

DATA SHEET

SMV1705 Series: Hyperabrupt Junction Tuning Varactors

Features

- Designed for high volume, low cost battery applications
- Low series resistance
- High capacitance ratio
- Available lead (Pb)-free MSL-1 @ 250 °C per JEDEC J-STD-020
- Ultra small size SC-79 package
- Available in tape and reel packaging






Description

The SMV1705 series are silicon hyperabrupt junction varactor diodes specifically designed for battery operation. The specified high capacitance ratio and low R_S of these varactors make them appropriate for low noise VCOs used at frequencies in wireless systems to beyond 2.5 GHz. Applications include low noise and wideband UHF and VHF VCO for GSM, PCS, CDMA and analog phones.

NEW


Skyworks offers lead (Pb)-free “environmentally friendly” packaging that is RoHS compliant (European Parliament for the Restriction of Hazardous Substances).

	
Common Cathode	Single
Marking: CY3	
SOT-23	SC-79
SMV1705-004	SMV1705-079
	SMV1705-079LF
$L_S = 1.4 \text{ nH}$	$L_S = 0.7 \text{ nH}$

 LF denotes lead (Pb)-free packaging option as an alternative to our standard tin/lead (Sn/Pb) packaging.

Absolute Maximum Ratings

Characteristic	Value
Forward current (I_F)	20 mA
Power dissipation (P_D)	250 mW
Storage temperature (T_{ST})	-55 °C to +150 °C
Operating temperature (T_{OP})	-55 °C to +125 °C
ESD human body model	Class 0

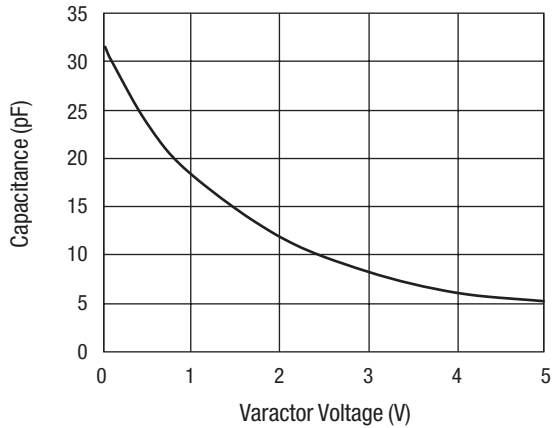
Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

Electrical Specifications at 25 °C

Parameter	Condition	Min.	Typ.	Max.	Unit
Reverse current (I_R)	$V_R = 8\text{ V}$		< 0.01	20.0	nA
Capacitance (C_T)	$V_R = 1\text{ V}, F = 1\text{ MHz}$	17.3	18.30	19.3	pF
Capacitance (C_T)	$V_R = 4\text{ V}, F = 1\text{ MHz}$	5.3	6.10	6.6	pF
Capacitance ratio (C_{TR})	$C_T(1\text{ V})/C_T(4\text{ V})$	2.8	3.00		
Series resistance (R_S)	$V_R = 1\text{ V}, F = 470\text{ MHz}$		0.32		Ω
Breakdown voltage (V_{BR})	$I_R = 10\ \mu\text{A}$	12.0			V

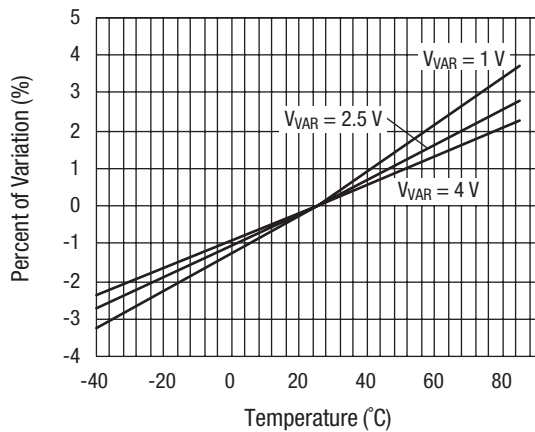
Typical Performance Data



Capacitance vs. Voltage

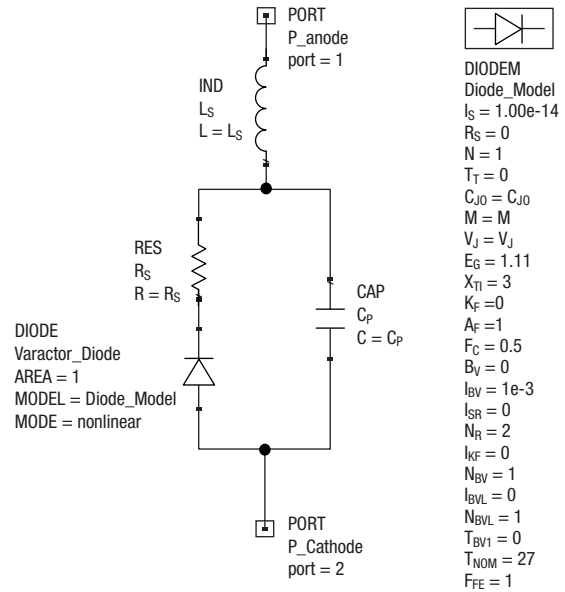
Capacitance vs. Voltage

V_R (V)	C_T (pF)
0.0	31.5
0.5	23.5
1.0	18.3
1.5	14.3
2.0	11.9
2.5	9.7
3.0	8.3
3.5	7.1
4.0	6.1
4.5	5.5
5.0	5.2



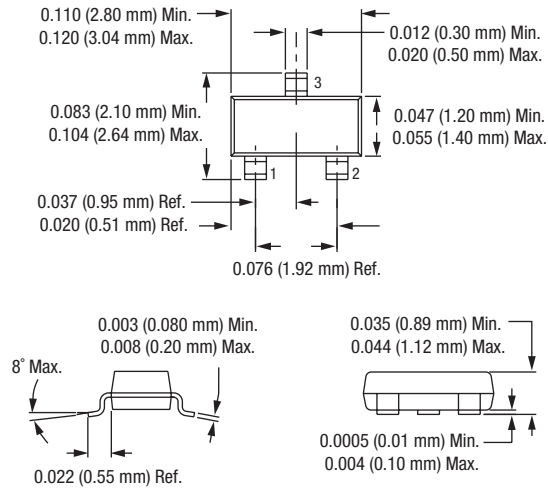
Relative Capacitance Change vs. Temperature

SPICE Model

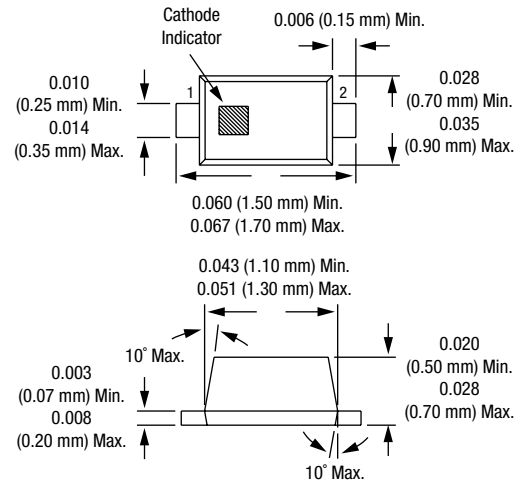


Part Number	C _{J0} (pF)	V _J (V)	M	C _P (pF)	R _S (Ω)	L _S (nH)
SMV1705	31	3	2	0.5	0.32	0.8

SOT-23



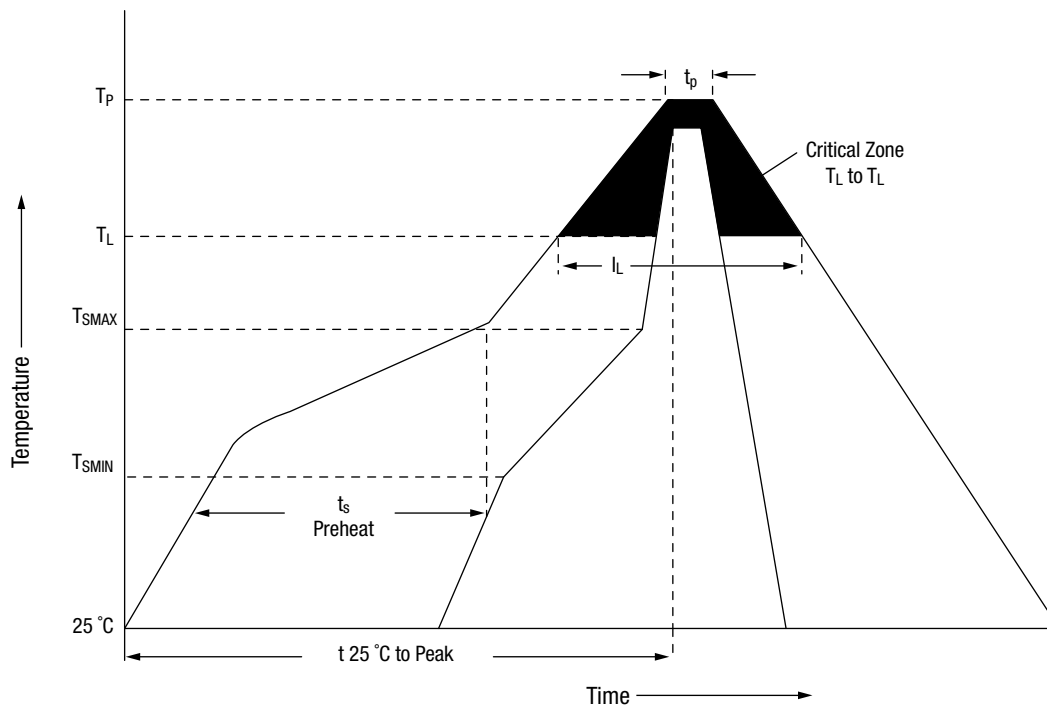
SC-79



Recommended Solder Reflow Profiles

Profile Feature	SnPb Eutectic Assembly	Lead (Pb)-Free Assembly 100% Sn
Average ramp-up rate (T_L to T_p)	3 °C/second max.	3 °C/second max.
Preheat		
Temperature min. (T_{SMIN})	100 °C	150 °C
Temperature max. (T_{SMAX})	150 °C	200 °C
Time (min. to max.) (t_s)	60–120 seconds	60–80 seconds
T_{SMAX} to T_L		
Ramp-up rate	—	3 °C/second max.
Time maintained above:		
Temperature (T_L)	183 °C	217 °C
Time (t_L)	60–150 seconds	60–150 seconds
Peak temperature (T_p)	240 +0/-5 °C	250 +0/-5 °C
Time within 5 °C of actual peak temperature (t_p)	10–30 seconds	20–40 seconds
Ramp-down rate	6 °C/second max.	6 °C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

All temperatures refer to the topside of the package, measured on the package body surface.
Reference JEDEC J-STD-020B.



Reference JEDEC J-STD-020

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