

International  
**IR** Rectifier

STPS20L15D  
STPS20L15G

SCHOTTKY RECTIFIER

20 Amps

$$I_{F(AV)} = 20\text{Amp}$$
$$V_R = 15\text{V}$$

Major Ratings and Characteristics

| Characteristics                                   | Values     | Units            |
|---------------------------------------------------|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform                  | 20         | A                |
| $V_{RRM}$                                         | 15         | V                |
| $I_{FSM}$ @tp = 5 $\mu$ s sine                    | 700        | A                |
| $V_F$ @ 19 Apk, $T_J=125^\circ\text{C}$ (Typical) | 0.25       | V                |
| $T_J$ range                                       | -55 to 125 | $^\circ\text{C}$ |

Description/Features

The Schottky rectifier module has been optimized for ultra low forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125  $^\circ\text{C}$  junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

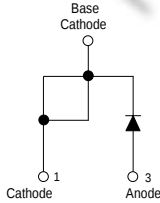
- 125 $^\circ\text{C}$   $T_J$  operation ( $V_R < 5\text{V}$ )
- Center tap module
- Optimized for OR-ing applications
- Ultra low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance

Case Styles

STPS20L15D



Base Cathode



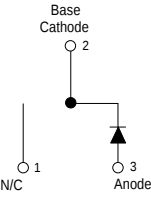
Cathode 1      Anode 3

TO-220AC

STPS20L15G



Base Cathode



N/C 1      Anode 3

D<sup>2</sup>PAK

# STPS20L15D, STPS20L15G

Bulletin PD-20626 rev. C 06/06

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## Voltage Ratings

| Part number                                                                 | Values |
|-----------------------------------------------------------------------------|--------|
| $V_R$ Max. DC Reverse Voltage (V) @ $T_J = 100^\circ\text{C}$               | 15     |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) @ $T_J = 100^\circ\text{C}$ |        |

## Absolute Maximum Ratings

| Parameters                                                              | Values | Units | Conditions                                                                                                               |
|-------------------------------------------------------------------------|--------|-------|--------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current<br>* See Fig. 5                | 20     | A     | 50% duty cycle @ $T_C = 85^\circ\text{C}$ , rectangular wave form                                                        |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 | 700    | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse                                                                      |
|                                                                         | 330    |       | 10ms Sine or 6ms Rect. pulse                                                                                             |
| $E_{AS}$ Non-Repetitive Avalanche Energy                                | 10     | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 2\text{Amps}$ , $L = 6\text{mH}$                                                    |
| $I_{AR}$ Repetitive Avalanche Current                                   | 2      | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical |

## Electrical Specifications

| Parameters                                           | Values | Units            | Conditions                                                                 |
|------------------------------------------------------|--------|------------------|----------------------------------------------------------------------------|
| $V_{FM}$ Forward Voltage Drop<br>* See Fig. 1 (1)    | Typ.   | Max.             |                                                                            |
|                                                      | -      | 0.41             | V @ 19A                                                                    |
|                                                      | -      | 0.52             | V @ 40A                                                                    |
|                                                      | 0.25   | 0.33             | V @ 19A                                                                    |
|                                                      | 0.37   | 0.50             | V @ 40A                                                                    |
| $I_{RM}$ Reverse Leakage Current<br>* See Fig. 2 (1) | -      | 10               | mA $T_J = 25^\circ\text{C}$                                                |
|                                                      | -      | 600              | mA $T_J = 100^\circ\text{C}$                                               |
| $V_{F(TO)}$ Threshold Voltage                        | 0.182  | V                | $T_J = T_J \text{ max.}$                                                   |
| $r_t$ Forward Slope Resistance                       | 7.6    | m $\Omega$       |                                                                            |
| $C_T$ Max. Junction Capacitance                      | -      | 2000             | pF $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance                      | 8      | -                | nH Measured lead to lead 5mm from package body                             |
| dv/dt Max. Voltage Rate of Change                    | 10000  | V/ $\mu\text{s}$ | (Rated $V_R$ )                                                             |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

