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

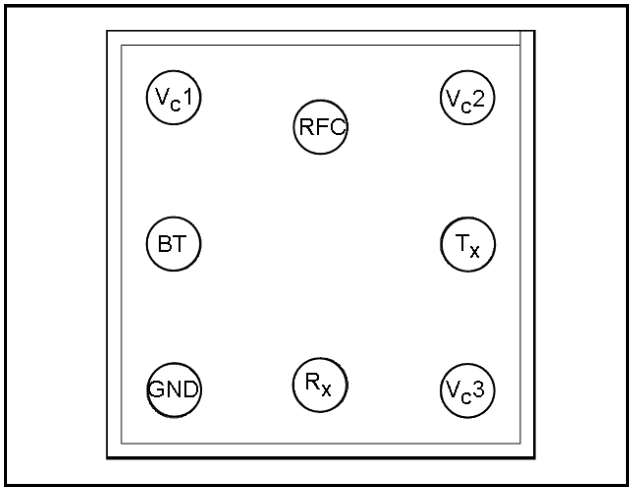
The MASW-009276-001DIE is a bumped GaAs pHEMT MMIC SP3T switch. Typical applications are WLAN (802.11 b/g) and Bluetooth applications.

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.

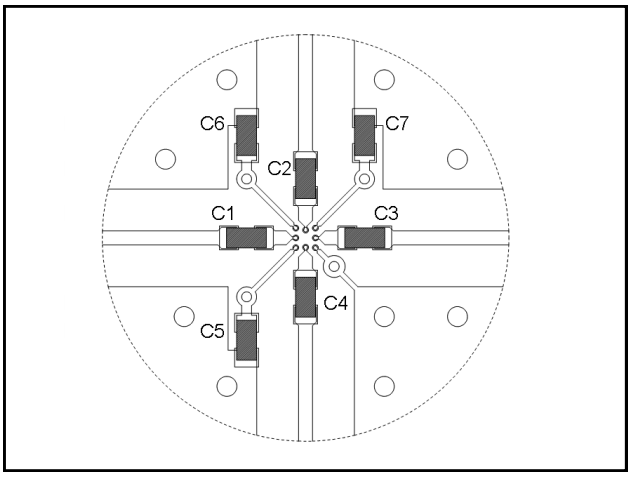
* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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.

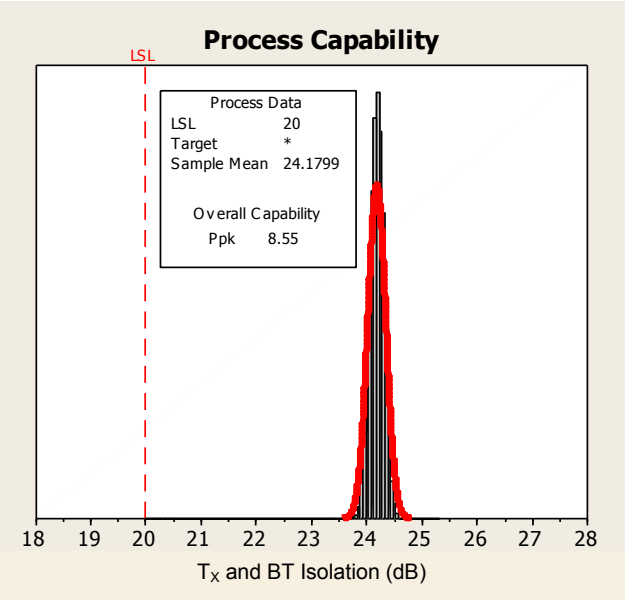
Handling Procedures

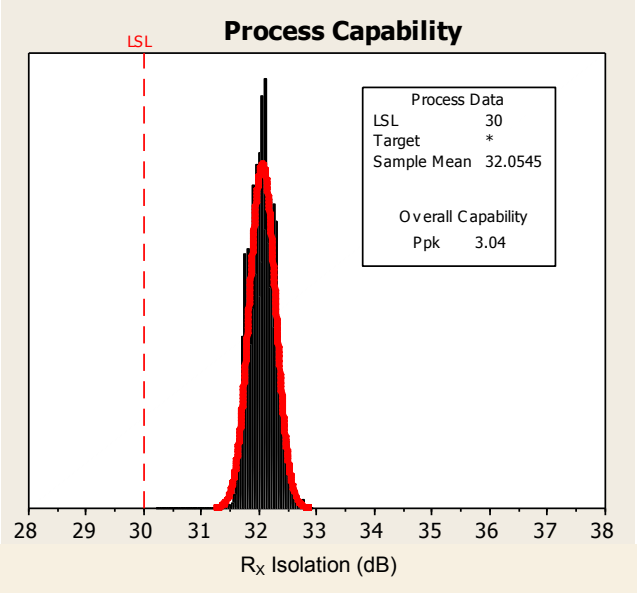
Please observe the following precautions to avoid damage:

