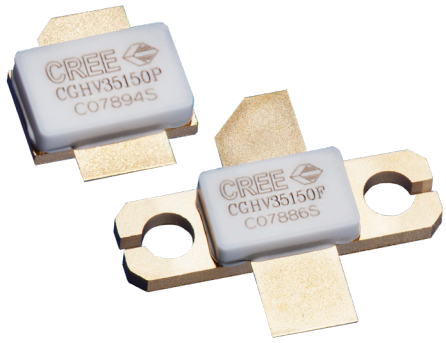
CGHV35150

150 W, 2900 - 3500 MHz, 50V, GaN HEMT for S-Band Radar Systems



Package Types: 440193 / 440206
PNs: CGHV35150F / CGHV35150P

Description

Cree's CGHV35150 is a gallium nitride (GaN) high electron mobility transistor (HEMT) designed specifically with high efficiency, high gain and wide bandwidth capabilities, which makes the CGHV35150 ideal for 2.9 - 3.5 GHz S-Band radar amplifier applications. The transistor is supplied in a ceramic/ metal flange and pill package.

Typical Performance 3.1 - 3.5 GHz (T_c = 85˚C)

Parameter	3.1 GHz	3.2 GHz	3.3 GHz	3.4 GHz	3.5 GHz	Units
Output Power	180	180	180	170	150	W
Gain	13.5	13.5	13.5	13.3	12.7	dB
Drain Efficiency	50	49	50	49	48	%

Note: Measured in the CGHV35150-AMP application circuit, under 300 µs pulse width, 20% duty cycle, P_{IN} = 39 dBm

Features

- Rated Power = 150 W @ T_{CASE} = 85°C
- Operating Frequency = 2.9 - 3.5 GHz
- Transient 100 µsec - 300 µsec @ 20% Duty Cycle
- 13 dB Power Gain @ T_{CASE} = 85°C
- 50% Typical Drain Efficiency @ T_{CASE} = 85°C
- Input Matched
- <0.3 dB Pulsed Amplitude Droop

Large Signal Models Available for ADS and MWO

RoHS COMPLIANT

Absolute Maximum Ratings (not simultaneous)

Parameter	Symbol	Rating	Units	Conditions
Drain-Source Voltage	V_{DSS}	150	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}	30	mA	25˚C
Maximum Drain Current[1]	I_{DMAX}	12	A	25˚C
Soldering Temperature[2]	T_S	245	˚C	
Screw Torque	τ	40	in-oz	
Pulsed Thermal Resistance, Junction to Case[3]	$R_{\theta JC}$	0.81	˚C/W	300 µsec, 20%, 85˚C
Pulsed Thermal Resistance, Junction to Case[4]	$R_{\theta JC}$	0.86	˚C/W	300 µsec, 20%, 85˚C
Case Operating Temperature	T_C	-40, +150	˚C	

Notes:
[1] Current limit for long term, reliable operation
[2] Refer to the Application Note on soldering at wolfspeed.com/rf/document-library
[3] Measured for the CGHV35150P at P_{DISS} = 150 W
[4] Measured for the CGHV35150F at P_{DISS} = 150 W

Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Units	Conditions
DC Characteristics[1] (T_C = 25˚C)						
Gate Threshold Voltage	$V_{GS(th)}$	-3.8	-3.0	-2.3	V_{DC}	V_{DS} = 10 V, I_D = 28.8 mA
Gate Quiescent Voltage	$V_{GS(Q)}$	–	-2.7	–	V_{DC}	V_{DS} = 50 V, I_D = 500 mA
Saturated Drain Current[2]	I_{DS}	18.7	26.8	–	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 = 28.8 mA
RF Characteristics[3] (T_C = 85˚C, F_0 = 3.1 - 3.5 GHz unless otherwise noted)						
Output Power at 3.1 GHz	P_{OUT}	130	170	–	W	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Output Power at 3.5 GHz	P_{OUT}	100	135	–	W	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Gain at 3.1 GHz	G_P	12.0	13.3	–	dB	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Gain at 3.5 GHz	G_P	11.0	12.3	–	dB	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Drain Efficiency at 3.1 GHz	D_E	40	47	–	%	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Drain Efficiency at 3.5 GHz	D_E	40	44	–	%	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Amplitude Droop	D	–	-0.3	–	dB	V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Output Mismatch Stress	VSWR	–	–	5 : 1	Ψ	No damage at all phase angles, V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm Pulsed

Notes:
[1] Measured on wafer prior to packaging
[2] Scaled from PCM data
[3] Measured in CGHV35150-AMP. Pulse Width = 300 µS, Duty Cycle = 20%

Typical Performance

Figure 1. CGHV35150 Typical Sparameters
V_{DD} = 50 V, I_{DQ} = 500 mA, T_{CASE} = 25°C

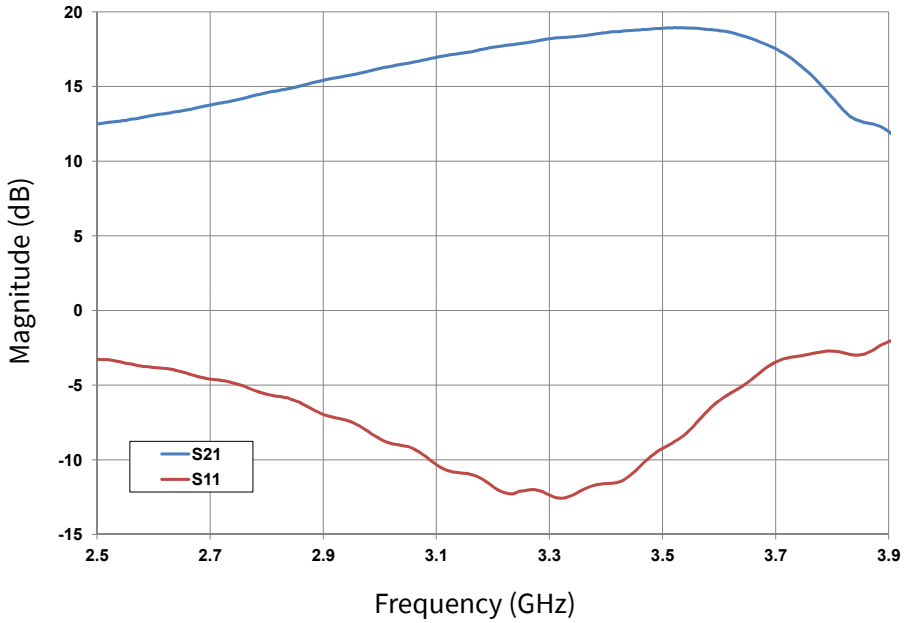
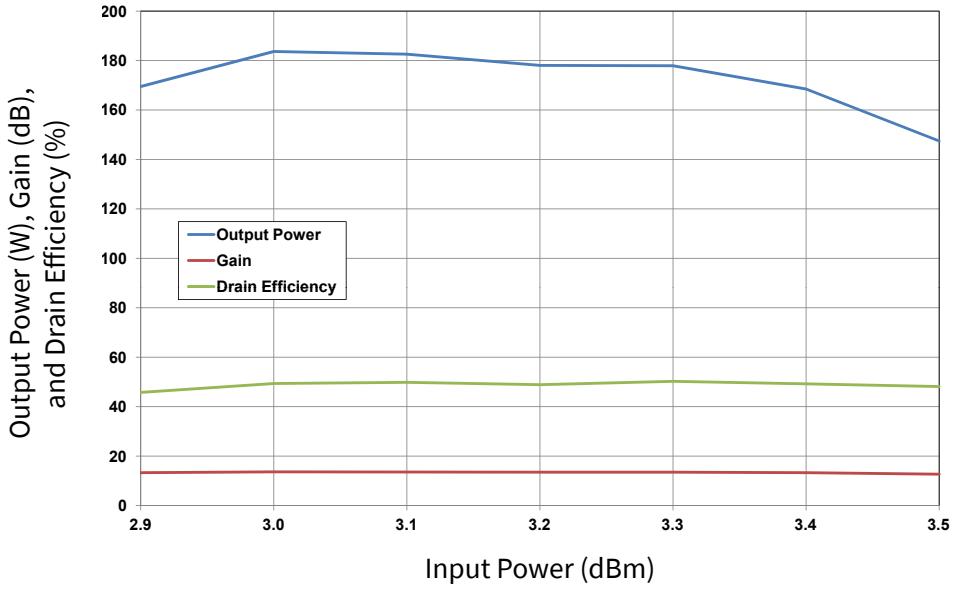


