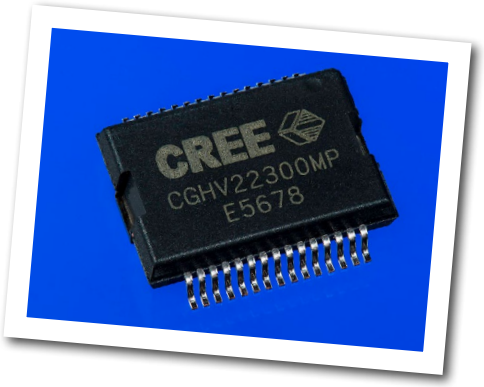
CGHV22300MP

300 W, 1800 -2200 MHz, GaN HEMT for LTE

Cree's CGHV22300MP is a gallium nitride (GaN) high electron mobility transistor (HEMT) is designed specifically for high efficiency, high gain and wide bandwidth capabilities, which makes the CGHV22300MP ideal for 1.8 -2.2 GHz LTE and BWA amplifier applications. The transistor is input matched and supplied in an overmold package.



PN: CGHV22300MP

Typical Performance Over 2.11 - 2.17 GHz (T_c = 25°C) of Demonstration Amplifier

Parameter	2.11 GHz	2.14 GHz	2.17 GHz	Units
Gain @ 47.8 dBm	17.0	17.2	17.6	dB
ACLR @ 47.8 dBm	-35.0	-34.5	-33.0	dBc
Drain Efficiency @ 47.8 dBm	31.1	31.5	32.1	%

Note:
Measured in the CGHV22300MP-TB amplifier circuit, under WCDMA 3GPP test model 1, 64 DPCH, 45% clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF.

Features

RoHS COMPLIANT

- 1.8 - 2.2 GHz Operation
- 17 dB Gain
- 60 W Average Output Power
- -35 dBc ACLR at 60 W P_{AVE}
- 32% Efficiency at 60 W P_{AVE}
- High Degree of DPD Correction Can be Applied

Rev 0 – May 2014

Absolute Maximum Ratings (not simultaneous)

Parameter	Symbol	Rating	Units	Units
Drain-Source Voltage	V_{DSS}	125	Volts	25˚C
Gate-to-Source Voltage	V_{GS}	-10, +2	Volts	25˚C
Storage Temperature	T_{STG}	-65, +150	˚C	
Operating Junction Temperature	T_J	225	˚C	
Maximum Forward Gate Current	I_{GMAX}	42	mA	25˚C
Maximum Drain Current[1]	I_{DMAX}	15.6	A	25˚C
Soldering Temperature[2]	T_S	245	˚C	
Thermal Resistance, Junction to Case[3]	$R_{\theta JC}$	1.03	˚C/W	85˚C, P_{DISS} = 125 W
Case Operating Temperature[4]	T_C	-40, +150	˚C	30 seconds

Note:
[1] Current limit for long term, reliable operation.
[2] Refer to the Application Note on soldering at http://www.cree.com/rf/document-library
[3] Measured for the CGHV22300MP
[4] See also, the Power Dissipation De-rating Curve on Page 4

Electrical Characteristics (T_C = 25˚C)