## Thermal-Mechanical Specifications

| Parameters                                             | Values      | Units              | Conditions                                         |
|--------------------------------------------------------|-------------|--------------------|----------------------------------------------------|
| $T_J$ Max. Junction Temperature Range                  | -55 to 125  | $^\circ\text{C}$   |                                                    |
| $T_{stg}$ Max. Storage Temperature Range               | -55 to 150  | $^\circ\text{C}$   |                                                    |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case    | 1.5         | $^\circ\text{C/W}$ | DC operation * See Fig. 4                          |
| $R_{thCS}$ Typical Thermal Resistance Case to Heatsink | 0.50        | $^\circ\text{C/W}$ | Mounting surface, smooth and greased<br>For TO-220 |
| $R_{thJA}$ Max. Thermal Resistance Junction to Ambient | 40          | $^\circ\text{C/W}$ | DC operation<br>For D <sup>2</sup> Pak             |
| wt Approximate Weight                                  | 2 (0.07)    | g (oz.)            |                                                    |
| T Mounting Torque                                      | Min.        | 6 (5)              | Non-lubricated threads                             |
|                                                        | Max.        | 12 (10)            |                                                    |
| Marking Device                                         | STPS 20L15D |                    | Case Style TO-220                                  |
|                                                        | STPS20L15G  |                    | Case Style D <sup>2</sup> Pak                      |

