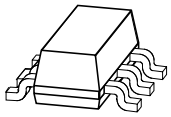
GaAs MMIC

CMY 91

Data Sheet

- GaAs mixer with integrated IF-amplifier for mobile communication
- Frequency range 0.8 GHz to 2.5 GHz
- Very low current consumption (1 mA typ.)
- Single positive supply voltage
- Operating voltage range: 2.7 to 6 V
- Miniature package MW-6 based on SOT-23

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!



MW-6

Type	**Marking**	**Ordering Code** (taped)	**Package**[1)]
CMY 91	M2	Q62702-M9	MW-6

[1)] Dimensions see **Page 14**.

Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	$V_{\text{IF-GND}}$	8	V
Gate-source voltage range	$V_{\text{LO-GND}}$	– 5 … 0	V
Drain current	I_{IF}	20	mA
RF- / LO-peak current	$+ I_{\text{RF}} + I_{\text{LO}}$	2	mA
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	– 55 … + 150	°C
Total power dissipation (T_S = t.b.d. °C)[1)]	P_{tot}	160	mW

[1)] T_S: Temperature measured at soldering point GND.

Thermal Resistance

Parameter	**Symbol**	**Value**	**Unit**
Channel-soldering point GND	R_{thChS}	350	K/W

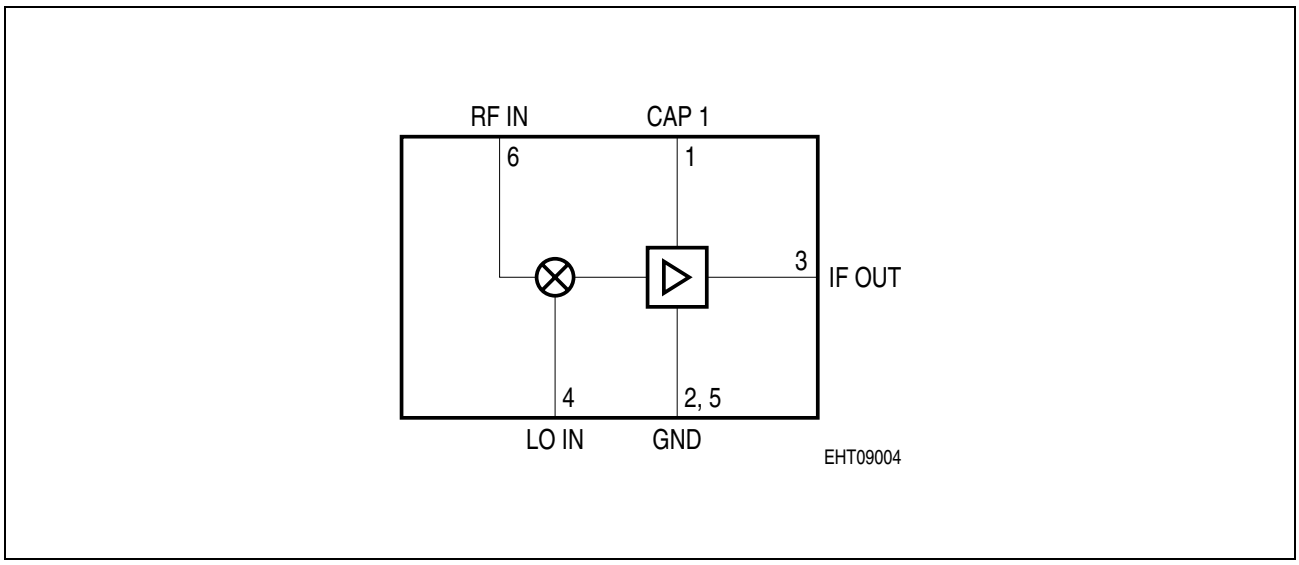


Figure 1 Block Diagram

Electrical Characteristics

T_A = 25 °C, V_D = 3 V, unless otherwise specified.
Characteristics of 900 MHz test and application circuit see **Page 8** and **Page 11**.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain-source breakdown voltage	$V_{(BR)\ IF\text{-}GND}$	8	–	–	V	I_{IF} = 500 µA $V_{LO\text{-}GND}$ = 0 V $V_{RF\text{-}GND}$ = 4 V CAP-pin not connected
Drain current	I_D	0.8	1	1.4	mA	$V_{RF\text{-}GND}$ = 0 V $V_{LO\text{-}GND}$ = 0 V $V_{IF\text{-}GND}$ = 3 V CAP-pin not connected
Conversion gain	G_C	–	5.5	–	dB	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	9	–	dB	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm

Electrical Characteristics (cont'd)
T_A = 25 °C, V_D = 3 V, unless otherwise specified.
Characteristics of 900 MHz test and application circuit see **Page 8** and **Page 11**.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
3rd order intermodulation	$IP3$	–	– 2	–	dBm	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	11	–	dB	f = 965 MHz

Electrical Characteristics
T_A = 25 °C, V_D = 3 V; CAP-pin connected to ground by 680 Ω resistor.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain current	I_D	–	2.5	–	mA	V_{RF-GND} = 0 V V_{LO-GND} = 0 V V_{IF-GND} = 3 V
Conversion gain	G_C	–	9.5	–	dB	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	8.0	–	dB	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm
3rd order intermodulation	$IP3$	–	0	–	dBm	f_{RF} = 920 MHz f_{LO} = 965 MHz f_{IF} = 45 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	11	–	dB	f = 965 MHz

Not used ports were terminated by 50 Ω.

Please make sure that LO-signal is clean of noise and spurious at $f = f_{LO} \pm f_{IF}$.

Electrical Characteristics

T_A = 25 °C, V_D = 3 V unless otherwise specified.
Characteristics of 1450 MHz application circuit see **Page 9** and **Page 11**.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain-source breakdown voltage	$V_{(BR)\ IF\text{-}GND}$	8	–	–	V	I_{IF} = 500 µA $V_{LO\text{-}GND}$ = 0 V $V_{RF\text{-}GND}$ = 4 V CAP-pin not connected
Drain current	I_D	0.8	1	1.4	mA	$V_{RF\text{-}GND}$ = 0 V $V_{LO\text{-}GND}$ = 0 V $V_{IF\text{-}GND}$ = 3 V CAP-pin not connected
Conversion gain	G_C	–	5.5	–	dB	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	10	–	dB	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
3rd order intermodulation	$IP3$	–	– 2	–	dBm	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	8	–	dB	f = 1350 MHz

Electrical Characteristics

T_A = 25 °C, V_D = 3 V; CAP-pin connected to ground by 680 Ω resistor.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain current	I_D	–	2.5	–	mA	$V_{RF\text{-}GND}$ = 0 V $V_{LO\text{-}GND}$ = 0 V $V_{IF\text{-}GND}$ = 3 V
Conversion gain	G_C	–	7.5	–	dB	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	9.5	–	dB	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
3rd order intermodulation	$IP3$	–	0	–	dBm	f_{RF} = 1450 MHz f_{LO} = 1350 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	8	–	dB	f = 1350 MHz

Not used ports were terminated by 50 Ω.

Electrical Characteristics

T_A = 25 °C, V_D = 3 V unless otherwise specified.
Characteristics of 1900 MHz application see **Page 10** and **Page 12**.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain-source breakdown voltage	$V_{(BR)\ IF\text{-}GND}$	8	–	–	V	I_{IF} = 500 µA $V_{LO\text{-}GND}$ = 0 V $V_{RF\text{-}GND}$ = 4 V CAP-pin not connected
Drain current	I_D	0.8	1	1.4	mA	$V_{RF\text{-}GND}$ = 0 V $V_{LO\text{-}GND}$ = 0 V $V_{IF\text{-}GND}$ = 3 V CAP-pin not connected
Conversion gain	G_C	–	5	–	dB	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	10.5	–	dB	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
3rd order intermodulation	$IP3$	–	– 2	–	dBm	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	8	–	dB	f = 1800 MHz

Electrical Characteristics

T_A = 25 °C, V_D = 3 V; CAP-pin connected to ground by 680 Ω resistor.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Drain current	I_D	–	2.5	–	mA	$V_{RF\text{-}GND}$ = 0 V $V_{LO\text{-}GND}$ = 0 V $V_{IF\text{-}GND}$ = 3 V
Conversion gain	G_C	–	7.5	–	dB	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
Single sideband noise figure	F_{SSB}	–	9.5	–	dB	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
3rd order intermodulation	$IP3$	–	0	–	dBm	f_{RF} = 1900 MHz f_{LO} = 1800 MHz f_{IF} = 100 MHz P_{LO} = – 3 dBm
LO/RF isolation	$Iso_{LO/RF}$	–	8	–	dB	f = 1800 MHz

Not used ports were terminated by 50 Ω.

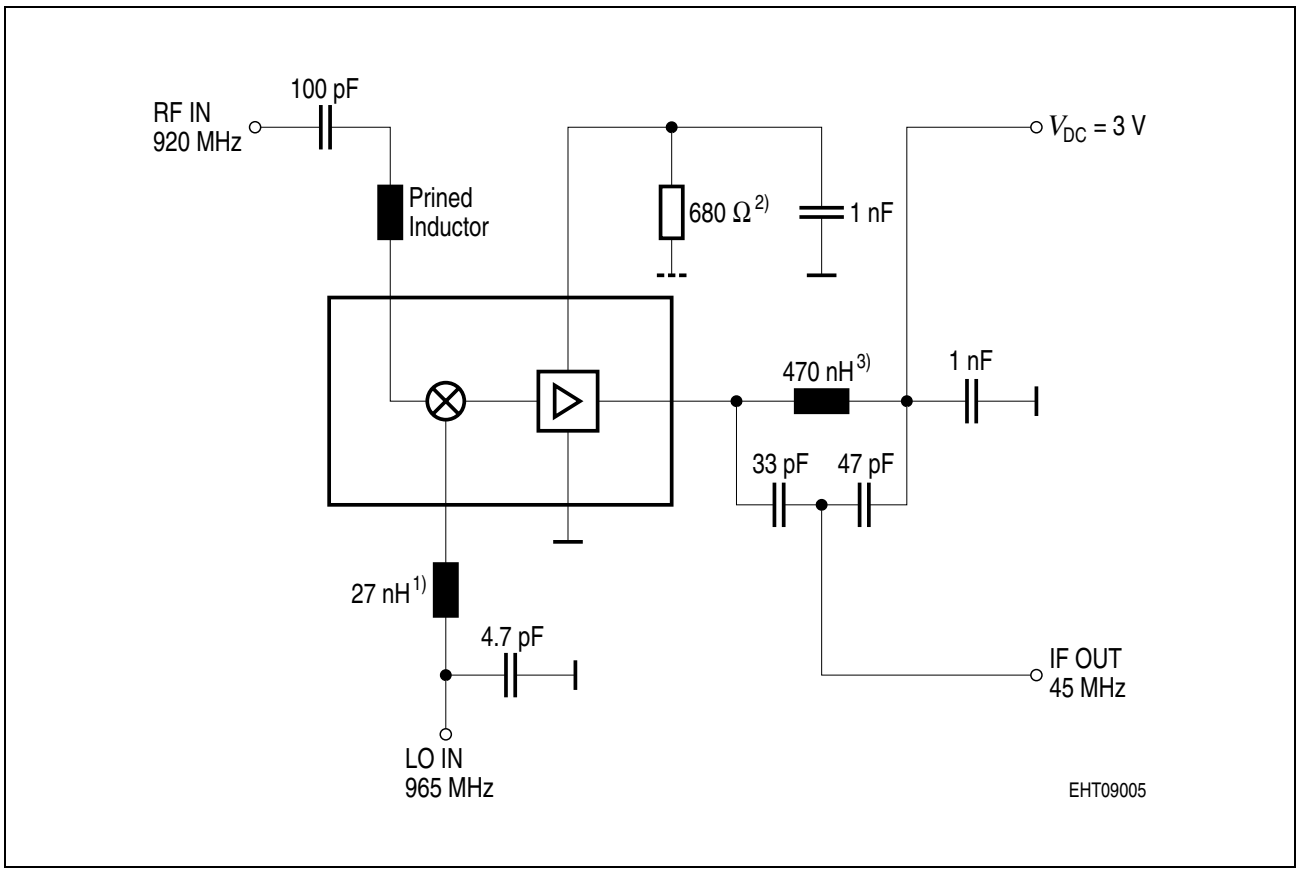


Figure 2 900 MHz Measurement and Application Circuit

1) Epcos SIMID 01-coil; Ordering code: B82412-A3270-M
2) Optional resistor increases IF-amplifier operating current and improves conversion gain and intermodulation performance (minimum value: 27 Ω)
3) Epcos SIMID 01-coil; Ordering code: B82412-A3471-K

