

1. DESCRIPTION

The XL2803AG and XL/XD2804 Series are high-voltage, high-current darlington drivers comprised of eight NPN darlington pairs.

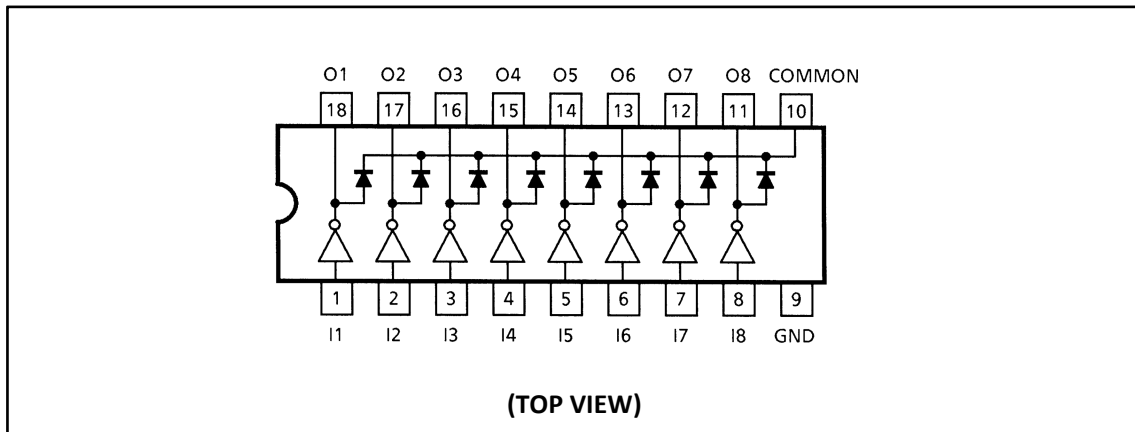
All units feature integral clamp diodes for switching inductive loads.

Applications include relay, hammer, lamp and display (LED) drivers.

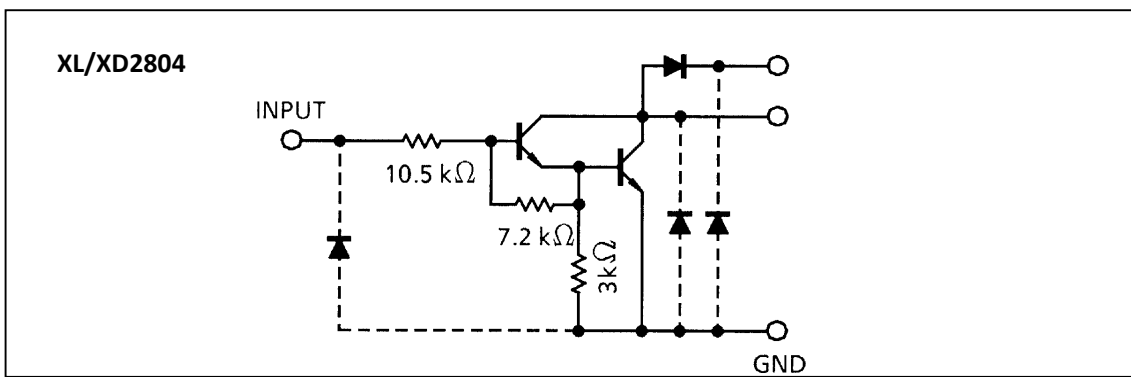
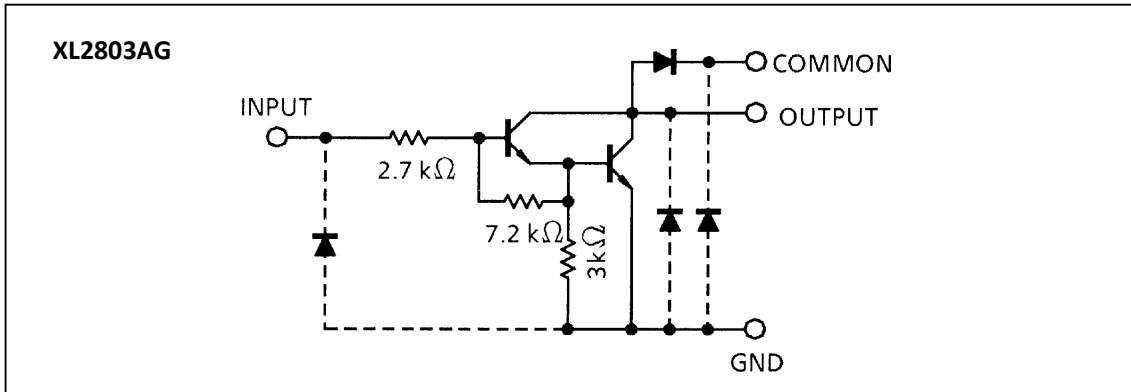
2. FEATURES

