



## FM8545

## Antenna Tuning Switch

### Features

- Very Linear Performance
- Off Ports, 'open Type'
- Two pin GPIO control Interface for standard SP4T operation
- Very Small 1.1mm x 1.5mm
- Very low profile, 0.5mm
- Ultra-Low On-resistance, 1.0  $\Omega$

### Applications

- Antenna Tuning
- Band Switching
- Impedance Tuning

designed for high performance antenna tuning applications. All RF path performance is enhanced with ultra-low on state resistance and off state capacitance. FM8545 allows the creation of advanced tuning topologies to maximize TRP & TIS performance in space constrained applications.

- The FM8545 SP4T tuner is provided in a compact QFN 1.1mm x 1.5mm x 0.5mm package. A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin description are provided in Table 1.

### Description

- The FM8545 is very low loss SP4T specifically

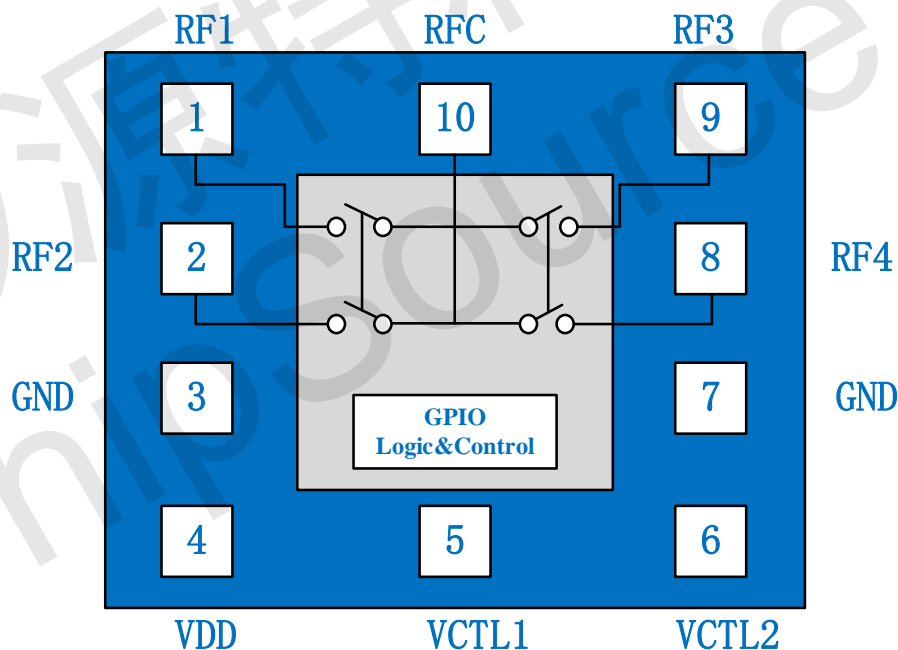


Figure 1. FM8545 Block Diagram



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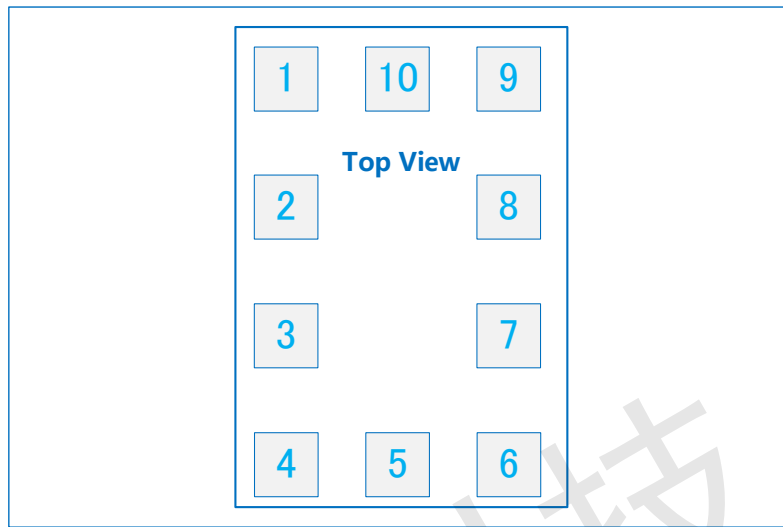


Figure 1. FM8545 Pinout – 10-Pin QFN (Top View)

Table 1. FM8545 Signal Descriptions

Pin#	Name	Details
1	RF1	RF port 1.
2	RF2	RF port 2.
3	GND	Ground
4	VDD	Voltages Supply
5	CTL1	Control Voltage 1.
6	CTL2	Control Voltage 2.
7	GND	Ground
8	RF4	RF port 4
9	RF3	RF port 3
10	RFC	RF Common port.

Table 2. FM8545 Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage, $V_{DD}$	+4.8	V
Control Voltage, $V_{CTL}$	+3.3	V
Max voltage between any combination of RF ports or ground $V_{RF}$ , $V_{DD} = 2.85VDC$ , $V_{CTL1/2} = 0/1.8VDC$ , Temp = 25°C @20% DC	60	VP
Max Input Power between any combination of RF ports or ground $V_{RF}$ , $V_{DD} = 2.85VDC$ , $V_{CTL1/2} = 0/1.8VDC$ , Temp = 25°C @20% DC	43	dBm
Operating Case Temperature	-40 to +90	°C
Storage Temperature	-55 to +150	°C
ESD ALL Pins, HBIM, JESD22-A114	2.0	kV



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**Table 3. FM8545 General Electrical Specifications**

(Active Mode  $V_{DD} = 2.85V$ ,  $CTL=0/1.8V$ ,  $T_{emp} = +25\text{ }^{\circ}C$ , Characteristic Impedance  $[Z_0] = 50\ \Omega$ )

Parameter	Specification			Unit	Conditions
	Min	Typ	Max		
Operating Frequency	700		2700	MHz	
Supply Voltage $V_{DD}$	2.4	2.85	4.2	V	
Supply Current $I_{DD}$		85	130	$\mu A$	
Control Voltage High $V_{CLT1}$ , $V_{CLT2}$	1.3	1.8	2.7	V	
Control Voltage Low $V_{CLT1}$ , $V_{CLT2}$	0	0	0.45	V	
Control Current $I_{CTL}$		0.01		$\mu A$	$V_{CTL} = 1.8V$

**Table 4. FM8545 Control Logic**

Logic State	Mode	CLT1	CLT2	State Description	RF Applied
1	Active	$V_{LOW}$	$V_{LOW}$	RFC to RF1 ON	Yes
2	Active	$V_{LOW}$	$V_{HIGH\_CTL}$	RFC to RF2 ON	Yes
3	Active	$V_{HIGH\_CTL}$	$V_{LOW}$	RFC to RF3 ON	Yes
4	Active	$V_{HIGH\_CTL}$	$V_{HIGH\_CTL}$	RFC to RF4 ON	Yes

**Table 5. FM8545 Electrical Specification**

(Active Mode  $V_{DD} = 2.85V$ ,  $CTL=0/1.8V$ ,  $T_{emp} = +25\text{ }^{\circ}C$ , Characteristic Impedance  $[Z_0] = 50\ \Omega$ )

Parameter	Specification			Unit	Conditions
	Min	Typ	Max		
Insertion Loss (RFC to RFX) $X=1,2,3,4$		0.35	0.45	dB	700 – 915 MHz
		0.45	0.65	dB	915 – 1910 MHz
		0.65	0.95	dB	1910 – 2700 MHz
Isolation (RFC to RFX) $X=1,2,3,4$	20	25		dB	700 – 915 MHz
	15	21		dB	915 – 1910 MHz
	12	16		dB	1910 – 2700 MHz
Isolation (RFX to RFX) $X=1,2,3,4$	22	26		dB	700 – 915 MHz
	18	21		dB	915 – 1910 MHz
	12	19		dB	1910 – 2700 MHz
Return Loss Logic States 1,2,3 & 4	18	23		dB	915 MHz
	13	15		dB	1910 MHz



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Table 6. FM8545 ELectrical Specification

(Active Mode  $V_{DD} = 2.85V$ ,  $CTL=0/1.8V$ ,  $T_{emp}= +25\text{ }^{\circ}C$ , Characteristic Impedance [ $Z_0$ ] = 50  $\Omega$ )

Parameter	Specification			Unit	Conditions
	Min	Typ	Max		
RON (RFC to RF1/RF2/RF3/RF4)		1.0	1.5	$\Omega$	Switch On path
Coff (RFC to RF1/RF2/RF3/RF4)		150	170	fF	Switch Off path
Input 0.1dB compression point		+43		dBm	700 to 2690MHz, CW, RFC to RF1/RF2/RF3/RF4
Second Harmonics		-73	-68	dBm	700 to 2690MHz, Pin = 26 dBm
Third Harmonics		-75	-68	dBm	
Second Harmonics		-63	-55	dBm	824 to 915MHz, Pin = 35 dBm
Third Harmonics		-68	-58	dBm	
Second Harmonics		-63	-55	dBm	1710 to 1910MHz, Pin = 33 dBm
Third Harmonics		-70	-60	dBm	
Start Up Time		10	20	$\mu S$	10% VDD ramp up to 90% of final RF amplitude
On switching speed		4	5	$\mu S$	50% VCTL to 90% RF
OFF Switching Speed		4	5	$\mu S$	50% VCTL to 10% RF



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### Handling Information

FM8545 application schematic is shown in Figure 3. Component value is shown in Table 9. (Note1)