Figure 2. CGHV35150 Typical RF Results
V_{DD} = 50 V, I_{DQ} = 500 mA, P_{IN} = 39 dBm
Tplate = 85°C, Pulse Width = 300 us, Duty Cycle = 20%



Typical Performance

Figure 3. CGHV35150 Output Power vs Input Power
V_{DD} = 50 V, I_{DQ} = 500 mA, T_{PLATE} = 85°C, Pulse Width = 300 µs, Duty Cycle = 20%

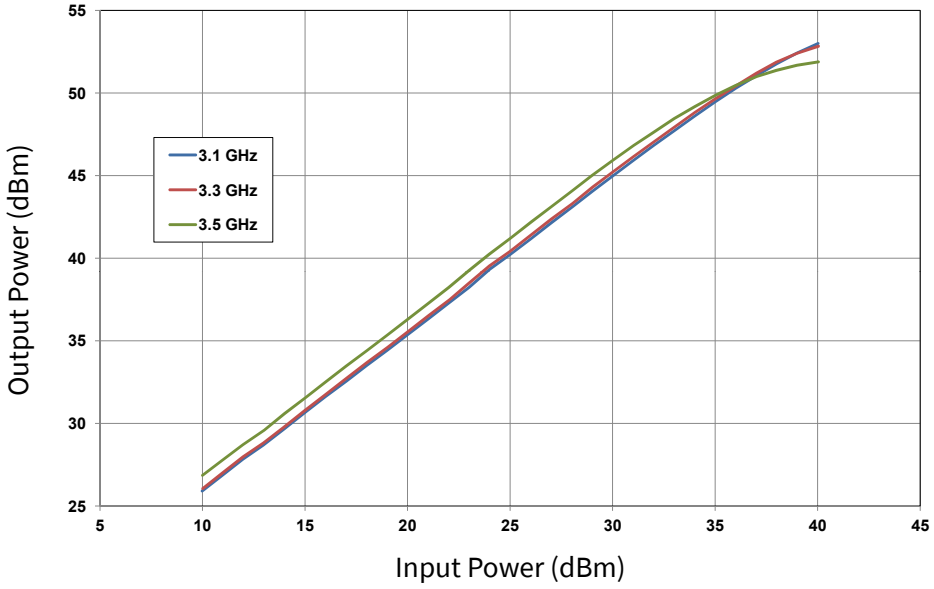
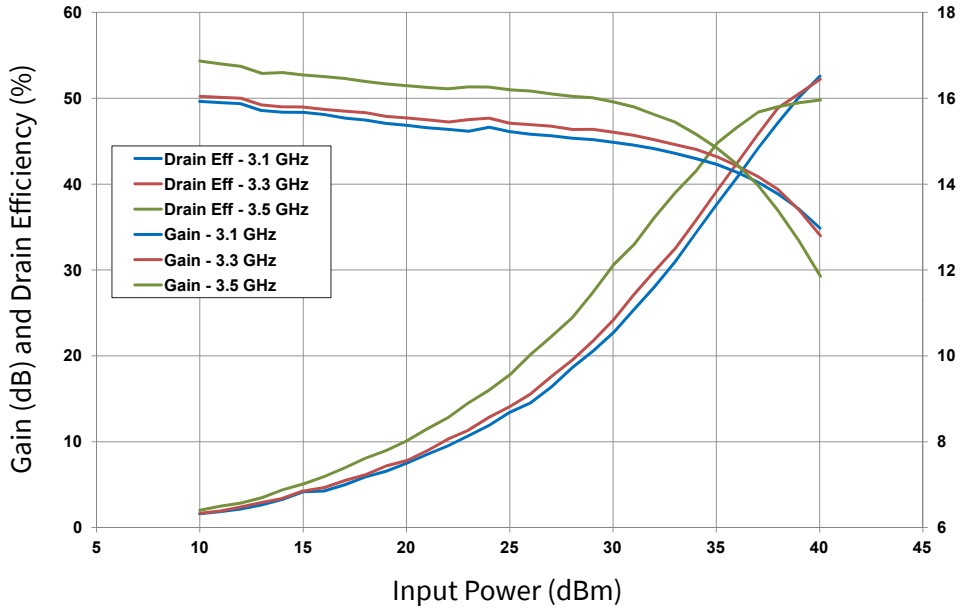


Figure 4. CGHV35150 Gain and Drain Efficiency vs Input Power
V_{DD} = 50 V, I_{DQ} = 500 mA, Tplate = 85°C, Pulse Width = 300 µs, Duty Cycle = 20%

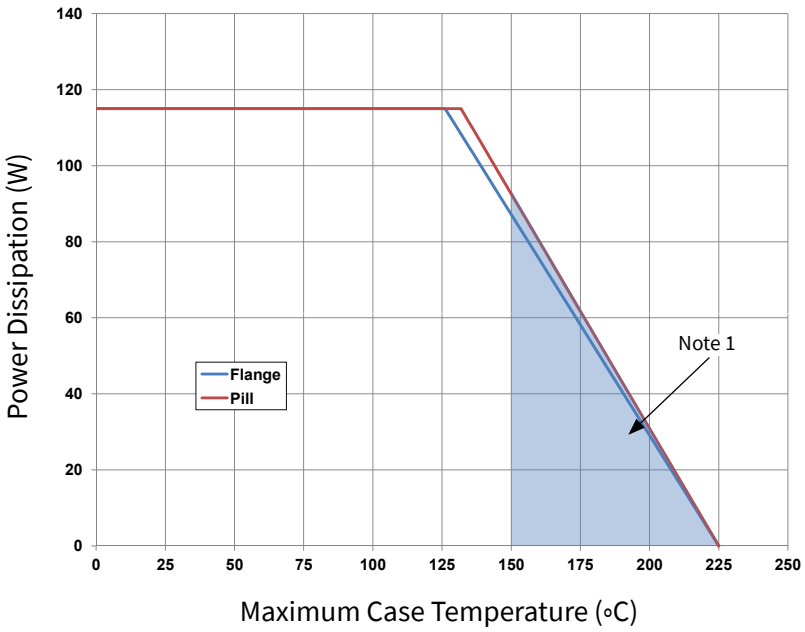


Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Class	Test Methodology
Human Body Model	HBM	1A (> 250 V)	JEDEC JESD22 A114-D
Charge Device Model	CDM	II (200 V to 500 V)	JEDEC JESD22 C101-C

CGHV35150 Power Dissipation De-rating Curve

Figure 5. CGHV35150 Transient Power Dissipation De-Rating Curve

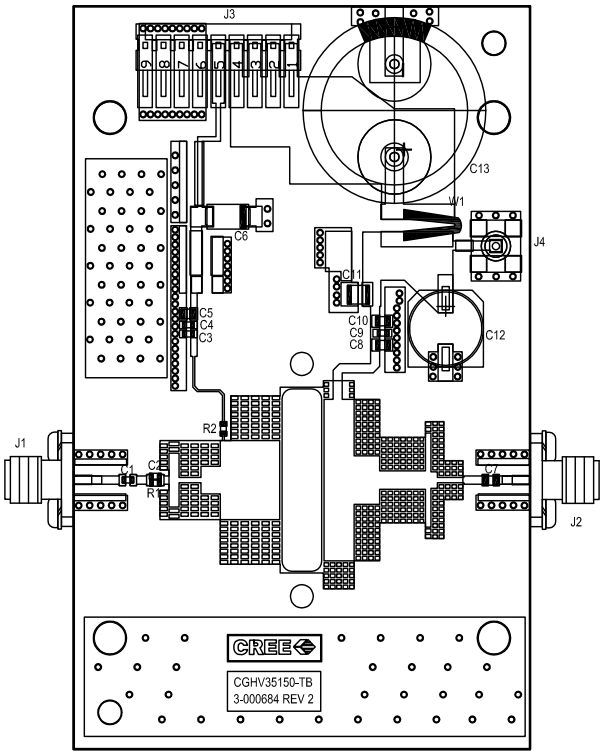


Note 1. Area exceeds Maximum Case Temperature (See Page 2)

