

Features

- 802.11b/g and Bluetooth Applications
- Low Insertion Loss:
0.65 dB 2.4 GHz to 2.5 GHz band
- High R_x Isolation: 23 dB typical
- High R_x Gain: 12 dB
- Flip-chip configuration
- RoHS* Compliant

Description

M/A-COM's MAMF-009448-000DIE is a bumped single band GaAs PHEMT MMIC SP3T switch with an integrated LNA with bypass mode in the RX path. Typical applications are for single band 2.4 GHz WLAN (802.11 b/g) and Bluetooth applications.

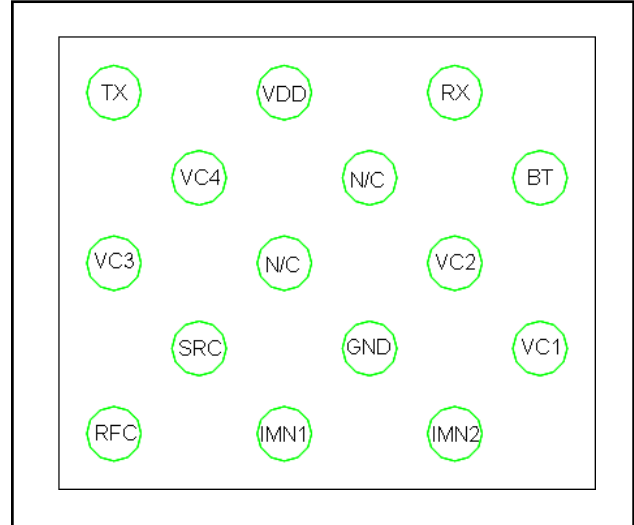
The MAMF-009448-000DIE delivers high isolation, low insertion loss, low noise and high linearity at 2.4 - 2.5 GHz. The MAMF-009448-000DIE is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability. This die features 2.5 % SnAg solder bump for flip-chip on lead frame package or WLCSP.

Ordering Information ¹

Part Number	Package
MAMF-009448-000DIE	Separated Die on Grip Ring

1. Die quantity varies.

Die Bumping Pad Layout (bump side up)



Die Bumping Pad Configuration

Pad	Name	Description
1	BT	Blue Tooth T _x /R _x Port
2	T _x	2.5 GHz T _x Port
3	RFC	Antenna Port
4	R _x	2.5 GHz R _x Port
5	V _{DD}	Drain Voltage Supply
6	IMN1	LNA Input Match Port 1
7	IMN2	LNA Input Match Port 2
8	SRC	Source Bypass Capacitor
9	V _c 1	Voltage Control 1
10	V _c 2	Voltage Control 2
11	V _c 3	Voltage Control 3
12	V _c 4	Voltage Control 4
13	GND	Ground

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

Electrical Specifications²: Freq. = 2.4 - 2.5 GHz, $V_{CC} = 3.3V$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	RFC to T _X , RFC to BT	dB	—	0.65	—
Bypass Mode Insertion Loss	RFC to R _X	dB	—	5.0	—
Input/Output Return Loss	RFC to T _X , RFC to BT	dB	—	20	—
Isolation	RFC to T _X , RFC to BT RFC to R _X	dB dB	— —	25 23	— —
LNA On Gain	RFC to R _X	dB	—	12	—
LNA On Input/Output Return Loss	RFC to R _X	dB	—	10	—
Noise Figure	—	dB	—	1.9	—
IIP3	—	dBm	—	7	—
IP1dB	RFC to T _X , RFC to BT LNA on Bypass path	dBm	—	32 -3.5 23.5	—
Quiescent Current	No RF, LNA On, $V_{CC} = 3.3 V$	mA	—	8	—
Leakage Current	All States except High Gain	μA	—	10	—

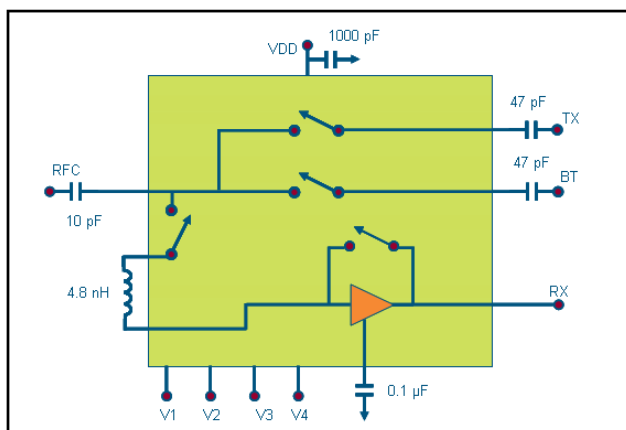
2. External blocking capacitors on RFC, T_X and BT ports.

Truth Table^{3,4,5}

Control V1	Control V2	Control V3	Control V4	V _{DD}	LNA On	RFC-R _X	RFC-BT	RFC-T _X
Hi	Low	Low	Low	Hi	No	Off	On	Off
Low	Hi	Low	Hi	Hi	Yes	High-Gain	Off	Off
Low	Hi	Low	Low	Hi	No	Low-Gain	Off	Off
Low	Low	Hi	Low	Hi	No	Off	Off	On

3. For positive voltage control, external DC blocking capacitors are required on RFC, T_X and BT ports.
4. Differential voltage, V(state Low) - V(state Hi), must be +2.7 V minimum and must not exceed 4 V.
5. Low = $0 \pm 0.1 V$, Hi = $V_{DD} \pm 0.4 V$.

Functional Schematic



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.

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

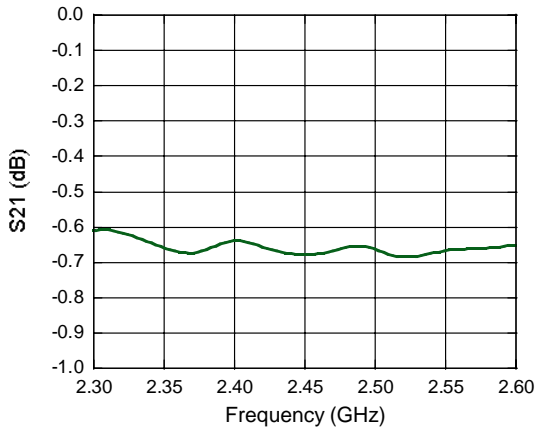
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
 - **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
 - **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298
- Visit www.macom.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Typical Performance Curves

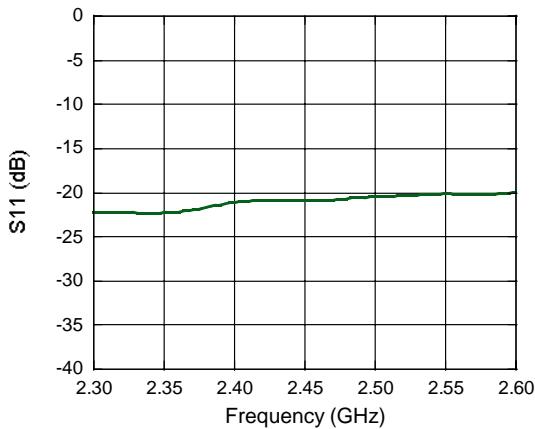
RFC to BT Insertion Loss



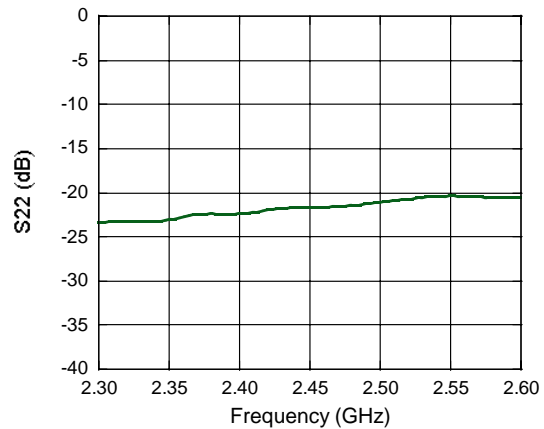
Truth Table

V1	V2	V3	V4	State
1	0	0	0	RFC to BT ON

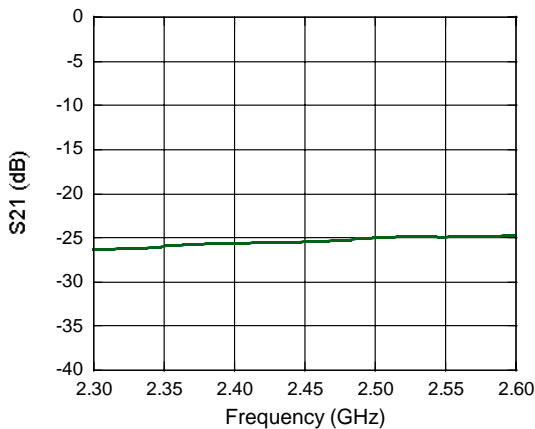
RFC to BT Return Loss



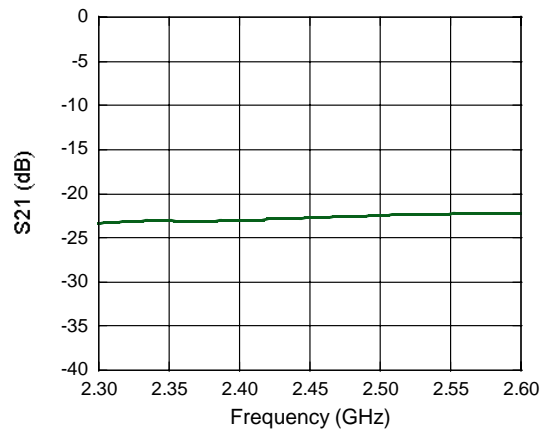
RFC to BT Return Loss



RFC to Tx Isolation

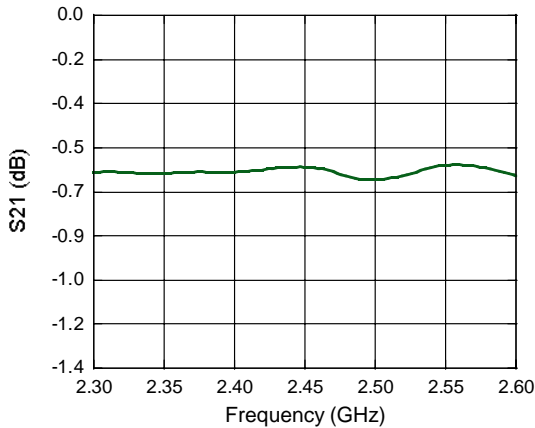


RFC to Rx Isolation



Typical Performance Curves

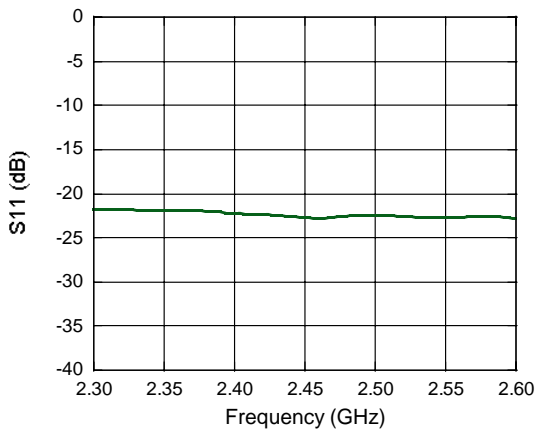
RFC to T_x Insertion Loss



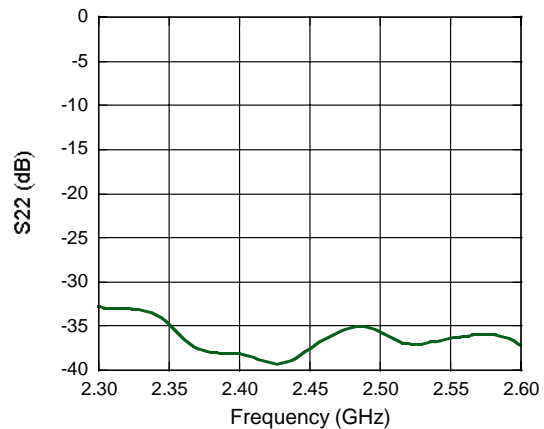
Truth Table

V1	V2	V3	V4	State
0	0	1	0	RFC to T_x ON

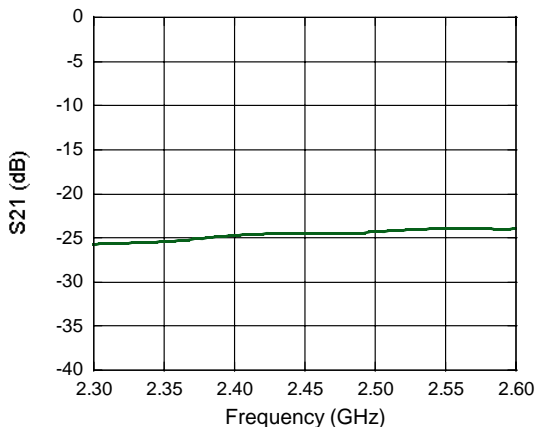
RFC to T_x Return Loss



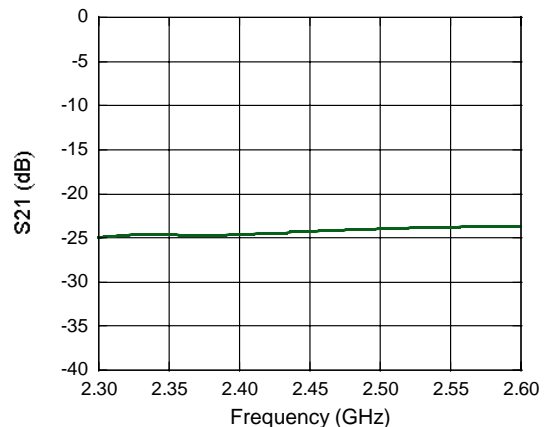
RFC to T_x Return Loss



RFC to T_x Isolation to BT

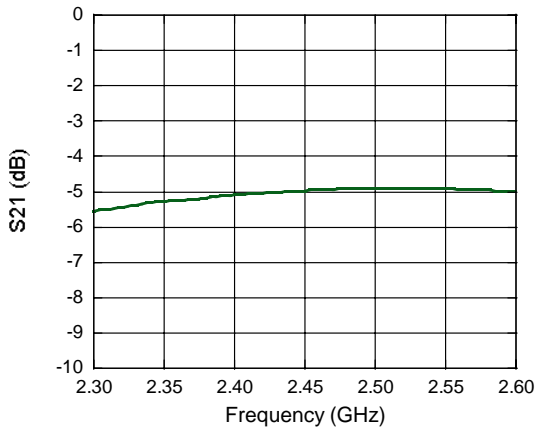


RFC to T_x Isolation to R_x



Typical Performance Curves

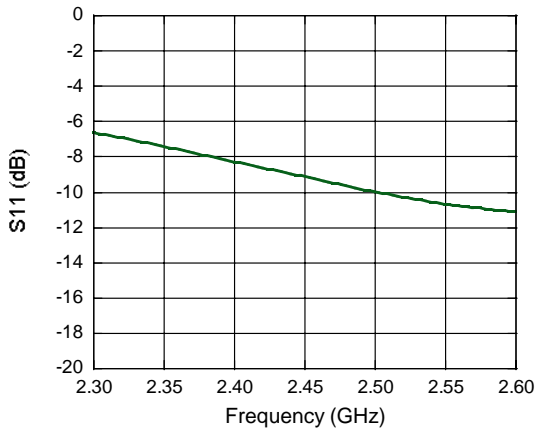
RFC to R_x LO Insertion Loss



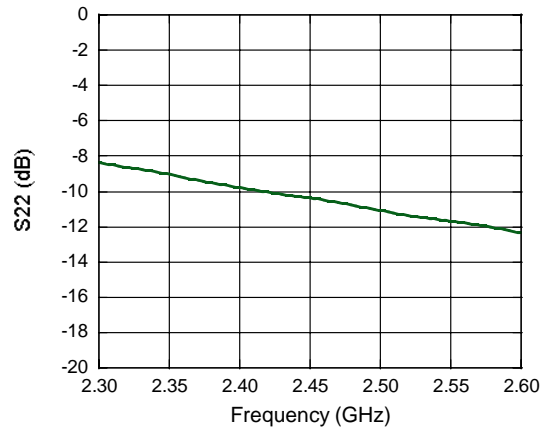
Truth Table

V1	V2	V3	V4	LO State
0	1	0	0	RFC to R _x ON

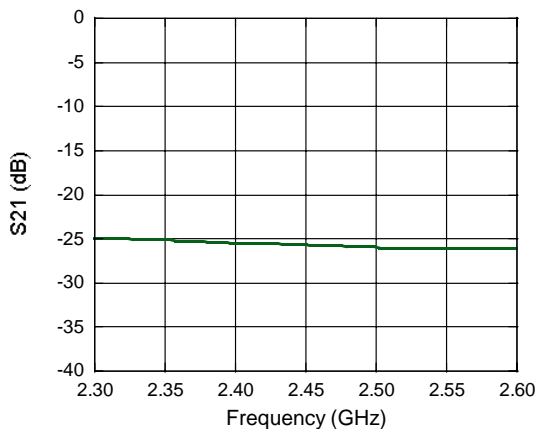
RFC to R_x LO Return Loss



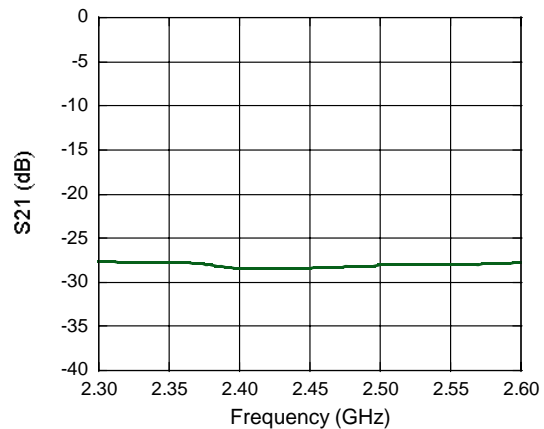
RFC to R_x LO Return Loss



RFC to R_x LO Isolation to BT

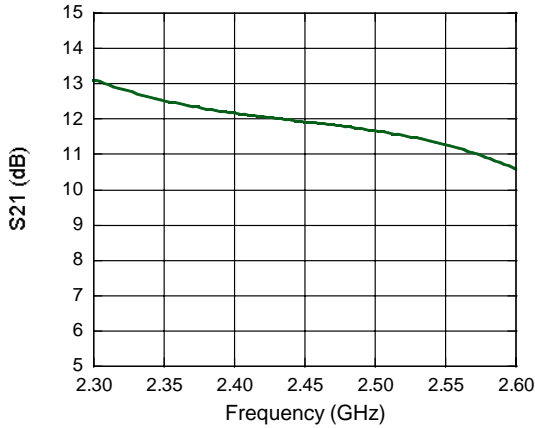


RFC to R_x LO Isolation to T_x

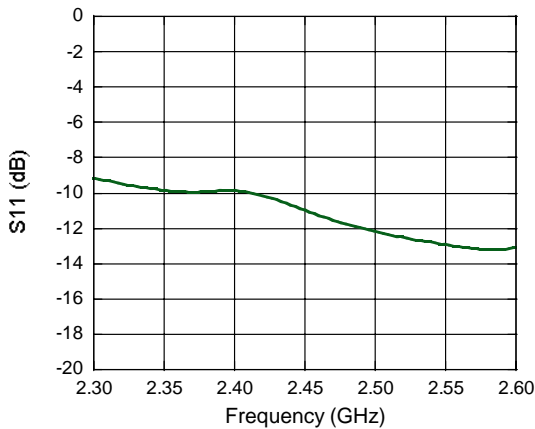


Typical Performance Curves

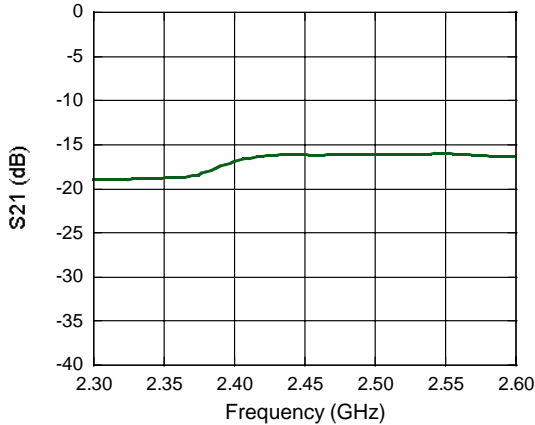
RFC to R_x HI Insertion Loss



RFC to R_x HI Return Loss



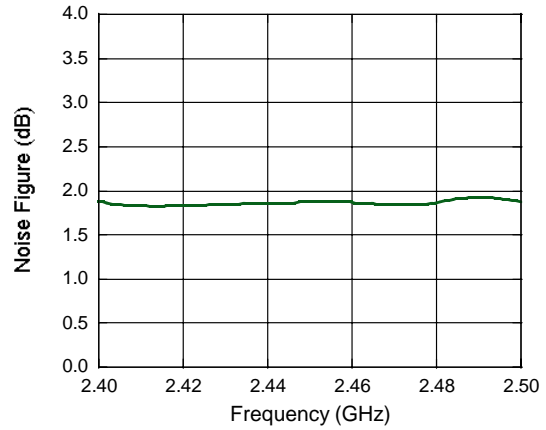
RFC to R_x HI Isolation to BT



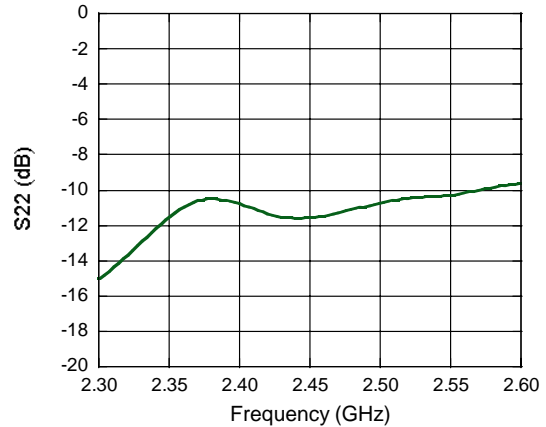
Truth Table

V1	V2	V3	V4	HI State
0	1	0	1	RFC to R_x ON

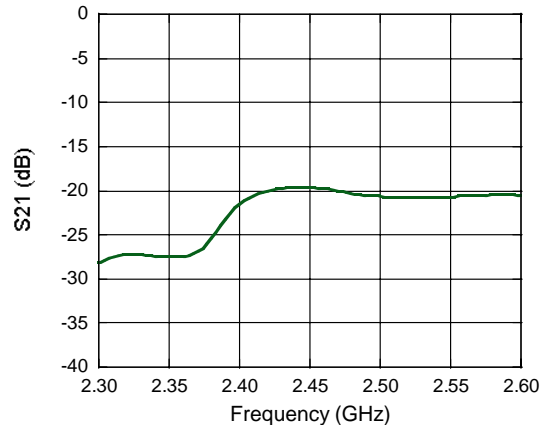
Noise Figure



RFC to R_x HI Return Loss



RFC to R_x HI Isolation to T_x



ADVANCED: Data Sheets contain information regarding a product M/A-COM 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 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.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
 - **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
 - **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298
- Visit www.macom.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Die Dimensions and Side View

