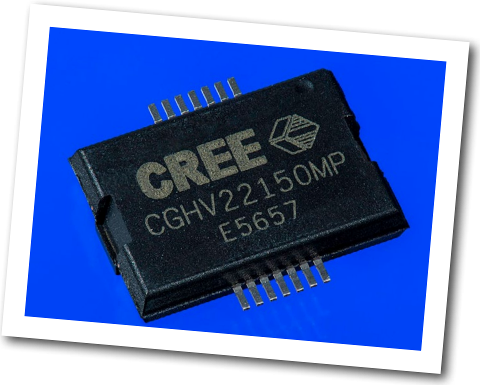
CGHV22150MP

150 W, 1800-2200 MHz, 50 V, GaN HEMT for LTE

Cree's CGHV22150MP 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 CGHV22150MP ideal for 1.8 - 2.2 GHz LTE, 4G Telecom and BWA amplifier applications. The transistor is input matched and supplied in an overmold flange package.



PN: CGHV22150MP

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 @ 45 dBm	18.5	18.8	19.0	dB
ACLR @ 45 dBm	-36.2	-35.0	-33.8	dBc
Drain Efficiency @ 45 dBm	30.9	32.0	33.3	%

Note:
Measured in the CGHV22150MP-TB amplifier circuit, under WCDMA 3GPP test model 1, 64 DPCH, 45% clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF, V_{DD} = 50 V, I_{DS} = 625 mA.

Features

RoHS COMPLIANT

- 1.8 - 2.2 GHz Operation
- 19 dB Gain
- 30 W Average Output Power
- -35 dBc ACLR at 30 W P_{AVE}
- 32% Efficiency at 30 W P_{AVE}
- High Degree of DPD Correction Can be Applied

Absolute Maximum Ratings (not simultaneous)

Parameter	Symbol	Rating	Units	Conditions
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}	20	mA	25˚C
Maximum Drain Current[1]	I_{DMAX}	7.5	A	25˚C
Soldering Temperature[2]	T_S	245	˚C	
Thermal Resistance, Junction to Case[3]	$R_{\theta JC}$	1.92	˚C/W	85˚C, P_{DISS} = 60 W
Case Operating Temperature[4]	T_C	-40, +150	˚C	

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 CGHV22150MP
[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 = 16 mA
Gate Quiescent Voltage	$V_{GS(Q)}$	–	-2.7	–	V_{DC}	V_{DS} = 50 V, I_D = 625 mA
Saturated Drain Current[2]	I_{DS}	15	18	–	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 = 16 mA
RF Characteristics[5] (T_C = 25˚C, F_0 = 2.14 GHz unless otherwise noted)						
Saturated Output Power[3,4]	P_{SAT}	–	170	–	W	V_{DD} = 50 V, I_{DQ} = 625 mA
Pulsed Drain Efficiency[3,4]	η	–	70	–	%	V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = P_{SAT}
Gain[6]	G	–	19	–	dB	V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = 45 dBm
WCDMA Linearity[6]	ACLR	–	-35	–	dBc	V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = 45 dBm
Drain Efficiency[6]	η	–	32	–	%	V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = 45 dBm
Output Mismatch Stress[3]	VSWR	–	–	10 : 1	Ψ	No damage at all phase angles, V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = 150 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_{GS} = 2.0 mA peak
[5] Measured in CGHV22150MP-TB.
[6] Single Carrier WCDMA, 3GPP Test Model 1, 64 DPCH, 45% Clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF, V_{DD} = 50 V.
[7] Includes package and internal matching components.

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Typical Performance

Figure 1. - Small Signal S-Parameters
V_{DD} = 50 V, I_{DQ} = 0.625 A

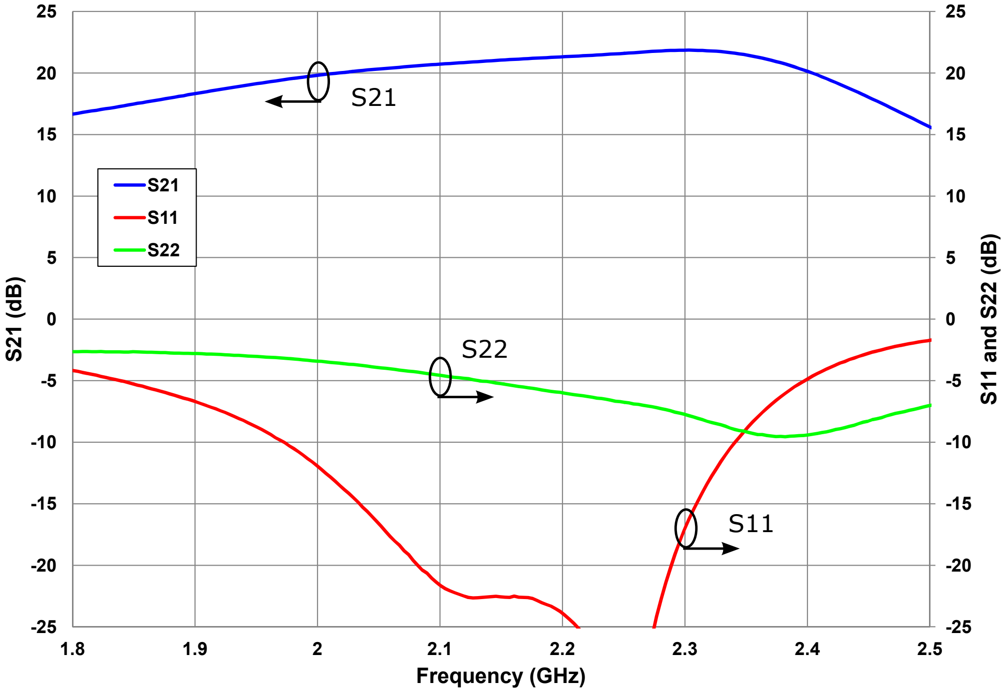
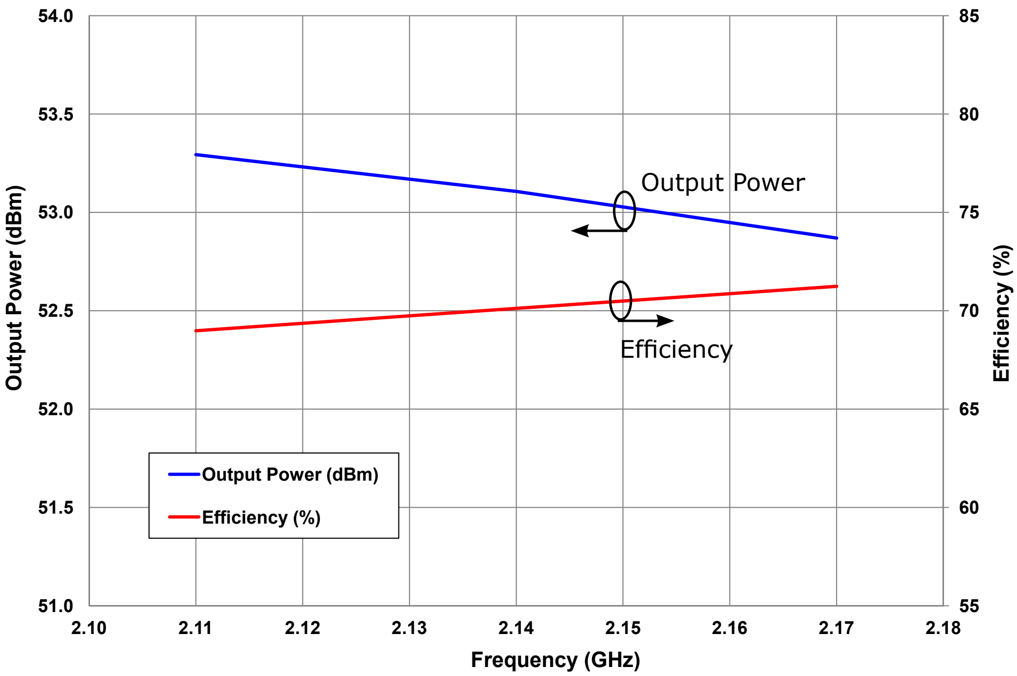


Figure 2. - Typical P_{SAT} Power and Efficiency
V_{DD}=50 V, I_{DQ}=0.625 A, 100 μs, 10%



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Typical Performance

Figure 3. - Typical Gain, Drain Efficiency and ACLR vs Frequency
V_{DD} = 50 V, I_{DQ} = 0.625 A, P_{AVE} = 30 W, 1c WCDMA, PAR = 7.5 dB

