# 2981 THRU 2984

# *8-CHANNEL SOURCE DRIVERS*

**UDN2981A thru UDN2984A**
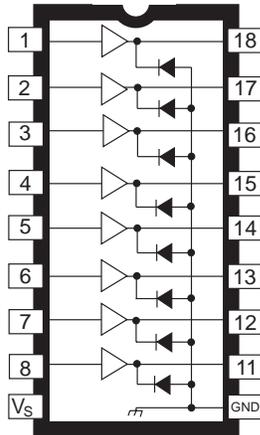


Dwg. No. A-10, 243

Note that the UDN2980A series (dual in-line package) and UDN2980LW series (small-outline IC package) are electrically identical and share a common terminal number assignment.

## ABSOLUTE MAXIMUM RATINGS
at 25°C Free-Air Temperature

Output Voltage Range, $V_{CE}$
  (UDN2981A, UDN2982A,
  UDN2982LW, and A2982SLW) . . **5 V to 50 V**
  (UDN2983A, UDN2984A,
  UDN2984LW, and A2984SLW) . **35 V to 80 V**
Input Voltage, $V_{IN}$
  (UDN2981A and UDN2983A) . . . . . . . . . **15 V**
  (UDN2982A, UDN2984A,
  UDN2982LW, UDN2984LW,
  A2982SLW, and A2984SLW) . . . . . . . . . **20 V**
Output Current, $I_{OUT}$ . . . . . . . . . . . . . . **-500 mA**
Package Power Dissipation,
  $P_D$ . . . . . . . . . . . . . . . . . . . . . . **See Graph**
Operating Temperature Range,
  $T_A$ . . . . . . . . . . . . . . . . . . . . **-20°C to +85°C**
Storage Temperature Range,
  $T_S$ . . . . . . . . . . . . . . . . . . . **-55°C to +150°C**

Recommended for high-side switching applications that benefit from separate logic and load grounds, these devices encompass load supply voltages to 80 V and output currents to -500 mA. These 8-channel source drivers are useful for interfacing between low-level logic and high-current loads. Typical loads include relays, solenoids, lamps, stepper and/or servo motors, print hammers, and LEDs.

All devices may be used with 5 V logic systems — TTL, Schottky TTL, DTL, and 5 V CMOS. The UDN2981A, UDN2982A, UDN2982LW, and A2982SLW are electrically interchangeable, will withstand a maximum output OFF voltage of 50 V, and operate to a minimum of 5 V; the UDN2983A, UDN2984A, UDN2984LW, and A2984SLW drivers are electrically interchangeable, will withstand an output voltage of 80 V, and operate to a minimum of 35 V. All devices in this series integrate input current limiting resistors and output transient suppression diodes, and are activated by an active high input.

The suffix 'A' (all devices) indicates an 18-lead plastic dual in-line package with copper lead frame for optimum power dissipation. Under normal operating conditions, these devices will sustain 120 mA continuously for each of the eight outputs at an ambient temperature of +50°C and a supply of 15 V.

The suffix 'LW' (UDN2982LW and UDN2984LW only) indicates an 18-lead surface-mountable wide-body SOIC package; the A2982SLW and A2984SLW are provided in a 20-lead wide-body SOIC package with improved thermal characteristics.

The UDN2982A, UDN2982LW, A2982SLW, UDN2984A, UDN2984LW, and A2984SLW drivers are also available for operation over an extended temperature range to -40°C. To order, change the prefix 'UDN' to 'UDQ' or the suffix 'SLW' to 'ELW'.

## FEATURES

- ■ TTL, DTL, PMOS, or CMOS Compatible Inputs
- ■ 500 mA Output Source Current Capability
- ■ Transient-Protected Outputs
- ■ Output Breakdown Voltage to 80 V
- ■ DIP or SOIC Packaging

Always order by complete part number, e.g.,   UDN2981A .
Note that all devices are not available in all package styles.

## One of Eight Drivers
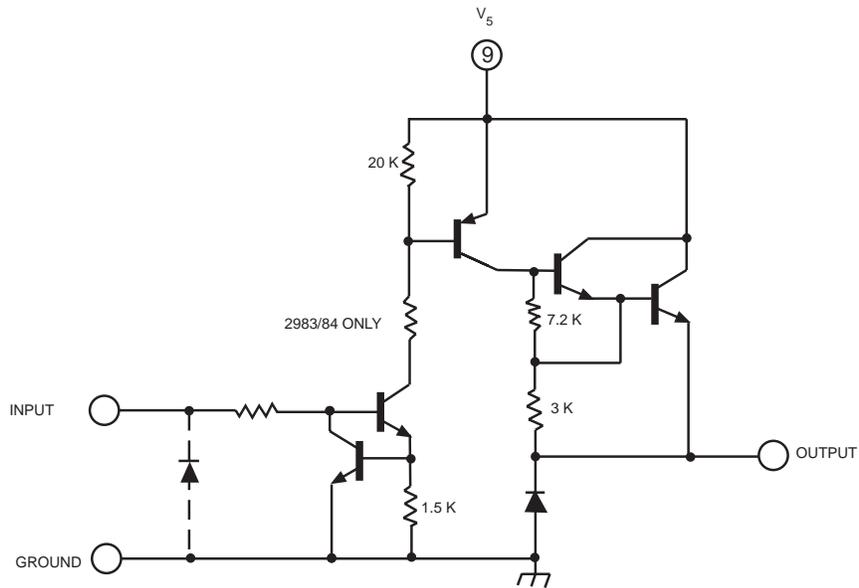


Dwg. No. A-10,242B

### A2982SLW and A2984SLW



Dwg. PP-064-2



18-PIN DIP, $R_{\theta JA} = 60°C/W$

20-LEAD SOIC, $R_{\theta JA} = 70°C/W$

18-LEAD SOIC, $R_{\theta JA} = 80°C/W$

ALLOWABLE PACKAGE POWER DISSIPATION IN WATTS

**AMBIENT TEMPERATURE IN °C**

Dwg. GP-022-4

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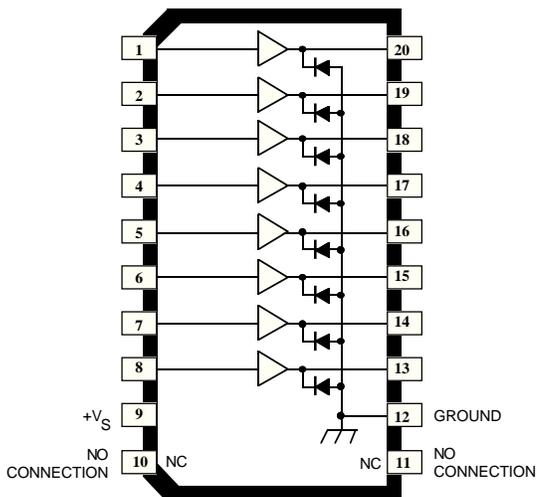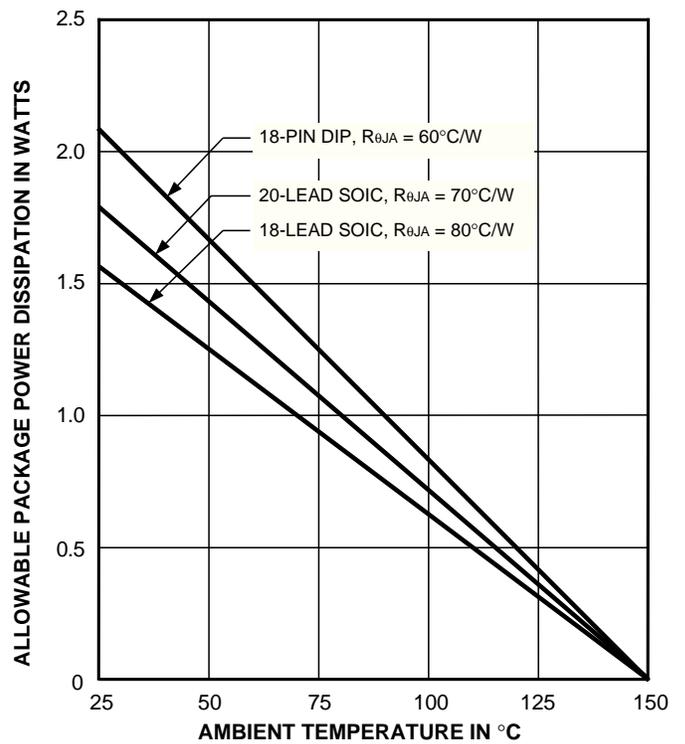
## ELECTRICAL CHARACTERISTICS at $T_A$ = +25$°$C (unless otherwise specified).

| Characteristic | Symbol | Applicable Devices | Test Conditions | Test Fig. | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|---|
| Output Leakage Current | $I_{CEX}$ | 2981/82† | $V_{IN}$ = 0.4 V*, $V_S$ = 50 V, $T_A$ = +70$°$C | 1 | — | — | 200 | µA |
| | | 2983/84† | $V_{IN}$ = 0.4 V*, $V_S$ = 80 V, $T_A$ = +70$°$C | 1 | — | — | 200 | µA |
| Output Sustaining Voltage | $V_{CE(SUS)}$ | 2981/82† | $I_{OUT}$ = -45 mA | — | 35 | — | — | V |
| | | 2983/84† | $I_{OUT}$ = -70 mA | — | 45 | — | — | V |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | All | $V_{IN}$ = 2.4 V, $I_{OUT}$ = -100 mA | 2 | — | 1.6 | 1.8 | V |
| | | | $V_{IN}$ = 2.4 V, $I_{OUT}$ = -225 mA | 2 | — | 1.7 | 1.9 | V |
| | | | $V_{IN}$ = 2.4 V, $I_{OUT}$ = -350 mA | 2 | — | 1.8 | 2.0 | V |
| Input Current | $I_{IN(ON)}$ | 2981/83A | $V_{IN}$ = 2.4 V | 3 | — | 140 | 200 | µA |
| | | | $V_{IN}$ = 3.85 V | 3 | — | 310 | 450 | µA |
| | | 2982/84† | $V_{IN}$ = 2.4 V | 3 | — | 140 | 200 | µA |
| | | | $V_{IN}$ = 12 V | 3 | — | 1.25 | 1.93 | mA |
| Output Source Current (Outputs Open) | $I_{OUT}$ | 2981/83A | $V_{IN}$ = 2.4 V, $V_{CE}$ = 2.0 V | 2 | -350 | — | — | mA |
| | | 2982/84† | $V_{IN}$ = 2.4 V, $V_{CE}$ = 2.0 V | 2 | -350 | — | — | mA |
| Supply Current Leakage Current | $I_S$ | 2981/82† | $V_{IN}$ = 2.4 V*, $V_S$ = 50 V | 4 | — | — | 10 | mA |
| | | 2983/84† | $V_{IN}$ = 2.4 V*, $V_S$ = 80 V | 4 | — | — | 10 | mA |
| Clamp Diode Forward Voltage | $I_R$ | 2981/82† | $V_R$ = 50 V, $V_{IN}$ = 0.4 V* | 5 | — | — | 50 | µA |
| | | 2983/84† | $V_R$ = 80 V, $V_{IN}$ = 0.4 V* | 5 | — | — | 50 | µA |
| Clamp Diode | $V_F$ | All | $I_F$ = 350 mA | 6 | — | 1.5 | 2.0 | V |
| Turn-On Delay | $t_{ON}$ | All | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$, $R_L$ = 100$\Omega$, $V_S$ = 35 V | — | — | 1.0 | 2.0 | µs |
| Turn-Off Delay | $t_{OFF}$ | All | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$, $R_L$ = 100$\Omega$, $V_S$ = 35 V, See Note | — | — | 5.0 | 10 | µs |

