Ordering number : ENA1839

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

SMA5101 — Silicon Monolithic Linear IC RF Double Balanced Mixer IC

Features

- Wide band : up to Ku band
- Low distortion : IIP3=20dBm (@I_{CC} > 11mA)
- SMT, Ultra small package : 2.0×2.1×0.85mm
- High conversion gain : –0.5dB (@450MHz)
- Low voltage available : 1.2V and above
- Halogen free compliance

Specifications

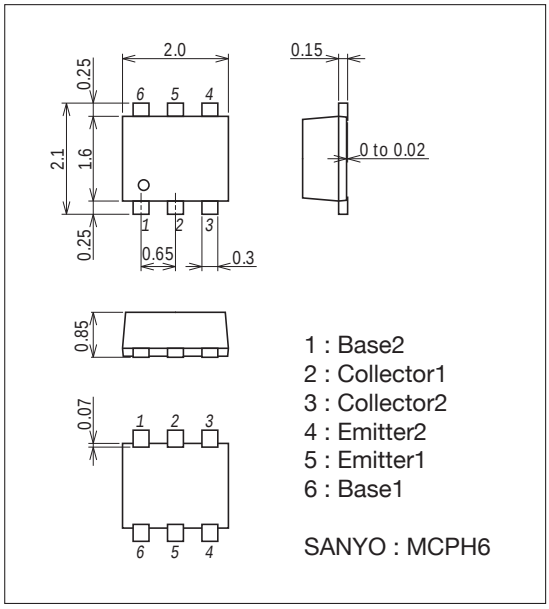
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		8	V
Collector-to-Emitter Voltage	V_{CEO}		6	V
Emitter-to-Base Voltage	V_{EBO}		2	V
Collector Current	I_{CC}		50	mA
Max Power Dissipation	P_C		280	mW
Operating Temperature	Topr		–40 to +85	°C
Storage Temperature	Tstg		–55 to +150	°C

Package Dimensions

unit : mm (typ)

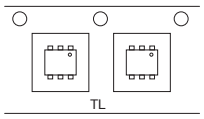
7022A-020



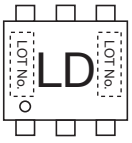
Product & Package Information

- Package : MCPH6
- JEITA, JEDEC : SC-88, SOT363
- Minimum Packing Quantity : 3,000pcs/real

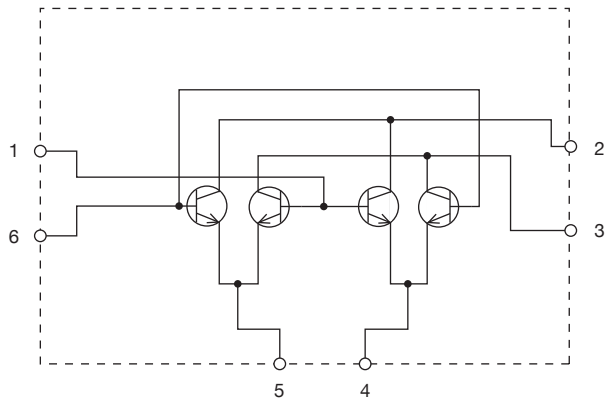
Packing Type: TL



Marking



Equivalent Circuit



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Recommended Operating Conditions at Ta=25°C

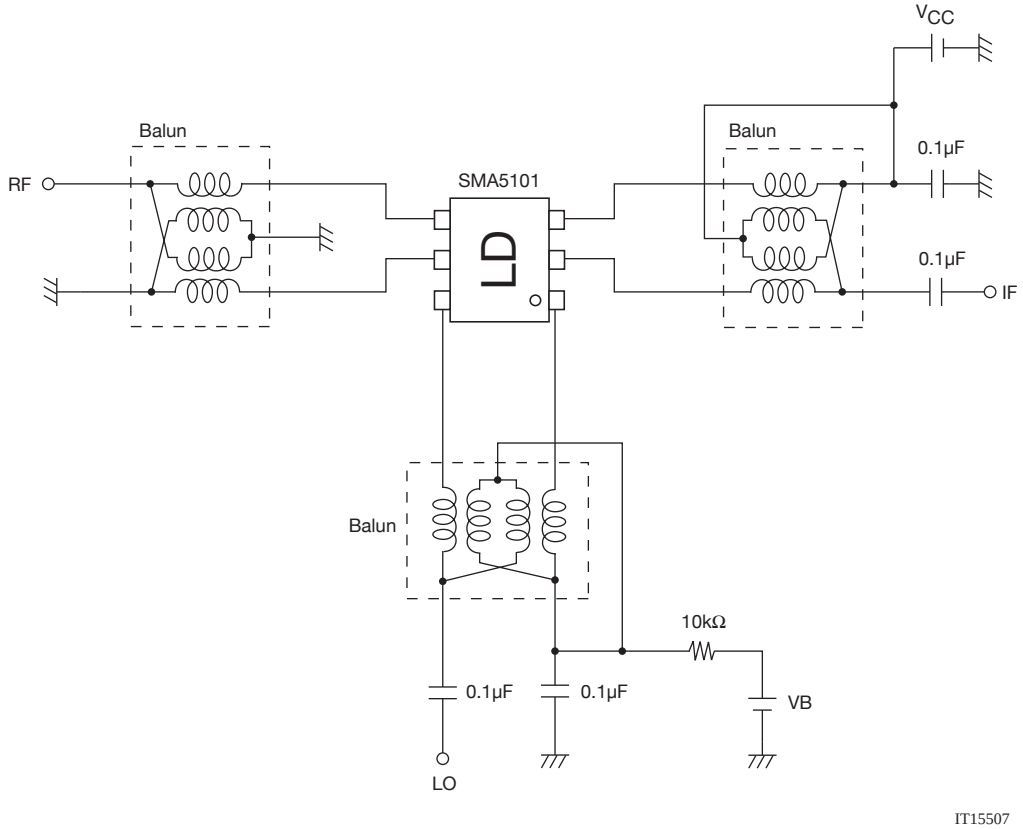
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply Voltage	V_{C1E1}		1.2	3	6	V
	V_{C2E1}		1.2	3	6	V
	V_{C1E2}		1.2	3	6	V
	V_{C2E2}		1.2	3	6	V

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{C1B1O}	V_{C1B1}=5V			1	μA
	I_{C2B1O}	V_{C2B1}=5V			1	μA
	I_{C1B2O}	V_{C1B2}=5V			1	μA
	I_{C2B2O}	V_{C2B2}=5V			1	μA
Emitter Cutoff Current	I_{E1B1O}	V_{E1B1}=1V			1	μA
	I_{E2B1O}	V_{E2B1}=1V			1	μA
	I_{E1B2O}	V_{E1B2}=1V			1	μA
	I_{E2B2O}	V_{E2B2}=1V			1	μA
DC Current Gain	h_{FE1}	V_{C1E1}=1V, I_{C1E1}=3mA	20		120	
	h_{FE2}	V_{C2E1}=1V, I_{C2E1}=3mA	20		120	
	h_{FE3}	V_{C1E2}=1V, I_{C1E2}=3mA	20		120	
	h_{FE4}	V_{C2E2}=1V, I_{C2E2}=3mA	20		120	
Conversion Gain *1	Gc	V_{CC}=5V, I_{CC}=6mA, f(RF)=450MHz, f(LO)=500MHz, P(RF)=−15dBm, P(LO)=−6dBm		−0.5		dB
Input Intercept Point *1	IIP3	V_{CC}=5V, I_{CC}=6mA, f(RF1)=450MHz, f(RF2)=451MHz, f(LO)=500MHz, P(RF1)=P(RF2)=−15dBm, P(LO)=−6dBm		15		dBm

*1 : On evaluation board

Measurement Circuit



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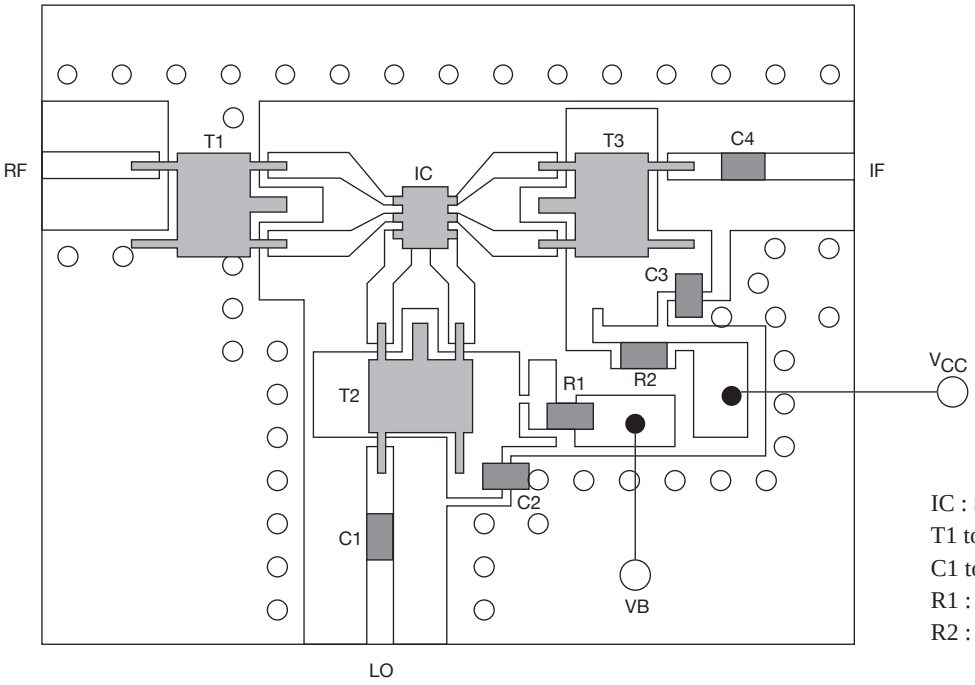
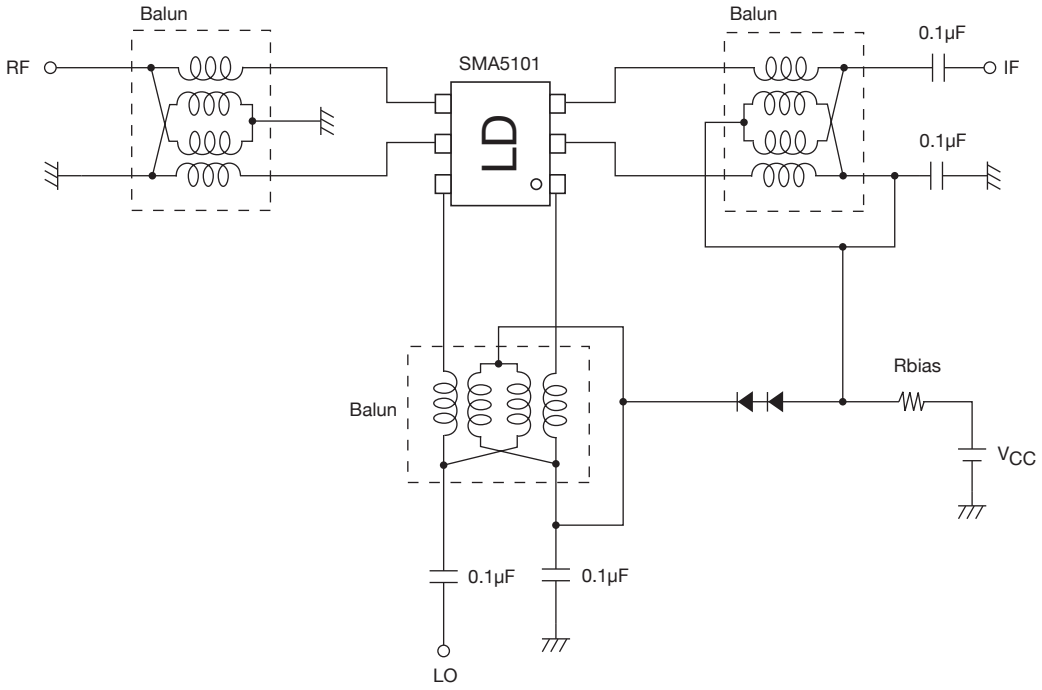
Evaluation Board



IC : SMA5101
T1 to T3 : Balun
C1 to C4 : 0.1μF
R1 : 10kΩ
R2 : 0Ω (short)

IT15508

Circuit Example (Self Bias)



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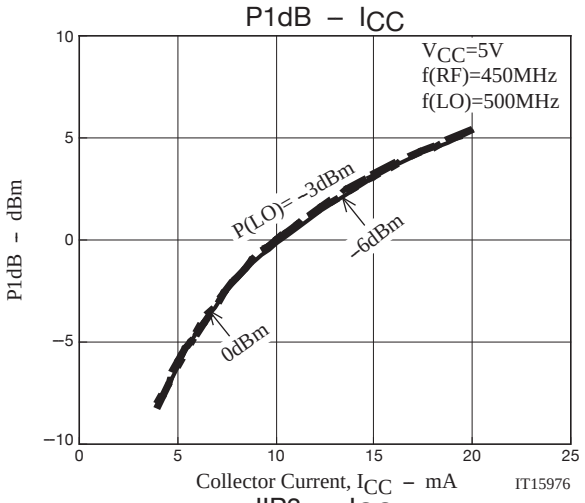
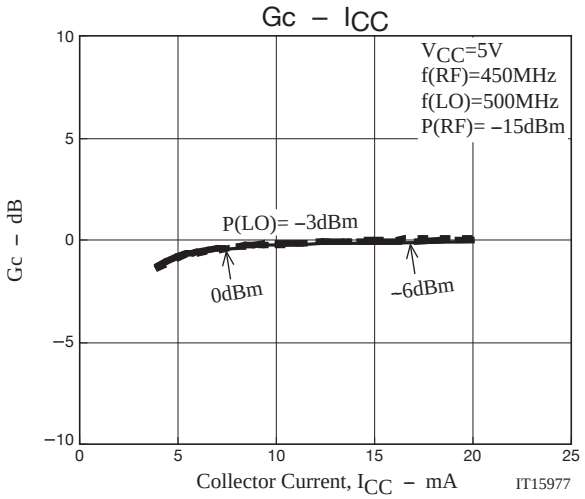
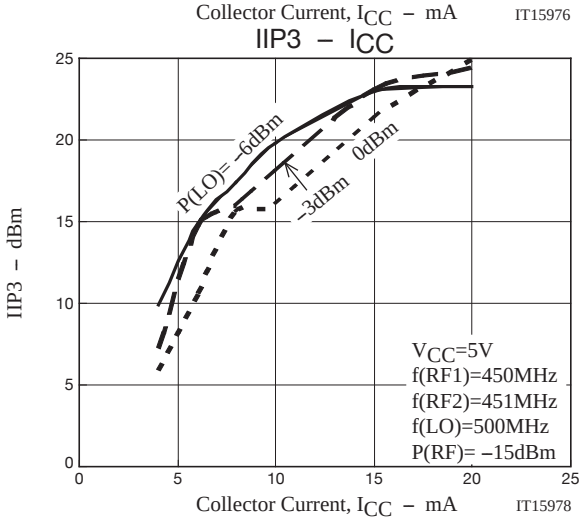

P1dB – ICC
VCC=5V
f(RF)=450MHz
f(LO)=500MHz
P(LO)= –3dBm
–6dBm
0dBm
P1dB – dBm
Collector Current, ICC – mA
IT15976


Gc – ICC
VCC=5V
f(RF)=450MHz
f(LO)=500MHz
P(RF)= –15dBm
P(LO)= –3dBm
0dBm
–6dBm
Gc – dB
Collector Current, ICC – mA
IT15977


IIP3 – ICC
P(LO)= –6dBm
0dBm
–3dBm
VCC=5V
f(RF1)=450MHz
f(RF2)=451MHz
f(LO)=500MHz
P(RF)= –15dBm
IIP3 – dBm
Collector Current, ICC – mA
IT15978

This catalog provides information as of October, 2010. Specifications and information herein are subject to change without notice.