

Features

- Broadband Performance
- Low Insertion Loss: 1.3 dB @ 20 GHz
- High Isolation: 46 dB @ 20 GHz
- Fast Switching Speed
- Non-Reflective Configuration
- Ultra Low DC Power Consumption
- Size: 1.3 × 0.85 × 0.1 mm
- RoHS* Compliant

Description

The MASW-011107-DIE is a versatile, broadband, non-reflective SPDT switch offered as bare die part. The switch operates from DC to 26.5 GHz and provides <2.0 dB insertion loss and >40 dB isolation. The combination of broadband performance along with very fast switching and excellent settling time make this device ideal for many applications, including Test & Measurement, EW and broadband communication systems.

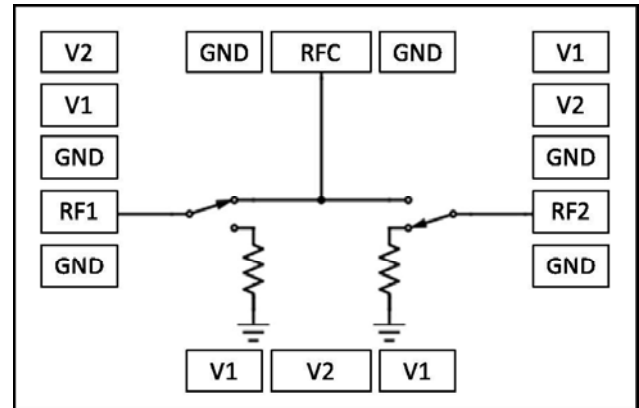
The MASW-011107-DIE is fabricated using MACOMs' mature 0.5 μm low gate-lag pHEMT process. This robust process features full surface passivation for a high performance and high reliability.

Ordering Information

Part Number	Package
MASW-011107-DIE	Die in Gel Pak ¹

1. Die quantity varies.

Functional Schematic



Bondpad Configuration²

Pad Name	Function
GND	Ground
RF1	RF 1
V1	Control Voltage 1
V2	Control Voltage 2
RFC	RF Common
RF2	RF 2

2. Backside of die must be connected to RF, DC and thermal ground.

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

GaAs SPDT Non-Reflective Switch DC - 26.5 GHz

Rev. V2

Electrical Specifications: $T_A = +25^\circ\text{C}$, $V_1, V_2 = -5\text{ V} / 0\text{ V}$, $Z_0 = 50\ \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	0.05 GHz	dB	—	0.7	—
	12 GHz			1.0	—
	18 GHz			1.1	—
	20 GHz			1.3	2.0
	25 GHz			1.5	—
Isolation	0.05 GHz	dB	—	53	—
	12 GHz		—	44	
	18 GHz		—	43	
	20 GHz		40	46	
	25 GHz		—	41	
Return Loss	RFC	dB	—	15	—
	RF1, RF2 "on state"			17	
	RF1, RF2 "off state"			12	
Input P1dB	0.5 - 25 GHz	dBm	—	27	—
Input IP3	2 Tone, 5 dBm/Tone, 5 MHz spacing, 0.5 - 25 GHz	dBm	—	45	—
$T_{\text{RISE}}, T_{\text{FALL}}$	10% to 90% RF and 90% to 10% RF	ns	—	10	—
$T_{\text{ON}}, T_{\text{OFF}}$	50% control to 90% RF and 50% control to 10% RF	ns	—	20	—
Control Current (Complementary Logic)	—	μA	—	1	—

Absolute Maximum Ratings^{3,4}

Parameter	Absolute Maximum
Control Voltage	-8.5 V
Input Power	27 dBm
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- MACOM does not recommend sustained operation near these survivability limits.

Truth Table^{5,6}

Control Input		Condition of Switch	
V1	V2	RF1	RF2
Low	High	On	Off
High	Low	Off	On

- $V_{\text{low}} = -5\text{ V}$, $V_{\text{high}} = 0\text{ V}$.
- All V1 bondpads and V2 bondpads are connected on die respectively. Bias voltages can be supplied to any combination of V1 and V2 bondpads.

Handling Procedures

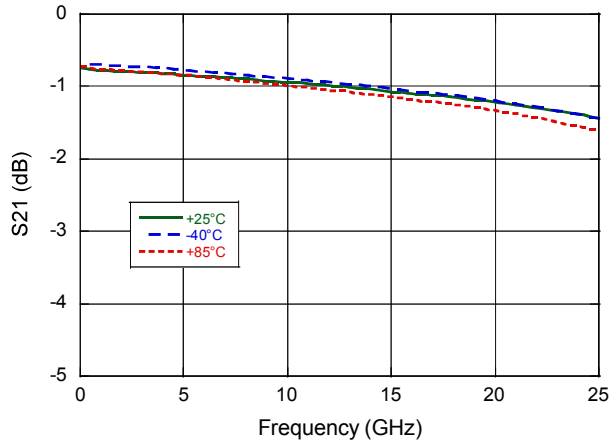
Please observe the following precautions to avoid damage:

Static Sensitivity

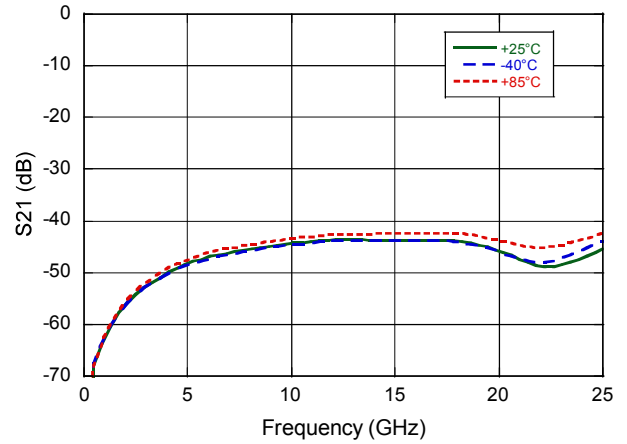
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

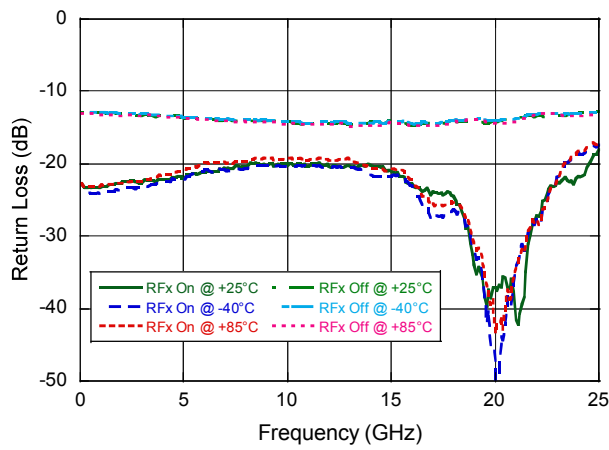
Insertion Loss



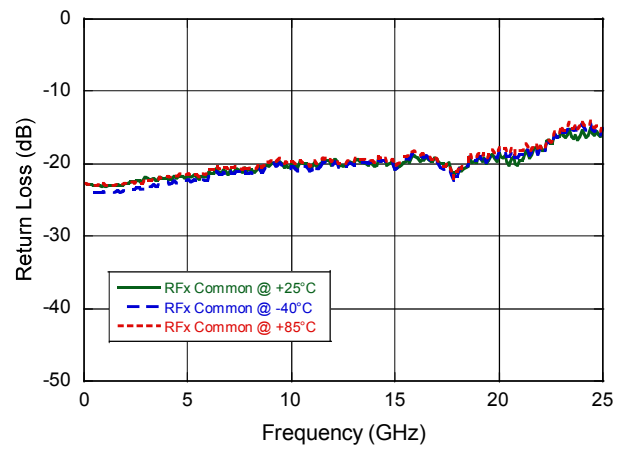
Isolation



Return Loss, RFx On & RFx OFF



Return Loss, RF Common



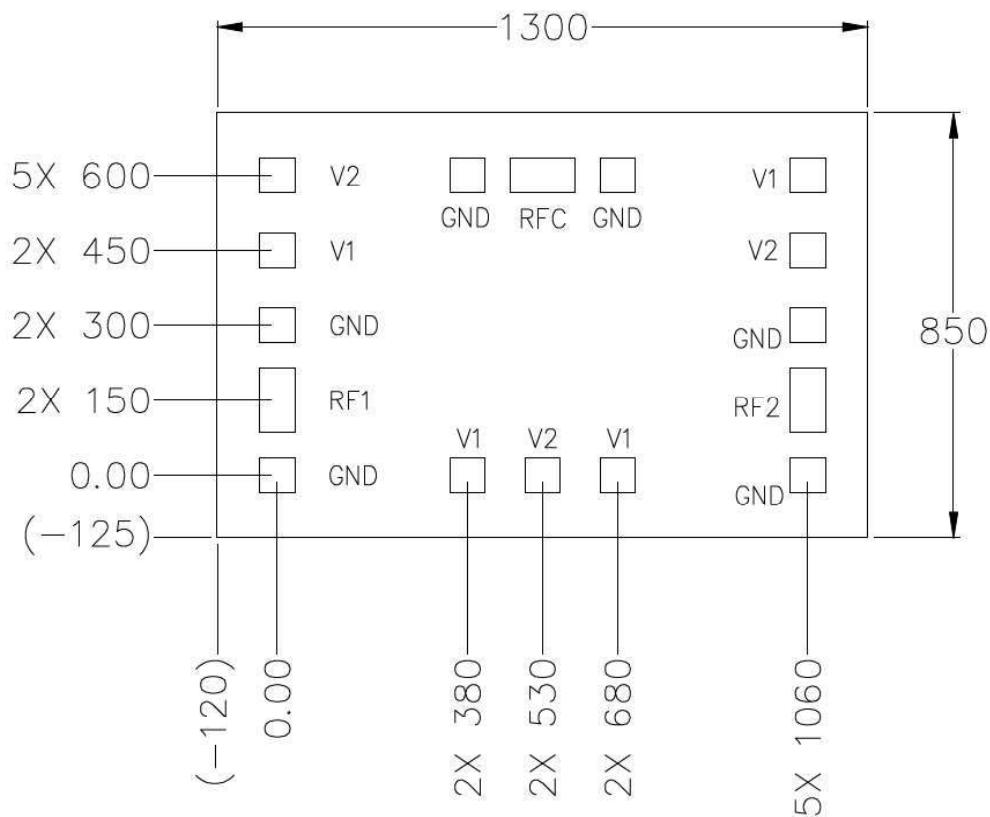
MASW-011107-DIE



GaAs SPDT Non-Reflective Switch
DC - 26.5 GHz

Rev. V2

Die Dimensions^{7,8}



7. All units are in μm , unless otherwise noted, with a tolerance of $\pm 5 \mu\text{m}$.

8. Die thickness is $100 \pm 10 \mu\text{m}$.

MACOM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with MACOM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.