

**MOTOROLA**  
**Semiconductors**  
 BOX 955 • PHOENIX, ARIZONA 85001

**PRELIMINARY  
 SPECIFICATION**

**FAST RECOVERY SILICON RECTIFIERS**

... designed for special applications such as high frequency rectification, inverters, free-wheeling diodes, and other fast switching circuits. A complete line of rectifiers having typical recovery time of 0.1 microseconds providing high efficiency at frequencies of 250 kHz and higher.

**MAXIMUM RATINGS**

I <sub>O</sub> * Ampere	I <sub>FM</sub> (surge)** Ampere	V <sub>RM</sub> (rep) V <sub>RM</sub> (wkg) V <sub>R</sub> (Volts)					
		50	100	200	300	400	600
1.0	30	1N4933	1N4934	1N4935	—	1N4936	1N4937
3.0	100	MR830	MR831	MR832	—	MR834	MR836
6.0	150	1N3879	1N3880	1N3881	1N3882	1N3883	MR1366
12	200	1N3889	1N3890	1N3891	1N3892	1N3893	MR1376
20	225	1N3899	1N3900	1N3901	1N3902	1N3903	MR1386
30	300	1N3909	1N3910	1N3911	1N3912	1N3913	MR1396

\* Figure 3 \*\* Figure 4

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max Limit	Units
Maximum Junction Operating Temperature Range	T <sub>J</sub>	-65 to +150	°C
Maximum Case Storage Temperature Range	T <sub>stg</sub>	-65 to +175	°C

**ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Max Limit	Unit
1N4933 thru 1N4937			
DC Forward Voltage Drop (I <sub>F</sub> = 1.0 Adc, T <sub>A</sub> = 25°C)	V <sub>F</sub>	1.2	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	5.0	μA
		100	
MR830 thru MR836			
DC Forward Voltage Drop (I <sub>F</sub> = 3.0 Adc, T <sub>A</sub> = 25°C)	V <sub>F</sub>	1.1	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	0.05	mA
		2.5	
1N3879 thru 1N3883, MR1366			
DC Forward Voltage Drop (I <sub>F</sub> = 6.0 Adc, T <sub>C</sub> = 25°C)	V <sub>F</sub>	1.4	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	0.015	mA
		1.0	
1N3889 thru 1N3893, MR1376			
DC Forward Voltage Drop (I <sub>F</sub> = 12 Adc, T <sub>C</sub> = 25°C)	V <sub>F</sub>	1.4	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	0.025	mA
		3.0	
1N3899 thru 1N3903, MR1386			
DC Forward Voltage Drop (I <sub>F</sub> = 20 Adc, T <sub>A</sub> = 25°C)	V <sub>F</sub>	1.4	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	0.05	mA
		6.0	
1N3909 thru 1N3913, MR1396			
DC Forward Voltage Drop (I <sub>F</sub> = 30 Adc, T <sub>A</sub> = 25°C)	V <sub>F</sub>	1.4	Vdc
DC Reverse Current (Rated V <sub>R</sub> )	I <sub>R</sub>	0.08	mA
		10	

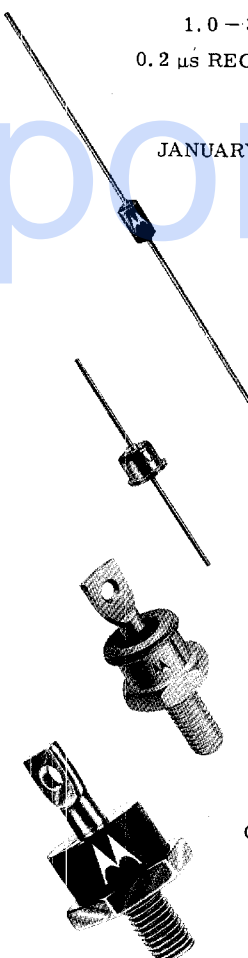
- 1N4933 thru 1N4937
- 1N3879 thru 1N3883
- 1N3889 thru 1N3893
- 1N3899 thru 1N3903
- 1N3909 thru 1N3913
- MR830 thru MR836
- MR1366, MR1376
- MR1386, MR1396

**FAST RECOVERY  
 SILICON RECTIFIERS**

50-600 VOLTS  
 DIFFUSED JUNCTION

1.0 - 30 AMPERE  
 0.2 μs RECOVERY TIME

JANUARY 1967 - PS 12



1.0 AMPERE  
 1N4933-1N4937  
 CASE 59

3.0 AMPERE  
 MR830-MR836  
 CASE 60

6.0 AMPERE  
 1N3879-1N3883  
 MR1366

12 AMPERE  
 1N3889-1N3893  
 MR1376  
 CASE 56A (DO-4)

20 AMPERE  
 1N3899-1N3903  
 MR1386

30 AMPERE  
 1N3909-1N3913  
 MR1396  
 CASE 42

NOTE: For stud mounted devices, standard polarity is cathode-connected-to-case. Reverse polarity is designated by adding "R" suffix to type number.



