

# ASML-5822

## Schottky Assisted Low Power PIN Diode Limiter

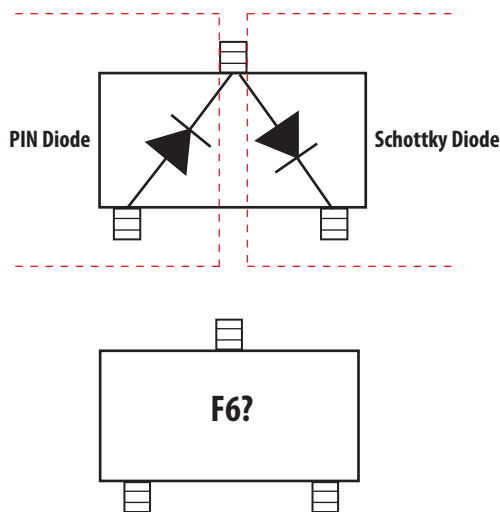


### Data Sheet

#### Description

The ASML-5822 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 and Package Marking, SOT-323



Notes:  
F6 = 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 : 2.85 dBm @900MHz)
- Semi integrated solution in Surface Mount SOT-323 Package
  - design simplicity
  - save board space
  - reduce cost
- PIN Diode features:
  - Power Limiting /Circuit Protection
  - 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** <sup>[1]</sup>  $T_c = +25^\circ\text{C}$ 

Symbol	Parameter	Units	Absolute Max. for PIN Diode	Absolute Max. for Schottky Diode
$I_F$	Forward Current (1 $\mu\text{s}$ Pulse)	Amp	1	1
$P_{IV}$	Peak Inverse Voltage	V	50	15
$T_J$	Junction Temperature	$^\circ\text{C}$		150
$T_{STG}$	Storage Temperature	$^\circ\text{C}$		-65 to 150
$\theta_{JC}$	Thermal Resistance <sup>[2]</sup>	$^\circ\text{C}/\text{W}$		500

Notes:

1. Operation in excess of anyone of these conditions may result in permanent damage to the device.
2.  $T_c = 25^\circ\text{C}$ ,  $T_c$  where is defined to be the temperature at the package pins where contacts is made to the circuit board.

**Table 2. Electrical Specifications,  $T_c = +25^\circ\text{C}$ , PIN diode**

Symbol	Parameter and Test Condition	Units	Min.	Typ	Max.
$V_{BR}$	Breakdown Voltage, $I_R \leq 10\mu\text{A}$	V	50	60	–
$V_F$	Forward Voltage, $I_F = 100\text{mA}$	V	–	0.93	–
$R_S$	Typical Series Resistance, Freq = 100MHz & $I_F = 1\text{mA}$	Ohm	–	1.2	–
$R_S$	Typical Series Resistance, Freq = 100MHz & $I_F = 10\text{mA}$	Ohm	–	0.5	0.6
$C_T$	Typical Total Capacitance, Freq = 1MHz & $V_R = 0\text{V}$	pF	–	0.9	–
$C_T$	Typical Total Capacitance, Freq = 1MHz & $V_R = 20\text{V}$	pF	–	0.53	0.8
$\tau$	Carrier Lifetime @ $I_F = 10\text{mA}$ & $I_R = 6\text{mA}$	ns	–	70	–

**Table 3. Electrical Specifications,  $T_c = +25^\circ\text{C}$ , Schottky diode**

Symbol	Parameter and Test Condition	Units	Min.	Typ	Max.
$V_{BR}$	Breakdown Voltage, $I_R \leq 100\mu\text{A}$	V	15	22	–
$I_R$	Reverse Leakage Current @ $V_{BR} = 1\text{V}$	nA	–	40	100
$V_F$	Forward Voltage, $I_F = 1\text{mA}$	V	–	0.32	0.34
$V_F$	Forward Voltage, $I_F = 10\text{mA}$	V	–	0.45	0.50
$C_T$	Typical Total Capacitance, Freq = 1MHz & $V_R = 0\text{V}$	pF	–	0.7	1.0
$R_D$	Typical Dynamic Resistance, $I_F = 5\text{mA}$	Ohm	–	12	–

