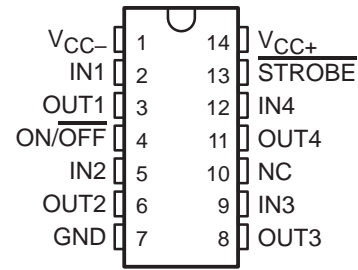


# LT1030C QUADRUPLE LOW-POWER LINE DRIVER

SLLS048F – APRIL 1989 – REVISED APRIL 1998

- Low Supply Voltage . . .  $\pm 5$  V to  $\pm 15$  V
- Supply Current . . . 500  $\mu$ A Typical
- Zero Supply Current When Shut Down
- Outputs Can Be Driven  $\pm 30$  V
- Output Open When Off (3-State)
- 10-mA Output Drive
- Outputs of Several Devices Can Be Connected in Parallel
- Meets or Exceeds the Requirements of ANSI EIA/TIA-232-F Specifications
- Designed to Be Interchangeable With Linear Technology LT1030

D OR N PACKAGE  
(TOP VIEW)



NC – No internal connection

## description

The LT1030C is an EIA/TIA-232-F line driver that operates over a  $\pm 5$ -V to  $\pm 15$ -V supply-voltage range on low supply current. The device can be shut down to zero supply current. Current limiting fully protects the outputs from externally applied voltages of  $\pm 30$  V. Since the output swings to within 200 mV of the positive supply and to within 1 V of the negative supply, supply-voltage requirements are minimized.

A major advantage of the LT1030C is the high-impedance output state when the device is off or powered down. This feature allows several different drivers on the same bus.

The device can be used as an EIA/TIA-232-F driver, micropower interface, or level translator, among others.

The LT1030C is characterized for operation from 0°C to 70°C.

## AVAILABLE OPTIONS

PACKAGE	
SMALL OUTLINE (D)	PLASTIC DIP (N)
LT1030CD	LT1030CN

The D package is available taped and reeled. Add the suffix R to the device type (i.e., LT1030CDR).



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

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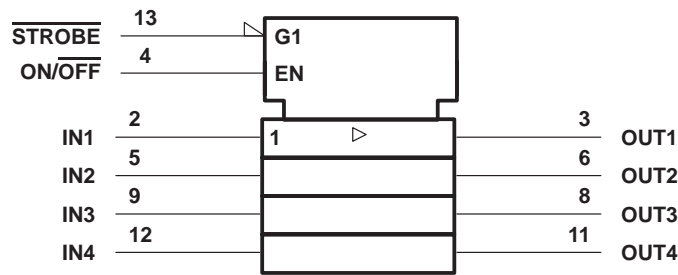
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# LT1030C

## QUADRUPLE LOW-POWER LINE DRIVER

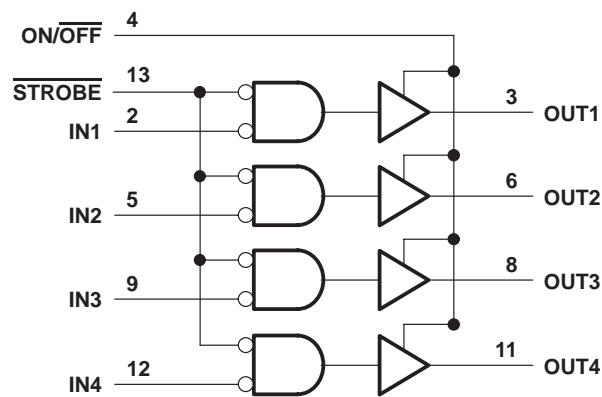
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### logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

