

High-Voltage, High-Current Source Driver Array

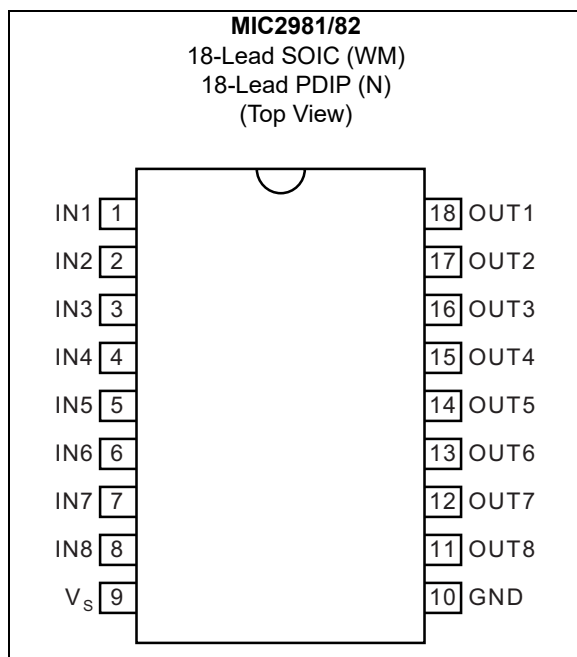
Features

- Output Voltage to 50V
- Output Current to 500 mA
- Transient-Protected Outputs
- Integral Clamp Diodes
- TTL, CMOS, or PMOS Compatible Inputs

Applications

- Relay and Solenoid Switching
- Stepping Motor
- LED and Incandescent Displays

Package Type



General Description

The MIC2981/82 is an 8-channel, high-voltage, high-current source driver array ideal for switching high-power loads from logic-level TTL, CMOS, or PMOS control signals.

These drivers can manage multiple loads of up to 50V and 500 mA, limited only by package power dissipation. The MIC2981/82 features inputs compatible with 5V TTL and 5V to 15V CMOS or PMOS logic outputs. Microchip's dual-marked device replaces either UDN2981 or UDN2982 devices.

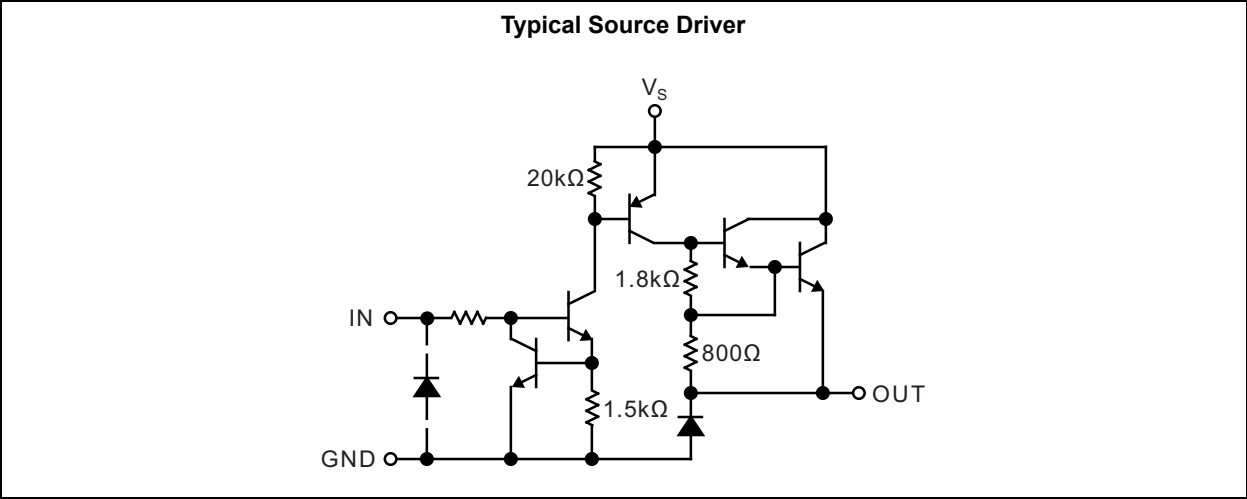
The MIC2981/82 is available in the 18-lead plastic DIP and 18-lead wide SOIC packages. Both devices operate in the industrial temperature range.

