DATA SHEET

SMV1130-040LF and SMV1130-079LF: Hyperabrupt Junction Tuning Varactors

Applications

- High-volume, low-cost systems
- Wideband VCOs

Features

- High tuning ratio
- Low series resistance
- Packages rated MSL1, 260 °C per JEDEC J-STD-020
- For RoHS and other product compliance information, see the Skyworks Certificate of Conformance.

Description

The SMV1130 surface mount varactor diodes are designed for very high capacitance tuning ratios with a low series resistance, making them attractive for wideband Voltage-Controlled Oscillator (VCO) applications.

Table 1. Packaging and Marking


Single
SOD-882
SMV1130-040LF Marking: HZ1
Ls = 0.45 nH

Single
SC-79
SMV1130-079LF Marking: Cathode and XH
LS = 0.70 nH

Figure 1. SMV1130 Packages

Electrical and Mechanical Specifications

The absolute maximum ratings of the SMV1130 varactors are provided in Table 2. Electrical specifications are provided in Table 3. Typical capacitance values are listed in Table 4. Typical capacitance versus voltage performance for the SMV1130 varactors is illustrated in Figure 2.

The SPICE model for the SMV1130 varactor series is shown in Figure 3 and the associated model parameters are provided in Table 5.

Package and tape and reel dimensions are shown in Figures 4 through 7.

Electrical Specifications

Table 2. Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V_R		26	V
Forward current	I_F		20	mA
Power dissipation	P_{DIS}		250	mW
Operating temperature	T_{OP}	–55	+125	°C
Storage temperature	T_{STG}	–55	+150	°C

1. Exposure to maximum rating conditions for extended periods may reduce device reliability. Exceeding any of the limits listed here may result in permanent damage to the device.

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 3. SMV1130 Series Specifications[1]
(TOP = 25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Reverse current	I_R	V_R = 21 V			20	nA
Capacitance	C_T	V_R = 1 V, f = 1 MHz	17.4		21.2	pF
Capacitance ratio	C_{TR}	V_R = 1 V/3 V V_R = 1 V/9 V	1.47 3.70		1.76 4.50	– –
Series resistance	R_S	f = 500 MHz, V_R = 1 V		0.5	0.8	Ω
Breakdown voltage	V_{BR}	I_R = 10 µA	26			V

1. Performance is guaranteed only under the conditions listed in this table.

Table 4. Capacitance vs Reverse Voltage

V_R (V)	C_T (pF)
0	27.6
1	18.5
2.5	12.8
5	7.9
10	3.8
15	2.6
20	2.0
25	1.8

Typical Performance Characteristics

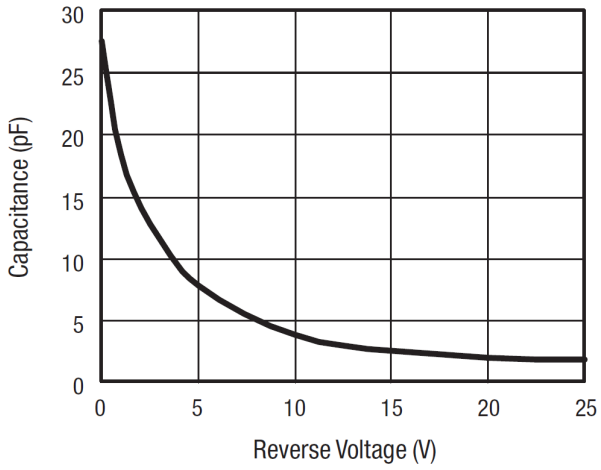


Figure 2. Capacitance vs Reverse Voltage

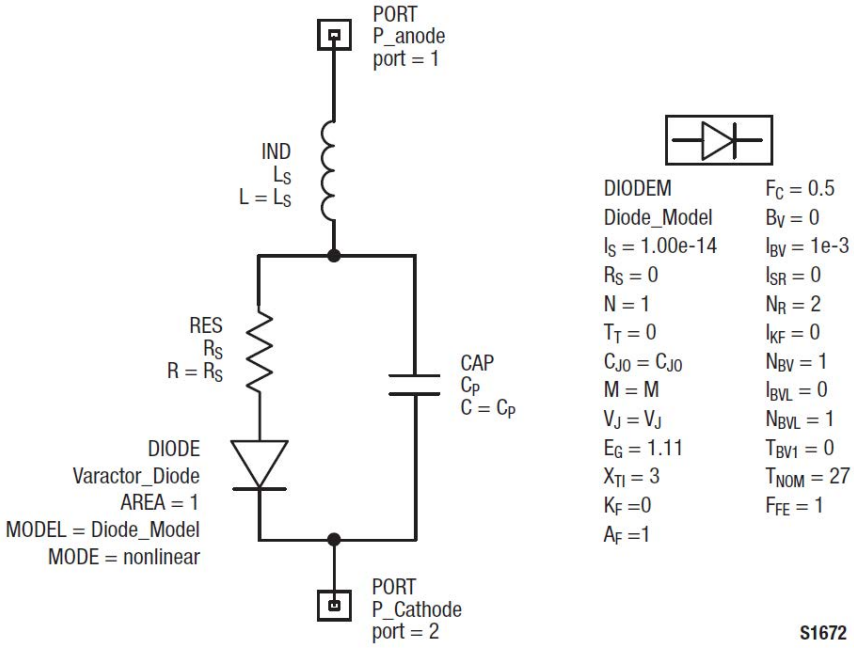


Figure 3. SPICE Model

Table 5. SPICE Model Parameters

Part Number	C_{JO} (pF)	V_J (V)	M	C_P (pF)	R_S (Ω)	L_S (nH)
SMV1130-040LF	25.8	10	3.7	1.8	0.8	0.45
SMV1130-079LF	25.8	10	3.7	1.8	0.8	0.70

Package and Handling Information

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SMV1130 varactors are rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. They can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, Solder Reflow Information, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

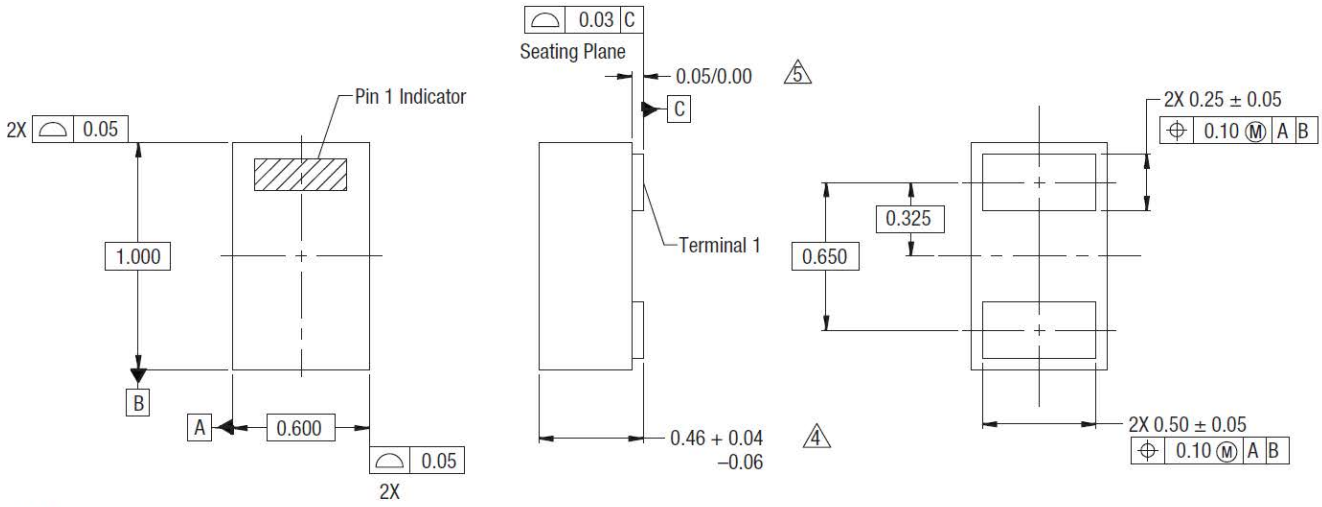
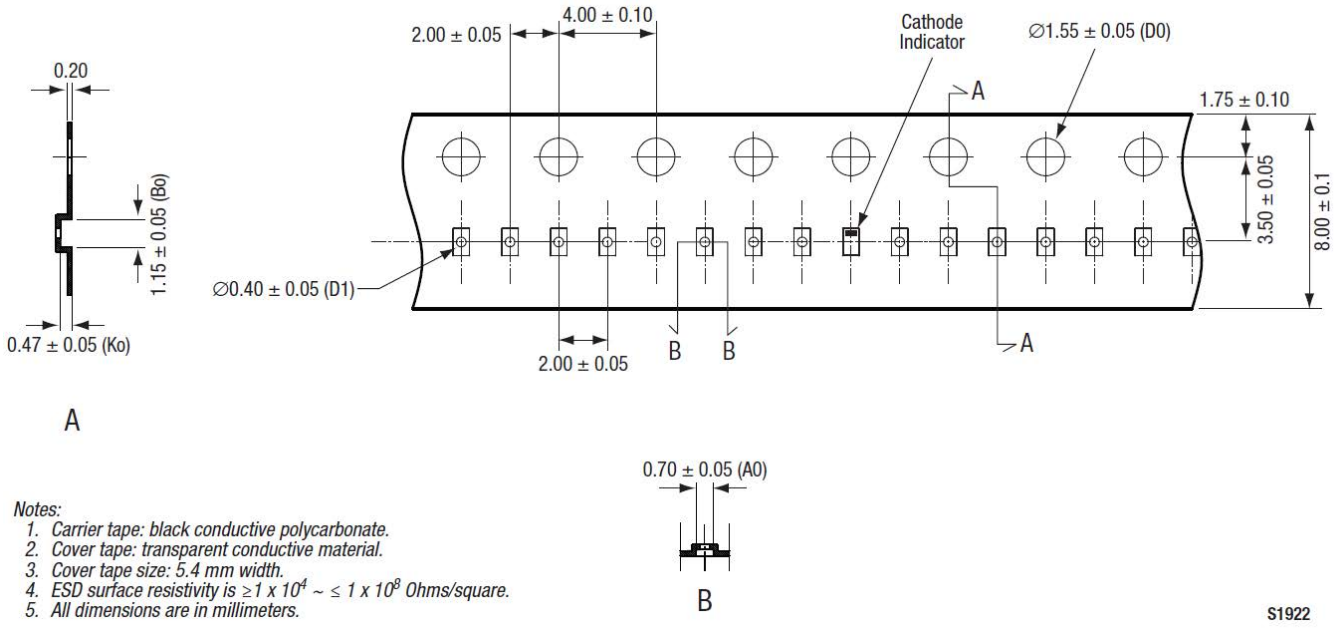