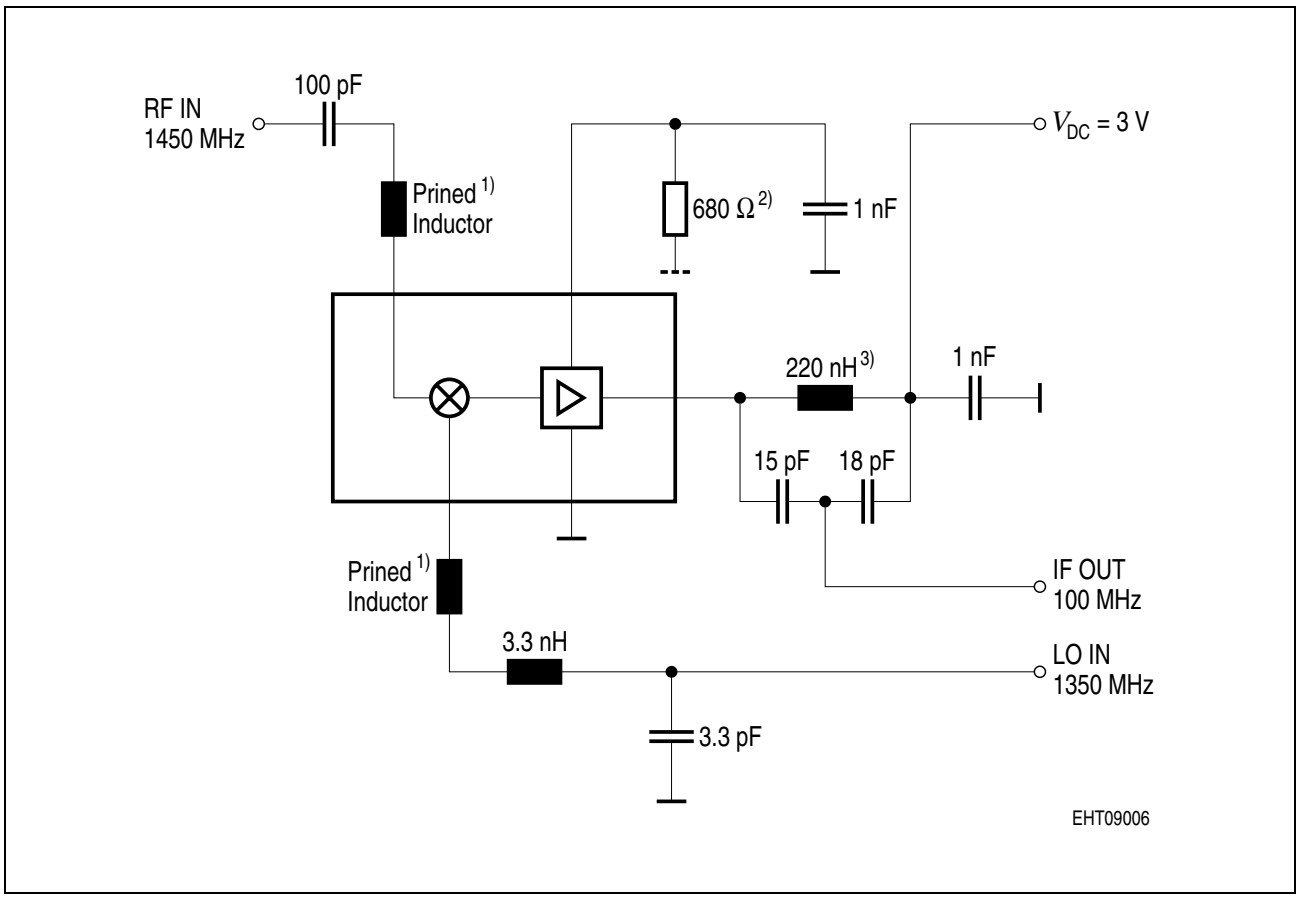


Figure 3 1450 MHz Measurement and Application Circuit

1) Tune for optimum match
2) Optional resistor increases IF-amplifier operating current and improves conversion gain and intermodulation performance
(minimum value: 27 Ω)
3) Epcos SIMID 01-coil; Ordering code: B82412-A3221-K

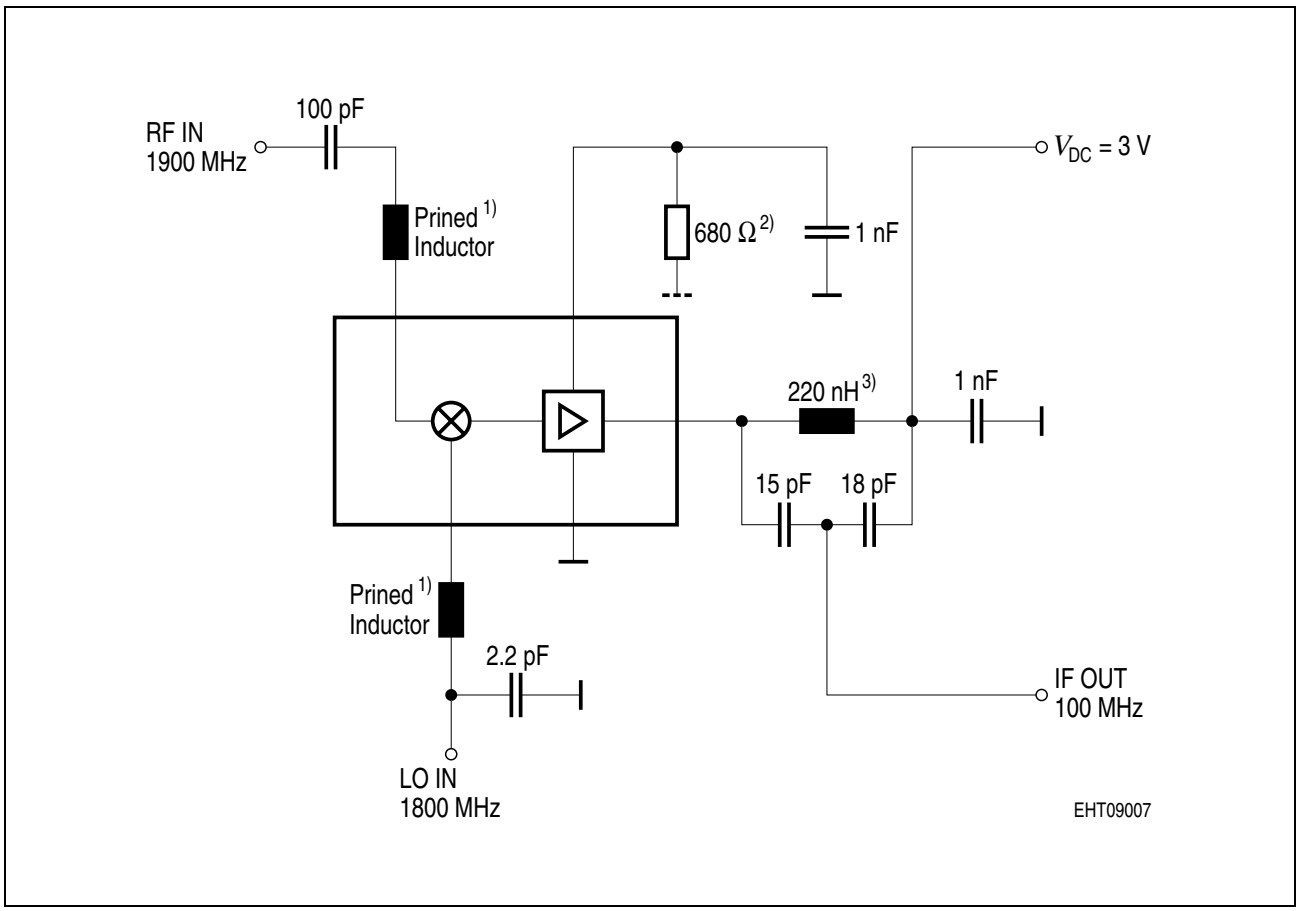
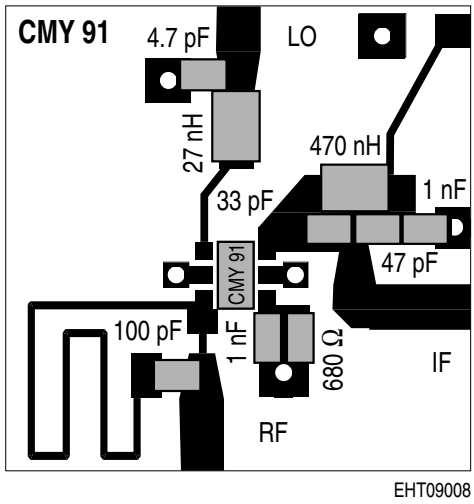
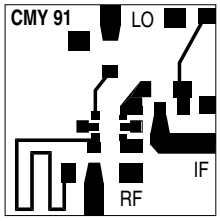


Figure 4 1900 MHz Measurement and Application Circuit

1) Tune for optimum match
2) Optional resistor increases IF-amplifier operating current and improves conversion gain and intermodulation performance (minimum value: 27 Ω)
3) Epcos SIMID 01-coil; Ordering code: B82412-A3221-M

