High-Power Packaged GaAs FET

Description

The CLY2 is a high-breakdown voltage GaAs FET designed for PA driver applications in the 400 MHz to 3 GHz frequency range. It is ideal for portable PA applications in mobile phones and portable WLAN transceivers due to its easy matching and excellent linearity. The CLY2 exhibits +23.5 dBm output power with +3V Vds at 1.8 GHz with an associated gain of 14.5 dB. Power added efficiencies to 55% are achievable.

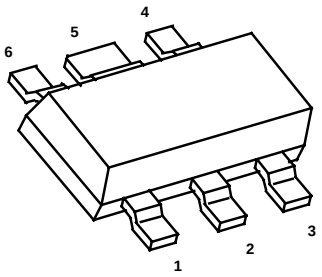
Features

- For frequencies up to 3 GHz
- Wide operating voltage range: 2 to 6 V
- P_{OUT} 23.5 dBm typical at V_D=3V, f=1.8GHz
- High efficiency: better than 55 %
- Nfmin 0.79 dB typical at 900 MHz
- Low Cost

Applications

- Power Amplifiers for WLAN transceivers
- Driver Amplifiers for WLAN or mobile phone basestations
- Low Noise Amplifier for basestations and antenna amplifiers

Package Outline, MW6



Pin Configuration:

1 & 6: Gate
2 & 5: Source
3 & 4: Drain

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	9	V
Drain-gate voltage	V_{DG}	12	V
Gate-source voltage	V_{GS}	-6	V
Drain current	I_D	600	mA
Channel temperature	T_{Ch}	150	°C
Storage temperature	T_{stg}	-55...+150	°C
Total power dissipation ($T_S \leq 50$ °C) [1)]	P_{tot}	900	mW
Thermal Resistance			
Channel-soldering point [1)]	R_{thChS}	≤110	K/W

[1)] T_S: Temperature at soldering point

Electrical Characteristics

(T_A = 25°C , unless otherwise specified)

Parameter	Symbol	min	typ	max	Unit
Drain-source saturation current V_{DS} = 3 V V_{GS} = 0 V	I_{DSS}	300	450	650	mA
Drain-source pinch-off current V_{DS} = 3 V V_{GS} = -3.8 V	I_D	-	5	50	µA
Gate pinch-off current V_{DS} = 3 V V_{GS} = -3.8 V	I_G	-	5	20	µA
Pinch-off Voltage V_{DS}= 3 V I_D=50µA	$V_{GS(p)}$	-3.8	-2.8	-1.8	V
Small Signal Gain*) V_{DS} = 5 V I_D = 180 mA f = 1.8 GHz P_{in} = -5 dBm	G	-	15.5	-	dB
Small Signal Gain*) V_{DS} = 3 V I_D = 180 mA f = 1.8 GHz P_{in} = -5 dBm	G	-	14.5	-	dB
Output Power V_{DS} = 3 V I_D = 180 mA f = 1.8 GHz P_{in} = 10 dBm	P_0	22.5	23.5	-	dBm

Electrical Characteristics (cont)

1dB-Compression Point V_{DS} = 3 V I_D = 180 mA f = 1.8 GHz	P_{1dB}	-	23.5	-	dBm
1dB-Compression Point V_{DS} = 5 V I_D = 180 mA f = 1.8GHz	P_{1dB}	-	27.0	-	dBm
Power Added Efficiency V_{DS} = 3 V I_D = 180 mA f = 1.8 GHz P_{in} = 10 dBm	PAE	-	55	-	%
Noise figure V_{DS} = 3 V I_D = 180 mA f = 1.8GHz	NF		1.48		dB

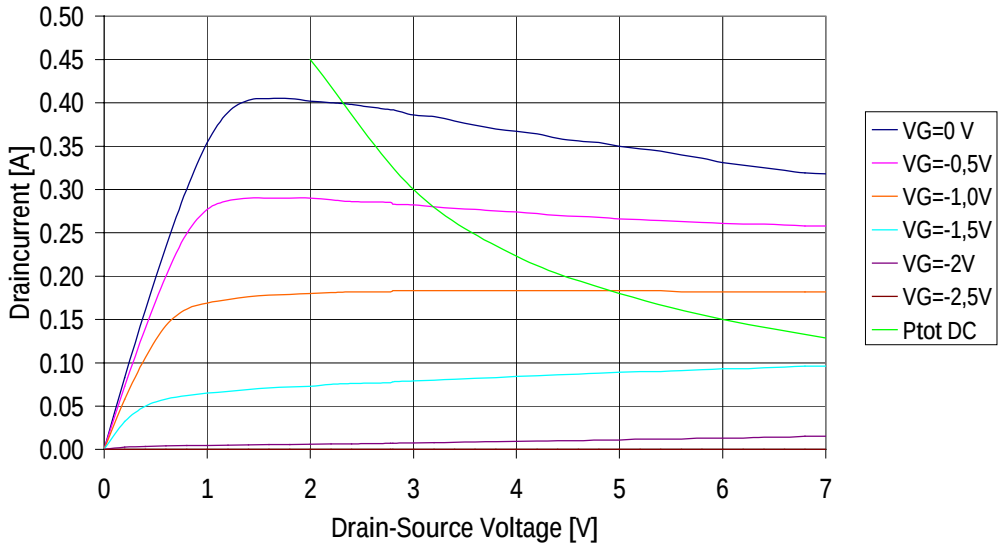
*) Matching conditions for maximum small signal gain (not identical with power matching conditions!)

**) Power matching conditions: f=1.8GHz:

Source Match: Γ_{ms}: MAG = 0.74, ANG 132°; Load Match: Γ_{ml}: ;MAG 0.61, ANG -153°

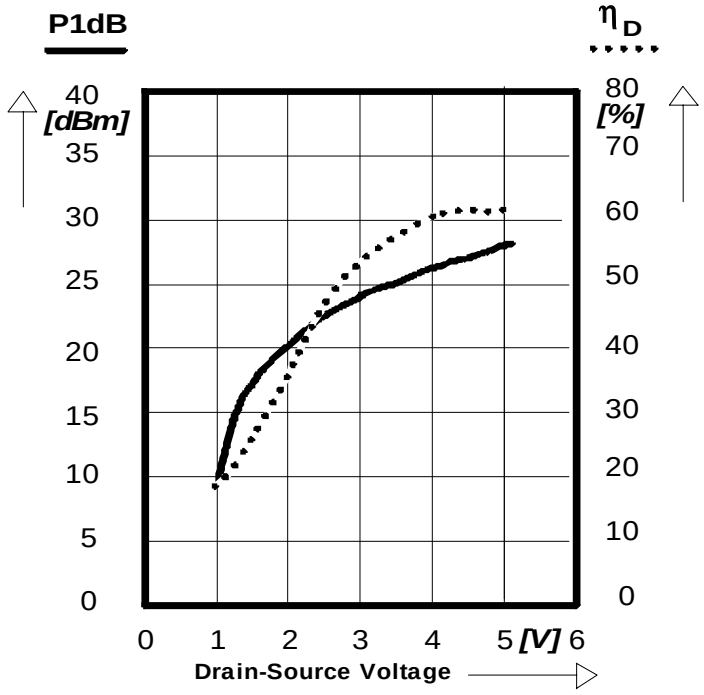
Electrical Characteristics (cont)

Output characteristics



Compression Power vs. Drain-Source Voltage

f = 1.8GHz; IDS = 0.5 Idss



Electrical Characteristics (cont)