TABLE 1: PIN DESCRIPTION

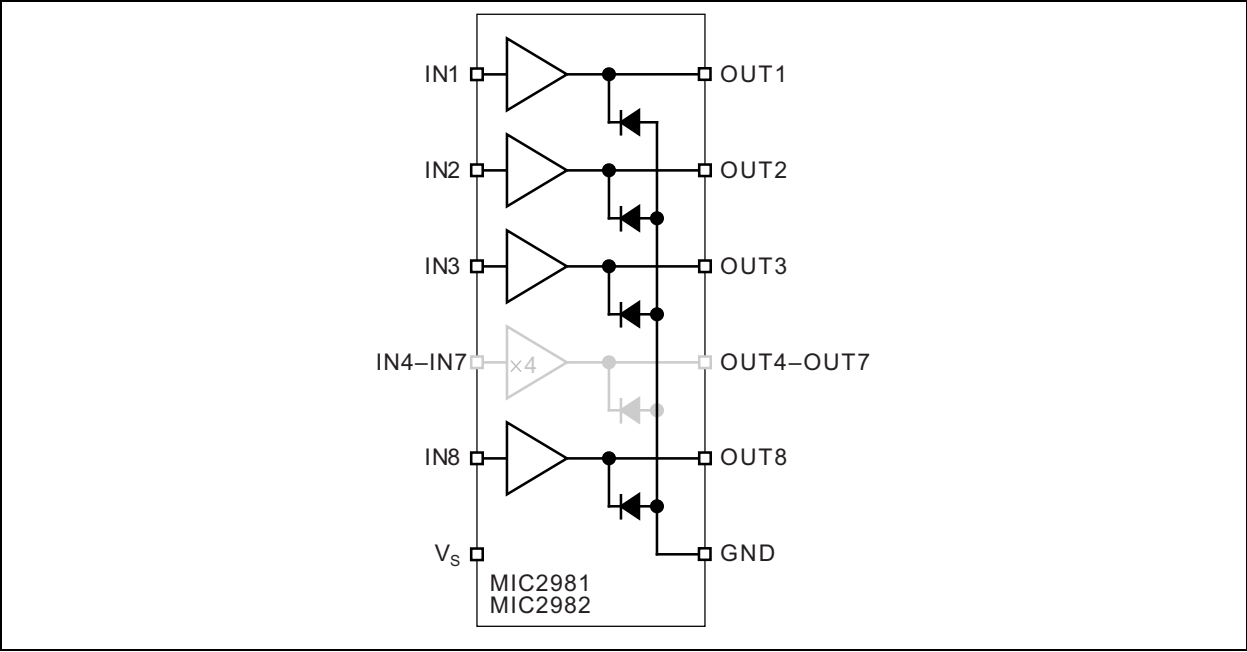
Pin No.	Pin Name	Pin Function
1-8	IN1-IN8	Input 1 through Input 8: Base drive to driver input transistor.
9	V _S	Supply input.
10	GND	Ground.
11-18	OUT8-OUT1	Output 8 through Output 1: Emitter of Darlington driver output.

MIC2981/82

Typical Application Circuit



Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V_S)	+50V
Output Voltage (V_{CE})	+50V
Continuous Output Current (I_C)	500 mA
Input Voltage (V_{IN})	+30V
Ground Current	3A

Operating Ratings ‡

Supply Voltage (V_S)	+5V to +50V
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† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

‡ **Notice:** The device is not guaranteed to function outside its operating ratings.

General Note: Devices are ESD protected; however, handling precautions are recommended.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics: $V_S = 50V$; $T_A = +25^\circ C$, unless noted. [Note 1](#)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Output Leakage Current	I_{CEX}	—	—	200	μA	$V_{IN} = 0.4V$, $T_A = +70^\circ C$, Note 2
Output Sustaining Voltage	$V_{CE(SUS)}$	35	—	—	V	$I_{OUT} = 45\text{ mA}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	1.7	2.0	V	$V_{IN} = 2.4V$, $I_{OUT} = 100\text{ mA}$
		—	1.8	2.1		$V_{IN} = 2.4V$, $I_{OUT} = 225\text{ mA}$
		—	1.9	2.2		$V_{IN} = 2.4V$, $I_{OUT} = 350\text{ mA}$
Input Current	$I_{IN(ON)}$	—	140	200	μA	MIC2981, $V_{IN} = 2.4V$
		—	310	450		MIC2981, $V_{IN} = 3.85V$
		—	140	200	μA	MIC2982, $V_{IN} = 2.4V$
		—	1.25	1.93	mA	MIC2982, $V_{IN} = 12V$
Output Source Current	I_{OUT}	350	—	—	mA	$V_{IN} = 2.4V$, $V_{CE} = 2.2V$
Supply Current	I_S	—	—	10	mA	$V_{IN} = 2.4V$, OUT1–8 = Open, Note 2
Turn-On Delay	t_{ON}	—	1.0	2.0	μs	$0.5E_{IN}$ to $0.5E_{OUT}$, $R_L = 100\Omega$, $V_S = 35V$
Turn-Off Delay	t_{OFF}	—	5.0	10	μs	$0.5E_{IN}$ to $0.5E_{OUT}$, $R_L = 100\Omega$, $V_S = 35V$, Note 3
Clamp Diode Leakage Current	I_R	—	—	50	μA	$V_R = 50V$, $V_{IN} = 0.4V$, Note 2
Clamp Diode Forward Voltage	V_F	—	1.5	2.0	V	$I_F = 350\text{ mA}$

Note 1: Specification for packaged product only.

2: Applied to all 8 inputs simultaneously.

3: Load conditions affect turn-off delay.

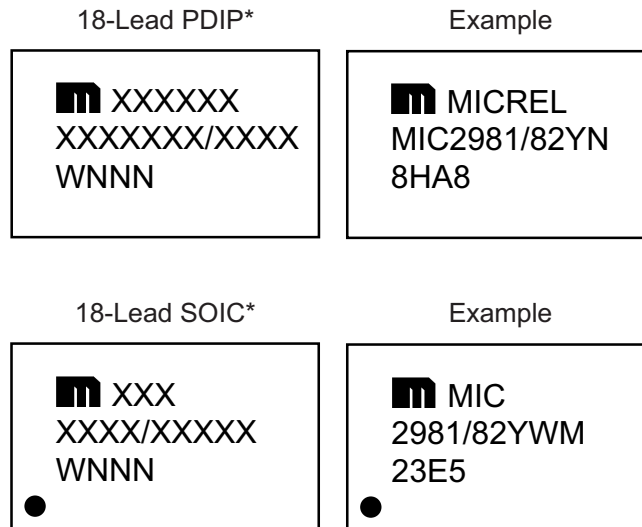
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TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Ambient Temperature Range	T_A	-40	—	+85	°C	—
Maximum Junction Temperature	$T_{J(MAX)}$	—	—	+150	°C	—
Storage Temperature	T_S	-65	—	+150	°C	—
Package Thermal Resistances						
Thermal Resistance, PDIP 18-Ld	θ_{JA}	—	56	—	°C/W	—
Thermal Resistance, SOIC 18-Ld	θ_{JA}	—	84	—	°C/W	—

2.0 PACKAGING INFORMATION

2.1 Package Marking Information



Note: Orders for MIC2981YWM or MIC2982YWM will be filled with the dual-marked MIC2981/82YWM. Orders for MIC2981YN or MIC2982YN will be filled with the dual-marked MIC2981/82YN.

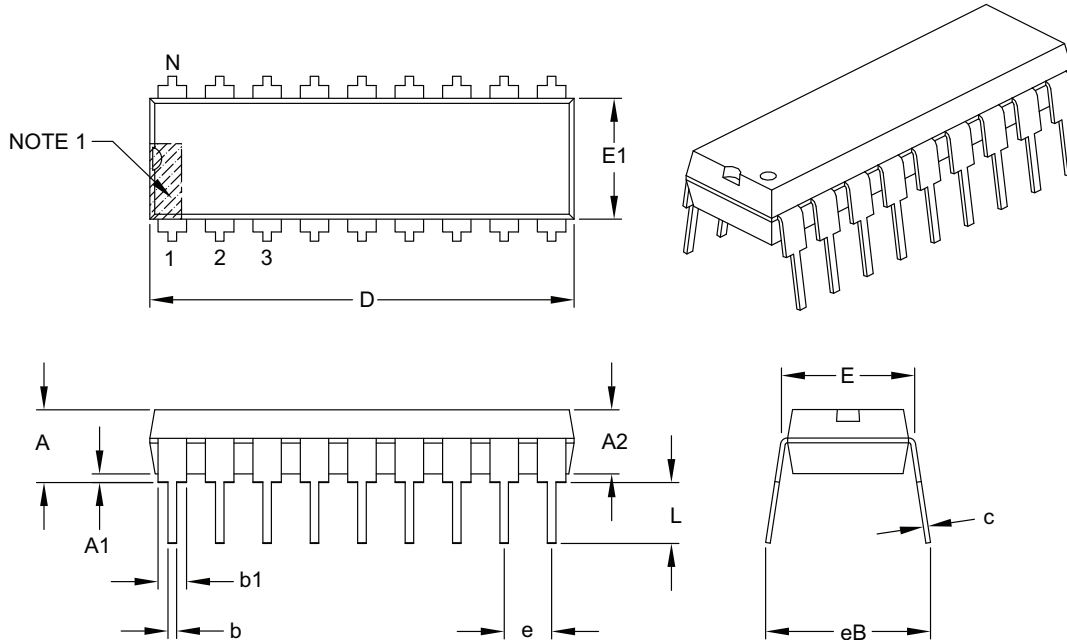
<p>Legend:</p> <ul style="list-style-type: none"> XX...X Product code or customer-specific information Y Year code (last digit of calendar year) YY Year code (last 2 digits of calendar year) WW Week code (week of January 1 is week '01') NNN Alphanumeric traceability code (e3) Pb-free JEDEC® designator for Matte Tin (Sn) * This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package. •, ▲, ▼ Pin one index is identified by a dot, delta up, or delta down (triangle mark).
<p>Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.</p> <p>Underbar (_) symbol may not be to scale.</p>

