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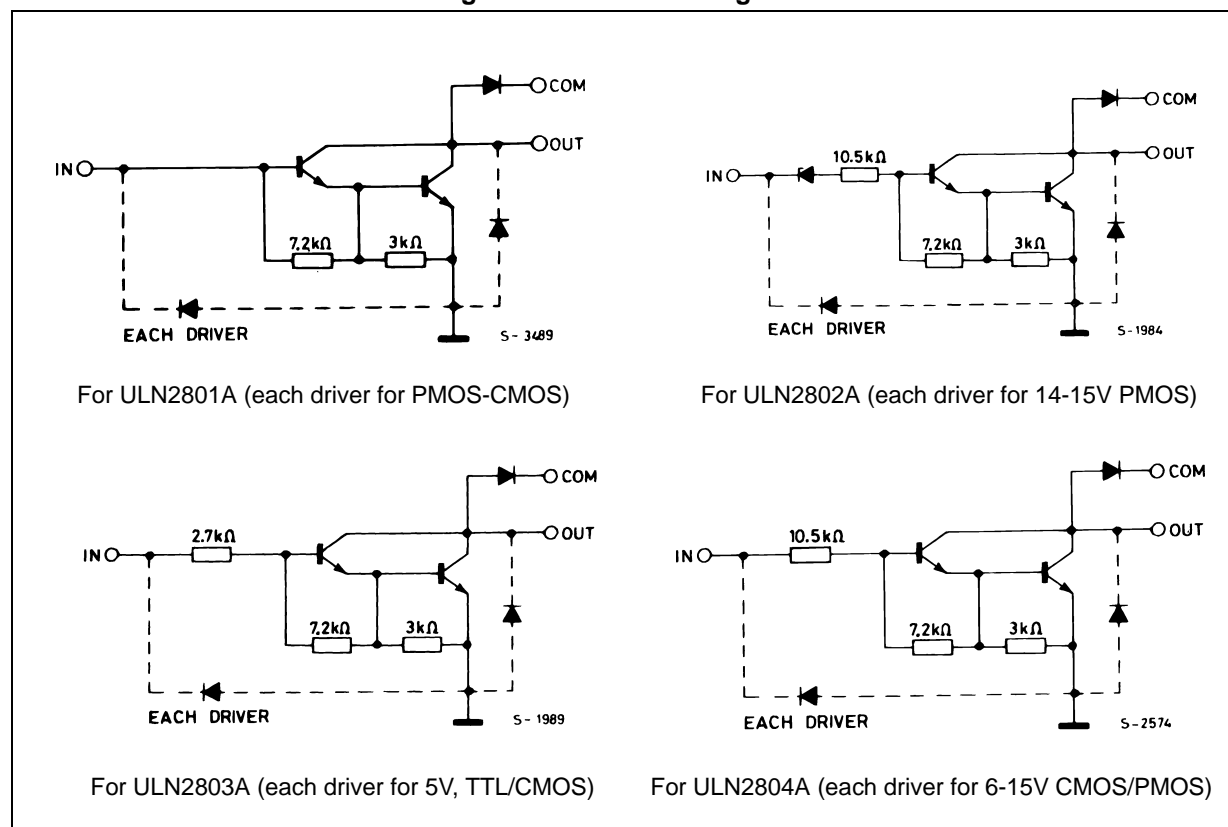
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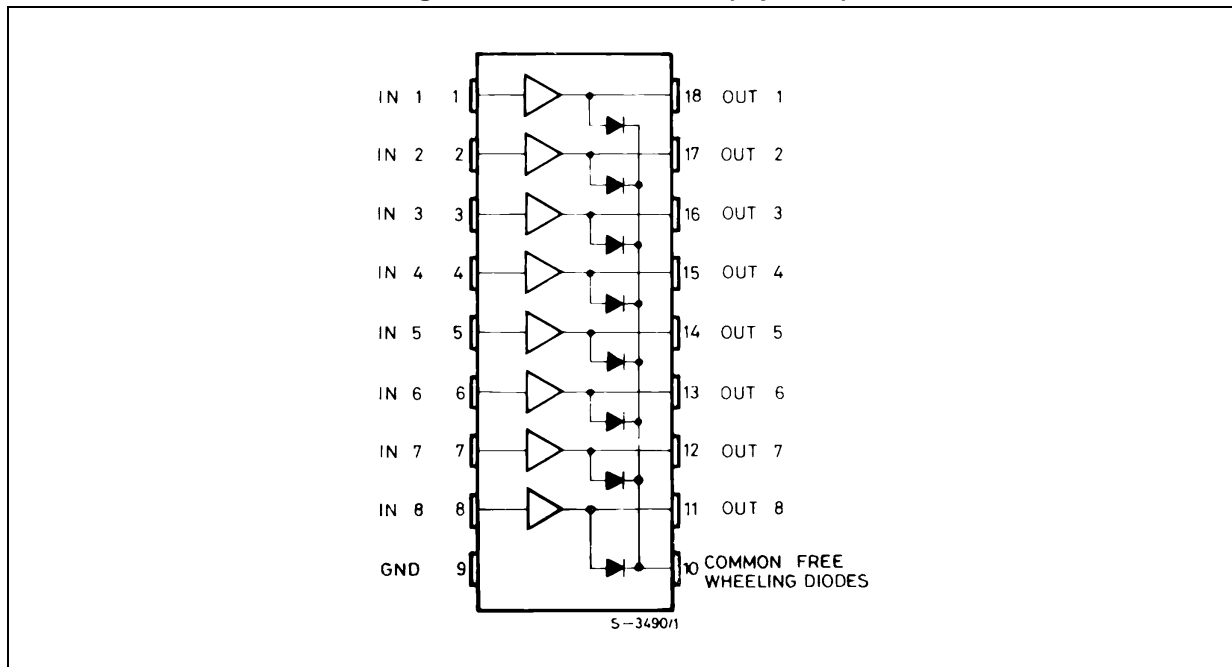
1 Diagram

Figure 1. Schematic diagrams



2 Pin configuration

Figure 2. Pin connections (top view)



3 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_O	Output voltage	50	V
V_I	Input voltage (for ULN2802A - ULN2803A - ULN2804A)	30	V
I_C	Continuous collector current	500	mA
I_B	Continuous base current	25	mA
P_{TOT}	Power Dissipation (one Darlington pair)	1	W
	Power Dissipation (total package)	2.25	
T_A	Operating ambient temperature range	- 20 to 85	°C
T_{STG}	Storage temperature range	- 55 to 150	°C
T_J	Junction temperature	-20 to 150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJA}	Thermal resistance junction-ambient	55	°C/W

4 Electrical characteristics

$T_A = 25\text{ °C}$ unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
I_{CEX}	Output leakage current	$V_{CE} = 50\text{ V}$				μA
		$T_A = 70\text{ °C}$, $V_{CE} = 50\text{ V}$ (Figure 3)			50	
		$T_A = 70\text{ °C}$ for ULN2802A, $V_{CE} = 50\text{ V}$, $V_I = 6\text{ V}$ (Figure 4)			100	
		$T_A = 70\text{ °C}$ for ULN2804A, $V_{CE} = 50\text{ V}$, $V_I = 1\text{ V}$ (Figure 4)			500	
$V_{CE(SAT)}$	Collector-emitter saturation voltage (Figure 5)	$I_C = 100\text{ mA}$, $I_B = 250\text{ }\mu\text{A}$		0.9	1.1	V
		$I_C = 200\text{ mA}$, $I_B = 350\text{ }\mu\text{A}$		1.1	1.3	
		$I_C = 350\text{ mA}$, $I_B = 500\text{ }\mu\text{A}$		1.3	1.6	
$I_{I(ON)}$	Input current (Figure 6)	for ULN2802A, $V_I = 17\text{ V}$		0.82	1.25	mA
		for ULN2803A, $V_I = 3.85\text{ V}$		0.93	1.35	
		for ULN2804A, $V_I = 5\text{ V}$		0.35	0.5	
		$V_I = 12\text{ V}$		1	1.45	
$I_{I(OFF)}$	Input current (Figure 7)	$T_A = 70\text{ °C}$, $I_C = 500\text{ }\mu\text{A}$	50	65		μA
$V_{I(ON)}$	Input voltage (Figure 8)	$V_{CE} = 2\text{ V}$, for ULN2802A $I_C = 300\text{ mA}$ for ULN2803A $I_C = 200\text{ mA}$ $I_C = 250\text{ mA}$ for ULN2804A $I_C = 125\text{ mA}$ $I_C = 200\text{ mA}$ $I_C = 275\text{ mA}$ $I_C = 350\text{ mA}$			13 2.4 2.7 3 5 6 7 8	V
h_{FE}	DC Forward current gain (Figure 5)	for ULN2801A, $V_{CE} = 2\text{ V}$, $I_C = 350\text{ mA}$	1000			
C_I	Input capacitance			15	25	pF
t_{PLH}	Turn-on delay time	0.5 V_I to 0.5 V_O		0.25	1	μs
t_{PHL}	Turn-off delay time	0.5 V_I to 0.5 V_O		0.25	1	μs
I_R	Clamp diode leakage current (Figure 9)	$V_R = 50\text{ V}$			50	μA
		$T_A = 70\text{ °C}$, $V_R = 50\text{ V}$			100	
V_F	Clamp diode forward voltage (Figure 10)	$I_F = 350\text{ mA}$		1.7	2	V

5 Test circuits

Figure 3. Output leakage current

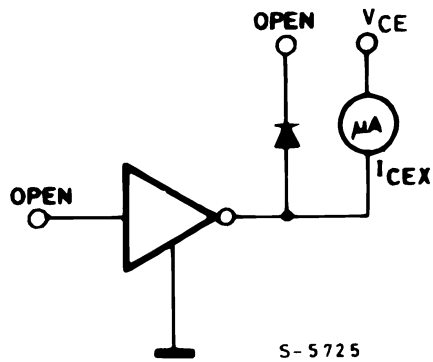


Figure 4. Output leakage current (for ULN2802A only)

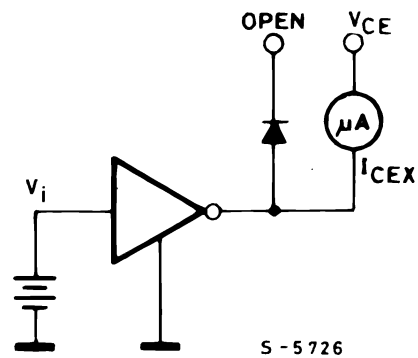


Figure 5. Collector-emitter saturation voltage

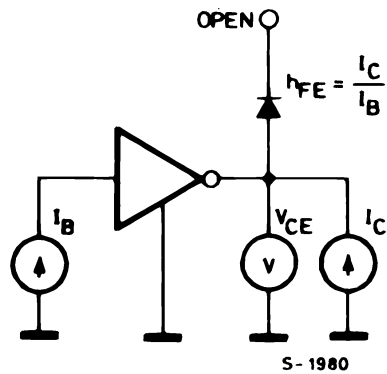


Figure 6. Input current (ON)

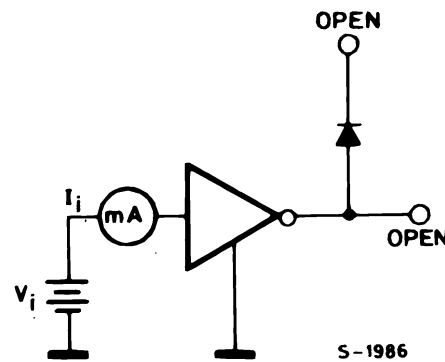


Figure 7. Input current (OFF)

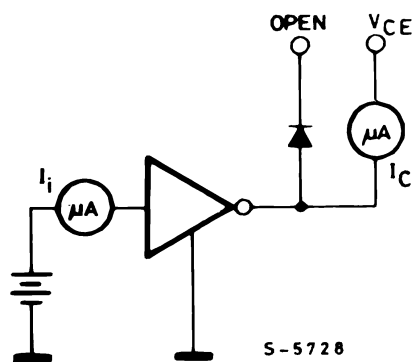


Figure 8. Input voltage

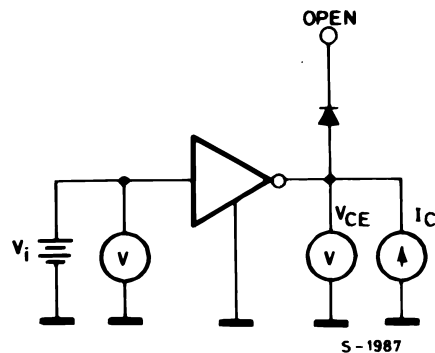


Figure 9. Clamp diode leakage current

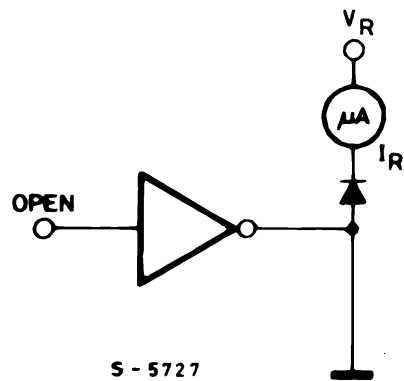
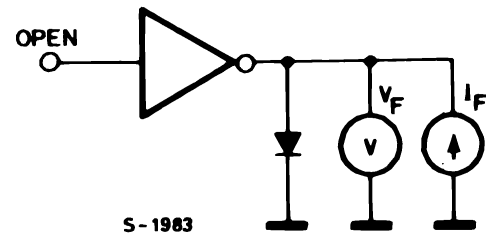


Figure 10. Clamp diode forward voltage



6 Typical performance characteristics

Figure 11. Collector current as a function of saturation voltage

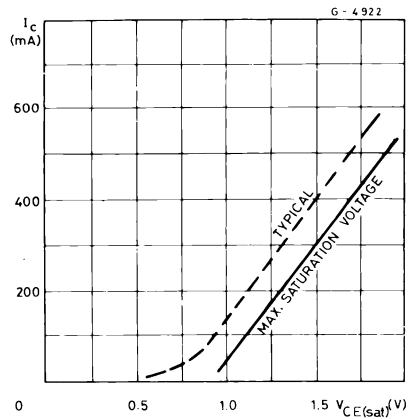


Figure 12. Collector current as a function of input current

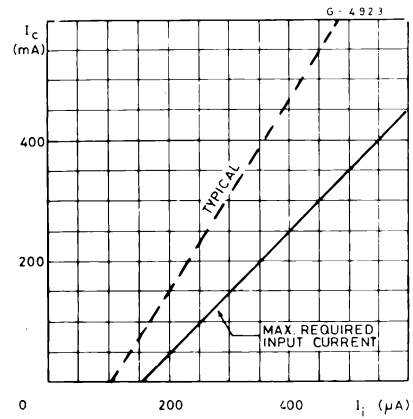


Figure 13. Allowable average power dissipation as a function of T_A

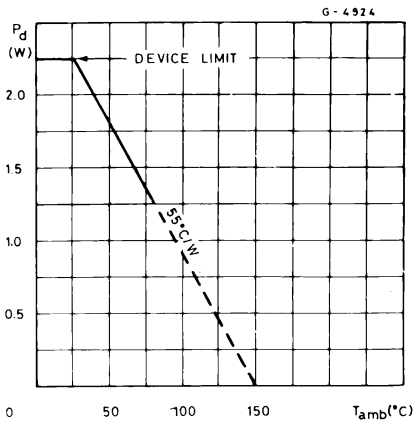


Figure 14. Peak collector current as a function of duty cycle

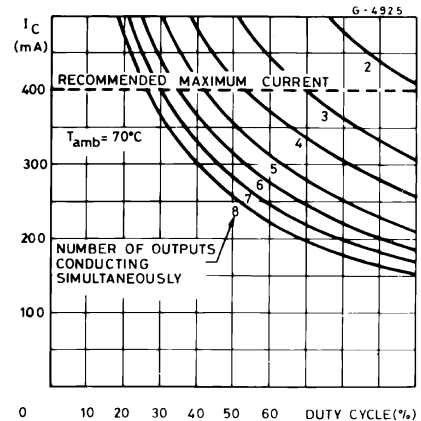
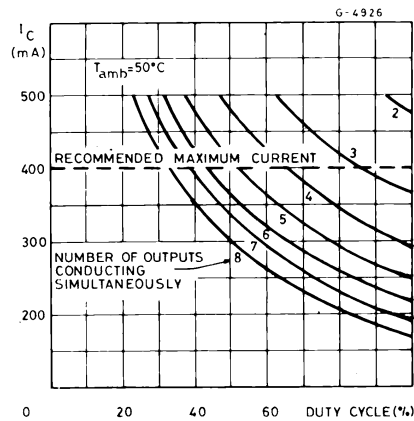
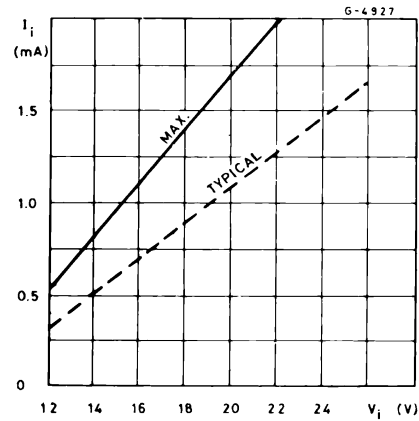
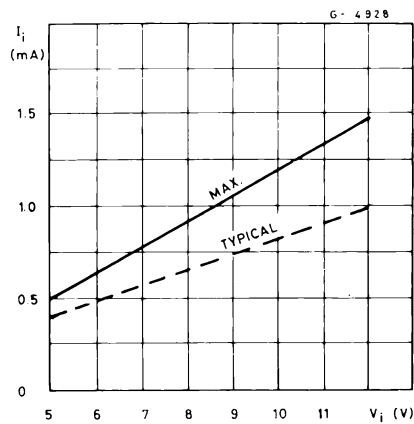
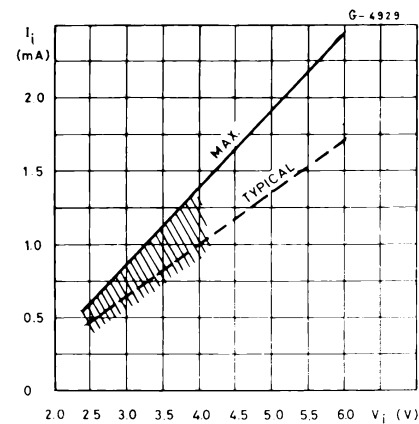


Figure 15. Peak collector current as a function of duty cycle**Figure 16. Input current as a function of input voltage (for ULN2802A)****Figure 17. Input current as a function of input voltage (for ULN2804A)****Figure 18. Input current as a function of input voltage (for ULN2803A)**

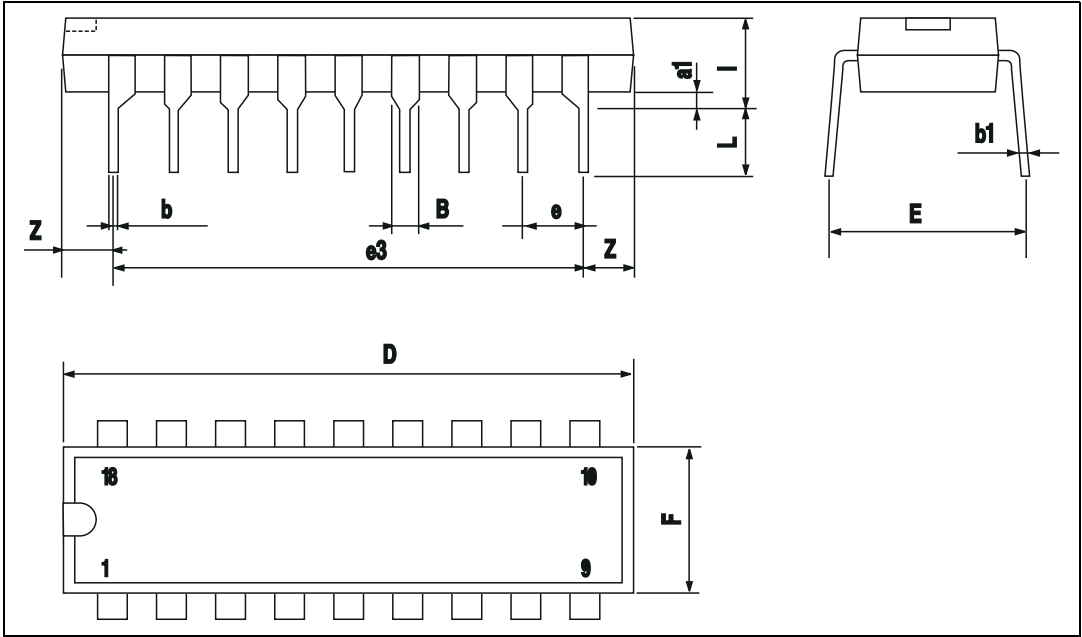
7 Package mechanical data

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Table 5. DIP-18 mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
a1	0.254		
B	1.39		1.65
b		0.46	
b1		0.25	
D			23.24
E		8.5	
e		2.54	
e3		20.32	
F			7.1
I			3.93
L		3.3	
Z		1.27	1.59

Figure 19. DIP-18 package dimensions



8 Revision history

Table 6. Document revision history

Date	Revision	Changes
18-Sep-2003	1	First release
10-Mar-2010	2	Updated package mechanical data
19-Nov-2012	3	Modified input voltage values Table 4 on page 6.
27-Jun-2018	4	Updated: $I_{I(ON)}$ test condition in Table 4: Electrical characteristics .

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