Typical Common Source S-Parameters and noise data

V_{DS} = 3 V I_D = 180 mA Z_O = 50 Ω

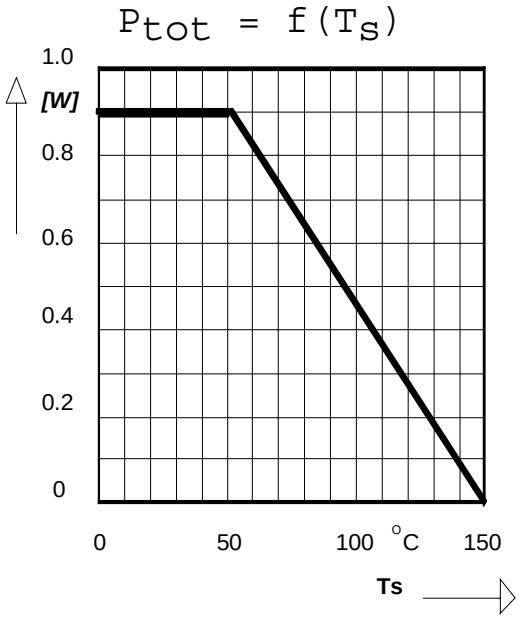
Freq. [GHz]	|S11|	<S11	|S21|	<S21	|S12|	<S12	|S22|	<S22
100	0.992	-13.3	10.120	170.7	0.008	101.1	0.115	-34.6
200	0.974	-26.4	9.778	162.6	0.014	74.1	0.140	-57.5
300	0.950	-38.6	9.278	154.7	0.021	74.0	0.171	-72.3
400	0.922	-49.5	8.683	147.8	0.025	68.0	0.200	-82.0
500	0.896	-59.1	8.042	141.8	0.031	64.8	0.226	-89.1
600	0.871	-67.1	7.444	137.0	0.033	63.0	0.248	-93.8
700	0.849	-74.0	6.880	132.5	0.036	60.6	0.267	-96.9
800	0.828	-79.9	6.373	129.1	0.038	60.2	0.284	-98.8
900	0.813	-85.0	5.900	125.9	0.039	59.1	0.299	-100.1
1,000	0.800	-89.2	5.485	123.4	0.041	59.5	0.312	-100.4
1,100	0.790	-92.6	5.110	121.3	0.041	59.4	0.323	-100.5
1,200	0.780	-95.5	4.780	119.3	0.043	60.2	0.335	-100.0
1,300	0.773	-97.7	4.498	117.7	0.043	61.6	0.345	-99.3
1,400	0.766	-99.6	4.225	116.2	0.044	62.3	0.354	-98.2
1,500	0.760	-100.9	3.987	115.3	0.045	64.1	0.364	-97.1
1,600	0.754	-102.0	3.769	114.4	0.045	65.9	0.372	-95.7
1,700	0.751	-102.7	3.588	113.6	0.045	67.7	0.380	-94.3
1,800	0.748	-103.3	3.426	112.9	0.046	70.0	0.388	-92.6
1,900	0.743	-103.5	3.268	112.3	0.046	71.8	0.397	-90.9
2,000	0.741	-103.8	3.119	111.7	0.047	74.525	0.404	-89.2

f	F_{min}	Γ_{opt}		R_n	r_n
GHz	dB	MAG	ANG	Ω	–
0.9	0.79	0.564	61	13.4	0.267
1.8	1.47	0.585	99	13.6	0.272

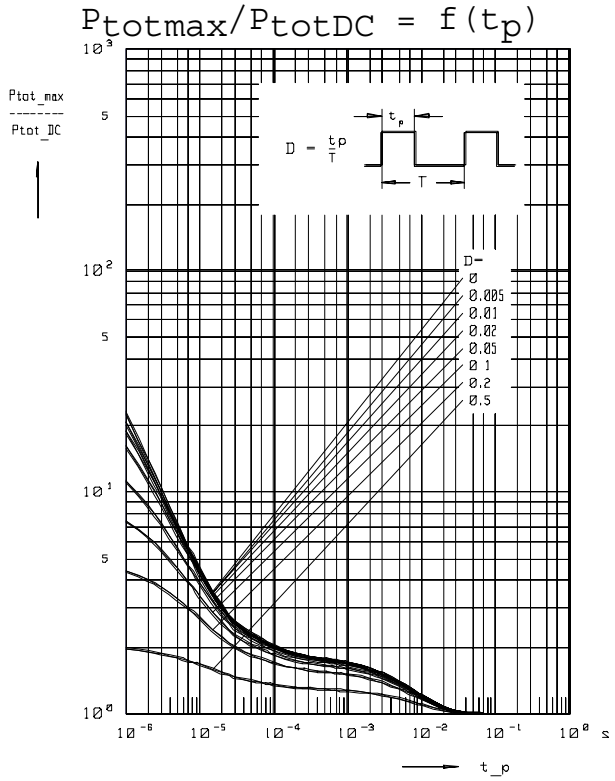
Additional S-Parameter and noise data available on data disc!

Electrical Characteristics (cont)

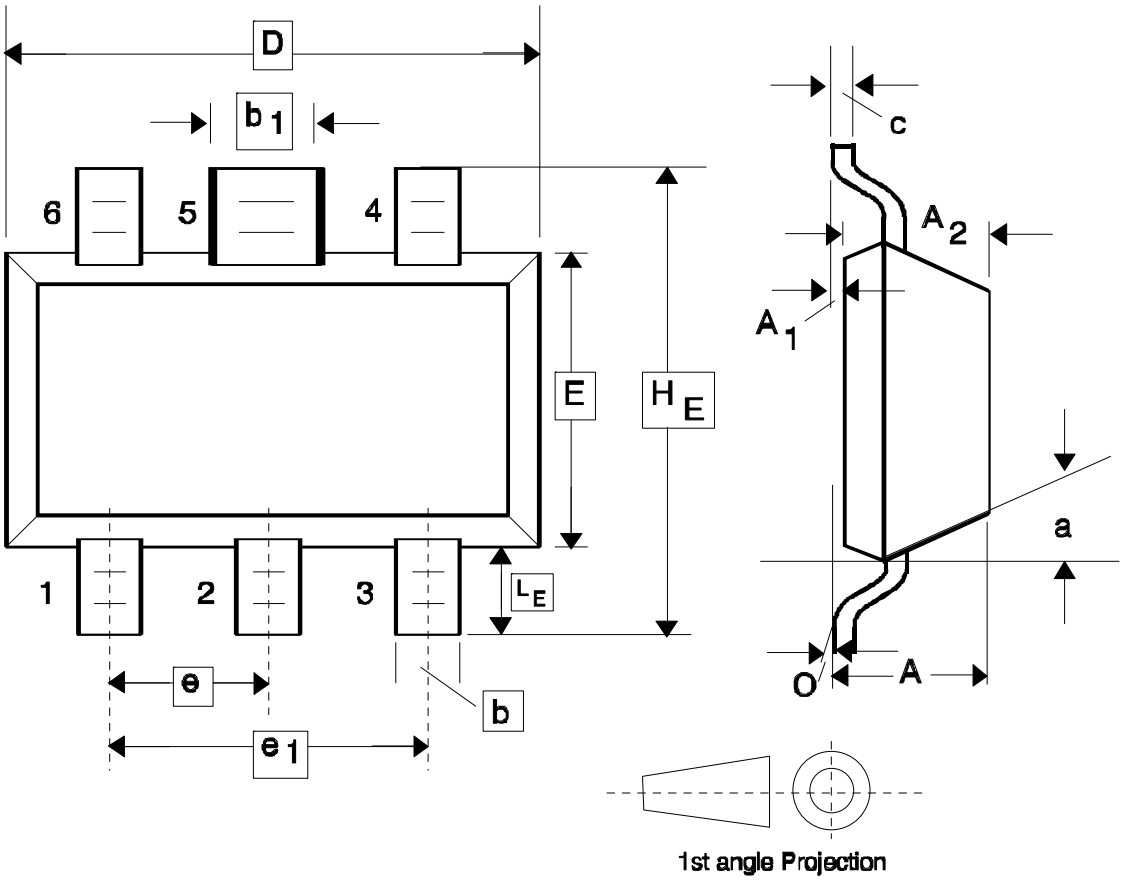
Total Power Dissipation



Permissible Pulse Load

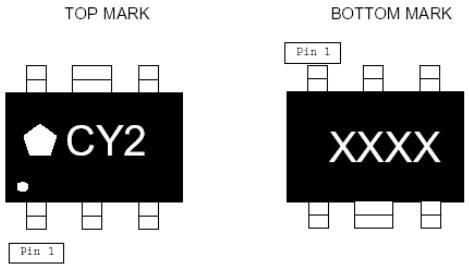


Package Dimensions

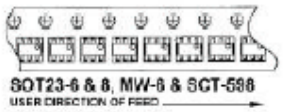


Dim.	min.	nom.	max.	Gradient	Remark
A			1.1		
A_1			0.1		
A_2			1.0		
b		0.3			
b_1		0.6			
c	0.08		0.15		
D	2.8		3.0		
E	1.2		1.4		
|e|		0.95			
$\|e_1\|$		1.9			
H_E			2.6		
L_E			0.6		
a				max 10°	1
q				2°...30°	

Package Marking



Package Orientation on Reel



Ordering Information

Type	Marking	Pin Configuration 1	2	3	4	5	6	Package 1)
CLY 2	CY2	G	S	D	D	S	G	MW 6

Additional Information

This part is compliant with RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

The part is rated Moisture Sensitivity Level 1 at 260°C per JEDEC standard IPC/JEDEC J-STD-020.

ESD: **E**lectro**s**tatic **d**ischarge sensitive device. Observe handling Precautions.

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