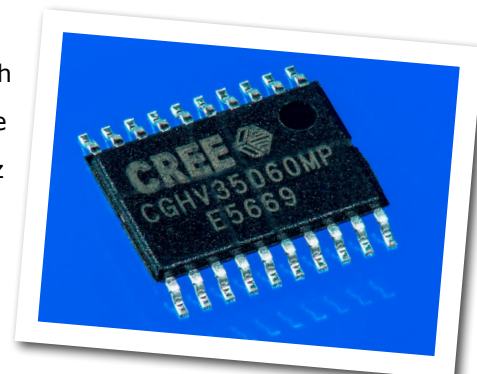


# CGHV35060MP

**60W, 2700-3500 MHz, 50V, GaN HEMT for S Band Radar and LTE base stations**

Cree's CGHV35060MP is a 60W input matched, gallium nitride (GaN) high electron mobility transistor (HEMT) optimized for S Band performance. The CGHV35060MP is suitable for typical bands of 2.7-3.1GHz and 3.1-3.5GHz while the input matched transistor provides optimal gain, power and efficiency in a small 6.5mm x 4.4mm plastic surface mount (SMT) package. The typical performance plots in the datasheet are derived with CGHV35060MP matched into a 3.1-3.5GHz high power amplifier.



PN: CGHV35060MP

## Typical Performance Over 3.1 - 3.5 GHz ( $T_c = 25^\circ\text{C}$ ) of Demonstration Amplifier

Parameter	3.1 GHz	3.3 GHz	3.5 GHz	Units
Gain	14.5	14.3	13.8	dB
Output Power	88	88	75	W
Drain Efficiency	61	67	64	%

Note:

Measured in the CGHV35060MP-TB amplifier circuit, under 100  $\mu\text{s}$  pulse width, 10% duty cycle,  $P_{IN} = 35\text{ dBm}$ .

## Features

- Reference design amplifier 3.1 - 3.5 GHz
- 75W Typical output power
- 14.5 dB power gain
- 67% Drain efficiency
- Internally pre-matched on input, unmatched output



## Absolute Maximum Ratings (not simultaneous) at 25 °C Case Temperature

Parameter	Symbol	Rating	Units	Conditions
Drain-Source Voltage	$V_{DS}$	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	$I_{GMAX}$	10.4	mA	25 °C
Maximum Drain Current <sup>1</sup>	$I_{DMAX}$	6.3	A	25 °C
Soldering Temperature <sup>2</sup>	$T_S$	245	°C	
CW Thermal Resistance, Junction to Case <sup>3</sup>	$R_{\theta JC}$	2.6	°C/W	85 °C, $P_{DISS} = 52$ W
Pulsed Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.95	°C/W	85 °C, $P_{DISS} = 62$ W, 100 $\mu$ sec 10%
Case Operating Temperature <sup>4</sup>	$T_C$	-40, +107	°C	

Note:

<sup>1</sup> Current limit for long term, reliable operation.

<sup>2</sup> Refer to the Application Note on soldering at <http://www.cree.com/rf/document-library>

<sup>3</sup> Measured for the CGHV35060MP

<sup>4</sup> See also, the Power Dissipation De-rating Curve on Page 4.

## Electrical Characteristics ( $T_C = 25^\circ\text{C}$ )

Characteristics	Symbol	Min.	Typ.	Max.	Units	Conditions
<b>DC Characteristics<sup>1</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	-3.8	-3.0	-2.3	$V_{DC}$	$V_{DS} = 10$ V, $I_D = 10.4$ mA
Gate Quiescent Voltage	$V_{GS(Q)}$	-	-2.7	-	$V_{DC}$	$V_{DS} = 50$ V, $I_D = 125$ mA
Saturated Drain Current <sup>2</sup>	$I_{DS}$	8.4	10.4	-	A	$V_{DS} = 6.0$ V, $V_{GS} = 2.0$ V
Drain-Source Breakdown Voltage	$V_{BR}$	150	-	-	$V_{DC}$	$V_{GS} = -8$ V, $I_D = 10.4$ mA
<b>RF Characteristics<sup>4</sup> (<math>T_C = 25^\circ\text{C}</math>, <math>F_0 = 3.3</math> GHz unless otherwise noted)</b>						
Saturated Output Power <sup>3</sup>	$P_{SAT}$	-	75	-	W	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{IN} = 35$ dBm
Pulsed Drain Efficiency <sup>3</sup>	$\eta$	-	67	-	%	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{IN} = 35$ dBm
Gain <sup>3</sup>	G	-	14.5	-	dB	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{IN} = 35$ dBm
Gain <sup>5</sup>	G	-	17	-	dB	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
WCDMA Linearity <sup>5</sup>	ACLR	-	-35	-	dBc	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
Drain Efficiency <sup>5</sup>	$\eta$	-	35	-	%	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
Output Mismatch Stress <sup>3</sup>	VSWR	-	-	TBD	$\Psi$	No damage at all phase angles, $V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 60$ W Pulsed
<b>Dynamic Characteristics</b>						
Input Capacitance <sup>6</sup>	$C_{GS}$	-	32.16	-	pF	$V_{DS} = 50$ V, $V_{gs} = -8$ V, $f = 1$ MHz
Output Capacitance <sup>6</sup>	$C_{DS}$	-	4.4	-	pF	$V_{DS} = 50$ V, $V_{gs} = -8$ V, $f = 1$ MHz
Feedback Capacitance	$C_{GD}$	-	0.5	-	pF	$V_{DS} = 50$ V, $V_{gs} = -8$ V, $f = 1$ MHz

Notes:

<sup>1</sup> Measured on wafer prior to packaging.

<sup>2</sup> Scaled from PCM data.

<sup>3</sup> Pulse Width = 100  $\mu$ s, Duty Cycle = 10%

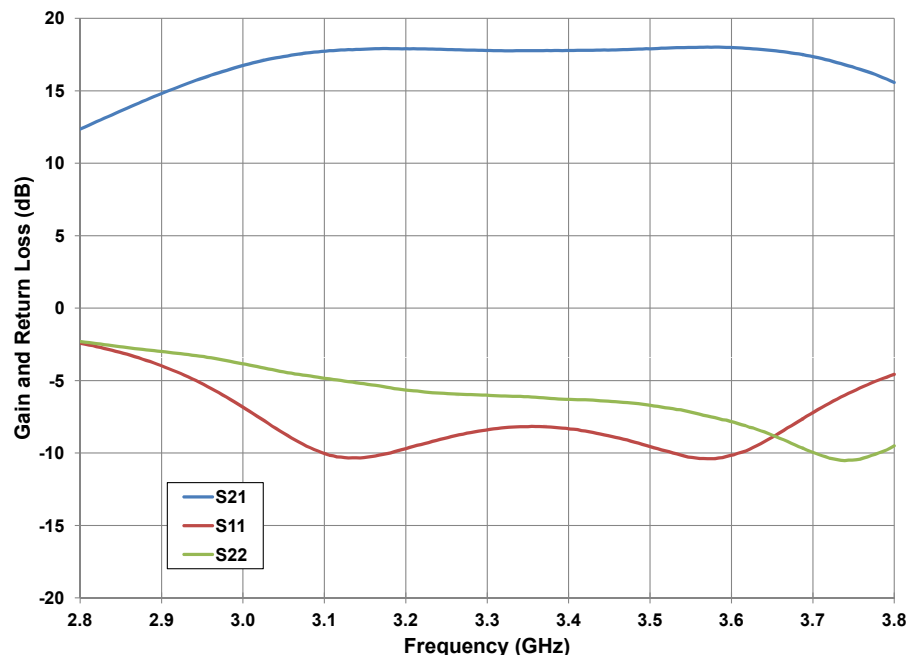
<sup>4</sup> Measured in CGHV35060MP-TB.

<sup>5</sup> Single Carrier WCDMA, 3GPP Test Model 1, 64 DPCH, 45% Clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF,  $V_{DD} = 50$  V.

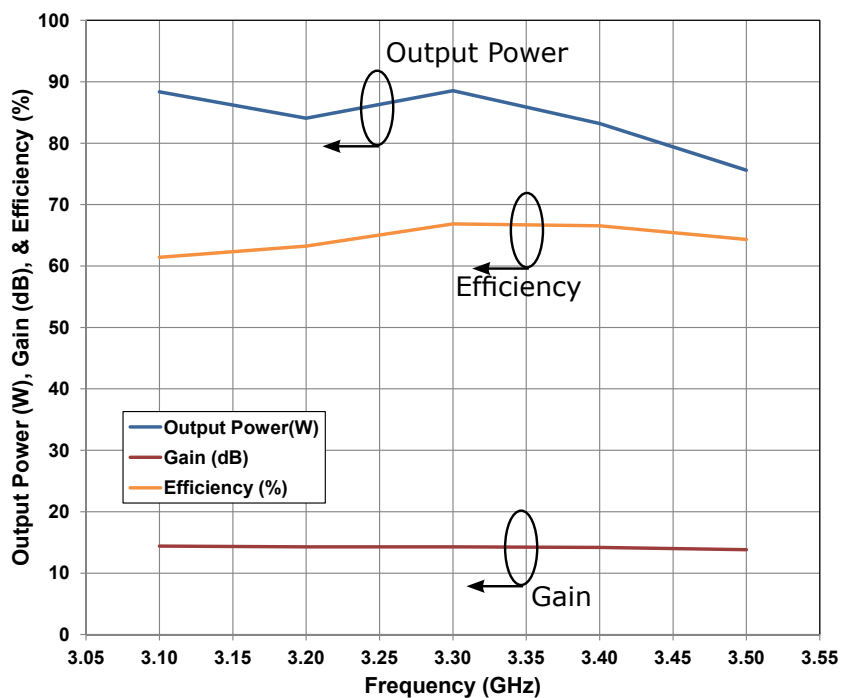
<sup>6</sup> Includes package.

## Typical Performance

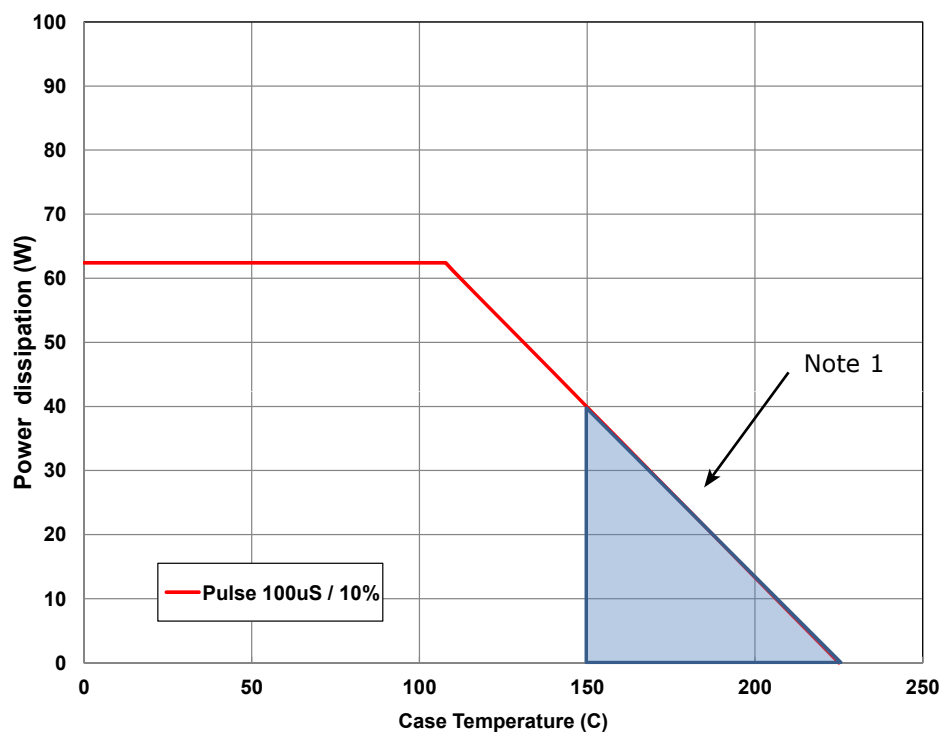
**Figure 1. - Small Signal Gain and Return Losses of the CGHV35060MP Measured in Demonstration Amplifier Circuit CGHV35060MP-TB**



**Figure 2. - Gain, Efficiency & Output Power for the CGHV35060MP at  $P_{IN} = 35$  dBm with 100  $\mu$ s/10% as Measured in Demonstration Amplifier Circuit CGHV35060MP**



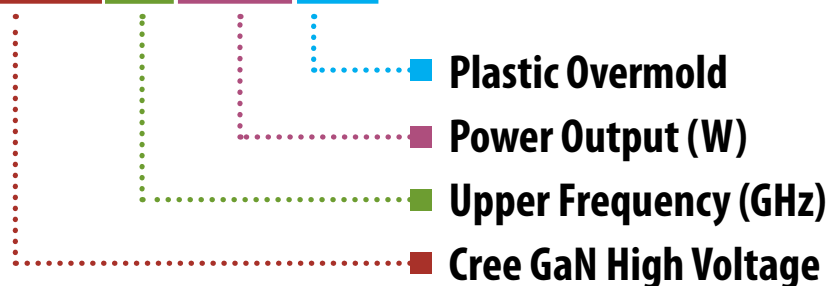
## CGHV35060MP Power Dissipation De-rating Curve



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

## Part Number System

### CGHV35060MP



Parameter	Value	Units
Upper Frequency <sup>1</sup>	3.5	GHz
Power Output	60	W
Package	MP	-

**Table 1.**

**Note<sup>1</sup>:** 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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