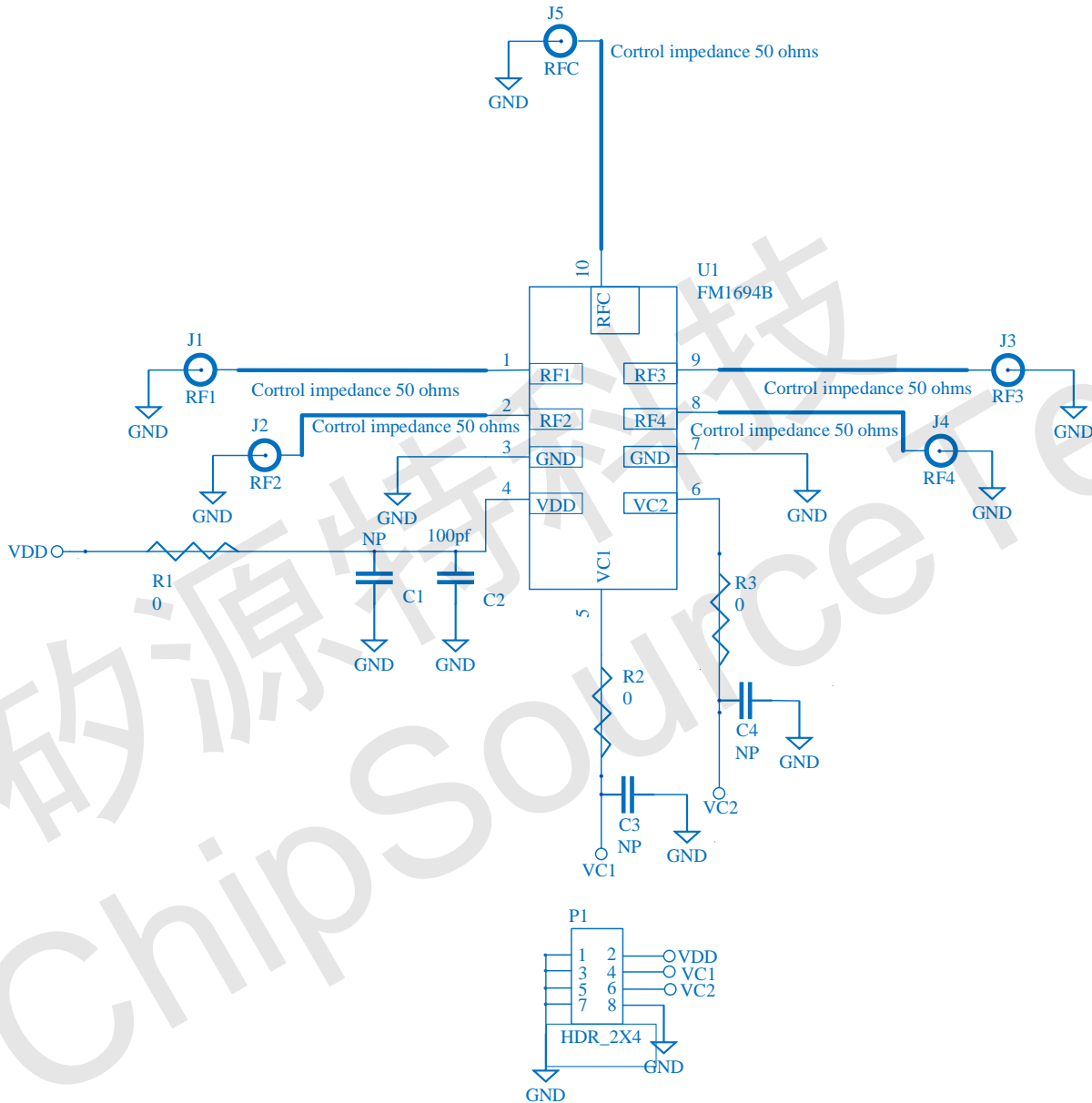


Figure 3. FM8545 Application Schematic



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### Package Dimensions

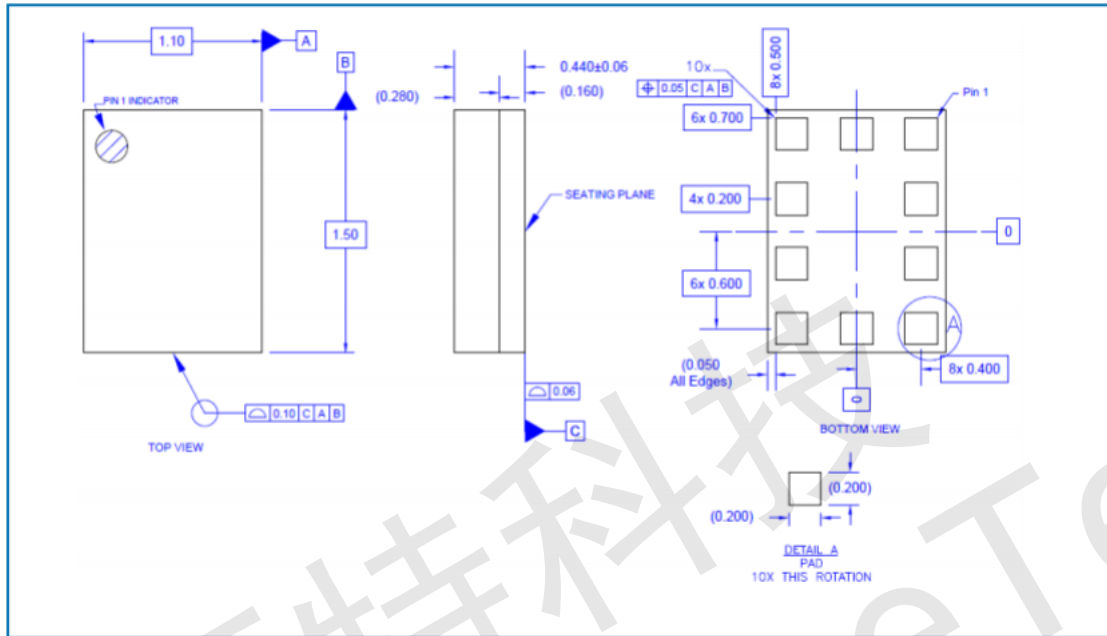


Figure 4. FM8545 10-Pin QFN Package Dimensions