

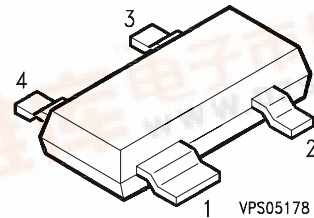
SIEMENS

GaAs MMIC

CF 750

Datasheet

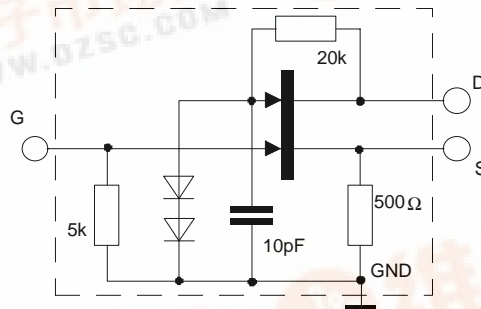
- * Biased Dual Gate GaAs FET
- * For frequencies from 400 MHz to 3 GHz
- * Mixer and amplifier applications in handheld equipment
- * Low power consumption, 2mA operating current typ.
- * Operating voltage range: 3 to 6V
- * Ion-implanted planar structure



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

Type	Marking	Ordering code (taped)	Pin Configuration				Package 1)
			1	2	3	4	
CF 750	MX	Q62702-F1391	GND	D	G	S	SOT 143

Circuit diagram:



Maximum ratings	Symbol		Unit
Drain-source voltage	V_{DS}	8	V
Gate-source voltage	$-V_{GS}$	5	V
Drain current	I_D	80	mA
Gate-source peak current	$+I_{GSM}$	2	mA
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	-55 ... +150	°C
Total power dissipat. ($T_S < 48^\circ C$) ²⁾	P_{tot}	300	mW
Thermal resistance			
Channel-soldering point (GND)	$R_{thChGND}$	340	K/W

1) For detailed dimensions see chapter Package Outlines

2) T_S : Temperature measured at soldering point



Electrical characteristics

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

DC characteristics	Symbol	min	typ	max	Unit
Drain-Source Breakdown Voltage $I_D = 500 \mu\text{A}$, $-V_{GS} = 4\text{V}$	$V_{DS(BR)}$	8	-	-	V
Drain Current $V_{GGND} = 0\text{V}$, $V_{DS} = 3.8\text{V}$ S-pin not connected	$I_{DSS,P}$	1.6	2	2.8	mA
Drain Current $V_{GS} = 0\text{V}$, $V_{DS} = 3.8\text{V}$ S-pin connected to GND	I_{DSS}	-	50	-	mA
Transconductance $I_D = 10\text{mA}$, $V_{DS} = 3.8\text{V}$ S-pin connected to GND	g_m	-	25	-	mS

Electrical characteristics of CF 750 in Amplifier Application

$T_A = 25^\circ\text{C}$, $V_{DGND} = 3.8\text{V}$, $R_S = R_L = 50 \Omega$, unless otherwise specified

Amplifier Application	Symbol	min	typ	max	Unit
Power Gain $I_D = 2\text{mA}$, $f = 900\text{MHz}$	G_{PS}	-	11	-	dB
Noise Figure $I_D = 2\text{mA}$, $f = 900\text{MHz}$	F	-	1.6	-	dB
3rd Order Intermodulation $I_D = 2\text{mA}$, $f = 900\text{MHz}$	$IPIP3$	-	-1	-	dBm
3rd Order Intermodulation $I_D = 2\text{mA}$, $f = 900\text{MHz}$	$OPIP3$	-	10	-	dBm
Power Gain $I_D = 2\text{mA}$, $f = 1.8\text{GHz}$	G_{PS}	-	10	-	dB
Noise Figure $I_D = 2\text{mA}$, $f = 1.8\text{GHz}$	F	-	1.9	-	dB
3rd Order Intermodulation $I_D = 2\text{mA}$, $f = 1.8\text{GHz}$	$IPIP3$	-	-1	-	dBm
3rd Order Intermodulation $I_D = 2\text{mA}$, $f = 1.8\text{GHz}$	$OPIP3$	-	9	-	dBm

Electrical characteristics of CF 750 in Mixer Application

$T_A = 25\text{ °C}$, $V_{DGND} = 3.8\text{V}$, $R_S = R_L = 50\ \Omega$, unless otherwise specified

Mixer Application	Symbol	min	typ	max	Unit
Single Sideband Noise Figure $f_{RF} = 945\text{ MHz}$, $f_{LO} = 900\text{ MHz}$ $f_{IF} = 45\text{ MHz}$, $P_{LO} = 3\text{ dBm}$	F_{SSB}	-	4.5	-	dB
Conversion Gain $f_{RF} = 945\text{ MHz}$, $f_{LO} = 900\text{ MHz}$ $f_{IF} = 45\text{ MHz}$, $P_{LO} = 3\text{ dBm}$	G_a	-	15	-	dB
3rd Order Intermodulation $f_{RF} = 945\text{ MHz}$, $f_{LO} = 900\text{ MHz}$ $f_{IF} = 45\text{ MHz}$, $P_{LO} = 3\text{ dBm}$	$IPIP3$	-	-5	-	dBm
3rd Order Intermodulation $f_{RF} = 945\text{ MHz}$, $f_{LO} = 900\text{ MHz}$ $f_{IF} = 45\text{ MHz}$, $P_{LO} = 3\text{ dBm}$	$OPIP3$	-	10	-	dBm

Typical Common Source S-Parameters

Bias conditions: $V_{DGND} = 3.8 \text{ V}$, $I_D = 2 \text{ mA}$

Source-Pad RF-grounded by capacitor with low inductance ($< 0.5 \text{ nH}$) !

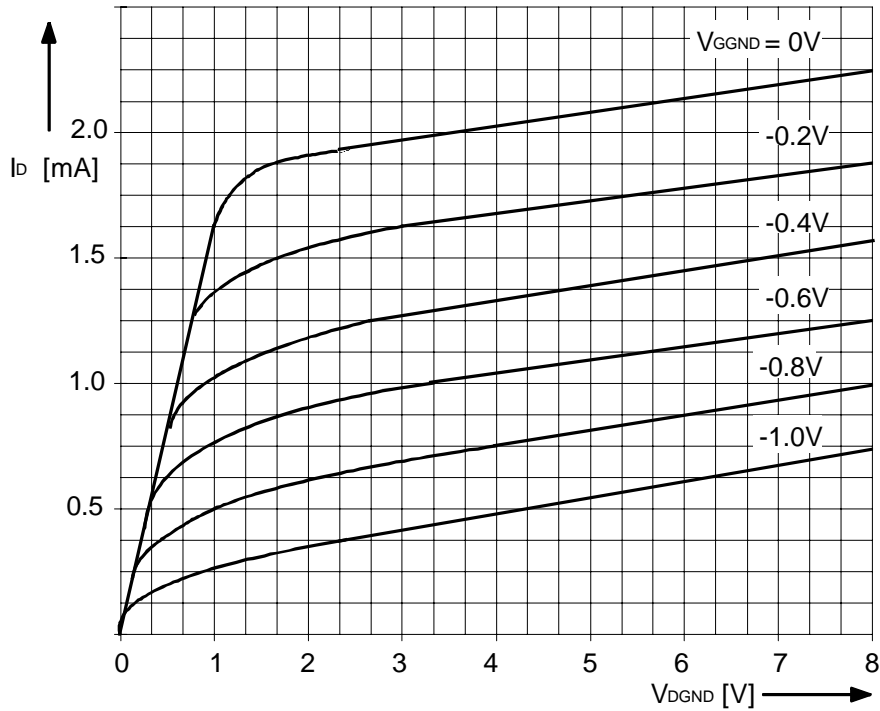
f	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.01	0.97	-1	1.78	179	0.002	89	0.98	-1
0.1	0.97	-3	1.78	175	0.008	84	0.98	-2
0.25	0.96	-8	1.76	169	0.015	78	0.97	-6
0.5	0.94	-16	1.73	155	0.027	75	0.95	-11
0.75	0.91	-26	1.70	141	0.039	71	0.93	-16
1.00	0.87	-34	1.68	127	0.046	64	0.91	-22
1.25	0.83	-42	1.65	118	0.052	62	0.89	-26
1.5	0.87	-49	1.62	108	0.061	57	0.88	-30
1.75	0.72	-57	1.59	95	0.066	55	0.87	-34
2.00	0.66	-65	1.54	82	0.069	52	0.86	-38
2.25	0.61	-73	1.51	71	0.071	54	0.85	-43
2.5	0.56	-81	1.47	60	0.073	60	0.84	-48
2.75	0.52	-87	1.45	52	0.074	63	0.83	-52
3.00	0.49	-93	1.42	45	0.075	66	0.82	-56

