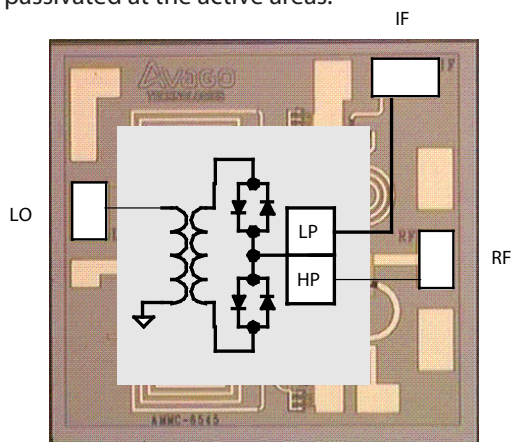


## Data Sheet

### Description

Avago's AMMC-6545 is an easy-to-use broadband sub-harmonic mixer, with the LO injected at half the frequency of that required by a conventional mixer. MMIC includes an 180° balanced diode based mixer. The MMIC is fabricated using PHEMT technology. The sub-harmonic mixer is designed to be an easy-to-use component for any chip and wire application. Intended applications include microwave radios, 802.16, VSAT and satellite receivers. Since this one mixer can cover several bands, the AMMC-6545 can reduce part inventory. For improved reliability and moisture protection, the die is passivated at the active areas.



**Chip Size:** 885 $\mu$ m x 825 $\mu$ m

**Chip Size Tolerance:**  $\pm 10$   $\mu$ m ( $\pm 0.4$  mils)

**Chip Thickness:** 100  $\pm$  10  $\mu$ m (4  $\pm$  0.4 mils)

**Pad Dimensions:** 120 x 80  $\mu$ m (4.7 x 3.2 mils)

### Features

- RF Frequency: 18-45GHz
- LO Frequency: 9-24GHz
- IF Frequency: DC-3GHz
- Suitable for Up and Down Conversion
- Diode Mixer

### Typical Performance

- Conversion Loss: 11.0 $\pm$ 1.5 dB
- 2\*LO Leakage @ R port: -39 dBm
- 2\*LO Leakage @ I port: -50 dBm
- L-R Isolation: 40 dB
- L-I Isolation: 36 dB
- IP<sub>3</sub> (@LO=+17dBm): +15 dBm
- LO Drive Power: +15 dBm
- LO Drive range (dBm): +12 to +20

### Applications

- Microwave Radio systems
- Satellite VSAT, DBS Up/Down Link
- LMDS & Pt-Pt mmW Long Haul
- Broadband Wireless Access (including 802.16 and 802.20 WiMax)
- WLL and MMDS loops

## Absolute Maximum Ratings<sup>[1]</sup>

Symbol	Parameter/Condition	Units	Minimum	Maximum
Pin RF	CW Input Power to RF Port	dBm		25
T <sub>b</sub>	Operating Backside Temp.	°C	-55	
T <sub>stg</sub>	Storage Temp.	°C	-65	
T <sub>max</sub>	Maximum Assembly Temp (60 sec max)	°C		260

Note:

1. Operation in excess of any one of these conditions may result in permanent damage to this device.

## DC Specifications/Physical Properties<sup>[2]</sup>

1. Operation in excess of any of these conditions may result in permanent damage to this device. The absolute maximum ratings for Pin were determined at an ambient temperature of 25°C unless noted otherwise.
2. Ambient operational temperature T<sub>A</sub>=25°C unless noted.
3. Channel-to-backside Thermal Resistance (T<sub>channel</sub> = 34°C) as measured using infrared microscopy. Thermal Resistance at backside temp. (T<sub>B</sub>) = 25°C calculated from measured data.

## AMMC-6545 Operating Conditions

Symbol	Parameters and Test Conditions	Units	Minimum	Typical	Maximum
RFfreq	RF Frequency	GHz	18		48
LOfreq	LO Frequency	GHz	9		24
IFfreq	IF Frequency	GHz	DC		3
LO	LO Drive Power	dBm	+12	+15	+22

## AMMC-6545 RF Specifications

T<sub>A</sub> = 25°C, Z<sub>o</sub> = 50Ω, LO = +15 dBm, IF = 2GHz.

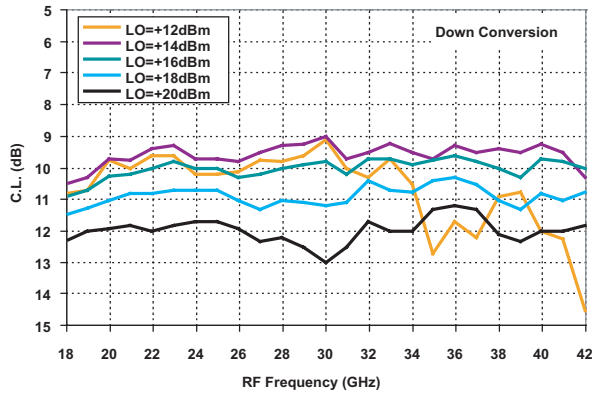
Symbol	Parameters	Frequency (GHz)	Units	Minimum	Typical	Maximum
CL	Conversion Loss <sup>[2]</sup>	RF=21GHz, LO=11.5GHz RF=23GHz, LO=12.5GHz RF=26GHz, LO=14GHz	dB		10	12
IIP3	Input Third Order Intercept <sup>[2]</sup>	RF=21GHz, LO=11.5GHz RF=23GHz, LO=12.5GHz RF=26GHz, LO=14GHz	dBm	11 9.5 8.5	13.5 10.3 10.9	
2LO-R	2LO-R Leakage	RF=21GHz, LO=10.5GHz RF=23GHz, LO=11.5GHz RF=26GHz, LO=13GHz	dBm		-45	-35
2LO-I	2LO-I Leakage	RF=21GHz, LO=10.5GHz RF=23GHz, LO=11.5GHz RF=26GHz, LO=13GHz	dBm		-50	
L-R	Isolation		dB		40	
L-I	Isolation		dB		36	

Notes:

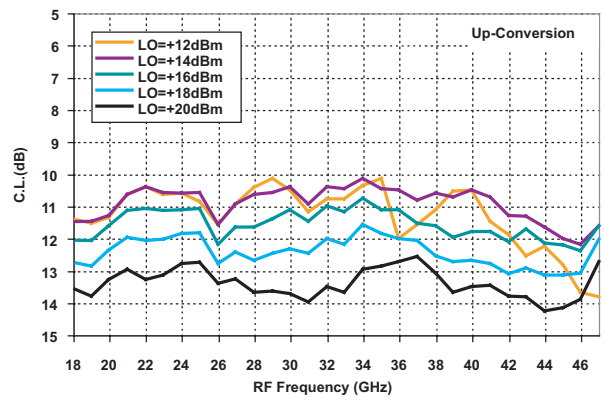
1. Production RF tested at 21, 23 and 26GHz in up-converter configuration.
2. All tested parameters are guaranteed with ±0.5dB for CL and ±1.5dBm for IIP3 and 2LO-R leakage.

# AMMC-6545 Typical Performance

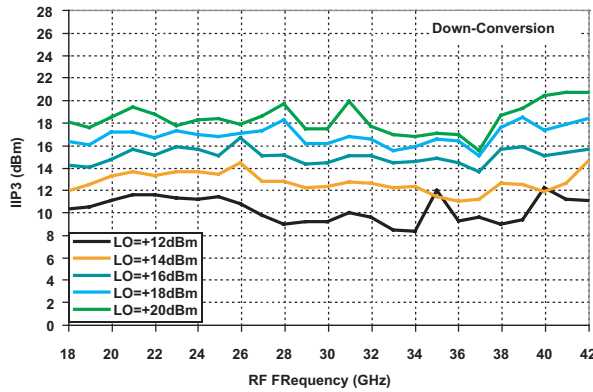
$T_A = 25^\circ\text{C}$ ,  $Z_0 = 50\Omega$ , LO = +15 dBm, IF = 1GHz, LO Power = +15 dBm unless otherwise noted



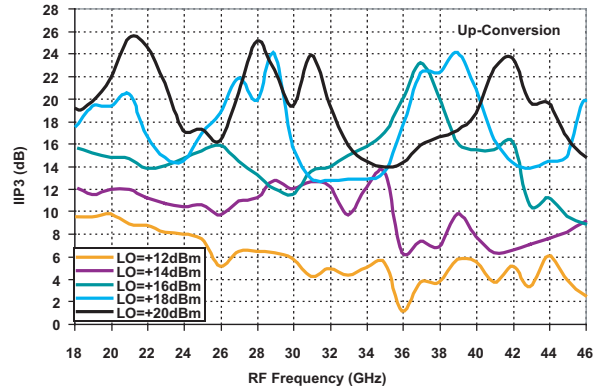
**Figure 1. Down-Conversion Loss at LO = +12 to +20 dBm**  
[LO Freq. =  $(RF+IF)/2$ , IF = 1GHz].



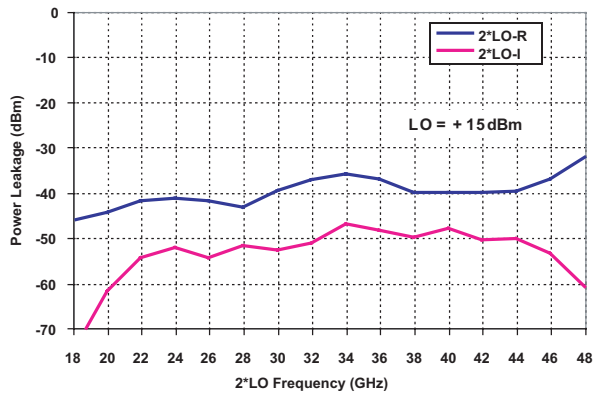
**Figure 2. Up-Conversion Loss at LO = +13 to +20 dBm**  
[LO Freq. =  $(RF+IF)/2$ , IF = 1GHz].



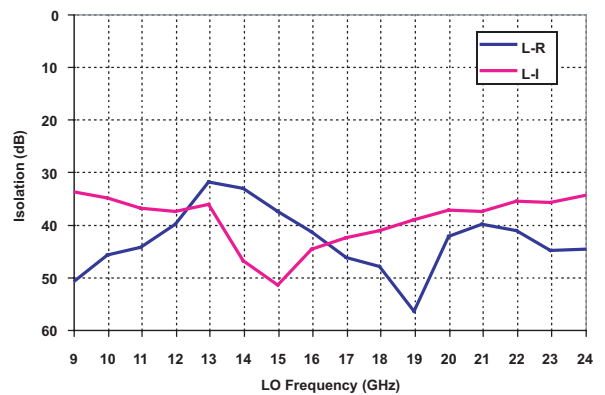
**Figure 3. Down-Conversion IIP3 at LO = +12 to +20 dBm**  
[LO Freq. =  $(RF+IF)/2$ , IF = 1GHz].



**Figure 4. Up-Conversion IIP3 at LO = +12 to +20 dBm**  
[LO Freq. =  $(RF+IF)/2$ , IF = 1GHz].



**Figure 5. 2\*LO-R and 2\*LO-I Power Leakage @ LO = +15 dBm.**



**Figure 6. L-R and L-I Isolation @ LO = +15 dBm.**

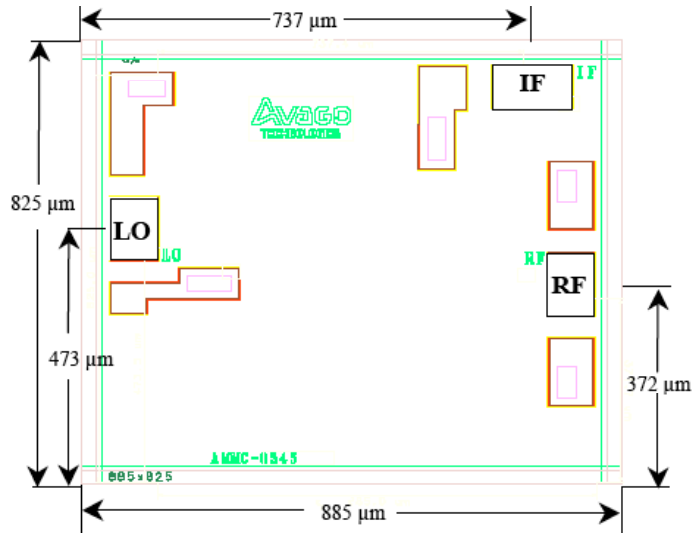


Figure 7. Die dimension details.

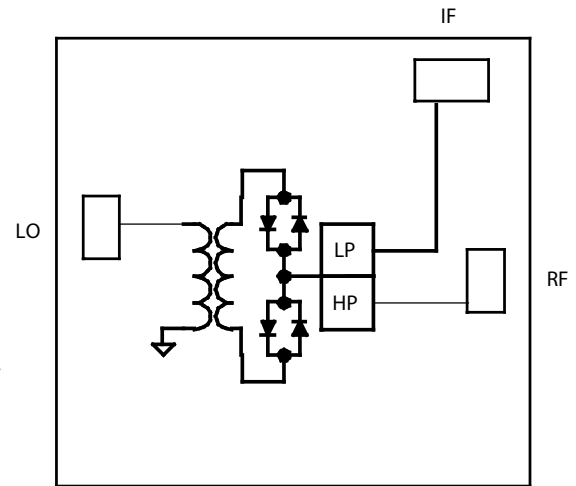


Figure 8. Simplified Schematic of the mixer.

### AMMC-6545 Ordering Information

AMMC-6545-W10 = 10 devices per tray

AMMC-6545-W50 = 50 devices per tray

For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

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