Switching Diode Array, Steering Diode Array

MMAD1103(e3)

Product Overview

These low capacitance diode arrays are multiple, discrete, isolated junctions fabricated by a planar process and mounted in a 14-Pin SOIC package for use as steering diodes protecting up to eight I/O ports from ESD, EFT, or surge by directing them either to the positive side of the power supply line or to ground (see Schematic and Circuit). An external TVS diode may be added between the positive supply line and ground to prevent overvoltage on the supply rail. They may also be used in fast switching core-driver applications. This includes computers and peripheral equipment such as magnetic cores, thin-film memories, plated-wire memories, etc., as well as decoding or encoding applications. These arrays offer many advantages of integrated circuits such as high-density packaging and improved reliability. This is a result of fewer pick and place operations, smaller footprint, smaller weight, and elimination of various discrete packages that may not be as user friendly in PC board mounting. They are available with either tin-lead plating terminations or as RoHS compliant with annealed matte-tin finish.

Features

- 16-diode array protects 8 lines
- Molded 14-Pin SOIC package
- UL 94V-0 flammability classification
- Low capacitance 1.5 pF per diode
- Switching speeds less than 5 ns
- IEC 61000-4 compatible:
  - 61000-4-2 (ESD): Air 15 kV, contact – 8 kV
  - 61000-4-4 (EFT): 40 A – 5/50 ns
  - 61000-4-5 (surge): 12 A, 8/20 μs
- RoHS compliant device is available

Applications/Benefits

- Low capacitance steering diode protection for high frequency data lines
- Ideal for:
  - RS-232 and RS-422 Interface Networks
  - Ethernet: 10 Base T
  - Computer I/O Ports
  - LAN
  - Switching Core Drivers

Figure 1. SO-14 Package

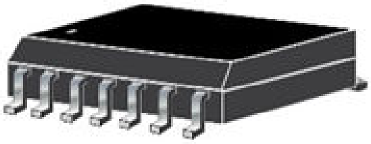
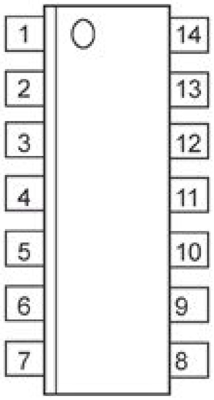


Figure 2. Top Viewing Pin Layout



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1. Maximum Ratings

Table 1-1. Maximum Ratings

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	−55 to +150	°C/W
Peak Working Reverse Voltage	V_{RWM}	75	V
Repetitive Peak Forward Current (one diode)	I_{FRM}	400	mA
Forward Surge Current @ 8.3 ms @ 8/20 µs	I_{FSM}	2.0 12	A
Rated Average Power Dissipation (total package)	$P_{M(AV)}$	1500	mW
Solder Temperature @ 10 s	—	260	°C

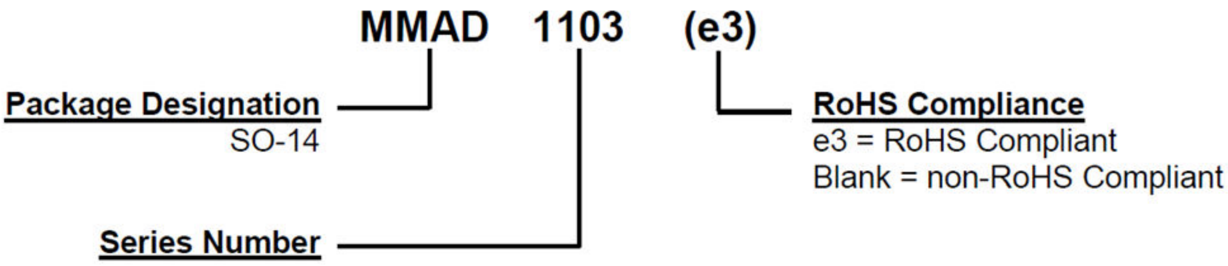
1.1. Mechanical Packaging

- Case: Void-free transfer molded thermosetting epoxy body meeting UL94V-0 flammability classification.
- Terminals: Tin-lead or RoHS compliant annealed matte-tin plating solderable per MIL-STD-750 method 2026.
- Marking: MSC logo, part number, date code and RoHS compliance. Pin #1 is to the left of the dot or indent on top of package.
- Delivery option: Tape and reel or carrier tube. Consult factory for quantities.
- Weight: Approximately 0.127 grams

See Package Dimensions.

2. Part Nomenclature

Figure 2-1. Part Nomenclature



3. Symbols and Definitions

Table 3-1. Symbols and Definitions

Symbol	Definition
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
I_F	Forward Current: The forward current dc value, no alternating component.
t_{rr}	Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified decay point after a peak reverse current occurs.
C_T	Total Capacitance: The total small signal capacitance between the diode terminals of a complete device.
$I_{(BR)}$	Breakdown Current: The current used for measuring Breakdown Voltage $V_{(BR)}$.
I_D	Standby Current: The current through the device at rated standoff voltage.
$V_{(BR)}$	Breakdown Voltage: The voltage across the device at a specified current $I_{(BR)}$ in the breakdown region.
V_R	Reverse Voltage: A positive dc cathode-anode voltage below the breakdown region.
I_R	Reverse Current: The dc current flowing from the external circuit into the cathode terminal at the specified voltage V_R.
I_{FSM}	Surge Peak Forward Current: The forward current including all nonrepetitive transient currents but excluding all repetitive transients (Ref. JESD282-B).
I_{FRM}	Repetitive Peak Forward Current: The peak forward current including all repetitive transient currents but excluding all nonrepetitive transient currents. (Ref. JESD282-B.)

4. Electrical Characteristics

Table 4-1. Electrical Characteristics @ 25 °C Unless Otherwise Stated

Part Number	Breakdown Voltage	Test Current	Leakage Current	Leakage Current	Reverse Voltage	Total Capacitance	Reverse Recovery Time	Forward Voltage	Forward Voltage
	$V_{(BR)}$ @ $I_{(BR)}$	$I_{(BR)}$	I_R @ V_R	I_R @ V_R T_A = 150 °C	V_R	C_T @ 0V	t_{rr}	V_F @ I_F = 10mA	V_F @ I_F = 100mA
	(V)	(μA)	(μA)	(μA)	(V)	(pF)	(ns)	(V)	(V)
	Min		Max	Max		Typical	Max	Max	Max
MMAD1103(E3)	90	100	0.200	300	20	1.50	5.00	1.00	1.20

5. Package Dimensions

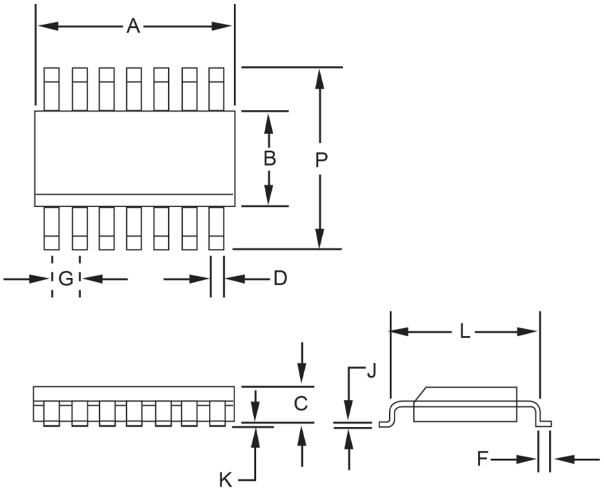
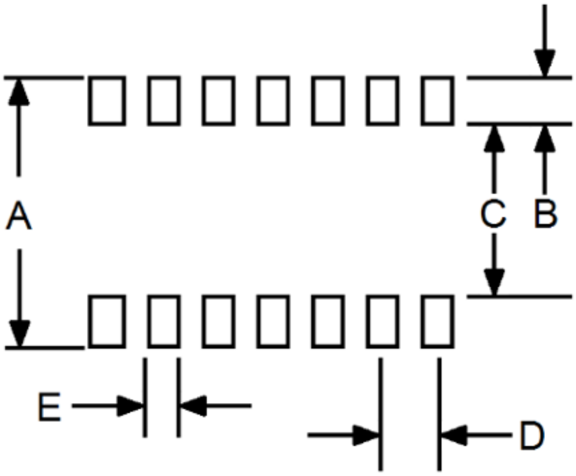


Figure 5-1. Package Dimensions

Ref.	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	0.336	0.344	8.53	8.74
B	0.150	0.158	3.81	4.01
C	0.053	0.069	1.35	1.75
D	0.011	0.021	0.28	0.53
F	0.016	0.050	0.41	1.27
G	0.050 BSC		1.27 BSC	
J	0.006	0.010	0.15	0.25
K	0.004	0.008	0.10	0.20
L	0.189	0.206	4.80	5.23
P	0.228	0.244	5.79	6.19

6. Pad Layout

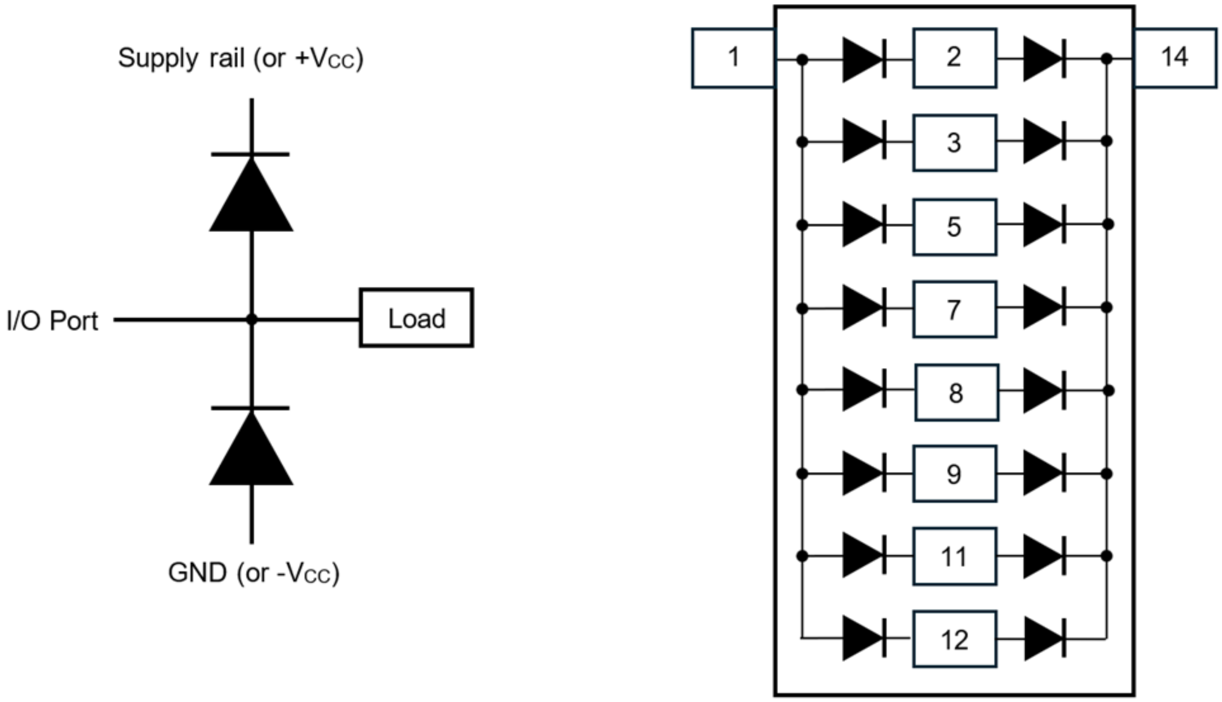
Figure 6-1. Pad Layout



Ref.	Dimensions	
	Inch	Millimeters
	Typical	Typical
A	0.275	6.99
B	0.060	1.52
C	0.144	3.94
D	0.050	1.27
E	0.024	0.61

7. Schematic and Circuit

Figure 7-1. Schematic and Circuit



8. Revision History

Revision Level	Date	Description
A	2/2026	Initial version created in the Microchip template. Legacy document number is RF01063.

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Trademarks

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