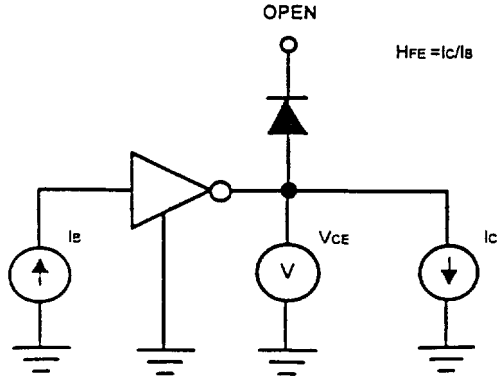


FIGURE 2

Test Figures

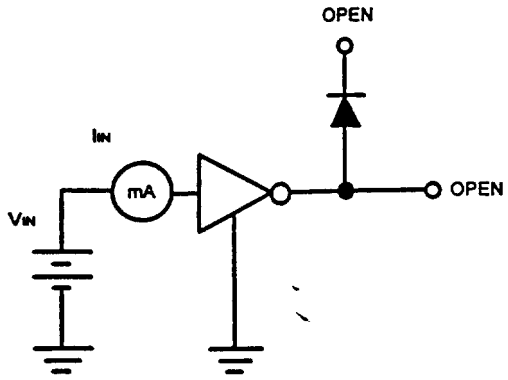


FIGURE 3

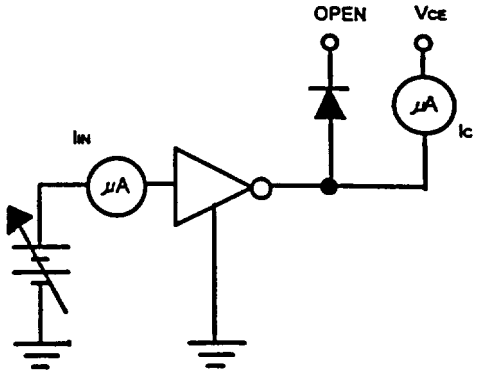


FIGURE 4

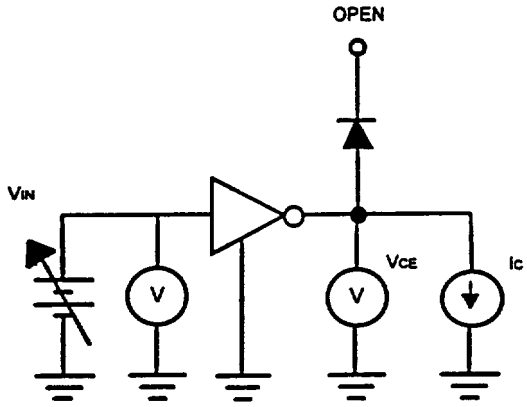


FIGURE 5

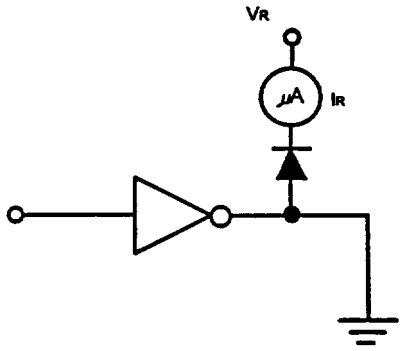


FIGURE 6

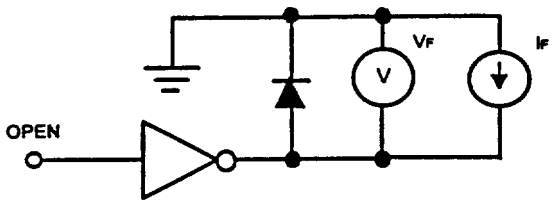