Typical Common Source Noise Parameters

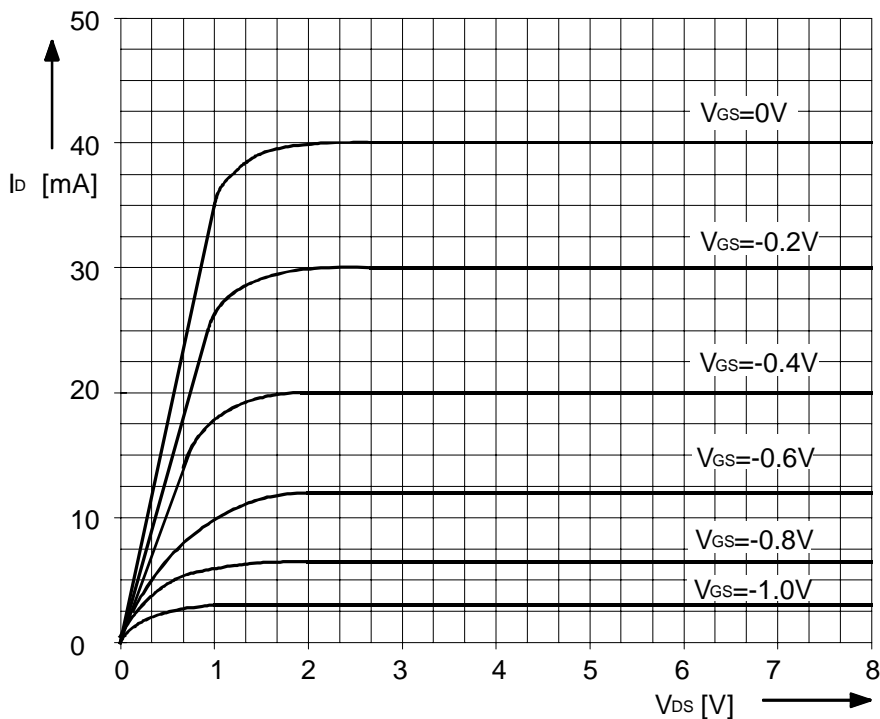
Bias conditions: $V_D = 3 \text{ V}$, $I_D = 2 \text{ mA}$, $Z = 50 \Omega$

f	$\Gamma_{opt} (F)$		Rn	Rn/50Ω	F min
	MAG	ANG			
200	0.80	5	75	1.50	1.2
450	0.79	12	60	1.20	1.2
800	0.68	23	51	1.02	1.5
900	0.63	26	49	0.98	1.6
1200	0.58	34	45	0.90	1.7
1500	0.54	42	40	0.80	1.8
1800	0.52	51	36	0.72	1.9
1900	0.50	53	35	0.70	1.9

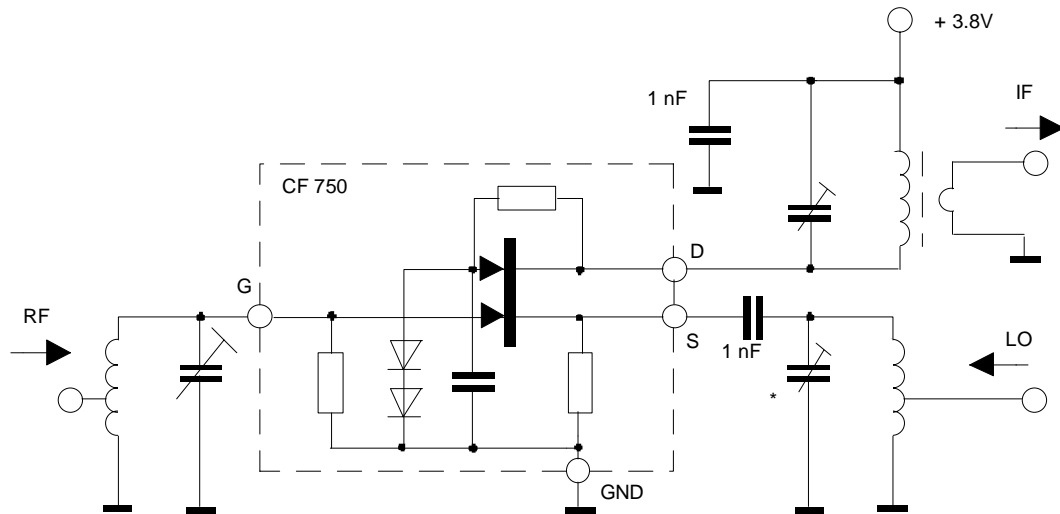
Output characteristics $I_D = f(V_{DGND})$ at nominal operating point; S not connected.



Output characteristics $I_D = f(V_{DS})$, S connected to GND.



Mixer measurement and application circuit (No. 1)



* must be high capacitance to ensure good IF grounding at source

Amplifier measurement and application circuit (No. 2)