Characteristics	Symbol	Min.	Typ.	Max.	Units	Conditions
DC Characteristics[1]						
Gate Threshold Voltage	$V_{GS(th)}$	-3.8	-3.0	-2.3	V_{DC}	V_{DS} = 10 V, I_D = 42 mA
Gate Quiescent Voltage	$V_{GS(Q)}$	–	-2.7	–	V_{DC}	V_{DS} = 50 V, I_D = 1.0 A
Saturated Drain Current[2]	I_{DS}	31.2	37.4	–	A	V_{DS} = 6.0 V, V_{GS} = 2.0 V
Drain-Source Breakdown Voltage	V_{BR}	125	–	–	V_{DC}	V_{GS} = -8 V, I_D = 42 mA
RF Characteristics[5] (T_C = 25˚C, F_0 = 2.14 GHz unless otherwise noted)						
Saturated Output Power[3,4]	P_{SAT}	–	300	–	W	V_{DD} = 50 V, I_{DQ} = 1.0 A
Pulsed Drain Efficiency[3]	η	–	70	–	%	V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = P_{SAT}
Gain[6]	G	–	17	–	dB	V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = 47.8 dBm
WCDMA Linearity[6]	ACLR	–	-35	–	dBc	V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = 47.8 dBm
Drain Efficiency[6]	η	–	32	–	%	V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = 47.8 dBm
Output Mismatch Stress[3]	VSWR	–	–	10 : 1	Ψ	No damage at all phase angles, V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = 200 W Pulsed
Dynamic Characteristics						
Input Capacitance[7]	C_{GS}	–	-	–	pF	V_{DS} = 50 V, V_{gs} = -8 V, f = 1 MHz
Output Capacitance[7]	C_{DS}	–	-	–	pF	V_{DS} = 50 V, V_{gs} = -8 V, f = 1 MHz
Feedback Capacitance	C_{GD}	–	-	–	pF	V_{DS} = 50 V, V_{gs} = -8 V, f = 1 MHz

Notes:
[1] Measured on wafer prior to packaging.
[2] Scaled from PCM data.
[3] Pulse Width = 100 µS, Duty Cycle = 10%
[4] P_{SAT} is defined as I_G = 4 mA peak.
[5] Measured in CGHV22300MP-TB.
[6] Single Carrier WCDMA, 3GPP Test Model 1, 64 DPCH, 45% Clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF.
[7] Includes package and internal matching components.

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Typical Performance

Figure 1. - Small Signal S-Parameters
V_{DD} = 50 V, I_{DQ} = 1.0 A

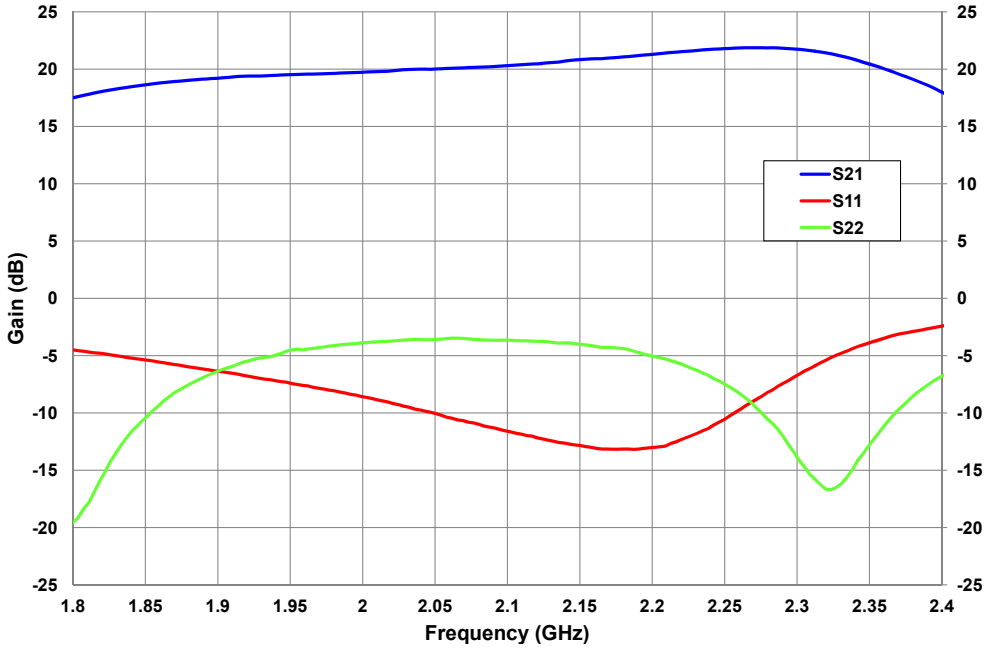
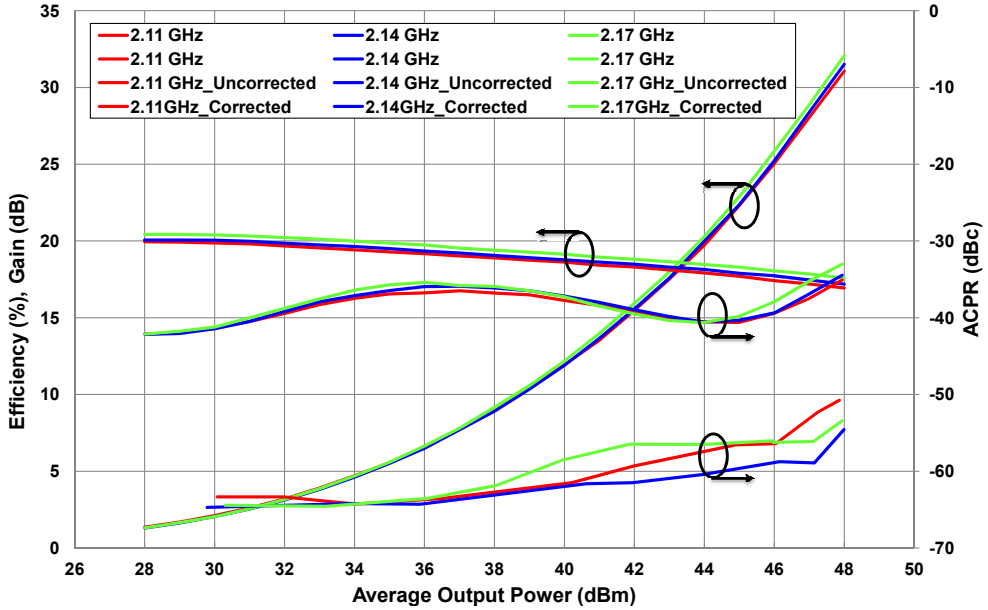