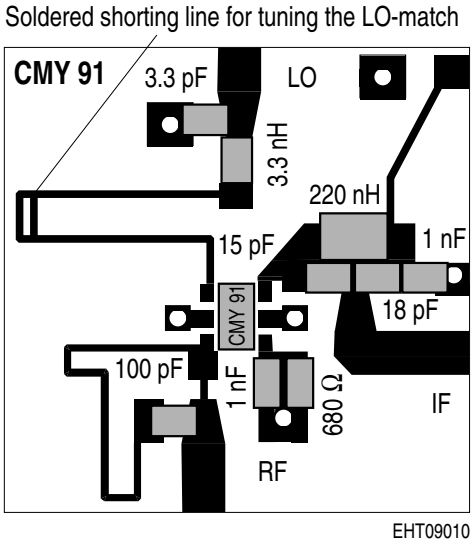
PCB - Layouts for Application Circuits

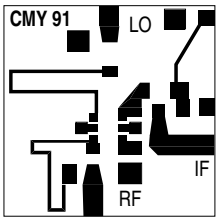




Actual size

Figure 5 900 MHz - Application Board

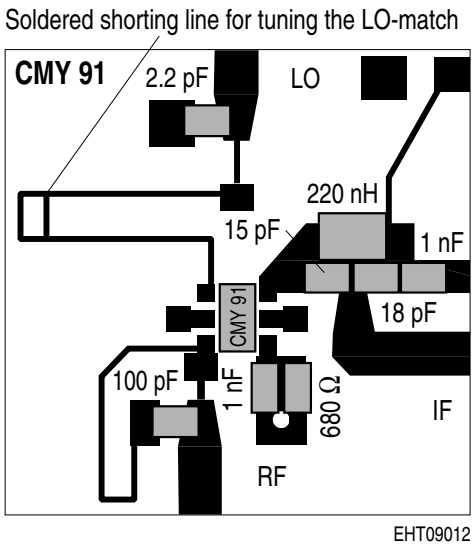


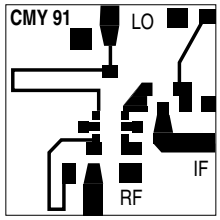


Actual size

Figure 6 1450 MHz - Application Board[1)]

[1)] PCB - data: Glass fiber epoxy board (double sided), ε_r = 4.8, thickness = 1 mm





Actual size

Figure 7 1900 MHz - Application Board[1)]

[1)] PCB - data: Glass fiber epoxy board (double sided), ε_r = 4.8, thickness = 1 mm

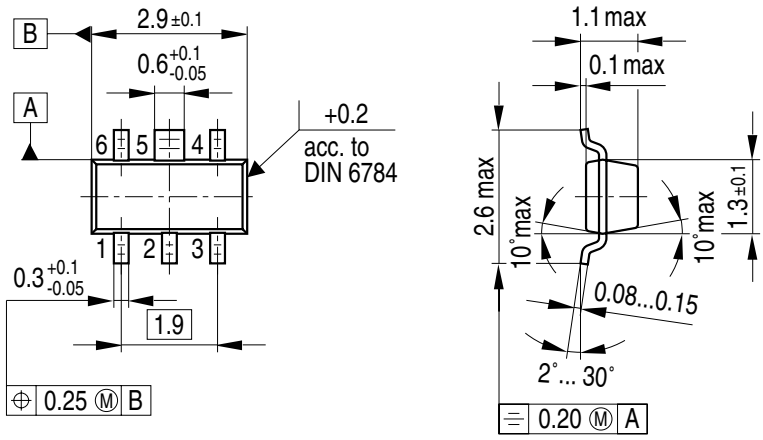
Package Parameters

Dim.	min.	nom.	max.	Gradient	Remark
A	–	–	1.1	–	–
A_1	–	–	0.1	–	–
A_2	–	–	1.0	–	–
b	–	0.3	–	–	–
b_1	–	0.6	–	–	–
c	0.08	–	0.15	–	–
D	2.8	–	3.0	–	–
E	1.2	–	1.4	–	–
$\|e\|$	–	0.95	–	–	–
$\|e_1\|$	–	1.9	–	–	–
H_E	–	–	2.6	–	–
L_E	–	–	0.6	–	–
a	–	–	–	max. 10°	[1]
q	–	–	–	2° … 30°	–

[1] Applicable on all sides.

Package Outlines

MW-6
(Special Package)



Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm