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MOTOROLA

SEMICONDUCTORS

P.O. BOX 20912 • PHOENIX, ARIZONA 85036

MAD130
MAD1103
MAD1107
MAD1108

MONOLITHIC DIODE ARRAY

HIGH CURRENT/FAST SWITCHING

DIODE ARRAY

These diode arrays are multiple diode junctions fabricated by a planar process and mounted in integrated circuit packages for use in high-current, fast-switching core-driver applications. These arrays offer many of the advantages of integrated circuits such as high-density packaging and improved reliability. These advantages result from such factors as fewer connections, more uniform device parameters, smaller size, less weight and fewer glass-to-metal seals.

- Designed for Use in Computers and Peripheral Equipment
- Applications Include:
  - Magnetic Cores
  - Thin-Film Memories
  - Plated-Wire Memories
  - Decoding or Encoding Applications

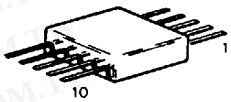
MAXIMUM RATINGS (@ 25°C Free-Air Temperature unless otherwise noted)

Rating	Symbol	MAD130	MAD1103	MAD1107 MAD1108	Unit
Peak Reverse Voltage (1)	V_{RM}	40	50	50	Vdc
Steady-State Reverse Voltage	V_R	25	25	40	Vdc
Peak Forward Current at (or below) 25°C Free-Air Temperature (1)	I_{FM}	500			mA
Continuous Forward Current at (or below) 25°C Free-Air Temperature (2)	I_F	400			mA
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	-65 to +125	-55 to +150	°C
Storage Temperature Range	T_{stg}	-65 to +150	-65 to +150	-65 to +175	°C
Lead Temperature 1/16" from Case for 10 Seconds		260			°C

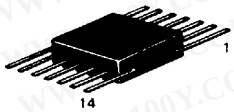
NOTES
1. These values apply for PW ≤ 100 μs, duty cycle ≤ 20%
2. Derate linearity to +125°C temperature at rate of 3.2 mA/°C
3. Derate linearity to +125°C temperature at rate of 6.0 mW/°C

PACKAGE OPTIONS

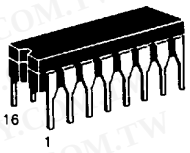
Device	CERAMIC C Suffix		PLASTIC P Suffix		FLAT CERAMIC F Suffix	
	Pin Connection Ref. No.	Case	Pin Connection Ref. No.	Case	Pin Connection Ref. No.	Case
MAD130 Dual 10-Diode Array	3	632-02	3	646-05	—	—
MAD1103 Dual 8-Diode Array	5	632-02	5	646-05	4	606-04
MAD1107 Dual 8-Diode Array	2	632-02	2	646-05	2	607-05
MAD1108 8-Diode Array	1	620-02	1	648-05	1	650-02



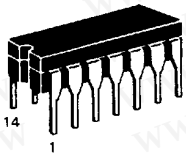
MAD1103F
FLAT CERAMIC PACKAGE
CASE 606-04



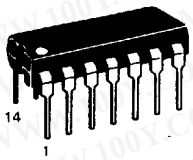
MAD1107F
FLAT CERAMIC PACKAGE
CASE 607-05



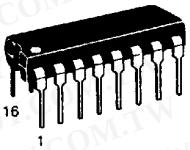
MAD1108C
CERAMIC PACKAGE
CASE 620-02



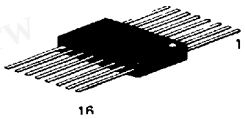
MAD130C
MAD1103C
MAD1107C
CERAMIC PACKAGE
CASE 632-02