NOTES:  Turn-off delay is influenced by load conditions.  Systems applications well below the specified output loading may require timing considerations for some designs, i.e., multiplexed displays or when used in combination with sink drivers in a totem pole configuration.

Negative current is defined as coming out of (sourcing) the specified device terminal.

* All inputs simultaneously.

† Complete part number includes a prefix (A or UDN) and a suffix (A or SLW) as follows:
UDN2981A,
UDN2982A, UDN2982LW, or A2982SLW,
UDN2983A,
UDN2984A, UDN2984LW, or A2984SLW.

# TEST FIGURES

**Figure 1**

$V_S$

$V_{IN}$

μA

$I_{CEX}$
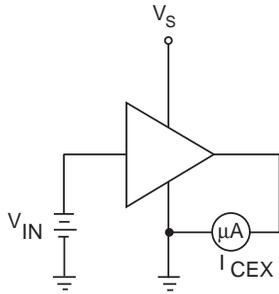
Dwg. No. A-11,083

**Figure 2**

$V_S$

$V_{CE}$

V

mA

$I_{OUT}$

$V_{IN}$
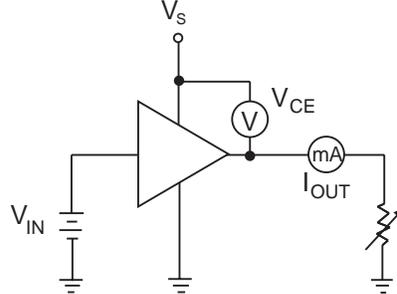
Dwg. No. A-11,084

**Figure 3**

$V_S$

$I_{IN}$

mA

$V_{IN}$

OPEN
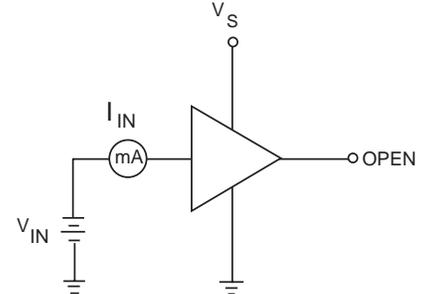
Dwg. No. A-11,085

**Figure 4**

$V_S$

$I_S$ mA

$V_{IN}$

OPEN
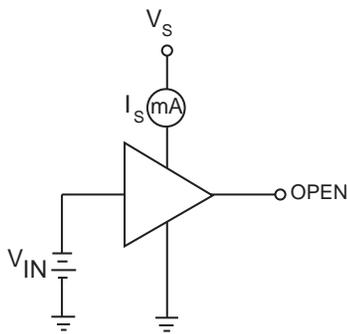
Dwg. No. A-11,086

**Figure 5**

$V_S$

$I_R$

μA

$V_{IN}$
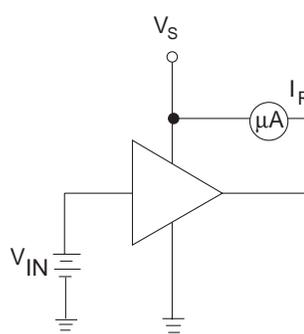
Dwg. No. A-11,087

**Figure 6**
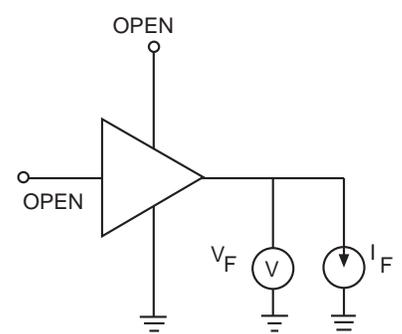
OPEN

OPEN

$V_F$ V

$I_F$

Dwg. No. A-11,088

## Allowable peak collector current
## as a function of duty cycle

### Series UDN2980A

ALLOWABLE PEAK COLLECTOR CURRENT IN mA AT 50°C

RECOMMENDED MAXIMUM OUTPUT CURRENT

NUMBER OF OUTPUTS
CONDUCTING
SIMULTANEOUSLY

$V_S = 35$ V

PER CENT DUTY CYCLE

Dwg. No. A-11,106B

ALLOWABLE PEAK COLLECTOR CURRENT IN mA AT 70°C

RECOMMENDED MAXIMUM OUTPUT CURRENT

NUMBER OF OUTPUTS
CONDUCTING
SIMULTANEOUSLY

$V_S = 35$ V

PER CENT DUTY CYCLE
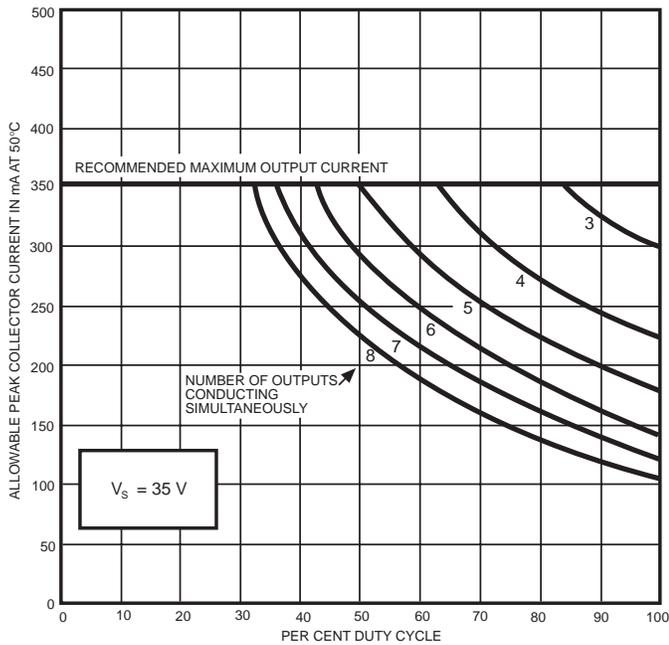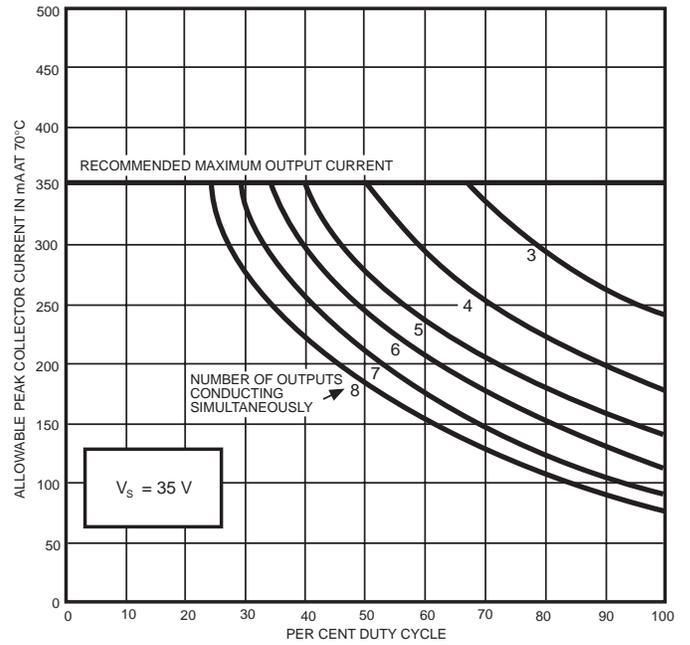
Dwg. No. A-11,111B

### UDN2981A and UDN2982A
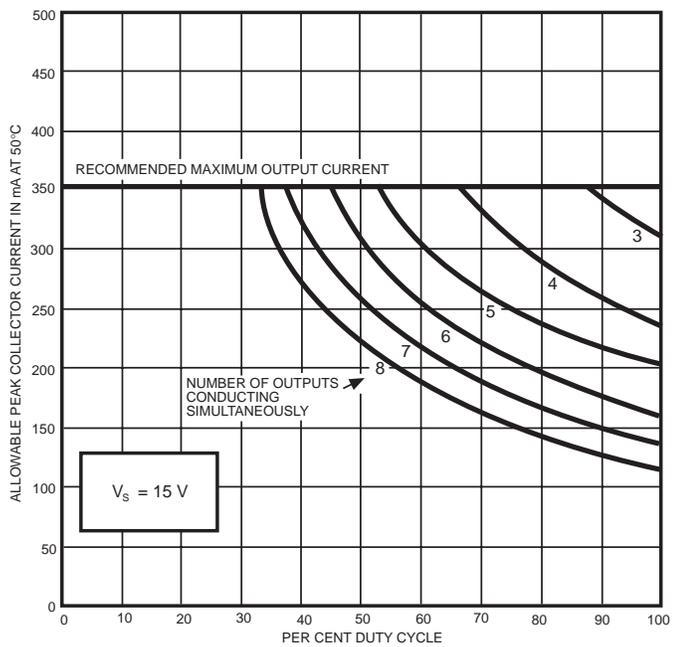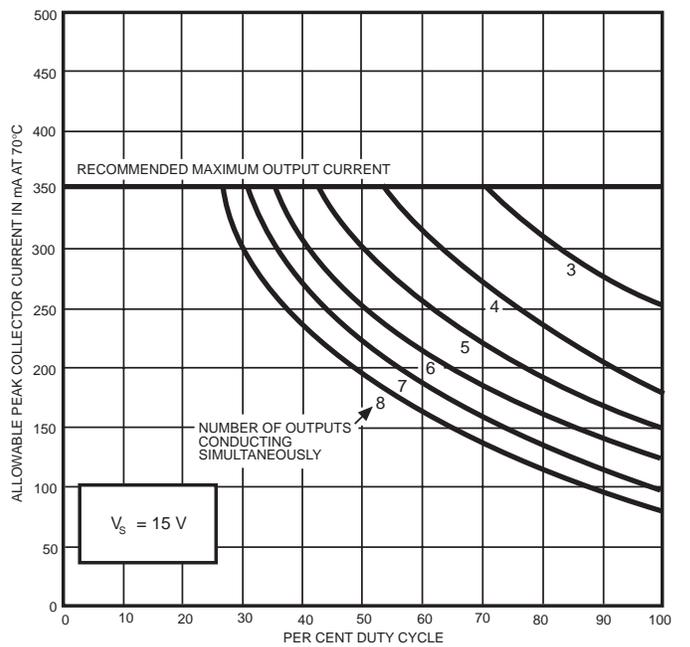
ALLOWABLE PEAK COLLECTOR CURRENT IN mA AT 50°C

RECOMMENDED MAXIMUM OUTPUT CURRENT

NUMBER OF OUTPUTS
CONDUCTING
SIMULTANEOUSLY

$V_S = 15$ V

PER CENT DUTY CYCLE

Dwg. No. A-11,107B

ALLOWABLE PEAK COLLECTOR CURRENT IN mA AT 70°C

RECOMMENDED MAXIMUM OUTPUT CURRENT

NUMBER OF OUTPUTS
CONDUCTING
SIMULTANEOUSLY

$V_S = 15$ V

PER CENT DUTY CYCLE

Dwg. No. A-11,108B

## Allowable peak collector current
## as a function of duty cycle

**UDN2983A and UDN2984A**
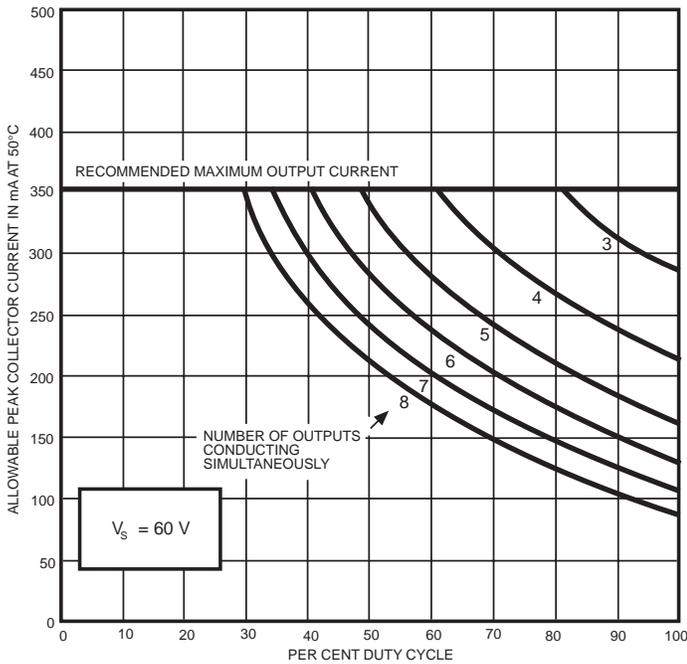


Dwg. No. A-11,109B
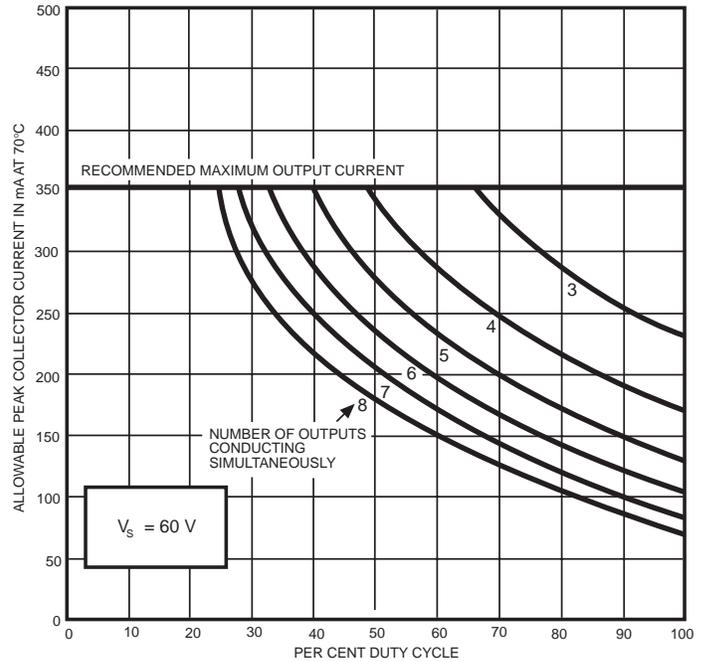


Dwg. No. A-11,110B

## Input current as a function
## of input voltage
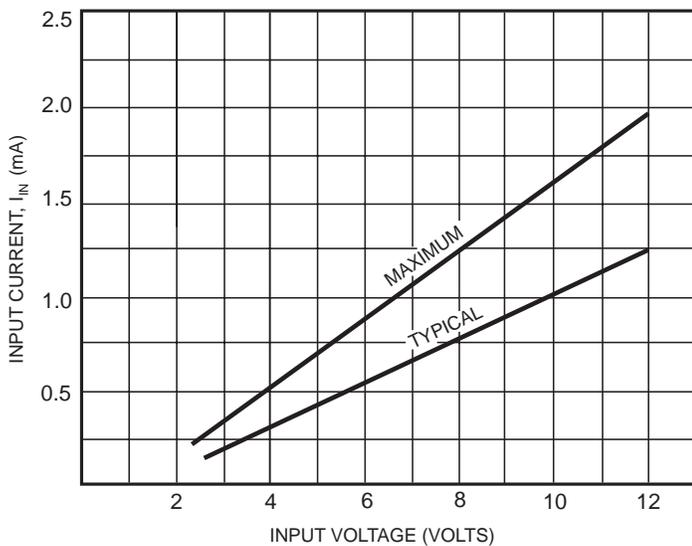