Figure 4. SOD-882 Package Dimensions



Notes:
1. *Carrier tape: black conductive polycarbonate.*
2. *Cover tape: transparent conductive material.*
3. *Cover tape size: 5.4 mm width.*
4. *ESD surface resistivity is ≥1 x 10^4 ~ ≤ 1 x 10^8 Ohms/square.*
5. *All dimensions are in millimeters.*

Figure 5. SOD-882 Tape and Reel Dimensions

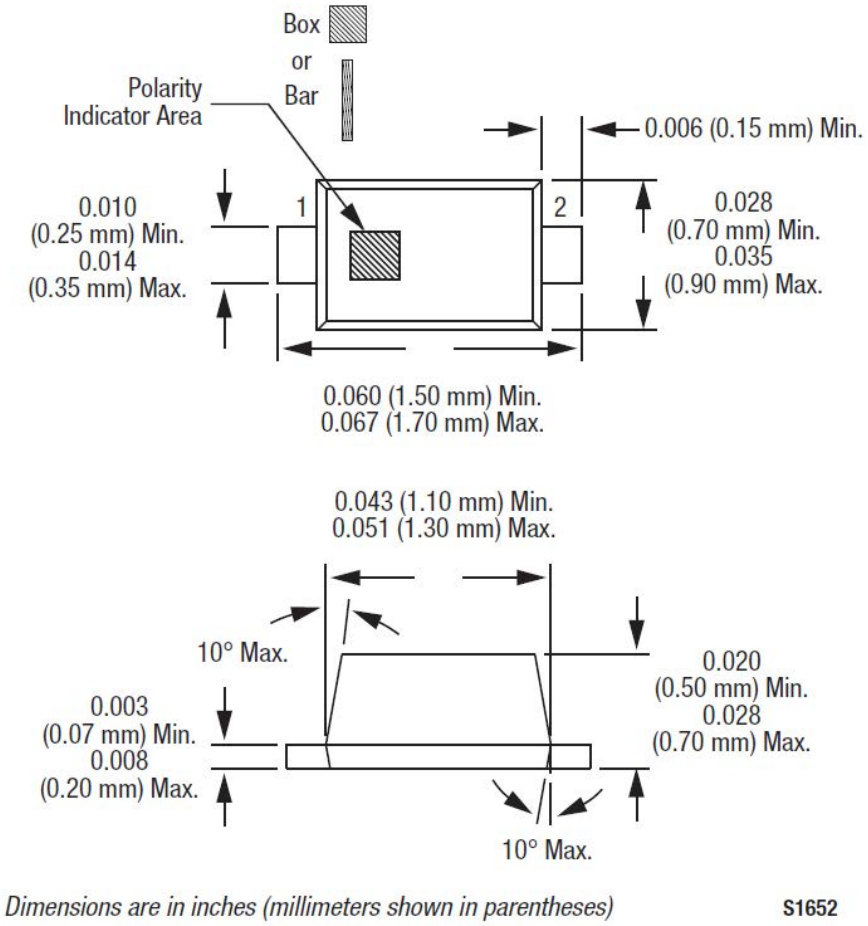
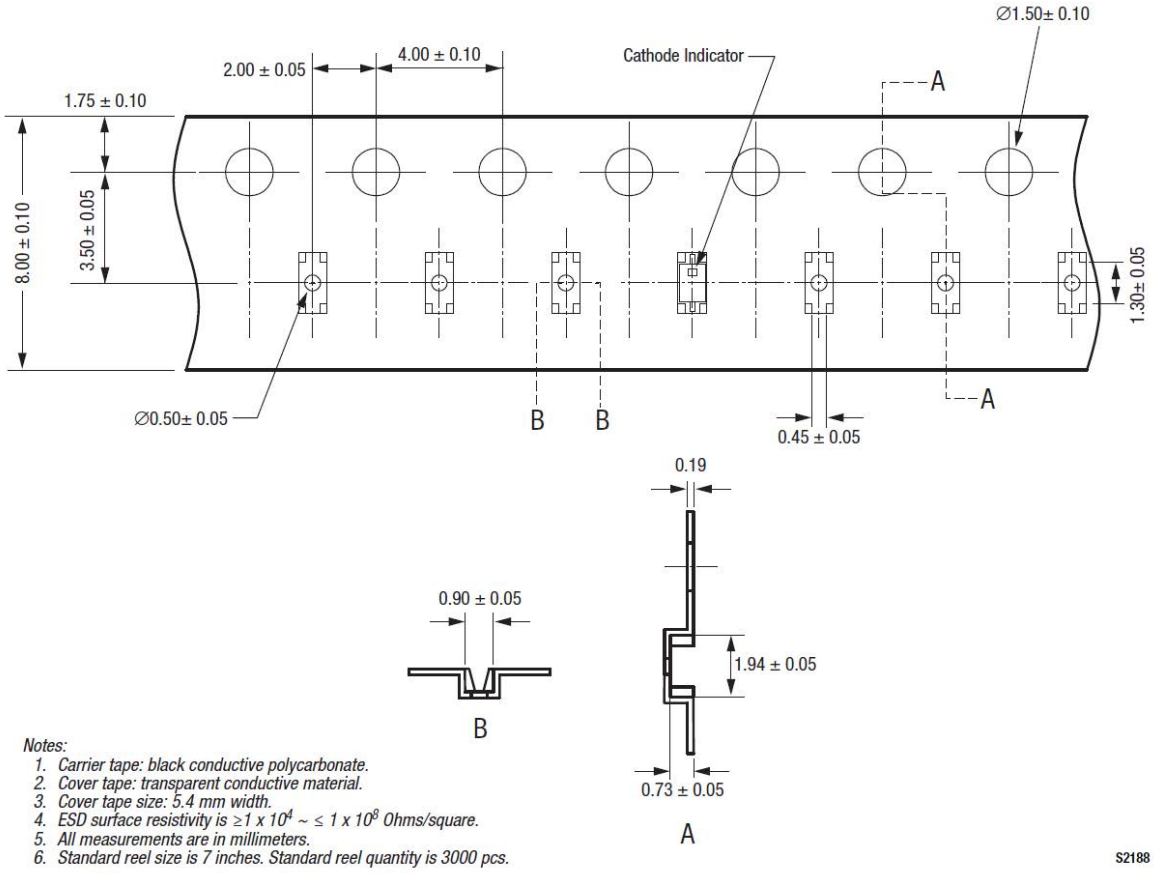


Figure 6. SC-79 Package Dimensions



Notes:
1. *Carrier tape: black conductive polycarbonate.*
2. *Cover tape: transparent conductive material.*
3. *Cover tape size: 5.4 mm width.*
4. *ESD surface resistivity is ≥1 x 10^4 ~ ≤ 1 x 10^9 Ohms/square.*
5. *All measurements are in millimeters.*
6. *Standard reel size is 7 inches. Standard reel quantity is 3000 pcs.*

Figure 7. SC-79 Tape and Reel Dimensions