1N3488–1N3566

TYPE	MATERIAL	REPLACEMENT	PAGE NUMBER	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_R (volts)	V_F (volts)	I_O (Amps)	I_R (mA)	I_{surge} (Amps)	V_Z (min)	V_Z (nom) * / V_Z (max)	Tol V_Z %	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV (volts)	V_F @ I_F (volts)		I_R	t_{rr} (μs)	TC %/°C	V_Z	T (min) °C	T (max) °C
1N3488		Varactor Diode, See table on page 1-86											
1N3489 thru 1N3490		4-Layer Diodes, See table on page 1-96											
1N3491	S			R	50	1.7	18	1.0	300				
1N3492	S			R	100	1.7	18	1.0	300				
1N3493	S			R	200	1.7	18	1.0	300				
1N3494	S			R	300	1.7	18	1.0	300				
1N3495	S			R	400	1.7	18	1.0	300				
1N3496	S	1N829	2-45	RD						0.005	6.5	0	75
1N3497	S	1N827	2-45	RD						0.002	6.5	0	75
1N3498	S	1N825	2-45	RD						0.001	6.5	0	75
1N3499	S	1N823	2-45	RD						0.0005	6.5	0	75
1N3500	S	1N821	2-45	RD						0.01	6.5	0	75
1N3501	S	MZ640	2-52	RD							6.5	25	100
1N3502	S	MZ620	2-52	RD							6.5	25	100
1N3503	S	MZ610	2-52	RD							6.5	25	100
1N3504	S	MZ605	2-52	RD							6.5	25	100
1N3506	S	1N5226B	2-32	ZD							3.3*	5.0	400M
1N3507	S	1N5227B	2-32	ZD							3.6*	5.0	400M
1N3508	S	1N5228B	2-32	ZD							3.9*	5.0	400M
1N3509	S	1N5229B	2-32	ZD							4.3*	5.0	400M
1N3510	S	1N5230B	2-32	ZD							4.7*	5.0	400M
1N3511	S	1N5231B	2-32	ZD							5.1*	5.0	400M
1N3512	S	1N5232B	2-32	ZD							5.6*	5.0	400M
1N3513	S	1N5234B	2-32	ZD							6.2*	5.0	400M
1N3514	S	1N5235B	2-32	ZD							6.8*	5.0	400M
1N3515	S	1N5236B	2-32	ZD							7.5*	5.0	400M
1N3516	S	1N5237B	2-32	ZD							8.2*	5.0	400M
1N3517	S	1N5239B	2-32	ZD							9.1*	5.0	400M
1N3518	S	1N5240B	2-32	ZD							10*	5.0	400M
1N3519	S	1N5241B	2-32	ZD							11*	5.0	400M
1N3520	S	1N5242B	2-32	ZD							12*	5.0	400M
1N3521	S	1N5243B	2-32	ZD							13*	5.0	400M
1N3522	S	1N5245B	2-32	ZD							15*	5.0	400M
1N3523	S	1N5246B	2-32	ZD							16*	5.0	400M
1N3524	S	1N5248B	2-32	ZD							18*	5.0	400M
1N3525	S	1N5250B	2-32	ZD							20*	5.0	400M
1N3526	S	1N5251B	2-32	ZD							22*	5.0	400M
1N3527	S	1N5252B	2-32	ZD							24*	5.0	400M
1N3528	S	1N5254B	2-32	ZD							27*	5.0	400M
1N3529	S	1N5256B	2-32	ZD							30*	5.0	400M
1N3530	S	1N5257B	2-32	ZD							33*	5.0	400M
1N3531	S	1N5258B	2-32	ZD							36*	5.0	400M
1N3532	S	1N5259B	2-32	ZD							39*	5.0	400M
1N3533	S	1N5260B	2-32	ZD							43*	5.0	400M
1N3534	S	1N5261B	2-32	ZD							47*	5.0	400M
1N3535	S			GP	200	0.549	100M						
1N3536	S			GP	70	0.65	1.0M	25N					
1N3537	S	1N4741A†	2-29	ZD							12*		1.0W
1N3538	S			GP	150		2.5M	2.0*					
1N3539	S	Backward Diode											
1N3539A	S	Backward Diode											
1N3540	S	Backward Diode											
1N3540A	S	Backward Diode											
1N3541	S	Backward Diode											
1N3541A	S	Backward Diode											
1N3542	S	Backward Diode											
1N3542A	S	Backward Diode											
1N3543	S	Backward Diode											
1N3543A	S	Backward Diode											
1N3544	S	1N4002	3-24	R	100	1.5	0.6	0.2	15				
1N3545	S	1N4003	3-24	R	200	1.5	0.6	0.2	15				
1N3546	S	1N4004	3-24	R	300	1.5	0.6	0.2	15				
1N3547	S	1N4004	3-24	R	400	1.5	0.6	0.2	15				
1N3548	S	1N4005	3-24	R	500	1.5	0.6	0.2	15				
1N3549	S	1N4005	3-24	R	600	1.5	0.6	0.2	15				
1N3550	S			MS	180	1.0	50M		1.5				
1N3551 thru 1N3552		Varactor Diodes, See table on page 1-86											
1N3553	S	1N821	2-45	RD						0.0001	6.3	-55	100
1N3554 thru 1N3557		Varactor Diodes, See table on page 1-86											
1N3558	S	Matched Pair of 1N751A's, Zener Diode											
1N3559	G			GP	24	1.0	200M	20*					
1N3560 thru 1N3562		Tunnel Diodes, See table on page 1-92											
1N3563	S			R	1000	1.2	0.4	0.2	40				
1N3564	G			GP	15	1.0	40M						
1N3565	S			HC	6.0	2.0	2.0A	25M					
1N3566	S			R	800	2.25	1.0	0.5	20				

R—Rectifier, **RD**—Reference Diode, **ZD**—Zener Diode, **GP**—General Purpose, **HC**—High Conductance (≥ 20 mA @ ≤ 1 V), **HS**—High Speed Switch (Max t_{rr} < 0.3 μs), **CS**—High Conductance, High Speed Switch, **MS**—Medium Speed Switch, **PA**—Parametric Amplifier, **SP**—Special Purpose.

†Original device is a clipper; requires a pair of units for adequate replacement.

1N3491 thru 1N3495 (SILICON)
(MR322 thru MR326)
MR327, MR328, MR330, MR331

V_R — to 1000 V
I_O = 25 A

CASE 43
(DO-21)

Medium-current silicon rectifiers - compact, highly efficient silicon rectifiers for medium-current applications.

MAXIMUM RATINGS

Rating	Symbol	1N3491 MR322	1N3492 MR323	1N3493 MR324	1N3494 MR325	1N3495 MR326	MR327	MR328	MR330	MR331	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RM(rep)}$ $V_{RM(wkg)}$ V_R	50	100	200	300	400	500	600	800	1000	Volts
Non-Repetitive Peak Reverse Voltage (halfwave, single phase, 60 cycle peak)	$V_{RM(non-rep)}$	100	200	300	400	500	600	720	1000	1200	Volts
RMS Reverse Voltage	V_r	35	70	140	210	280	350	420	560	700	Volts
Average Rectified Forward Current (single phase, resistive load, 60 Hz , see Figure 3) T_C = 130°C	I_O	← 25 →									Amp
Non-Repetitive Peak Surge Current (surge applied at rated load conditions, see Figure 5)	$I_{FM(surge)}$	← 300 (for 1/2 cycle) →									Amp
I^2t Rating (non-repetitive, for t greater than 1 ms and less than 8.3 ms)	I^2t	← 375 →									$A_{(rms)}{}^2$ sec
Operating and Storage Junction Temperature Range	T_J, T_{stg}	← -65 to +175 →									°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.2	°C/Watt

MECHANICAL CHARACTERISTICS

CASE: Welded, hermetically sealed construction.

FINISH: All external surfaces corrosion-resistant and the terminal lead is readily solderable.

POLARITY: CATHODE TO CASE (reverse polarity units are available upon request and are designated by an "R" suffix i.e. MR327R or 1N3491R).

MOUNTING POSITIONS: Any.

1N3491 thru 1N3495 (continued)

ELECTRICAL CHARACTERISTICS

Characteristic and Conditions	Symbol	Max	Unit
Full Cycle Average Forward Voltage Drop (rated I_O and V_r, single phase, 60 Hz, T_C = 150°C)	$V_{F(AV)}$	0.6	Volts
Instantaneous Forward Voltage Drop (i_F = 100 Amps, T_J = 25°C)	V_F	1.5	Volts
Full Cycle Average Reverse Current (rated I_O and V_r, single phase, 60 Hz, T_C = 150°C)	$I_{R(AV)}$		mA
1N3491/MR322		10	
1N3492/MR323		10	
1N3493/MR324		8	
1N3494/MR325		6	
1N3495/MR326		4	
MR327		3	
MR328		2.5	
MR330		2	
MR331		1.5	
DC Reverse Current (Rated V_R, T_C = 25°C)	I_R	1.0	mA

FIGURE 1 — MAXIMUM FORWARD VOLTAGE DROP

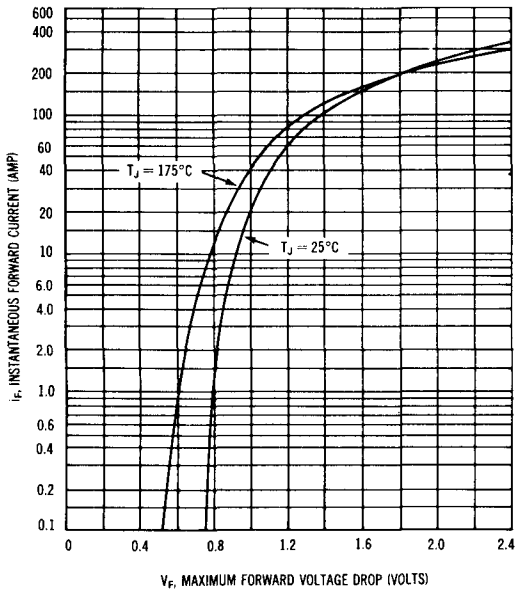
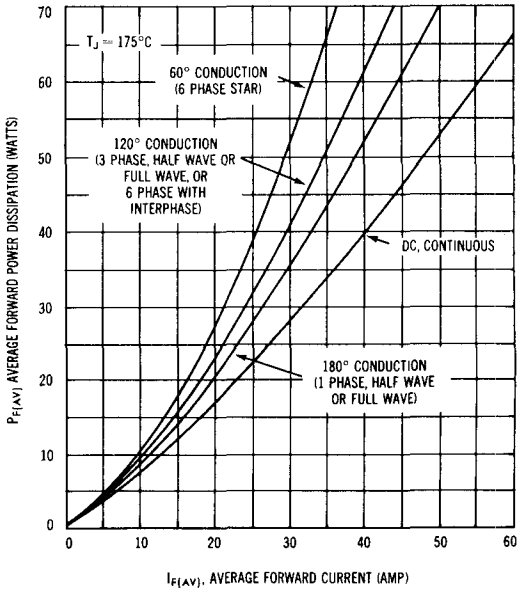


FIGURE 2 — MAXIMUM FORWARD POWER DISSIPATION



1N3491 thru 1N3495 (continued)

