

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

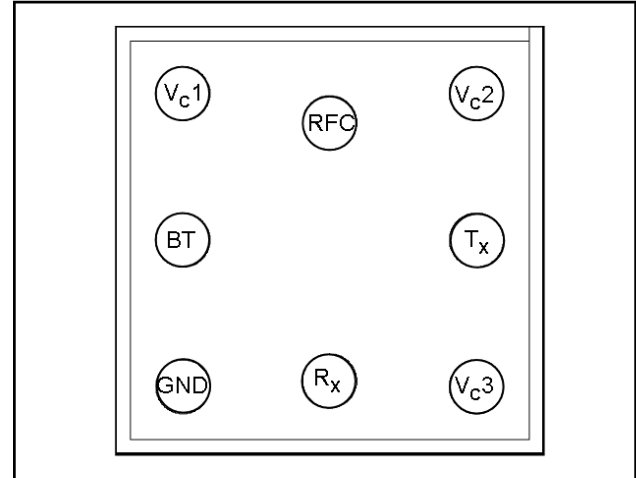
The MASW-009276-001DIE is a bumped GaAs pHEMT MMIC SP3T switch. Typical applications are WLAN (802.11 b/g) and Bluetooth applications.

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.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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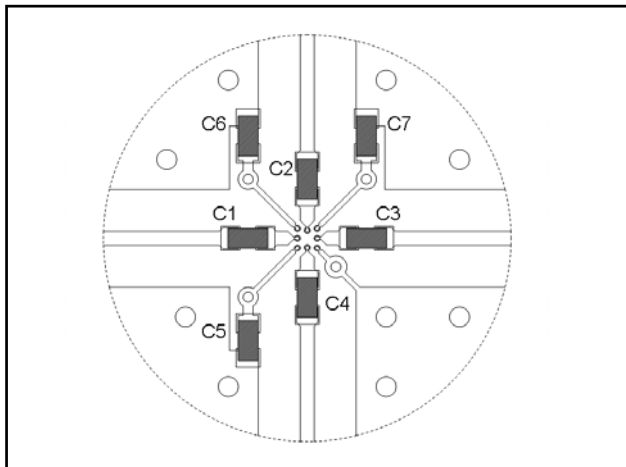
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Electrical Specifications³: $T_A = 25^\circ\text{C}$, $Z_0 = 50 \Omega$, $V_c = 0 \text{ V} / 3 \text{ V}$, $\text{Pin} = 0 \text{ dBm}$

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	dB	20	24	—
	RFC to Rx, 2.4 GHz	dB	30	32	—
	RFC to BT, 2.4 GHz	dB	20	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	dBm	—	32	—
	RFC to Rx, 2.4 GHz	dBm	—	28	—
	RFC to BT, 2.4 GHz	dBm	—	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	$ V_c = 3 \text{ 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

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

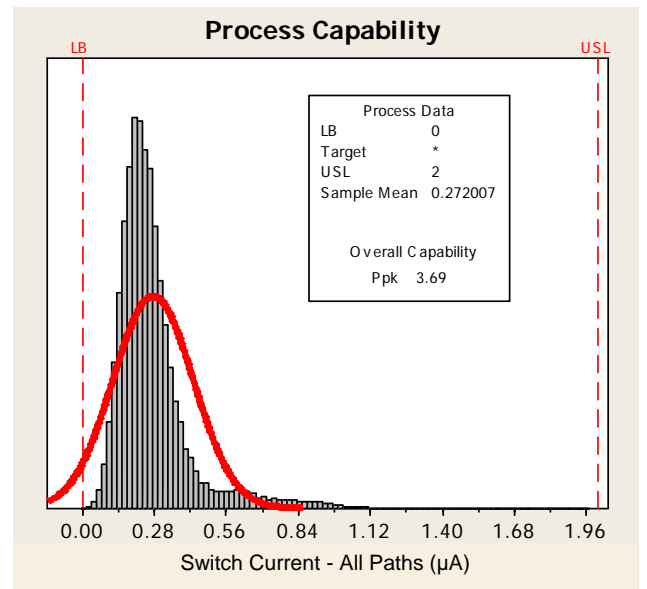
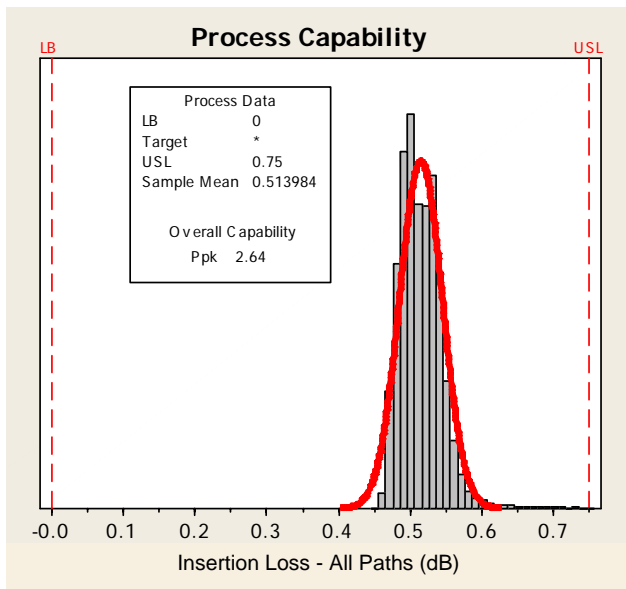
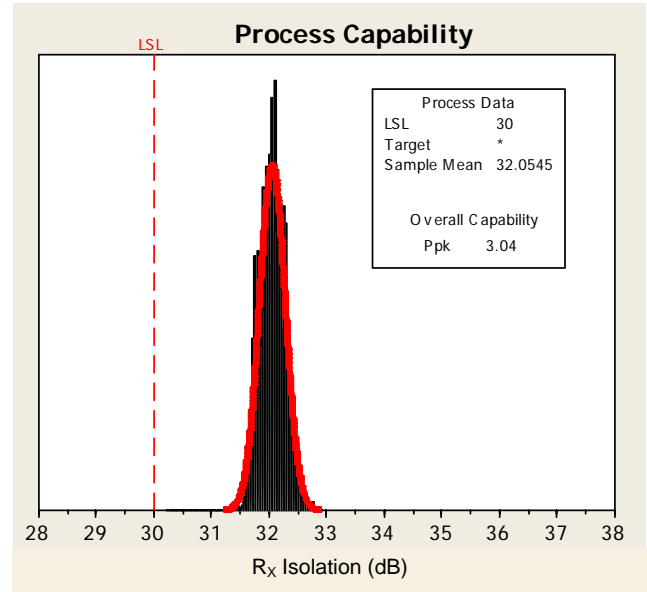
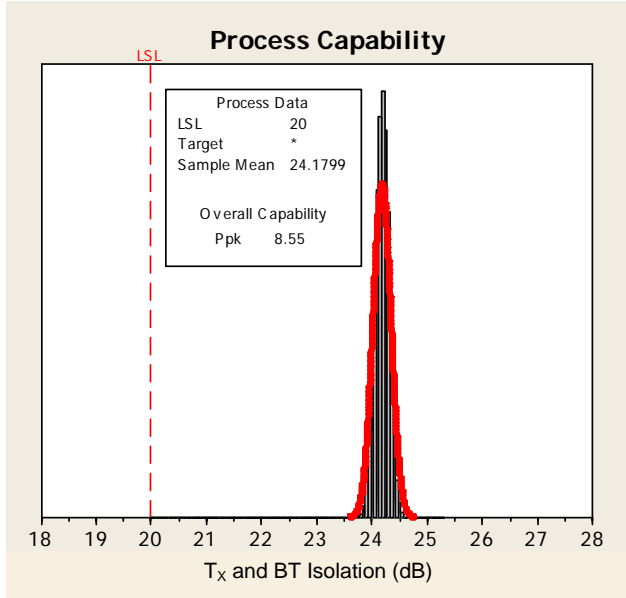
Handling Procedures

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.

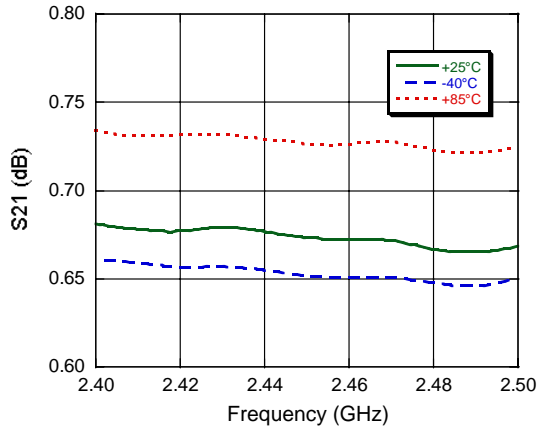
Product Consistency Distribution Charts⁷ (on wafer RF test)



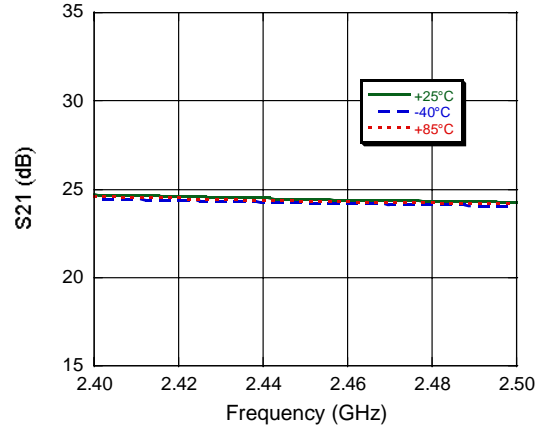
7. Represents >5 wafers, tested per electrical specifications, probed directly on the die to the solder bump: $T_A = 25^\circ\text{C}$, $Z_0 = 50 \Omega$, $V_C = 0/3\text{V}$, $P_{IN} = 0 \text{ dBm}$

Typical Performance Curves (plots = chip on board assembly)

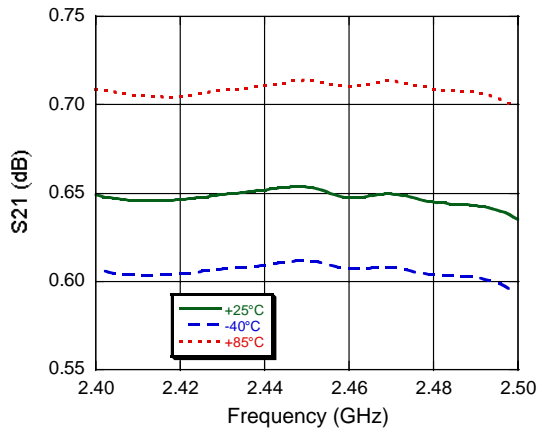
T_x Insertion Loss



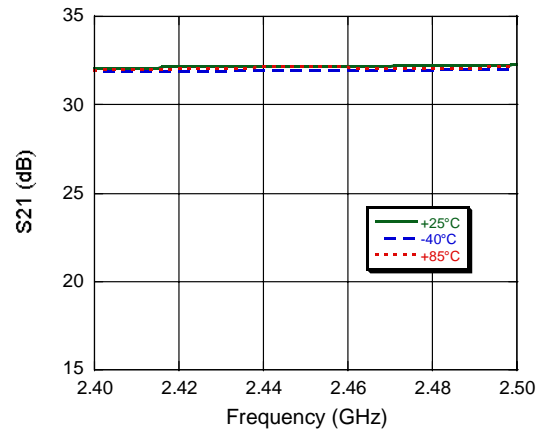
T_x Isolation