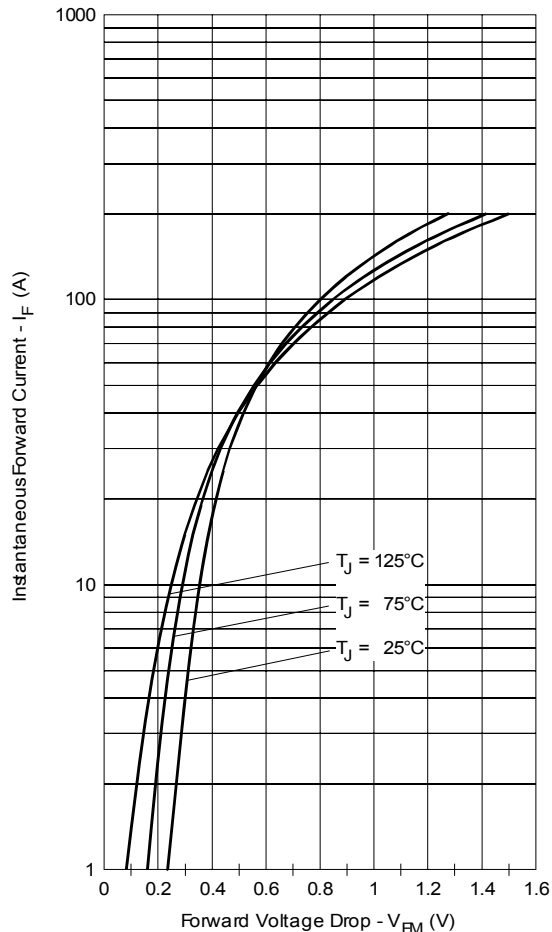


Fig. 1 - Maximum Forward Voltage Drop Characteristics

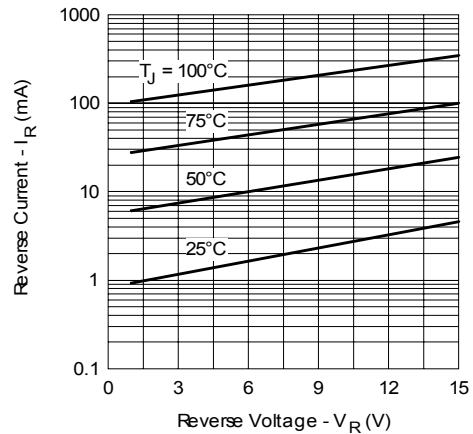


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

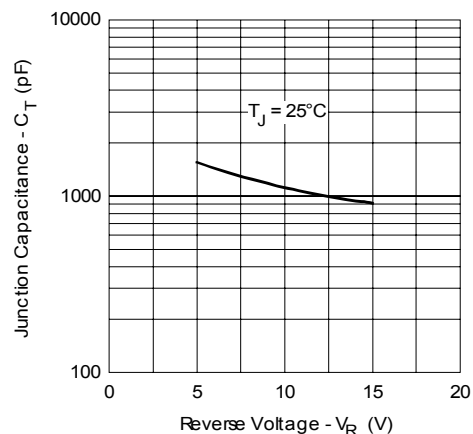


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

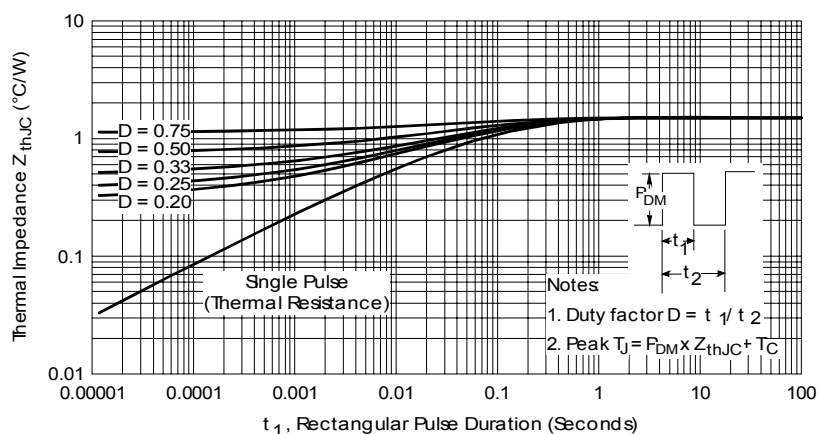


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

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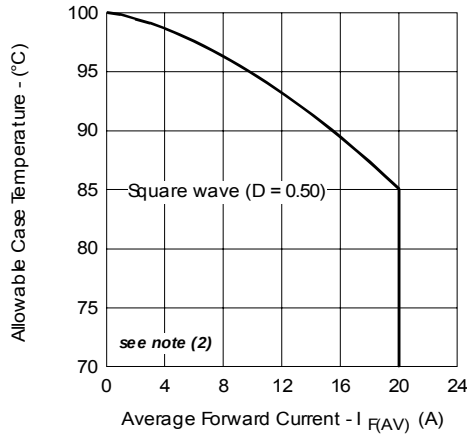


