

SOLID STATE DEVICES INC

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T-03-21

SDR 504 thru SDR 510

50 AMPS

ULTRA FAST RECOVERY RECTIFIER

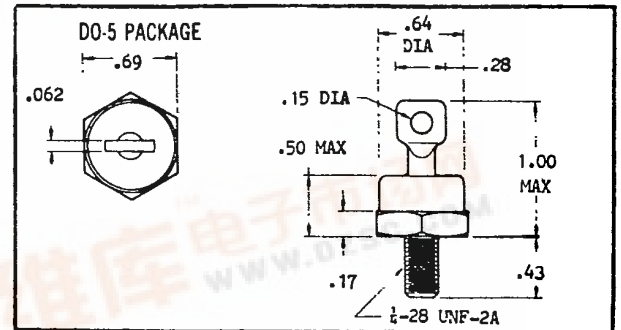
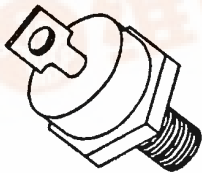
400-1000 VOLTS



14830 Valley View Avenue
La Mirada, California 90638
(213) 921-9660
TWX 910-583-4807
FAX 213-921-2396

FEATURES

- PIV 400 TO 1000 VOLTS
- ULTRA FAST SWITCHING
60 Nsec. TYPICAL
- LOW REVERSE LEAKAGE
- LOW THERMAL IMPEDANCE
- HIGH SURGE CAPABILITY



MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage and DC Blocking Voltage	SDR 504	$V_{RM} (rep)$		Volts
	SDR 506	V_R	400	
	SDR 508		600	
	SDR 510		800	
			1000	
RMS Reverse Voltage	SDR 504	V_r	280	Volts
	SDR 506		420	
	SDR 508		560	
	SDR 510		700	
Average 1/2 Wave Rectified Forward Current (Resistive Load, 60 Hz, $T_C = 25^\circ C$)		I_O	50	Amp
Peak Repetitive Forward Current ($T_C = 55^\circ C$)		$I_{FM} (rep)$	90	Amp
Peak Surge Current ($T_C = 55^\circ C$, Superimposed on Rated Current at Rated Voltage)		$I_{FM} (surge)$	625	Amp
Operating and Storage Temperature		T_J, T_{stg}	150	$^\circ C$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient (typical printed circuit board mounting) $L = 3/8"$	$R_{\theta JC}$	1.0	$^\circ C/W$

NOTE: All specifications subject to change without notice.



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ELECTRICAL CHARACTERISTICS

SOLID STATE DEVICES INC

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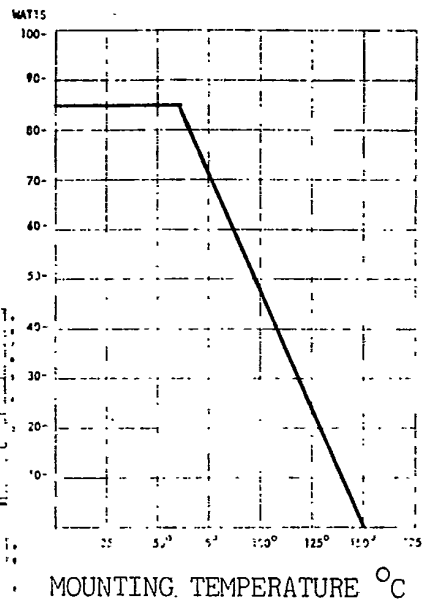
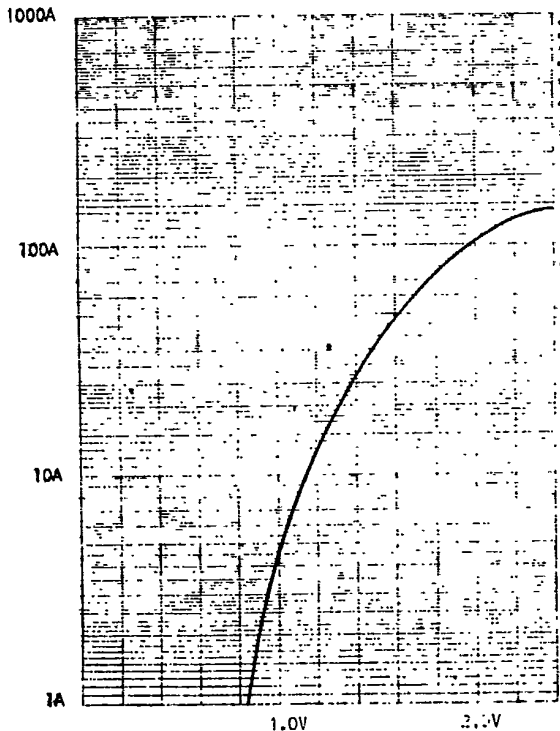
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Characteristics	Symbol	Value	Unit
Max Full Cycle Average Forward Voltage Drop (I_O (Max), rated V_F , 60 Hz, $T_C = 55^\circ\text{C}$)	$V_{F(AV)}$	.85	Volts
Max Instantaneous Forward Voltage Drop ($I_F = 50$ Amps, $T_J = 25^\circ\text{C}$)	V_F	1.7	Volts
Max Full Cycle Average Reverse Current (I_O (max), rated V_R , 60 Hz, $T_C = 100^\circ\text{C}$)	$I_{R(AV)}$	1	mA
Max DC Reverse Current (Rated V_R , $T_C = 25^\circ\text{C}$)	I_R	25	μA

