

# ASML-5829

## Schottky Assisted Low Power PIN Diode Limiter

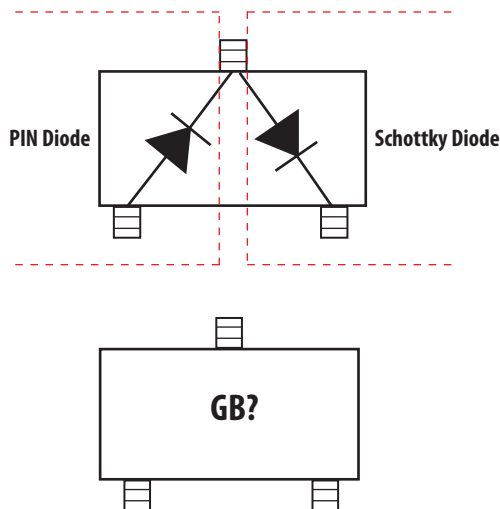


### Data Sheet

#### Description

The ASML-5829 is specifically designed for low power limiter applications, where it can be used to protect the receiver system from being damaged by large input signals, and allow the receiver system to function normally with the absence of large signal. The Schottky enhanced limiter will have a lower limiting threshold compared to the more conventional self-biased PIN limiter. The PIN diode is placed at the input, to protect the Schottky from high RF power levels.

#### Pin Connections, Package Marking & Orientation, SOT-323



Notes:  
GB = Device Code  
? = Month code indicates the month of manufacture

#### Features

- Low Power Limiter with unique combination of PIN and Schottky Diode
- Low limiting threshold power (OP1dB: 6.05 dBm @900MHz)
- Semi integrated solution in Surface Mount SOT-323 Package
  - increase flexibility
  - save board space
  - reduce cost
- PIN Diode features:
  - Low Capacitance
  - Low Resistance at Low Current
  - Low Failure in Time (FIT) Rate<sup>[1]</sup>
- Schottky Diode features:
  - Low Turn-On Voltage (As Low as 0.34 V at 1 mA)
  - Low FIT (Failure in Time) Rate<sup>[1]</sup>

Note:

1. For more information see the Surface Mount PIN Reliability Data Sheet.

**Table 1. Absolute Maximum Rating [1] Tc = +25°C, PIN diode**

| Symbol           | Parameter                   | Units | Absolute Max.<br>for PIN Diode | Absolute Max.<br>for Schottky Diode |
|------------------|-----------------------------|-------|--------------------------------|-------------------------------------|
| I <sub>F</sub>   | Forward Current (1μs Pulse) | Amp   | 1                              | 1                                   |
| P <sub>IV</sub>  | Peak Inverse Voltage        | V     | 100                            | 15                                  |
| T <sub>J</sub>   | Junction Temperature        | °C    |                                | 150                                 |
| T <sub>STG</sub> | Storage Temperature         | °C    |                                | -65 to 150                          |
| θ <sub>JC</sub>  | Thermal Resistance [2]      | °C/W  |                                | 150                                 |

Notes:

1. Operation in excess of anyone of these conditions may result in permanent damage to the device.
2. T<sub>C</sub> = 25°C, T<sub>C</sub> where is defined to be the temperature at the package pins where contacts is made to the circuit board.

**Table 2. Electrical Specifications, Tc = +25°C, PIN diode**

| Symbol          | Parameter and Test Condition                                     | Units | Min. | Typ  | Max.  |
|-----------------|--|-------|------|------|-------|
| V <sub>BR</sub> | Breakdown Voltage @ I <sub>R</sub> ≤ 10μA                        | V     | 100  | 128  | –     |
| V <sub>F</sub>  | Forward Voltage @ I <sub>F</sub> = 30mA                          | V     | –    | 0.90 | –     |
| R <sub>S</sub>  | Typical Series Resistance @ Freq = 100MHz & I <sub>F</sub> = 1mA | Ohm   | –    | 4.00 | –     |
| R <sub>S</sub>  | Typical Series Resistance @ Freq = 100MHz & I <sub>F</sub> = 5mA | Ohm   | –    | 1.90 | 2.5   |
| C <sub>T</sub>  | Typical Total Capacitance @ Freq = 1MHz & V <sub>R</sub> = 5V    | pF    | –    | 0.28 | 0.375 |
| τ               | Carrier Lifetime @ I <sub>F</sub> = 10mA & I <sub>R</sub> = 6mA  | ns    | –    | 200  | –     |

**Table 3. Electrical Specifications, Tc = +25°C, Schottky diode**

| Symbol          | Parameter and Test Condition                                  | Units | Min. | Typ  | Max. |
|-----------------|---|-------|------|------|------|
| V <sub>BR</sub> | Breakdown Voltage @ I <sub>R</sub> ≤ 100μA                    | V     | 15   | 22   | –    |
| I <sub>R</sub>  | Reverse Leakage Current @ V <sub>BR</sub> = 1V                | nA    | –    | 40   | 100  |
| V <sub>F</sub>  | Forward Voltage @ I <sub>F</sub> = 1mA                        | V     | –    | 0.32 | 0.34 |
| V <sub>F</sub>  | Forward Voltage @ I <sub>F</sub> = 10mA                       | V     | –    | 0.45 | 0.50 |
| C <sub>T</sub>  | Typical Total Capacitance @ Freq = 1MHz & V <sub>R</sub> = 0V | pF    | –    | 0.7  | 1.0  |
| RD              | Typical Dynamic Resistance, I <sub>F</sub> = 5mA              | Ohm   | –    | 12   | –    |

**ASML-5829 Typical Performance,  $T_c = +25^\circ\text{C}$**

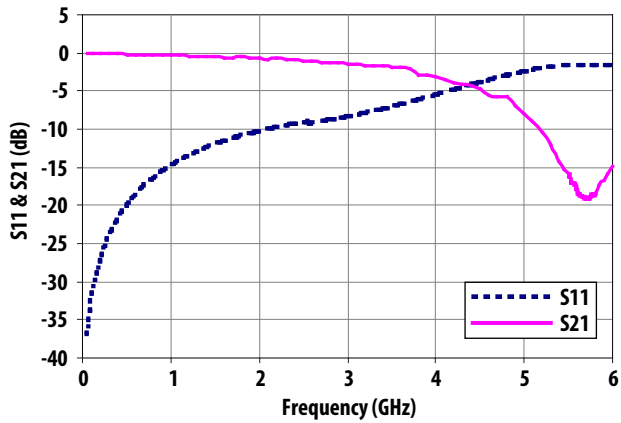


Figure 1. S11 & S21 vs Frequency at Input Power = 0dBm

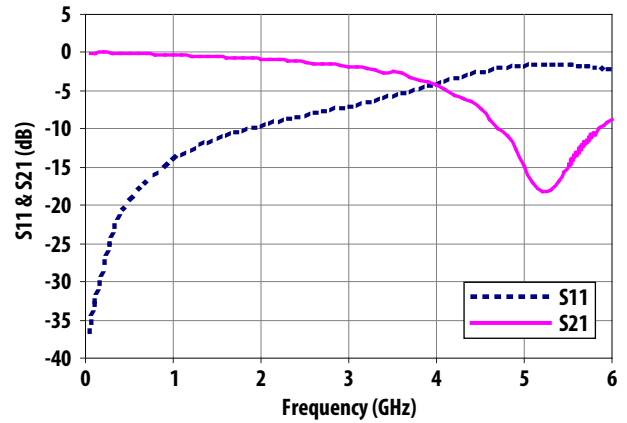


Figure 2. S11 & S21 vs Frequency at Input Power = -30dBm

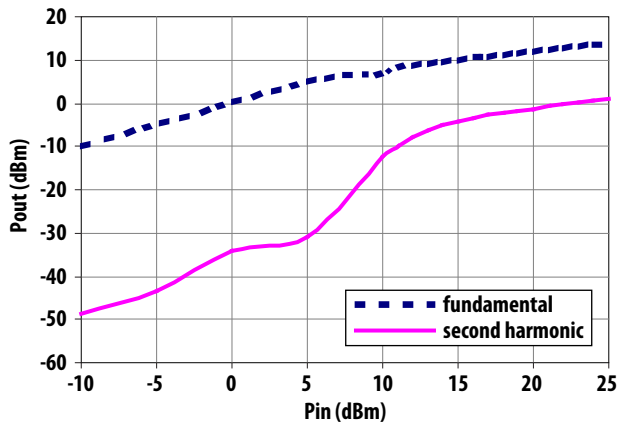


Figure 3.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 450MHz

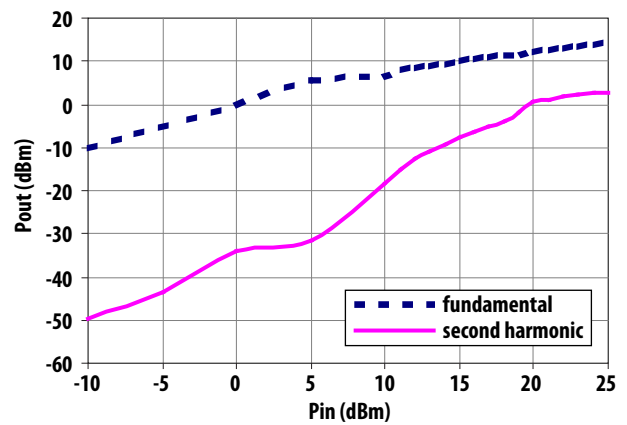


Figure 4.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 900MHz

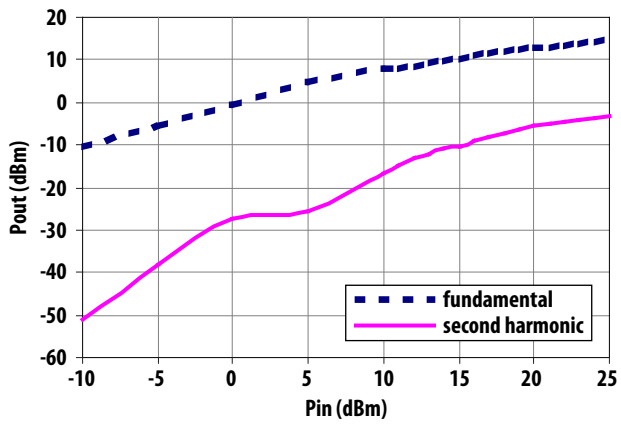


Figure 5.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 1.8GHz

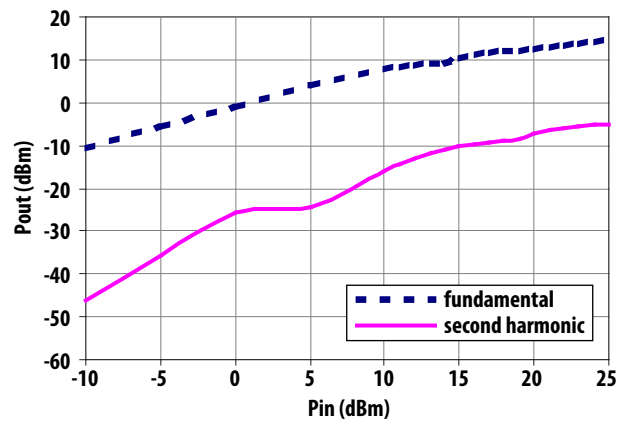


Figure 6.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 2.0GHz

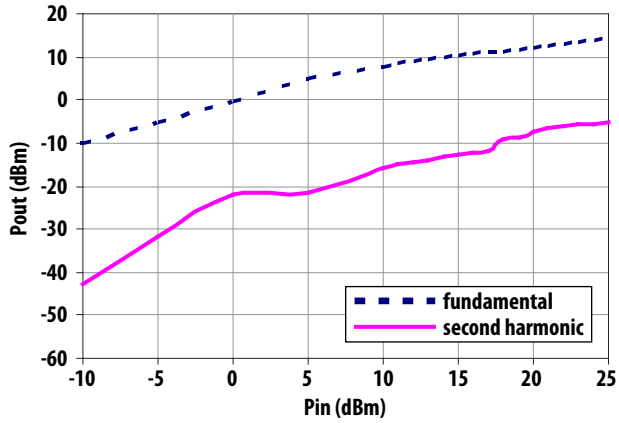


Figure 7.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 2.5GHz

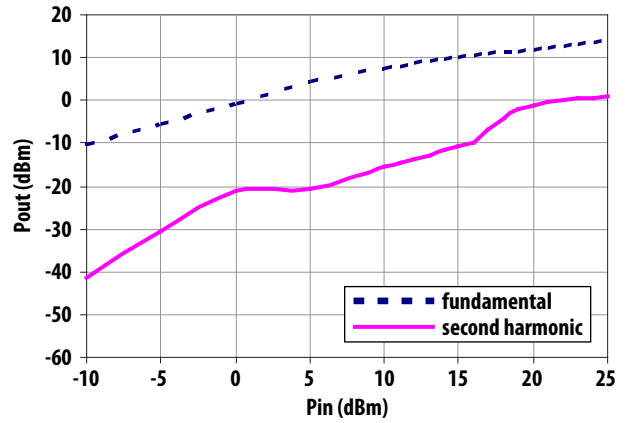
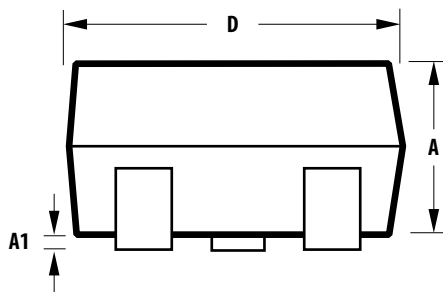
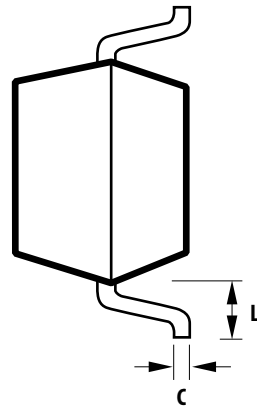
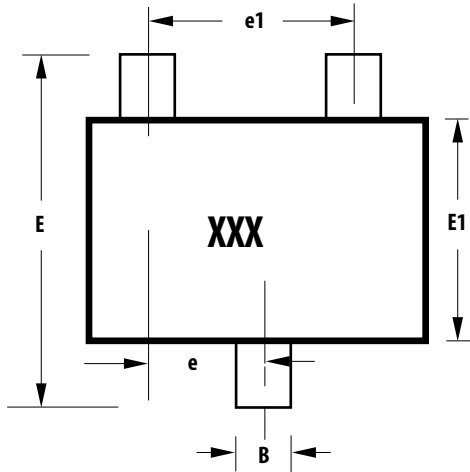


Figure 8.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 2.7GHz

### SOT-323 Package Outline



Notes:  
 XXX-package marking  
 Drawings are not to scale

| SYMBOL | DIMENSIONS (mm) |      |
|--------|-----------------|------|
|        | MIN.            | MAX. |
| A      | 0.80            | 1.00 |
| A1     | 0.00            | 0.10 |
| B      | 0.15            | 0.40 |
| C      | 0.10            | 0.20 |
| D      | 1.80            | 2.25 |
| E1     | 1.10            | 1.40 |
| e      | 0.65 typical    |      |
| e1     | 1.30 typical    |      |
| E      | 1.80            | 2.40 |
| L      | 0.425 typical   |      |

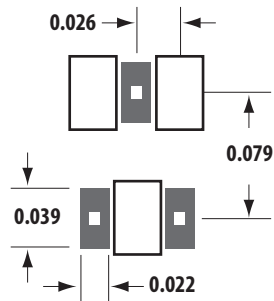
### Part Number Ordering Information

| Part Number   | No. of Devices | Container                 |
|---------------|----------------|---------------------------|
| ASML-5829-BLK | 100            | Bulk, per Antistatic bag  |
| ASML-5829-TR1 | 3000           | Tape & Reel, per 7" Reel  |
| ASML-5829-TR2 | 10000          | Tape & Reel, per 13" Reel |

Tape and Reeling conforms to Electronic Industries RS-481, "Taping of Surface Mounted Components for Automated Placement".

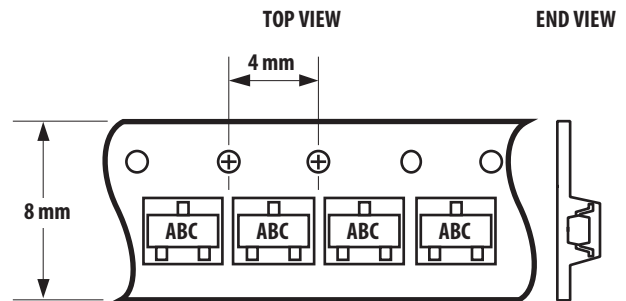
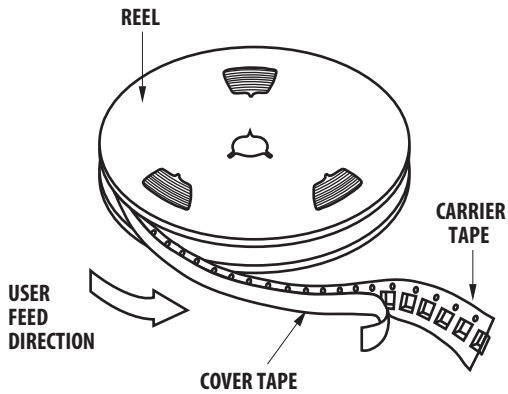
For lead-free option, the part number will have the character "G" at the end, eg. -TR2G for a 10K pc lead-free reel.

