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ULN2803

LINEAR INTEGRATED CIRCUIT

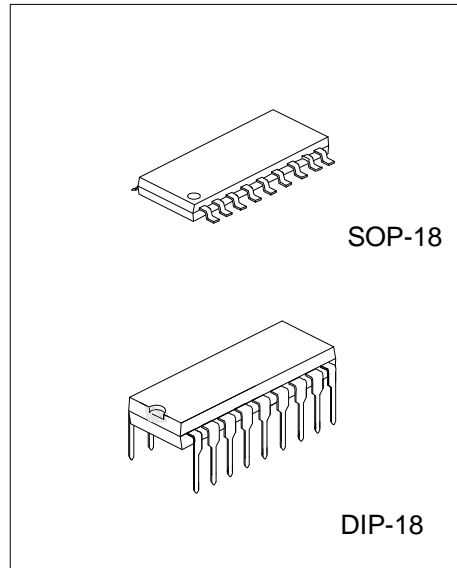
EIGHT DARLINGTON ARRAYS

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

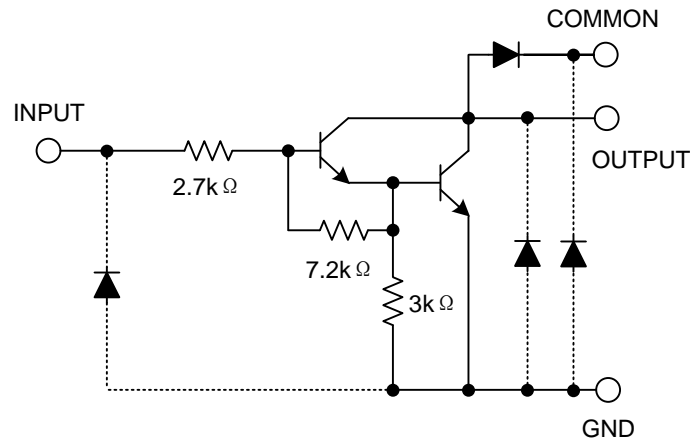


ORDERING INFORMATION

| Ordering Number | | | Package | Packing |
|-----------------|----------------|----------------|---------|-----------|
| Normal | Lead Free | Halogen Free | | |
| ULN2803-D18-T | ULN2803L-D18-T | ULN2803G-D18-T | DIP-18 | Tube |
| ULN2803-S18-R | ULN2803L-S18-R | ULN2803G-S18-R | SOP-18 | Tape Reel |
| ULN2803-S18-T | ULN2803L-S18-T | ULN2803G-S18-T | SOP-18 | Tube |

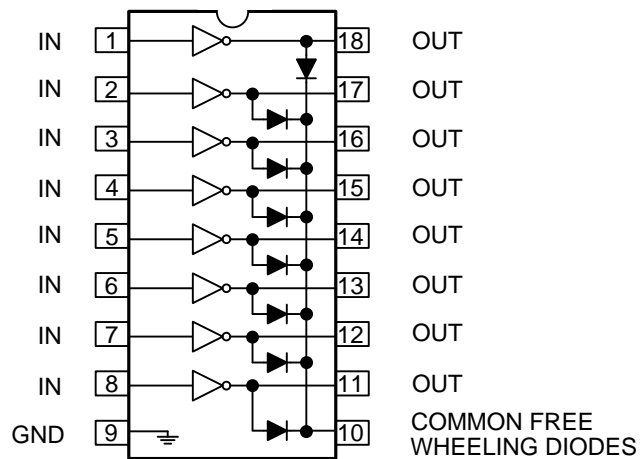
| | |
|--|--|
| <p>ULN2803L-D18-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p> | <p>(1) T: Tube, R: Tape Reel (2) D18: DIP-18, S18: SOP-18 (3)G: Halogen Free L: Lead Free , Blank: Pb/Sn</p> |
|--|--|

■ SCHEMATICS (EACH DRIVER)



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

■ PIN CONFIGURATIONS



■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | 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 | | V_R | 50 | V |
| Clamp Diode Forward Current | | I_F | 500 | mA |
| Power Dissipation | DIP-18 | P_D | 1.47 | W |
| | SOP-18 | | 0.54/0.625(Note) | |
| Operating Temperature | | T_{OPR} | -40 ~ +85 | °C |
| Storage Temperature | | T_{STG} | -40 ~ +150 | °C |

Note 1. On glass epoxy PCB (30x30x1.6mm Cu 50%)

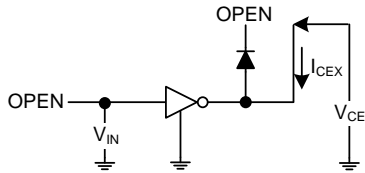
2. Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified.)

