

HXCKRF2179MM26-C4 L, S-band Middle Power SPDT Switch

Description

The HXCKRF2179MM26-C4 is a pHEMT GaAs SPDT (Single Pole Double Throw) switch. This device operates within a frequency range of 0.05 to 3.0 GHz, featuring low insertion loss and high isolation characteristics.

Applications

Wireless LAN (IEEE 802.11 b/g)

Features

★ Control voltage :

VC(H) = 1.8 to 5.3 V (3.0V TYP.)

VC(L) = -0.2 to 0.2 V (0V TYP.)

★ Low Insertion Loss :

Lins 1 = 0.30 dB TYP. @ f = 0.05 to 0.5 GHz

Lins 2 = 0.30 dB TYP. @ f = 0.5 to 1.0 GHz

Lins 3 = 0.40 dB TYP. @ f = 1.0 to 2.0 GHz

Lins4 = 0.45 dB TYP. @ f = 2.0 to 2.5 GHz

Lins 5 = 0.45 dB TYP. @ f = 2.5 to 3.0 GHz

★ High Isolation :

ISL1= 39 dB TYP. @ f = 0.05 to 0.5 GHz

ISL2= 33 dB TYP. @ f = 0.5 to 1.0 GHz

ISL3= 27 dB TYP. @ f = 1.0 to 2.0 GHz

ISL4= 26 dB TYP. @ f = 2.0 to 2.5 GHz

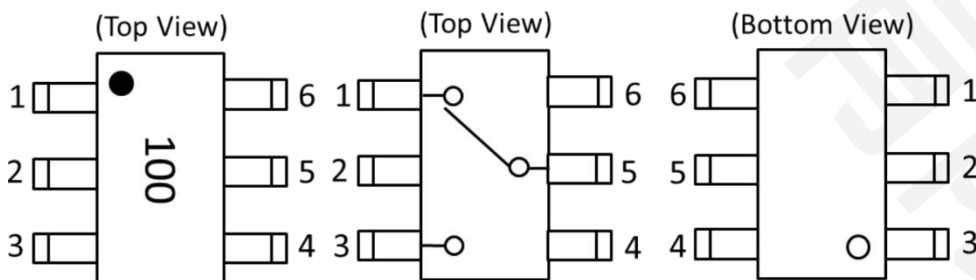
ISL5= 23 dB TYP. @ f = 2.5 to 3.0 GHz

★ Handling power :

Pin(0.5dB) = +32 dBm TYP. @ f = 3.0 GHz,

VC(H) = 3.0 V, VC(L) = 0 V

Pin Configuration And Internal Block Diagram



Pin No.	Pin Name
1	RF1
2	GND
3	RF2
4	VC2
5	RFC
6	VC1

Ordering Information

Part Number	Order Number	Package	Marking	Supplying Form
HXCKRF2179MM26-C4	HXCKRF2179MM26-C4	-6-pin mini mold package (Pb-Free)	100	- Embossed tape 8 mm wide - Pin 4, 5, 6 face the perforation side of the tape - Qty 10 Kpcs/reel

Absolute Maximum Ratings

($T_A = +25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 ^{Note 1}	V
Input Power	P_{in1}	+33 ^{Note 2}	dBm
	P_{in2}	+29 ^{Note 3}	dBm
Operating Ambient Temperature	T_A	-45 ~ +85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 ~ +150	$^{\circ}\text{C}$

- Note
1. $|VC1 - VC2| \leq 6.0\text{V}$
 2. $3.0\text{V} \leq |VC1 - VC2| \leq 5.0\text{V}$, $0.4\text{GHz} \leq f$
 3. $3.0\text{V} \leq |VC1 - VC2| \leq 5.0\text{V}$, $0.05\text{GHz} \leq f \leq 0.4\text{GHz}$

Recommended Operating Range

($T_A = +25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	MIN	TYP	MAX	Unit
Operating Frequency	f	0.05	-	3.0	GHz
Switch Control Voltage (H)	VC(H)	+1.8	+3.0	+5.3	V
Switch Control Voltage (L)	VC(L)	-0.2	0	+0.2	V