- Output current (single output)
500 mA (Max.)
- High sustaining voltage output
50 V (Min.)
- Output clamp diodes
- Inputs compatible with various types of logic.
- Package Type-XD : DIP-18pin
- Package Type-XL : SOP-18pin

3. PIN CONFIGURATIONS AND FUNCTIONS



4. SCHEMATICS



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

5. SPECIFICATIONS

5.1. Absolute Maximum Ratings

Characteristic		Symbol	Rating	Unit
Output sustaining voltage		V _{CE(SUS)}	-0.5 ~ 50	V
Output current		I _{OUT}	500	mA / ch
Input voltage		V _{IN}	-0.5~30	V
Clamp diode reverse voltage		V _R	50	V
Clamp diode forward current		I _F	500	mA
Power dissipation	XD	P _D	1.47	W
	XL		0.92 / 1.31 (Note)	
Operating temperature		T _{opr}	-40~85	°C
Storage temperature		T _{stg}	-55~150	°C

Note: On Glass Epoxy PCB (75 × 114 × 1.6 mm Cu 20%)

5.2. Recommended Operating Conditions

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Output sustaining voltage		V _{CE(SUS)}		0	—	50	V
Output current	XD	I _{OUT}	T _{pw} = 25 ms, Duty = 10%, 8 Circuits	0	—	347	mA / ch
			T _{pw} = 25 ms, Duty = 50%, 8 Circuits	0	—	123	
	XL		T _{pw} = 25 ms, Duty = 10%, 8 Circuits	0	—	268	
			T _{pw} = 25 ms, Duty = 50%, 8 Circuits	0	—	90	
Input voltage		V _{IN}		0	—	30	V
Input voltage (Output on)	XL2803AG	V _{IN(ON)}		3.5	—	30	V
	XL/XD2804			8	—	30	
Clamp diode reverse voltage		V _R		—	—	50	V
Clamp diode forward current		I _F		—	—	400	mA
Power dissipation	XD	P _D	T _a = 85°C	—	—	0.76	W
	XL		T _a = 85°C (Note)	—	—	0.48	

