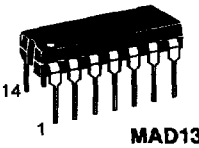
Monolithic Diode Arrays

MAD130P
MAD1103P
MAD1107P
MAD1108P
Motorola Preferred Devices

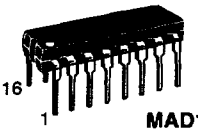
MAXIMUM RATINGS (@ 25°C Free–Air Temperature unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Reverse Voltage(1)	V_{RM}	50	Vdc
Steady–State Reverse Voltage	V_R	50	Vdc
Peak Forward Current at (or below) 25°C Free–Air Temperature(1)	I_{FM}	500	mAdc
Continuous Forward Current at (or below) 25°C Free–Air Temperature(2)	I_F	400	mAdc
Continuous Power Dissipation at (or below) 25°C Free–Air Temperature(3)	P_D	600	mW
Operating Free–Air Temperature Range	T_A	−65 to +125	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C
Lead Temperature 1/16″ from Case for 10 Seconds		260	°C

NOTES:
1. These values apply for PW ≤ 100 μs, duty cycle ≤ 20%.
2. Derate linearity to +125°C temperature at rate of 3.2 mA/°C.
3. Derate linearity to +125°C temperature at rate of 6.0 mW/°C.



MAD130P
MAD1103P, MAD1107P
CASE 646–06



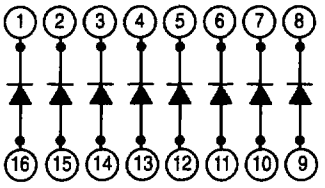
MAD1108P
CASE 648–08

PACKAGE OPTIONS

Device	PLASTIC P Suffix		Device	PLASTIC P Suffix	
	Pin Connection Ref. No.	Case		Pin Connection Ref. No.	Case
MAD130P Dual 10–Diode Array	3	646–06	MAD1107P Dual 8–Diode Array	2	646–06
MAD1103P Dual 8–Diode Array	4	646–06	MAD1108P 8–Diode Array	1	648–08

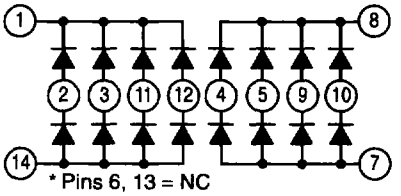
PIN CONNECTION DIAGRAMS

1
8–Diode Array
16–Pin Package



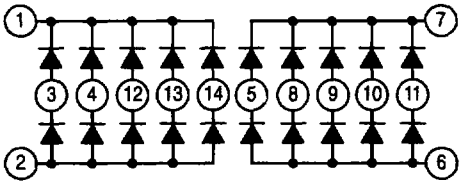
Case 648

2
Dual 8–Diode Array
14–Pin Package



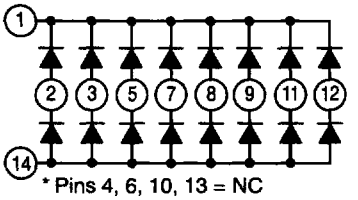
* Pins 6, 13 = NC
Case 646

3
Dual 10–Diode Array
14–Pin Package



Case 646

4
Dual 8–Diode Array
14–Pin Package



* Pins 4, 6, 10, 13 = NC
Case 646

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 1

MOTOROLA

ELECTRICAL CHARACTERISTICS (@ 25°C Free–Air Temperature)

Characteristic	Symbol	Limit		Unit
		Min	Max	
Reverse Breakdown Voltage(1) (I_R = 10 μAdc)	$V_{(BR)}$	50	—	Vdc
Static Reverse Current (V_R = 40 Vdc)	I_R	— —	0.1 —	μAdc
Static Forward Voltage (I_F = 100 mAdc) (I_F = 500 mAdc)(2)	V_F	— —	1.2 1.6	Vdc
Peak Forward Voltage(3) (I_F = 500 mAdc)	V_{FM}	—	5.0	Vdc

SWITCHING CHARACTERISTICS (@ 25°C Free–Air Temperature)

Characteristic	Symbol	Typical Value		Unit
Forward Recovery Time, Figure 3 (I_F = 500 mAdc)	t_{fr}	20		ns
Reverse Recovery Time, Figure 2	t_{rr}	MAD1108	8.0	ns
(I_F = 200 mAdc, I_{RM} = 200 mAdc, R_L = 100 Ω, i_{rr} = 20 mAdc)		Others	10	

NOTES:

1. This parameter must be measured using pulse techniques. PW = 100 μs, duty cycle ≤ 20%.
2. This parameter is measured using pulse techniques. PW = 300 μs, duty cycle ≤ 2.0%. Read time is 90 μs from the leading edge of the pulse.
3. The initial instantaneous value is measured using pulse techniques. PW = 150 ns, duty cycle ≤ 2.0%, pulse rise time ≤ 10 ns. The total capacitance shunting the diode is 19 pF maximum and the equipment bandwidth is 80 MHz.

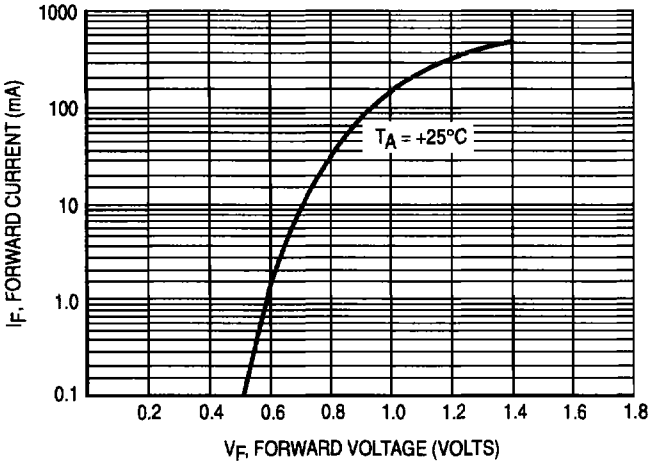


Figure 1. Typical Characteristics Static Forward Voltage

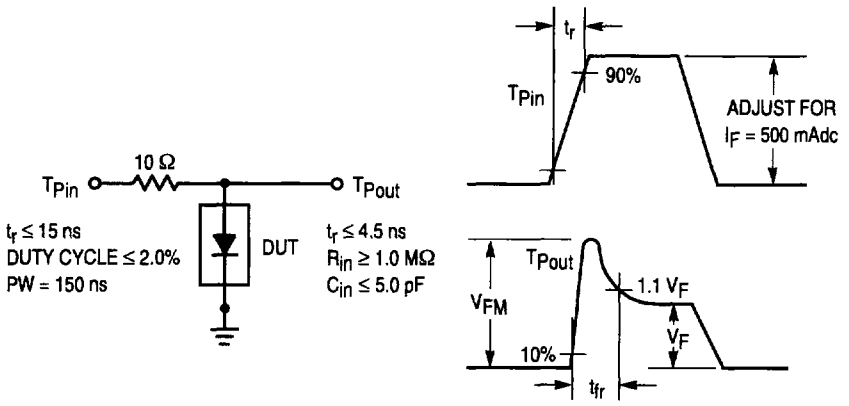


Figure 2. Forward Recovery Time and Peak Forward Voltage Test Circuit and Waveforms

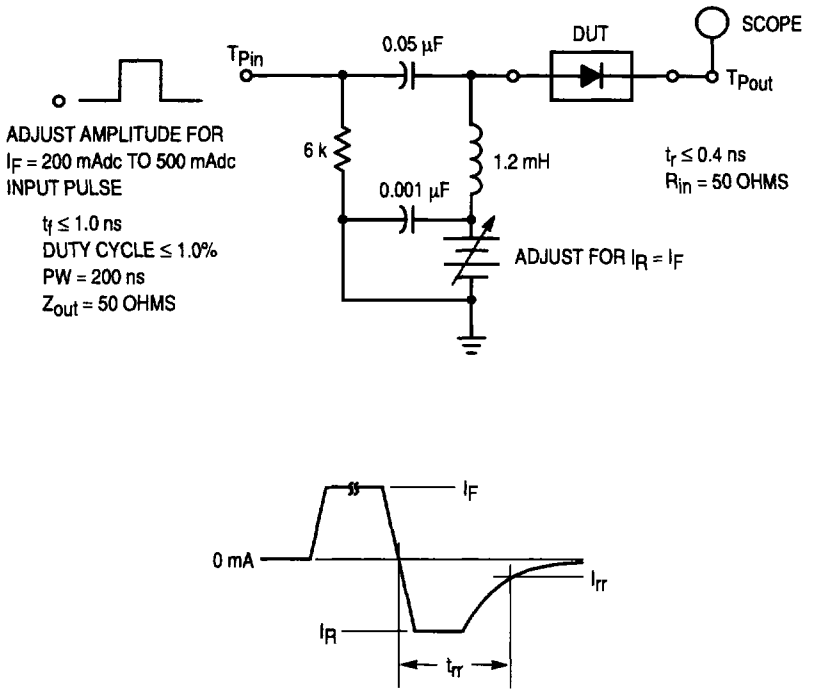


Figure 3. Reverse Recovery Time Test Circuit and Waveforms

TEST PROCEDURE FOR MULTIPLE DIODES

1.0. REVERSE BIAS TESTING

1.1. LEAKAGE

Regardless of device configuration type, when testing any reverse bias condition, the forcing power supply must be applied only to the uncommon terminal of the pair. As in Figure 1, this would be pins 1 and 14. This can be referred as the high side of the test circuit. The low side of the test circuit must be connected to the common terminal of the pair which in most testers is where the current measurement is taken. This method is used to eliminate the possibility of degrading the diode in that pair which is not under test. Diode arrays with multiple pairs such as the MAD1103, also have leakage paths in the die between common terminals of the pairs. To isolate the device under test so that the leakage from the other pairs in the package do not affect the test result, the leakage current from the common terminals of the pairs not under test must be shunted to measurement common. Figure 1 shows the test configuration for both of these cases.

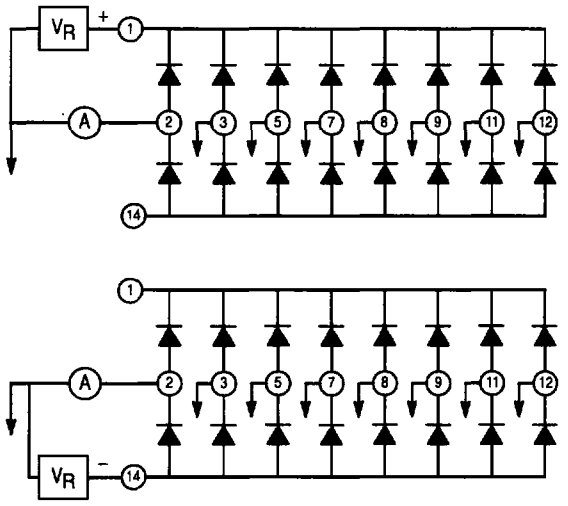


Figure 1

1.2. BREAKDOWN

It is not recommended to test breakdown on these devices due to the possibility of degrading the device. Breakdown may be checked on a curve tracer but extreme caution should be used.

2.0. FORWARD BIAS TESTING

Diode arrays are designed with the pairs in parallel therefore care must be taken to prevent the other diodes in the array from affecting the measured value of the diode under test. Figure 2 illustrates the proper technique to measure only the correct value of the diode under test.

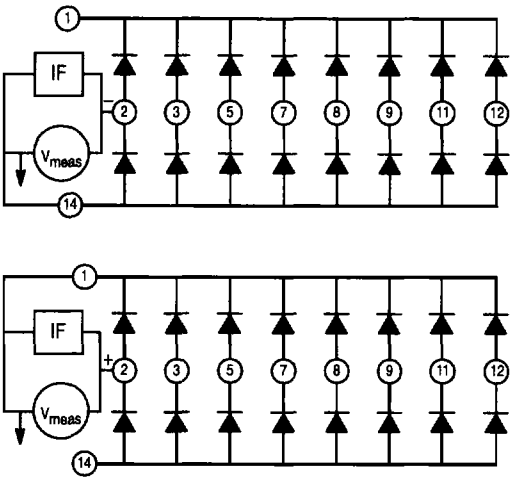


Figure 2

2.1. KELVIN CONNECTION

To achieve the best possible accuracy when testing bias currents over 10 mA, Kelvin connection to the leads of the device under test is mandatory. True Kelvin connection dictates that two test connections are made directly to the leads of the device. One is for power which is the bias supply, and the other is for sense which is for the measurement circuit. Kelvin connections are used to eliminate the effects of the connection resistance between the lead of the device and the contacts of the test handler and/or hand fixture. Figure 3 is an example of Kelvin connection.

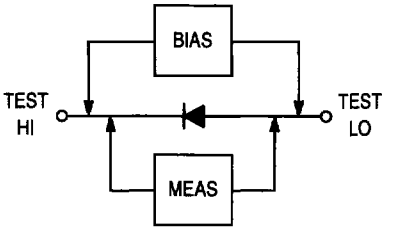


Figure 3

2.2. PULSE TESTING

When testing bias currents over 10 mA, pulse testing should be used to minimize thermal drift of the measured value. The pulse width of a pulse test is approximately 300 μs to 380 μs.

3.0. TESTING PROTOCOL

3.1. TEST TYPES

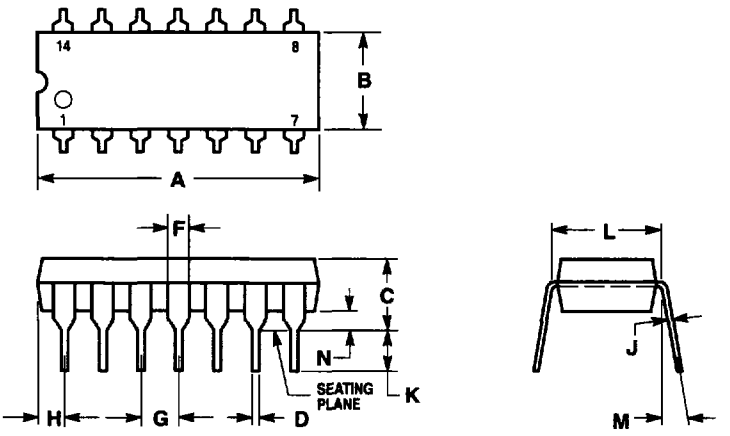
When testing in sequence all of the electrical characteristics, all reverse bias conditions should be tested before the forward bias conditions are tested.

3.2. BIASING MAGNITUDES

Tests of the same test type should be grouped together with the bias conditions in ascending order. For example:

V_F @ 10 mA < 0.6 V
V_F @ 50 mA < 0.8 V
V_F @ 100 mA < 1 V
V_F @ 500 mA < 1.5 V

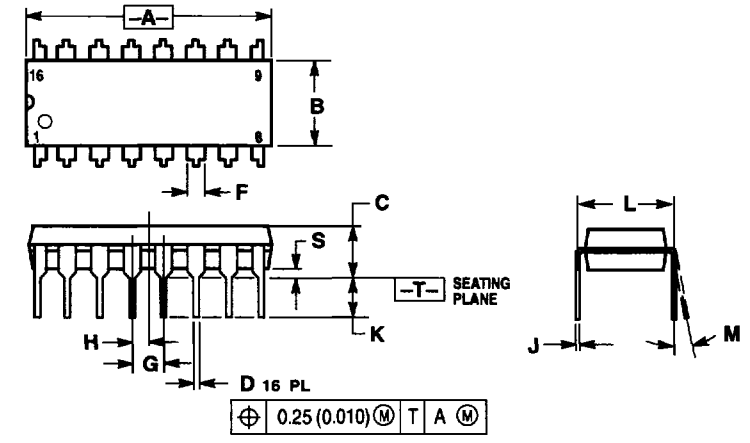
PACKAGE DIMENSIONS



NOTES:
1. LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
4. ROUNDED CORNERS OPTIONAL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	19.56
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.300 BSC		7.62 BSC	
M	0°	10°	0°	10°
N	0.015	0.039	0.39	1.01

CASE 646–06
ISSUE M



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0°	10°	0°	10°
S	0.020	0.040	0.51	1.01

CASE 648–08
ISSUE R

NOTES

How to reach us:
USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

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Nishi–Gotanda, Shinagawa–ku, Tokyo 141, Japan. 81–3–5487–8488

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298