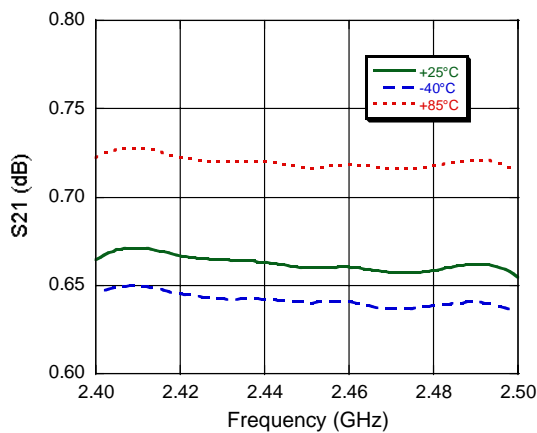
R_x Insertion Loss



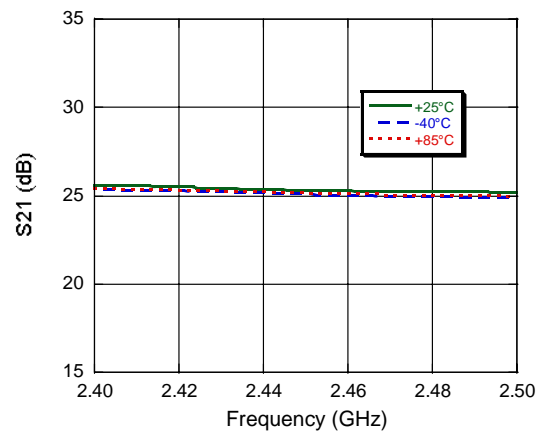
R_x Isolation



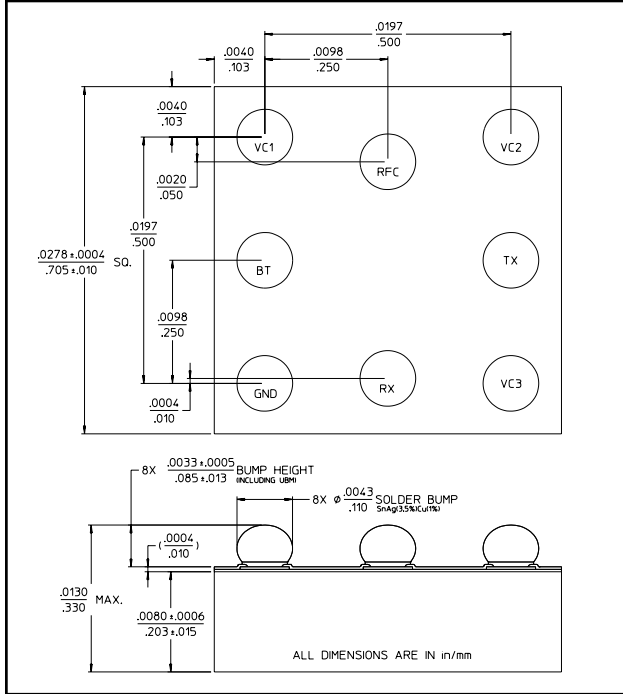
BT Insertion Loss



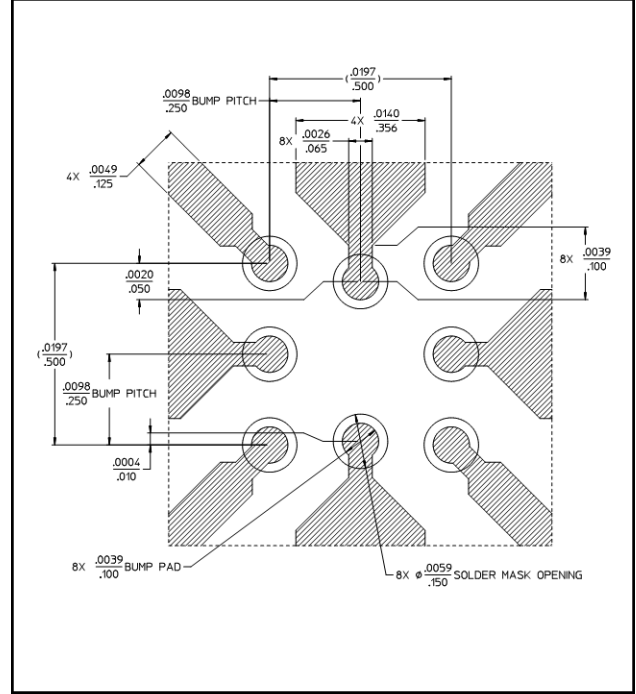
BT Isolation



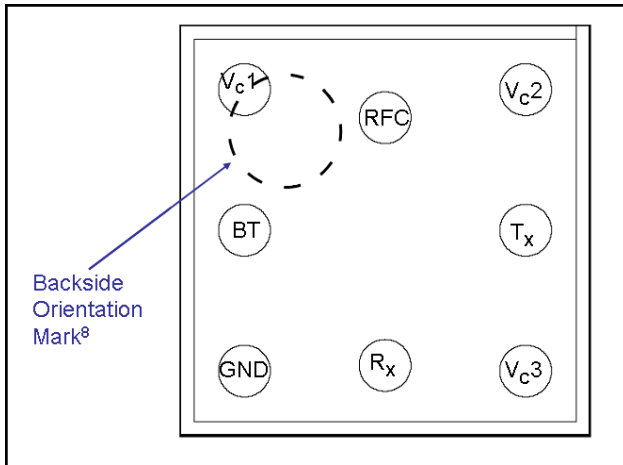
Die Dimensions (Top and Side Views)



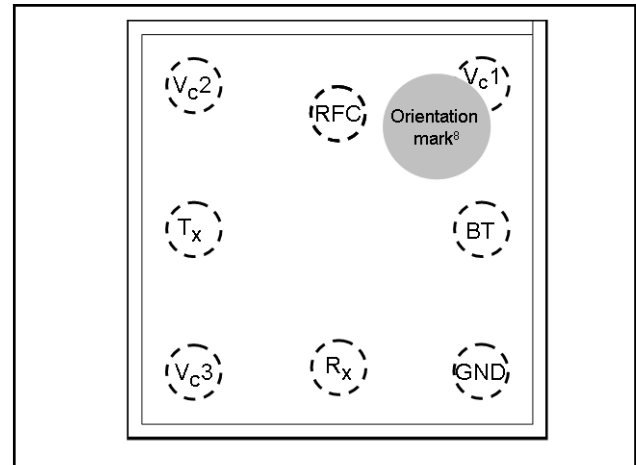
PCB Top Metal / Solder Mask



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.