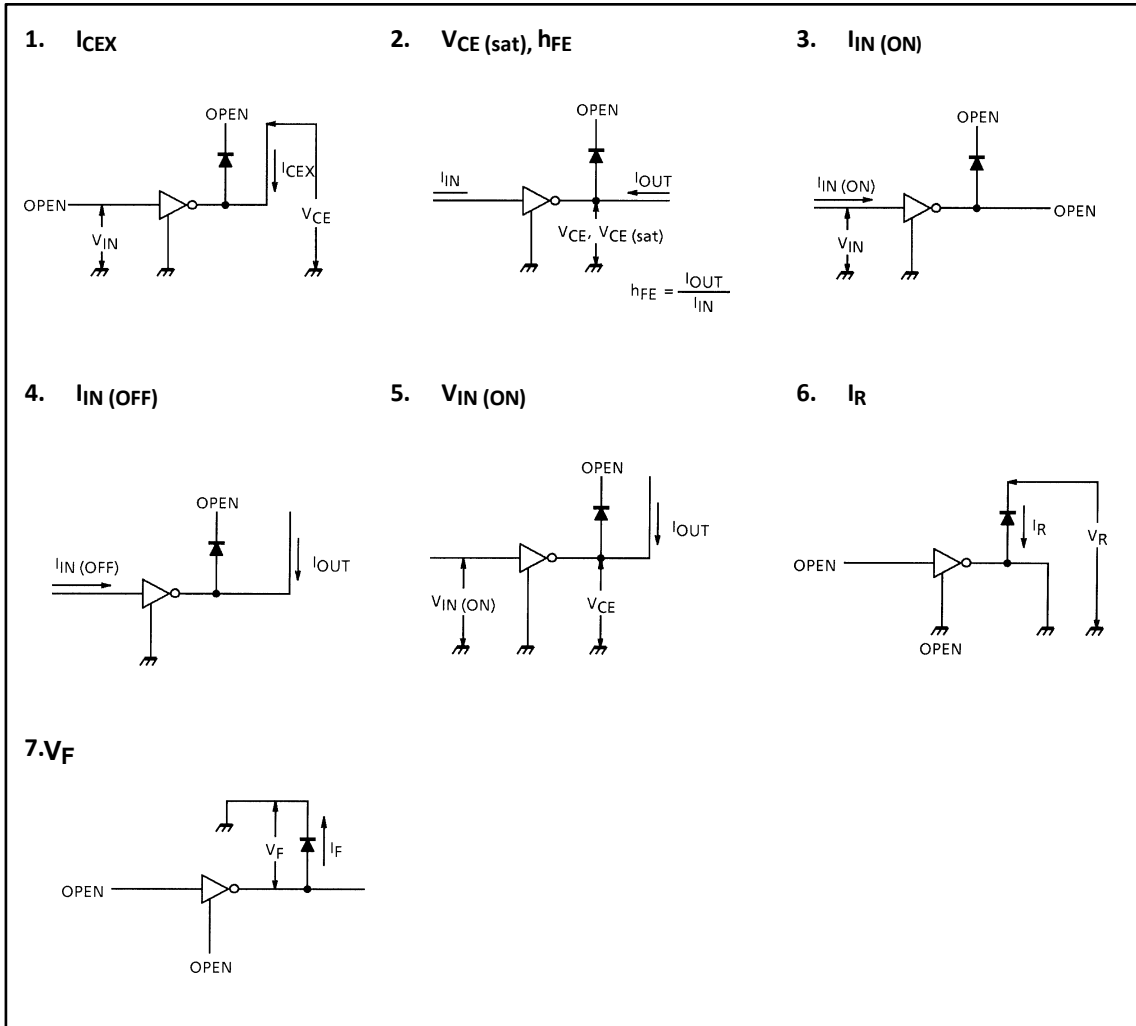
Note: On Glass Epoxy PCB (75 × 114 × 1.6 mm Cu 20%)