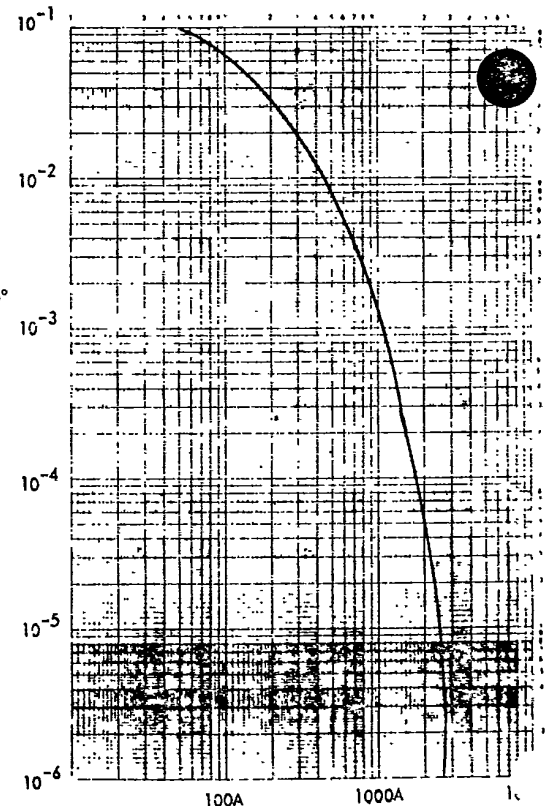
REVERSE RECOVERY CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Reverse Recovery Time ($I_F = 500\text{ma}$, $I_R = 1\text{A}$, $t_{rr} = 250\text{ma}$)	t_{rr}	-	60	80	ns

$V_F - I_F @ 25^\circ\text{C}$



Peak Repetitive
Surge Time in Seconds



SSDI SOLID STATE DEVICES, INC.

SDR 1004 thru SDR 1010

100 AMPS

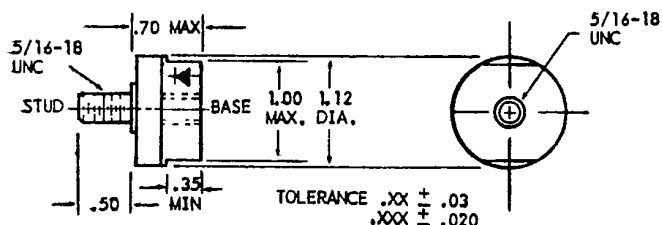
ULTRA FAST RECOVERY RECTIFIER

400-1000 VOLTS



14830 Valley View Avenue
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CASE STYLE



FEATURES

- PIV 400 TO 1000 VOLTS
- ULTRA FAST SWITCHING 60 NSEC TYPICAL
- LOW REVERSE LEAKAGE
- LOW THERMAL IMPEDANCE
- HIGH SURGE CAPABILITY
- REVERSE POLARITY UNITS CAN BE SUPPLIED, ADD SUFFIX "R" TO PART NUMBER