Note: If the full seven-character YYWWNNN code cannot fit on the package, the following truncated codes are used based on the available marking space:
6 Characters = YWWNNN; 5 Characters = WWNNN; 4 Characters = WNNN; 3 Characters = NNN;
2 Characters = NN; 1 Character = N

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18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	.100 BSC		
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.880	.900	.920
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.014
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

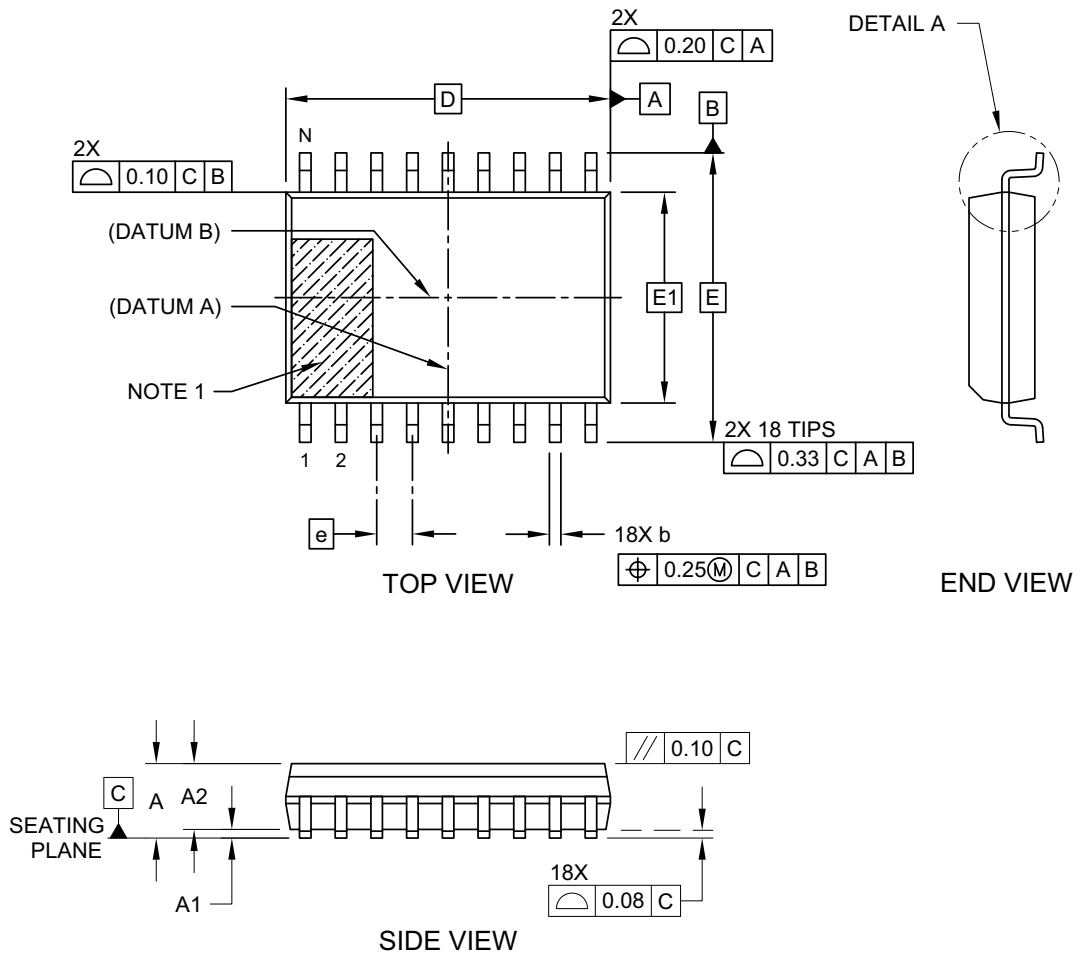
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-007B