Dwg. No. A-11,115B

## Typical electrosensitive
## printer application
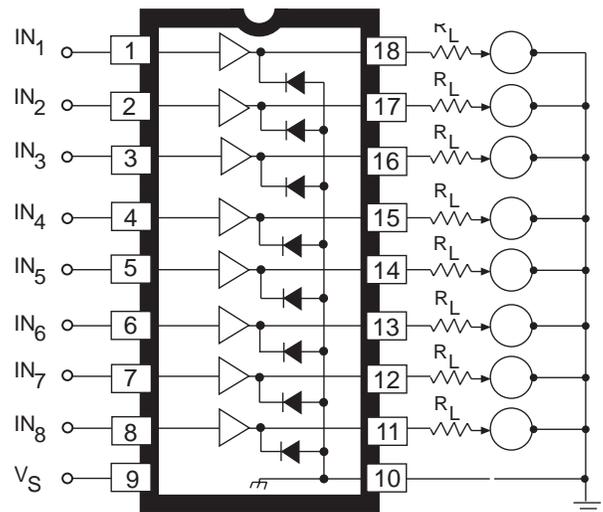


Dwg. No. A-11,113A

## UDN2981A, UDN2982A, UDN2983A, and UDN2984A

Dimensions in Inches
(controlling dimensions)

18    10

0.280
0.240

1    0.070
0.045

0.100
BSC

9    0.005
MIN

0.920
0.880

0.210
MAX

0.015
MIN

0.150
0.115

0.022
0.014

0.014
0.008

0.430
MAX

0.300
BSC

Dwg. MA-001-18A in
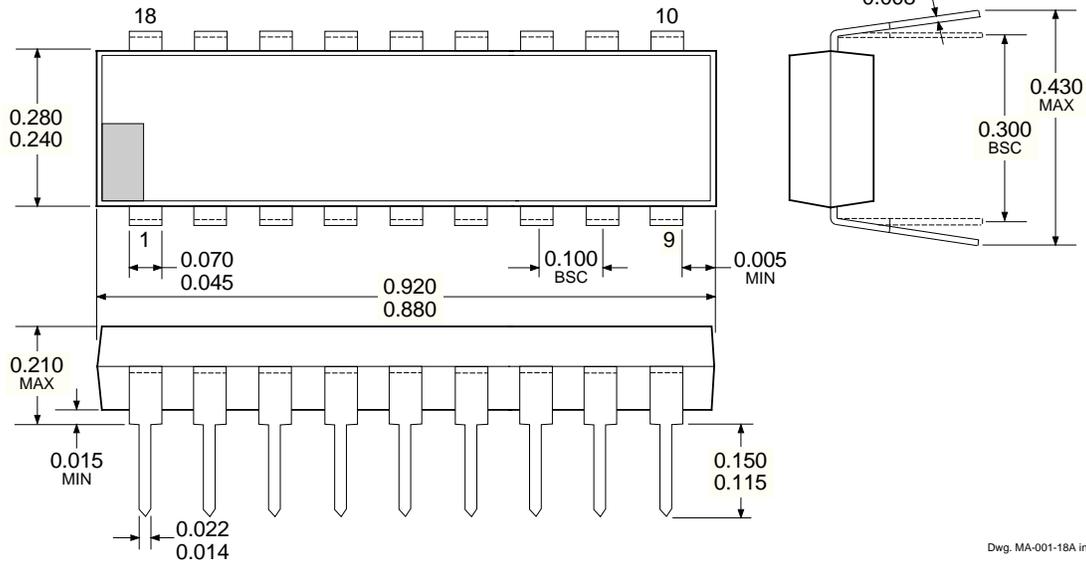
Dimensions in Millimeters
(for reference only)
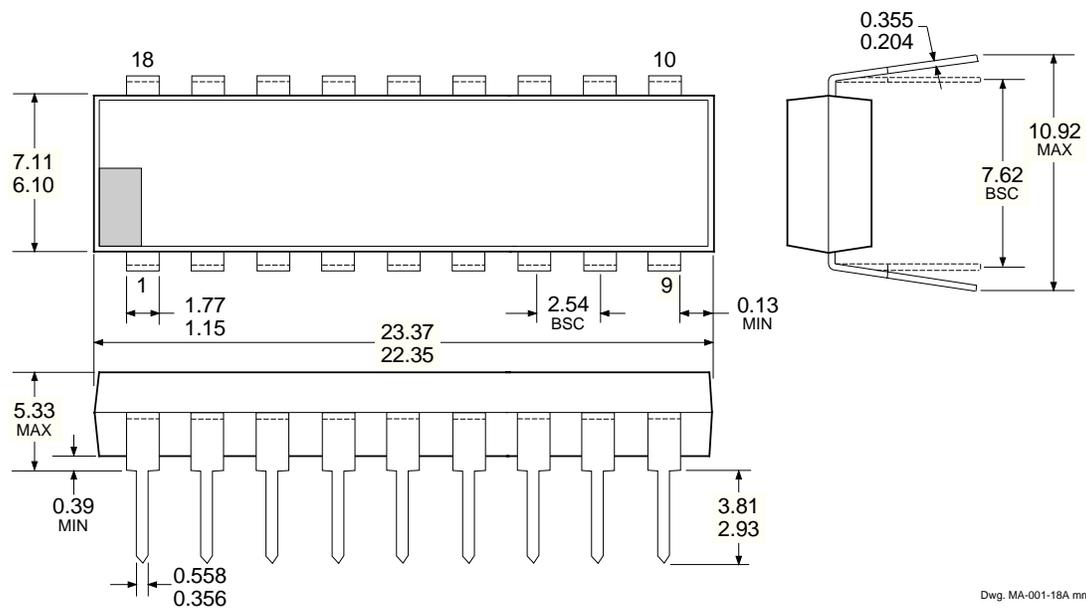
18    10