MAD130P
MAD1103P
MAD1107P
PLASTIC PACKAGE
CASE 646-05



MAD1108P
PLASTIC PACKAGE
CASE 648-05



MAD1108F
FLAT CERAMIC PACKAGE
CASE 650-02

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

Characteristic		Symbol	Limit Min	Limit Max	Unit
Reverse Breakdown Voltage (1) (I_R = 10 μA)	MAD130	$V_{(BR)}$	40	—	Vdc
	MAD1103/1107/1108		50	—	
Static Reverse Current (V_R = 25 V)	MAD130	I_R	—	0.5	μA
(V_R = 40 V)	MAD1103/1107		—	0.5	
	MAD1108		—	0.1	
Static Forward Voltage (I_F = 100 mA)		V_F	—	1.1	Vdc
(I_F = 500 mA) (2)			—	1.5	
Peak Forward Voltage (3) (I_F = 500 mA)		V_{FM}	—	5.0	Vdc

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% 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%, pulse rise time ≤ 10 ns The total capacitance shunting the diode is 19 pF maximum and the equipment bandwidth is 80 MHz

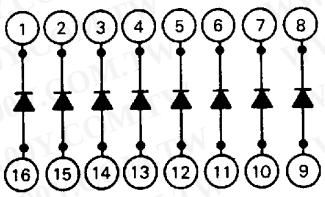
SWITCHING CHARACTERISTICS (@ 25°C Free-Air Temperature)

Characteristic	Symbol	Typical Value	Unit
Forward Recovery Time, Figure 3 (I_F = 500 mA)	t_{fr}	20	ns
Reverse Recovery Time, Figure 2 (I_F = 200 mA, I_{RM} = 200 mA, R_L = 100 Ω, i_{rr} = 20 mA)	t_{rr}	80	ns

PIN CONNECTION DIAGRAMS

1

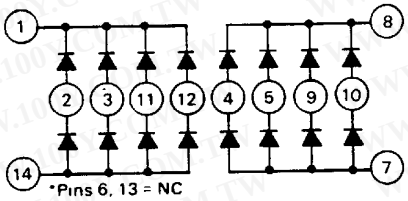
8-Diode Array
16-Pin Package



Case 620, Case 648, Case 650

2

Dual 8-Diode Array
14-Pin Package

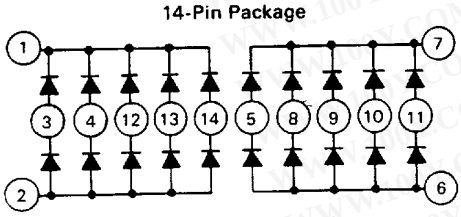


*Pins 6, 13 = NC

Case 607, Case 632, Case 646

3

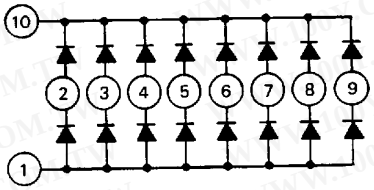
Dual 10-Diode Array
14-Pin Package



Case 632, Case 646

4

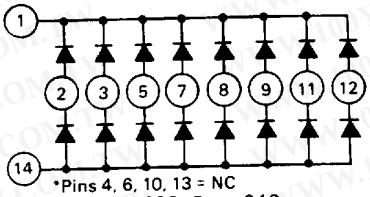
Dual 8-Diode Array
10-Pin Package



Case 606

5

Dual 8-Diode Array
14-Pin Package



*Pins 4, 6, 10, 13 = NC

Case 632, Case 646

FIGURE 1 — TYPICAL CHARACTERISTICS STATIC FORWARD VOLTAGE

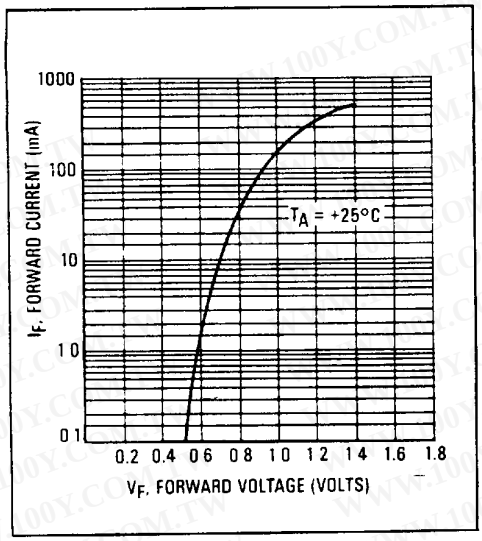


FIGURE 2 — FORWARD RECOVERY TIME AND PEAK FORWARD VOLTAGE TEST CIRCUIT AND WAVEFORMS

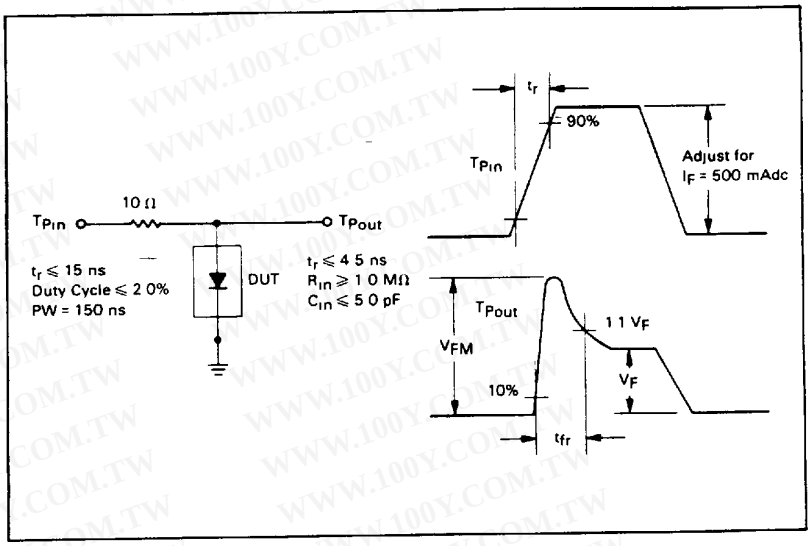
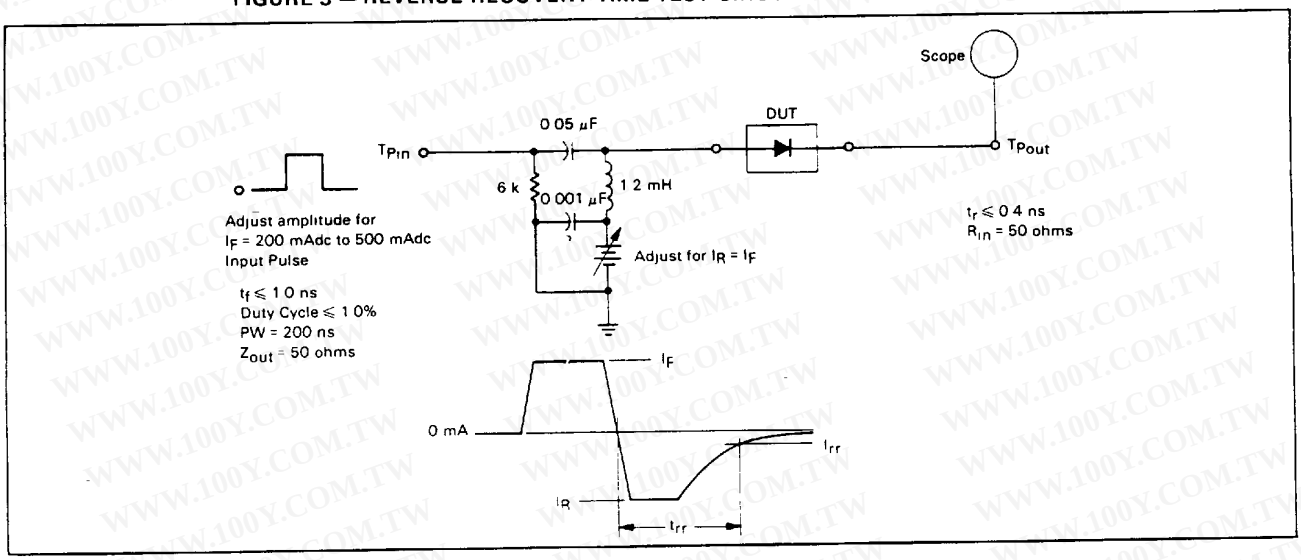
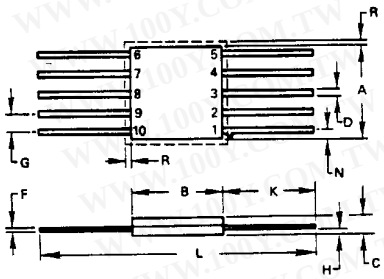


FIGURE 3 — REVERSE RECOVERY TIME TEST CIRCUIT AND WAVEFORMS



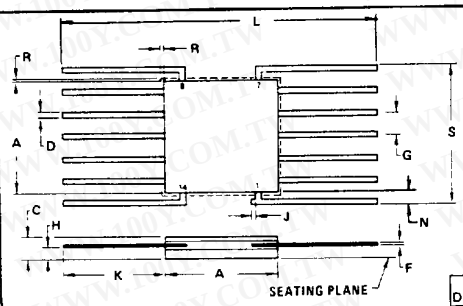
OUTLINE DIMENSIONS



NOTE
1. ALL RULES & NOTES ASSOCIATED WITH TO 91 OUTLINE SHALL APPLY
2. LEADS WITHIN 0.25 mm (0.010) TOTAL OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION (AT BODY)

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	6.10	7.36	0.240	0.290
B	6.10	6.60	0.240	0.260
C	0.762	1.77	0.030	0.070
D	0.254	0.482	0.010	0.019
F	0.077	0.152	0.003	0.006
G	1.15	1.39	0.045	0.055
H	0.127	0.889	0.005	0.035
K	1.78	–	0.070	–
R	–	0.381	–	0.015

CASE 606-04
F SUFFIX
CERAMIC PACKAGE



NOTES
1. R DIMENSIONS DETERMINE ZONE WITHIN WHICH ALL BODY AND LEAD IRREGULARITIES LIE
2. LEADS WITHIN 0.13 mm (0.005) TOTAL OF TRUE POSITION RELATIVE TO A AT MAXIMUM MATERIAL CONDITION

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	6.10	6.60	0.240	0.260
C	0.76	1.78	0.030	0.070
D	0.33	0.48	0.013	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.30	0.89	0.012	0.035
J	–	0.38	–	0.015
K	6.35	9.40	0.250	0.370
L	18.80	–	0.740	–
N	0.25	–	0.010	
R	–	0.38	–	0.015
S	7.62	8.38	0.300	0.330

CASE 607-05
F SUFFIX
CERAMIC PACKAGE

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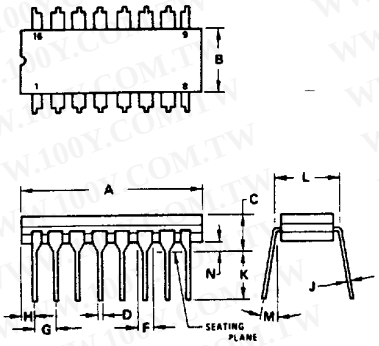
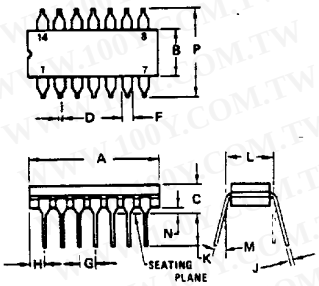
OUTLINE DIMENSIONS (continued)



NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION
2. PKG. INDEX: NOTCH IN LEAD NOTCH IN CERAMIC OR INK DOT
3. DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	19.05	19.81	0.750	0.780
B	6.22	6.98	0.245	0.275
C	4.06	5.08	0.160	0.200
D	0.38	0.51	0.015	0.020
F	1.40	1.65	0.055	0.065
G	2.54 BSC		0.100 BSC	
H	0.51	1.14	0.020	0.045
J	0.20	0.30	0.008	0.012
K	3.18	4.06	0.125	0.160
L	7.37	7.87	0.290	0.310
M	–	15°	–	15°
N	0.51	1.02	0.020	0.040