Truth Table

VC1	VC2	RFC-RF1	RFC-RF2
Low	High	ON	OFF
High	Low	OFF	ON

Electrical Characteristics 1

($T_A = +25^\circ\text{C}$, $V_C(H) = 3.0\text{V}$, $V_C(L) = 0\text{V}$, $Z_0 = 50\Omega$, DC Block Capacitance = 56pF, unless otherwise specified)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Insertion Loss	L_{INS1}	$f = 0.05 \text{ to } 0.5\text{GHz}$ ^{Note 1}	---	0.30	0.50	dB
	L_{INS2}	$f = 0.5 \text{ to } 1.0\text{GHz}$	---	0.30	0.50	dB
	L_{INS3}	$f = 1.0 \text{ to } 2.0\text{GHz}$	---	0.40	0.60	dB
	L_{INS4}	$f = 2.0 \text{ to } 2.5\text{GHz}$	---	0.45	0.65	dB
	L_{INS5}	$f = 2.5 \text{ to } 3.0\text{GHz}$	---	0.45	0.65	dB
Isolation	$ISL1$	$f = 0.05 \text{ to } 0.5\text{GHz}$ ^{Note 1}	36	39	---	dB
	$ISL2$	$f = 0.5 \text{ to } 1.0\text{GHz}$	30	33	---	dB
	$ISL3$	$f = 1.0 \text{ to } 2.0\text{GHz}$	23	27	---	dB
	$ISL4$	$f = 2.0 \text{ to } 2.5\text{GHz}$	22	26	---	dB
	$ISL5$	$f = 2.5 \text{ to } 3.0\text{GHz}$	21	24	---	dB
Input Return Loss	RL_{in}	$f = 0.05 \text{ to } 3.0\text{GHz}$ ^{Note 1}	15	20	---	dB
Output Return Loss	RL_{out}	$f = 0.05 \text{ to } 3.0\text{GHz}$ ^{Note 1}	15	20	---	dB
0.1dB Loss Compression Input Power ^{Note 2}	$P_{in(0.1dB)}$	$f = 0.05 \sim 0.5\text{GHz}$ ^{Note 1}	---	+26	---	dBm
		$f = 0.5 \sim 3.0\text{GHz}$	---	+30	---	dBm
0.5dB Loss Compression Input Power ^{Note 3}	$P_{in(0.5dB)}$	$f = 0.05 \sim 0.5\text{GHz}$ ^{Note 1}	---	+28.5	---	dBm
		$f = 0.5 \sim 3.0\text{GHz}$	---	+32	---	dBm
2nd Harmonics	$2f_0$	$f = 3.0\text{GHz}$, $P_{in} = +20\text{dBm}$	---	-85	---	dBc
3rd Harmonics	$3f_0$	$f = 3.0\text{GHz}$, $P_{in} = +20\text{dBm}$	---	-85	---	dBc
3rd Order Input Intercept Point	IIP_3	$f = 2.5\text{GHz}$, 2-tone 1MHz Spacing	---	+58	---	dBm
Error Vector Magnitude	EVM	802.11g, 64QAM, 54Mbps $P_{in} \leq +25\text{dBm}$	---	2.5	---	%
Switch Control Current	I_{CONT}	RF none	---	1	10	uA
Switching Speed	T_{SW}	50% CTL to 90/10% RF	---	50	---	ns

Note 1. DC block capacitance = 1000pF at $f = 0.05 \text{ to } 0.5\text{GHz}$

- $P_{in(0.1dB)}$ is the measured input power level when the insertion loss increases 0.1dB more than that of the linear range.
- $P_{in(0.5dB)}$ is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range.

Electrical Characteristics 2

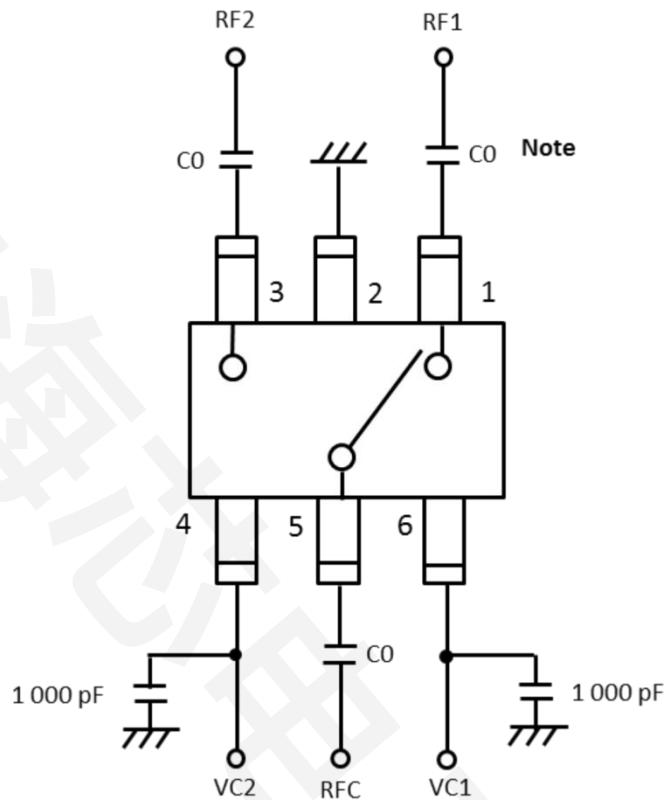
($T_A = +25^\circ\text{C}$, $V_C(H) = 1.8\text{V}$, $V_C(L) = 0\text{V}$, $Z_0 = 50\Omega$, DC Block Capacitance = 56pF, unless otherwise specified)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Insertion Loss	L_{INS1}	$f = 0.05 \text{ to } 0.5\text{GHz}$ ^{Note 1}	---	0.30	0.50	dB
	L_{INS2}	$f = 0.5 \text{ to } 1.0\text{GHz}$	---	0.30	0.50	dB
	L_{INS3}	$f = 1.0 \text{ to } 2.0\text{GHz}$	---	0.40	0.60	dB
	L_{INS4}	$f = 2.0 \text{ to } 2.5\text{GHz}$	---	0.45	0.65	dB
	L_{INS5}	$f = 2.5 \text{ to } 3.0\text{GHz}$	---	0.45	0.65	dB
Isolation	$ISL1$	$f = 0.05 \text{ to } 0.5\text{GHz}$ ^{Note 1}	36	39	---	dB
	$ISL2$	$f = 0.5 \text{ to } 1.0\text{GHz}$	30	33	---	dB
	$ISL3$	$f = 1.0 \text{ to } 2.0\text{GHz}$	23	27	---	dB
	$ISL4$	$f = 2.0 \text{ to } 2.5\text{GHz}$	22	26	---	dB
	$ISL5$	$f = 2.5 \text{ to } 3.0\text{GHz}$	21	24	---	dB
Input Return Loss	RL_{in}	$f = 0.05 \text{ to } 3.0\text{GHz}$ ^{Note 1}	15	20	---	dB
Output Return Loss	RL_{out}	$f = 0.05 \text{ to } 3.0\text{GHz}$ ^{Note 1}	15	20	---	dB
0.1dB Loss Compression Input Power ^{Note 2}	$P_{in(0.1dB)}$	$f = 0.05 \sim 0.5\text{GHz}$ ^{Note 1}	---	+19	---	dBm
		$f = 0.5 \sim 3.0\text{GHz}$	---	+23	---	dBm
0.5dB Loss Compression Input Power ^{Note 3}	$P_{in(0.5dB)}$	$f = 0.05 \sim 0.5\text{GHz}$ ^{Note 1}	---	+22	---	dBm
		$f = 0.5 \sim 3.0\text{GHz}$	---	+26	---	dBm
Switch Control Current	I_{CONT}	RF none	---	1	10	uA
Switching Speed	T_{SW}	50% CTL to 90/10% RF	---	50	---	ns

Note 1. DC block capacitance = 1000pF at $f = 0.05 \text{ to } 0.5\text{GHz}$

- $P_{in(0.1dB)}$ is the measured input power level when the insertion loss increases 0.1dB more than that of the linear range.
- $P_{in(0.5dB)}$ is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range.

