

ESD8024

Transient Voltage Suppressors

Low Capacitance ESD Protection for High Speed Data

The ESD8024 transient voltage suppressor is designed specifically to protect Low Voltage Differential Signals (LVDS) for LCD panels. Ultra-low capacitance and low ESD clamping voltage make this device an ideal solution for protecting voltage sensitive data lines. The integrated 24 lines of protection offers a simplified solution with premier performance for LVDS applications.

Features

- Full Function LVDS Solution
- 4 pF Max, I/O to GND
- Protection for the Following IEC Standards:
IEC 61000-4-2 Level 4 (± 8 kV Contact)
- UL Flammability Rating of 94 V-0
- This is a Pb-Free Device

Typical Applications

- LVDS

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

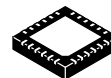
Rating	Symbol	Value	Unit
Operating Junction Temperature Range	T_J	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature – Maximum (10 Seconds)	T_L	260	$^\circ\text{C}$
IEC 61000-4-2 Contact (ESD)	ESD	± 30	kV
IEC 61000-4-2 Air (ESD)	ESD	± 30	kV
Maximum Peak Pulse Current 8 x 20 μs @ $T_A = 25^\circ\text{C}$	I_{pp}	20	A

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



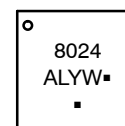
ON Semiconductor®

<http://onsemi.com>



QFN24
CASE 485L

MARKING DIAGRAM



8024 = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
ESD8024MNTAG	QFN24 (Pb-Free)	4000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

See Application Note AND8308/D for further description of survivability specs.

ESD8024

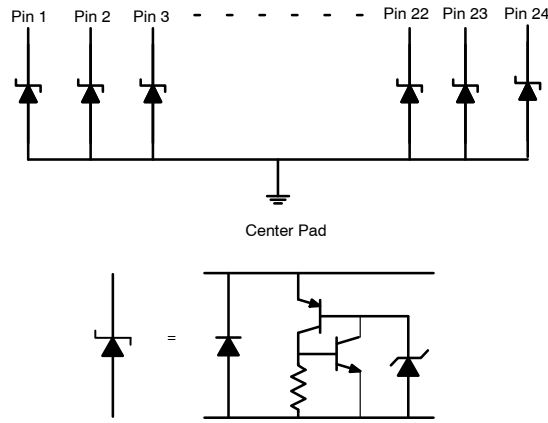
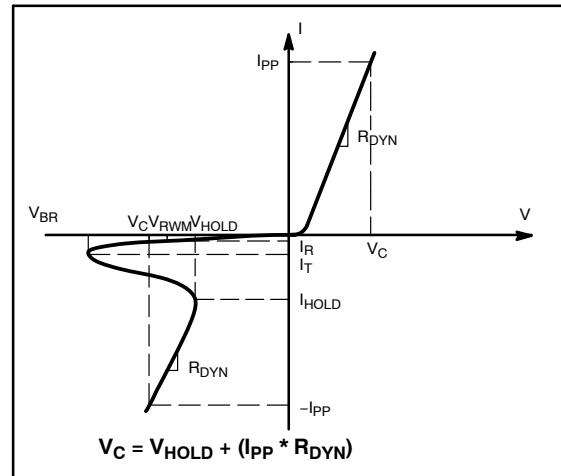


Figure 1. Pin Schematic

ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter
V_{RWM}	Working Peak Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
V_{HOLD}	Holding Reverse Voltage
I_{HOLD}	Holding Reverse Current
R_{DYN}	Dynamic Resistance
I_{PP}	Maximum Peak Pulse Current
V_C	Clamping Voltage @ I_{PP} $V_C = V_{HOLD} + (I_{PP} * R_{DYN})$



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	All Pins (1-24) to GND (Note 1)			2.5	V
Forward Voltage	V_F	$I_F = 10 \text{ mA}$, GND to All Pins (1-24)	0.5	0.85	1.1	V
Breakdown Voltage	V_{BR}	$I_T = 1 \text{ mA}$, All Pins (1-24) to GND	5.5	7.0	9.0	V
Reverse Leakage Current	I_R	$V_{RWM} = 2.5 \text{ V}$, All Pins (1-24) to GND			0.5	μA
Holding Reverse Voltage	V_{HOLD}	I/O Pin to GND	1	1.5		V
Holding Reverse Current	I_{HOLD}	I/O Pin to GND		50		mA
Clamping Voltage	V_C	$I_{PP} = 1 \text{ A}$, All Pins (1-24) to GND (8 x 20 μs pulse)			4.0	V
Clamping Voltage	V_C	$I_{PP} = 10 \text{ A}$, All Pins (1-24) to GND (8 x 20 μs pulse)			7.0	V
Clamping Voltage	V_C	$I_{PP} = 15 \text{ A}$, All Pins (1-24) to GND (8 x 20 μs pulse)			8.0	V
Clamping Voltage	V_C	IEC61000-4-2, $\pm 8 \text{ kV}$ Contact	See Figures 2 and 3			V
Junction Capacitance	C_J	$V_R = 0 \text{ V}$, $f = 1 \text{ MHz}$ between I/O Pins			2.0	pF
Junction Capacitance	C_J	$V_R = 0 \text{ V}$, $f = 1 \text{ MHz}$ between I/O Pins and GND			4.0	pF

1. TVS devices are normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal or greater than the DC or continuous peak operating voltage level.

