ASML-5822

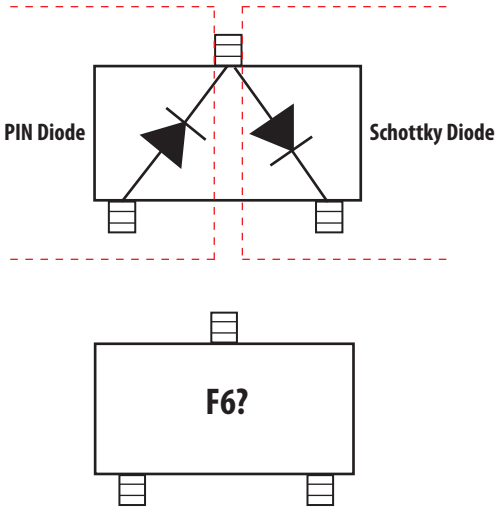
Schottky Assisted Low Power PIN Diode Limiter

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[1]
- Schottky Diode features:
  - Low Turn-On Voltage (As Low as 0.34 V at 1 mA)
  - Low FIT (Failure in Time) Rate[1]

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

Table 1. Absolute Maximum Rating [1] Tc = +25°C

Symbol	Parameter	Units	Absolute Max. for PIN Diode	Absolute Max. for Schottky DIode
I_F	Forward Current (1μs Pulse)	Amp	1	1
P_{IV}	Peak Inverse Voltage	V	50	15
T_J	Junction Temperature	°C	150	
T_{STG}	Storage Temperature	°C	-65 to 150	
θ_{JC}	Thermal Resistance [2]	°C/W	500	

Notes:
1. Operation in excess of anyone of these conditions may result in permanent damage to the device.
2. T_C = 25°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, Tc = +25°C, PIN diode

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

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

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

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

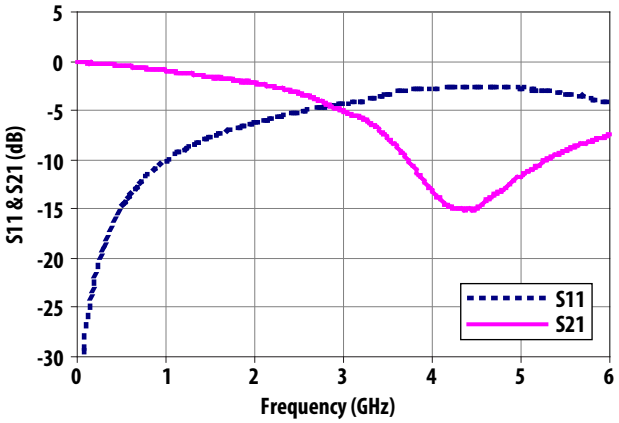


Figure 1. S11 & S21 vs Frequency at Input Power = 0dBm

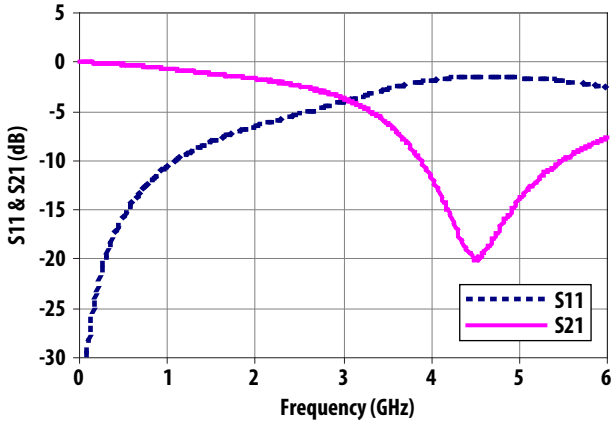


Figure 2. S11 & S21 vs Frequency at Input Power = -30dBm

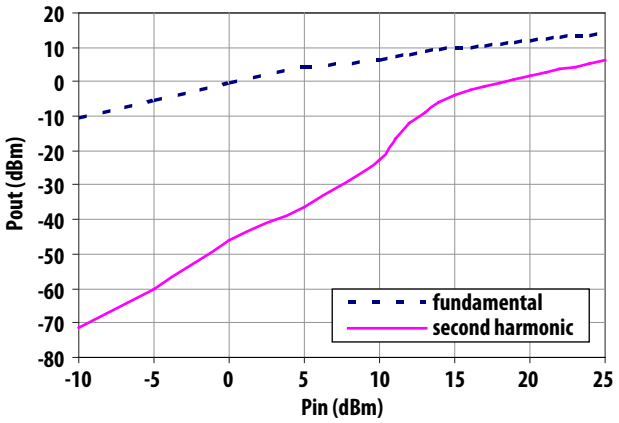


Figure 3. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 450MHz

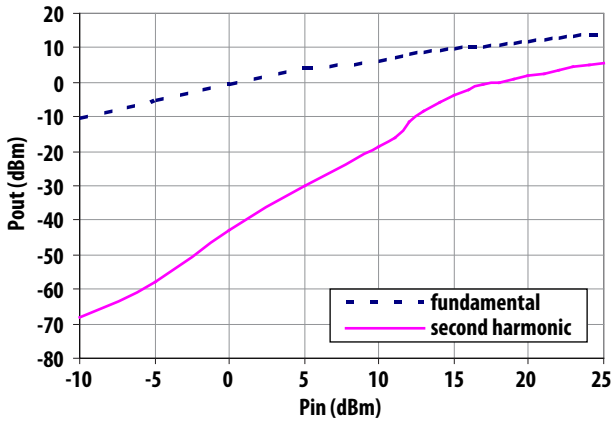


Figure 4. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 900MHz

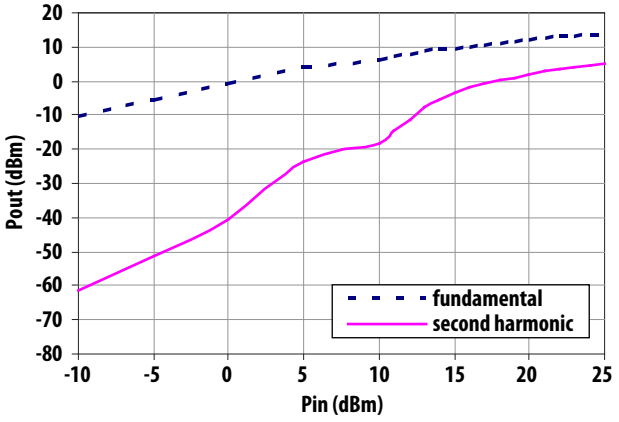


Figure 5. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 1.8GHz

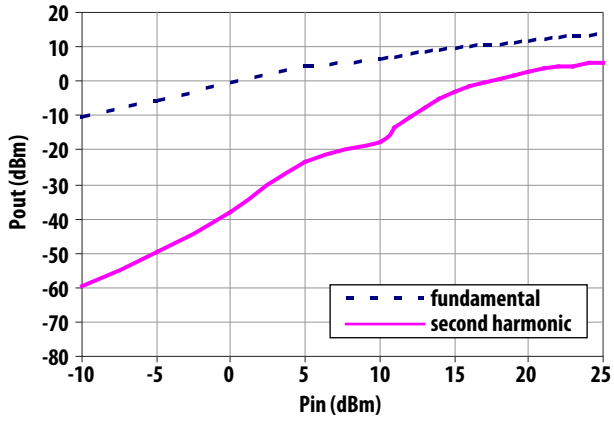


Figure 6. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 2.0GHz

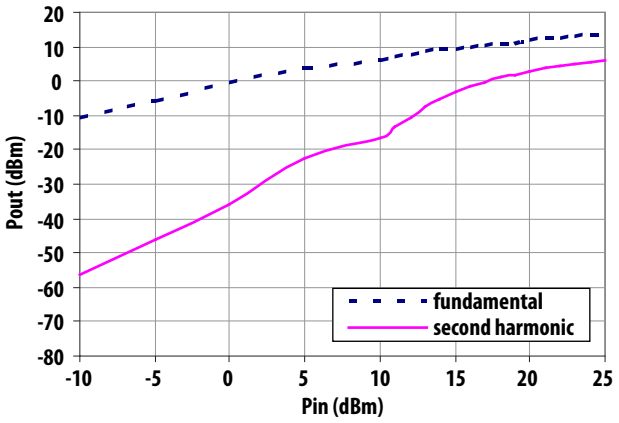


Figure 7. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 2.5GHz

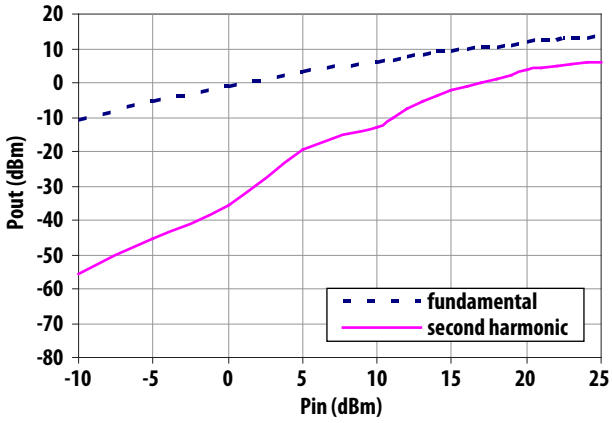
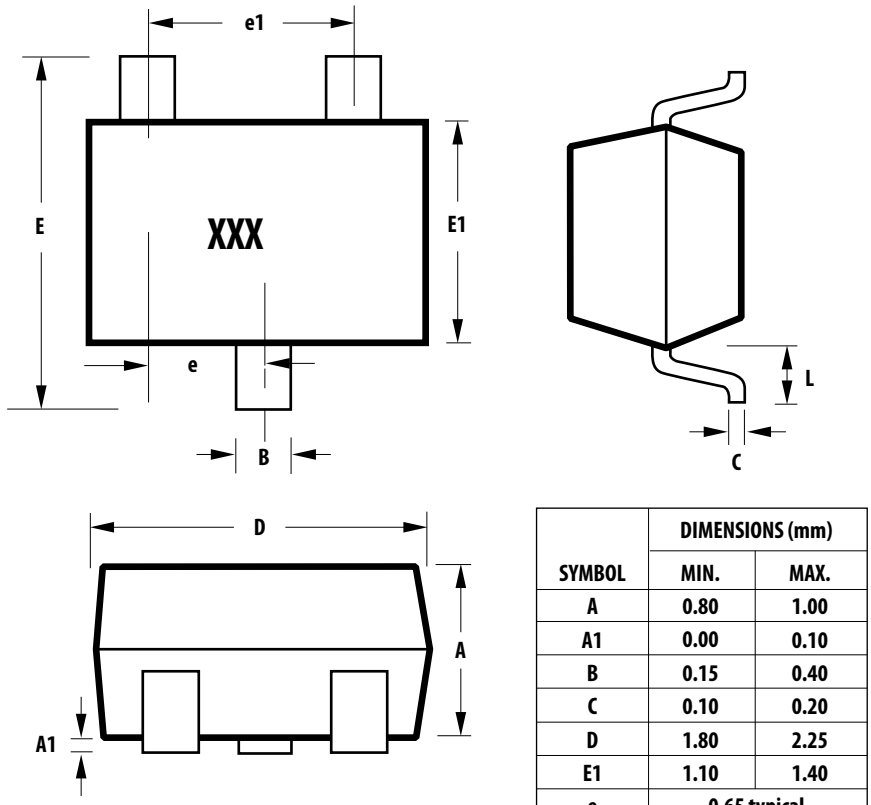


Figure 8. $P_{out\ fundamental}$ & $P_{out\ second\ harmonic}$ vs Pin at freq = 2.7GHz

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	

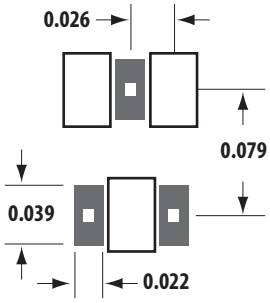
Part Number Ordering Information

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".