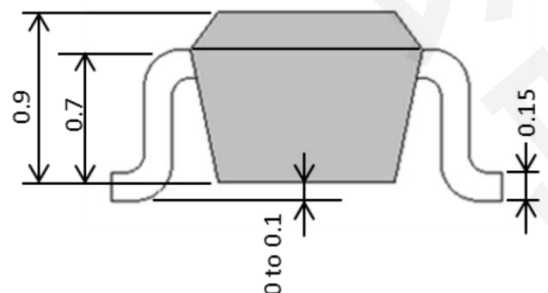
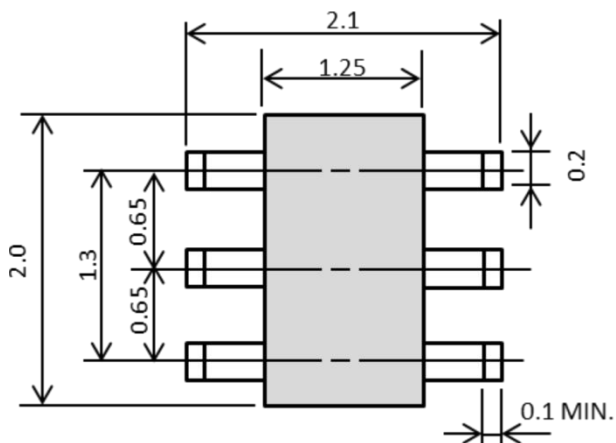
Evaluation Circuit



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins. This device is used it is necessary to use DC Block Capacitance.

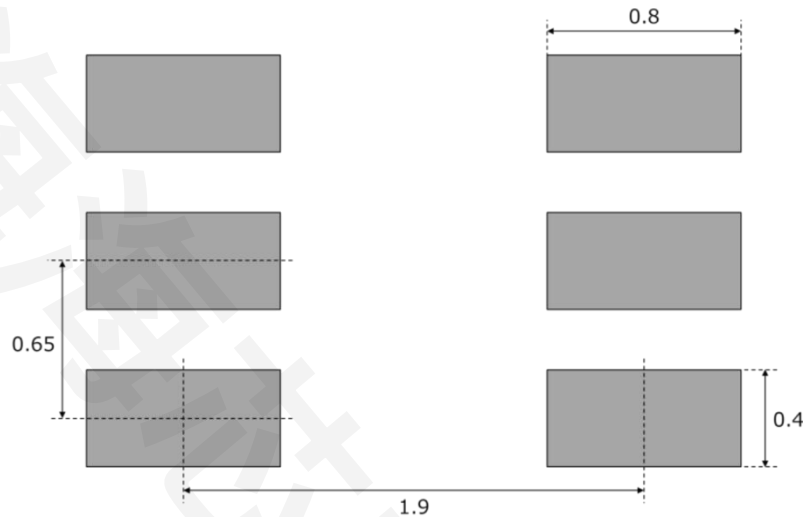
Package Dimensions

6-pin mini mold (Unit : mm)



PCB Layout Footprint

6-pin mini mold (Unit : mm)



The PCB Layout Footprint in this document is for reference only.

[Caution in the gallium arsenide (GaAs) product handling]

This product uses gallium arsenide (GaAs) of the toxic substance appointed in laws and ordinances. GaAs vapor and powder are hazardous to human health if inhaled or ingested.

- Do not dispose in fire or break up this product.
- Do not chemically make gas or powder with this product.
- When discard this product, please obey the law of your country.
- Do not lick the product or in any way allow it to enter the mouth.

[CAUTION]

Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.