T-03-21

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage and DC Blocking Voltage	SDR 1004 SDR 1006 SDR 1008 SDR 1010	$V_{RM (rep)}$ V_R	400 600 800 1000	Volts
RMS Reverse Voltage	SDR 1004 SDR 1006 SDR 1008 SDR 1010	V_r	280 420 560 700	Volts
Average 1/2 Wave Rectified Forward Current (Resistive Load, 60 Hz, $T_C = 25^\circ C$)		I_O	100	Amp
Peak Repetitive Forward Current ($T_C = 55^\circ C$)		$I_{FM (rep)}$	180	Amp
Peak Surge Current ($T_C = 55^\circ C$, Superimposed on Rated Current at Rated Voltage)		$I_{FM (surge)}$	1250	Amp
Operating and Storage Temperature		T_J, T_{stg}	150	$^\circ C$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient (typical printed circuit board mounting)	$R_{\theta JC}$	.5	$^\circ C/W$

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SOLID STATE DEVICES INC
ELECTRICAL CHARACTERISTICS

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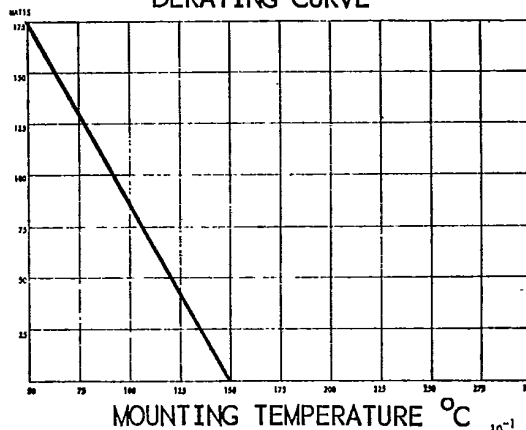
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Characteristics	Symbol	Value	Unit
Max Full Cycle Average Forward Voltage Drop	$V_{F(AV)}$	.85	Volts
Max Instantaneous Forward Voltage Drop ($I_F = 100$ Amps, $T_J = 25^\circ\text{C}$)	V_F	1.7	Volts
Max Reverse Current rated V_R , 60 Hz, $T_C = 100^\circ\text{C}$	I_R	2	mA
Max DC Reverse Current (Rated V_R , $T_C = 25^\circ\text{C}$)	I_R	50	μA

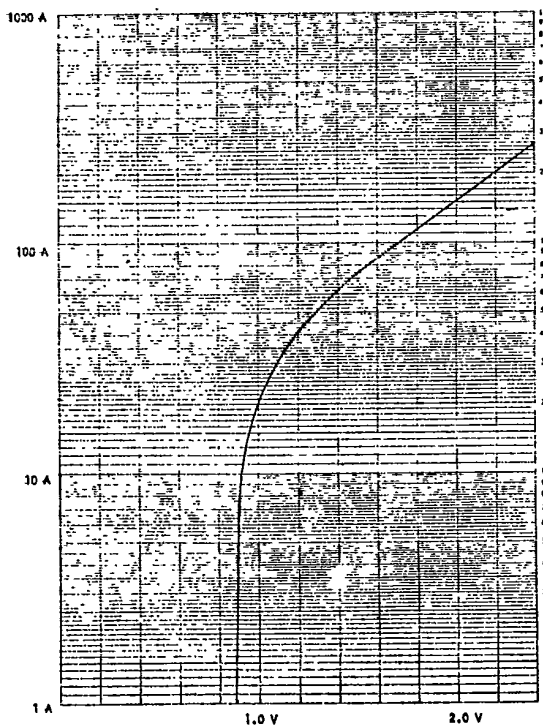
REVERSE RECOVERY CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Reverse Recovery Time ($I_F = 500\text{ma}$, $I_R = 1\text{A}$, $t_{rr} = 250\text{ma}$)	t_{rr}	-	60	80	ns