7.11
6.10

1    1.77
1.15

2.54
BSC

9    0.13
MIN

23.37
22.35

5.33
MAX

0.39
MIN

3.81
2.93

0.558
0.356

0.355
0.204

10.92
MAX

7.62
BSC

Dwg. MA-001-18A mm

NOTES:  1.  Exact body and lead configuration at vendor's option within limits shown.
2.  Lead spacing tolerance is non-cumulative.
3.  Lead thickness is measured at seating plane or below.

## UDN2982LW and UDN2984LW

### Dimensions in Inches
### (for reference only)

18    10

0.2992
0.2914

0.020
0.013

1   2   3

0.4625
0.4469

0.050
BSC

0.0125
0.0091

0.419
0.394

0.050
0.016

0° TO 8°

0.0926
0.1043

0.0040 MIN.
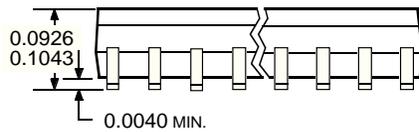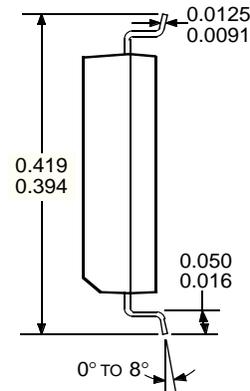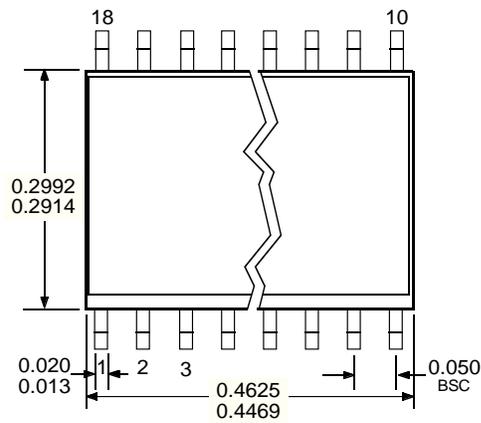
Dwg. MA-008-18A in

### Dimensions in Millimeters
### (controlling dimensions)

18    10

7.60
7.40

0.51
0.33

1   2   3

11.75
11.35

1.27
BSC

0.32
0.23

10.65
10.00

1.27
0.40

0° TO 8°

2.65
2.35

0.10 MIN.
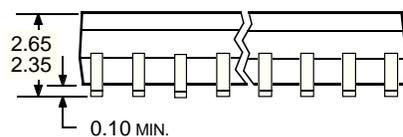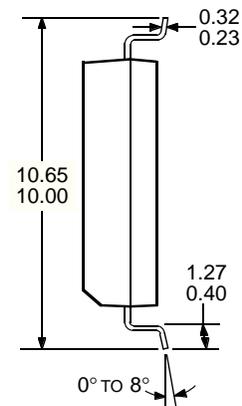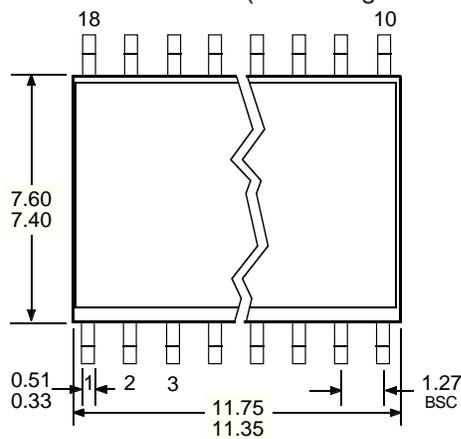
Dwg. MA-008-18A mm

NOTES: 1.   Exact body and lead configuration at vendor's option within limits shown.
       2.   Lead spacing tolerance is non-cumulative.