Figure 2. - Typical Gain, Drain Efficiency and ACPR vs Average Output Power
P_{OUT} = 60 W Avg, W-CDMA, 5 MHz, Single Carrier,
Test Model 1, 64 DPCH, 7.5 dB @ 0.01%



Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Typical Performance

Figure 3. - Typical Saturated Output Power and Efficiency vs Frequency
100 µsec, 10%

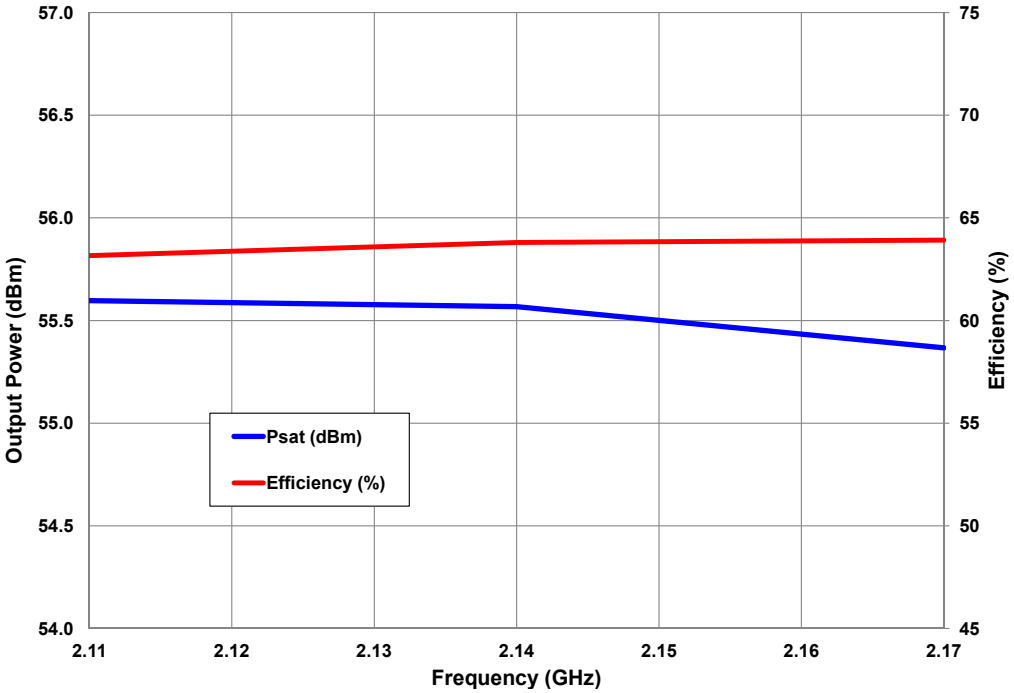
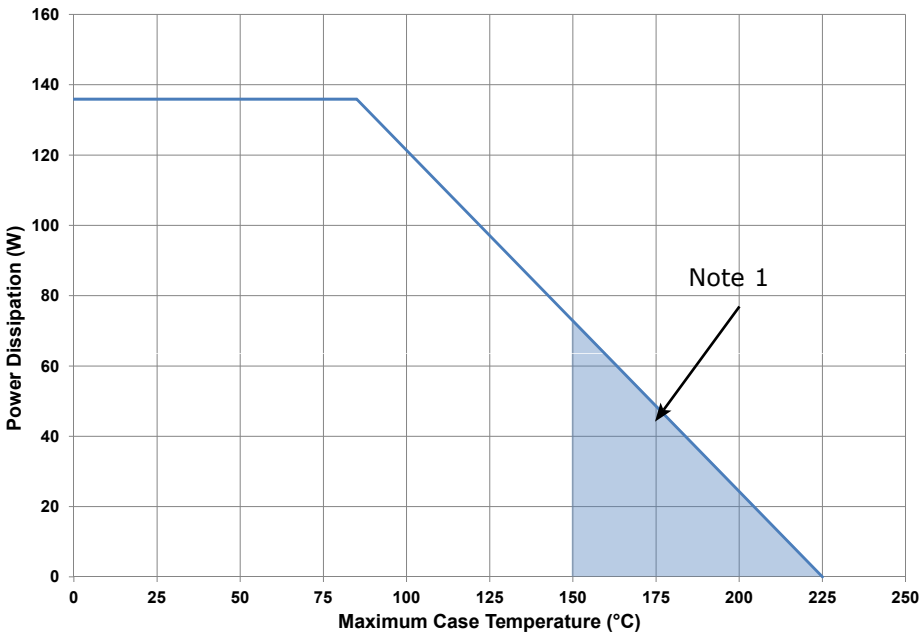


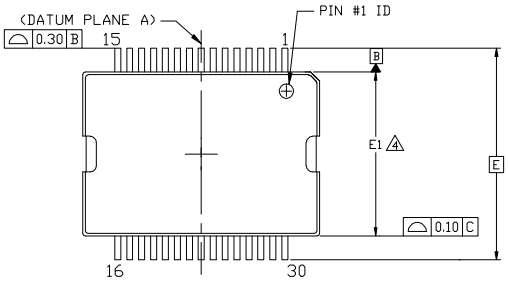
Figure 4. - Power Dissipation Derating Curve

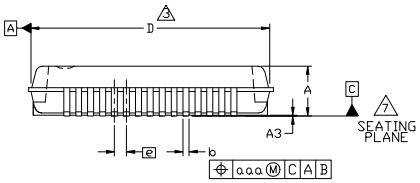


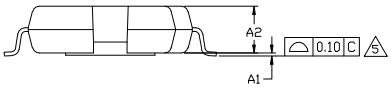
Note 1. Area exceeds Maximum Case Operating Temperature (See Page 2).

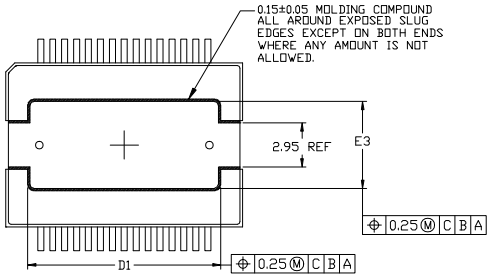
Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Product Dimensions CGHV22300MP (Package Type)









NOTES:

1. DIMENSIONING & TOLERANCES PER ANSI.Y14.5M-1994.
2. "C" IS A REFERENCE DATUM.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE.
4. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15 PER SIDE.
5. FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.076mm AT SEATING PLANE.
6. CONTROLLING DIMENSION: MILLIMETERS.
7. SEATING PLANE IS DEFINED BY LEAD TIPS ONLY.

SYMBOL	COMMON DIMENSIONS			NOTE
	MIN.	NOM.	MAX.	
A	——	——	3.60	
A1	0.10	0.20	0.30	
A2	3.00	3.15	3.30	
A3	0	0.05	0.10	
aaa		0.20		
b	0.35	——	0.48	
D		15.90 BSC		3
D1	9.00	——	13.00	
E		14.20 BSC		
E1		11.00 BSC		4
E3	5.80	——	6.20	
e		0.80 BSC.		

PINOUT TABLE

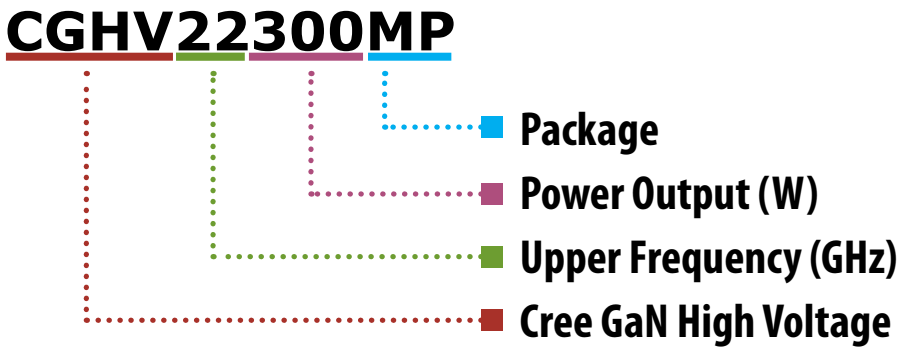
PIN	FUNCTION
1	NC
2	NC
3	NC
4	RF INPUT
5	RF INPUT
6	RF INPUT
7	RF INPUT
8	RF INPUT
9	RF INPUT
10	RF INPUT
11	RF INPUT
12	RF INPUT
13	NC
14	NC
15	NC
16	VIDEO BIAS FEED
17	VIDEO BIAS FEED
18	NC
19	RF OUTPUT
20	RF OUTPUT
21	RF OUTPUT
22	RF OUTPUT
23	RF OUTPUT
24	RF OUTPUT
25	RF OUTPUT
26	RF OUTPUT
27	RF OUTPUT
28	NC
29	VIDEO BIAS FEED
30	VIDEO BIAS FEED

Pin	Input/Output
1	NC
2	NC
3	NC
4	RF IN
5	RF IN
6	RF IN
7	RF IN
8	RF IN
9	RF IN
10	RF IN
11	RF IN
12	RF IN
13	NC
14	NC
15	NC

Pin	Input/Output
16	VIDEO BIAS FEED
17	VIDEO BIAS FEED
18	NC
19	RF OUT
20	RF OUT
21	RF OUT
22	RF OUT
23	RF OUT
24	RF OUT
25	RF OUT
26	RF OUT
27	RF OUT
28	NC
29	VIDEO BIAS FEED
30	VIDEO BIAS FEED

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Part Number System



Parameter	Value	Units
Upper Frequency[1]	2.2	GHz
Power Output	300	W
Package	Plastic Overmold	-

Table 1.

Note[1]: Alpha characters used in frequency code indicate a value greater than 9.9 GHz. See Table 2 for value.

Character Code	Code Value
A	0
B	1
C	2
D	3
E	4
F	5
G	6
H	7
J	8
K	9
Examples:	1A = 10.0 GHz 2H = 27.0 GHz

Table 2.

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For more information, please contact:

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
www.cree.com/rf

Sarah Miller
Marketing & Export
Cree, RF Components
1.919.407.5302

Ryan Baker
Marketing
Cree, RF Components
1.919.407.7816

Tom Dekker
Sales Director
Cree, RF Components
1.919.407.5639

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf