Ka band MMIC
Phase Shifter with Power Amp

Ka-PSPA-2733 Previously named LE-Ka1360307

Phase Shifter with Integrated Power Amplifier 27-32.5 GHz

Overview

Ka-PSPA-2733 is a MMIC analogue phase-shifter core chip with integrated power amplifier that enables more than 360° phase variation across the 27–32.5 GHz frequency band. By supplying typically 17dB gain with low variation over all phases and frequencies, the excellent phase tracking (less than ±20°), means that this MMIC offers an alternative to digital phase-shifters where any required phase delay is achievable with the phase set by choosing a voltage in the range -0.7 to 0.9V.

As the underside of the die is gold plated, this MMIC is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown herein is provisional and subject to change at any time.

Features

- 27 – 32.5GHz.
- 17dB gain.
- 5dB input return loss.
- 10dB output return loss.
- >360° phase variation.
- 20dBm output power.

Applications

- Frequency translation.
- Phased arrays.
- IOT.
- Security.

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	27		32.5	GHz
Phase Variation	0		360	degrees
Gain		17		dB
Gain Variation (over frequency, all VC's)			±4	dB
Phase Variation (over frequency, all VC's)			±20	degrees
Saturated Output Power		20		dBm
Input Return Loss		5		dB
Output Return Loss		10		dB
Control Voltage (VC)	-0.7		0.9	V
Bias Voltage (VD)		3		V
Current (ID)		210		mA

Notes
All tests are carried out at 25°C.

Absolute Maximum Ratings

Parameter	Rating
RF Power	20dBm
VC	5V
VD	5V
ID	400mA
Storage Temperature	−65°C to +175°C
Channel Temperature	+175°C
Operating Temperature	−40°C to +85°C

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features proprietary protection circuitry, damage may occur on devices subjected to ESD. Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Measured Performance Data

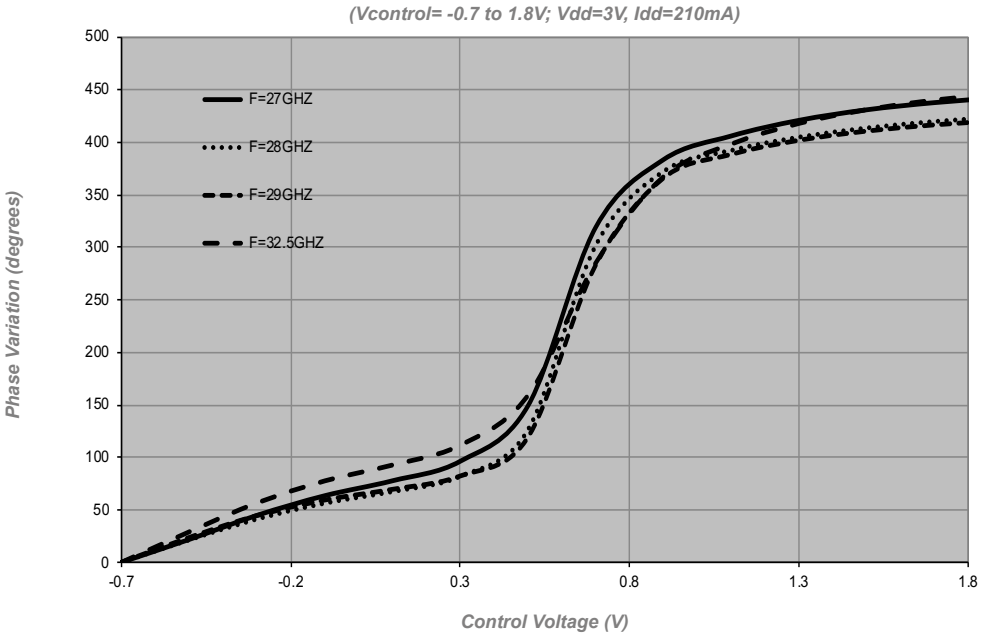


Figure 1
'Relative' Phase Shift

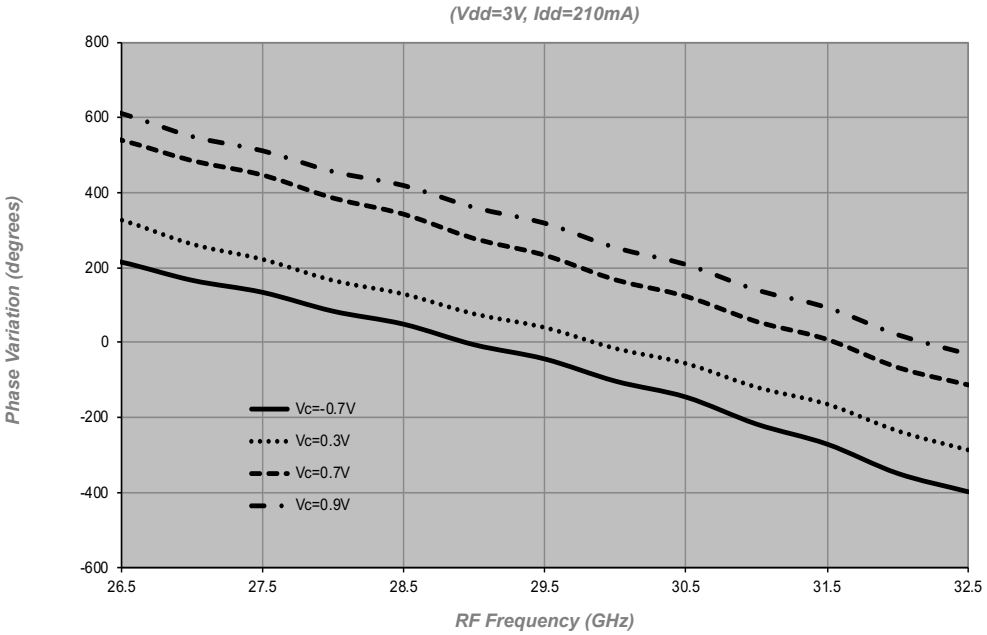


Figure 2
'Absolute' Phase Variation

Measured Performance Data

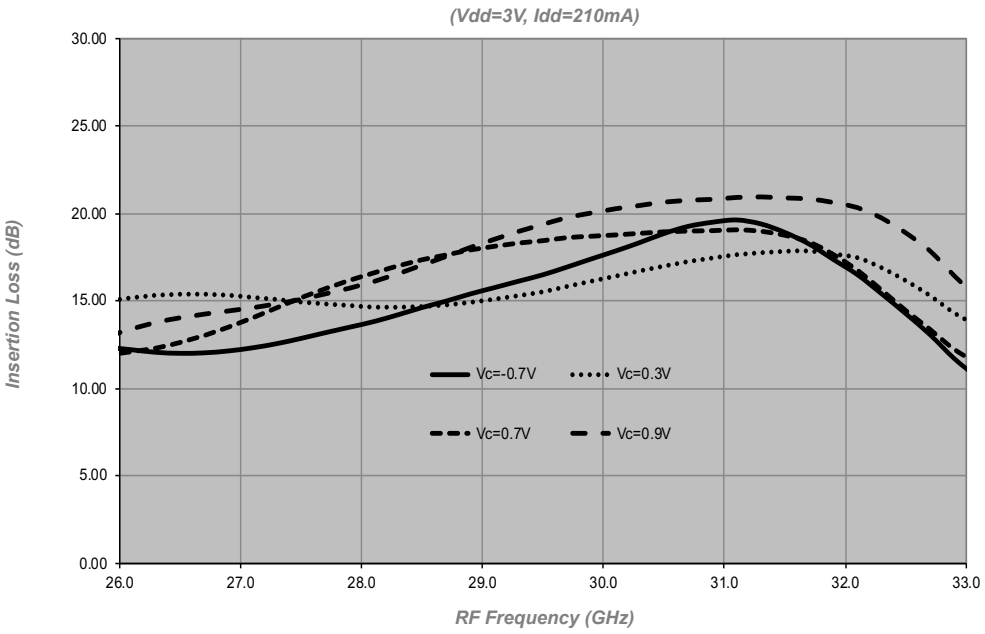


Figure 3
Insertion Loss

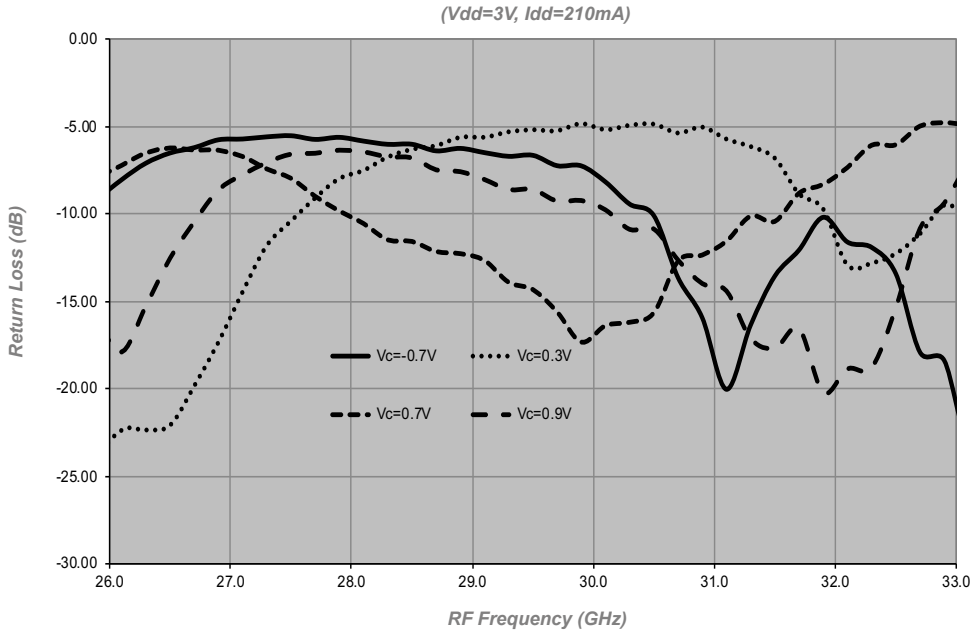


Figure 4
Input Return Loss

Measured Performance Data

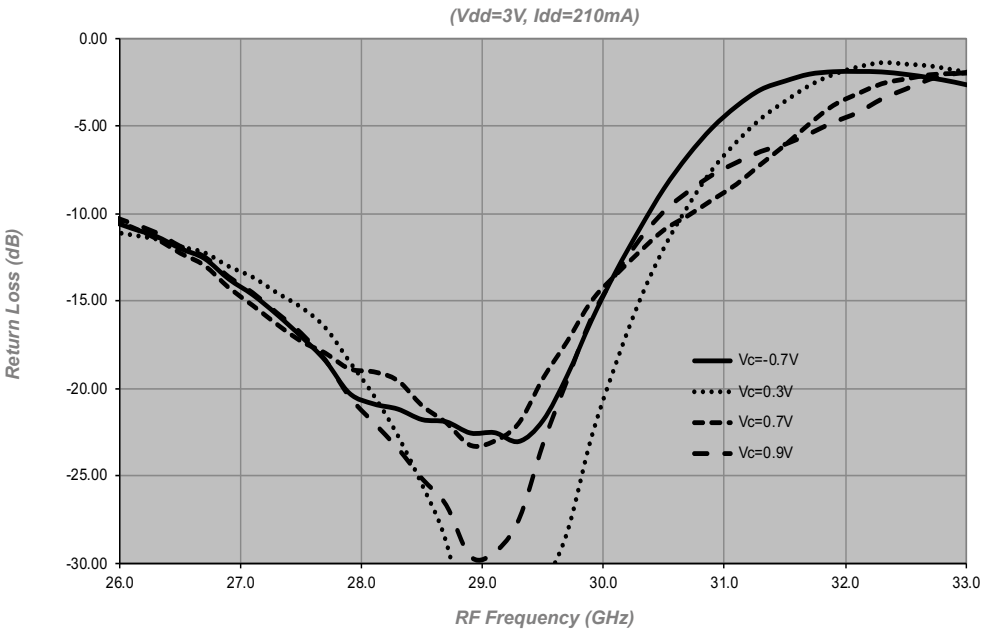
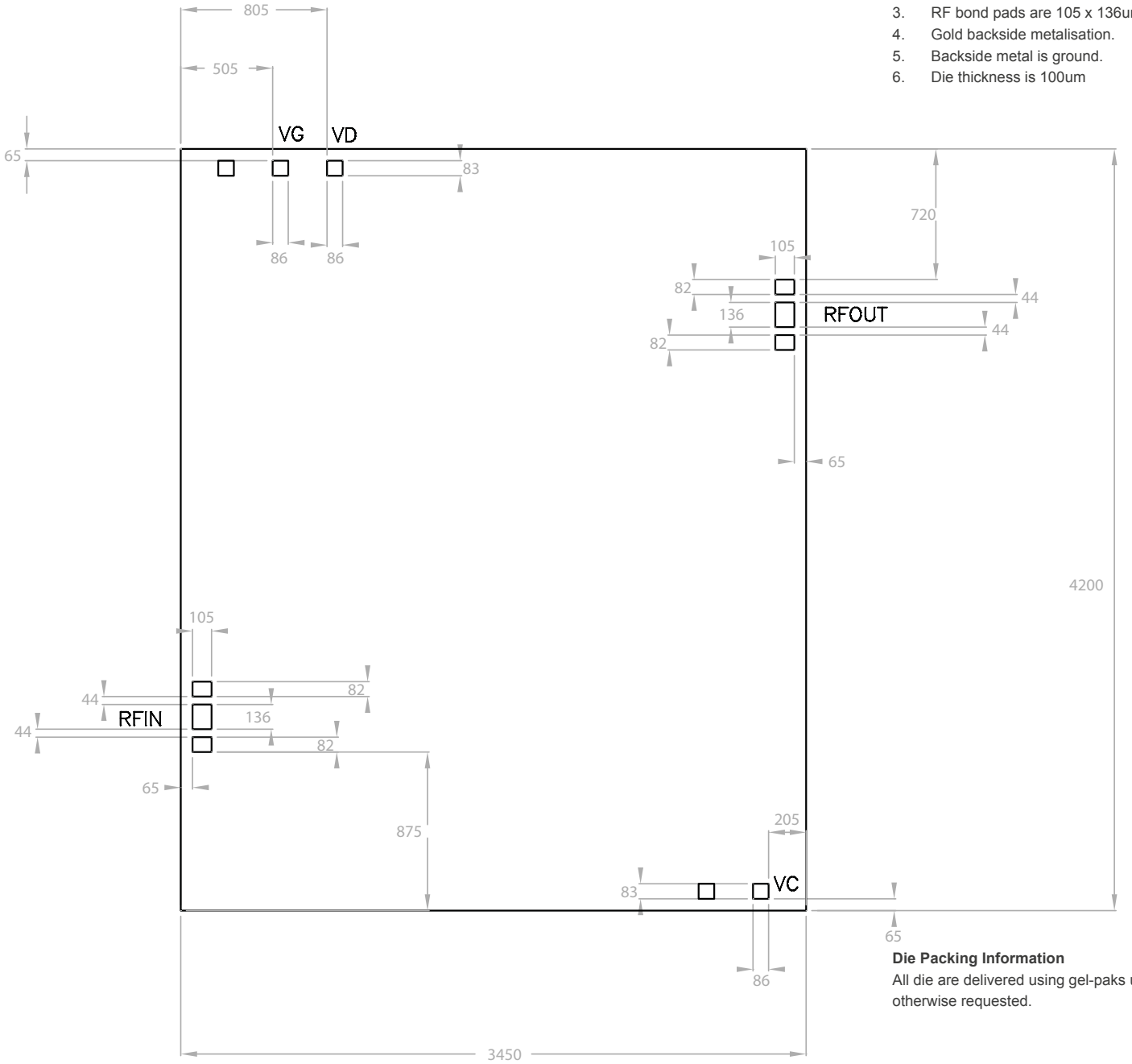


Figure 5
Output Return Loss

Outline Drawing

Notes

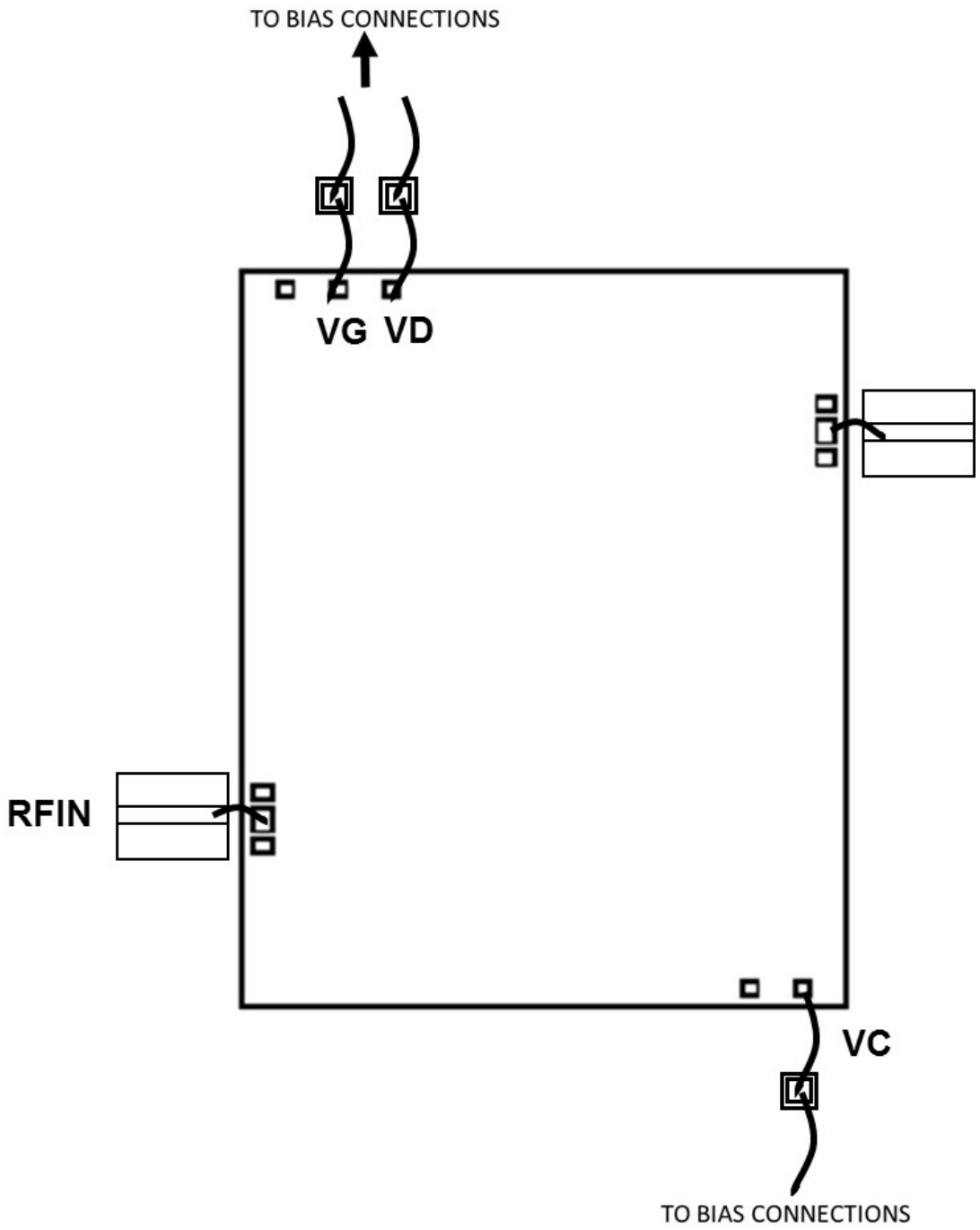
1. All dimensions are in um.
2. Typical DC bond pads are 86 83um.
3. RF bond pads are 105 x 136um.
4. Gold backside metalisation.
5. Backside metal is ground.
6. Die thickness is 100um



Die Packing Information

All die are delivered using gel-paks unless otherwise requested.

Connection Configurations



Pad Descriptions

Name	Description
RFIN	RF input pad. This pad is AC coupled.
RFOUT	RF output pad. This pad is AC coupled.
VD	Drain Voltage pad.
VG	Gate Voltage pad.
VC	Voltage phase control pad.
BOTTOM	The die backside must be connected to RF/DC ground.

General Notes on Assembly

Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/Sn occurs at approximately 280°C so the die (plus mount and preform) is initially heated up to 180°C and then it is heated for approximately 10 seconds to 280°C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330°C.
2. Pure, dry nitrogen should be used as the heat source.
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Aluminium wire must not be used.

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