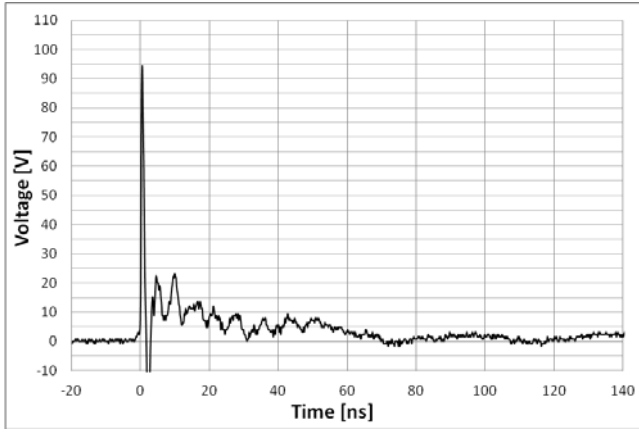


Figure 2. IEC61000-4-2 +8 KV Contact Clamping Voltage

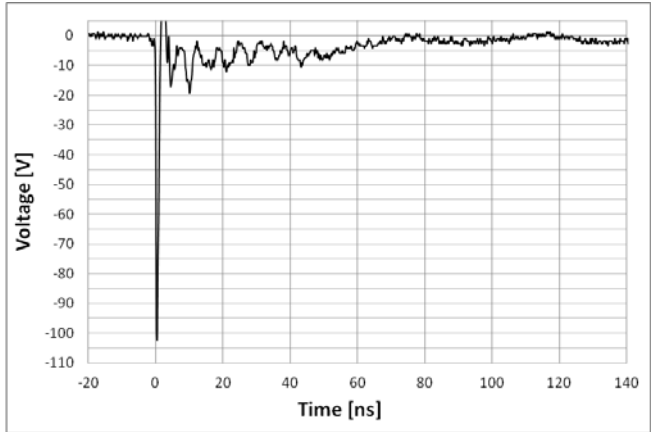


Figure 3. IEC61000-4-2 -8 KV Contact Clamping Voltage

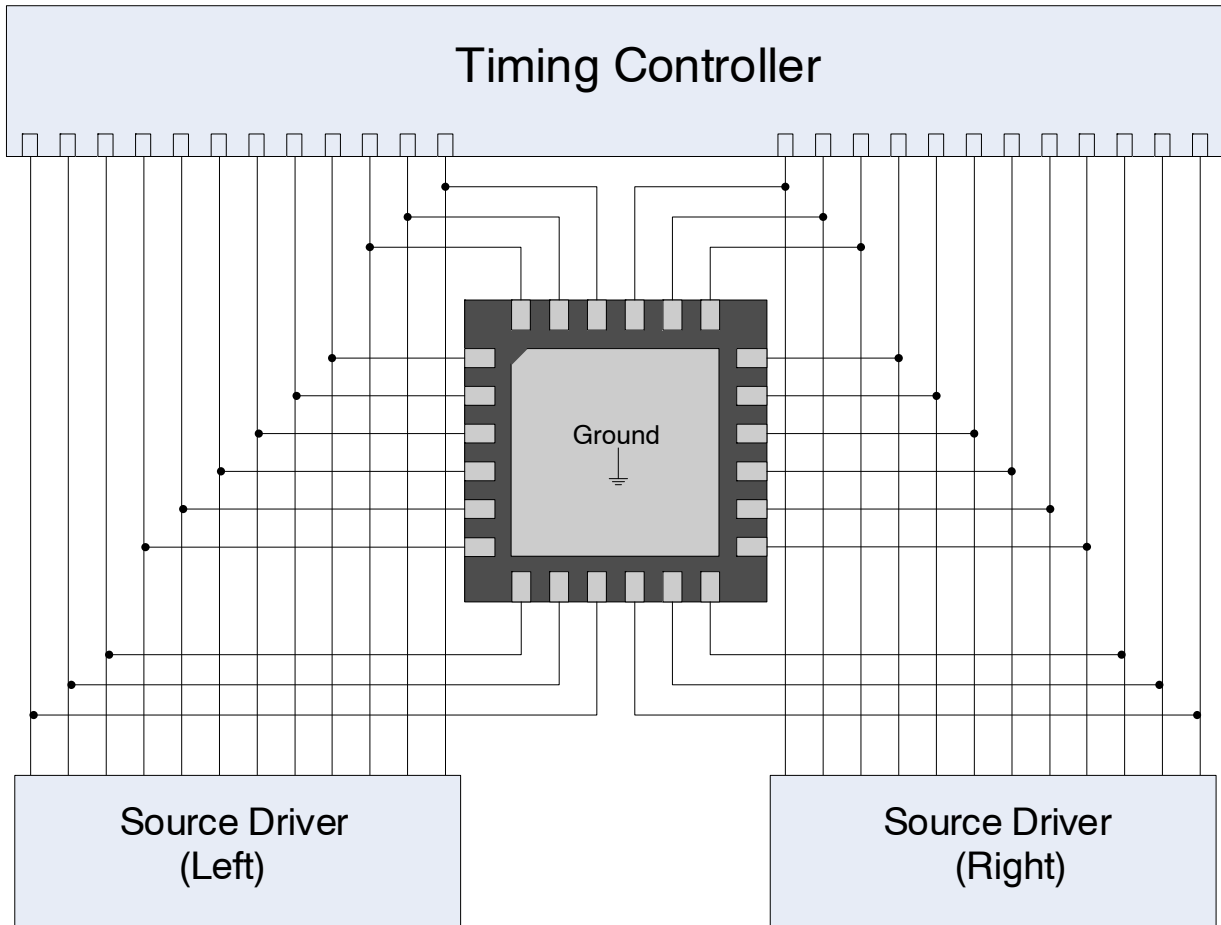
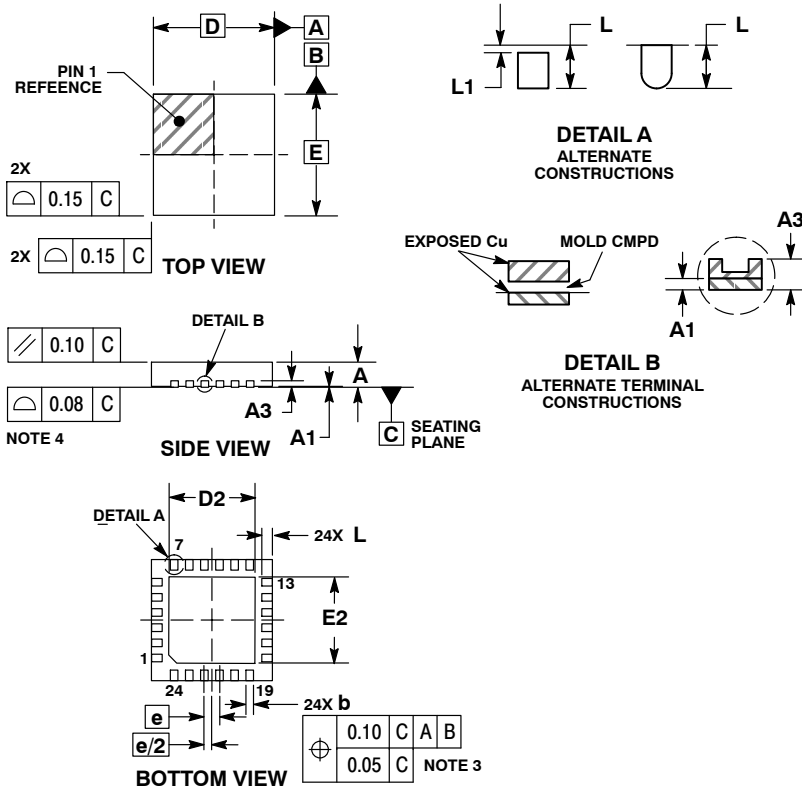


Figure 4. Board Routing Diagram - LVDS Interface

ESD8024

PACKAGE DIMENSIONS

QFN24, 4x4, 0.5P
CASE 485L
ISSUE B

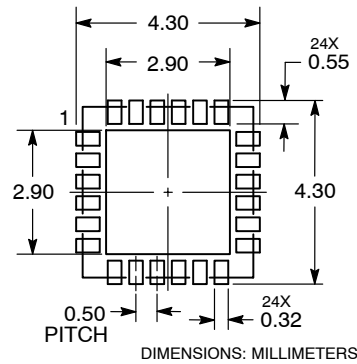


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.20	REF
b	0.20	0.30
D	4.00	BSC
D2	2.70	2.90
E	4.00	BSC
E2	2.70	2.90
e	0.50	BSC
L	0.30	0.50
L1	0.05	0.15

RECOMMENDED SOLDERING FOOTPRINT



ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative