

CM1240

Dual-Voltage ESD Protection Array for USB Ports

Product Description

The CM1240 is a 4-channel ESD protection array. Three channels of the CM1240 are low voltage (LV) diodes, which have a capacitance of 7 pF enabling them to protect high speed I/O ports while providing robust ESD protection. The other channel of the CM1240 is a high voltage (HV) diode which has a capacitance of 25 pF enabling it to protect power supply inputs or OLED power rails, etc.

The parts integrate avalanche-type ESD diodes, which provide a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The ESD protection diodes are designed and characterized to safely dissipate ESD strikes of ± 8 kV, the maximum requirement of the IEC61000-4-2 international standard. Using the MIL-STD-883 (Method 3015) specification for Human Body Model (HBM) ESD, the pins are protected for contact discharges of greater than ± 16 kV.

This device is particularly well suited for portable electronics (e.g. wireless handsets, PDAs, notebook computers) because of its small package format and easy-to-use pin assignments. In particular, the CM1240 is ideal for protecting USB or mini-USB ports operating at full speed (12 Mbps).

Features

- Four Channels of ESD Protection
- ± 8 kV ESD Protection (IEC61000-4-2, Contact Discharge)
- ± 16 kV ESD Protection (HBM)
- SOT-563 Space-saving Package
- 16 V Clamp on V_{CC}
- These Devices are Pb-Free and are RoHS Compliant

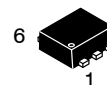
Applications

- USB and Mini-USB Applications
- I/O Port Protection for Mobile Handsets
- Wireless Handsets



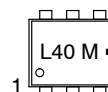
ON Semiconductor®

<http://onsemi.com>



SOT-563
SE SUFFIX
CASE 463A

MARKING DIAGRAM



L40 = Specific Device Code
M = Month Code
▪ = Pb-Free Package

ORDERING INFORMATION

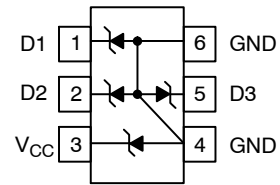
Device	Package	Shipping†
CM1240-F4SE	SOT-563 (Pb-Free)	5000/Tape & Reel

†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.

Table 1. PIN DESCRIPTIONS

6-pin SOT-563 Package		
Pin	Name	Description
1	D1	Cathode Connection for Low Voltage ESD Diode
2	D2	Cathode Connection for Low Voltage ESD Diode
5	D3	Cathode Connection for Low Voltage ESD Diode
3	V _{CC}	Cathode Connection for High Voltage ESD Diode
–	NC	No Connect
–	NC	No Connect
–	NC	No Connect
–	NC	No Connect
4	GND	Anode-side Connection for All ESD Diodes
6	GND	Anode-side Connection for All ESD Diodes

PACKAGE / PINOUT DIAGRAMS



SOT-563

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
ESD Protection (HBM)	16	kV
Pin Voltages V _{CC} to GND All Other Pins to GND	[GND – 0.3] to +13 [GND – 0.3] to +5.5	V
Storage Temperature Range	–65 to +150	°C
Lead Temperature (soldering, 10 sec)	300	°C

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.

Table 3. STANDARD OPERATING CONDITIONS

Parameter	Rating	Units
Operating Temperature Range	–40 to +85	°C

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{LV}	LV Diode Capacitance at 3 Vdc; 1 MHz, 30 mVac			6		pF
C_{HV}	HV Diode Capacitance at 3 Vdc; 1 MHz, 30 mVac			25		pF
I_{LV}	LV Diode Leakage at +3.3 V reverse bias voltage			0.01	0.4	μ A
I_{HV}	HV Diode Leakage at +11 V reverse bias voltage			0.01	0.4	μ A
$V_{CL(LV)}$	LV Diode Signal Clamp Voltage: Positive Clamp, 10 mA Negative Clamp, -10 mA		5.6 -1.5	6.8 -0.8	9 -0.4	V
$V_{CL(HV)}$	HV Diode Signal Clamp Voltage: Positive Clamp, 10 mA Negative Clamp, -10 mA		13 -1.5	16 -0.8	19 -0.4	V
V_{ESD}	In-system ESD withstand voltage: Human Body Model (MIL-STD-883, method 3015) IEC 61000-4-2, contact discharge method	(Note 2)	± 25 ± 12			kV
$R_{DYN(LV)}$	LV Diode Dynamic Resistance: Positive Negative			2.8 1.2		Ω
$R_{DYN(HV)}$	HV Diode Dynamic Resistance: Positive Negative			1.0 0.7		Ω

1. Guaranteed at 25°C only

2. ESD applied to input/output pins with respect to GND, one at a time. These parameters are guaranteed by design.

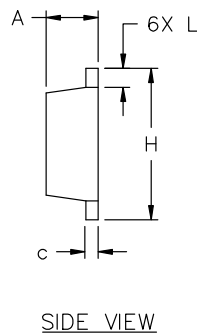
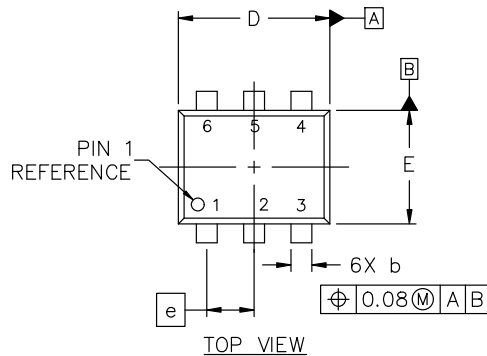


SOT-563-6 1.60x1.20x0.55, 0.50P
CASE 463A
ISSUE J

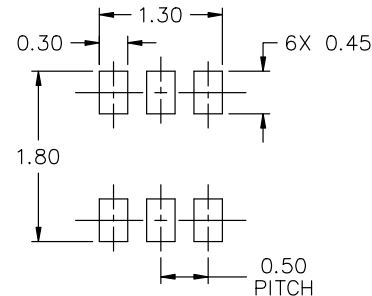
DATE 15 FEB 2024

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.50	1.60	1.70
E	1.10	1.20	1.30
e	0.50 BSC		
H	1.50	1.60	1.70
L	0.10	0.20	0.30



RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

STYLE 1:
PIN 1. EMITTER 1
2. BASE 1
3. COLLECTOR 2
4. EMITTER 2
5. BASE 2
6. COLLECTOR 1

STYLE 2:
PIN 1. EMITTER 1
2. EMITTER 2
3. BASE 2
4. COLLECTOR 2
5. BASE 1
6. COLLECTOR 1

STYLE 3:
PIN 1. CATHODE 1
2. CATHODE 1
3. ANODE/ANODE 2
4. CATHODE 2
5. CATHODE 2
6. ANODE/ANODE 1

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. CATHODE
3. ANODE
4. ANODE
5. CATHODE
6. CATHODE

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

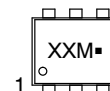
STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

STYLE 11:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

**GENERIC
MARKING DIAGRAM***



XX = Specific Device Code
M = Month Code
▪ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	98AON11126D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	SOT-563-6 1.60x1.20x0.55, 0.50P	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales