

DATA SHEET

# SMV1763 Series: Hyperabrupt Junction Tuning Varactors

## Features

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



## Description

The SMV1763 series is a silicon hyperabrupt junction varactor diode specifically designed for 3 V platforms. The specified high capacitance ratio and low  $R_S$  of this varactor make it attractive for low phase noise VCOs in wireless systems up to and 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).



## 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.

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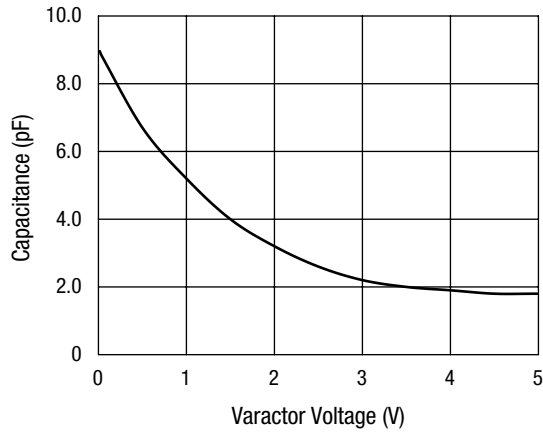
**Electrical Specifications at 25 °C**

| Parameter                      | Condition  | Min. | Typ. | Max. | Unit     |
|--------------------------------|--|------|------|------|----------|
| Reverse current ( $I_R$ )      | $V_R = 8\text{ V}$   |      |      | 20.0 | nA       |
| Capacitance ( $C_T$ )          | $C_T @ 0.5\text{ V}, V_R = 0.5\text{ V}, F = 1\text{ MHz}$ | 6.2  | 6.7  | 7.2  | pF       |
| Capacitance ( $C_T$ )          | $C_T @ 2.5\text{ V}, V_R = 2.5\text{ V}, F = 1\text{ MHz}$ | 2.3  | 2.6  | 2.9  | pF       |
| Capacitance ratio ( $C_{TR}$ ) | $C_T (0.5\text{ V})/C_T (2.5\text{ V})$                    | 2.3  | 2.5  |      |          |
| Series resistance ( $R_S$ )    | $V_R = 1\text{ V}, F = 900\text{ MHz}$                     |      | 0.5  | 0.7  | $\Omega$ |
| Breakdown voltage ( $V_{BR}$ ) | $I_R = 10\ \mu\text{A}$                                    | 10.0 |      |      | V        |

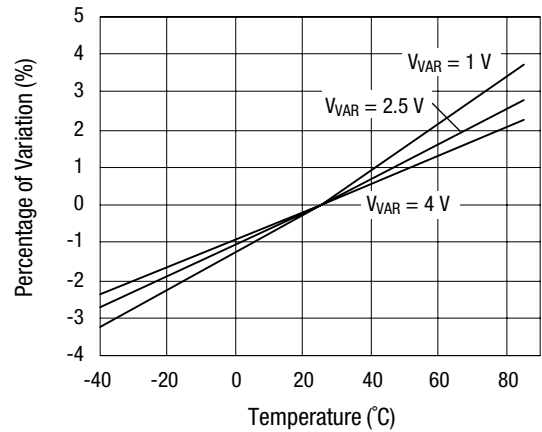
|   |
|---|
|  |
| Single  |
| Marking: Cathode  |
| SC-79   |
| <b>SMV1763-079</b>  |
| <b>SMV1763-079LF</b>  |
| $L_S = 0.7\text{ nH}$   |

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

**Typical Performance Data**



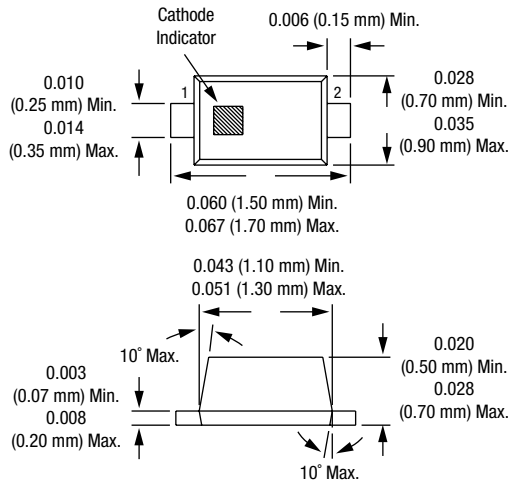
**Capacitance vs. Voltage**



**Relative Capacitance Change vs. Temperature**

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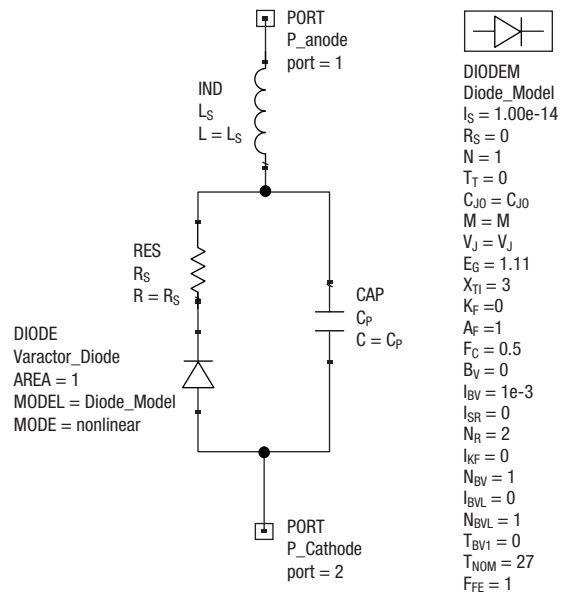
**SC-79**



**Capacitance vs. Voltage**

| $V_R$ (V) | $C_T$ (pF) |
|-----------|------------|
| 0.0       | 9.0        |
| 0.5       | 6.7        |
| 1.0       | 5.2        |
| 1.5       | 4.0        |
| 2.0       | 3.2        |
| 2.5       | 2.6        |
| 3.0       | 2.2        |
| 3.5       | 2.0        |
| 4.0       | 1.9        |
| 4.5       | 1.8        |
| 5.0       | 1.8        |

**SPICE Model**



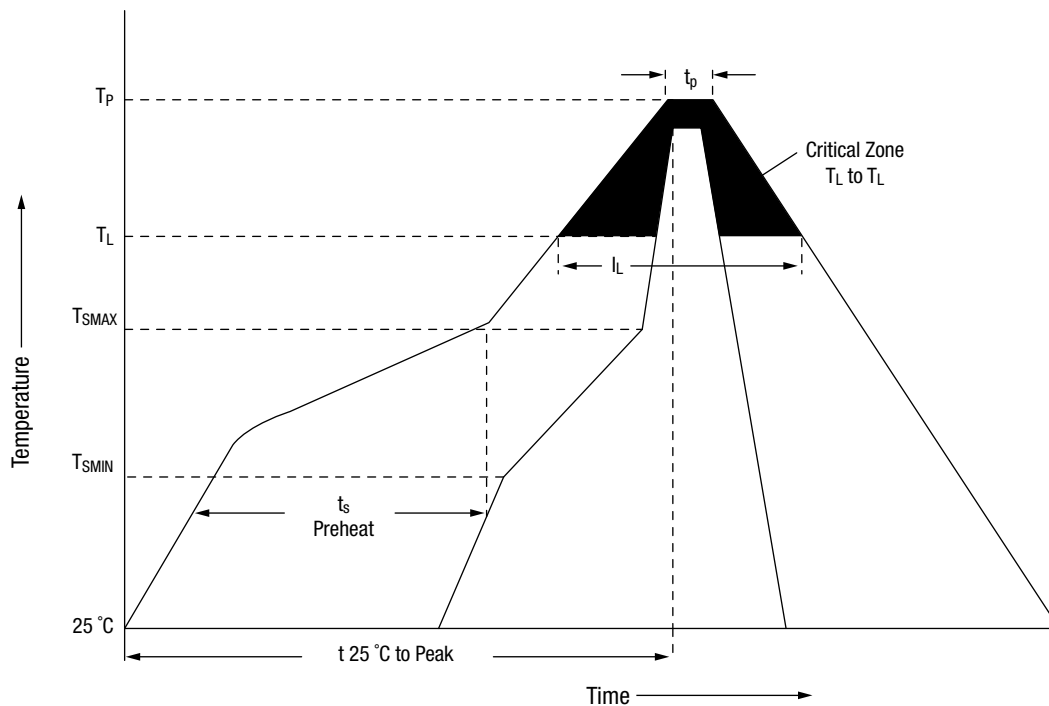
| Part Number | $C_{J0}$ (pF) | $V_J$ (V) | M   | $C_P$ (pF) | $R_S$ ( $\Omega$ ) | $L_S$ (nH) |
|-------------|---------------|-----------|-----|------------|--------------------|------------|
| SMV1763     | 8.2           | 15        | 9.5 | 0.67       | 0.5                | 0.8        |

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**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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