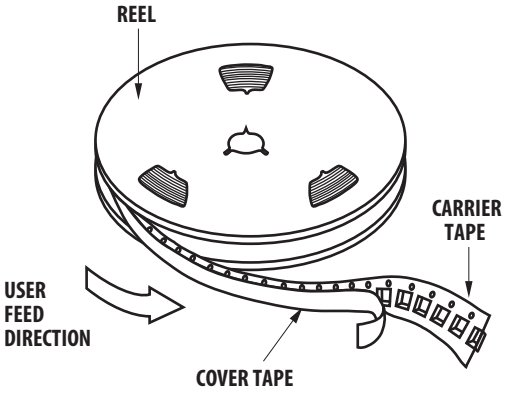
For lead-free option, the part number will have the character "G" at the end, eg. –TR2G for a 10K pc lead-free reel.

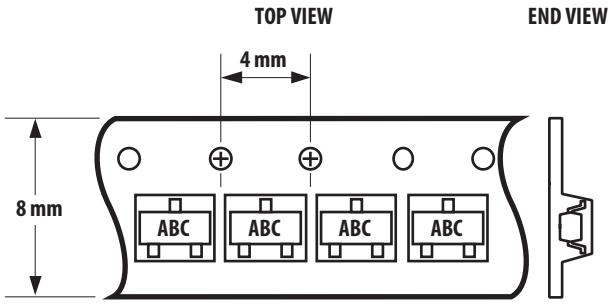
Recommended PCB Pad Layout for AVAGO's SOT-323 Products



Dimensions in inches

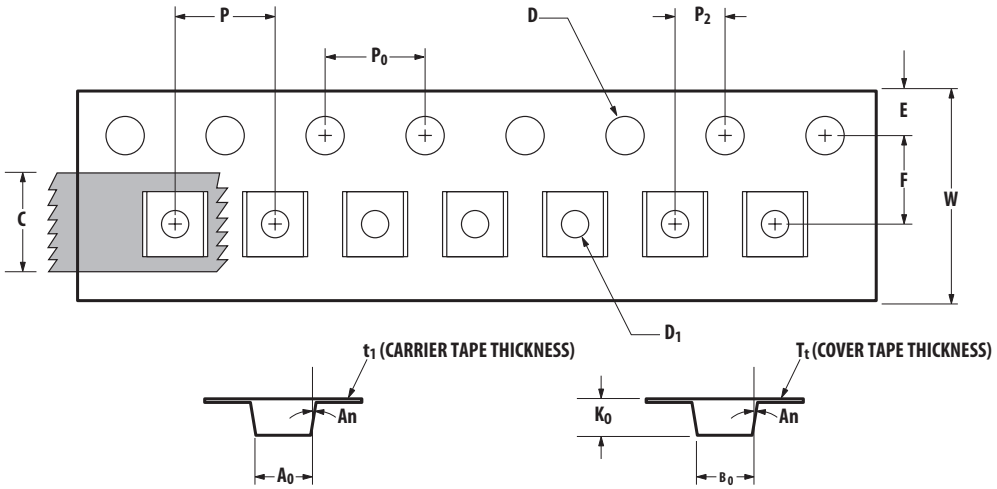
Device Orientation





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 ± 0.10	0.094 ± 0.004
	WIDTH	B_0	2.40 ± 0.10	0.094 ± 0.004
	DEPTH	K_0	1.20 ± 0.10	0.047 ± 0.004
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 + 0.25	0.039 + 0.010
PERFORATION	DIAMETER	D	1.55 ± 0.05	0.061 ± 0.002
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	8.00 ± 0.30	0.315 ± 0.012
	THICKNESS	t_1	0.254 ± 0.02	0.0100 ± 0.0008
COVER TAPE	WIDTH	C	5.4 ± 0.10	0.205 ± 0.004
	TAPE THICKNESS	T_t	0.062 ± 0.001	0.0025 ± 0.00004
DISTANCE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002
ANGLE	FOR SOT-323 (SC70-3 LEAD)	An	8°C MAX	
	FOR SOT-363 (SC70-6 LEAD)		10°C MAX	

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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