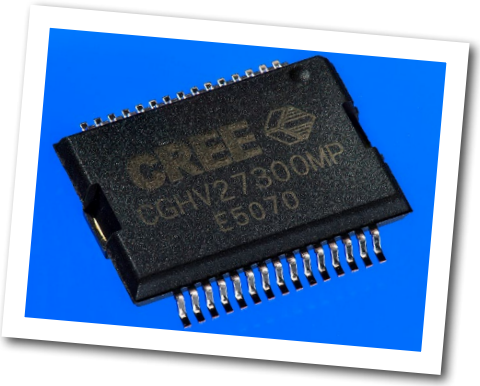
CGHV27300MP

300 W, 2300-2700 MHz, GaN HEMT for LTE

Cree's CGHV27300MP 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 CGHV27300MP ideal for 2.3-2.7 GHz LTE and BWA amplifier applications. The transistor is input matched and supplied in an overmold package.



PN: CGHV27300MP

Typical Performance Over 2.5 - 2.7 GHz (T_C = 25°C) of Demonstration Amplifier

Parameter	2.5 GHz	2.6 GHz	2.7 GHz	Units
Gain @ 47.8 dBm	16	16	16	dB
ACLR @ 47.8 dBm	-35.0	-37.0	-34.0	dBc
Drain Efficiency @ 47.8 dBm	34.7	32.1	32.7	%

Note:
Measured in the CGHV27300MP-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

- 2.3 - 2.7 GHz Operation
- 16 dB Gain
- -35 dBc ACLR at 60 W P_{AVE}
- 33% 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 CGHV27300MP
[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 = 2.7 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	–	65	–	%	V_{DD} = 50 V, I_{DQ} = 1.0 A, P_{OUT} = P_{SAT}
Gain[6]	G	–	16	–	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 CGHV27300MP-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.

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Typical Performance

Figure 1. - Small Signal Gain and Return Losses vs Frequency for the CGHV27300MP measured in CGHV27300-TB Amplifier Circuit
V_{DD} = 50 V, I_{DQ} = 1.0 A

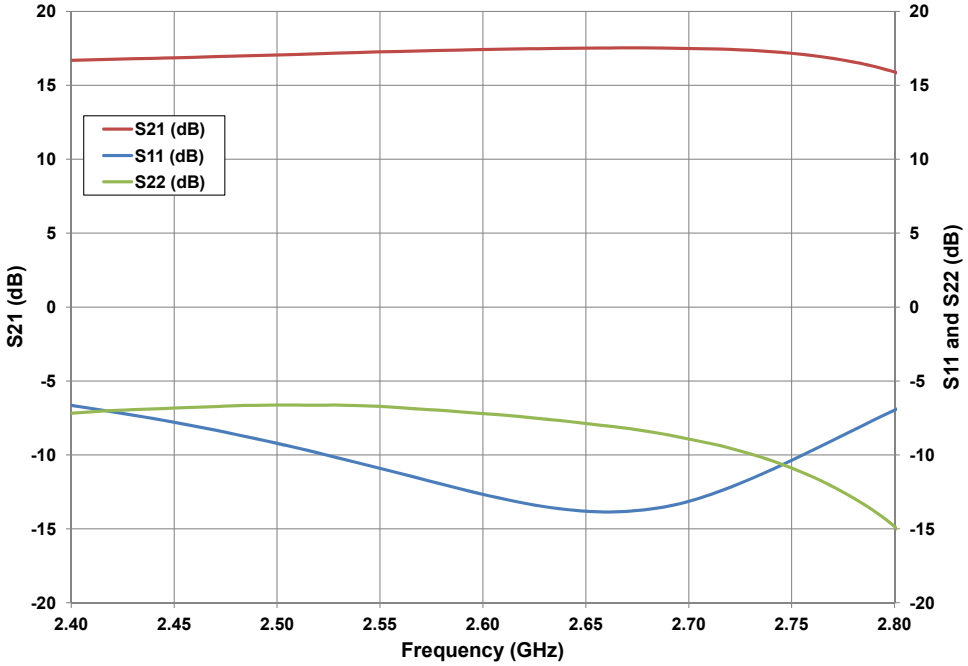
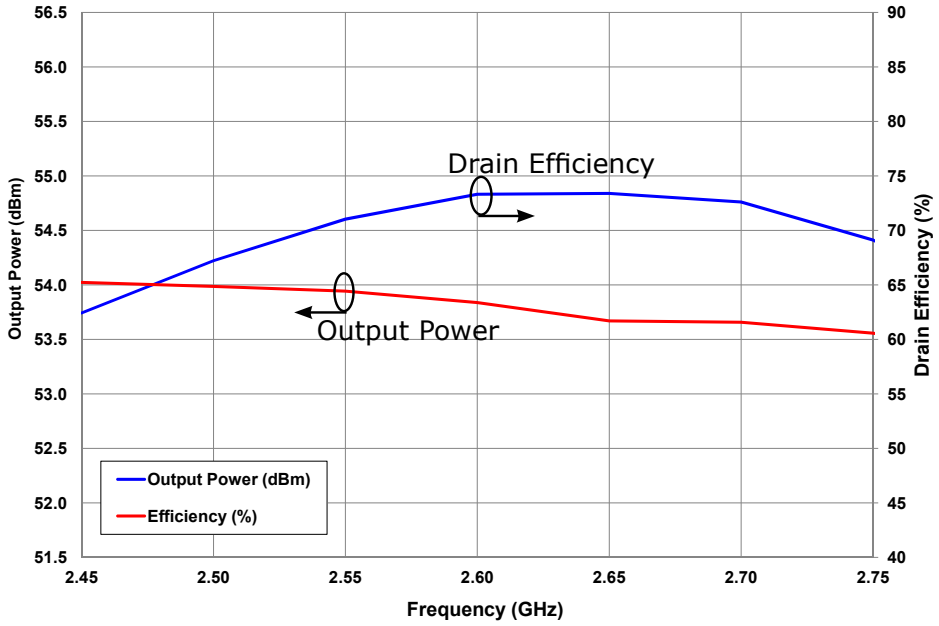


