National Semiconductor

May 1986

DS8654 8-Output Display Driver (LED, VF, Thermal Printer)

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General Description

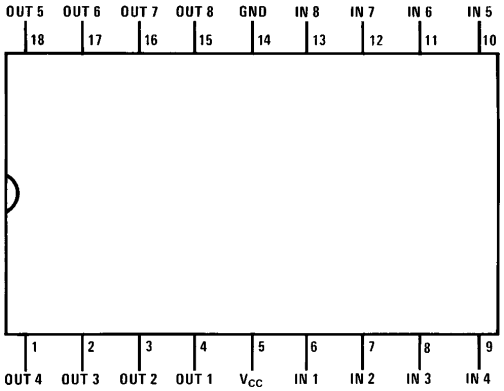
DS8654 is an 8-digit driver with emitter/follower outputs. It can source up to 50 mA at a low impedance, and operates with a constant internal drive current over a wide range of power supply—from 4.5V to 33V. The DS8654 can be used to drive electrical or mechanical, multiplexed or unmultiplexed display systems. It can be used as a segment driver for common cathode displays with external current limiting resistors or can drive incandescent or fluorescent displays directly, both digits (anodes) and segments (grids). It will be necessary to run the device at a lower duty cycle, to keep the maximum package dc power dissipation less than 600 mW while operating all 8 outputs at high supply voltage and large source current. The inputs are MOS compatible and eliminate the need for level shifting since inputs are referenced to the most negative supply of system.

System Description

The DS8654 is specifically designed to operate a thermal printing head for calculator or other uses. In this application the same segment in each digit is selected at the same time, reducing the overall time for a complete print cycle. The DS8654 is an 8-digit driver. With a 15-digit print head, two of the DS8654 are required.

Connection Diagram

Dual-In-Line Package



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Top View

Order Number DS8654N
See NS Package Number N18A

RRD-B30M105/Printed in U. S. A.

Absolute Maximum Ratings (Note 1)

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

Supply Voltage	36V
Input Voltage	36V
Output Voltage	V_{CC} − 36V
Storage Temperature Range	−65°C to +150°C
Maximum Power Dissipation* at 25°C Molded Package	1563 mW
Lead Temperature (Soldering, 4 seconds)	260°C

*Derate molded package 12.5 mW/°C above 25°C.

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})	4.5	33	V
Temperature (T_A)	0	+70	°C

Electrical Characteristics (Notes 2 and 3)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
I_{IH}	Logical "1" Input Current	V_{CC} = Max, V_{IN} = 6.5V		390	500	μA
I_{IL}	Logical "0" Input Current	V_{CC} = Max, V_{IN} = 0.4V		13	40	μA
I_{OFF}	"Off" State Leakage Current	V_{OUT} = V_{CC} − 33V		0.01	−100	μA
V_{ON}	"On" State Output Voltage	V_{CC} = Max, I_{IN} = 500 μA, I_{OH} = −50 mA		V_{CC} − 1.8	V_{CC} − 2.5	V
$I_{CC(OFF)}$	Supply Current	V_{CC} = Max, V_{IN} = V_{OUT} = GND		0.01	1.0	mA
$I_{CC(ON)}$	Supply Current (All Outputs "ON")	V_{CC} = Max, V_{IN} = 6.5V, I_{OUT} = 0 mA		7.5	10	mA

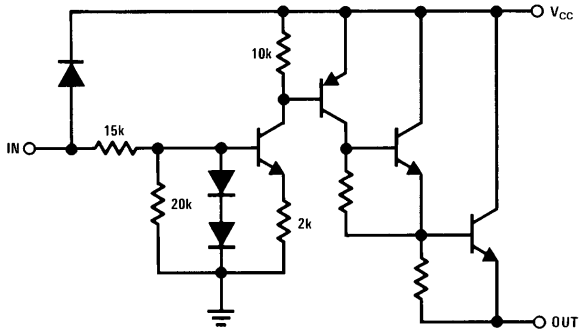
Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Unless otherwise specified min/max limits apply across the 0°C to +70°C range for the DS8654. All typicals are given for V_{CC} = 30V and T_A = 25°C.

Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

Schematic Diagram

DS8654



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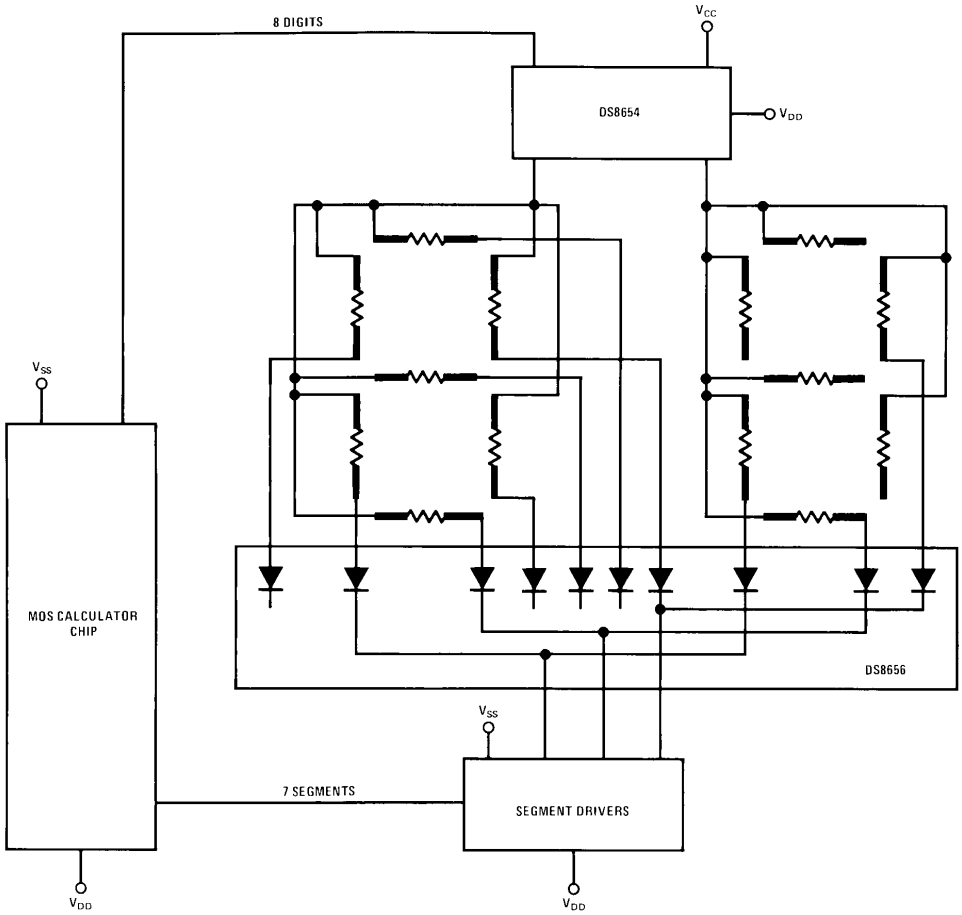
Typical Applications

Thermal Printer



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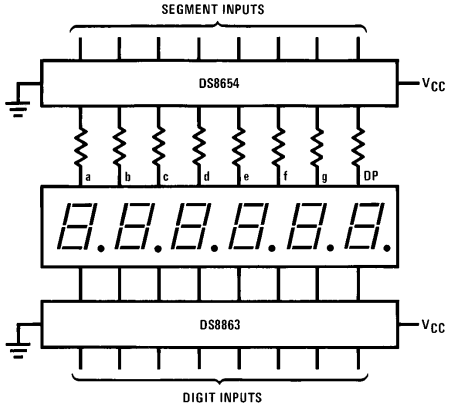
LED Display—0 mA to 50 mA Peak Segment Current



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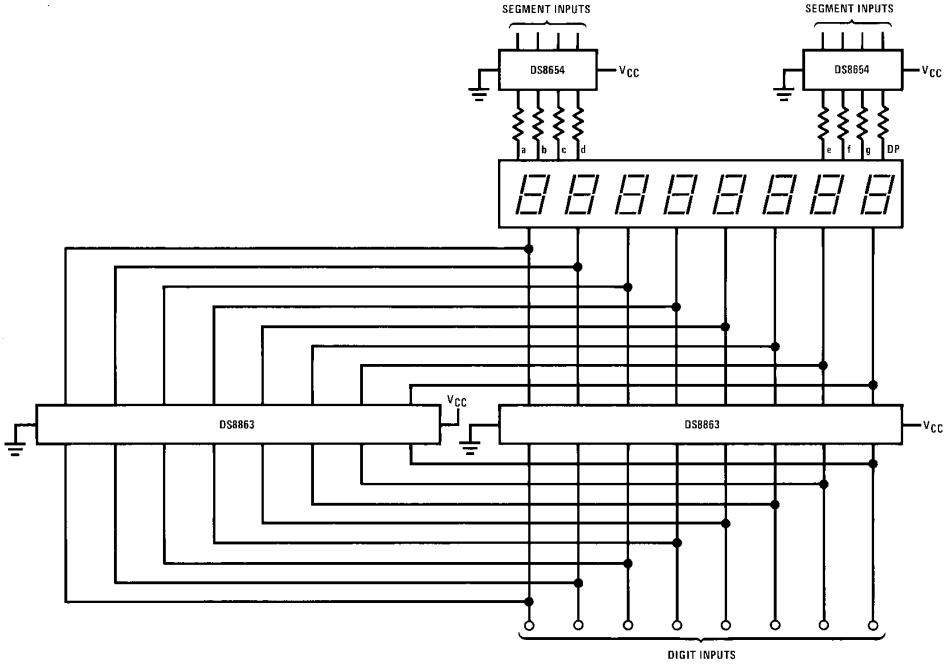
Typical Applications (Continued)