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REVERSE RECOVERY TIME CHARACTERISTICS

Characteristics	Symbol	Max Limit	Unit
Maximum Reverse Recovery Time ( $I_F = 1.0$ Amp min, Figure 2 test circuit) All Types	$t_{rr}$	0.2	$\mu s$
Maximum Overshoot Current (Figure.2)	$I_{os}$		Amp
1N4933, MR830, 1N3879, 1N3889 Series MR1366, MR1367		2.0	
1N3899, 1N3909 Series MR1386, MR1396		3.0	

FIGURE 1, TYPICAL RECOVERY PATTERN

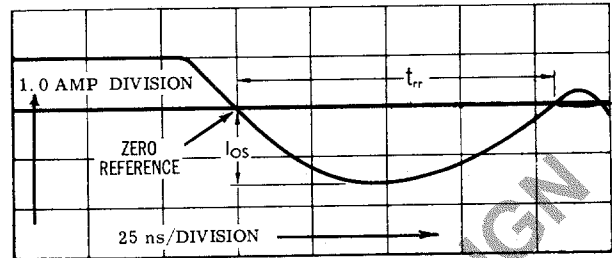
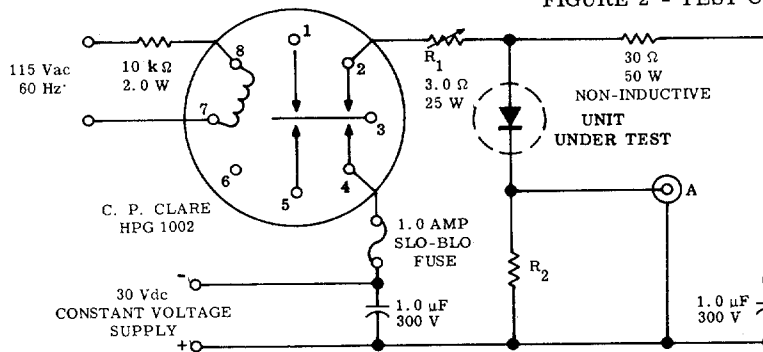


FIGURE 2 - TEST CIRCUIT



- A - TEKTRONIX 545A, K PLUG-IN PRE-AMP, P6000 PROBE OR EQUIVALENT
- $R_1$  - ADJUST TO APPROXIMATELY  $1.4 \Omega$  TO GIVE A MAX  $I_{os}$  WHICH IS NOT GREATER THAN THE MAX SPECIFIED VALUE.  $t_{rr}$  IS THEN MEASURED.
- $R_2$  - TEN  $1.0$  W,  $10 \Omega$ , 1% CARBON COMPOUND RESISTORS IN PARALLEL
- $T_A = 25^{+10}_{-0}$  °C FOR RECTIFIER
- MINIMIZE ALL LEAD LENGTHS

FIGURE 3 - MAXIMUM CURRENT RATING

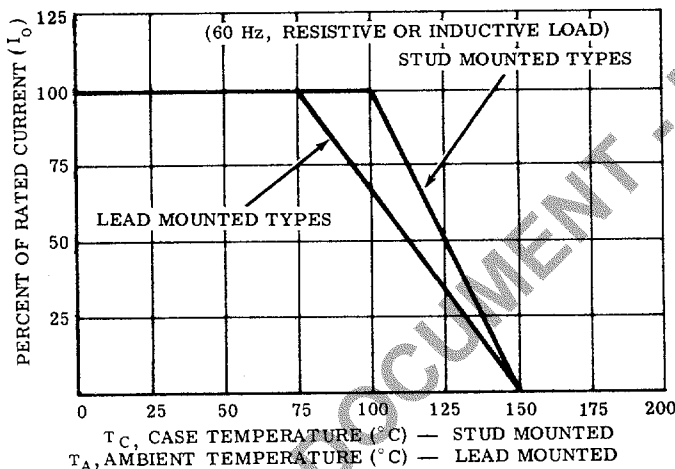
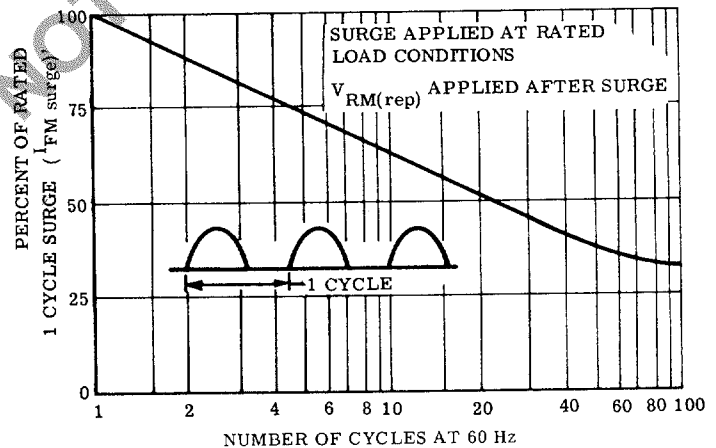


FIGURE 4 - MAXIMUM ALLOWABLE SURGE CURRENT



OUTLINE DIMENSIONS

1N4933 - 4937

MR830 - 836

1N3879 - 3883, MR1366

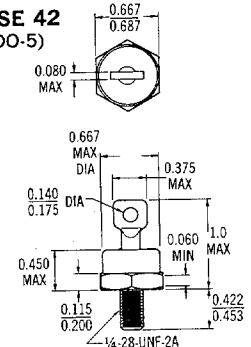
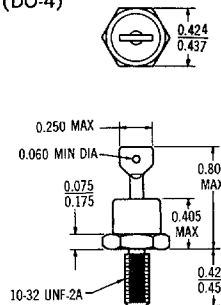
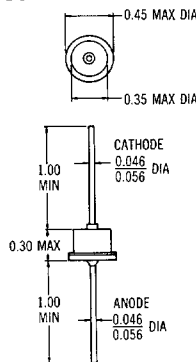
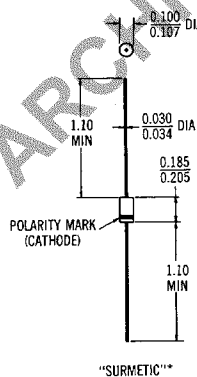
1N3899 - 3903, MR1386

CASE 59

CASE 60

CASE 56A (DO-4)

CASE 42 (DO-5)



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