



**THE DATASHEET OF  
CLF1G0035-200PU**



# CLF1G0035-200P; CLF1G0035S-200P

Broadband RF power GaN HEMT

Rev. 1 — 22 April 2016

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

The CLF1G0035-200P and CLF1G0035S-200P are 200 W general purpose broadband GaN HEMTs usable from DC to 3.5 GHz.

**Table 1. CW and pulsed RF application information**

Typical RF performance at  $T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $I_{Dq} = 300\text{ mA}$ ;  $V_{DS} = 50\text{ V}$  in a class-AB broadband demo board.

Test signal	f	P <sub>L</sub>	G <sub>p</sub>	η <sub>D</sub>
	(MHz)	(W)	(dB)	(%)
1-Tone CW	1700	200	11	47
	2000	200	10	52
	2300	200	9	58
1-Tone pulsed [1]	1700	200	14	46
	2000	200	14	48
	2300	200	13	51

[1] Pulsed RF;  $t_p = 100\text{ }\mu\text{s}$ ;  $\delta = 10\text{ }\%$ .

**Table 2. 2-Tone CW application information**

Typical 2-Tone performance at  $T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $I_{Dq} = 600\text{ mA}$ ;  $V_{DS} = 50\text{ V}$  in a class-AB broadband demo board.

Test signal	f	P <sub>L(PEP)</sub>	IMD3
	(MHz)	(W)	(dBc)
2-Tone CW [1]	1700	120	-40
	2000	120	-45
	2300	120	-43

[1] 2-Tone CW;  $\Delta f = 100\text{ kHz}$ .

### 1.2 Features and benefits

- Frequency of operation is from DC to 3.5 GHz
- 200 W general purpose broadband RF Power GaN HEMT
- Excellent ruggedness (VSWR = 10 : 1)
- High voltage operation (50 V)
- Thermally enhanced package

### 1.3 Applications

- Commercial wireless infrastructure (cellular, WiMAX)
- Radar
- Broadband general purpose amplifier
- Public mobile radios
- Industrial, scientific, medical
- Jammers
- EMC testing
- Defense application

## 2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
<b>CLF1G0035-200P (SOT1228A)</b>			
1	drain1		 aaa-005775
2	drain2		
3	gate1		
4	gate2		
5	source <a href="#">[1]</a>		
<b>CLF1G0035S-200P (SOT1228B)</b>			
1	drain1		 aaa-005775
2	drain2		
3	gate1		
4	gate2		
5	source <a href="#">[1]</a>		

[1] Connected to flange.

## 3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
CLF1G0035-200P	-	flanged ceramic package; 2 mounting holes; 4 leads	SOT1228A
CLF1G0035S-200P	-	earless flanged ceramic package; 4 leads	SOT1228B

## 4. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	drain-source voltage		-	150	V
$V_{GS}$	gate-source voltage		-8	+3	V
$I_{GF}$	forward gate current	external $R_G = 5 \Omega$	-	72	mA
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature	measured via IR scan	-	250	°C

## 5. Thermal characteristics

**Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit	
$R_{th(j-c)}$	thermal resistance from junction to case	$T_j = 200 \text{ °C}$	[1]	0.52	K/W

[1]  $T_j$  is measured via IR scan with case temperature of 85 °C and power dissipation of 220 W.

## 6. Characteristics

**Table 7. DC Characteristics**

$T_{case} = 25 \text{ °C}$  per section; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = -7 \text{ V}; I_{DS} = 24 \text{ mA}$	150	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 0.1 \text{ V}; I_{DS} = 24 \text{ mA}$	-2.4	-2	-1.3	V
$I_{DSX}$	drain cut-off current	$V_{DS} = 10 \text{ V}; V_{GS} = 3 \text{ V}$	-	17.5	-	A
$g_{fs}$	forward transconductance	$V_{DS} = 10 \text{ V}; V_{GS} = 0 \text{ V}$	-	4	-	S

**Table 8. RF Characteristics**

Test signal: pulsed RF;  $f = 3000 \text{ MHz}$ ;  $t_p = 100 \mu\text{s}$ ;  $\delta = 10 \%$ ; RF performance at  $V_{DS} = 50 \text{ V}$ ;  $I_{DQ} = 660 \text{ mA}$ ;  $T_{case} = 25 \text{ °C}$ ; unless otherwise specified in a class-AB production circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\eta_D$	drain efficiency	$P_L = 200 \text{ W}$	39	44	-	%
$G_p$	power gain	$P_L = 200 \text{ W}$	9	11	-	dB
$RL_{in}$	input return loss	$P_L = 200 \text{ W}$	-	-10	-	dB
$t_r$	rise time	$P_L = 200 \text{ W}$	-	9	-	ns
$t_f$	fall time	$P_L = 200 \text{ W}$	-	9	-	ns