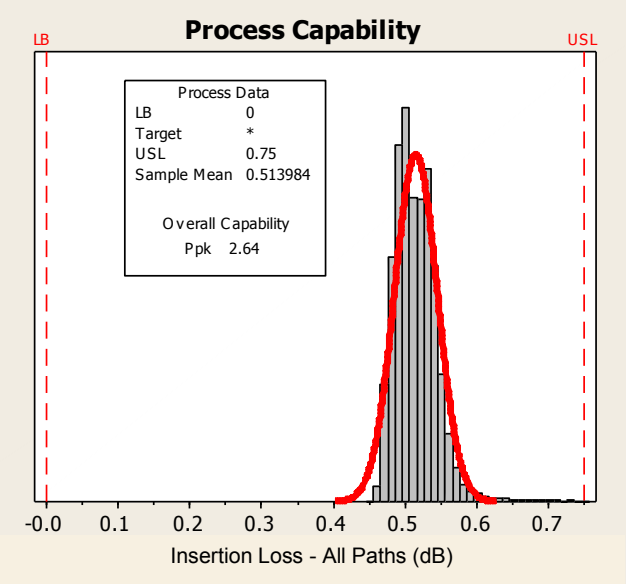
Static Sensitivity

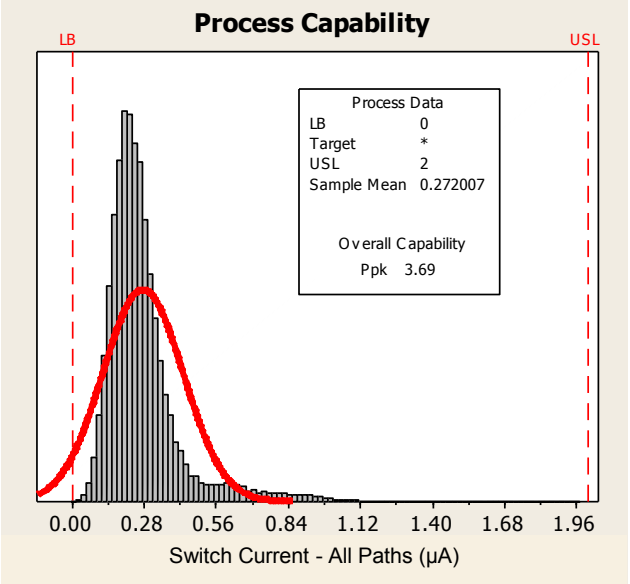
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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





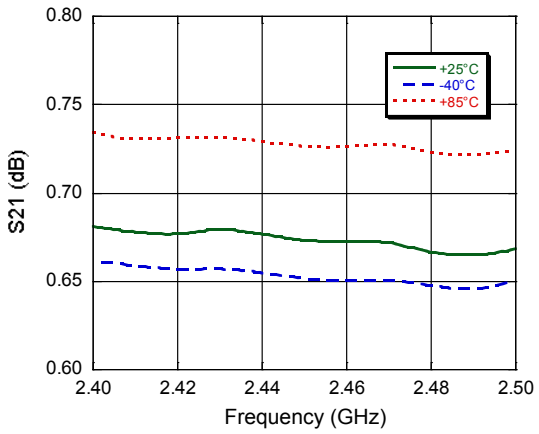




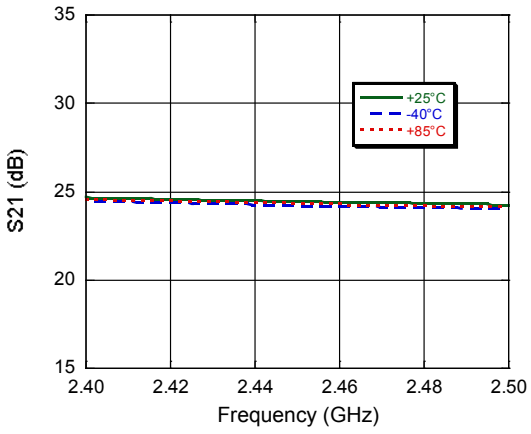
7. Represents >5 wafers, tested per electrical specifications, probed directly on the die to the solder bump: T_A = 25°C, Z_0 = 50 Ω, V_C = 0/3V, P_{IN} = 0 dBm