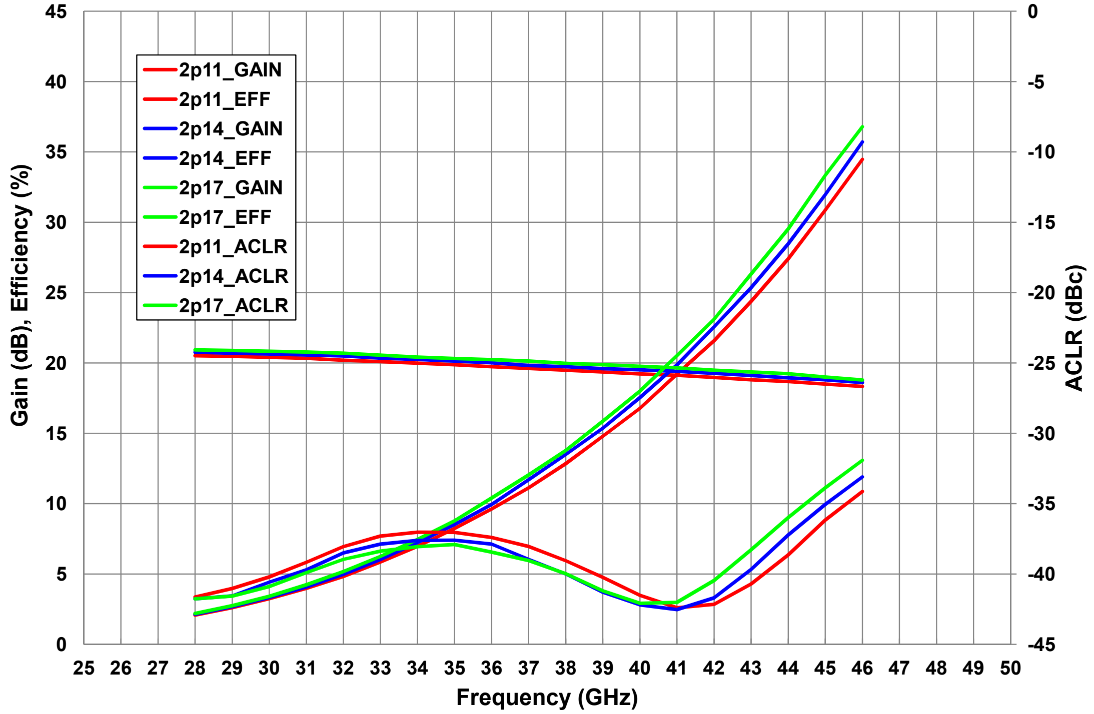
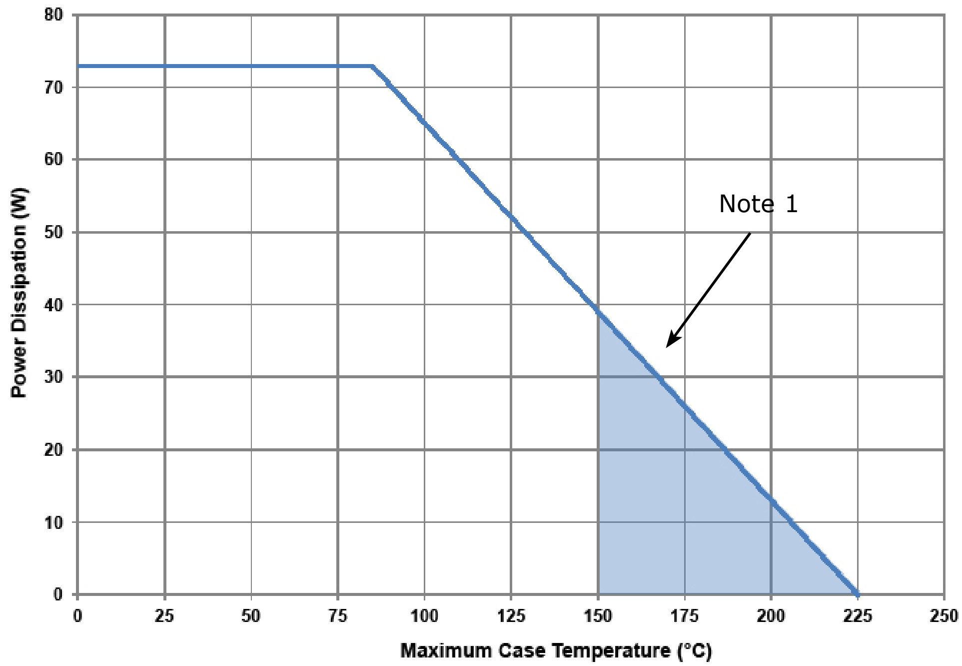


