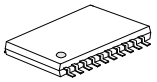
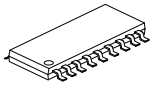
ULN2803M1

LINEAR INTEGRATED CIRCUIT

EIGHT DARLINGTON ARRAYS



SOP-20



SOP-18

■ DESCRIPTION

The UTC **ULN2803M1** is high-voltage, high-current Darlington drivers comprised of eight NPN Darlington pairs.

■ FEATURES

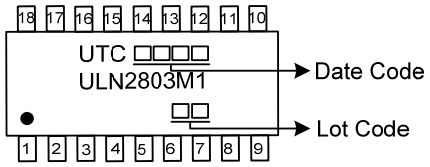
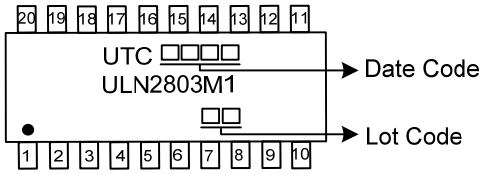
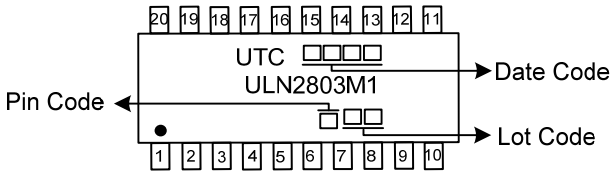
* MSL1 Robust Package Design
* Output current (single output) 500mA MAX.
* High sustaining voltage output 50V MIN.
* Output clamp diodes
* Inputs compatible with various types of logic
* Green & Pb free

■ ORDERING INFORMATION

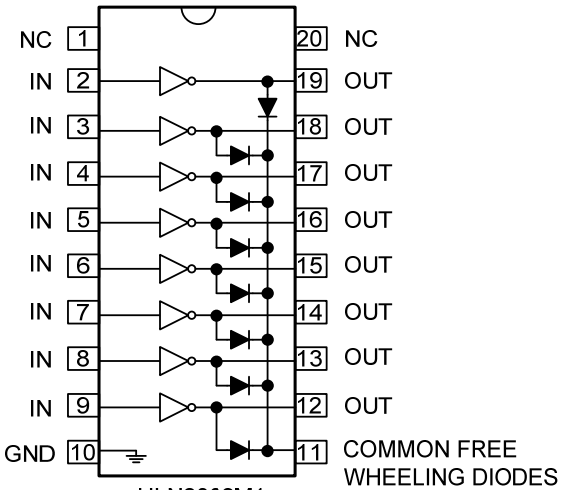
Ordering Number	Package	Packing
ULN2803M1-S18-R	SOP-18	Tape Reel
ULN2803M1-S20-R	SOP-20	Tape Reel
ULN2803M1-S20-A-R	SOP-20	Tape Reel

ULN2803M1-S20-A-R (1)Packing Type (2)Pin Code (3)Package Type	(1) T: Tube, R: Tape Reel (2) A: refer to PIN CONFIGURATIONS (3) S18: S18, S20: SOP-20

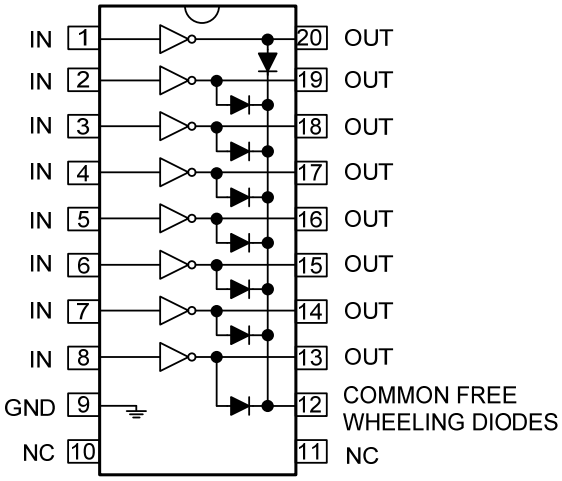
■ MARKING

PACKAGE	MARKING
SOP-18	
SOP-20 (For ULN2803M1)	
SOP-20 (For ULN2803M1-A)	

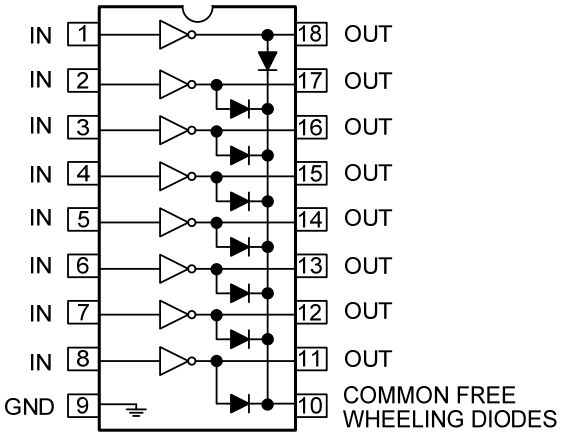
■ PIN CONFIGURATIONS



ULN2803M1
SOP-20

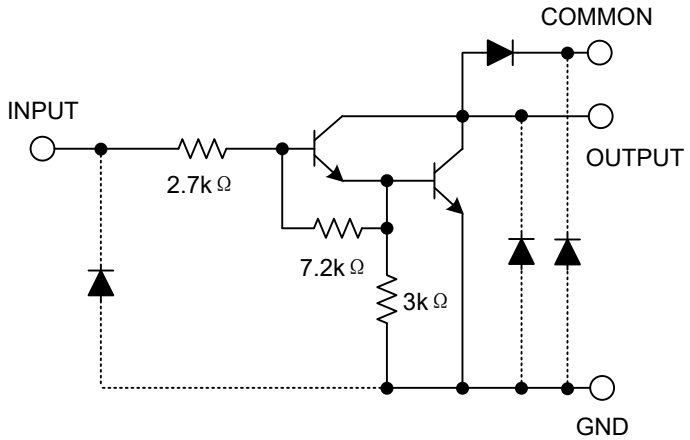


ULN2803M1-A
SOP-20



ULN2803M1
SOP-18

■ SCHEMATICS (EACH DRIVER)



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

■ 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	P_D	0.92 / 1.31 (Note 2)	W
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-40 ~ +150	°C

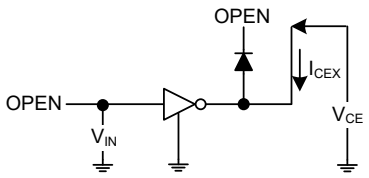
Notes: 1. Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.
2. On glass epoxy PCB (75x144x1.6mm Cu 20%).

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

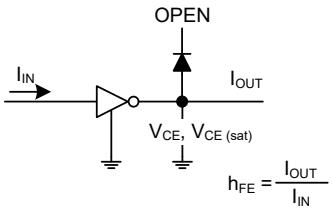
PARAMETER		SYMBOL	TEST CIRCUIT	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Leakage Current		I_{CEX}	1	V_{CE}=50V,T_A=25°C V_{CE}=50V,T_A=85°C			50 100	μA
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	2	I_{OUT}=350mA,I_{IN}=500μA I_{OUT}=200mA,I_{IN}=350μA I_{OUT}=100mA,I_{IN}=250μA		1.3 1.1 0.9	1.6 1.3 1.1	V
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}=500μA, T_A=85°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°C V_R=50V, T_A=85°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=125Ω,C_L=15pF		0.1	1	μS
Turn-Off Delay		t_{OFF}	8	V_{OUT}=50V,R_L=125Ω,C_L=15pF		0.2	1	μS

■ TEST CIRCUIT

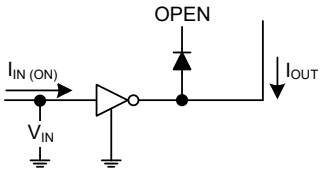
1. I_{CEX}



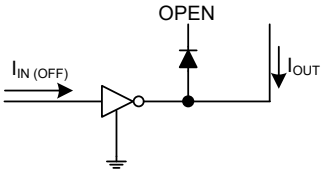
2. $V_{CE\ (sat)}$, h_{FE}



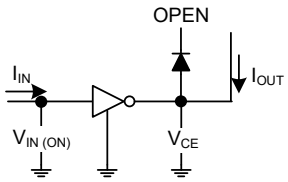
3. $I_{IN\ (ON)}$



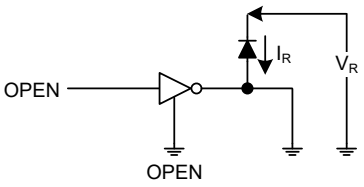
4. $I_{IN\ (OFF)}$



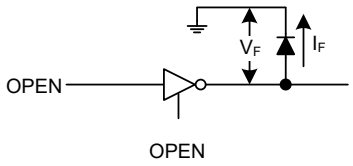
5. $V_{IN\ (ON)}$



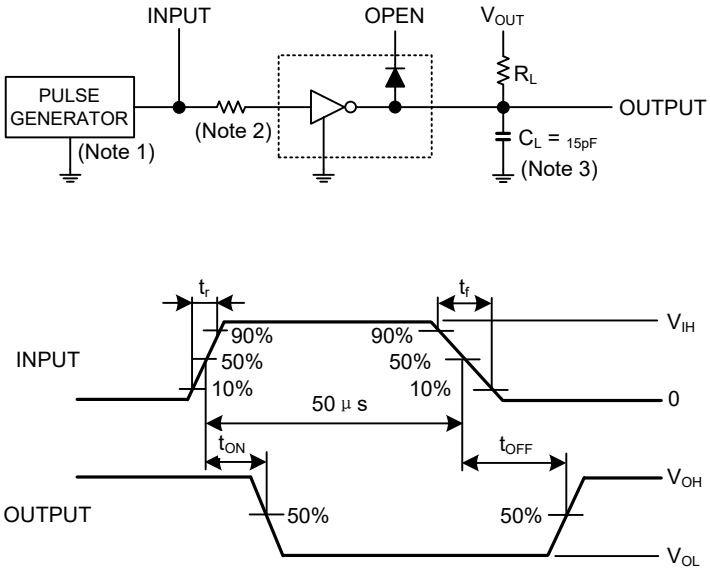
6. I_R



7. V_F



8. t_{ON}, t_{OFF}



Notes: 1. Pulse width 50μs, duty cycle 10%
Output impedance 50Ω, tr<=5ns, tf<=10ns
2. R1: 0, V_{IH}: 3V
3. C_L includes probe and jig capacitance.

■ TYPICAL CHARACTERISTICS