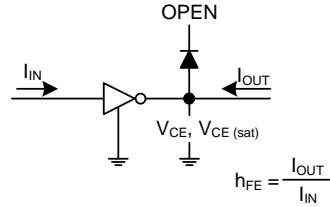
| PARAMETER | | SYMBOL | TEST CIRCUIT | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------|-----|---------------|--------------|--|-----|-------------------|-------------------|---------|
| Output Leakage Current | | I_{CEX} | 1 | $V_{CE}=50V, T_a=25^\circ C$ $V_{CE}=50V, T_a=85^\circ C$ | | | 50 100 | μA |
| Collector-Emitter Saturation Voltage | | $V_{CE(SAT)}$ | 2 | $I_{OUT}=350mA, I_{IN}=500\mu A$ $I_{OUT}=200mA, I_{IN}=350\mu A$ $I_{OUT}=100mA, I_{IN}=250\mu A$ | | 1.3 1.1 0.9 | 1.6 1.3 1.1 | V |
| Input Current | ON | $I_{IN(ON)}$ | 3 | $V_{IN}=3.85V, I_{OUT}=350mA$ | | 0.93 | 1.35 | mA |
| | OFF | $I_{IN(OFF)}$ | 4 | $I_{OUT}=500\mu A, T_a=85^\circ C$ | 50 | 65 | | μA |
| Input Voltage (output on) | | $V_{IN(ON)}$ | 5 | $V_{CE}=2.0V$ $I_{OUT}=200mA$ $I_{OUT}=250mA$ $I_{OUT}=300mA$ | | | 2.4 2.7 3.0 | V |
| Clamp Diode Reverse Current | | I_R | 6 | $V_R=50V, T_a=25^\circ C$ $V_R=50V, T_a=85^\circ C$ | | | 50 100 | μA |
| Clamp Diode Forward Voltage | | V_F | 7 | $I_F=350mA$ | | | 2.0 | V |
| Input Capacitance | | C_{IN} | | | | 15 | 25 | pF |
| Turn-On Delay | | t_{ON} | 8 | $V_{OUT}=50V, R_L=125\Omega, C_L=15pF$ | | 0.1 | 1 | μS |
| Turn-Off Delay | | t_{OFF} | 8 | $V_{OUT}=50V, R_L=125\Omega, C_L=15pF$ | | 0.2 | 1 | μS |

■ TEST CIRCUIT

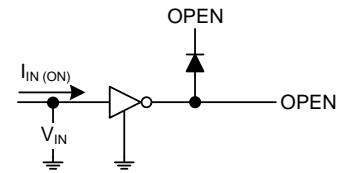
1. I_{CEX}



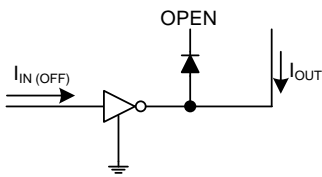
2. $V_{CE(sat)}$, h_{FE}



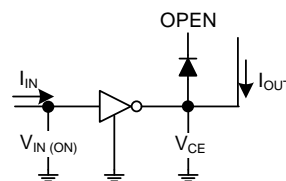
3. $I_{IN(ON)}$



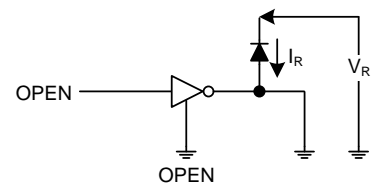
4. $I_{IN(OFF)}$



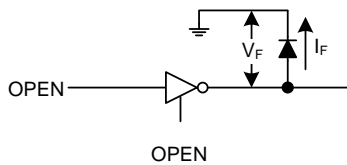
5. $V_{IN(ON)}$



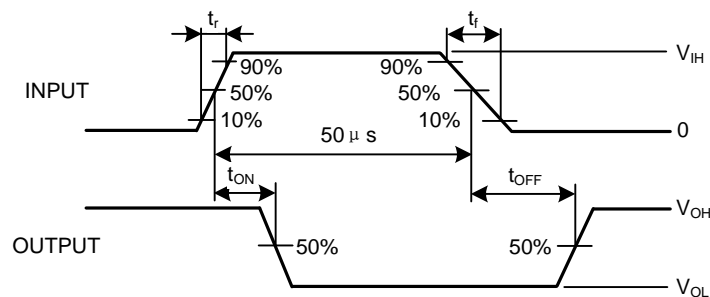
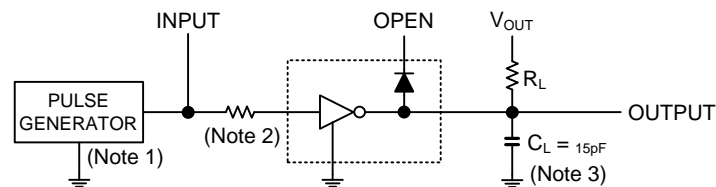
6. I_R