## 7. Application information

### 7.1 Demo circuit

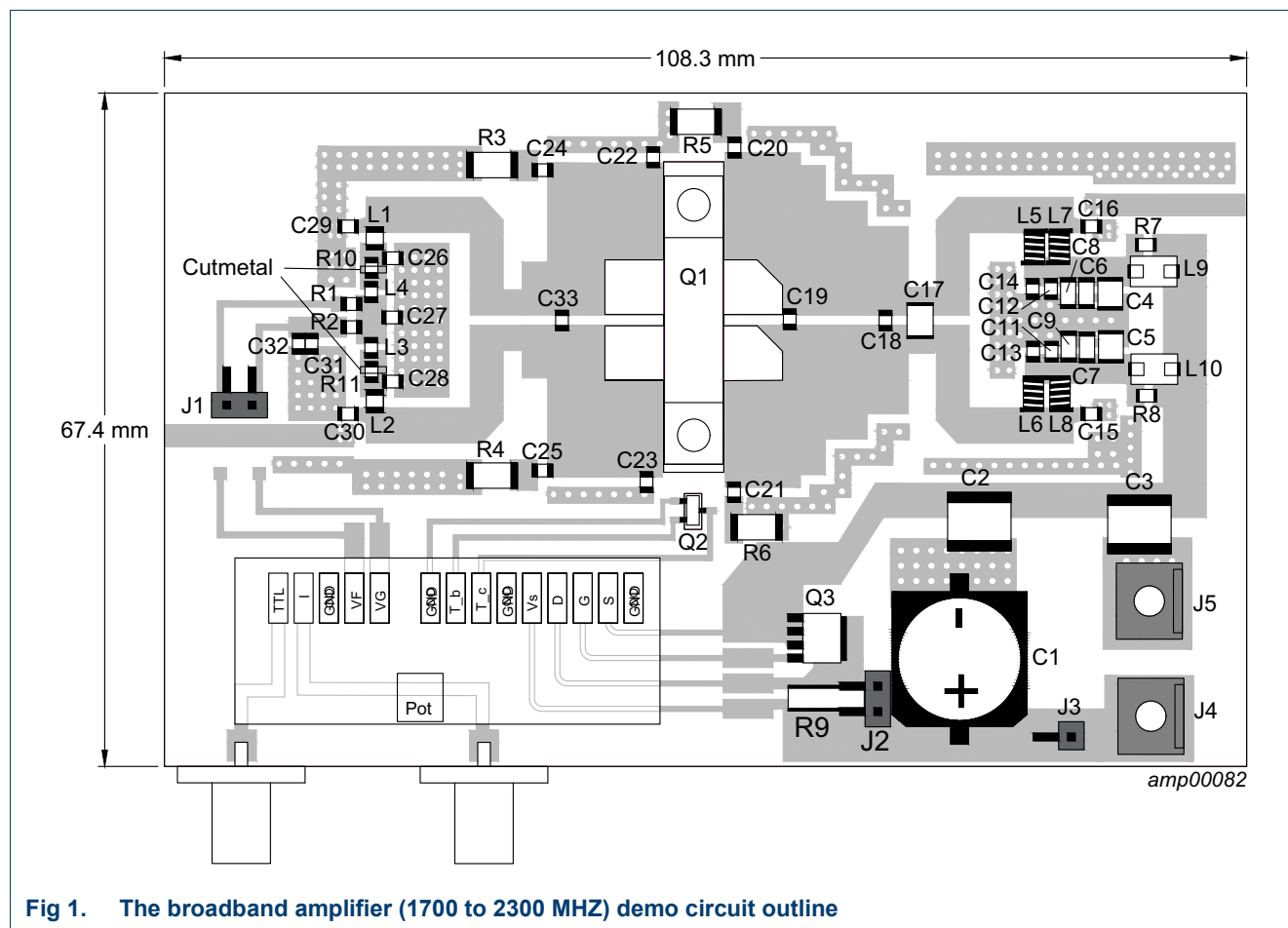


Fig 1. The broadband amplifier (1700 to 2300 MHz) demo circuit outline

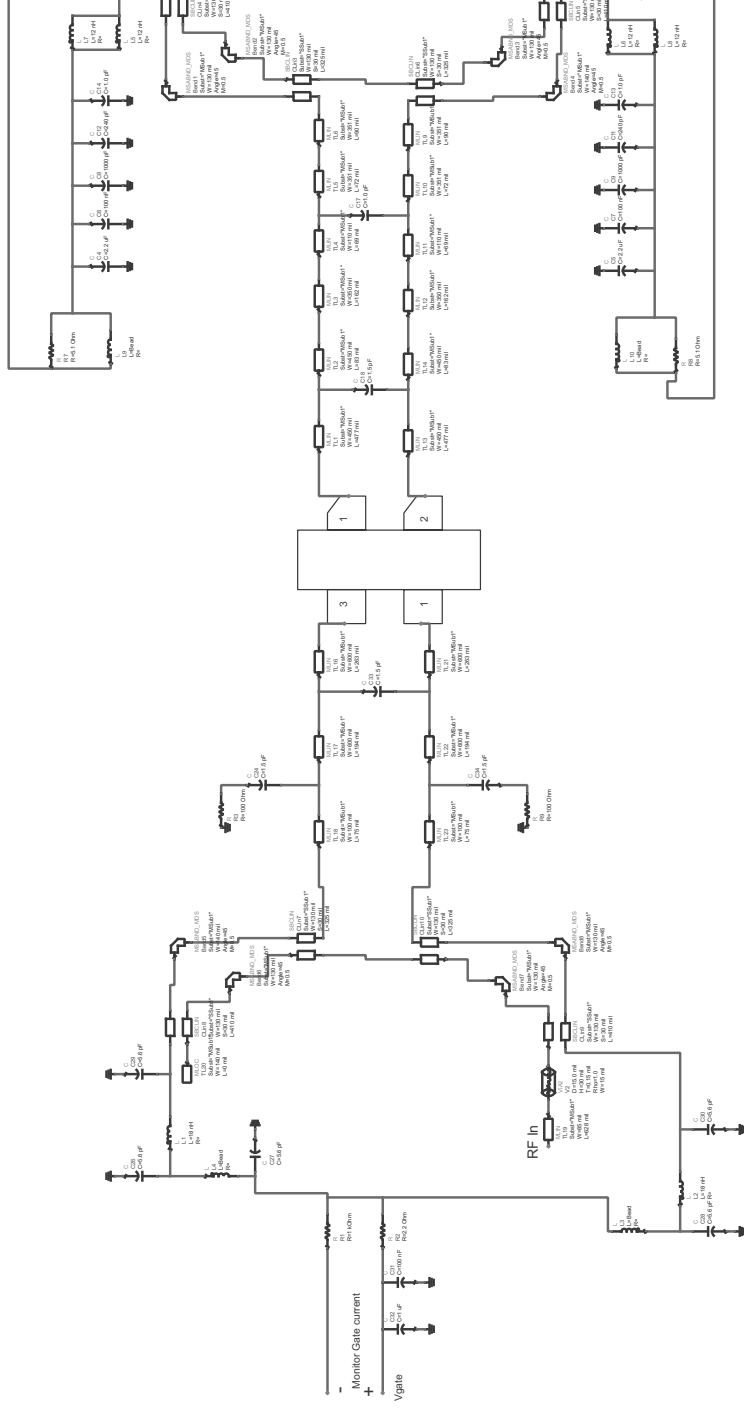
Table 9. List of components

See Figure 1 and Figure 2.

Component	Description	Value	Remarks
C1	electrolytic capacitor		Panasonic EEE-TK1J471AM
C2, C3	multilayer ceramic chip capacitor	10 $\mu$ F, 100 V	TDK C5750X7S2A106M
C4, C5	multilayer ceramic chip capacitor	2.2 $\mu$ F, 100 V	Murata GRM32ER72A225KA35L
C6, C7	multilayer ceramic chip capacitor	0.1 $\mu$ F, 250 V	Murata GRM32DR72E104KW01L
C8, C9	multilayer ceramic chip capacitor	1000 pF	PassivePlus 1111N
C11, C12	multilayer ceramic chip capacitor	240 pF	Passive Plus 0805N
C13, C14	multilayer ceramic chip capacitor	1.8 pF	Passive Plus 0805N
C15, C16, C26, C27, C28, C29, C30	multilayer ceramic chip capacitor	5.6 pF	Passive Plus 0805N
C17	multilayer ceramic chip capacitor	0.9 pF	ATC 100B
C18	multilayer ceramic chip capacitor	0.2 pF	Passive Plus 0805N
C19	multilayer ceramic chip capacitor	1.6 pF	Passive Plus 0805N

**Table 9. List of components ...continued**  
See [Figure 1](#) and [Figure 2](#).

Component	Description	Value	Remarks
C20, C21, C24, C25	multilayer ceramic chip capacitor	0.2 pF	Passive Plus 0805N
C22, C23	multilayer ceramic chip capacitor	0.5 pF	Passive Plus 0805N
C31	multilayer ceramic chip capacitor	100 nF, 50 V	Multicomp U0805W104K1HRN-P4
C32	multilayer ceramic chip capacitor	1 μF, 100 V	Murata GRM31CR72A105KA01L
C33	multilayer ceramic chip capacitor	0.6 pF	Passive Plus 0805N
J1, J2	header	2 pin 0.1"	
J3	header	1 pin 0.1"	
J4, J5	spade connector	-	
L1, L2	inductor	18 nH, 1.4 A	Coil-Craft 0805HQ-18NX L
L3, L4	ferrite chip bead	600 Ω	Laird MI0805K601R-10
L5, L6, L7, L8	inductor	12 nH, 4.4 A	Coil-Craft 0908SQ-8N1 L
L9, L10	ferrite chip bead	-	Fair-Rite 2743019447
Q1	transistor	-	CLF1G0035-200P
Q2	transistor	-	NXP BC857B
Q3	transistor	-	NXP PSMN8R2-80YS
R1	resistor	1 Ω	SMD 0805
R2	resistor	2.2 kΩ	SMD 0805
R3, R4	resistor	100 Ω	SMD 2010
R5, R6	resistor	50 Ω	SMD 2010
R7, R8, R10, R11	resistor	5.1 Ω	SMD 0805
R9	resistor	0.010 Ω	Susumu RL7520WT-R010-F



See [Table 9](#) for a list of components.  
**Fig 2. The broadband amplifier (1700 to 2300 MHz) demo circuit schematic**

## 7.2 Application test results

**Table 10. CW and pulsed RF application information**

Typical RF performance at  $T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $I_{Dq} = 300\text{ mA}$ ;  $V_{DS} = 50\text{ V}$  in a class-AB broadband demo board.

Test signal	f	P <sub>L</sub>	G <sub>p</sub>	η <sub>D</sub>
	(MHz)	(W)	(dB)	(%)
1-Tone CW	1700	200	11	47
	2000	200	10	52
	2300	200	9	58
1-Tone pulsed [1]	1700	200	14	46
	2000	200	14	48
	2300	200	13	51

[1] Pulsed RF:  $t_p = 100\text{ }\mu\text{s}$ ;  $\delta = 10\text{ }\%$ .

**Table 11. 2-Tone CW application information**

Typical RF performance at  $T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $I_{Dq} = 600\text{ mA}$ ;  $V_{DS} = 50\text{ V}$  in a class-AB broadband demo board.

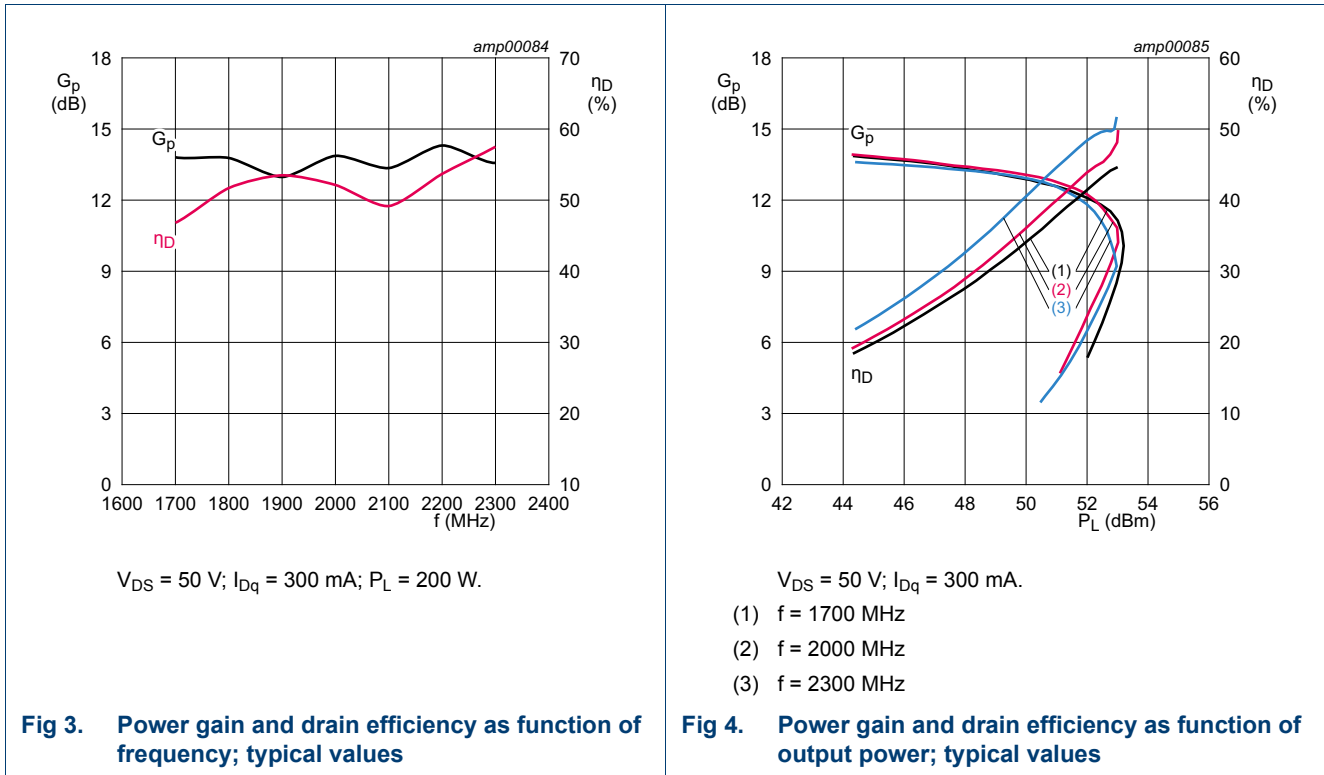
Test signal	f	P <sub>L(PEP)</sub>	IMD3
	(MHz)	(W)	(dBc)
2-Tone CW [1]	1700	120	-40
	2000	120	-45
	2300	120	-43

[1] 2-Tone CW;  $\Delta f = 1\text{ MHz}$ .

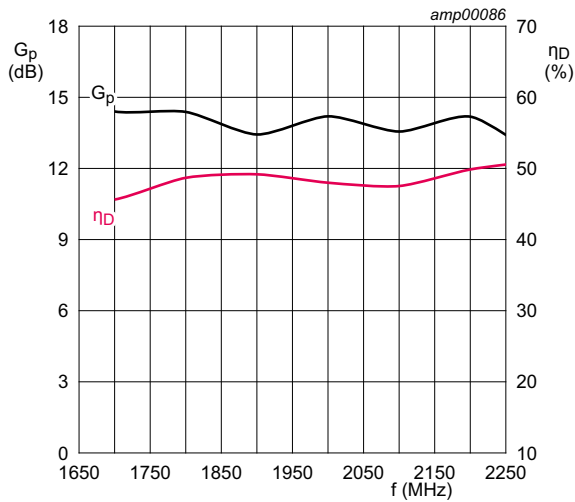
7.3 Graphical data

The following figures are measured in a broadband amplifier demo board from 1700 MHz to 2300 MHz.

7.3.1 1-Tone CW RF performance

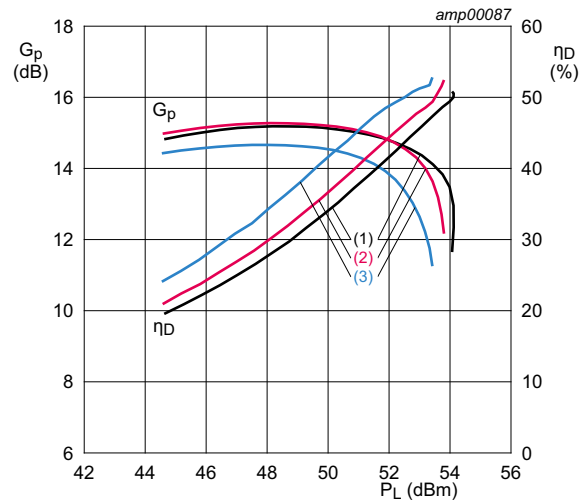


7.3.2 1-Tone pulsed RF performance



$V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 300\text{ mA}$ ;  $t_p = 100\text{ }\mu\text{s}$ ;  $\delta = 10\text{ }\%$ ;  
 $P_L = 200\text{ W}$ .