LED Display—50 mA to 100 mA Peak Segment Current



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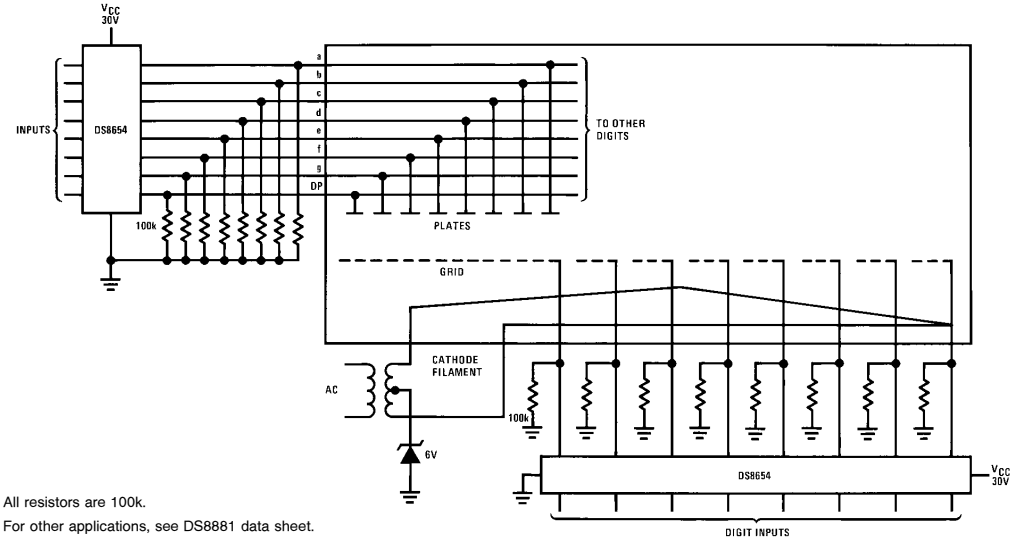
VF Display



All resistors are 100k.

For other applications, see DS8881 data sheet.

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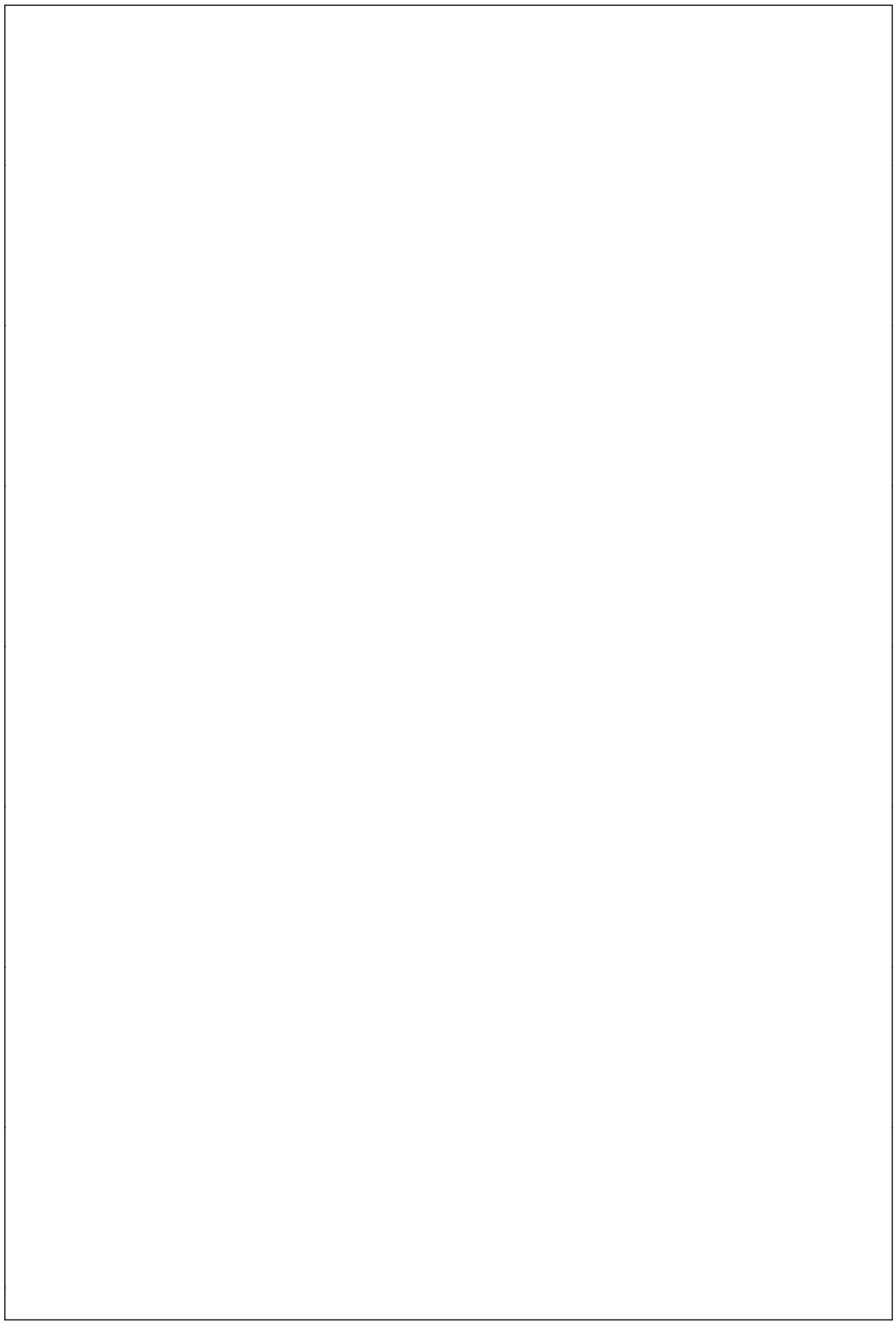
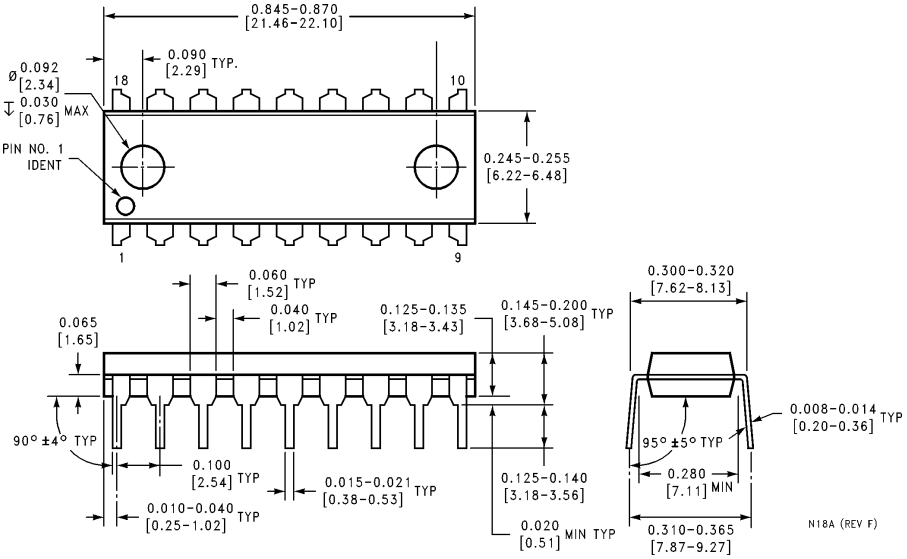


Physical Dimensions inches (millimeters)



Order Number DS8654N
NS Package Number N18A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

National Semiconductor Corporation
1111 West Bardin Road
Arlington, TX 76017
Tel: 1(800) 272-9959
Fax: 1(800) 737-7018

National Semiconductor Europe
Fax: (+49) 0-180-530 85 86
Email: cnjwge@tevm2.nsc.com
Deutsch Tel: (+49) 0-180-530 85 85
English Tel: (+49) 0-180-532 78 32
Français Tel: (+49) 0-180-532 93 58
Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
Tel: 81-043-299-2309
Fax: 81-043-299-2408