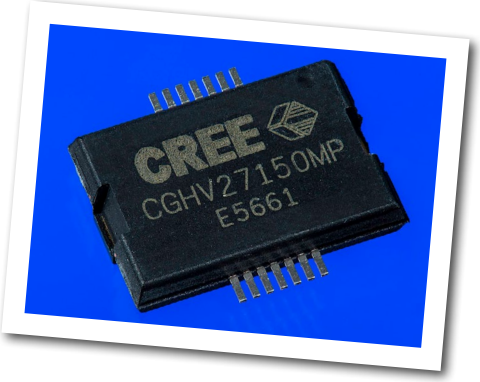
PRELIMINARY

CGHV27150MP

150 W, 2300-2700 MHz, 50 V, GaN HEMT for LTE

Cree's CGHV27150MP 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 CGHV27150MP ideal for 2.3 - 2.7 GHz LTE, 4G Telecom and BWA amplifier applications. The transistor is input matched and supplied in an overmold flange package.



PN: CGHV27150MP

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 @ 45 dBm	16.4	16.6	16.1	dB
ACLR @ 45 dBm	-38.0	-34.7	-33.0	dBc
Drain Efficiency @ 45 dBm	30.0	33.8	36.9	%

Note:
Measured in the CGHV27150MP-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

- 2.3 - 2.7 GHz Operation
- 16 dB Gain
- -35 dBc ACLR at 30 W P_{AVE}
- 34% Efficiency at 30 W P_{AVE}
- High Degree of DPD Correction Can be Applied

Rev 0 – May 2014

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 CGHV27150MP
[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 = 2.7 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	–	63	–	%	V_{DD} = 50 V, I_{DQ} = 625 mA, P_{OUT} = P_{SAT}
Gain[6]	G	–	16	–	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	–	34	–	%	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 CGHV27150MP-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.

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 Gain and Return Losses vs Frequency for the CGHV27150MP measured in CGHV27150MP-TB Amplifier Circuit
V_{DD} = 50 V, I_{DQ} = 0.625 A

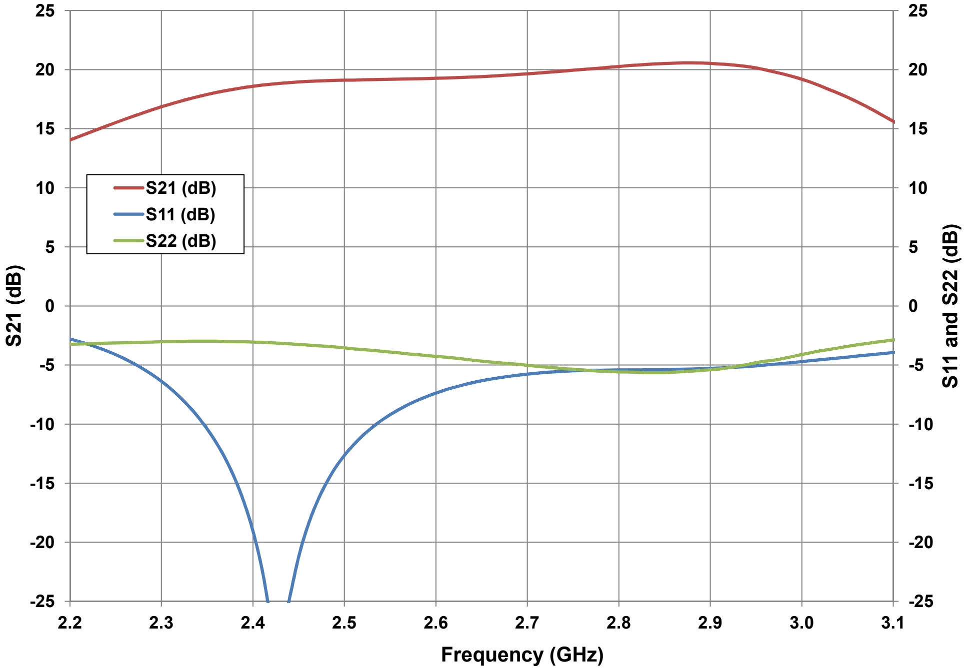
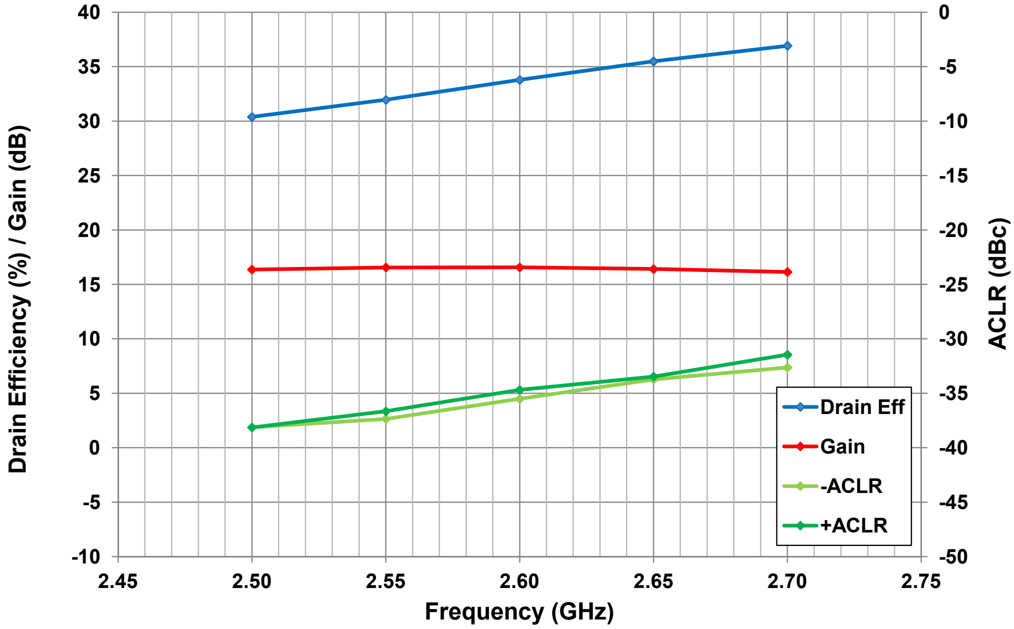