5.3. Electrical Characteristics

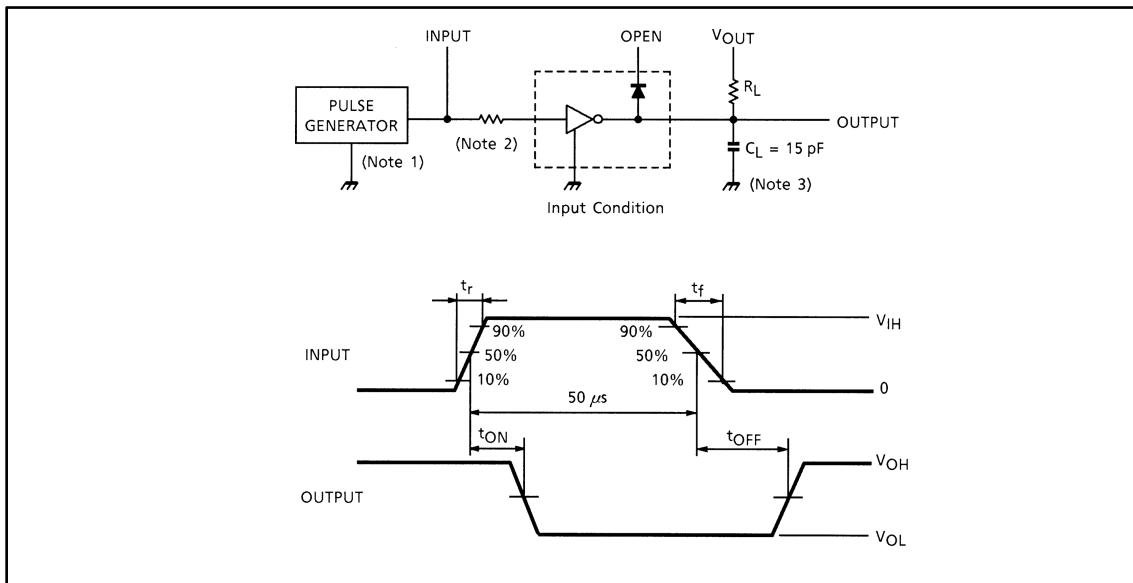
Characteristic		Symbol	Test Circuit	Test Condition		Min	Typ.	Max	Unit
Output leakage current	XL/XD2804	ICEX	1	VCE = 50 V	Ta = 25°C	—	—	50	μA
				VCE = 50 V	Ta = 85°C	—	—	100	
				VCE = 50 V	VIN = 1 V	—	—	500	
Collector-emitter saturation voltage		VCE (sat)	2	IOUT = 350 mA, IIN = 500 μA		—	1.3	1.6	V
				IOUT = 200 mA, IIN = 350 μA		—	1.1	1.3	
				IOUT = 100 mA, IIN = 250 μA		—	0.9	1.1	
Input current	XL2803AG	IIN (ON)	2	VIN = 3.85 V		—	0.93	1.35	mA
	XL/XD2804			VIN = 5 V		—	0.35	0.5	
				VIN = 12 V		—	1.0	1.45	
		IIN (OFF)	4	IOUT = 500 μA, Ta = 85°C		50	65	—	μA
Input voltage (Output on)	XL2803AG	VIN (ON)	5	VCE = 2 V, IOUT = 200 mA		—	—	2.4	V
				VCE = 2 V, IOUT = 250 mA		—	—	2.7	
				VCE = 2 V, IOUT = 300 mA		—	—	3.0	
	XL/XD2804			VCE = 2 V, IOUT = 125 mA		—	—	5.0	
				VCE = 2 V, IOUT = 200 mA		—	—	6.0	
				VCE = 2 V, IOUT = 275 mA		—	—	7.0	
				VCE = 2 V, IOUT = 350 mA		—	—	8.0	
DC current transfer ratio		hFE	2	VCE = 2 V, IOUT = 350 mA		1000	—	—	
Clamp diode reverse current		IR	6	Ta = 25°C (Note)		—	—	50	μA
				Ta = 85°C (Note)		—	—	100	
Clamp diode forward voltage		VF	7	IF = 350 mA		—	—	2.0	V
Input capacitance		CIN	—			—	15	—	pF
Turn-on delay		tON	8	RL = 125 Ω, VOUT = 50 V		—	0.1	—	μs
Turn-off delay		tOFF		RL = 125 Ω, VOUT = 50 V		—	0.2	—	

Note: VR = VR MAX.

5.4. Test Circuit



6. tON, tOFF



Note 1: Pulse Width $50 \mu\text{s}$, Duty Cycle 10%

Output Impedance 50Ω , $t_r \leq 5 \text{ ns}$, $t_f \leq 10 \text{ ns}$

Note 2: See below.