7. V_F



8. t_{ON} , t_{OFF}



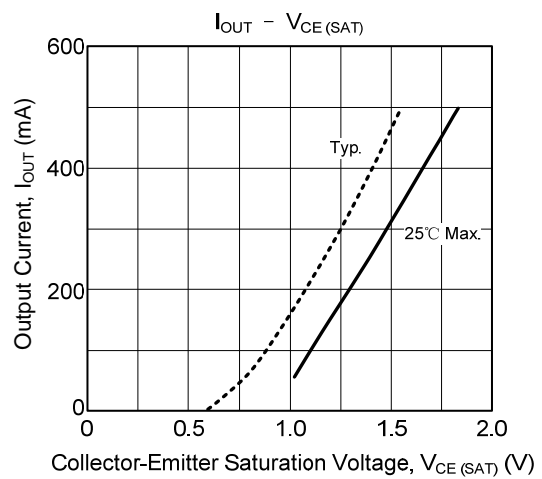
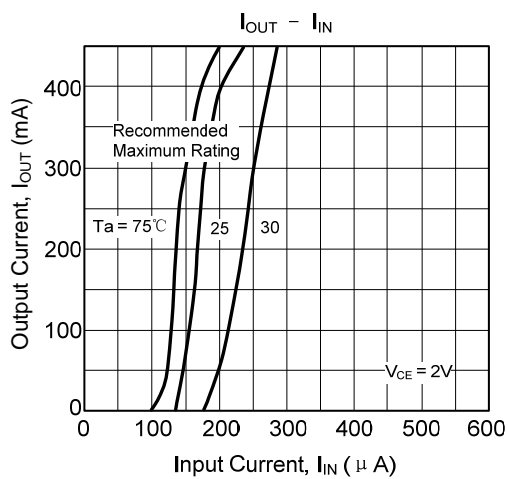
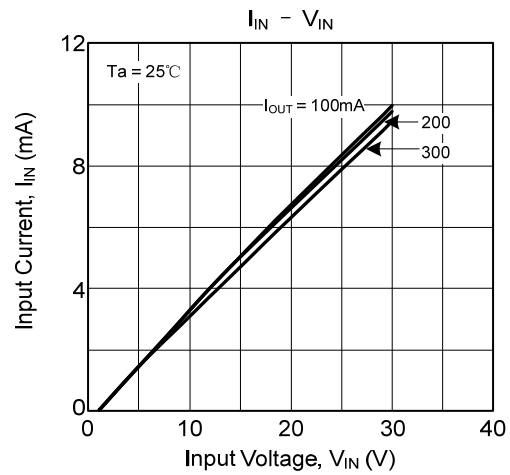
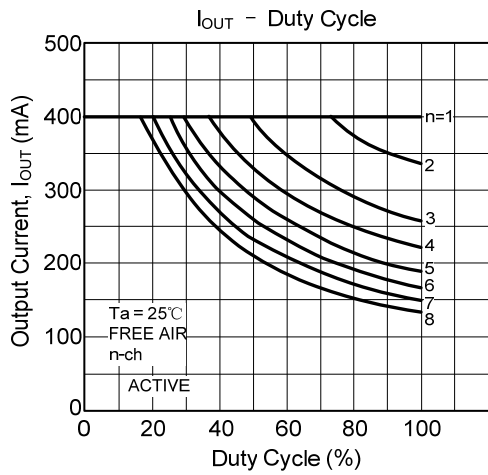
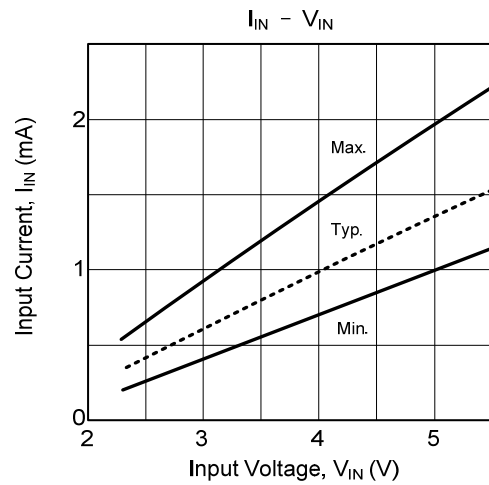
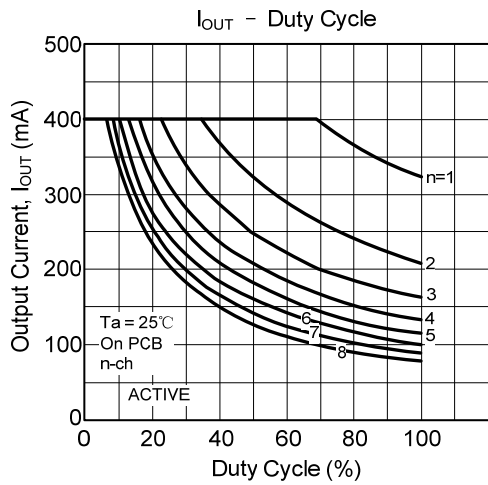
Note1: Pulse width 50 μ s, duty cycle 10%

