UTC ULN2803 LINEAR INTEGRATED CIRCUIT

EIGHT DARLINGTON ARRAYS

DESCRIPTION

The UTC ULN2803 is high-voltage, high-current Darlington drivers comprised of eight NPN Darlington pairs.

FEATURES
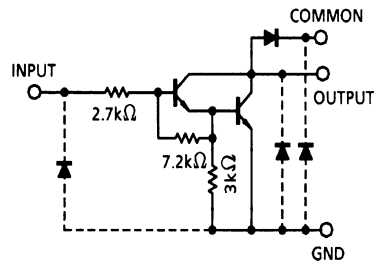
*Output current (single output) 500mA MAX.
*High sustaining voltage output 50V MIN.
*Output clamp diodes
*Inputs compatible with various types of logic

APPLICATIONS

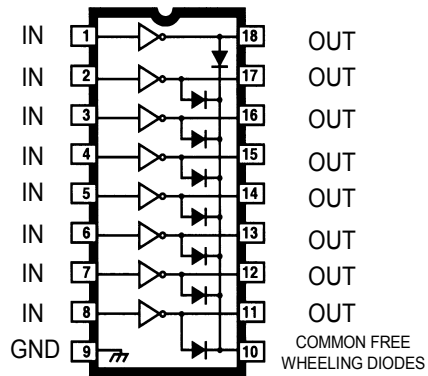*Relay, hammer, lamp and display (LED) drivers.

SOP-18

DIP-18
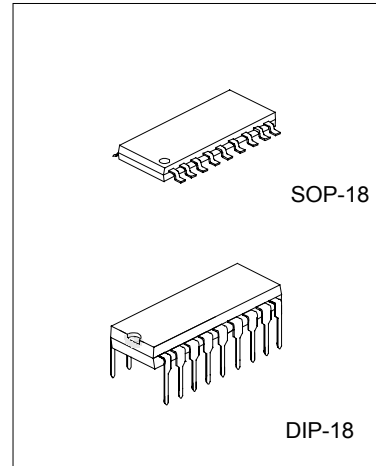
SCHEMATICS (EACH DRIVER)

Note: The input and output parasitic diodes cannot be used as clamp diodes.

PIN CONFIGURATIONS

IN	1	18	OUT
IN	2	17	OUT
IN	3	16	OUT
IN	4	15	OUT
IN	5	14	OUT
IN	6	13	OUT
IN	7	12	OUT
IN	8	11	OUT
GND	9	10	COMMON FREE WHEELING DIODES

UTC ULN2803   LINEAR INTEGRATED CIRCUIT

ABSOLUTE MAXIMUM RATINGS

| PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage	V_{IN}	-0.5~30	V
Output Sustaining Voltage	$V_{CE\,(SUS)}$	-0.5~50	V
Output Current	I_{OUT}	500	mA/ch
Clamp Diode Reverse Voltage	VR	50	V
Clamp Diode Forward Current	IF	500	mA
Power Dissipation	P_D	DIP: 1.47 SOP:0.54/0.625(Note)	W
Operating Ambient Temperature Range	T_{opr}	-40 to +85	°C
Storage Temperature Range	T_{Stg}	-55 to +150	°C

Note: On glass epoxy PCB (30x30x1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25 °C, Unless otherwise specified)

| PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	FIG
Output Leakage Current	I_{CEX}	V_{CE}=50V,T_A=25°C V_{CE}=50V,T_A=85°C			50 100	μA	1
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	I_{OUT}=350mA,I_{IN}=500μA I_{OUT}=200mA,I_{IN}=350μA I_{OUT}=100mA,I_{IN}=250μA		1.3 1.1 0.9	1.6 1.3 1.1	V	2
Input Current (output on)	$I_{IN(ON)}$	V_{IN}=3.85V,I_{OUT}=350mA		0.93	1.35	mA	3
Input Current (output off)	$I_{IN(OFF)}$	I_{OUT}=500μA,T_A=85°C	50	65		μA	4
Input Voltage (output on)	$V_{IN(ON)}$	V_{CE}=2.0V I_{OUT}=200mA I_{OUT}=250mA I_{OUT}=300mA			 2.4 2.7 3.0	V	5
Clamp Diode Reverse Current	IR	VR=50V, T_A=25°C VR=50V, T_A=85°C			50 100	μA	6
Clamp Diode Forward Voltage	VF	IF=350mA			2.0	V	7
Input Capacitance	C_{IN}			15	25	pF	-
Turn-On Delay	t_{ON}	V_{OUT}=50V,R_L=125Ω,CL=15pF		0.1	1	μS	8
Turn-Off Delay	t_{OFF}	V_{OUT}=50V,R_L=125Ω,CL=15pF		0.2	1	μS	8

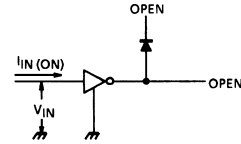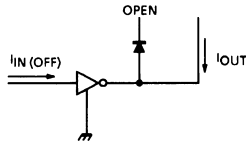# UTC ULN2803   LINEAR INTEGRATED CIRCUIT
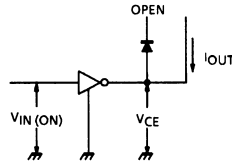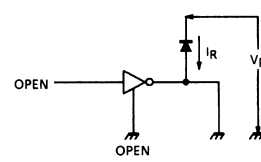
TEST CIRCUIT

1. I_{CEX}
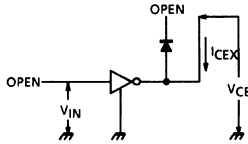
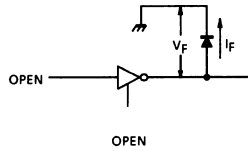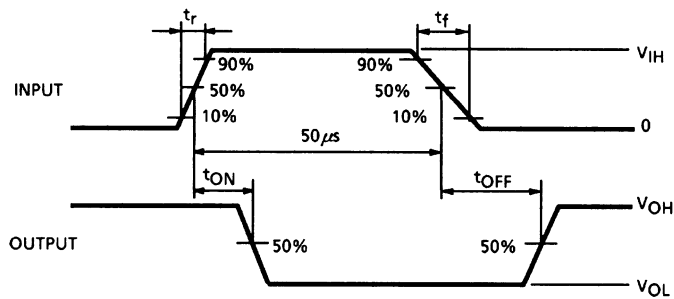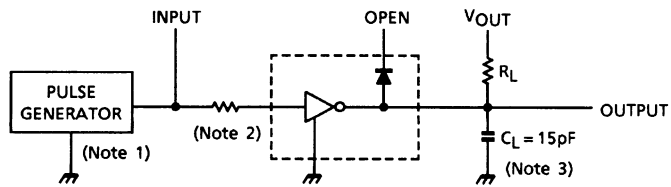2. $V_{CE (sat)}$, h_{FE}
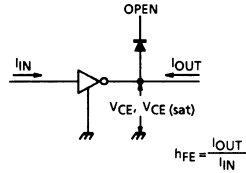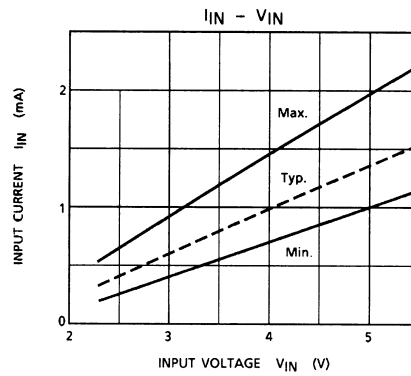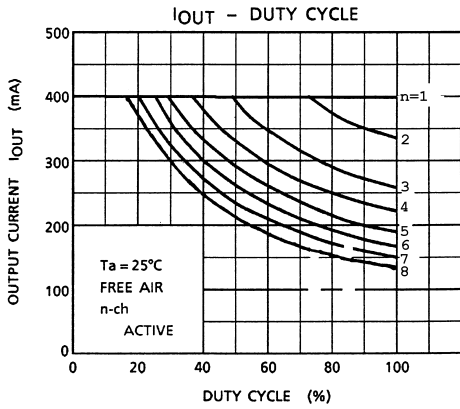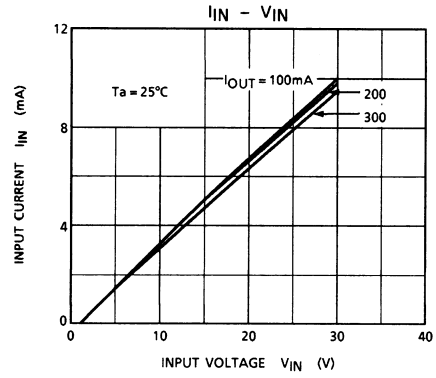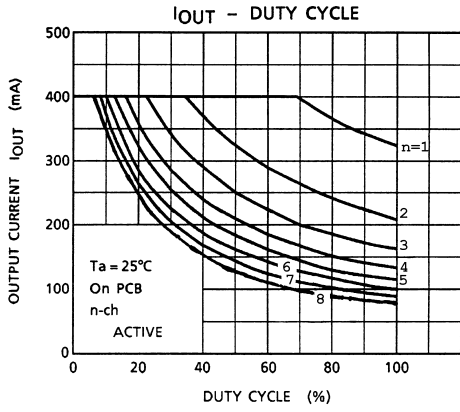
3. $I_{IN (ON)}$

4. $I_{IN (OFF)}$

5. $V_{IN (ON)}$

6. I_R

7. V_F

UTC ULN2803   LINEAR INTEGRATED CIRCUIT

8. tON, tOFF

Note1: Pulse width 50μs, duty cycle 10%
        Output impedance 50Ω, tr<=5ns, tf<=10ns
Note2: R1: 0, V$_{IH}$: 3V
Note3: CL includes probe and jig capacitance.

I_{OUT} – DUTY CYCLE

Graph: OUTPUT CURRENT I_{OUT} (mA) vs DUTY CYCLE (%)
Ta = 25°C, On PCB, n-ch, ACTIVE
Curves: n=1, 2, 3, 4, 5, 6, 7, 8

I_{IN} – V_{IN}

Graph: INPUT CURRENT I_{IN} (mA) vs INPUT VOLTAGE V_{IN} (V)
Ta = 25°C, I_{OUT} = 100mA, 200, 300

I_{OUT} – DUTY CYCLE

Graph: OUTPUT CURRENT I_{OUT} (mA) vs DUTY CYCLE (%)
Ta = 25°C, FREE AIR, n-ch, ACTIVE
Curves: n=1, 2, 3, 4, 5, 6, 7, 8

I_{IN} – V_{IN}

Graph: INPUT CURRENT I_{IN} (mA) vs INPUT VOLTAGE V_{IN} (V)
Max. Typ. Min.

$I_{OUT} - I_{IN}$

OUTPUT CURRENT I_{OUT} (mA)

Recommended Maximum Rating

$T_a = 75°C$ 25   30

$V_{CE} = 2V$

INPUT CURRENT I_{IN} (μA)

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

OUTPUT CURRENT I_{OUT} (mA)

Typ.

25°C Max.

COLLECTOR-EMITTER SATURATION VOLTAGE V_{CE} (sat) (V)

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

OUTPUT CURRENT I_{OUT} (mA)

$I_{IN} = 500\mu$A

$T_a = 85°C$

25
- 30

COLLECTOR-EMITTER SATURATION VOLTAGE V_{CE} (sat) (V)

$I_F - V_F$

CLAMP DIODE FORWARD CURRENT I_F (mA)

$T_a = 25°C$

CLAMP DIODE FORWARD VOLTAGE V_F (V)

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UTC ULN2803   LINEAR INTEGRATED CIRCUIT

hFE – IOUT

PD – Ta

① Type-AP free air
② Type-AFW on glass epoxy PCB 30×30×1.6mm Cu 50%
③ Type-AFW free air