**ASML-5822 Typical Performance, Tc = +25°C**

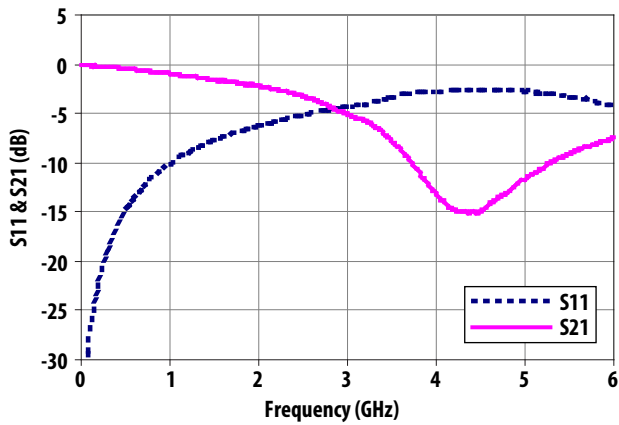


Figure 1. S11 & S21 vs Frequency at Input Power = 0dBm

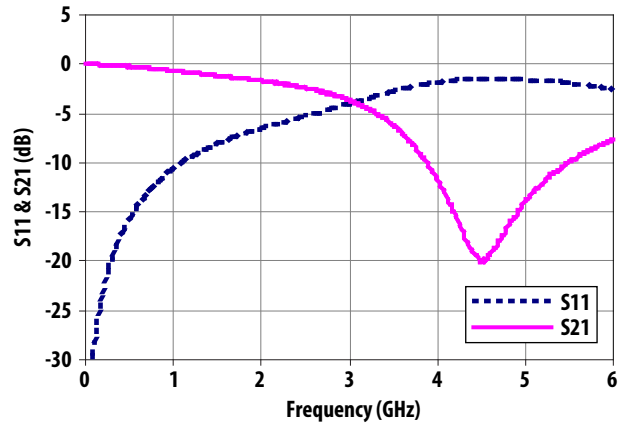


Figure 2. S11 & S21 vs Frequency at Input Power = -30dBm

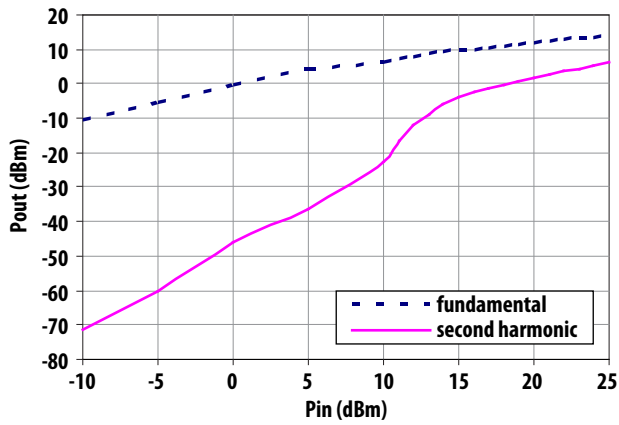


Figure 3. Pout fundamental & Pout second harmonic vs Pin at freq = 450MHz

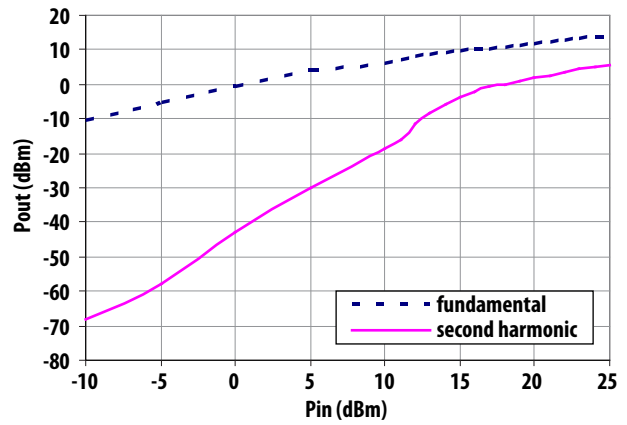


Figure 4. Pout fundamental & Pout second harmonic vs Pin at freq = 900MHz

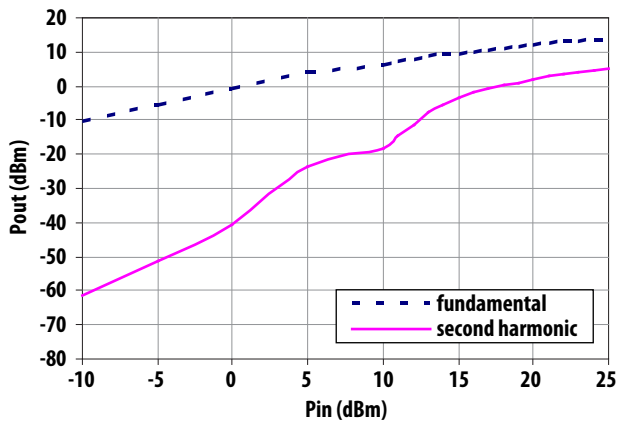


Figure 5. Pout fundamental & Pout second harmonic vs Pin at freq = 1.8GHz

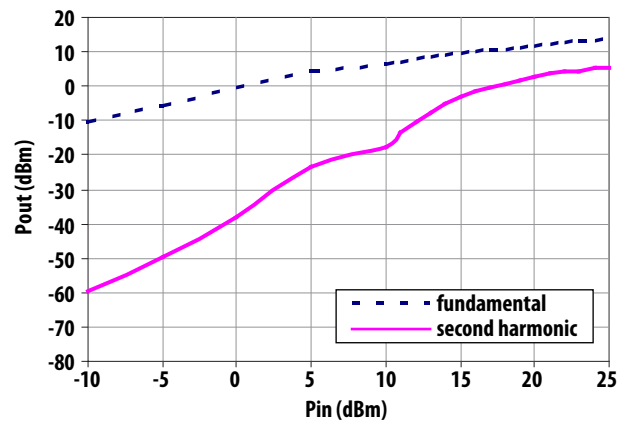


Figure 6. Pout fundamental & Pout second harmonic vs Pin at freq = 2.0GHz

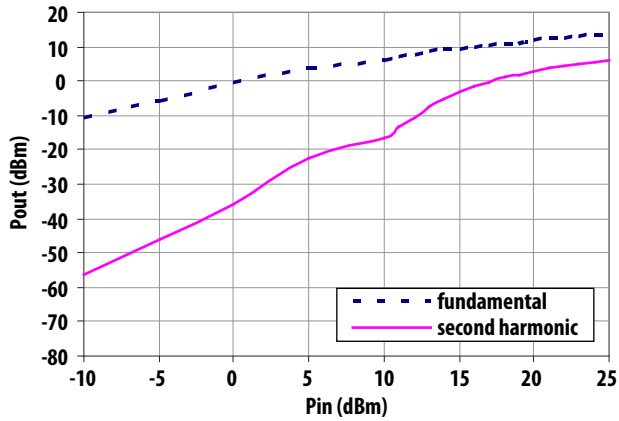


Figure 7.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 2.5GHz

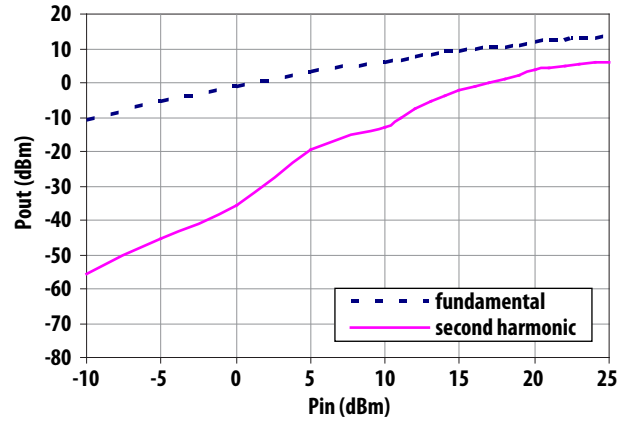
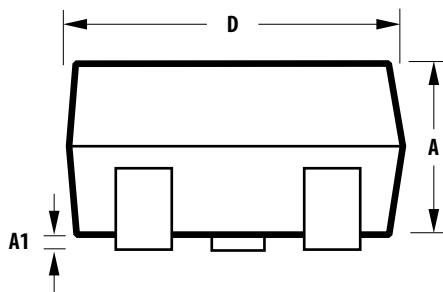
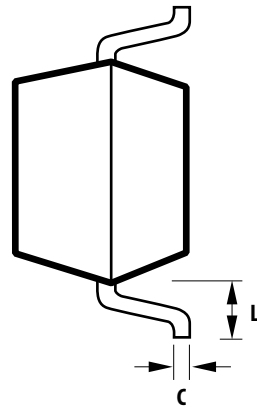
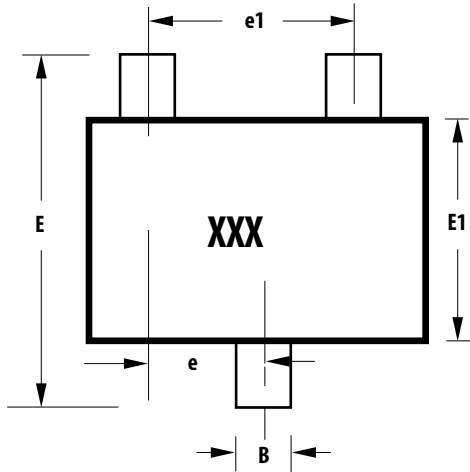


Figure 8.  $P_{out}$  fundamental &  $P_{out}$  second harmonic vs  $P_{in}$  at freq = 2.7GHz

### 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	

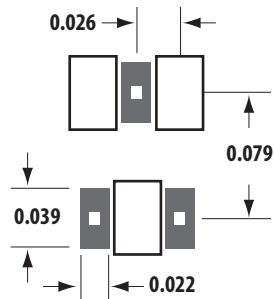
### Part Number Ordering Information

Part Number	No. of Devices	Container
ASML-5822-BLK	100	Bulk, per Antistatic bag
ASML-5822-TR1	3000	Tape & Reel, per 7" Reel
ASML-5822-TR2	10000	Tape & Reel, per 13" Reel

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

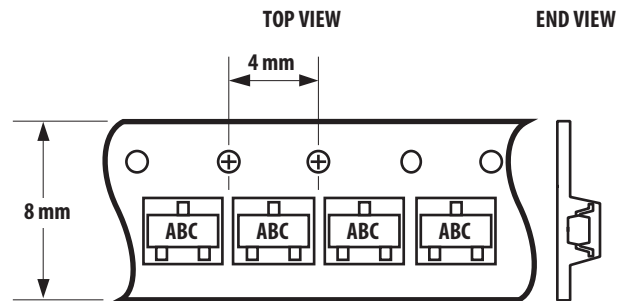
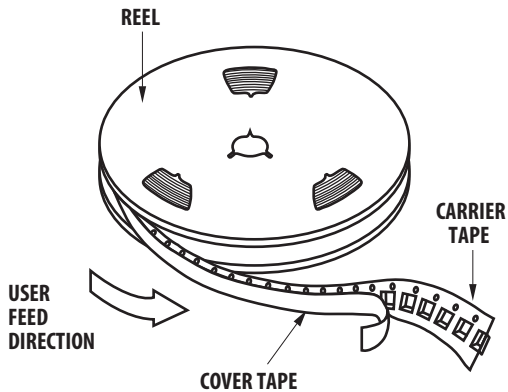
For lead-free option, the part number will have the character "G" at the end, eg. -TR2G for a 10K pc lead-free reel.

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



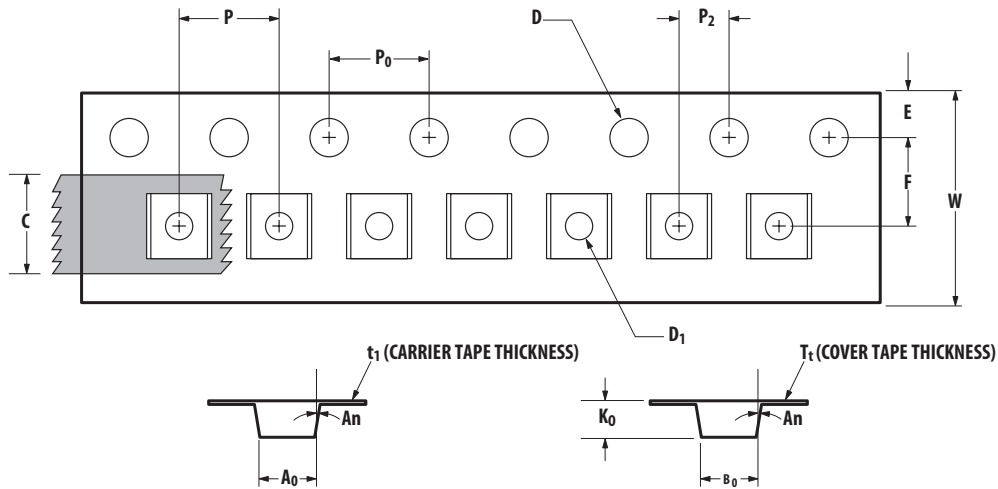
Dimensions in inches

### 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) FOR SOT-363 (SC70-6 LEAD)	$A_n$	8°C MAX 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)

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