National Semiconductor

February 1995

DH0035/DH0035C PIN Diode Driver

General Description

The DH0035/DH0035C is a high speed digital driver designed to drive PIN diodes in RF modulators and switches. The device is used in conjunction with an input buffer such as the DM7830/DM8830 or DM5440/DM7440.

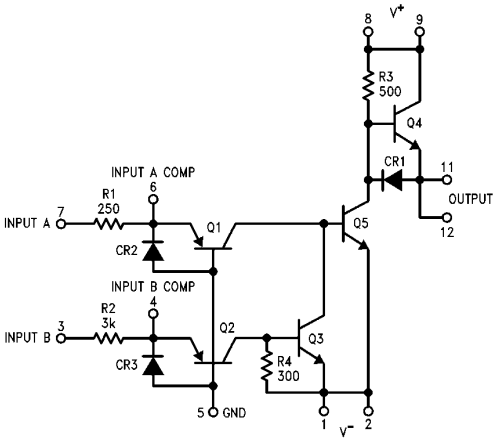
Features

- Large output voltage swing—30V
- Peak output current in excess of 1A
- Inputs TTL/DTL compatible
- Short propagation delay—10 ns
- High repetition rate—5 MHz

The DH0035/DH0035C is capable of driving a variety of PIN diode types including parallel, serial, anode grounded and cathode grounded. For additional information, see *AN-49 PIN Diode Drivers.*

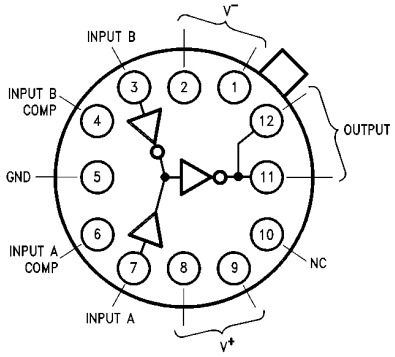
The DH0035 is guaranteed over the temperature range −55°C to +125°C whereas the DH0035C is guaranteed from 0°C to +85°C.

Schematic and Connection Diagrams



TL/K/10124–1

Metal Can Package



TL/K/10124–2

Top View

Order Number DH0035G-MIL or DH0035CG
See NS Package Number G12B

RRD-B30M115/Printed in U. S. A.

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

V^- Supply Voltage Differential (Pin 5 to Pin 1 or 2)	40V
V^+ Supply Voltage Differential (Pin 1 or 2 to Pin 8 or 9)	30V
Input Current (Pin 3 or 7)	±75 mA
Peak Output Current	±1.0A
Power Dissipation (Note 3)	1.5W
Storage Temperature Range	−65°C to +150°C
Operating Temperature Range	
DH0035	−55°C to +125°C
DH0035C	0°C to +85°C
Lead Temperature (Soldering, 10 sec.)	300°C

Electrical Characteristics (Notes 1 and 2)

Parameter	Conditions	Limits			Units
		Min	Typ	Max	
Input Logic "1" Threshold	$V_{OUT} = -8V$, $R_L = 100\Omega$		1.0	2.0	V
Input Logic "0" Threshold	$V_{OUT} = +8V$, $R_L = 100\Omega$	0.4	0.6		V
Positive Output Swing	$I_{OUT} = 100$ mA	7.0	+8.0		V
Negative Output Swing	$I_{OUT} = 100$ mA		−8.0	−7.0	V
Positive Short Circuit Current	$V_{IN} = 0V$, $R_L = 0\Omega$ (Pulse Test, Duty Cycle ≤ 3%)	400	800		mA
Negative Short Circuit Current	$V_{IN} = 1.5V$, $I_{IN} = 50$ mA, $R_L = 0\Omega$ (Pulse Test, Duty Cycle ≤ 3%)	800	1000		mA
Turn-On Delay	$V_{IN} = 1.5V$, $V_{OUT} = -3V$		10	15	ns
Turn-Off Delay	$V_{IN} = 1.5V$, $V_{OUT} = +3V$		15	30	ns
On Supply Current	$V_{IN} = 1.5V$		45	60	mA

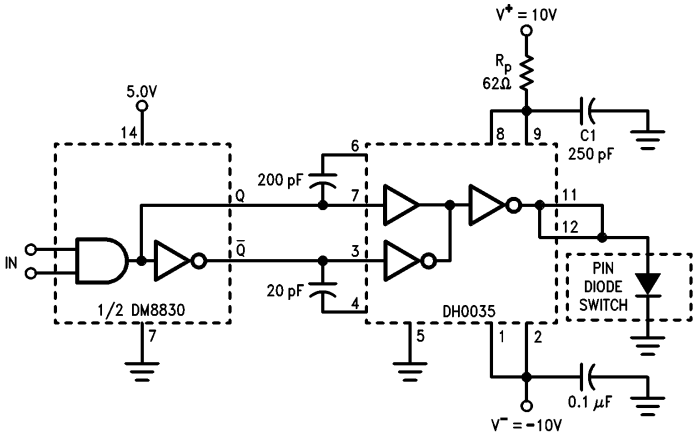
Note 1: Unless otherwise specified, these specifications apply for $V^+ = 10.0V$, $V^- = -10.0V$, pin 5 grounded, over the temperature range −55°C to +125°C for the DH0035, and 0°C to +85°C for the DH0035C.

Note 2: All typical values are for $T_A = 25°C$.

Note 3: Derate linearly at 10 mW/°C for ambient temperatures above 25°C.

Typical Applications

Grounded Cathode Design

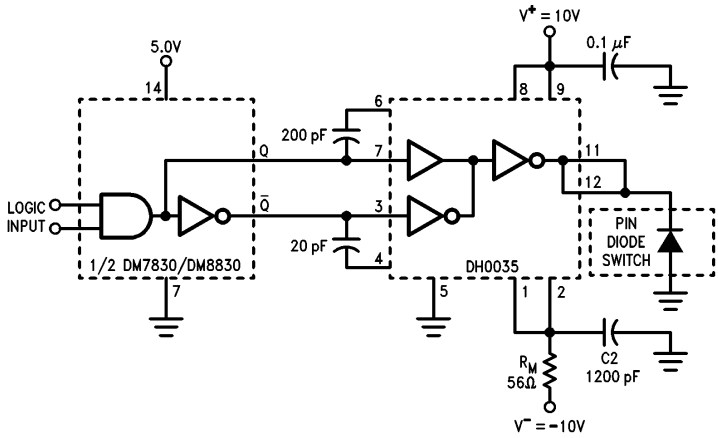


TL/K/10124–3

Note: Cathode grounded PIN diode: $R_p = 62\Omega$ limits diode forward current to 100 mA. Typical switching for HP33604A, RF turn-on 25 ns, turn-off 5 ns. C2 = 250 pF, $R_p = 0\Omega$, C1 = 0.1F.

Typical Applications (Continued)

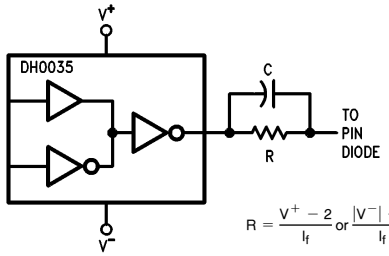
Grounded Anode Design



TL/K/10124–4

Note: Anode Grounded PIN diode: $R_M = 56\Omega$ limits diode forward current to 100 mA. Typical switching for HP33622A, RF turn-on 5 ns; turn-off 4 ns. C1 = 470 pF, C2 = 0.1 μF, $R_M = 0\Omega$.

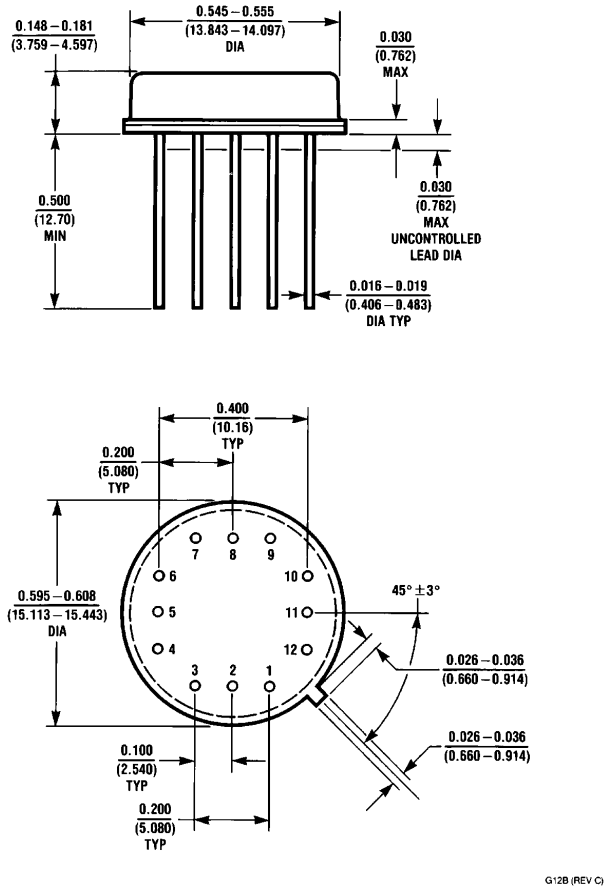
Alternate Current Limiting



$$R = \frac{V^+ - 2}{I_f} \text{ or } \frac{|V^-| - 2}{I_f}$$

TL/K/10124–5

Physical Dimensions inches (millimeters)



12 Lead Metal Can Package
Order Number DH0035G-MIL or DH0035CG
NS Package Number G12B

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