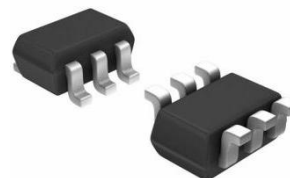


HX179-92-ST

General Description

The HX179-92-ST is a GaAs MMIC specifically designed for L, S-band SPDT switches, developed with mobile phones and other L, S-band applications in mind. This device can be controlled using a voltage range of 1.8 to 5.3 V for precise switching. Operating within a frequency range from 0.05 to 3.0 GHz, it offers low insertion loss and excellent isolation. The HX179-92-ST is housed in a compact 6-pin, super minimold package, making it suitable for high-density surface mounting.



SOT-363

Features

- **Switch control voltage**

$V_{\text{cont}}(\text{H})=1.8$ to 5.3V (3.0V TYP.)

$V_{\text{cont}}(\text{L})=-0.2$ to $+0.2\text{V}$ (3.0V TYP.)

- **Low insertion loss**

$\text{Lins1}=0.25$ dB TYP. @ $f=0.05$ to 0.5 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

$\text{Lins2}=0.25$ dB TYP. @ $f=0.5$ to 1.0 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

$\text{Lins3}=0.30$ dB TYP. @ $f=1.0$ to 2.0 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

$\text{Lins4}=0.35$ dB TYP. @ $f=2.0$ to 2.5 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

$\text{Lins5}=0.35$ dB TYP. @ $f=2.5$ to 3.0 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

- **Handling power**

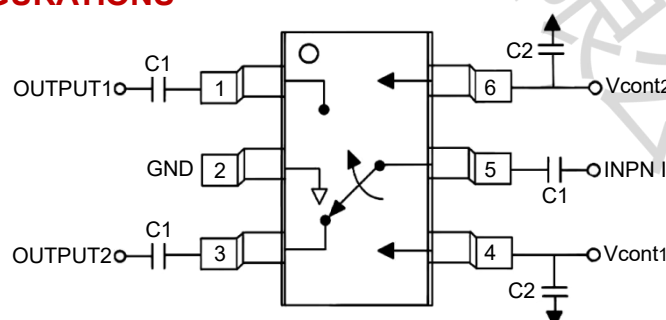
$\text{Pin}(1\text{dB})=+27.0$ dBm TYP. @ $f=0.5$ to 3.0 GHz, $V_{\text{cont}}(\text{H})=3.0$ V, $V_{\text{cont}}(\text{L})=0$ V

$\text{Pin}(1\text{dB})=+20.0$ dBm TYP. @ $f=0.5$ to 3.0 GHz, $V_{\text{cont}}(\text{H})=1.8$ V, $V_{\text{cont}}(\text{L})=0$ V

Applications

- W-LAN, WLL and Bluetooth™ etc.
- L, S-band digital cellular or cordless telephone

PIN CONFIGURATIONS



DC blocking capacitors C1 are required on all RF ports.

$C1=56\text{pF}$, $C2=1000\text{pF}$ for operation $>500\text{MHz}$

TRUTH TABLE

V_{cont1}	V_{cont2}	INPUT-OUTPUT1	INPUT-OUTPUT2
High	Low	ON	OFF
Low	High	OFF	ON

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ABSOLUTE MAXIMUM RATINGS (TA=+25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	Vcont	+6.0 ^A	v
Input Power	Pin	+30	dBm
Operating Ambient Temperature	TA	-45 to +85	°C
Storage Temperature	Tstg	-55 to +150	°C

Notes

A. Vcont1 - Vcont2 ≤ 6.0V

RECOMMENDED OPERATING RANGE (TA=+25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Switch Control Voltage (H)	Vcont (H)	1.8	3.0	6.3	V
Switch Control Voltage (L)	Vcont (L)	-0.2	0	0.2	V

ELECTRICAL CHARACTERISTICS

(TA=+25°C, Vcont(H)=3.0 V, Vcont(L)=0 V, DC cut capacitors =100 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 1	Lins1	f=0.05 to 0.5 GHz ^A		0.25	0.45	dB
Insertion Loss 2	Lins2	f=0.5 to 1.0 GHz		0.25	0.45	dB
Insertion Loss 3	Lins3	f=1.0 to 2.0 GHz		0.30	0.50	dB
Insertion Loss 4	Lins4	f=2.0 to 2.5 GHz		0.35	0.55	dB
Insertion Loss 5	Lins5	f=2.5 to 3.0 GHz		0.35	0.60	dB
Isolation 1	ISL1	f=0.05 to 0.5 GHz ^A	29	32		dB
Isolation 2	ISL2	f=0.5 to 1.0 GHz	25	28		dB
Isolation 3	ISL3	f=1.0 to 2.0 GHz	24	27		dB
Isolation 4	ISL4	f=2.0 to 2.5 GHz	23	26		dB
Isolation 5	ISL5	f=2.5 to 3.0 GHz	21	24		dB
Input Return Loss 1	RLin1	f=0.05 to 0.5 GHz ^A	15	20		dB
Input Return Loss 2	RLin2	f=0.5 to 3.0 GHz	15	20		dB
Output Return Loss 1	RLout1	f=0.05 to 0.5 GHz ^A	15	20		dB
Output Return Loss 2	RLout2	f=0.5 to 3.0 GHz	15	20		dB
0.1 dB Loss Compression Input Power ^B	Pin(0.1dB)	f=20/2.5 GHz	+21.0	+23.0		dBm
		f=0.5 to 3.0 GHz		+23.0		dBm
1 dB Loss Compression Input Power ^C	Pin(1dB)	f=0.5 to 3.0 GHz		+27.0		dBm
2nd Harmonics	2fo	f=2.0GHz, Pin=+15dBm		-55	-47	dBc
		f=2.5GHz, Pin=+15dBm		-55	-47	dBc
3rd Harmonics	3fo	f=2.0GHz, Pin=+15dBm		-55	-47	dBc
		f=2.5GHz, Pin=+15dBm		-55	-47	dBc
Intermodulation Intercept Point	IIP ₃	f=0.5 to 3.0 GHz, 2 tone, Pn=+16 dBm, 5 MHz spacing		+58		dBm
Switch Control Current	Icont			4	20	μA
Switch Control Speed	tsw	50%CTL to 90/10%RF		20	200	ns

Notes

A. DC cut capacitors =1000 pF at f=0.05 to 0.5 GHz

B. Pin(0.1 dB) is measured the input power level when the insertion loss increases more 0.1 dB than that of linear range.

C. Pin(1 dB) is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

ELECTRICAL CHARACTERISTICS

(TA=+25°C, Vcomt(H)=1.8 V, Vcont(L)=0 V, DC cut capacitors =100 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 6	Lins6	f =0.05 to 0.5 GHz ^A		0.25	0.50	dB
Insertion Loss 7	Lins7	f=0.5 to 1.0 GHz		0.25	0.50	dB
Insertion Loss 8	Lins8	f=1.0 to 2.0 GHz		0.30	0.55	dB
Insertion Loss 9	Lins9	f=2.0 to 2.5 GHz		0.35	0.60	dB
Insertion Loss 10	Lins10	f=2.5 to 3.0 GHz		0.35	0.65	dB
Isolation 6	ISL6	f =0.05 to 0.5 GHz ^A	27	30		dB
Isolation 7	ISL7	f=0.5 to 2.0 GHz	23	27		dB
Isolation 8	ISL8	f=2.0 to 2.5 GHz	21	25		dB
Isolation 9	ISL9	f=2.5 to 3.0 GHz	20	24		dB
Input Return Loss 3	RLin3	f=0.05 to 3.0 GHz ^A	15	20		dB
Output Return Loss 3	RLout3	f =0.05 to 3.0 GHz ^A	15	20		dB
0.1 dB Loss Compression Input Power ^B	P _{In(0.1dB)}	f=2.0/2.5 GHz	+14.0	+17.0		dBm
		f=0.5 to 3.0 GHz		+17.0		dBm
1 dB Loss Compression Input Power ^C	P _{In(1dB)}	f=0.5 to 3.0 GHz		+20.0		dBm
Switch Control Current	I _{cont}			4	20	μA
Switch Control Speed	t _{sw}	50%CTL to 90/10%RF		20	200	ns

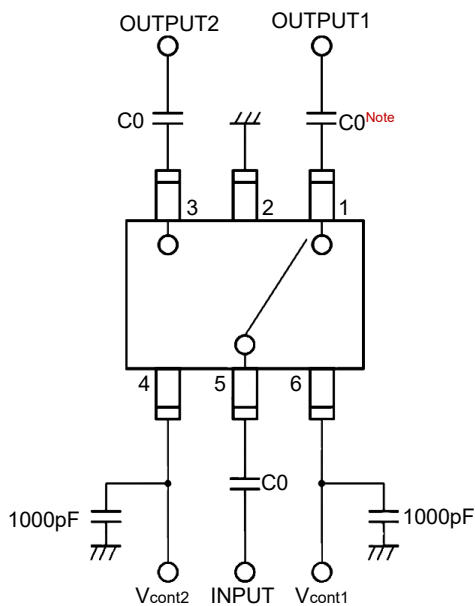
Notes

^A.DC cut capacitors =1000 pF at f =0.05 to 0.5 GHz^B.P_{In(0.1 dB)} is measured the input power level when the insertion loss increases more 0.1 dB than that of linear range.^C.P_{In(1dB)} is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

Caution

It is essential to use DC blocking capacitors when utilizing this device. The value of the DC blocking capacitors must be chosen based on the frequency of operation, bandwidth, switching speed, and the actual board conditions of your system. The recommended range for DC blocking capacitor values is less than 100 pF.

EVALUATION CIRCUIT



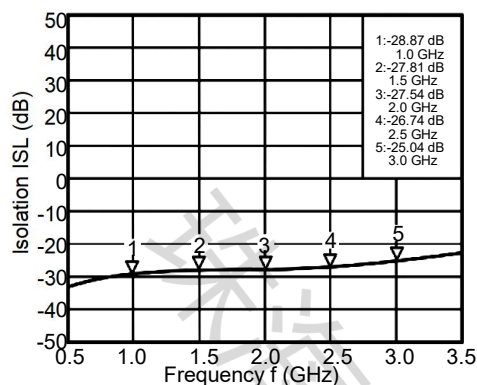
Note

C0:0.05 to 0.5 GHz 1000 pF
:0.5 to 3.0 GHz 100 pF

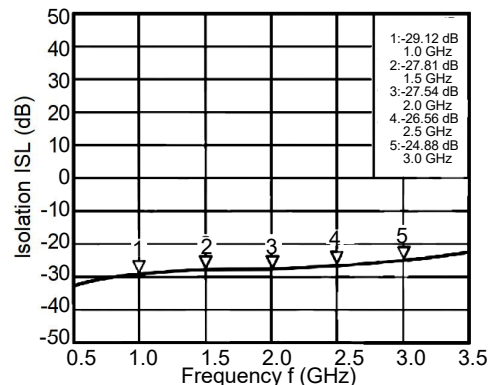
The application circuits and their parameters are for reference purposes only and are not intended for actual design implementation.

TERISTICSTYPICAL CHARACTERISTICS

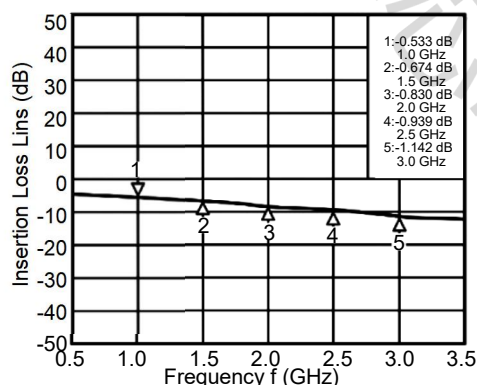
(TA=+25°C,Vcont(H)=3.0 V,Vcont(L)=0 V,DC cut capacitors =100 pF,unless otherwise specified)



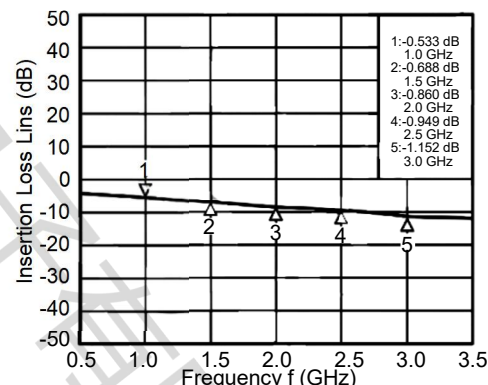
INPUT-OUTPUT1 ISOLATION vs.FREQUENCY



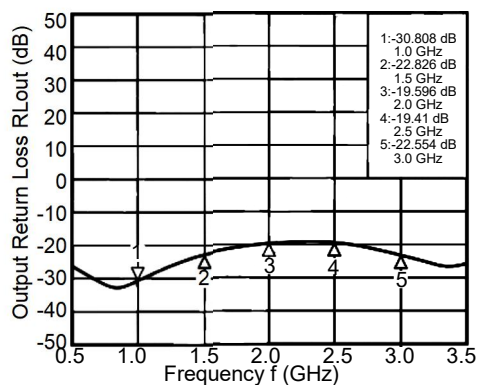
INPUT-OUTPUT2 ISOLATION vs.FREQUENCY



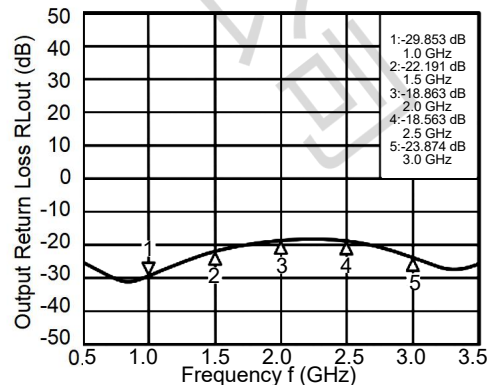
INPUT-OUTPUT1 ISOLATION vs.FREQUENCY



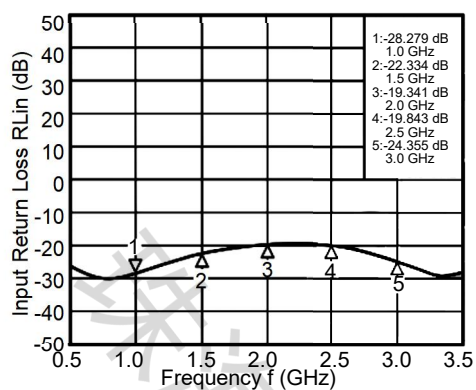
INPUT-OUTPUT2 ISOLATION vs.FREQUENCY



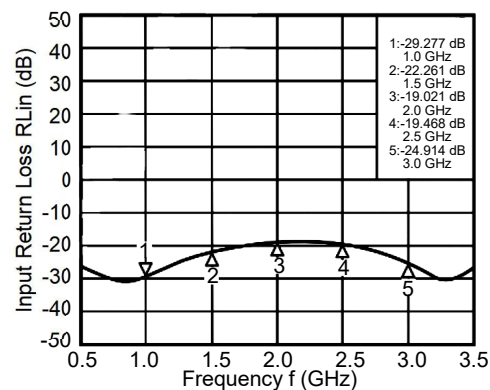
INPUT-OUTPUT1 ISOLATION vs.FREQUENCY



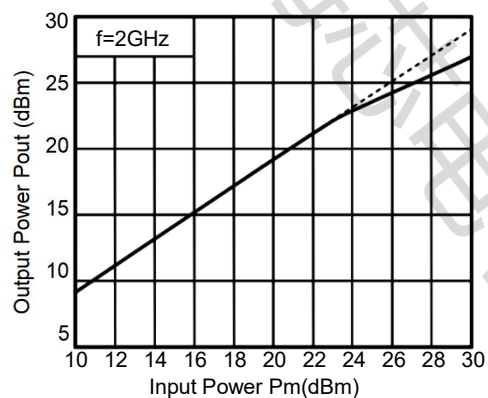
INPUT-OUTPUT2 ISOLATION vs.FREQUENCY



INPUT-OUTPUT1 ISOLATION vs.FREQUENCY

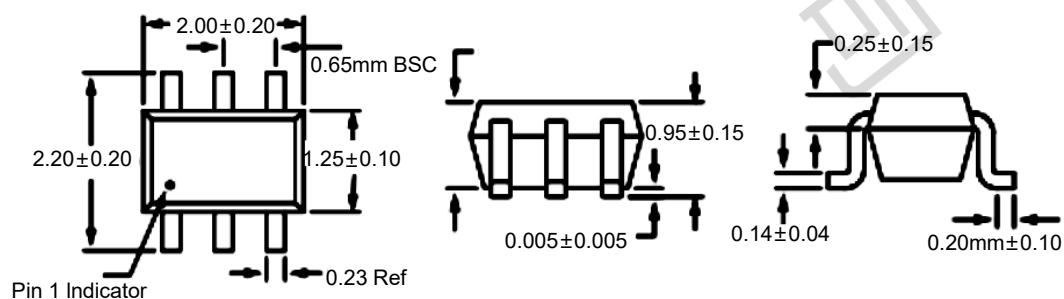


INPUT-OUTPUT2 ISOLATION vs.FREQUENCY



OUTPUT POWER Vs.INPUT POWER

DIMENSIONAL DRAWINGS



Part Number	Package Type	package	quantity
HX179-92-ST	SOT-363	Taping	3000

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