Fig 5. Power gain and drain efficiency as function of frequency; typical values

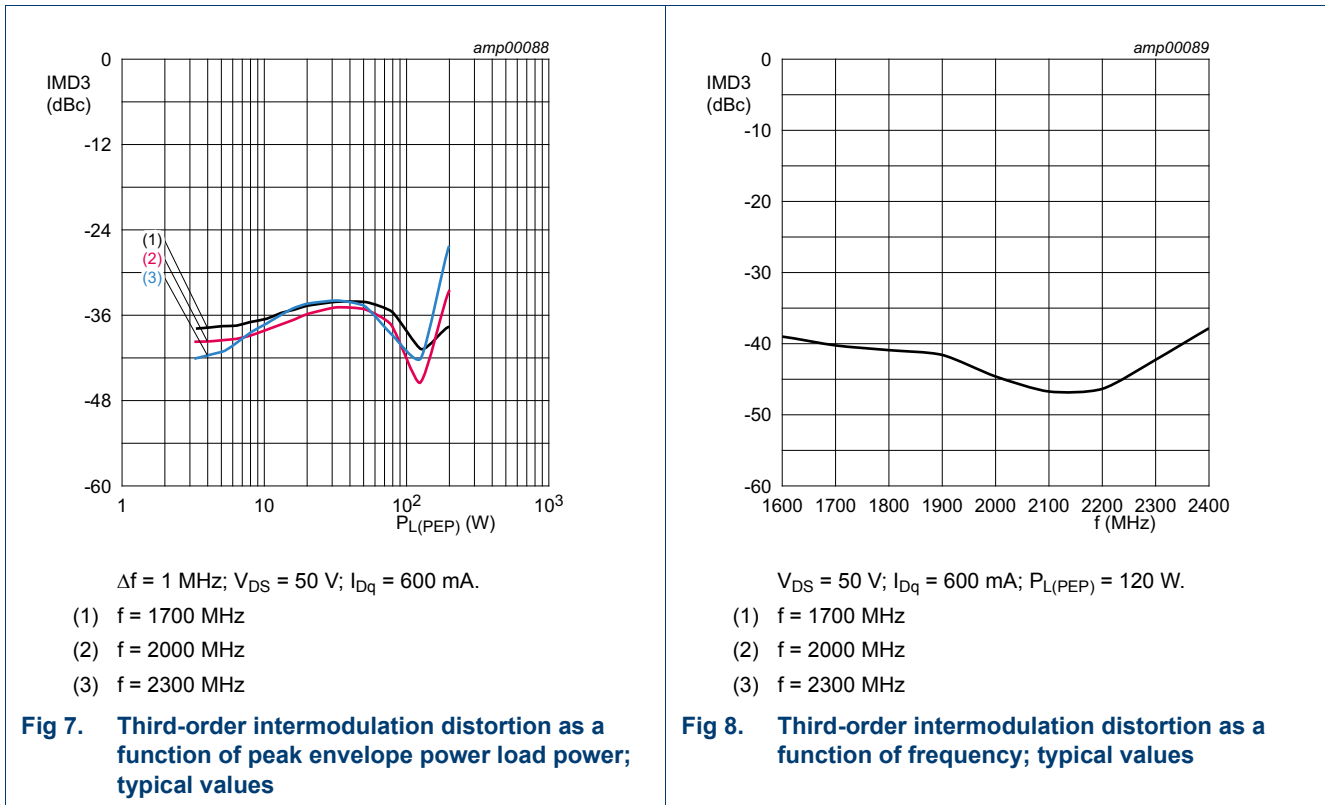


$V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 300\text{ mA}$ ;  $t_p = 100\text{ }\mu\text{s}$ ;  $\delta = 10\text{ }\%$ .

- (1)  $f = 1700\text{ MHz}$
- (2)  $f = 2000\text{ MHz}$
- (3)  $f = 2300\text{ MHz}$

Fig 6. Power gain and drain efficiency as function of output power; typical values

7.3.3 2-Tone CW performance



7.3.4 Bias module

The bias module information for the GaN HEMT amplifier is described in application note AN11130.

## 8. Test information

### 8.1 Ruggedness in class-AB operation

The CLF1G0035-200P and CLF1G0035S-200P are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 50\text{ V}$ ;  $P_L = 175\text{ W (CW)}$ ,  $f = 2140\text{ MHz}$  in a broadband application circuit.

### 8.2 Load pull impedance information

The measured half section load pull impedances are shown below. Impedance reference plane defined at device leads at each half section. Measurements performed with Ampleon test fixtures. Test temperature set at 25 °C with a pulsed CW signal;  $t_p = 100\ \mu\text{s}$ ;  $\delta = 10\ \%$ ; RF performance at  $V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 330\text{ mA}$ .

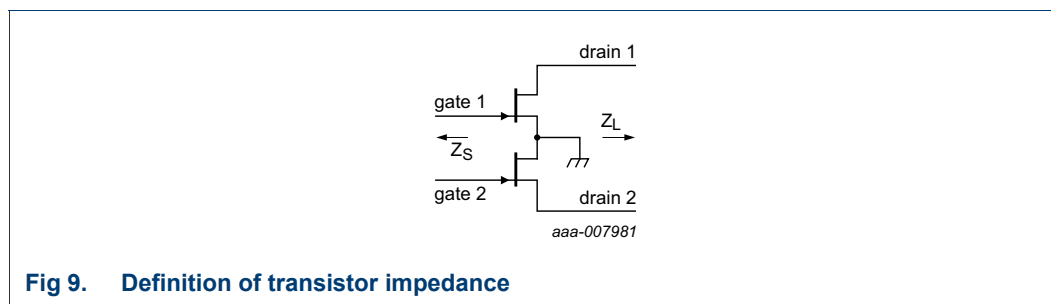
**Table 12. Typical impedance**

Measured load-pull data half device. Typical values unless otherwise specified.  $I_{Dq} = 330\text{ mA}$ ;  $V_{DS} = 50\text{ V}$ .  $Z_S$  and  $Z_L$  defined in [Figure 9](#).

f (MHz)	$Z_S$ [1] ( $\Omega$ )	$Z_L$ (maximum $P_{L(M)}$ ) [2] ( $\Omega$ )	$Z_L$ (maximum $\eta_D$ ) [2] ( $\Omega$ )
500	6 + 6.5j	5.8 + 1.9j	7.6 + 5j
1000	1.7 + 2j	6 + 0.7j	6.5 + 5.2j
2000	1.2 – 2.8j	4.5 – 0.5j	3.8 + 1.6j
2600	1 – 4.2j	4 – 1.2j	3 + 0j
3000	1.7 – 5.2j	3.8 – 2.5j	3.1 – 1.3j
3500	2.7 – 8.9j	4.2 – 4.8j	3.3 – 3.7j

[1] measured at gate1 and gate2

[2] measured at drain1 and drain2



**Fig 9. Definition of transistor impedance**

$Z_S$  is the measured source pull impedance presented to the device.  $Z_L$  is the measured load pull impedance presented to the device.

8.3 Packaged S-parameter data

Table 13. S-parameter data half device

Small signal;  $V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 330\text{ mA}$ ;  $Z_S = Z_L = 50\ \Omega$

f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)
100	0.89132	-156.66	34.068	94.493	0.012475	7.7032	0.52196	-147.24
200	0.89073	-168.26	17.043	82.662	0.012315	-0.83012	0.53166	-156.66
300	0.89427	-172.3	11.153	74.641	0.011818	-5.3714	0.55825	-158.1
400	0.89924	-174.48	8.1416	67.823	0.011142	-8.4181	0.59137	-158.32
500	0.90493	-175.96	6.3028	61.71	0.010348	-10.333	0.62678	-158.56
600	0.91086	-177.14	5.0617	56.145	0.009484	-11.104	0.66181	-159.08
700	0.91671	-178.17	4.1699	51.054	0.008599	-10.584	0.69485	-159.87
800	0.92224	-179.13	3.5016	46.389	0.007737	-8.5461	0.72507	-160.86
900	0.92735	179.94	2.9855	42.108	0.006948	-4.7126	0.75217	-161.98
1000	0.93196	179.04	2.578	38.172	0.006285	1.1721	0.77617	-163.17
1100	0.93606	178.16	2.2506	34.546	0.005806	9.1609	0.79724	-164.39
1200	0.93966	177.28	1.9837	31.195	0.005568	18.833	0.81567	-165.61
1300	0.94281	176.4	1.7635	28.089	0.005606	29.182	0.83174	-166.82
1400	0.94552	175.53	1.5801	25.2	0.005918	38.964	0.84575	-168
1500	0.94785	174.66	1.4259	22.504	0.006469	47.302	0.85796	-169.15
1600	0.94982	173.78	1.2952	19.978	0.00721	53.919	0.86862	-170.26
1700	0.95148	172.9	1.1837	17.603	0.008097	58.951	0.87793	-171.34
1800	0.95285	172.02	1.088	15.361	0.009097	62.687	0.88608	-172.38
1900	0.95397	171.13	1.0053	13.239	0.010189	65.418	0.89322	-173.38
2000	0.95484	170.23	0.93366	11.223	0.011359	67.384	0.89949	-174.36
2100	0.9555	169.32	0.87121	9.2996	0.012601	68.77	0.905	-175.31
2200	0.95595	168.39	0.81661	7.4599	0.013912	69.711	0.90983	-176.23
2300	0.95622	167.44	0.76871	5.6942	0.015292	70.306	0.91408	-177.14
2400	0.9563	166.48	0.7266	3.9939	0.016745	70.629	0.91781	-178.02
2500	0.9562	165.49	0.68949	2.3514	0.018273	70.735	0.92108	-178.88
2600	0.95593	164.48	0.65676	0.7596	0.019885	70.661	0.92394	-179.72
2700	0.95549	163.44	0.62788	-0.788	0.021586	70.439	0.92643	179.44
2800	0.95487	162.36	0.60239	-2.2976	0.023385	70.091	0.92858	178.62
2900	0.95408	161.25	0.57994	-3.775	0.025294	69.632	0.93042	177.81
3000	0.9531	160.1	0.56021	-5.226	0.027321	69.075	0.93198	177
3100	0.95192	158.9	0.54294	-6.656	0.029482	68.427	0.93328	176.2
3200	0.95053	157.65	0.52791	-8.0708	0.03179	67.696	0.93433	175.4
3300	0.94892	156.35	0.51495	-9.4758	0.034261	66.885	0.93514	174.6
3400	0.94706	154.98	0.5039	-10.877	0.036915	65.995	0.93573	173.81
3500	0.94493	153.54	0.49464	-12.28	0.039772	65.028	0.93611	173.01
3600	0.9425	152.02	0.48708	-13.692	0.042855	63.98	0.93627	172.2
3700	0.93974	150.42	0.48113	-15.12	0.046193	62.851	0.93622	171.4

**Table 13. S-parameter data half device ...continued**  
 Small signal;  $V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 330\text{ mA}$ ;  $Z_S = Z_L = 50\ \Omega$

f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)
3800	0.93661	148.72	0.47676	-16.57	0.049816	61.637	0.93596	170.58
3900	0.93304	146.91	0.47391	-18.052	0.053758	60.331	0.93549	169.76
4000	0.92899	144.97	0.47258	-19.574	0.05806	58.928	0.9348	168.93
4100	0.92439	142.9	0.47276	-21.147	0.062766	57.42	0.93389	168.09
4200	0.91915	140.66	0.47446	-22.781	0.067929	55.796	0.93276	167.24
4300	0.91317	138.25	0.47772	-24.491	0.073607	54.046	0.93138	166.37
4400	0.90633	135.63	0.48257	-26.289	0.079867	52.157	0.92976	165.49
4500	0.89849	132.78	0.48907	-28.193	0.086783	50.112	0.9279	164.6
4600	0.88949	129.66	0.49729	-30.221	0.094441	47.895	0.92577	163.69
4700	0.87914	126.23	0.50729	-32.395	0.10293	45.484	0.92339	162.77
4800	0.8672	122.45	0.51914	-34.739	0.11237	42.857	0.92076	161.83
4900	0.85343	118.25	0.53291	-37.279	0.12284	39.988	0.91791	160.88
5000	0.83755	113.57	0.54862	-40.045	0.13448	36.847	0.91488	159.92
5100	0.81926	108.32	0.56627	-43.069	0.14738	33.402	0.91174	158.95
5200	0.79827	102.42	0.58578	-46.386	0.16163	29.62	0.9086	157.98
5300	0.77437	95.758	0.60694	-50.029	0.1773	25.468	0.90565	156.99
5400	0.74749	88.197	0.62942	-54.032	0.19438	20.912	0.90312	156
5500	0.7178	79.599	0.65267	-58.42	0.2128	15.928	0.90132	155
5600	0.68594	69.815	0.67591	-63.21	0.23234	10.5	0.90063	153.96
5700	0.65314	58.706	0.69815	-68.399	0.25267	4.6305	0.90147	152.86
5800	0.62143	46.181	0.71818	-73.964	0.2733	-1.6555	0.90421	151.66
5900	0.59357	32.261	0.73479	-79.853	0.29362	-8.3064	0.90909	150.31
6000	0.57266	17.159	0.7469	-85.99	0.31299	-15.244	0.9161	148.75

9. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 4 leads

SOT1228A

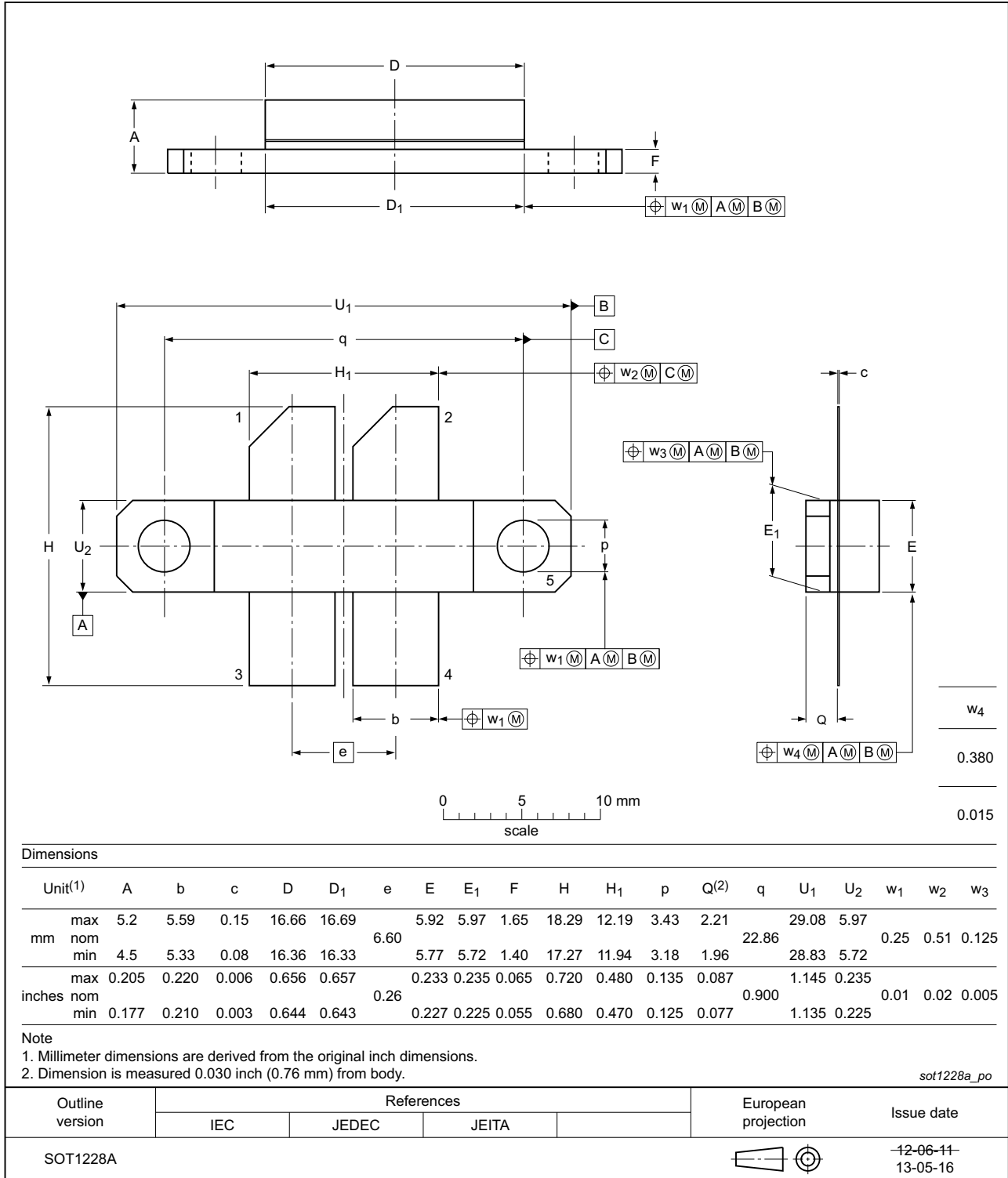
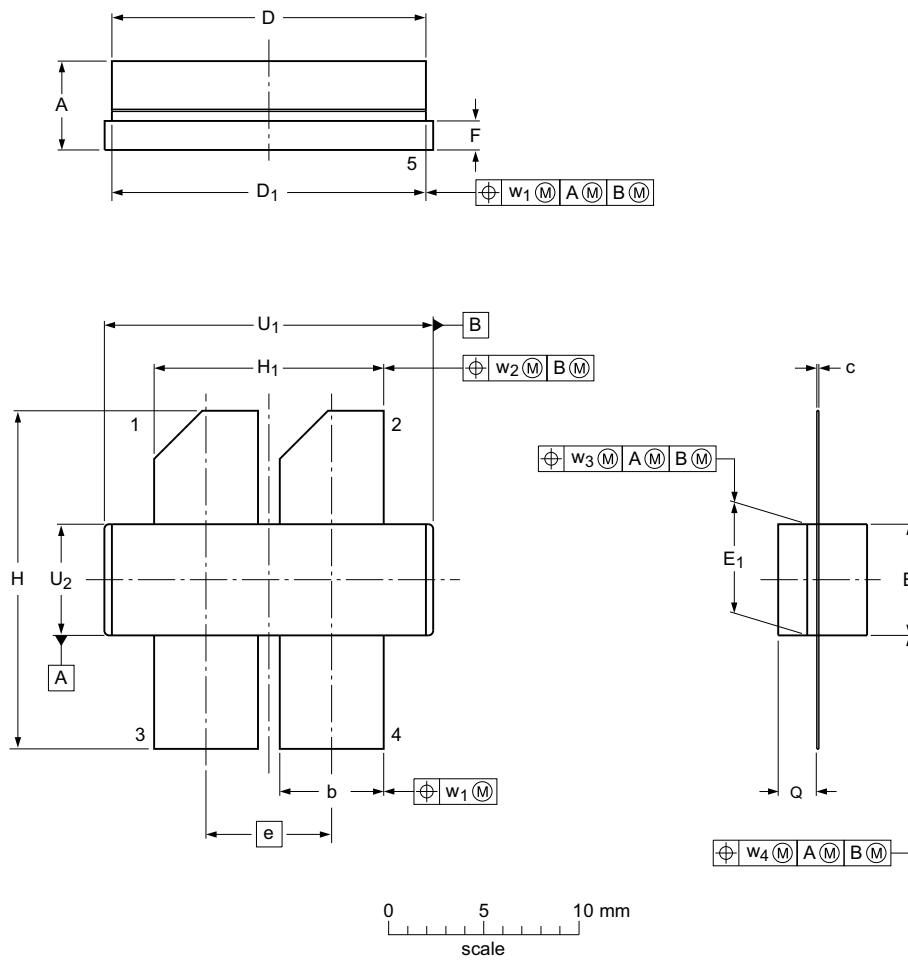