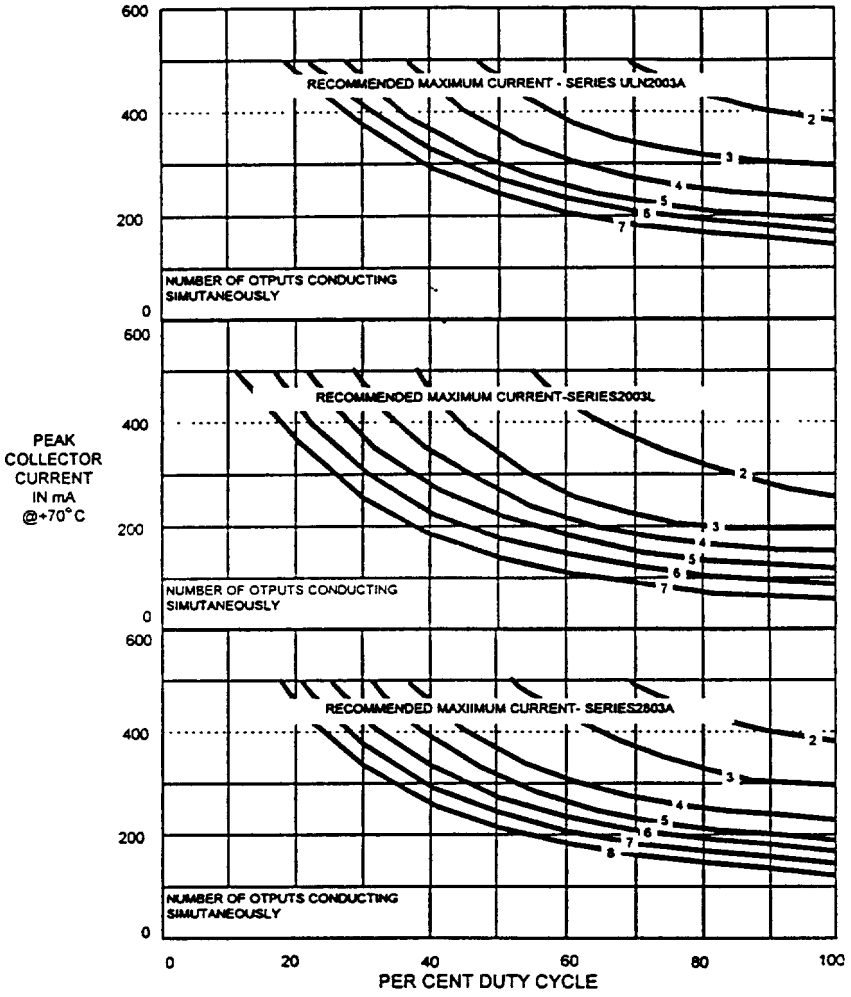
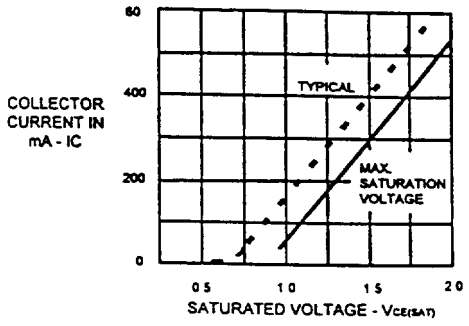


FIGURE 7

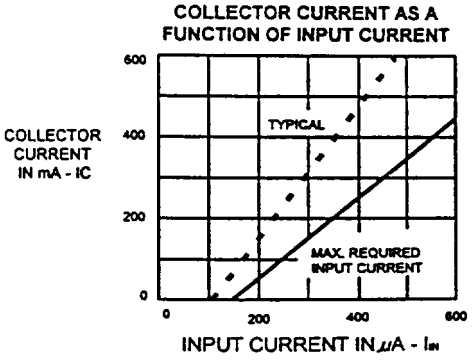
PEAK COLLECTOR CURRENT AS A FUNCTION OF DUTYCYCLE



COLLECTOR CURRENTAS A FUNCTION OF SATURATED VOLTAGE



COLLECTOR CURRENT AS A FUNCTION OF INPUT CURRENT



INPUT CURRENT AS A FUNCTION OF INPUT VOLTAGE