Figure 2. - Typical Gain, Drain Efficiency and ACLR vs Frequency CGHV27150MP measured in CGHV27150MP-TB Amplifier Circuit
V_{DD} = 50 V, I_{DQ} = 0.625 A, P_{AVE} = 30 W, 1c WCDMA, PAR = 7.5 dB



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Typical Performance

Figure 3. - Typical P_{SAT} and Drain Efficency vs Frequency
100 μs, 10% Duty Cycle

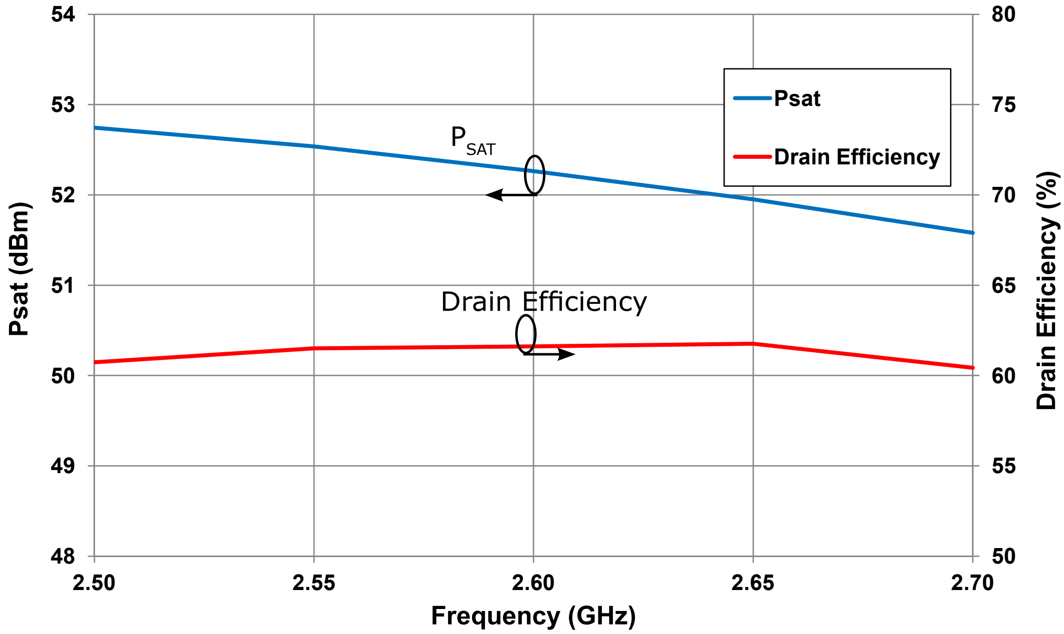
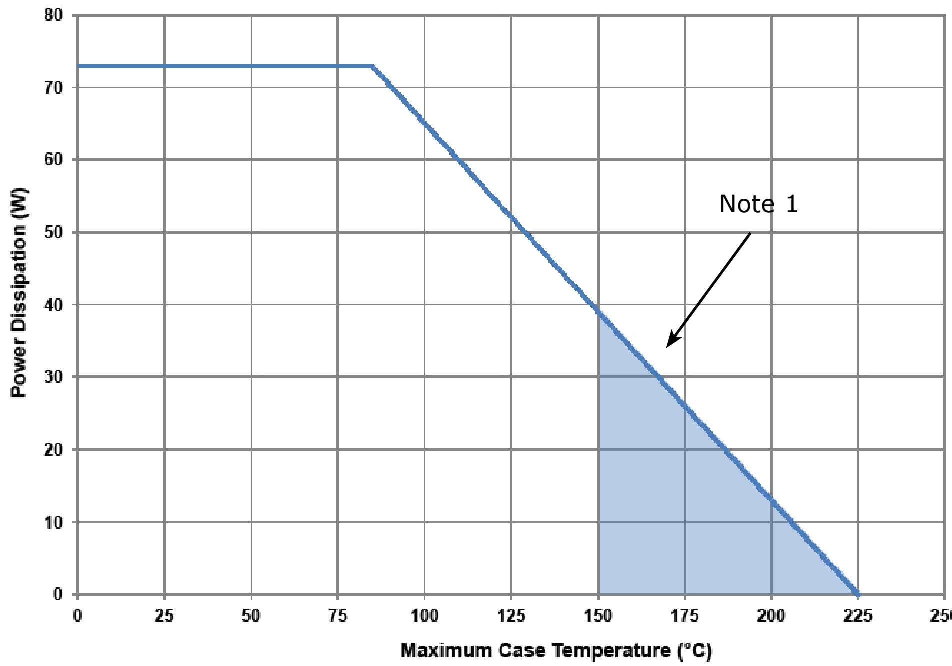