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

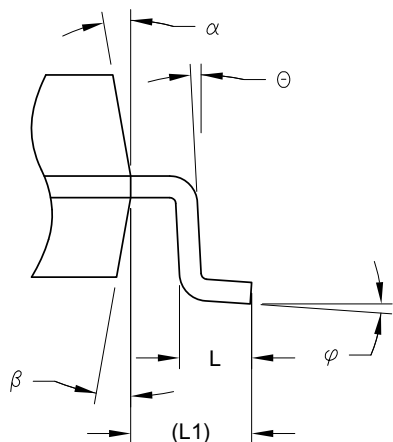


Microchip Technology Drawing C04-051D Sheet 1 of 2

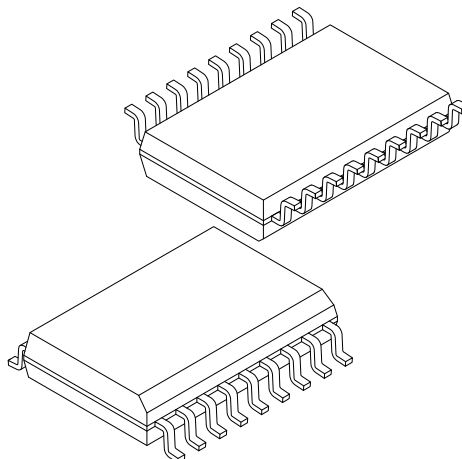
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18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	1.27 BSC		
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	11.55 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

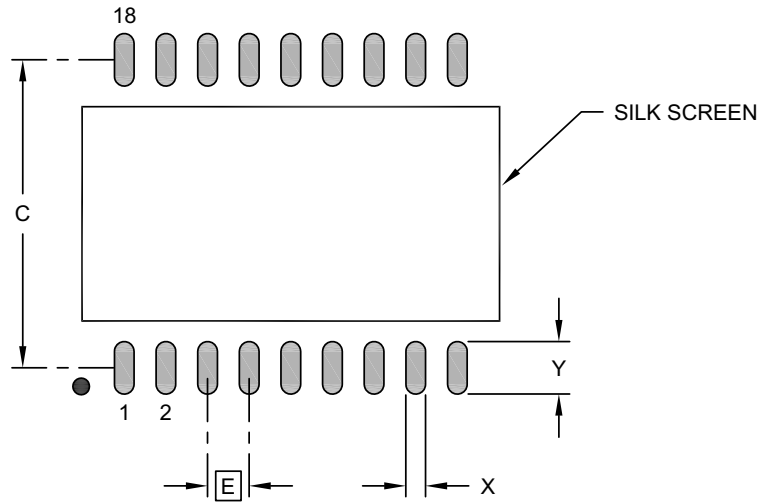
Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-051D Sheet 2 of 2

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm (.300 In.) Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		9.40	
Contact Pad Spacing				
Contact Pad Width (X18)	X			0.60
Contact Pad Length (X18)	Y			1.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2051A

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NOTES:

APPENDIX A: REVISION HISTORY

Revision A (September 2022)

- Converted Micrel document MIC2981/82 to Microchip data sheet DS20006727A.
- Minor text changes throughout.

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NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

<u>Part Number</u>	<u>X</u>	<u>XX</u>	<u>-XX</u>	Examples:
Device	Temperature Range	Package	Media Type	
Device:	MIC2981/82:	High-Voltage, High-Current Source Driver Array		a) MIC2981/82YN: MIC2981/82, -40°C to +85°C Temp. Range, 18-Lead PDIP, 21/Tube
Temperature Range:	Y =	-40°C to +85°C		b) MIC2981/82YWM: MIC2981/82, -40°C to +85°C Temp. Range, 18-Lead SOIC, 41/Tube
Package:	WM =	18-Lead SOIC		c) MIC2981/82YWM-TR: MIC2981/82, -40°C to +85°C Temp. Range, 18-Lead SOIC, 1,000/Reel
	N =	18-Lead PDIP		Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.
Media Type:	<blank> =	21/Tube (PDIP Only)		
	<blank> =	41/Tube (SOIC Only)		
	TR =	1,000/Reel (SOIC Only)		

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NOTES:

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