Fig 10. Package outline SOT1228A

Earless flanged LDMOST ceramic package; 4 leads

SOT1228B



Dimensions

Unit <sup>(1)</sup>	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	Q <sup>(2)</sup>	U <sub>1</sub>	U <sub>2</sub>	w <sub>1</sub>	w <sub>2</sub>	w <sub>3</sub>	w <sub>4</sub>
mm	max	5.2	5.59	0.15	16.66	16.69	5.92	5.97	1.65	18.29	12.19	2.21	17.40	5.97				
	nom	4.5	5.33	0.08	16.36	16.33	6.60	5.77	5.72	1.40	17.27	1.96	17.15	5.72	0.25	0.51	0.125	0.38
inches	max	0.205	0.220	0.006	0.656	0.657	0.233	0.235	0.065	0.720	0.480	0.087	0.685	0.235				
	nom	0.177	0.210	0.003	0.644	0.643	0.26	0.227	0.225	0.055	0.680	0.077	0.675	0.225	0.01	0.02	0.005	0.01

Note

1. Millimeter dimensions are derived from the original inch dimensions.
2. Dimension is measured 0.030 inch (0.76 mm) from body.

sot1228b\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1228B					13-05-15 13-05-23

Fig 11. Package outline SOT1228B

## 10. Handling information

### 10.1 ESD Sensitivity

Table 14. ESD sensitivity

ESD model	Class
Human Body Model (HBM); According JEDEC standard 22-A114E	1B <a href="#">[1]</a>

[1] Classification 1B is granted to any part that passes after exposure to an ESD pulse of 500 V, but fails after exposure to an ESD pulse of 1000 V.

## 11. Abbreviations

Table 15. Abbreviations

Acronym	Description
CW	Continuous Wave
EMC	ElectroMagnetic Compatibility
ESD	ElectroStatic Discharge
GaN	Gallium Nitride
HEMT	High Electron Mobility Transistor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio
WiMAX	Worldwide Interoperability for Microwave Access

## 12. Revision history

Table 16. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
CLF1G0035-200P_1G0035S-200P v.1	20160422	Product data sheet	-	-

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.ampleon.com>.

### 13.2 Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Ampleon does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

**Short data sheet** — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Ampleon sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification** — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Ampleon and its customer, unless Ampleon and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Ampleon product is deemed to offer functions and qualities beyond those described in the Product data sheet.

Ampleon product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Ampleon and its suppliers accept no liability for inclusion and/or use of Ampleon products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. Ampleon makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Ampleon products, and Ampleon accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Ampleon product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Ampleon does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Ampleon products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Ampleon does not accept any liability in this respect.

**Limiting values** — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

**Terms and conditions of commercial sale** — Ampleon products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.ampleon.com/terms>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Ampleon hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Ampleon products by customer.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

### 13.3 Disclaimers

**Limited warranty and liability** — Information in this document is believed to be accurate and reliable. However, Ampleon does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Ampleon takes no responsibility for the content in this document if provided by an information source outside of Ampleon.

In no event shall Ampleon be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Ampleon's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of Ampleon.

**Right to make changes** — Ampleon reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

**Suitability for use** — Ampleon products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an

**Non-automotive qualified products** — Unless this data sheet expressly states that this specific Ampleon product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Ampleon accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Ampleon' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Ampleon' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Ampleon for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Ampleon' standard warranty and Ampleon' product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

## 13.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Ampleon's own trademarks.

## 14. Contact information

For more information, please visit: <http://www.ampleon.com>

For sales office addresses, please visit: <http://www.ampleon.com/sales>

15. Contents

**1 Product profile . . . . . 1**

1.1 General description . . . . . 1

1.2 Features and benefits . . . . . 1

1.3 Applications . . . . . 2

**2 Pinning information . . . . . 2**

**3 Ordering information . . . . . 2**

**4 Limiting values . . . . . 3**

**5 Thermal characteristics . . . . . 3**

**6 Characteristics . . . . . 3**

**7 Application information . . . . . 4**

7.1 Demo circuit . . . . . 4

7.2 Application test results . . . . . 7

7.3 Graphical data . . . . . 8

7.3.1 1-Tone CW RF performance . . . . . 8

7.3.2 1-Tone pulsed RF performance . . . . . 9

7.3.3 2-Tone CW performance . . . . . 10

7.3.4 Bias module . . . . . 10

**8 Test information . . . . . 11**

8.1 Ruggedness in class-AB operation . . . . . 11

8.2 Load pull impedance information . . . . . 11

8.3 Packaged S-parameter data . . . . . 12

**9 Package outline . . . . . 14**

**10 Handling information . . . . . 16**

10.1 ESD Sensitivity . . . . . 16

**11 Abbreviations . . . . . 16**

**12 Revision history . . . . . 16**

**13 Legal information . . . . . 17**

13.1 Data sheet status . . . . . 17

13.2 Definitions . . . . . 17

13.3 Disclaimers . . . . . 17

13.4 Trademarks . . . . . 18

**14 Contact information . . . . . 18**

**15 Contents . . . . . 19**

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© Ampleon Netherlands B.V. 2016. All rights reserved.

For more information, please visit: <http://www.ampleon.com>  
 For sales office addresses, please visit: <http://www.ampleon.com/sales>

Date of release: 22 April 2016

Document identifier: CLF1G0035-200P\_1G0035S-200P

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View CLF1G0035-200PU on WIN SOURCE](#)
- ⊖ [Ampleon USA Inc. Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management