CASE 620-02
C SUFFIX
CERAMIC PACKAGE

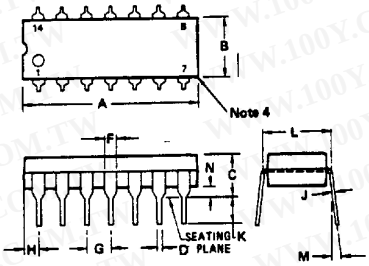


NOTES:
1. ALL RULES AND NOTES ASSOCIATED WITH MO-001 AA OUTLINE SHALL APPLY
2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. LEADS WITHIN 0.25mm (0.010) DIA OF TRUE POSITION AT SEATING PLANE AND MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	16.8	19.9	0.660	0.785
B	5.59	7.11	0.220	0.280
C	–	5.08	–	0.200
D	0.381	0.584	0.015	0.023
F	0.77	1.77	0.030	0.070
G	2.54 BSC		0.100 BSC	
J	0.203	0.381	0.008	0.015
K	2.54	–	0.100	–
L	7.62 BSC		0.300 BSC	
M	–	15°	–	15°
N	0.51	0.76	0.020	0.030
P	–	8.25	–	0.325

All JEDEC dimensions and notes apply.

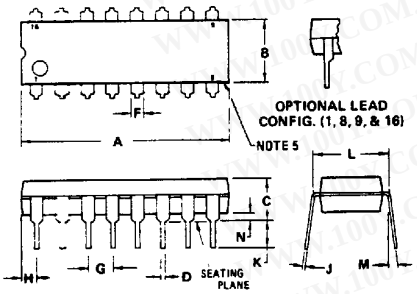
CASE 632-02
C SUFFIX
CERAMIC PACKAGE



NOTES:
1. LEADS WITHIN 0.13 mm (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.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	18.16	19.56	0.715	0.770
B	6.10	6.60	0.240	0.260
C	4.06	5.08	0.160	0.200
D	0.38	0.53	0.015	0.021
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	1.32	2.41	0.052	0.095
J	0.20	0.38	0.008	0.015
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	0°	10°	0°	10°
N	0.51	1.02	0.020	0.040

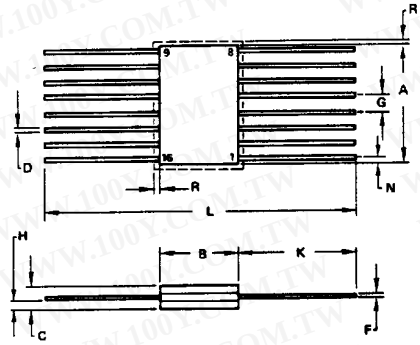
CASE 646-05
P SUFFIX
PLASTIC PACKAGE



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	18.80	21.34	0.740	0.840
B	6.10	6.60	0.240	0.260
C	4.06	5.08	0.160	0.200
D	0.38	0.53	0.015	0.021
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.38	2.41	0.015	0.095
J	0.20	0.38	0.008	0.015
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	0°	10°	0°	10°
N	0.51	1.02	0.020	0.040

NOTES:
1. LEADS WITHIN 0.13 mm (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. "F" DIMENSION IS FOR FULL LEADS. "HALF" LEADS ARE OPTIONAL AT LEAD POSITIONS 1, 8, 9, and 16)
5. ROUNDED CORNERS OPTIONAL.

CASE 648-05
P SUFFIX
PLASTIC PACKAGE



NOTES.
1. LEAD NO. 1 IDENTIFIED BY TAB ON LEAD OR DOT ON COVER.
2. LEADS WITHIN 0.13 mm (0.005) TOTAL OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.40	10.16	0.370	0.400
B	6.22	6.60	0.245	0.260
C	1.52	2.03	0.060	0.080
D	0.38	0.48	0.015	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.64	0.89	0.025	0.035
K	6.35	9.40	0.250	0.370
L	18.92	–	0.745	–
N	–	0.51	–	0.020
R	–	0.38	–	0.015

CASE 650-02
F SUFFIX
CERAMIC PACKAGE

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