Figure 4. - Power Dissipation Derating Curve



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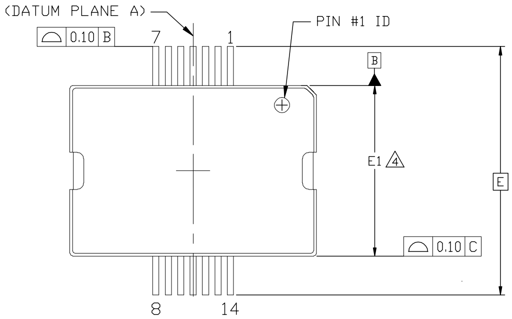
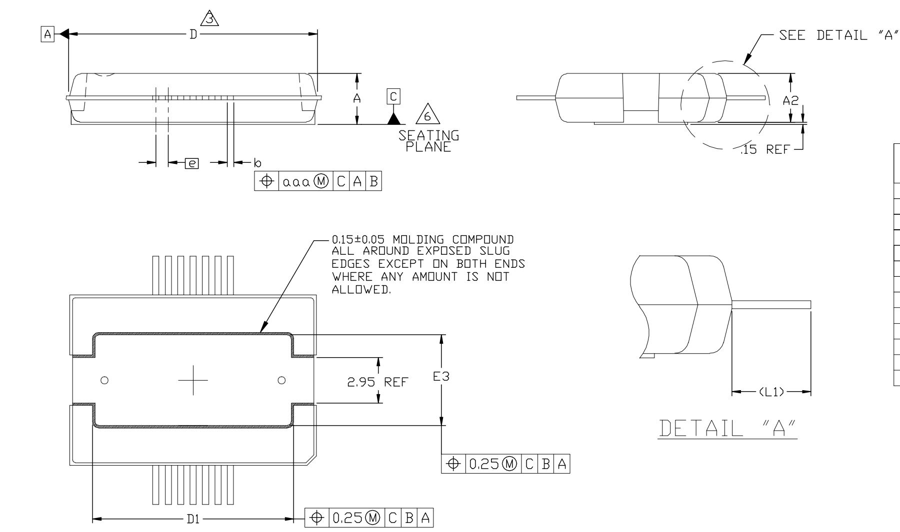
Product Dimensions CGHV22150MP (Package Type)



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. CONTROLLING DIMENSION: MILLIMETERS.
6. SEATING PLANE IS DEFINED BY BOTTOM OF HEAT SLUG.



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		16.00 BSC		
E1		11.00 BSC		4
E3	5.80	——	6.20	
e		0.80 BSC.		
L1		2.54 REF		

PINOUT TABLE

PIN	FUNCTION
1	RF INPUT
2	RF INPUT
3	RF INPUT
4	RF INPUT
5	RF INPUT
6	RF INPUT
7	RF INPUT
8	RF OUTPUT
9	RF OUTPUT
10	RF OUTPUT
11	RF OUTPUT
12	RF OUTPUT
13	RF OUTPUT
14	RF OUTPUT

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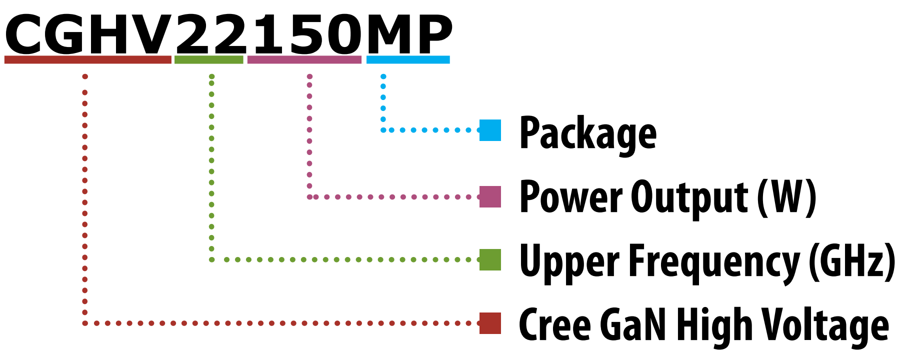
Part Number System



Parameter	Value	Units
Upper Frequency[1]	2.2	GHz
Power Output	150	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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