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

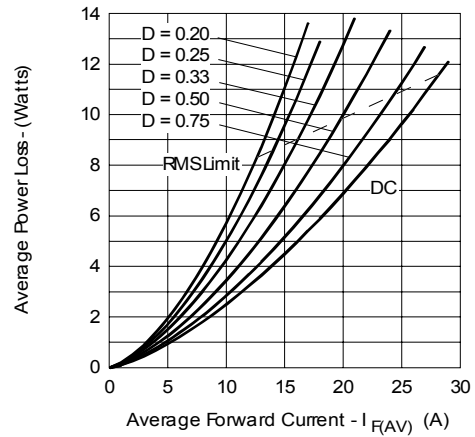


Fig. 6 - Forward Power Loss Characteristics

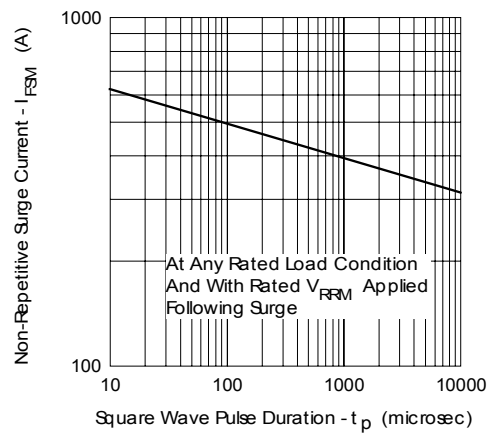


Fig. 7 - Maximum Non-Repetitive Surge Current

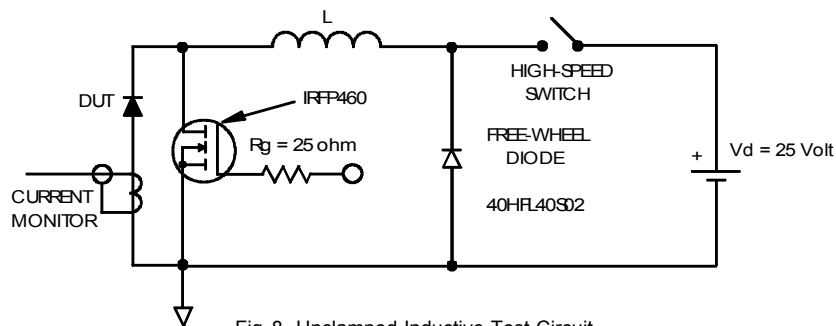


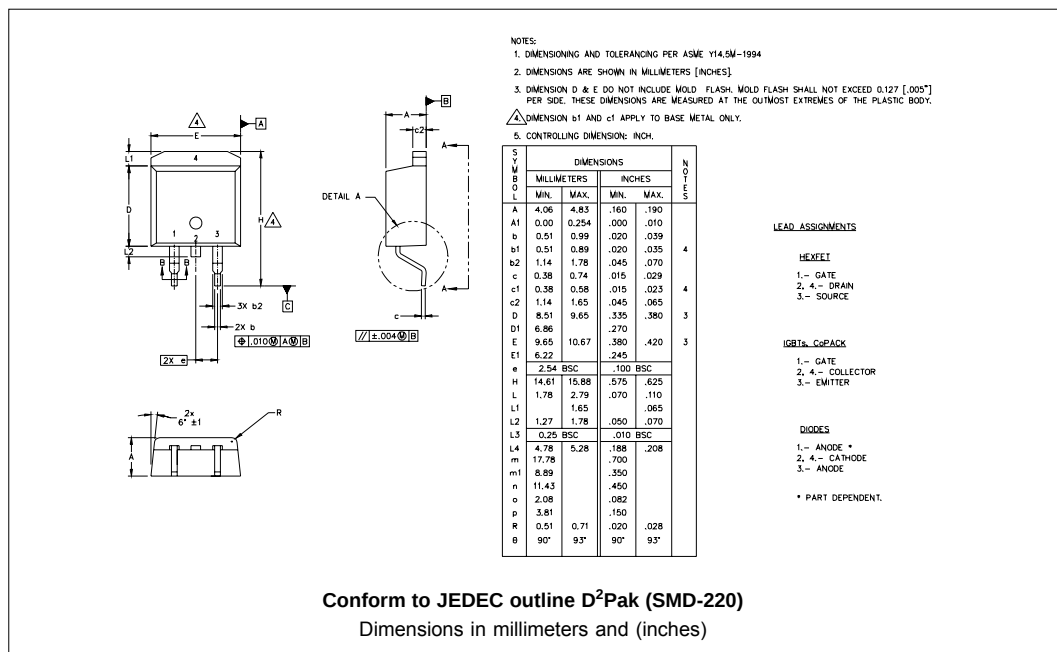
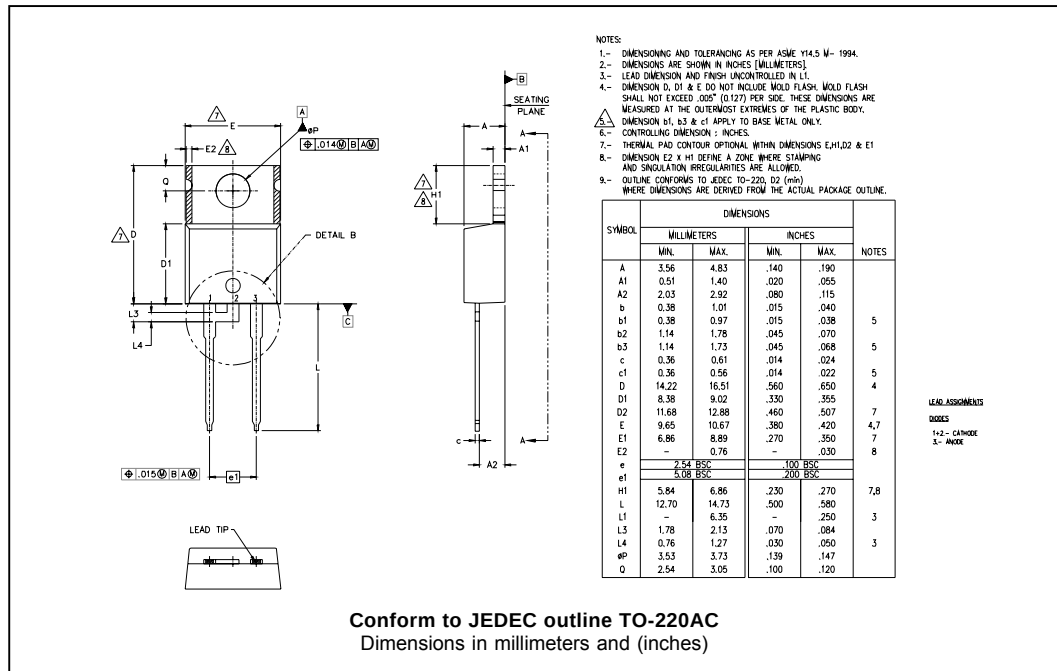
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$

$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = 80\% \text{ rated } V_R$

## Outline Table



## STPS20L15D, STPS20L15G

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### Part Marking Information

**TO-220AC**

EXAMPLE: THIS IS A STPS20L15D  
LOT CODE 1789  
ASSEMBLED ON WW 19, 2001  
IN THE ASSEMBLY LINE "C"

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE  
YEAR 1 = 2001  
WEEK 19  
LINE C

**D<sup>2</sup>Pak**

EXAMPLE: THIS IS A STPS20L15G  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000

INTERNATIONAL RECTIFIER LOGO

ASSEMBLY LOT CODE

PART NUMBER

DATE CODE  
YEAR 0 = 2000  
WEEK 02  
LINE C

### Tape & Reel Information

SECTION Y-Y

NOTES:

- 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE  $\pm 0.2$
- 2.0 CAMBER NOT TO EXCEED 1mm in 100mm
- 3.0 MATERIAL: CONDUCTIVE BLACK STYRENIC ALLOY
- 4.0  $K_o$  MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
- 5.0 MEASURED FROM CENTRELINE OF SPROCKET HOLE TO CENTRELINE OF POCKET
- 6.0 VENDOR: (OPTIONAL)
- 7.0 MUST ALSO MEET REQUIREMENTS OF EIA STANDARD #EIA-481A TAPING OF SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT
- 8.0 SURFACE RESISTIVITY OF MOLDED MATL. MUST MEASURE LESS OR EQUAL TO  $10^6$  OHMS PER SQUARE. MEASURED IN ACCORDANCE TO PROCEDURE GIVEN IN ASTM D-257 & ASTM D-991
- 9.0 TOTAL LENGTH PER REEL MUST BE 45 METERS
- 10.0  $\phi$  CRITICAL

|       |                 |
|-------|-----------------|
| $A_o$ | 10.50 $\pm 0.1$ |
| $B_o$ | 15.80 $\pm 0.1$ |
| $B_2$ | 10.25 $\pm 0.1$ |
| $K_o$ | 4.90 $\pm 0.1$  |
| $F$   | 11.50 $\pm 0.1$ |
| $P_1$ | 16.00 $\pm 0.1$ |
| $W$   | 24.00 $\pm 0.3$ |

Dimensions in millimeters and (inches)

## Ordering Information Table

## Device Code

|      |    |   |    |   |   |
|------|----|---|----|---|---|
| STPS | 20 | L | 15 | D | - |
| 1    | 2  | 3 | 4  | 5 | 6 |

- 1** - Schottky STPS Series
- 2** - Current Rating (20 = 20A)
- 3** - L = Low Voltage Drop
- 4** - Voltage Rating (15 = 15V)
- 5** - Package Style:
  - D = TO-220
  - G = D<sup>2</sup>PAk
- 6** -
  - none = Standard Production
  - PbF = Lead-Free

Tube Standard Pack Quantity : 50 pieces

Data and specifications subject to change without notice.  
 This product has been designed and qualified for Industrial Level.  
 Qualification Standards can be found on IR's Web site.

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