Output impedance 50 Ω , $t_r \leq 5$ ns, $t_f \leq 10$ ns

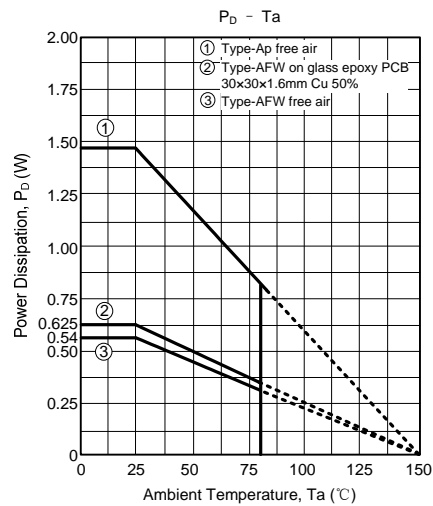
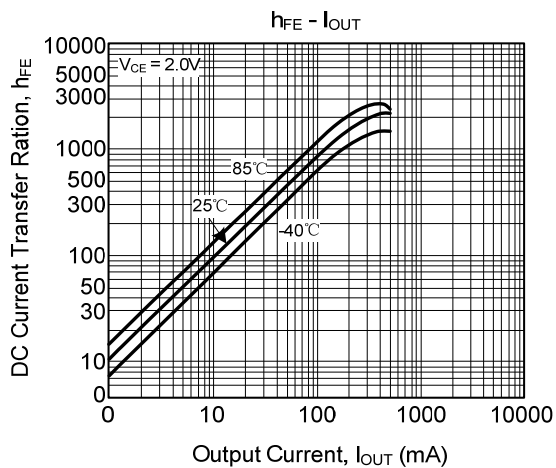
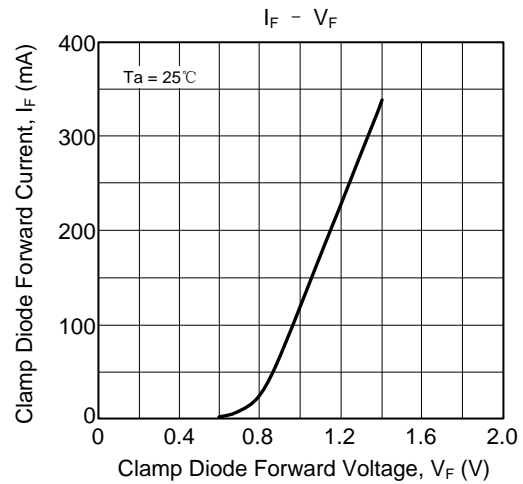
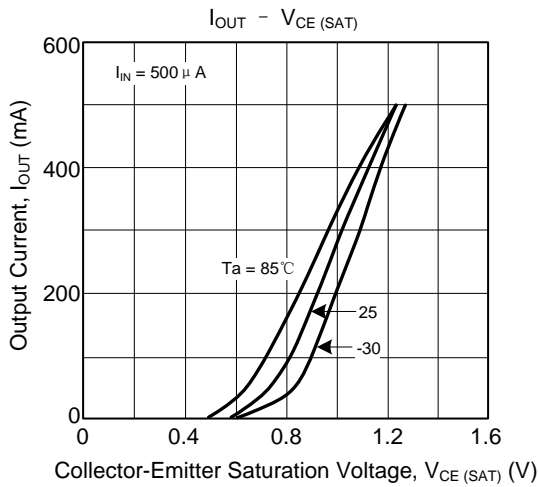
Note2: $R_1 = 0$, $V_{IH} = 3$ V

Note3: C_L includes probe and jig capacitance.

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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