Figure 4. - Power Dissipation Derating Curve



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

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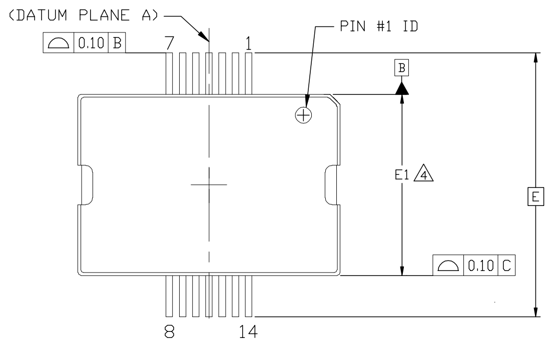
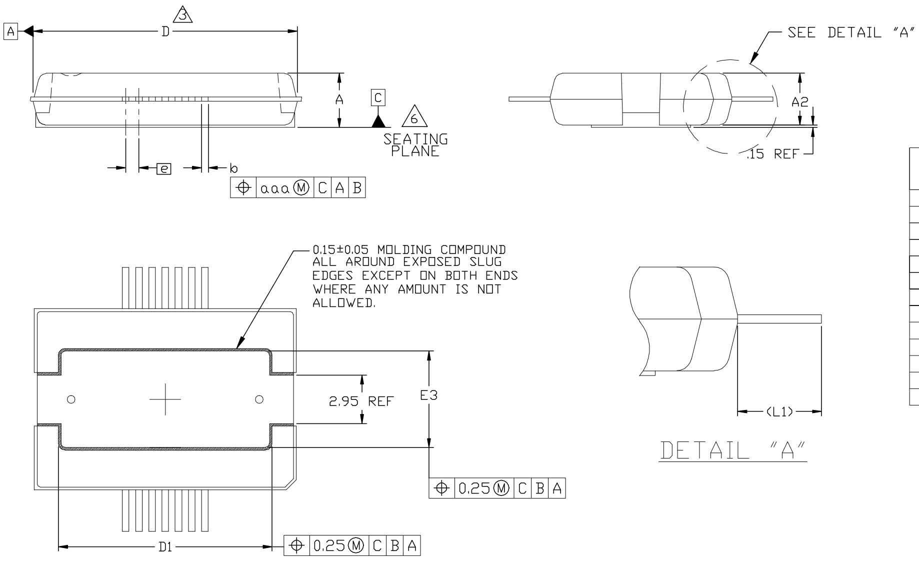
Product Dimensions CGHV27150MP (Package Type)



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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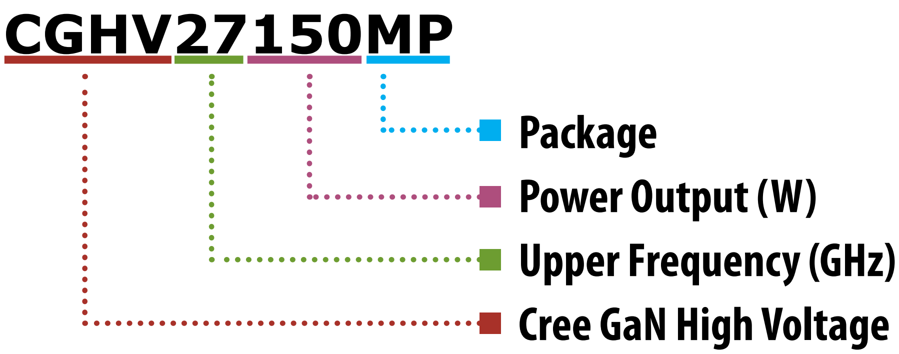
Part Number System



Parameter	Value	Units
Upper Frequency[1]	2.7	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.

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
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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