Input Condition

Type Number	R1	V_{IH}
XL2803AG	0Ω	3 V
XL/XD2804	0Ω	8 V

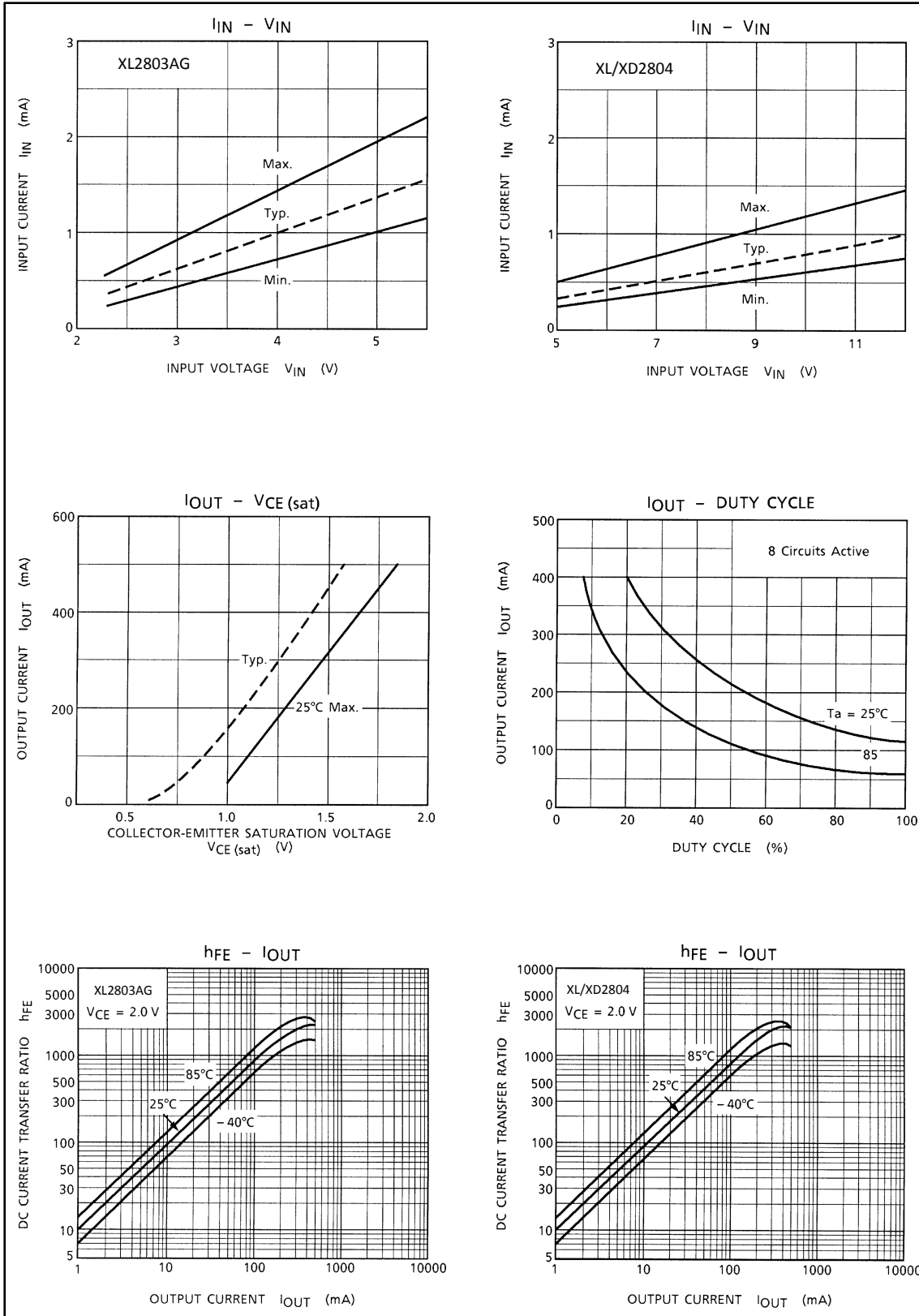
Note 3: C_L includes probe and jig capacitance