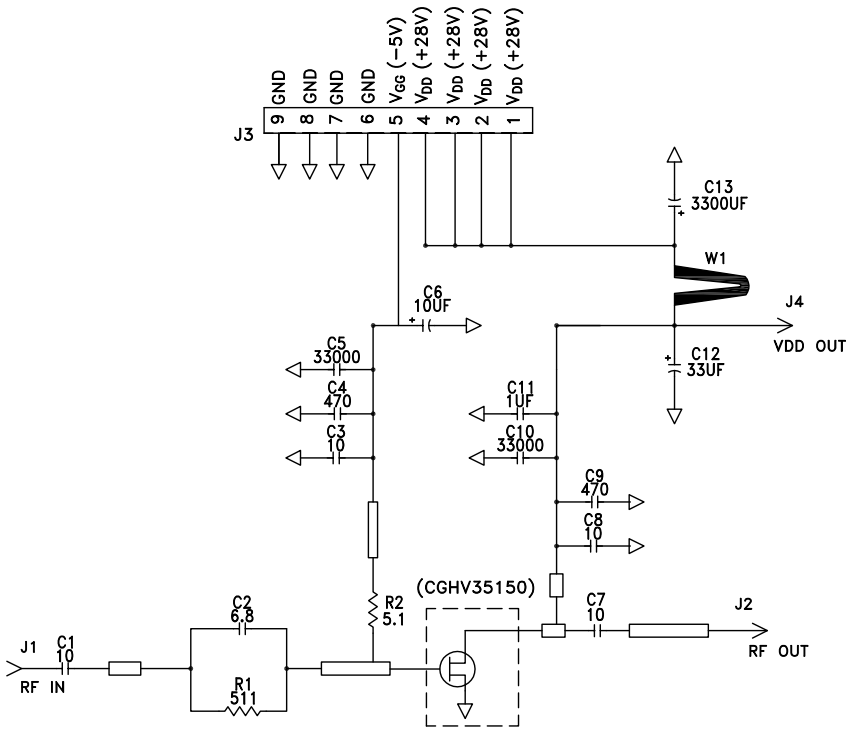
CGHV35150-AMP Application Circuit Bill of Materials

Designator	Description	Qty
R1	RES, 511 OHM, +/- 1%, 1/16W, 0603	1
R2	RES, 5.1 OHM, +/- 1%, 1/16W, 0603	1
C1,C7,C8	CAP, 10pF, +/- 1%, 250V, 0805	3
C2	CAP, 6.8pF, +/- 0.25 pF,250V, 0603	1
C3	CAP, 10.0pF, +/-5%,250V, 0603	1
C4,C9	CAP, 470PF, 5%, 100V, 0603, X	2
C5,C10	CAP, 33000PF, 0805,100V, X7R	1
C6	CAP 10uF 16V TANTALUM	1
C11	CAP, 1.0UF, 100V, 10%, X7R, 1210	1
C12	CAP, 33 UF, 20%, G CASE	1
C13	CAP, 3300 UF, +/-20%, 100V, ELECTROLYTIC	1
J1,J2	CONN, SMA, PANEL MOUNT JACK, FL	2
J3	HEADER RT>PLZ .1CEN LK 9POS	1
J4	CONNECTOR ; SMB, Straight, JACK,SMD	1
W1	CABLE ,18 AWG, 4.2	1
	PCB, RO4350, 20 MIL THK, CGHV35150	1
Q1	CGHV35150	1

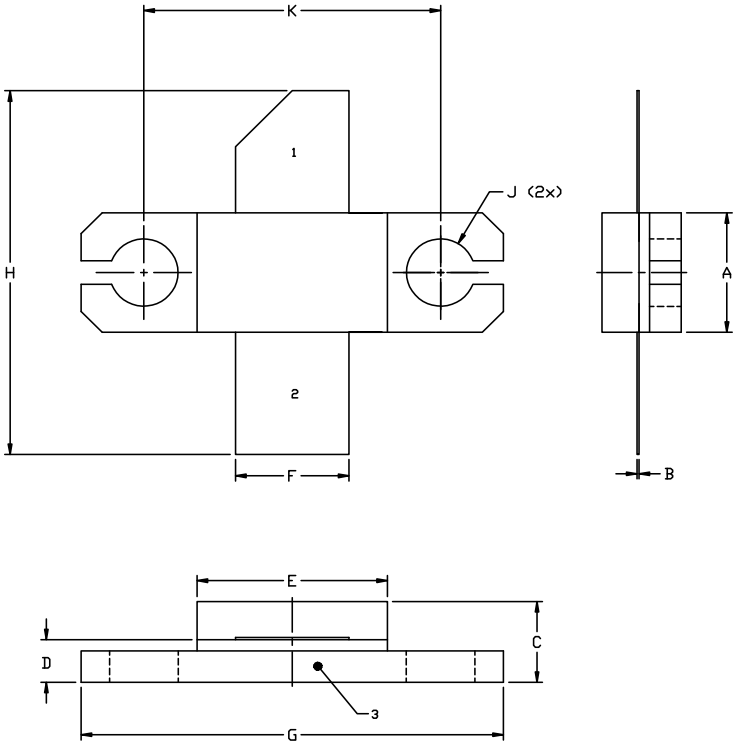
CGHV35150-AMP Application Circuit Outline



CGHV35150-AMP Application Circuit Schematic



Product Dimensions CGHV35150F (Package Type — 440193)



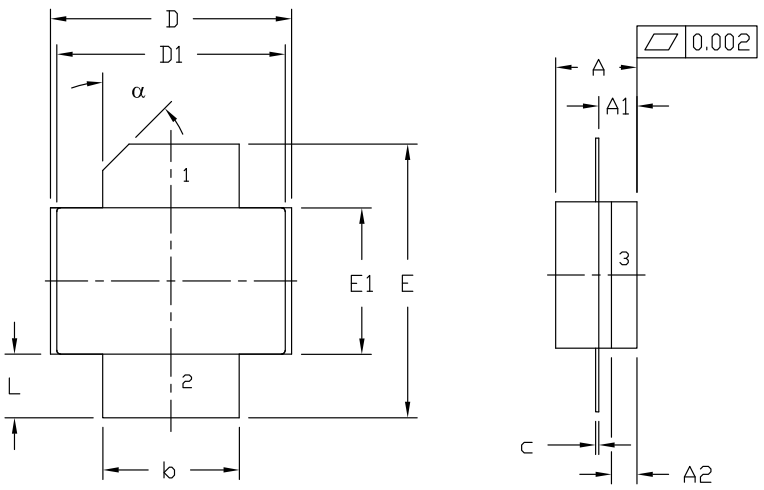
NOTES:

1. DIMENSIONING AND TOLERANICING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ADHESIVE FROM LID MAY EXTEND A MAXIMUM OF 0.020" BEYOND EDGE OF LID.
4. LID MAY BE MISALIGNED TO THE BODY OF THE PACKAGE BY A MAXIMUM OF 0.008" IN ANY DIRECTION.
5. ALL PLATED SURFACES ARE NI/AU

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.72	5.97
B	0.004	0.006	0.10	0.15
C	0.145	0.165	3.18	4.19
D	0.077	0.087	1.96	2.21
E	0.355	0.365	9.02	9.27
F	0.210	0.220	5.33	5.59
G	0.795	0.805	20.19	20.45
H	0.670	0.730	17.02	18.54
J	ø .130		3.30	
k	0.562		14.28	

PIN 1. GATE
PIN 2. DRAIN
PIN 3. SOURCE

Product Dimensions CGHV35150P (Package Type — 440206)



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M – 1994.
2. CONTROLLING DIMENSION: INCH.
3. ADHESIVE FROM LID MAY EXTEND A MAXIMUM OF 0.020" BEYOND EDGE OF LID.
4. LID MAY BE MISALIGNED TO THE BODY OF PACKAGE BY A MAXIMUM OF 0.008" IN ANY DIRECTION.