FIGURE 3 — MAXIMUM CURRENT RATINGS

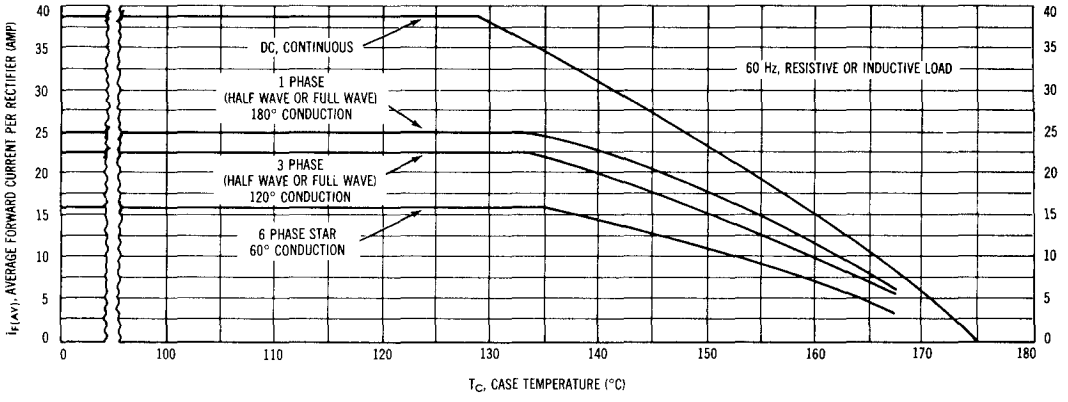


FIGURE 4 — MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE

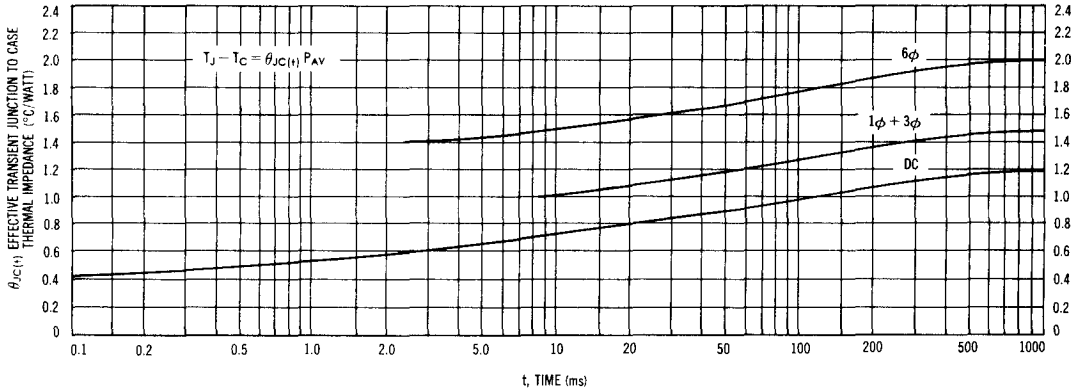
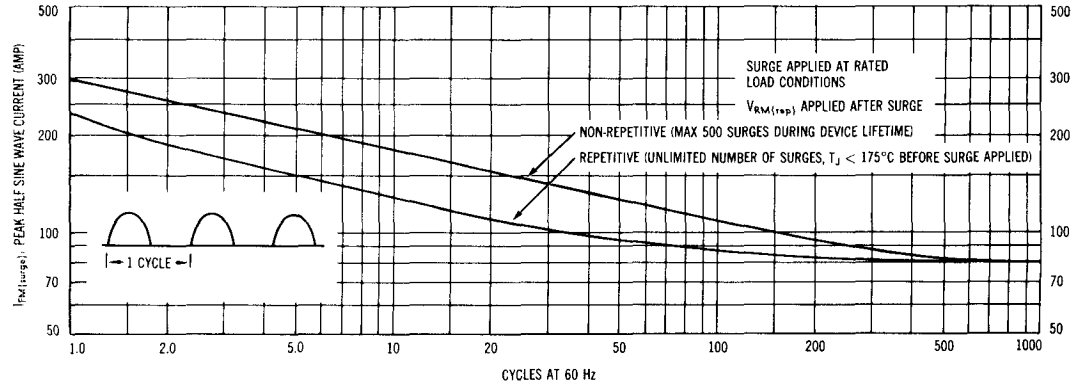


FIGURE 5 — MAXIMUM ALLOWABLE SURGE CURRENT



1N3491 thru 1N3495 (continued)

TYPICAL DYNAMIC CHARACTERISTICS

FIGURE 6 — RECTIFICATION EFFICIENCY

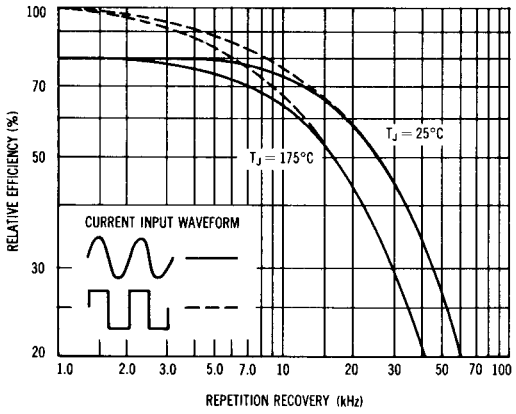


FIGURE 7 — REVERSE RECOVERY TIME

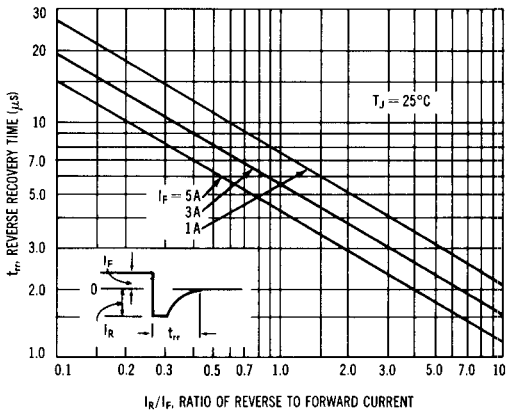


FIGURE 8 — JUNCTION CAPACITANCE

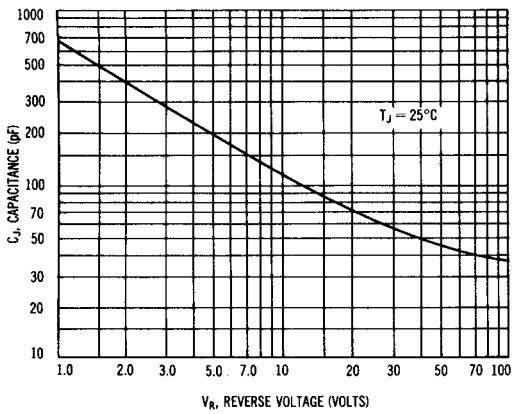
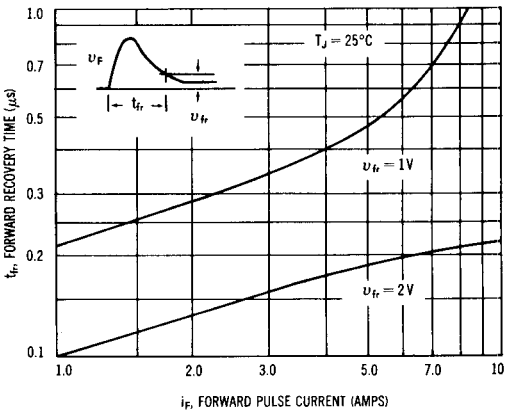
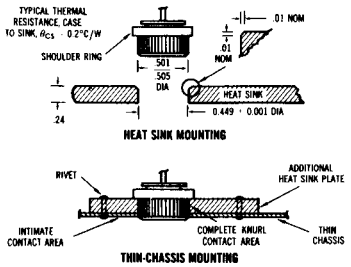


FIGURE 9 — FORWARD RECOVERY TIME





MOUNTING PROCEDURES

MR322-MR331 and 1N3491-1N3495 rectifiers are designed to be press-fitted in a heat sink in order to attain full device ratings. Recommended procedures for this type of mounting are as follows:

1. Drill a hole in the heat sink 0.499 ± .001 inch in diameter.
2. Break the hole edge as shown to prevent shearing off the knurled edge of the rectifier when it is pressed into the hole.
3. The depth and width of the break should be 0.010 inch maximum to retain maximum heat sink surface contact.
4. To prevent damage to the rectifier during press-in, the pressing force should be applied only on the shoulder ring of the rectifier case as shown in the figure.
5. The pressing force should be applied evenly about the shoulder ring to avoid tilting or canting of the rectifier case in the hole during the press-in operation. Also, the use of a light industrial lubricant will be of considerable aid.

NOTE:
Refer to brochure PR-104 for additional suggested mounting methods, examples and information.