Figure 2. - Typical Output Power and Drain Efficiency of the CGHV27300MP measured in CGHV27300MP-TB Amplifier Circuit.
V_{DS} = 50 V, I_{DS} = 1.0 A, Pulse Width 100 µs, Duty Cycle 10%



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Typical Performance

Figure 3. - WCDMA 5MHz Single Carrier - Gain, Drain Efficiency, and ACLR CGHV27300MP measured in CGHV27300-TB Amplifier Circuit V_{DD} = 50 V, I_{DQ} = 1.0 A

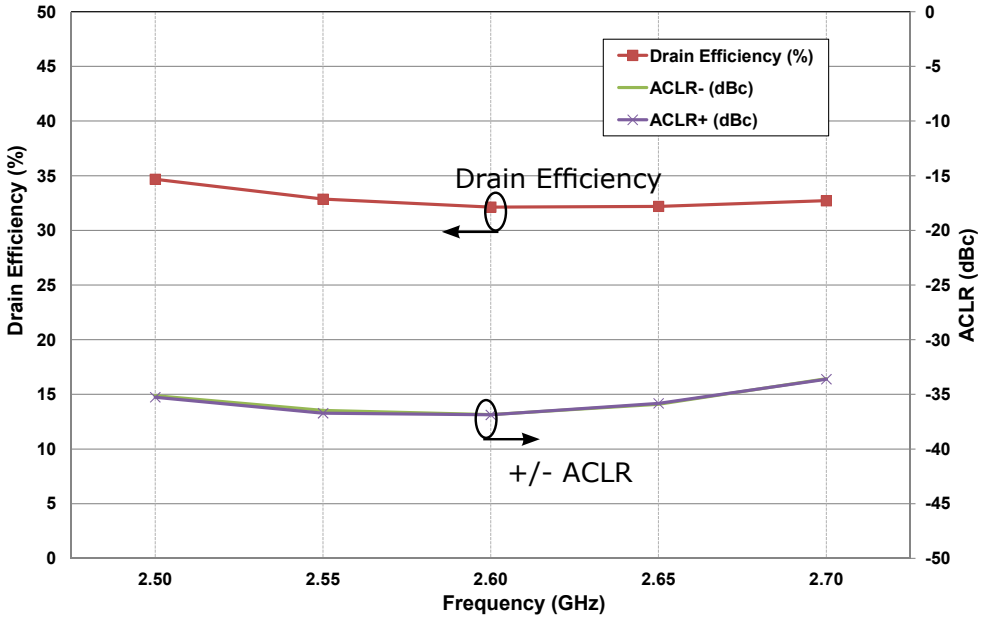
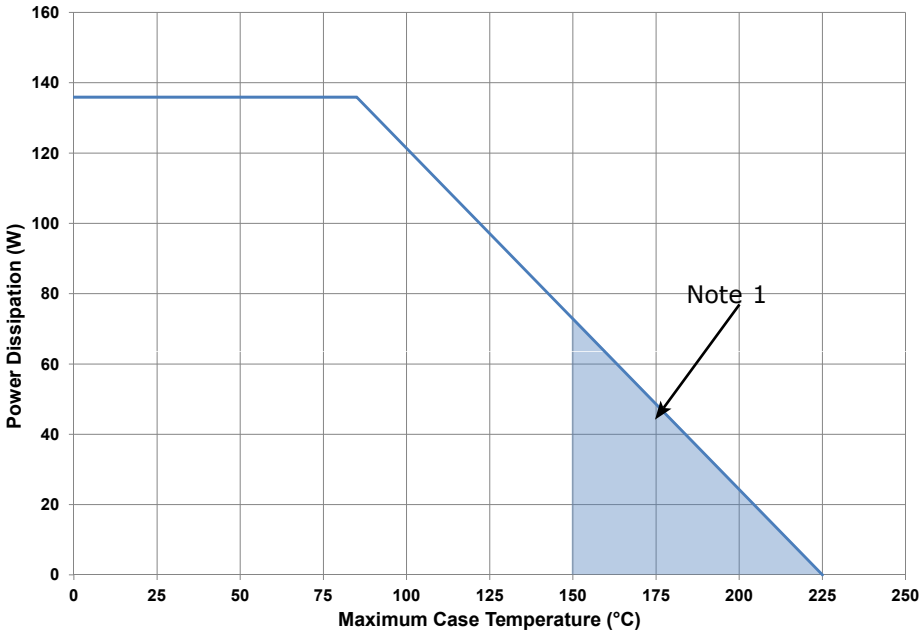