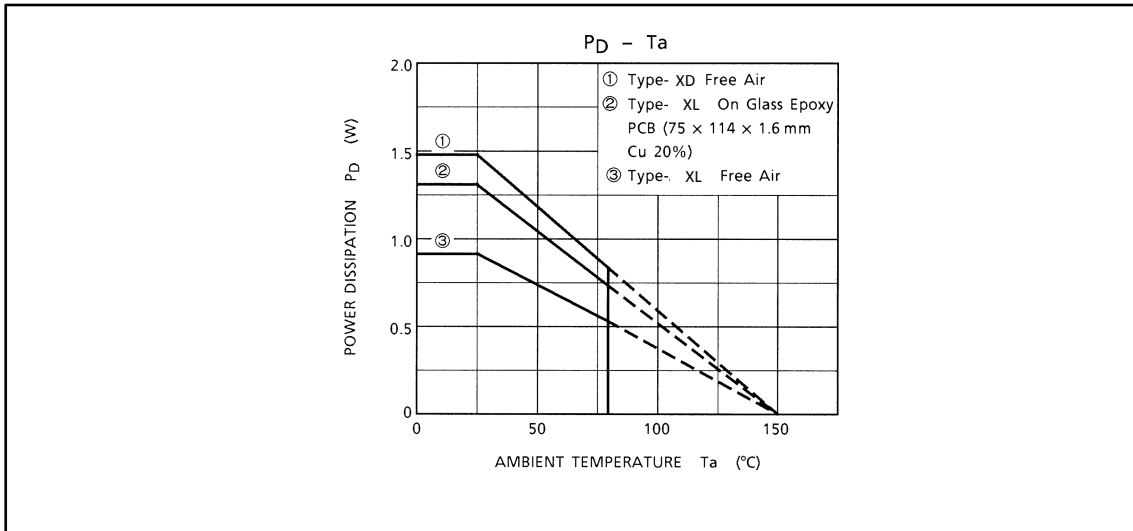
6.1. Precautions for Using

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.

Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.

Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding



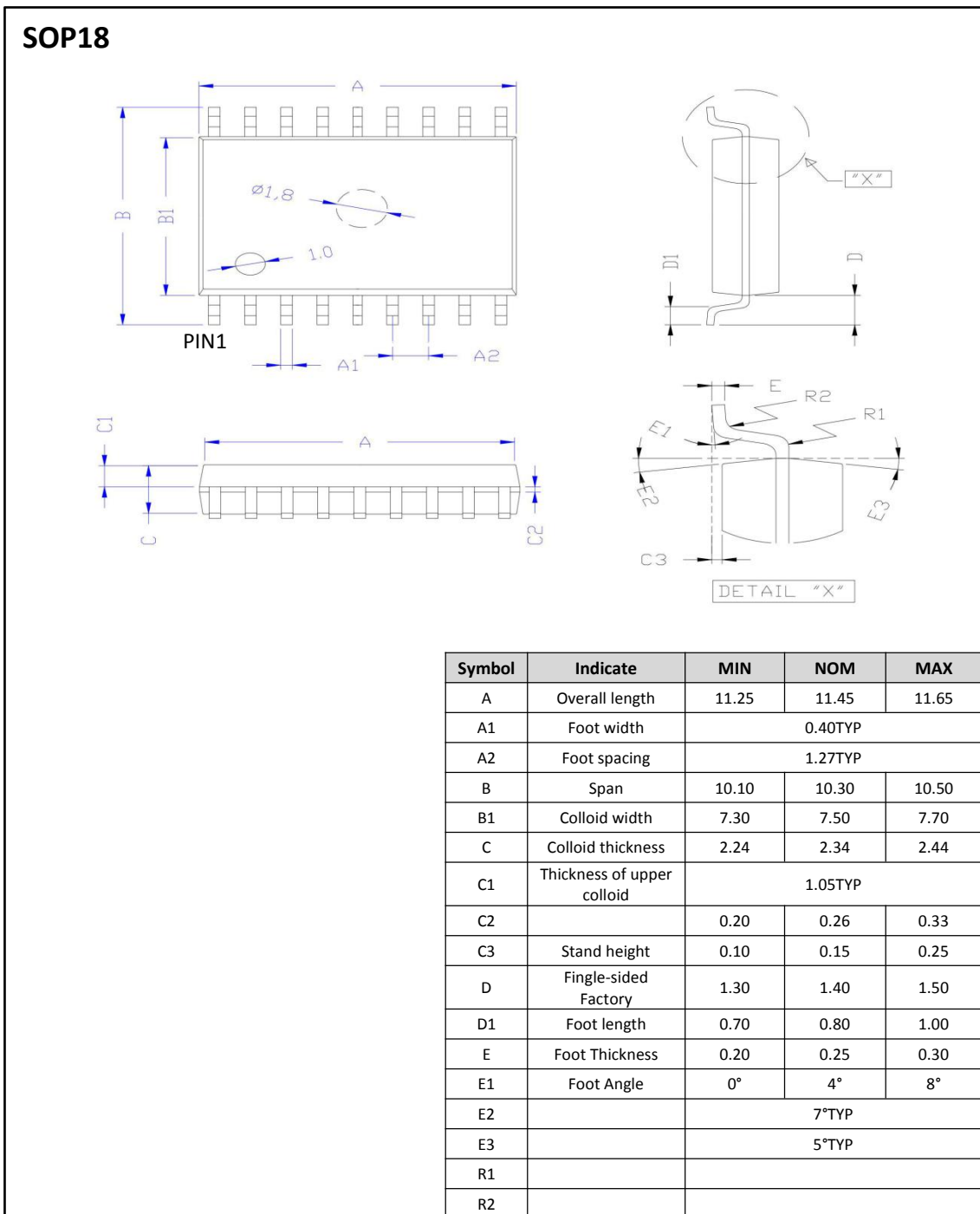


7. ORDERING INFORMATION

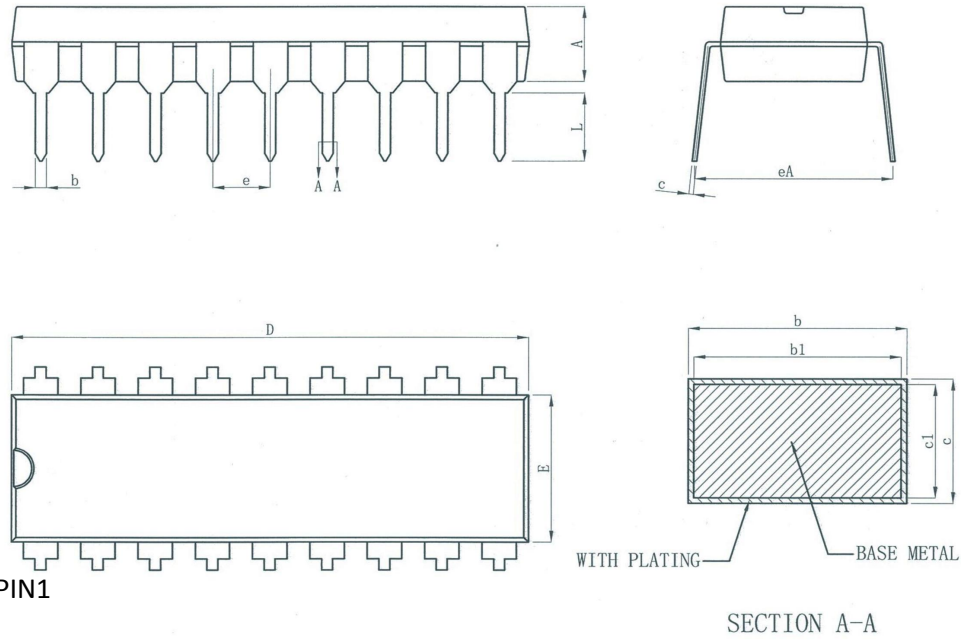
Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XD2804	XD2804	DIP18	22.90 * 6.50	- 40 to 85	MSL3	Tube 20	800
XL2804	XL2804	SOP18	11.45 * 7.50	- 40 to 85	MSL3	T&R	1000
XL2803AG	XL2803AG	SOP18	11.45 * 7.50	- 40 to 85	MSL3	T&R	1000

8. DIMENSIONAL DRAWINGS



DIP18



symbol	millimeter		
	Min	Nom	Max
A	3.20	3.30	3.40
b	0.44	---	0.53
b1	0.43	0.46	0.49
c	0.25	---	0.30
c1	0.24	0.25	0.26
D	22.80	22.90	23.00
E	6.40	6.50	6.60
e	2.54BSC		
eA	8.30	8.80	9.30
L	3.00	---	---