

## GaAs SPDT Non-Reflective Switch DC - 26.5 GHz

Rev. V2

### 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.

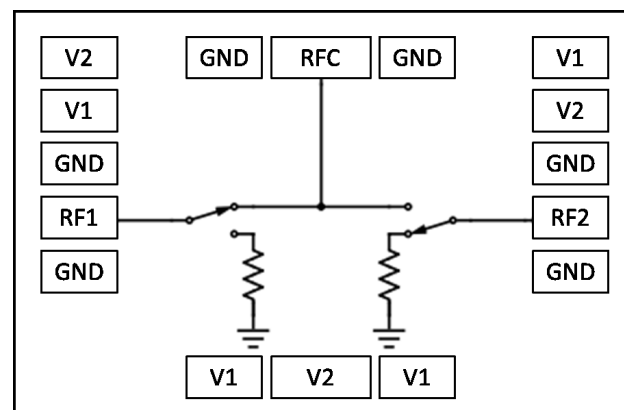
The MASW-011107-DIE is fabricated using MACOMs' mature 0.5  $\mu$ m low gate-lag pHEMT process. This robust process features full surface passivation for a high performance and high reliability.

### Ordering Information

Part Number	Package
MASW-011107-DIE	Die in Gel Pak <sup>1</sup>

1. Die quantity varies.

### Functional Schematic



### Bondpad Configuration<sup>2</sup>

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.

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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)	—	$\mu\text{A}$	—	1	—

### Absolute Maximum Ratings<sup>3,4</sup>

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<sup>5,6</sup>

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

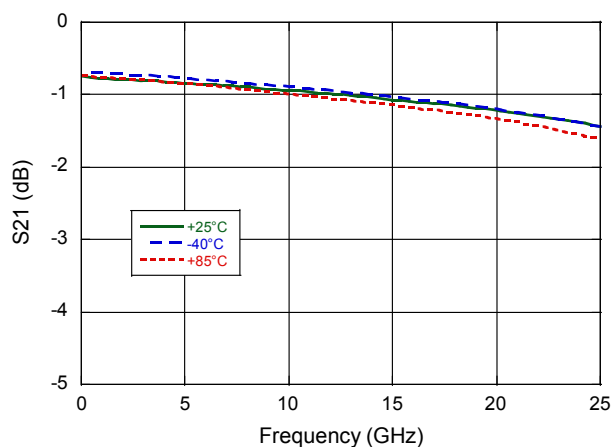
Please observe the following precautions to avoid damage:

### Static Sensitivity

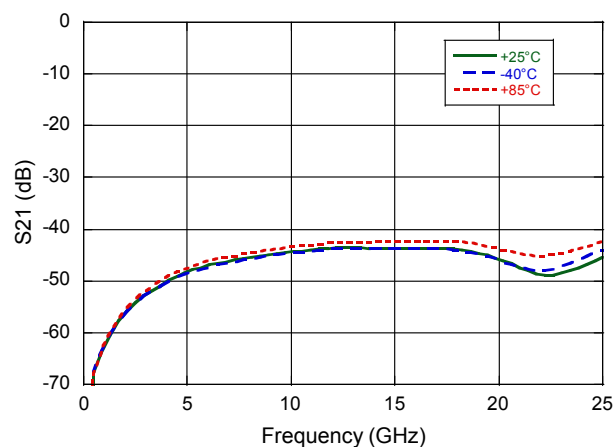
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

## Typical Performance Curves

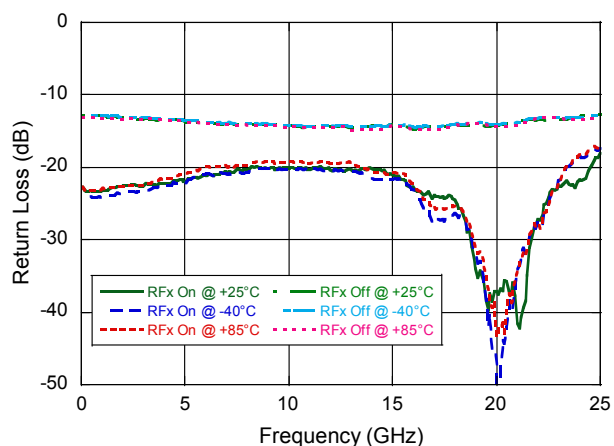
**Insertion Loss**



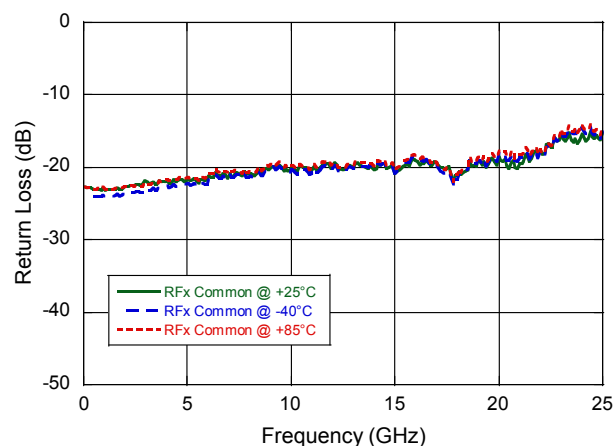
**Isolation**



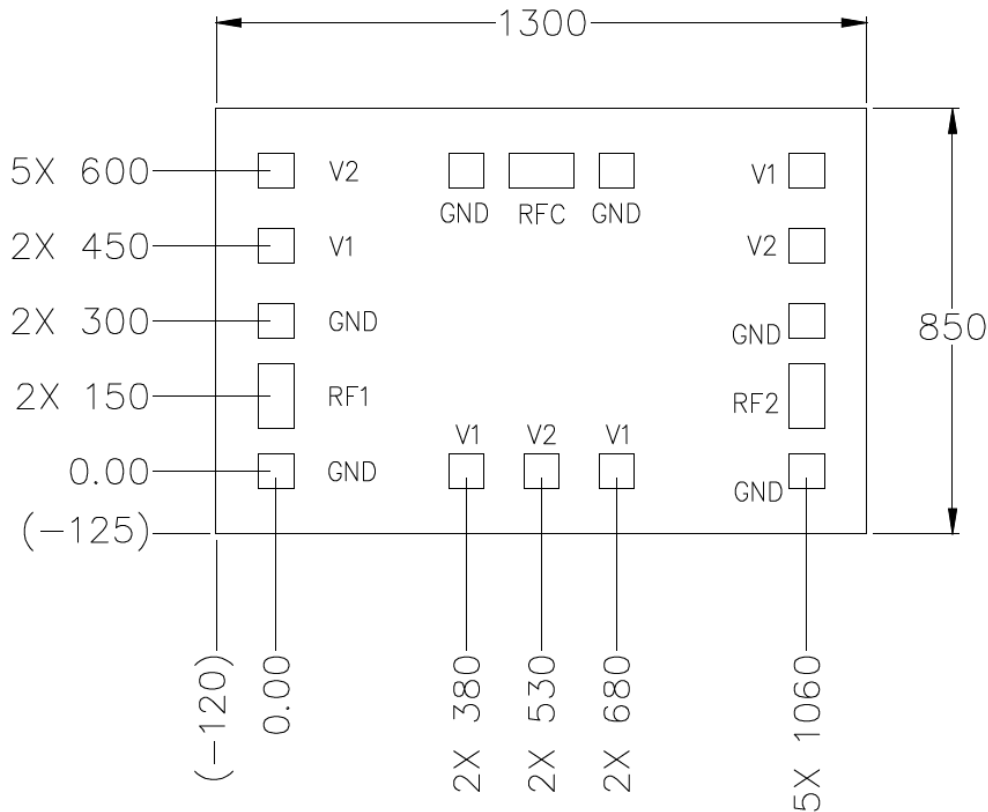
**Return Loss, RFx On & RFx OFF**



**Return Loss, RF Common**



## Die Dimensions<sup>7,8</sup>



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

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

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