Typical Performance Curves (plots = chip on board assembly)

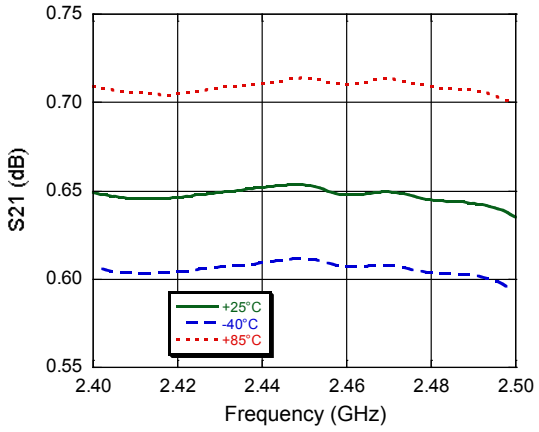
T_X Insertion Loss



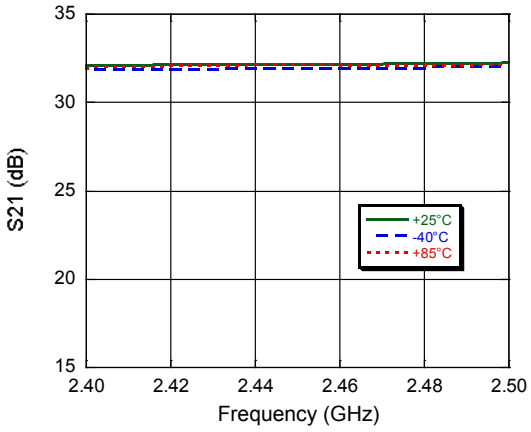
T_X Isolation



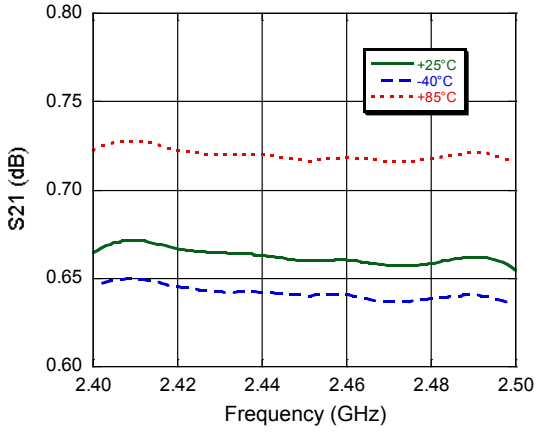
R_X Insertion Loss



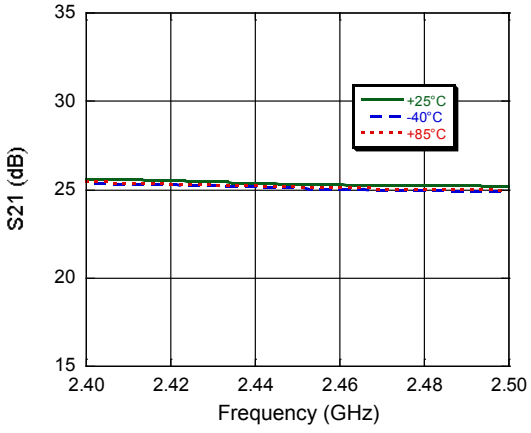
R_X Isolation