### logic diagram



### Terminal Functions

TERMINAL NAME	NO.	DESCRIPTION
GND	7	Ground terminal
IN1 IN2 IN3 IN4	2 5 9 12	Logic inputs. INx operate properly on TTL or CMOS levels. Output valid from $V_I = V_{CC-} + 2\text{ V}$ to 15 V. Connect to 5 V when not used.
ON/OFF	4	ON/OFF shuts down the entire circuit. It cannot be left open. For normally on operation, connect between 5 V and 10 V. If $V_{IL}$ is at or near 0.8 V, significant settling time may be required.
OUT1 OUT2 OUT3 OUT4	3 6 8 11	Line driver outputs
STROBE	13	STROBE forces all outputs low. Drive with 3 V. Strobe terminal input impedance is approximately 2 k $\Omega$ to GND. Leave STROBE open when not used.
V <sub>CC+</sub>	14	Positive supply
V <sub>CC-</sub>	1	Negative supply

**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†**

Supply voltage range, $V_{CC+}$ (see Note 1)	0 V to 15 V
Supply voltage range, $V_{CC-}$	0 V to -15 V
Input voltage range, logic inputs, $V_I$	$V_{CC-}$ to 25 V
Input voltage range at ON/OFF, $V_I$	0 V to 12 V
Output voltage range, $V_O$ (any output)	$V_{CC+} - 30$ V to $V_{CC-} + 30$ V
Duration of output short circuit to $\pm 30$ V at (or below) 25°C (see Note 2)	Unlimited
Package thermal impedance, $\theta_{JA}$ (see Note 3): D package	127°C/W
N package	78°C/W
Storage temperature range, $T_{stg}$	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES:
1. All voltage values, except differential voltages, are with respect to GND.
  2. The output may be shorted to either supply. Temperature and/or supply voltages must be limited to ensure that the maximum dissipation rating is not exceeded.
  3. The package thermal impedance is calculated in accordance with JESD 51, except for through-hole packages, which use a trace length of zero.

**recommended operating conditions**

	MIN	MAX	UNIT
Supply voltage, $V_{CC+}$	5	15	V
Supply voltage, $V_{CC-}$	-5	-15	V
High-level input voltage, $V_{IH}$ (see Note 4)	2	15	V
Low-level input voltage, $V_{IL}$ (see Note 4)		0.8	V
Operating free-air temperature, $T_A$	0	70	°C

NOTE 4: These  $V_{IH}$  and  $V_{IL}$  specifications apply only for inputs IN1–IN4. For operating levels for ON/OFF, see Figure 2.

**electrical characteristics over operating free-air temperature range,  $V_{CC\pm} = \pm 5$  V to  $\pm 15$  V (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	MIN	TYP‡	MAX	UNIT
$V_{OM+}$ Maximum positive peak output voltage swing	$I_O = -2$ mA, $T_A = 25^\circ\text{C}$	$V_{CC+} - 0.3$	$V_{CC+} - 0.1$		V
$V_{OM-}$ Maximum negative peak output voltage swing	$I_O = 2$ mA, $T_A = 25^\circ\text{C}$		$V_{CC-} + 0.9$	$V_{CC-} + 1.4$	V
$I_{IH}$ High-level input current	$V_I \geq 2$ V, $T_A = 25^\circ\text{C}$		2	20	μA
$I_{IL}$ Low-level input current	$V_I \leq 0.8$ V, $T_A = 25^\circ\text{C}$		-10	-20	μA
$I_I$ Input current, ON/OFF	$V_I = 0$		-0.1	-10	μA
	$V_I = 5$ V		30	65	
$I_O$ Output current	$T_A = 25^\circ\text{C}$	5	12		mA
$I_{OZ}$ Off-state output current	$V_O = \pm 15$ V, $T_A = 25^\circ\text{C}$ , ON/OFF at 0.4 V		±2	±100	μA
$I_{CC}$ Supply current (all outputs low)	$V_I \geq$ at 2.4 V, $I_O = 0$		500	1000	μA
$I_{CC(off)}$ Off-state supply current	ON/OFF at 0.4 V			10	μA
	ON/OFF at 0.1 V		10	150	

‡ All typical values are at  $V_{CC\pm} = \pm 12$  V,  $T_A = 25^\circ\text{C}$ .

LT1030C  
QUADRUPLE LOW-POWER LINE DRIVER

SLLS048F – APRIL 1989 – REVISED APRIL 1998

operating characteristics,  $V_{CC\pm} = \pm 5\text{ V to } \pm 15\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
SR    Driver slew rate	$R_L = 3\text{ k}\Omega$ , $C_L = 51\text{ pF}$	4	15	30	V/ $\mu\text{s}$

† All typical values are at  $V_{CC\pm} = \pm 12\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

TYPICAL CHARACTERISTICS

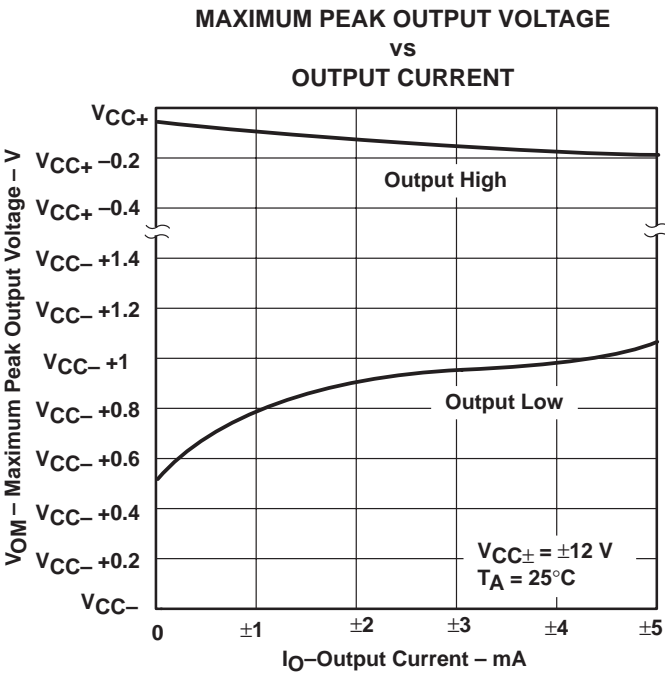


Figure 1

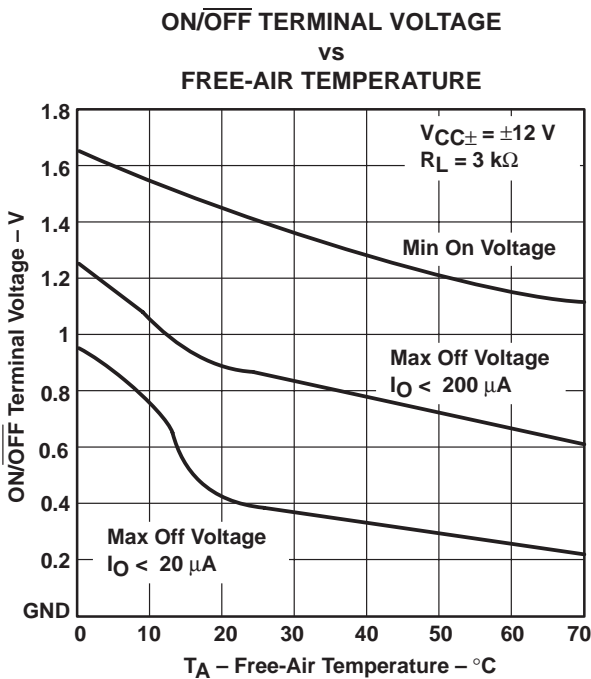


Figure 2

TYPICAL CHARACTERISTICS

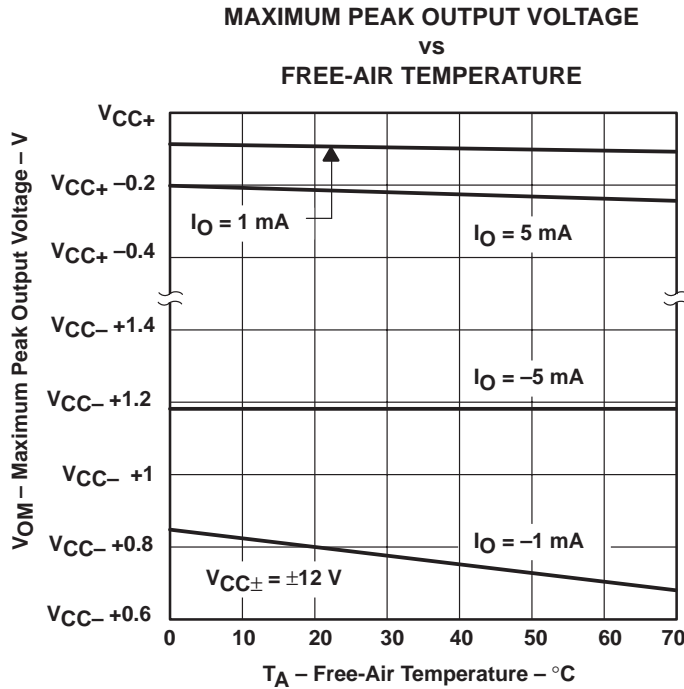


Figure 3

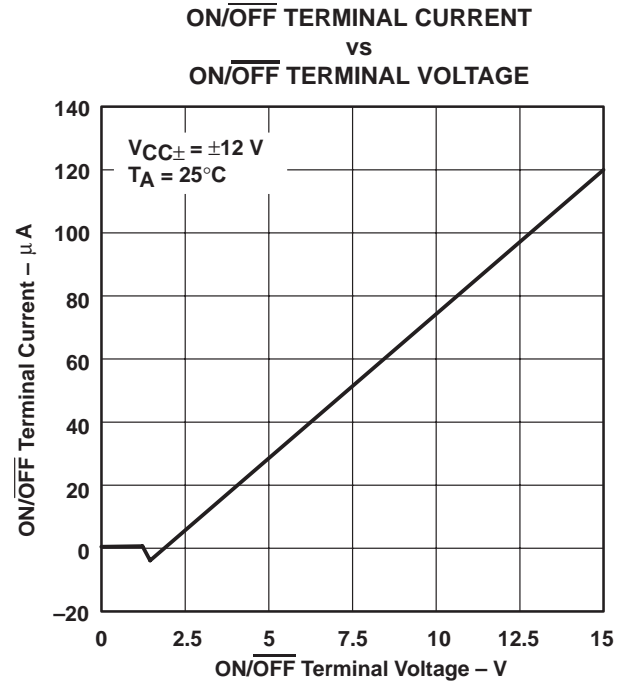


Figure 4

TYPICAL CHARACTERISTICS

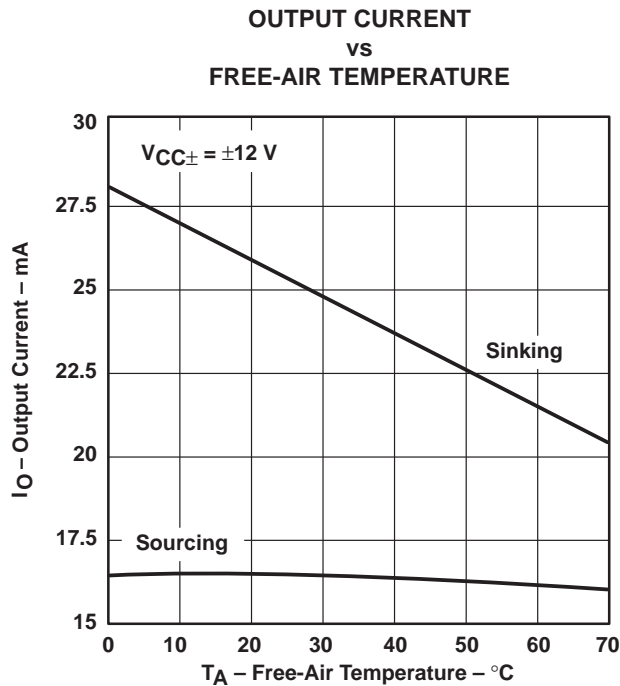


Figure 5

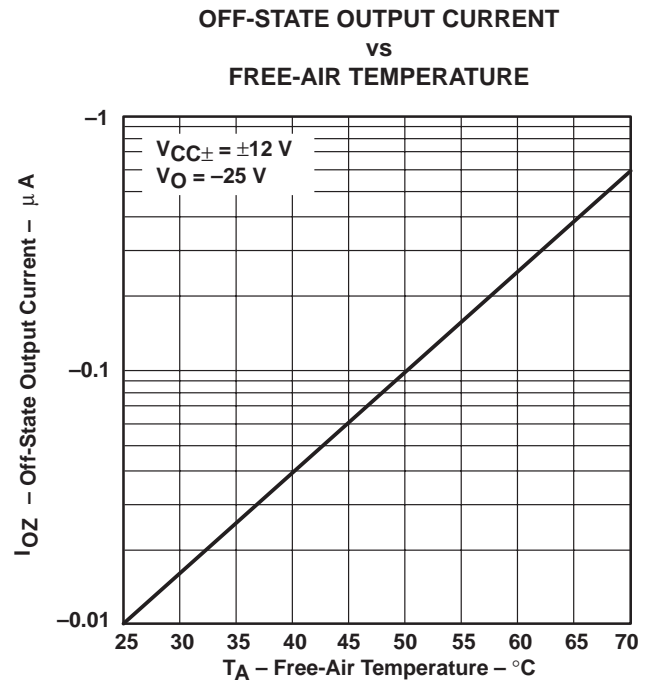


Figure 6

# LT1030C QUADRUPLE LOW-POWER LINE DRIVER

SLLS048F – APRIL 1989 – REVISED APRIL 1998

## TYPICAL CHARACTERISTICS

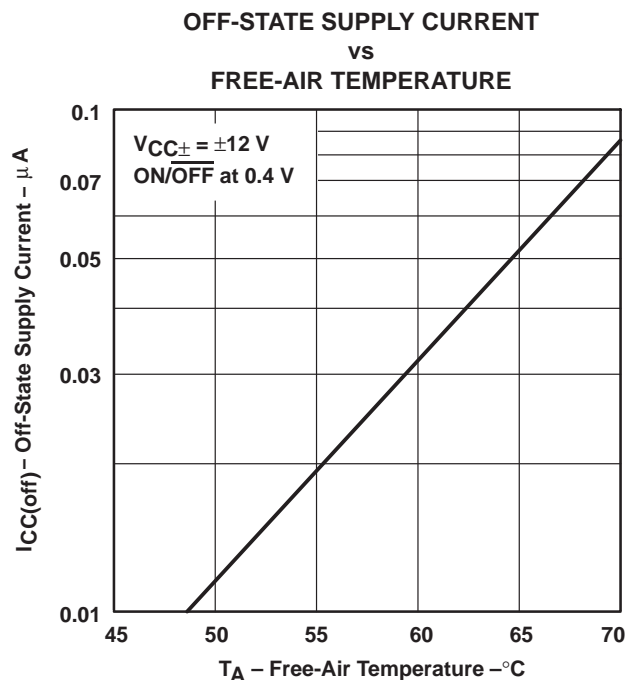


Figure 7

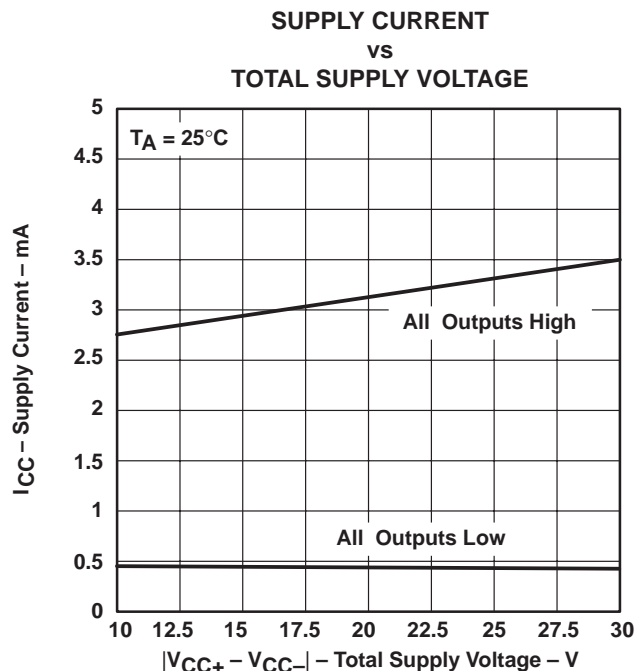


Figure 8

## TYPICAL CHARACTERISTICS

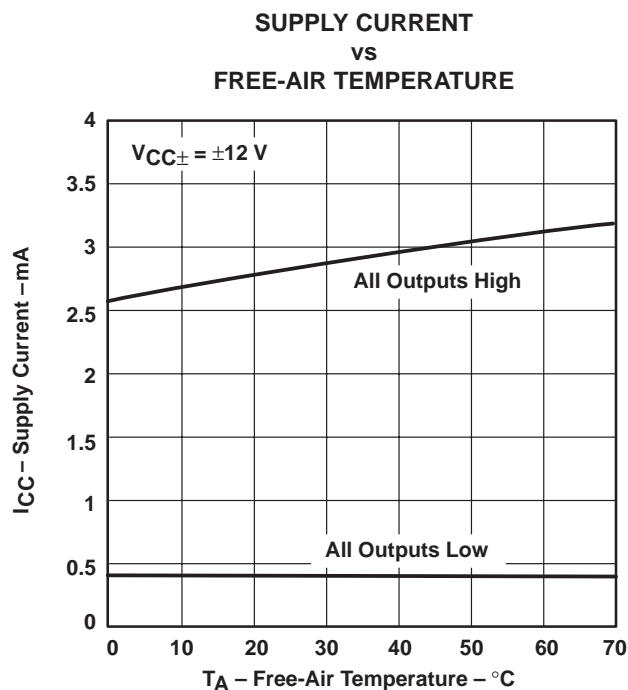


Figure 9

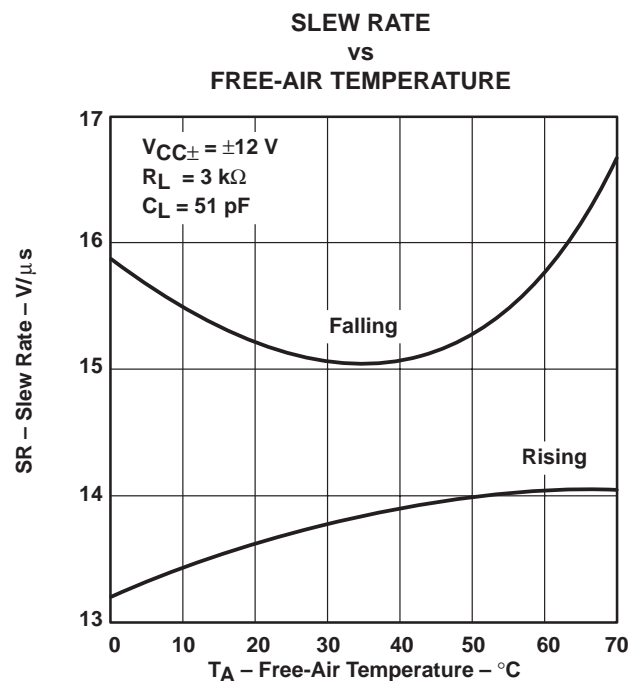


Figure 10

## APPLICATION INFORMATION

### forward biasing the substrate

As with other bipolar integrated circuits, forward biasing the substrate diode can cause problems. The LT1030C draws high current from  $V_{CC+}$  to GND when  $V_{CC-}$  is open circuited or pulled above ground. Connecting a diode from  $V_{CC-}$  to GND (if possible) prevents the high-current state. Any low-cost diode can be used (see Figure 11).

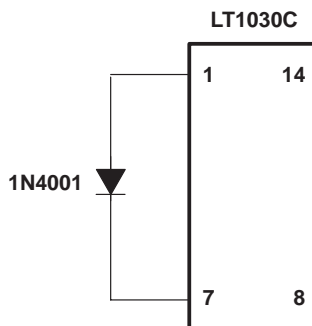


Figure 11. Connecting a Diode From  $V_{CC-}$  to GND

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