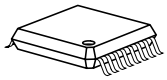
GaAs MMIC

CGY 353

Data Sheet

- 3-stage power amplifier for 3.5 GHz applications
- Linear Output power 31.0 dBm
- Gain of 21.0 dB typ.
- Operating voltage 7.0 V typ.
- Unconditionally stable



MW-16

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

Type	**Marking**	**Ordering Code** (taped)	**Package**
CGY 353	CGY 353	Q62702-G82	MW-16

Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Positive supply voltage	V_D	8.0	V
Supply current	I_D	2.0	A
Maximum input power	P_{IN_max}	17.0	dBm
Channel temperature	T_{Ch}	150	°C
Storage temperature	T_{stg}	– 55 … + 150	°C
Total power dissipation ($T_S \leq 81$ °C) T_S: Temperature at soldering point	P_{tot}	7.0	W
Pulse peak power dissipation duty cycle 30%, t_{ON} = 0.5 ms	P_{Pulse}	11.0	W

Thermal Resistance

Parameter	**Symbol**	**Value**	**Unit**
Channel-soldering point	R_{thChS}	t.b.d.	K/W

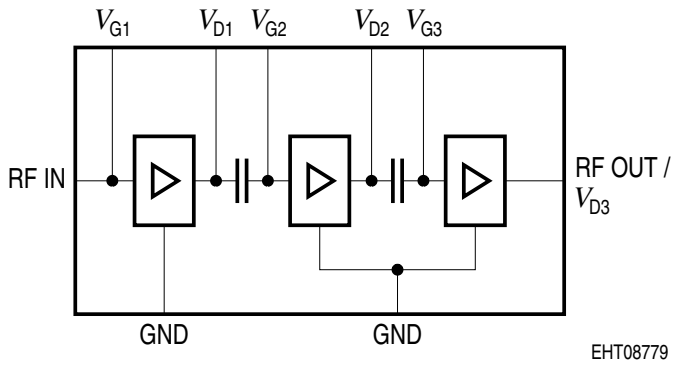


Figure 1 Functional Block Diagram

Pin Configuration

Pin No.	Name	Configuration	Bias Voltage
1	RF IN	RF input[1)]	–
2	GND	GND	0 V
3	GND	GND	0 V
4	GND	GND	0 V
5	GND	GND	0 V
6	GND	GND	0 V
7	V_{D1}	1st RF Amp Drain Bias	pos. voltage[2)]
8	V_{G2}	2nd RF Amp Gate Bias	neg. voltage[3)]
9	V_{G1}	1st RF Amp Gate Bias	neg. voltage[3)]
10	GND	GND	0 V
11	GND	GND	0 V
12	RF OUT/V_{D3}	RF output/3rd RF Amp Drain Bias	pos. voltage[2)]
13	RF OUT/V_{D3}	RF output/3rd RF Amp Drain Bias	pos. voltage[2)]
14	RF OUT/V_{D3}	RF output/3rd RF Amp Drain Bias	pos. voltage[2)]
15	V_{G3}	3rd RF Amp Gate Bias	neg. voltage[3)]

Pin Configuration (cont'd)

Pin No.	Name	Configuration	Bias Voltage
16	V_{D2}	2nd RF Amp Drain Bias	pos. voltage[2)]
MW-16 Heatsink Slug	GND	OWP Ground	0 V

1) The gate voltage of the 1st RF Amp is not blocked internally (see also **Figure 1**). Therefore V_{G1} must be blocked externally at RF IN.

2) The positive DC voltages of V_{D1}, V_{D2} and V_{D3} are typically equal. The voltage range is typically between + 5.0 V and + 7.0 V.

3) The negative DC voltages of V_{G1}, V_{G2} and V_{G3} are typically equal. The voltage range depends on the wanted drain current. A gate voltage of – 2.1 V will set I_D typically to 1.2 A at V_D = 7.0 V. In that case I_{D1} will have about 70 mA, I_{D2} about 270 mA and I_{D3} about 900 mA.

Electrical Characteristics

Conditions: V_D = 7.0 V, T_A = 25 °C, f = 3425 - 3450 MHz, $Z_S = Z_L$ = 50 Ω, pulsed operation mode, duty cycle = 30%, unless otherwise specified.

Parameters	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Supply current	I_{DD}	–	1.2	–	A	–
Power down current	I_{Pdown}	–	10	–	mA	–
Supply current neg. voltage	I_G	–	1	–	mA	–
Gain at nominal linear output power	G	–	21	–	dB	–
Linear Output Power	P_{OUT}	–	31	–	dBm	P_{IN} = 12 dBm
Saturation Output Power	P_{SAT}	–	33	–	dBm	P_{IN} = 14 dBm
Overall Power added Efficiency	PAE	–	15	–	%	P_{IN} = 10 dBm
Adjacent channel power[1)]	ACP	–	–	– 30	dBc	± 156 kHz beside carrier
Input return loss[2)]	S11	10	–	–	dB	P_{IN} = 10 dBm
Output return loss	S22	8	–	–	dB	P_{IN} = 10 dBm
Noise Figure	NF	–	5	–	dB	–

1) Modulation: π/4 DQPSK with an alpha = 0.4 root raised cosine filtered
Symbol rate: 256 ksymbols/s.
Transmission burst: Each burst has a 500 s nominal duration with 20 dB of raised cosine shaping of 8 s duration at the beginning and the end of the burst. A maximum of three bursts occur in each 5 ms period, but consecutive bursts are separated by a minimum interval of 1 ms.
Duty cycle: 30%, 3 bursts per 5 ms frame with a minimum interval of 1 ms between bursts.
The modulation signal has a peak to mean envelope ratio of 3.1 dB.

2) Values of S11 and S22 with match as realized on application board.

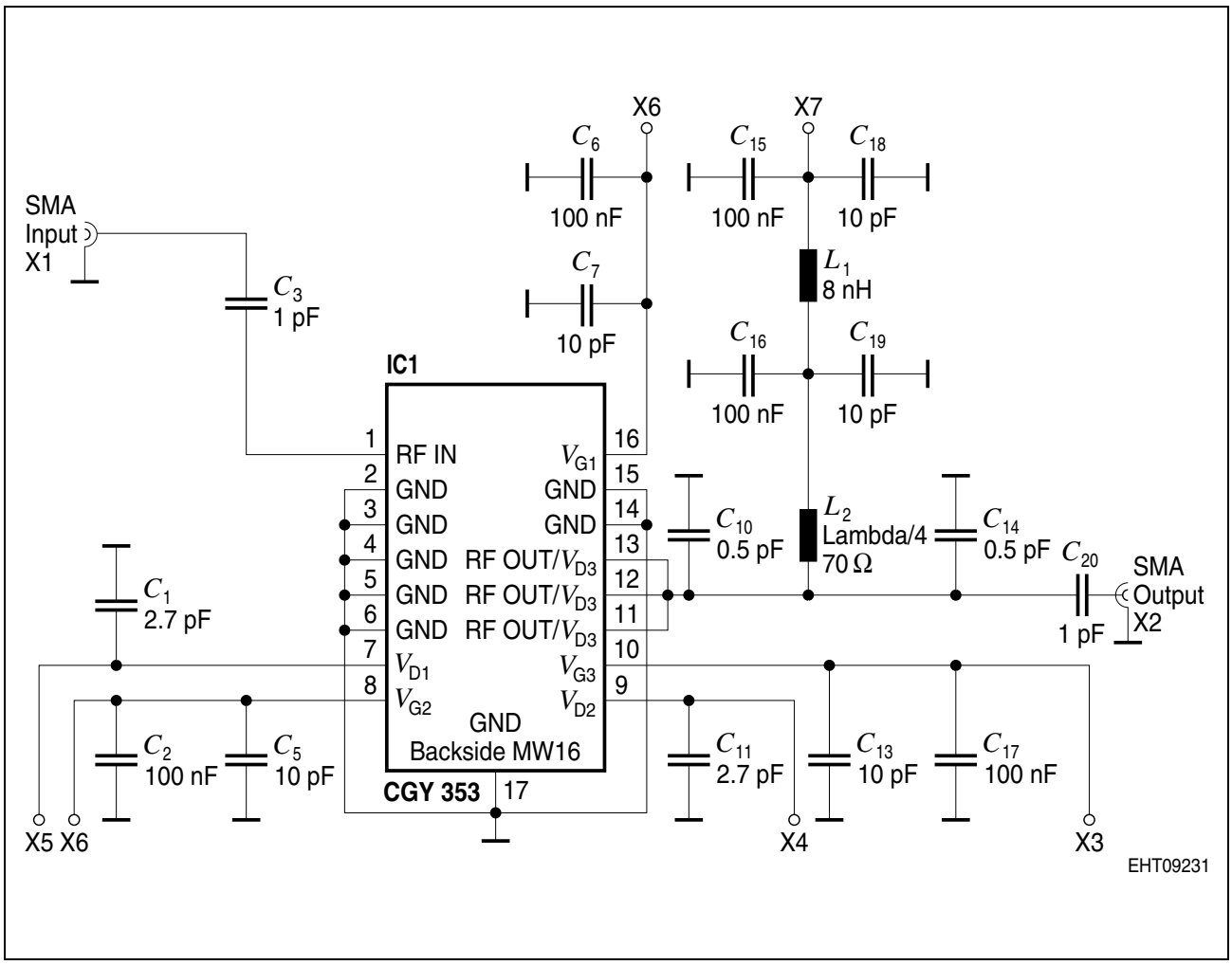


Figure 2 Application Circuit

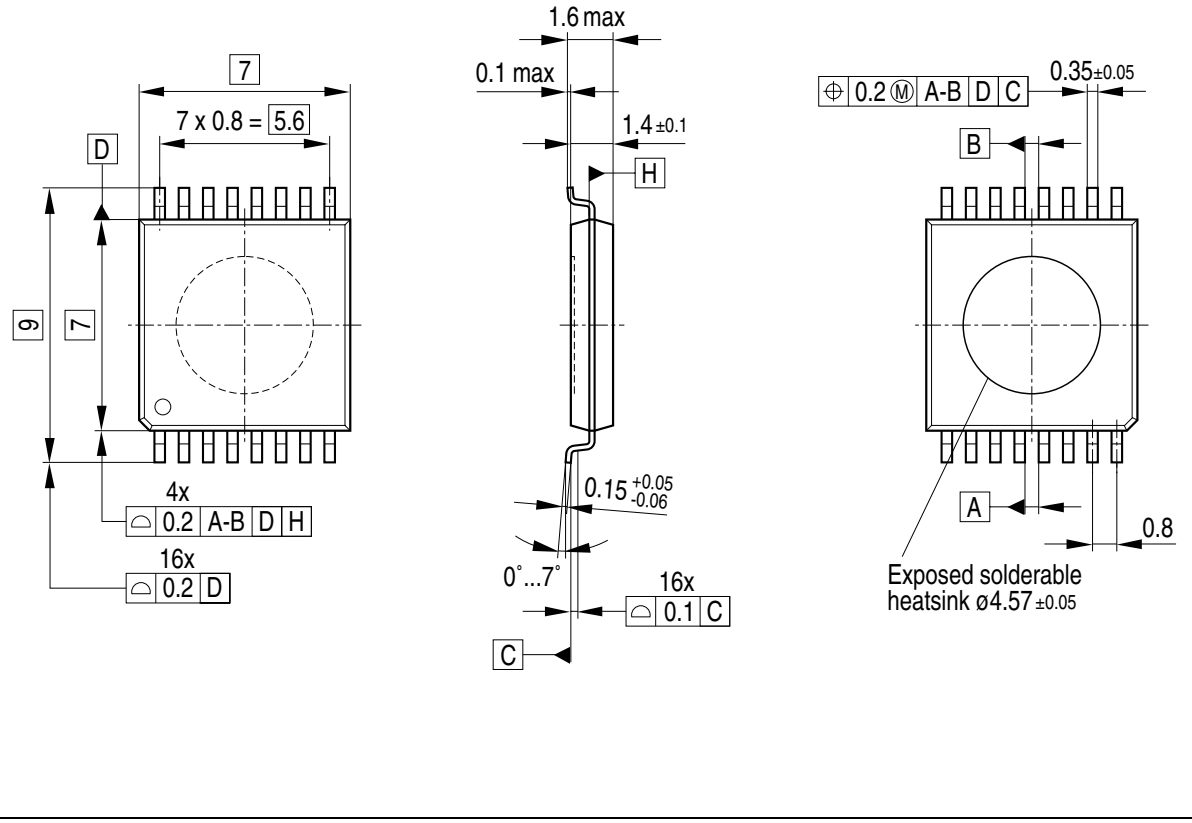
Notes:

Input and output line:	50 Ω
C_{10} and C_{14}:	0402 capacitors
All other capacitors:	0603
C_{20}:	AVX 06035J1R0BBT
L_1:	Coilcraft Air Core Inductor A03T
Suggested Heat Sink:	about 7 K/W

V_{D3} additionally blocked with 4.7 µF/16 V at connection X7

Package Outlines

MW-16
(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