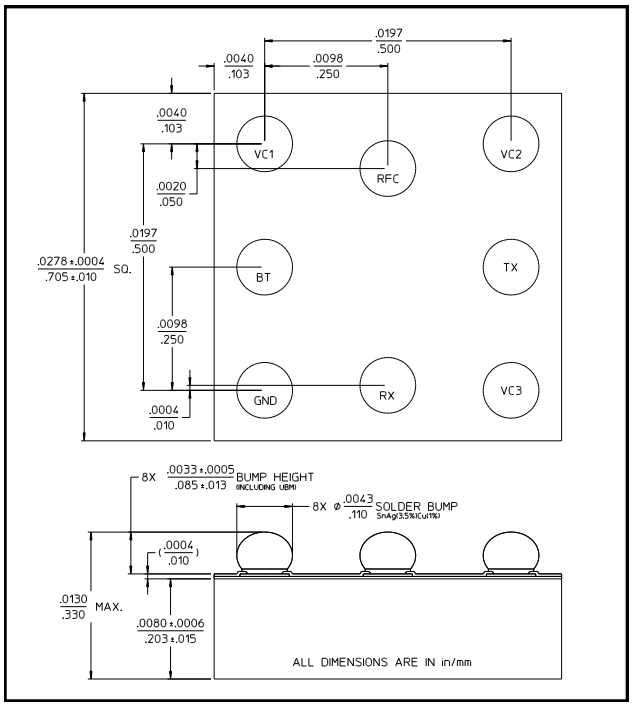
BT Insertion Loss



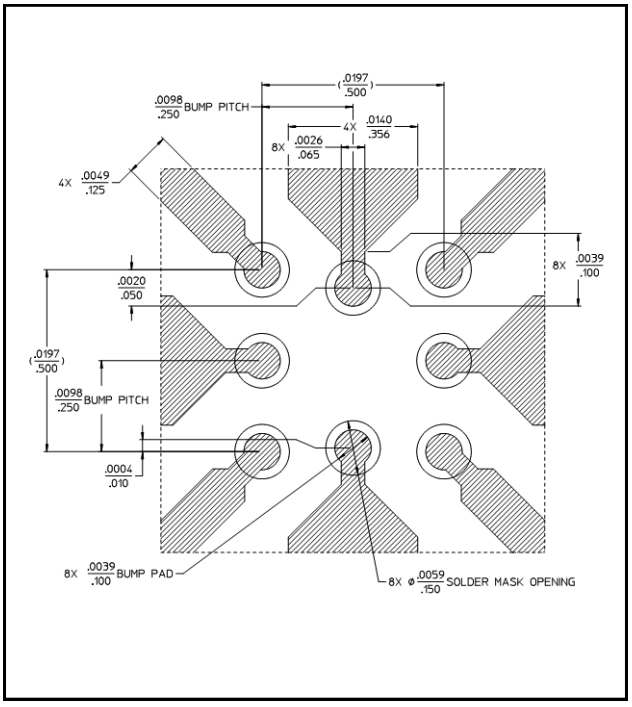
BT Isolation



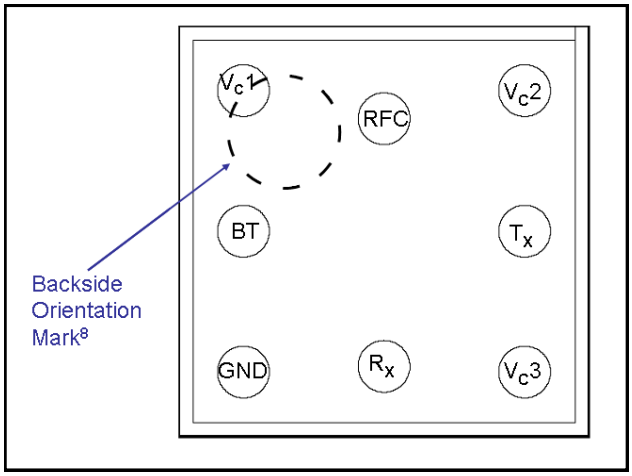
Die Dimensions (Top and Side Views)



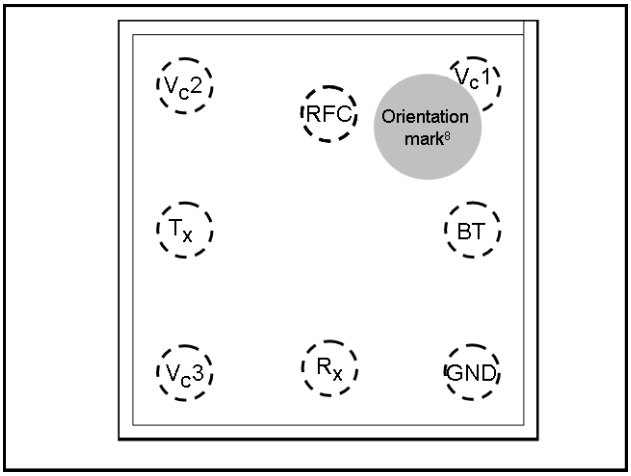
PCB Top Metal / Solder Mask



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.