DIM	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.125	0.145	3.18	3.68	
A1	0.057	0.067	1.45	1.70	
A2	0.035	0.045	0.89	1.14	
b	0.210	0.220	5.33	5.59	2x
c	0.004	0.006	0.10	0.15	2x
D	0.375	0.385	9.53	9.78	
D1	0.355	0.365	9.02	9.27	
E	0.400	0.460	10.16	11.68	
E1	0.225	0.235	5.72	5.97	
L	0.085	0.115	2.16	2.92	2x
α	45° REF		45° REF		

PIN 1. GATE
2. DRAIN
3. SOURCE

Part Number System

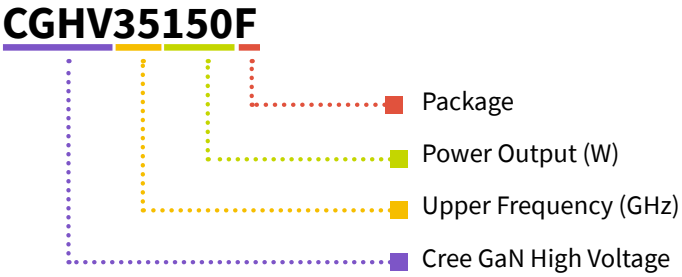


Table 1.

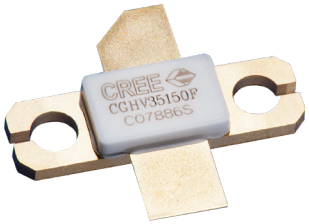
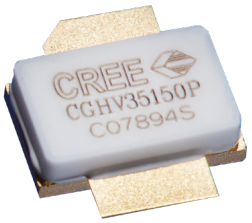
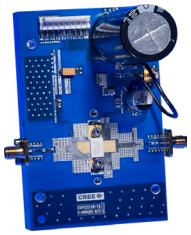
Parameter	Value	Units
Upper Frequency[1]	3.5	GHz
Power Output	150	W
Package	F = Flange, P = Pill	-

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

Table 2.

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

Product Ordering Information

Order Number	Description	Unit of Measure	Image
CGHV35150F	GaN HEMT	Each	
CGHV35150P	GaN HEMT	Each	
CGHV35150F-AMP	Test board with GaN HEMT installed	Each	

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com

Notes

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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for RF Development Tools ***category:***

Click to view products by Wolfspeed ***manufacturer:***

Other Similar products are found below :

MAAM-011117 MAAP-015036-DIEEV2 EV1HMC1113LP5 EV1HMC6146BLC5A EV1HMC637ALP5 EVAL-ADG919EBZ ADL5363-EVALZ LMV228SDEVAL SKYA21001-EVB SMP1331-085-EVB EV1HMC618ALP3 EVAL01-HMC1041LC4 MAAL-011111-000SMB MAAM-009633-001SMB 107712-HMC369LP3 107780-HMC322ALP4 SP000416870 EV1HMC470ALP3 EV1HMC520ALC4 EV1HMC244AG16 MAX2614EVKIT# 124694-HMC742ALP5 SC20ASATEA-8GB-STD MAX2837EVKIT+ MAX2612EVKIT# MAX2692EVKIT# EV1HMC629ALP4E SKY12343-364LF-EVB 108703-HMC452QS16G EV1HMC863ALC4 EV1HMC427ALP3E 119197-HMC658LP2 EV1HMC647ALP6 ADL5725-EVALZ 106815-HMC441LM1 EV1HMC1018ALP4 UXN14M9PE MAX2016EVKIT EV1HMC939ALP4 MAX2410EVKIT MAX2204EVKIT+ EV1HMC8073LP3D SIMSA868-DKL SIMSA868C-DKL SKY65806-636EK1 SKY68020-11EK1 SKY67159-396EK1 SKY66181-11-EK1 SKY65804-696EK1 SKY13396-397LF-EVB