Bias and Sequence of the PE42420 RF Switch

Application Note 105

Summary

This application note describes the correct power-on and power-off states and sequences to prevent damage and ensure proper operation in the correct RF state. The PE42420 with the fast power-on and power off performance with multiple logic controls requires single step V_{DD} to maintain signal integrity.

Introduction

Figure 1 shows the PE42420 functional diagram. This switch requires special biasing and sequencing at all conditions for optimum switching speed and low noise, stable performance.

Figure 1 ▪ PE42420 Functional Diagram

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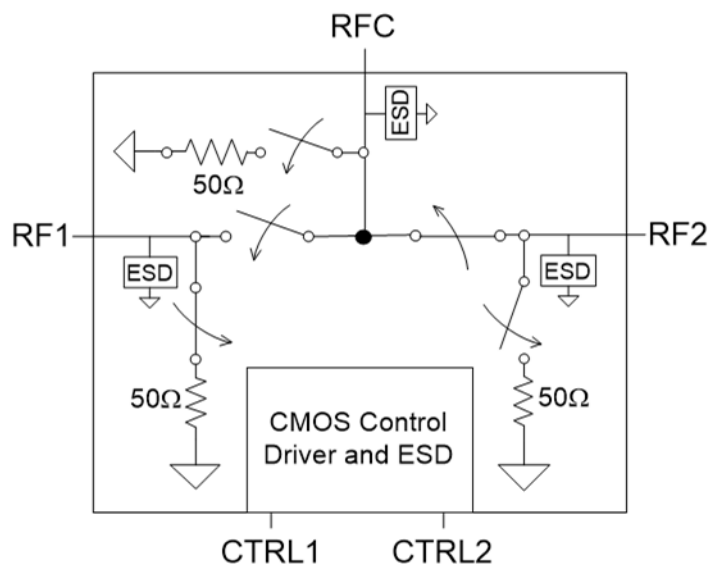
Pin Information

Figure 2 shows the pin configuration and **Table 1** provides the pin description information needed for proper operation of the PE42420.
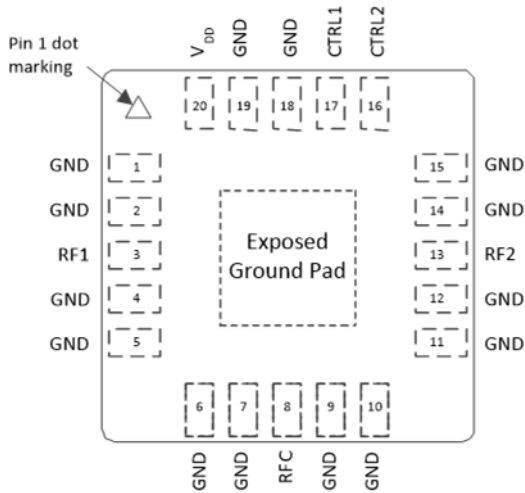
Figure 2 ▪ Pin Configuration (Top View)

Table 1 ▪ Pin Descriptions for PE42420

Pin No.	Pin Name	Description
1, 2, 4–7, 9, 10–12, 14, 15, 18, 19	GND	Ground
3	RF1*	RF port
8	RFC*	RF common
13	RF2*	RF port
16	CTRL2	Digital control logic input 2
17	CTRL1	Digital control logic input 1
20	VDD	Supply voltage
Pad	GND	Exposed pad: ground for proper operation.

Note: * RF pins 3, 8 and 13 must be at 0 VDC. The RF pins do not require DC blocking capacitors for proper operation if the 0 VDC requirement is met.

Test Conditions

Be aware of the following nominal operating ranges and bias levels shown in **Table 2** prior to power-up and power-down procedures.

Table 2 ▪ Recommended Operating Conditions for PE42420

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{DD}	2.7		5.5	V
Supply current V_{DD} = 2.7 to 5.5V	I_{DD}		120	200	µA
Digital input high (CTR!, CTRL2)	V_{IH}	1.17		3.6	V
Digital input low (CTR!, CTRL2)	V_{IL}	-0.3		0.6	V
Digital input current	I_{CTRL}		9	12	µA
Maximum operating power (RFC-RFX)	P_{IN}			30	dBm
Maximum power into termination (RFX)[*]	P_{MAX}			20	dBm
Operating temperature range	T_{OP}	-40		+105	°C
Note: * 100% duty cycle, all bands 50Ω.					

Power-up Sequence

This section describes the correct power-up sequence for the PE42420.

1) Before starting the sequence, do NOT apply any RF power.

   NOTE: V_{CTRL} and V_{DD} voltages are independent from each other. V_{CTRL} voltages can be turned on at any time and in any order in this sequence.

2) Set V_{DD} to 0V.

3) Set V_{DD} to recommended supply voltage range between 2.7V to 5.5V in a single voltage step. Do not use intermediate voltage steps.

4) Apply RF power.

Power-down Sequence

This section describes the correct power-down sequence for the PE42420.

1) Shut off the RF power.

   NOTE: V_{CTRL} and V_{DD} voltages are independent from each other. V_{CTRL} voltages can be set to 0V or turned off at any time and in any order in this sequence.

2) Set V_{DD} from selected operating voltage to 0V or off state in a single voltage step. Do not use intermediate voltage steps.

Conclusion

The PE42420, when biased at the correct levels and with the correct sequences using single-step V_{DD}, will guarantee proper RF performance at both power up and power down states. This allows for clean on / off transitions at all logic states.

Sales Contact

For additional information, contact Sales at sales@psemi.com.

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