### Recommended PCB Pad Layout for AVAGO's SOT-323 Products



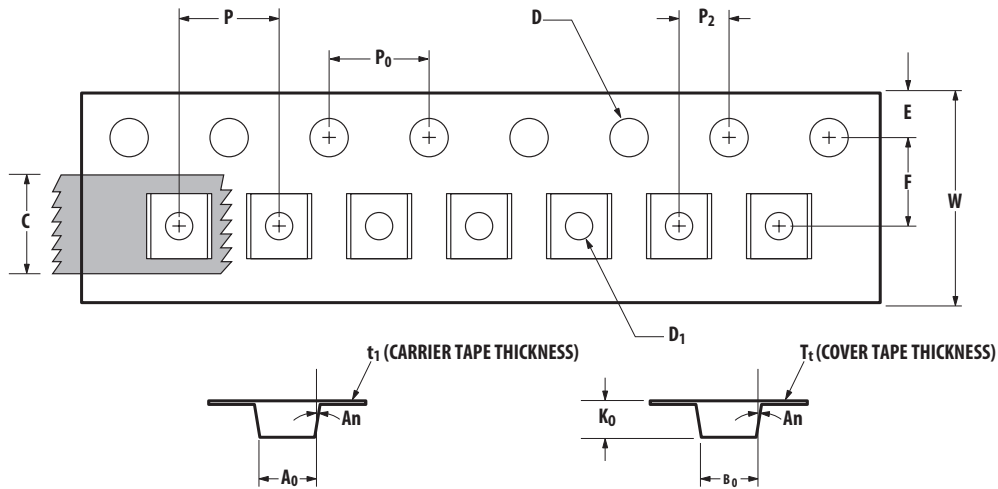
Dimensions in inches

### Device Orientation



Note: "AB" represents package marking code.  
"C" represents date code.

## Tape Dimensions and Product Orientation



|              | DESCRIPTION  | SYMBOL   | SIZE (mm)           | SIZE (INCHES)        |
|--------------|--|----------|---------------------|----------------------|
| CAVITY       | LENGTH   | $A_0$    | $2.40 \pm 0.10$     | $0.094 \pm 0.004$    |
|              | WIDTH  | $B_0$    | $2.40 \pm 0.10$     | $0.094 \pm 0.004$    |
|              | DEPTH  | $K_0$    | $1.20 \pm 0.10$     | $0.047 \pm 0.004$    |
|              | PITCH  | $P$      | $4.00 \pm 0.10$     | $0.157 \pm 0.004$    |
|              | BOTTOM HOLE DIAMETER                                   | $D_1$    | $1.00 + 0.25$       | $0.039 + 0.010$      |
|              | PERFORATION  | DIAMETER | $D$                 | $1.55 \pm 0.05$      |
| PITCH        |  | $P_0$    | $4.00 \pm 0.10$     | $0.157 \pm 0.004$    |
| POSITION     |  | $E$      | $1.75 \pm 0.10$     | $0.069 \pm 0.004$    |
| CARRIER TAPE | WIDTH  | $W$      | $8.00 \pm 0.30$     | $0.315 \pm 0.012$    |
|              | THICKNESS  | $t_1$    | $0.254 \pm 0.02$    | $0.0100 \pm 0.0008$  |
| COVER TAPE   | WIDTH  | $C$      | $5.4 \pm 0.10$      | $0.205 \pm 0.004$    |
|              | TAPE THICKNESS   | $T_t$    | $0.062 \pm 0.001$   | $0.0025 \pm 0.00004$ |
| DISTANCE     | CAVITY TO PERFORATION (WIDTH DIRECTION)                | $F$      | $3.50 \pm 0.05$     | $0.138 \pm 0.002$    |
|              | CAVITY TO PERFORATION (LENGTH DIRECTION)               | $P_2$    | $2.00 \pm 0.05$     | $0.079 \pm 0.002$    |
| ANGLE        | FOR SOT-323 (SC70-3 LEAD)<br>FOR SOT-363 (SC70-6 LEAD) | $An$     | 8°C MAX<br>10°C MAX |                      |

For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

Avago, Avago Technologies, and the A logo are trademarks of Avago Technologies in the United States and other countries. Data subject to change. Copyright © 2005-2009 Avago Technologies. All rights reserved.  
AV02-1692EN - January 13, 2009

**AVAGO**  
TECHNOLOGIES

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Avago Technologies:](#)

[ASML-5829-TR1G](#) [ASML-5829-BLKG](#) [ASML-5829-TR2G](#)