MASW-009276-001DIE

Bumped GaAs SP3T Switch for WLAN 1.0 - 4.0 GHz

Rev. V2

Features

- 802.11b/g and Bluetooth Applications
- Low Insertion Loss:
  0.5 dB 2.4 GHz to 2.5 GHz band
- High Isolation: 32 dB Typical on R_X
- Low Harmonics: <-70 dBc @ 20 dBm
- Flip-chip configuration
- RoHS* Compliant

Description

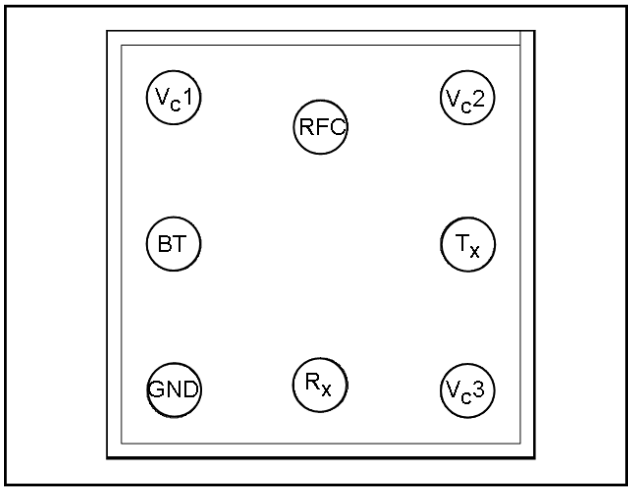
The MASW-009276-001DIE is a bumped GaAs pHEMT MMIC SP3T switch. Typical applications are WLAN (802.11 b/g) and Bluetooth applications.

The MASW-009276-001DIE delivers high isolation, low insertion loss, and high linearity at 2.4 - 2.5 GHz. This device is fabricated using a 0.5 micron gate length GaAs pHEMT process. The process features full passivation for performance and reliability. This die features SnAg(3.5%)Cu(1%) solder bumps for Wafer Level Chip Scale Package (WLCSP) applications.

Ordering Information

Part Number	Package
MASW-009276-001D3K	Die in 3000 piece reel
MASW-009276-002SMB	Sample Board SP3T

Die Bump Pad Layout (bump side up)



Die Bump Pad Configuration

Name	Description
V_C1	Voltage Control 1
BT	Blue Tooth T_X/R_X Port
GND	Ground
R_X	2.5 GHz R_X Port
V_C3	Voltage Control 3
T_X	2.5 GHz T_X Port
V_C2	Voltage Control 2
RFC	Antenna Port

Absolute Maximum Ratings [1,2]

Parameter	Absolute Maximum
Input Power @ 3 V Control	+32 dBm
Input Power @ 5 V Control	+35 dBm
Operating Voltage	+8 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. M/A-COM Technology does not recommend sustained operation near these survivability limits.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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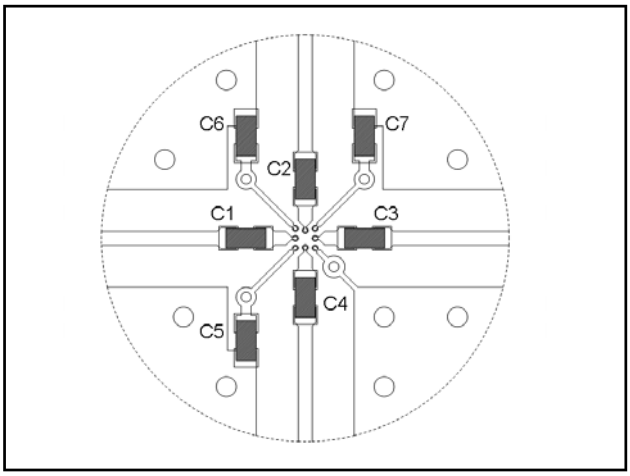
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Electrical Specifications[3]: T_A = 25°C, Z_0 = 50 Ω, Vc = 0 V / 3 V, Pin = 0 dBm

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	RFC to Tx/Rx/BT, 2.4 GHz	dB	—	0.5	0.75
Isolation	RFC to Tx, 2.4 GHz RFC to Rx, 2.4 GHz RFC to BT, 2.4 GHz	dB dB dB	20 30 20	24 32 24	— — —
Return Loss	2.4 - 2.5 GHz	dB	—	15	—
IP3	RFC to Tx/Rx/BT, 2.4 GHz, 20 dBm Total Power, 1MHz Spacing	dBm	—	55	—
Input P1dB	RFC to Tx, 2.4 GHz RFC to Rx, 2.4 GHz RFC to BT, 2.4 GHz	dBm	— — —	32 28 32	— — —
Harmonics	RFC to Tx 2.4 GHz, 20 dBm	dBm	—	-75	—
Switching Speed	50% control to 90% RF 50%control to 10% RF	ns	— —	165 25	— —
Control Current	|Vc| = 3 V	µA	—	<1	10

3. External blocking capacitors on all RF ports.

Recommended PCB Configuration



Parts List

Part	Value	Case Style
C1 - C4	39 pF	0402
C5 - C7	1000 pF	0402

Truth Table [4,5,6]

V_C1	V_C2	V_C3	RFC–BT	RFC-T_X	RFC-R_X
1	0	0	On	Off	Off
0	1	0	Off	On	Off
0	0	1	Off	Off	On

4. For positive voltage control, external DC blocking capacitors are required on all RF ports.
5. Differential voltage, V(state 1) - V(state 0), must be +2.7 V minimum and must not exceed +5 V.
6. 0 = 0 ± 0.3 V, 1 = +2.7 V to +5 V.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

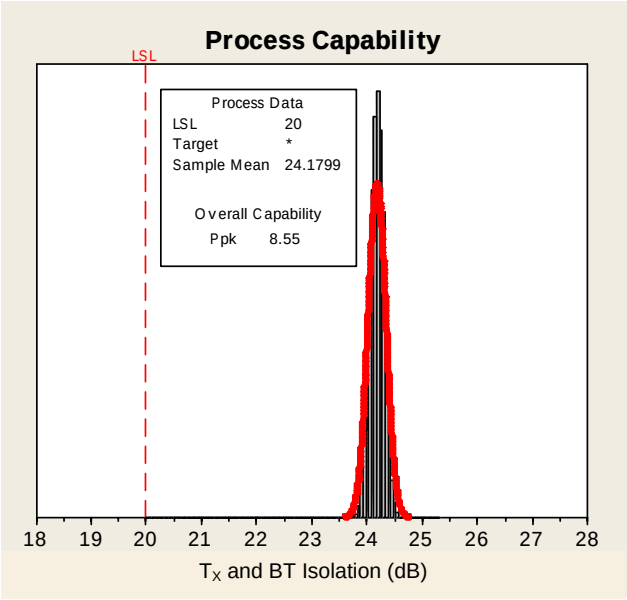
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

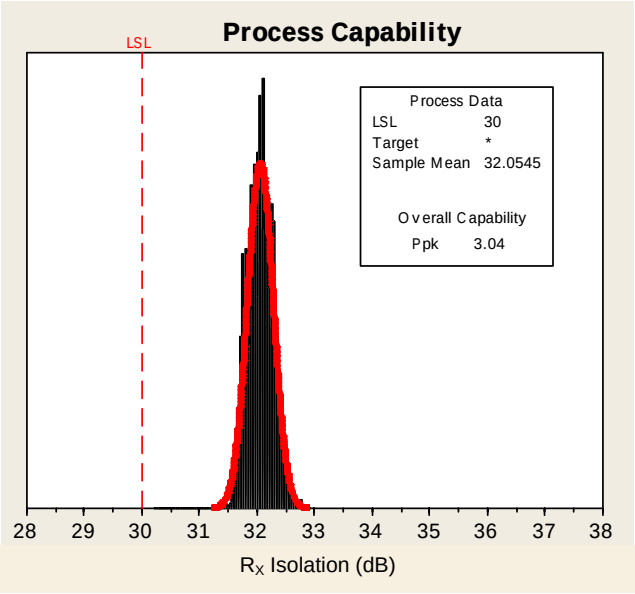
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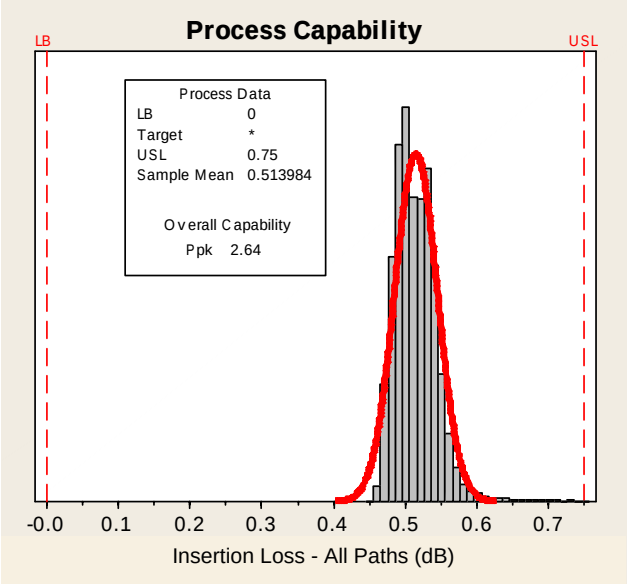
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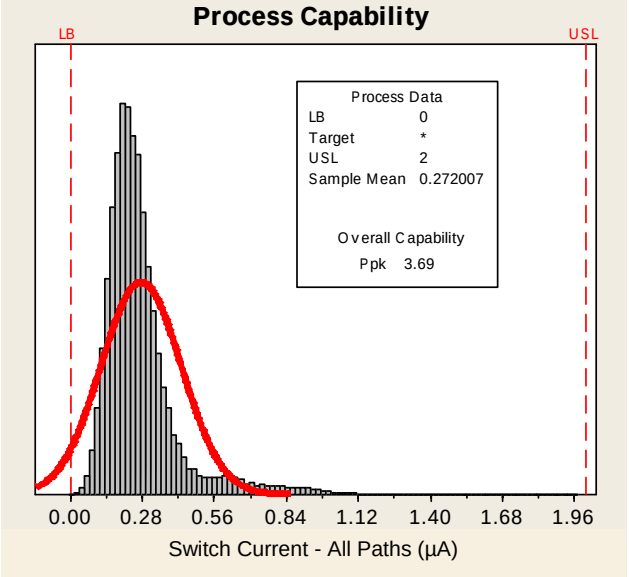
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Product Consistency Distribution Charts[7] (on wafer RF test)









7. Represents >5 wafers, tested per electrical specifications, probed directly on the die to the solder bump: T_A = 25°C, Z_0 = 50 Ω, V_C = 0/3V, P_{IN} = 0 dBm

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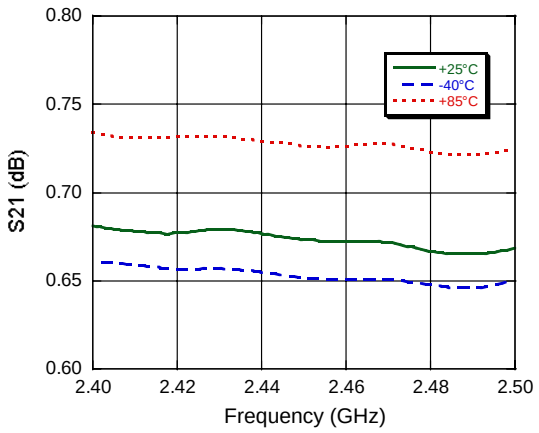
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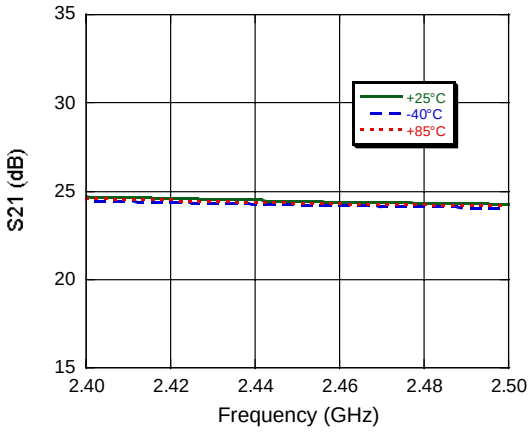
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Typical Performance Curves (plots = chip on board assembly)

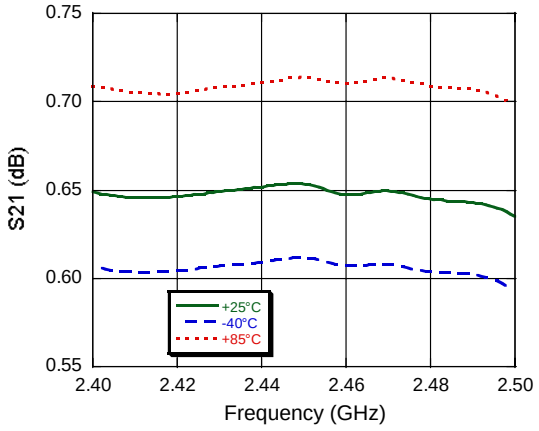
T_X Insertion Loss



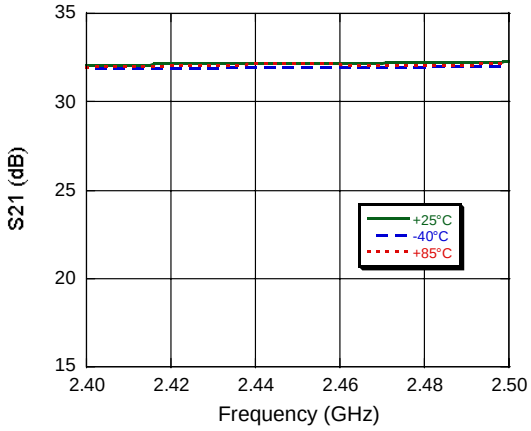
T_X Isolation



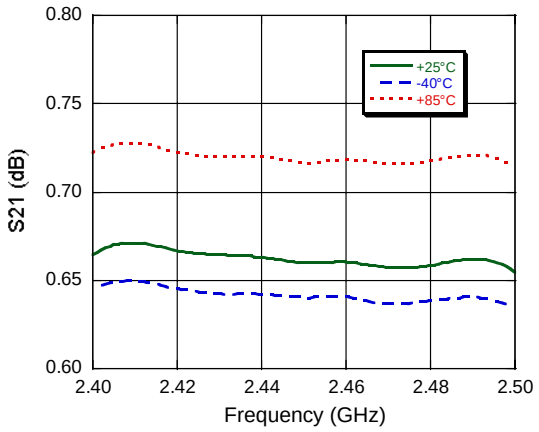
R_X Insertion Loss



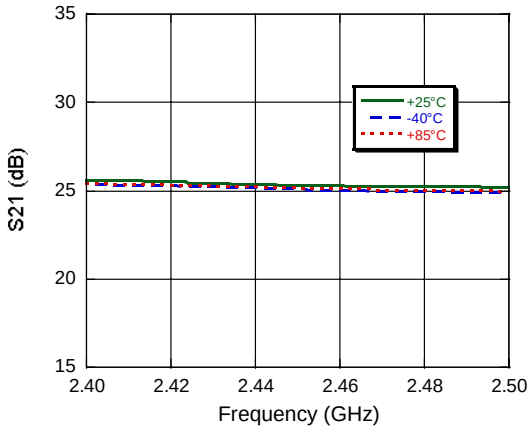
R_X Isolation



BT Insertion Loss



BT Isolation

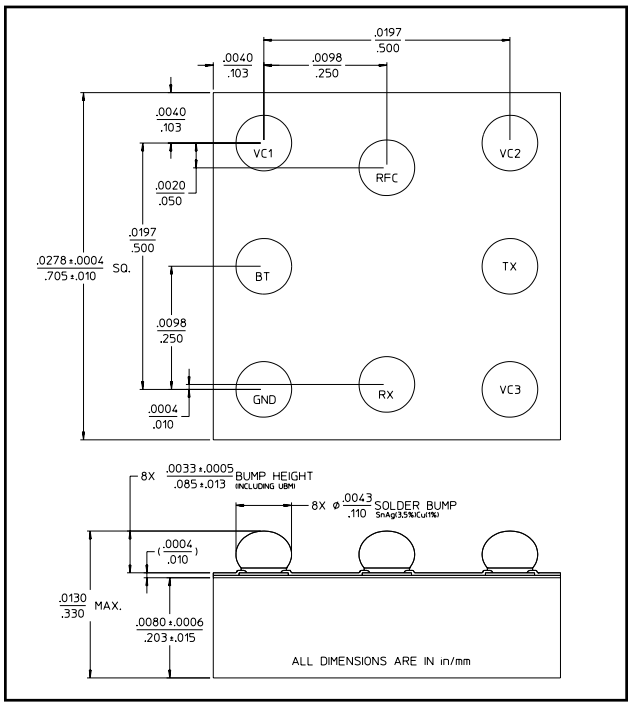


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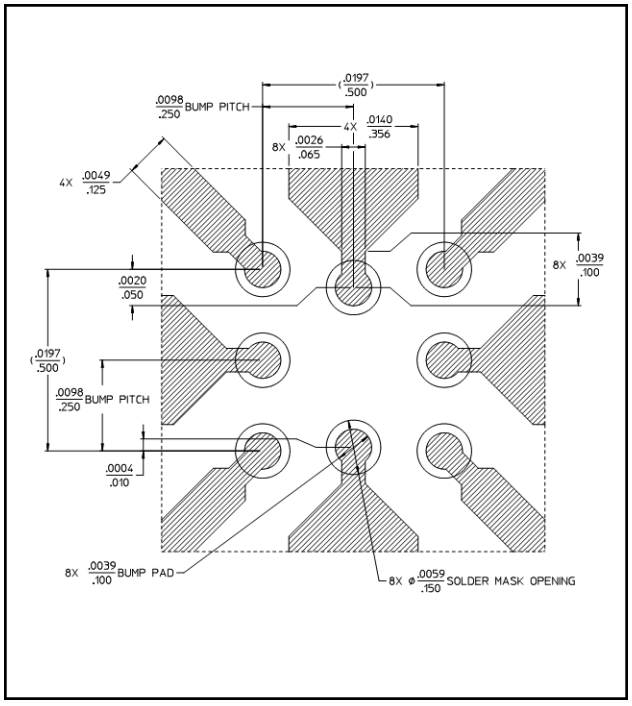
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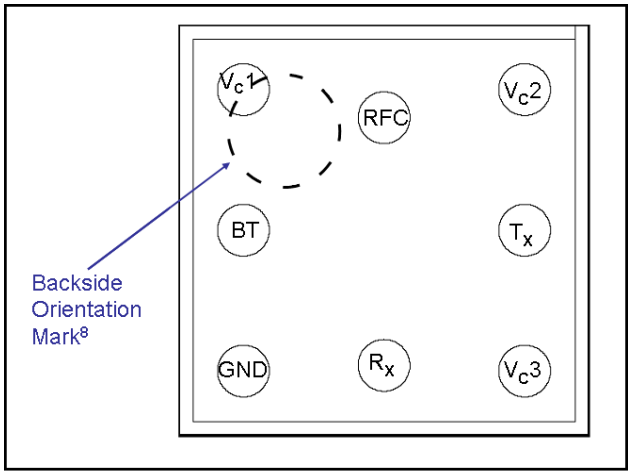
Die Dimensions (Top and Side Views)



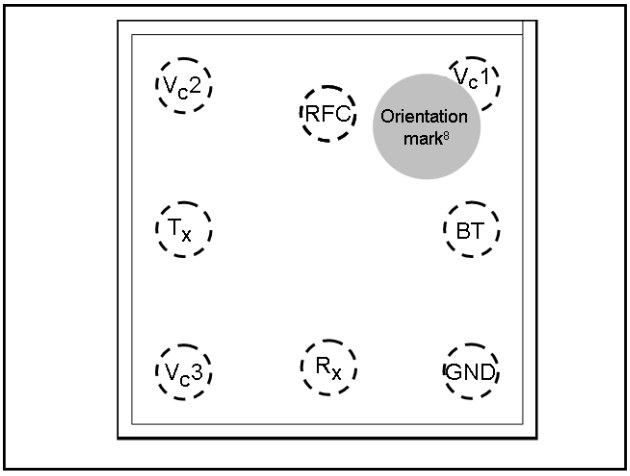
PCB Top Metal / Solder Mask



Die Bump Pad Layout - Top View (bump side up)



Die Bump Pad Layout - Bottom View (bump side down - as installed on board)



8. Orientation mark is only on material that is shipped in tape and reel. The mark is not available on die shipped on grip ring.

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