*Allegro*®
MicroSystems, Inc.

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Worcester, Massachusetts 01615-0036  (508) 853-5000

**A2982SLW and A2984SLW**

Dimensions in Inches
(for reference only)

20          11

0.2992
0.2914

0.020    1  2  3              0.050
0.013                         BSC
              0.5118
              0.4961

0.0125
0.0091

0.419
0.394

0.050
0.016

0° TO 8°

0.0926
0.1043

0.0040 MIN.
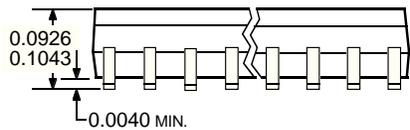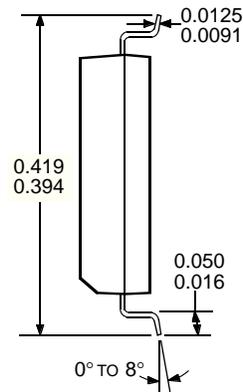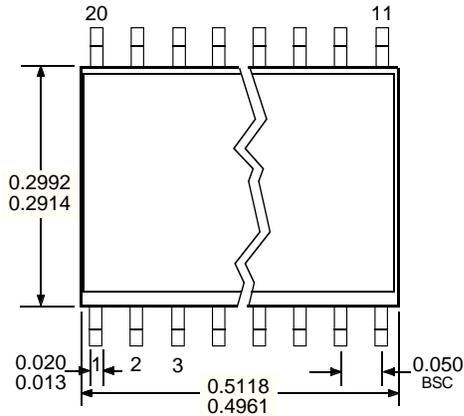
Dwg. MA-008-20 in

Dimensions in Millimeters
(controlling dimensions)
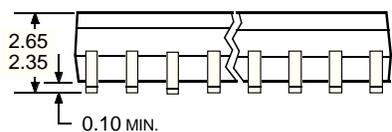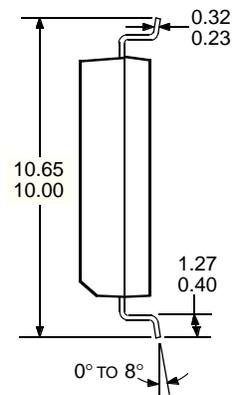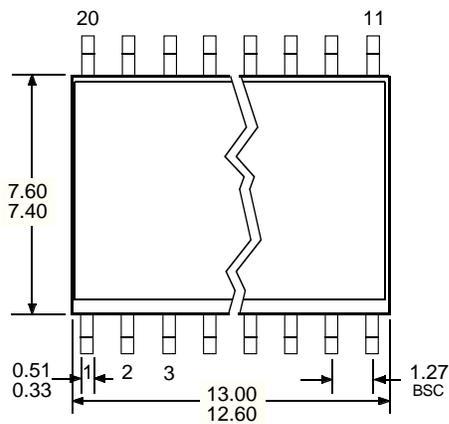
20          11

7.60
7.40

0.51    1  2  3              1.27
0.33                         BSC
              13.00
              12.60

0.32
0.23

10.65
10.00

1.27
0.40

0° TO 8°

2.65
2.35

0.10 MIN.

NOTES: 1.    Exact body and lead configuration at vendor's option within limits shown.
       2.    Lead spacing tolerance is non-cumulative.

# *POWER SOURCE DRIVERS SELECTION GUIDE*

**IN ORDER OF 1) OUTPUT CURRENT, 2) OUTPUT VOLTAGE, 3) NUMBER OF DRIVERS**

| Output Ratings * | | | Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| mA | V | # | Serial Input | Latched Drivers | Diode Clamp | Saturated Outputs | Internal Protection | Part Number [†] |
| -25 | 60 | 8 | – | X | – | – | – | 5815 |
| | 60 | 10 | X | X | Active Pull-Down | – | – | 5810-F and 6809/10 |
| | 60 | 12 | X | X | Active Pull-Down | – | – | 5811 and 6811 |
| | 60 | 20 | X | X | Active Pull-Down | – | – | 5812-F and 6812 |
| | 60 | 32 | X | X | Active Pull-Down | – | – | 5818-F and 6818 |
| | 85 | 8 | – | – | – | – | – | 6118 |
| -120 | -25 | 8 | – | – | X | X | – | 2585 |
| | 30 | 8 | – | – | X | X | – | 2985 |
| | 50 | 8 | X | X | X | X | – | 5895 |
| -350 | 35 | 8 | – | – | X | – | X | 2987 |
| | 50 | 8 | – | – | X | – | – | 2981 and 2982 |
| | 50 | 8 | X | X | X | – | – | 5891 |
| | -50 | 8 | – | – | X | – | – | 2580 |
| | 80 | 8 | – | – | X | – | – | 2983 and 2984 |
| | 80 | 8 | X | X | X | – | – | 5890 |
| | -80 | 8 | – | – | X | – | – | 2588 |

\* Current is maximum specified test condition, voltage is maximum rating. See specification for sustaining voltage limits or over-current protection voltage limits.

† Complete part number includes additional characters to indicate operating temperature range and package style.