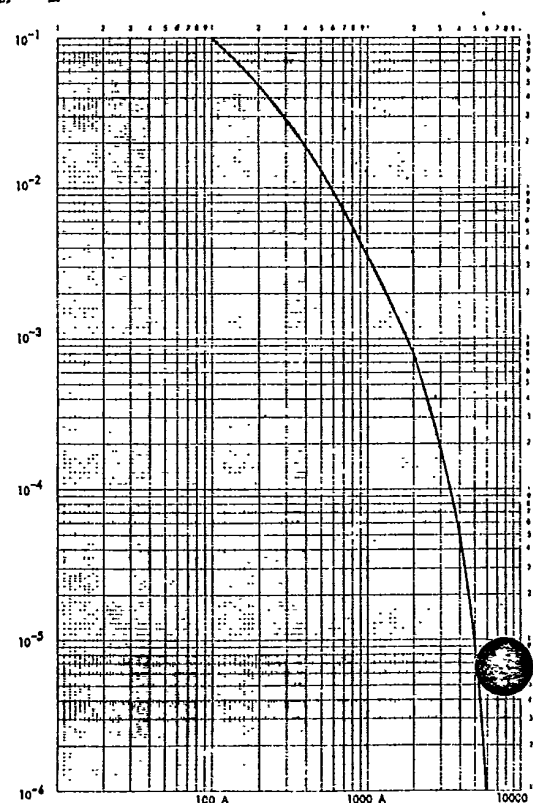
DERATING CURVE



$V_F - I_F @ 25^\circ\text{C}$



PEAK REPETITIVE SURGE
TIME IN SECONDS



SOLID STATE DEVICES INC

12E D 8366011 0001867 8

SSDI Solid State Devices, Incorporated

14830 Valley View Avenue La Mirada, California 90638 • Telephone: (213) 921-9660 • TWX 910-583-4807

EPION™**NEW EPION ION-IMPLANTED DIODES NOW AVAILABLE FROM SSDI**

Solid State Devices, Inc. makes the world's only available ion-implanted semiconductors, with all standard catalog items available for off-the-shelf delivery. SSDI's breakthrough in semiconductor construction permits an unusual combination of features not obtainable with diodes and rectifiers manufactured by other processes. These include extremely fast turn-on and reverse recovery times, exceptionally low power dissipation (one-sixth to one-half the conventional voltage drop) and high current pulse handling capability, both continuous and surge. Applications for these diodes and rectifiers include clamps, shunts, high frequency switching, miniaturized power supplies, core memories, modulators and other applications where the combination of high speed, high current-carrying capability and low forward voltage drop is important.

WHY ION-IMPLANTATION? The Epion implantation of ions into semiconductor crystal surfaces is a new method of controlling electrical

behavior. Because maximum impurity concentration is just below the crystal surface (depths of a few hundred angstroms), forward and reverse recovery characteristics are improved by the inability of the thin implanted junction to store carriers. In the actual manufacture of Epion implanted semiconductors, a lower temperature can be used for doping, or implanting the ions, than is necessary with other methods. Dopants are directionally placed in the crystal lattice with virtually no lateral migration. This provides low surface spreading resistance for high pulse current capability and fast forward recovery. Further high speed characteristics are achieved without requiring gold doping or other forms of crystal degradation. SSDI's ultra-high speed characteristics are achieved without affecting radiation resistance.

The Epion diodes described in this catalog are available for immediate delivery. If you have special requirements, please contact SSDI.

DIODES EPION™

Epion implanted silicon-diodes are hermetically sealed with weldable gold-plated leads.

HSA/18**V_{f1} = 250 mV max. (A)****200 to 600 mA****ELECTRICAL CHARACTERISTICS @ 25°C**

T_{fr} Forward Recovery** 0.5 NSec Max.
 T_{rr} Reverse Recovery* 3 NSec Max.
 V_{th} Forward Threshold @ 1 mA 0.225 Volt Max.
 P Power Dissipation*** 500 mw Max.
 I_{urge} Surge Current 1 μ Sec 50 Amps Max.
 J, T_{stg} Operating and Storage Temp. -65°C to +200°C

*Lower Forward Voltages Available, Consult Factory

TYPE NO. PRV, V _{f1} , I _r , I _s	PRV VOLTS	MAX I _r @ .5 PRV μ A	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA
5A1 ()	50	10	200	300	400	500	600
5A2 ()	50	20	200	300	400	500	600
5A5 ()	50	50	200	300	400	500	600
7A1 ()	75	10	200	300	400	500	600
7A2 ()	75	20	200	300	400	500	600
7A5 ()	75	50	200	300	400	500	600
10A1 ()	100	10	200	300	400	500	600
10A2 ()	100	20	200	300	400	500	600
10A5 ()	100	50	200	300	400	500	600

HSB/18**V_{f1} = 325 mV max. (B)****200 to 600 mA****ELECTRICAL CHARACTERISTICS @ 25°C**

T_{fr} Forward Recovery** 0.5 NSec Max.
 T_{rr} Reverse Recovery* 3 NSec Max.
 V_{th} Forward Threshold @ 1 mA 0.325 Volt Max.
 P Power Dissipation*** 500 mw Max.
 I_{urge} Surge Current 1 μ Sec 50 Amps Max.
 J, T_{stg} Operating and Storage Temp. -65°C to +200°C

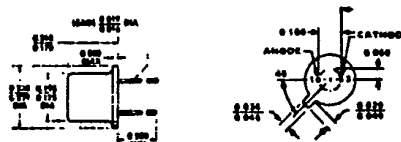
* IF = .1A, IR = .1A, IRR = 10mA.

** Measured 10% to 10% above quiescent.

*** 25°C free air mounted 1/16" from package.

TYPE NO. PRV, V _{f1} , I _r , I _s	PRV VOLTS	MAX I _r @ .5 PRV μ A	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA	I _s @ P = 500 mw mA
5B1 ()	50	10	200	300	400	500	600
5B2 ()	50	20	200	300	400	500	600
5B5 ()	50	50	200	300	400	500	600
7B1 ()	75	10	200	300	400	500	600
7B2 ()	75	20	200	300	400	500	600
7B5 ()	75	50	200	300	400	500	600
10B1 ()	100	10	200	300	400	500	600
10B2 ()	100	20	200	300	400	500	600
10B5 ()	100	50	200	300	400	500	600

TO-18

PHYSICAL DIMENSIONS

ALL DIMENSIONS IN INCHES AND MILLIMETERS

Ordering Information: first digit indicates PRV, letter indicates forward voltage drop at 1 mA, second digit indicates leakage at half the PRV, and the last digit indicates the forward voltage for a power dissipation of 500 mw at the rated current. Example: 5A15/18 - this is a 50 volt device, with a V_{f1} at 1 mA of 225 mV, I_r (leakage) is 10 μ A at .5 PRV (which is 25 V), plus a forward voltage of 1 V maximum at 500 mA current handling capacity. The /18 indicates the TO 18 package.

DIODES **EPION™**

Epion implanted silicon-diodes are hermetically sealed with weldable gold-plated leads.

HSC/18 $V_f = 450$ mV max. (C)

400 to 700 mA

ELECTRICAL CHARACTERISTICS @ 25°C

T_{fr}	Forward Recovery**	1 NSec Max.
T_{rr}	Reverse Recovery*	9 NSec Max.
V_f	Forward Threshold @ 1 mA	0.450 Volt Max.
P	Power Dissipation***	600 mw Max.
I_{urge}	Surge Current 1 μ Sec	50 Amps Max.
J, T_{stg}	Operating and Storage Temp.	-65°C to +200°C

TYPE NO. PRV, V_f , I_f , I_r	PRV VOLTS	MAX I_r , 50 S PRV μ A	I_f 400 P 500 mw mA	I_f 500 P 500 mw mA	I_f 600 P 500 mw mA	I_r 700 P 500 mw mA
5C1 ()	50	10	400	500	600	700
5C2 ()	50	20	400	500	600	700
5C05 ()	50	5	400	500	600	700
7C1 ()	75	10	400	500	600	700
7C2 ()	75	20	400	500	600	700
7C05 ()	75	5	400	500	600	700
10C1 ()	100	10	400	500	600	700
10C2 ()	100	20	400	500	600	700
10C05 ()	100	5	400	500	600	700

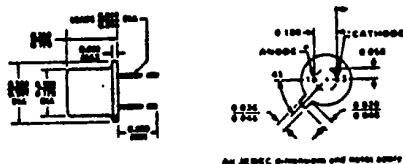
* $I_F = .1A$, $I_R = .1A$, $I_{RR} = 10mA$

** Measured 10% to 10% above quiescent.

*** 25°C free air mounted 1/16" from package.

Ordering Information: first digit indicates PRV, letter indicates forward voltage drop at 1 mA, second digit indicates leakage at half the PRV, and the last digit indicates the forward voltage for a power dissipation of 500 mw at the rated current. Example: 5A15/18 - this is a 50 volt device, with a V_f at 1 mA of 225 mV, I_r (leakage) is 10 μ A at .5 PRV (which is 25 V), plus a forward voltage of 1 V maximum at 500 mA current handling capacity. The /18 indicates the TO 18 package.

TO-18

PHYSICAL DIMENSIONS

NOTE: Specifications are subject to change without notice.