Figure 4. - Power Dissipation Derating Curve



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

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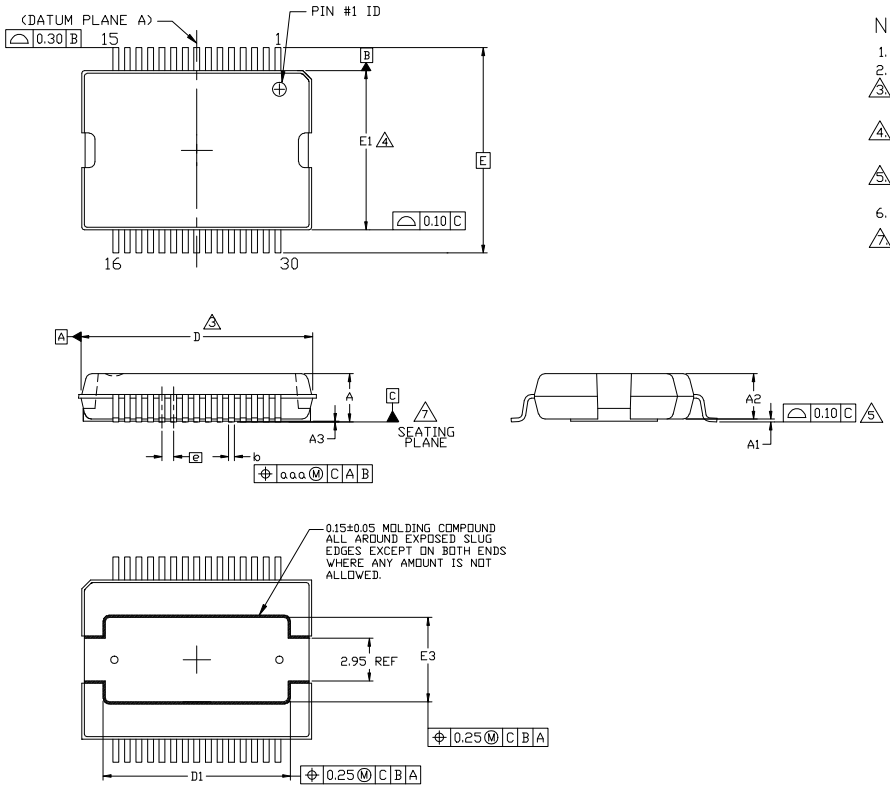
Product Dimensions CGHV27300MP (Package Type)



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

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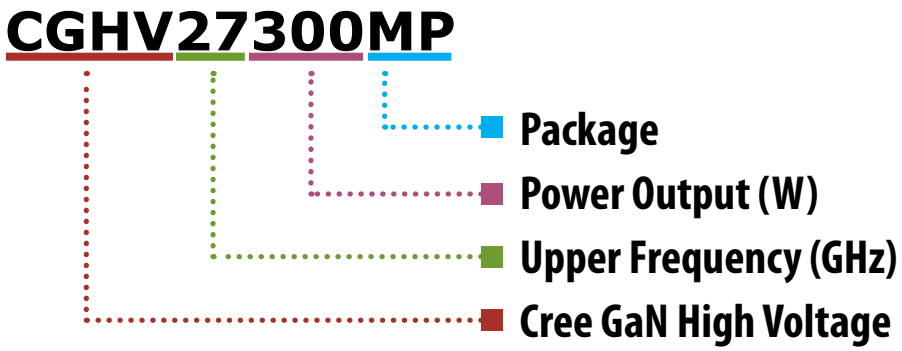
Part Number System



Parameter	Value	Units
Upper Frequency[1]	2.7	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.

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