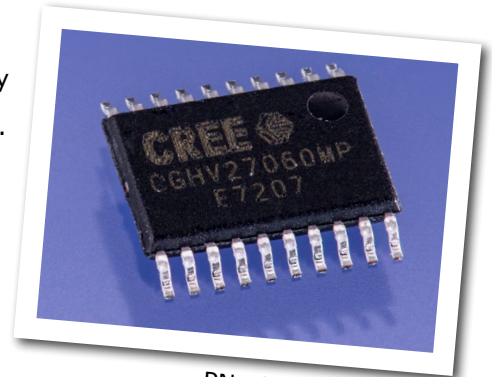


CGHV27060MP

60 W, DC - 2700 MHz, 50 V, GaN HEMT for LTE and Pulse Radar Applications

Cree's CGHV27060MP is a 60W gallium nitride (GaN) high electron mobility transistor (HEMT) housed in a small plastic SMT package 4.4mm x 6.5mm. The transistor is a broadband device with no internal input or output match which allows for the agility to apply to a wide range of frequencies from UHF thru 2.7GHz. The CGHV27060MP makes for an excellent transistor for pulsed applications at UHF, L Band or low S Band (<2.7GHz). Additionally, the transistor is well suited for LTE micro basestation amplifiers in the power class of 10 to 15W average power in high efficiency topologies such as Class A/B, F or Doherty amplifiers. The CGHV27060MP typical performance described in the datasheet is derived from a Class A/B reference design from 2.5-2.7GHz.



PN: CGHV27060MP

Typical Performance Over 2.5 - 2.7 GHz ($T_c = 25^\circ\text{C}$) of Demonstration Amplifier

Parameter	2.5 GHz	2.6 GHz	2.7 GHz	Units
Gain @ 41.5 dBm Avg P_{OUT}	18.25	18.5	18.25	dB
ACLR @ 41.5 dBm Avg P_{OUT}	-34	-37	-38	dBc
Drain Efficiency @ 41.5 dBm Avg P_{OUT}	33	35	33	%

Note:

Measured in the CGHV27060MP-TB amplifier circuit, under WCDMA 3GPP test model 1, 64 DPCH, 45% clipping, PAR = 7.5 dB @ 0.01% Probability on CCDF, $V_{DD} = 50\text{ V}$, $I_{DS} = 125\text{ mA}$.

Typical Performance Over 2.5 - 2.7 GHz ($T_c = 25^\circ\text{C}$) of Demonstration Amplifier

Parameter	2.5 GHz	2.6 GHz	2.7 GHz	Units
Gain	16.5	16.3	16.2	dB
Output Power	84	82	79	dBc
Drain Efficiency	71	69	65	%

Note:

Measured in the CGHV27060MP-TB amplifier circuit, under pulse width 100 μs , 10% duty cycle, $P_{IN} = 33\text{ dBm}$

Features - WCDMA

- 2.5 - 2.7 GHz Reference Design Amplifier
- 18.5 dB Gain at 14 W P_{AVE}
- -35 dBc ACLR at 14 W P_{AVE}
- 35% Efficiency at 14 W P_{AVE}
- High Degree of DPD Correction Can be Applied

Features - Pulsed

- 16.5 dB Gain at Pulsed P_{SAT}
- 70% Efficiency at Pulsed P_{SAT}
- 80W at Pulsed P_{SAT}



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 ¹	I_{DMAX}	6.3	A	25 °C
Soldering Temperature ²	T_S	245	°C	
Thermal Resistance, Junction to Case ³	$R_{\theta JC}$	2.6	°C/W	85 °C, $P_{DISS} = 52$ W
Thermal Resistance Pulsed 10%, 100 μ s, Junction to Case	$R_{\theta JC}$	1.95	°C/W	85 °C, $P_{DISS} = 62$ W, 100 μ s/10%
Case Operating Temperature ⁴	T_C	-40, +90	°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 CGHV27060MP

⁴ 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
DC Characteristics¹						
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 ²	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
RF Characteristics⁵ ($T_C = 25^\circ\text{C}$, $F_0 = 2.7$ GHz unless otherwise noted)						
Saturated Output Power ^{3,4}	P_{SAT}	-	80	-	W	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA
Pulsed Drain Efficiency ^{3,4}	η	-	70	-	%	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = P_{SAT}$
Gain ^{3,4}	G	-	16.5	-	dB	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = P_{SAT}$
Gain ⁶	G	-	18.5	-	dB	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
WCDMA Linearity ⁶	ACLR	-	-35	-	dBc	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
Drain Efficiency ⁶	η	-	34	-	%	$V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 41.5$ dBm
Output Mismatch Stress ³	VSWR	-	-	TBD	Ψ	No damage at all phase angles, $V_{DD} = 50$ V, $I_{DQ} = 125$ mA, $P_{OUT} = 60$ W Pulsed
Dynamic Characteristics						
Input Capacitance ⁷	C_{GS}	-	15.3	-	pF	$V_{DS} = 50$ V, $V_{GS} = -8$ V, $f = 1$ MHz
Output Capacitance ⁷	C_{DS}	-	4.7	-	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:

¹ Measured on wafer prior to packaging.

² Scaled from PCM data.

³ Pulse Width = 100 μ s, Duty Cycle = 10%

⁴ P_{SAT} is defined as $I_{GS} = 1.0$ mA peak

⁵ Measured in CGHV27060MP-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.

Typical Performance

Figure 1. - Small Signal Gain and Return Losses of the CGHV27060MP Measured in Demonstration Amplifier Circuit CGHV27060MP-TB

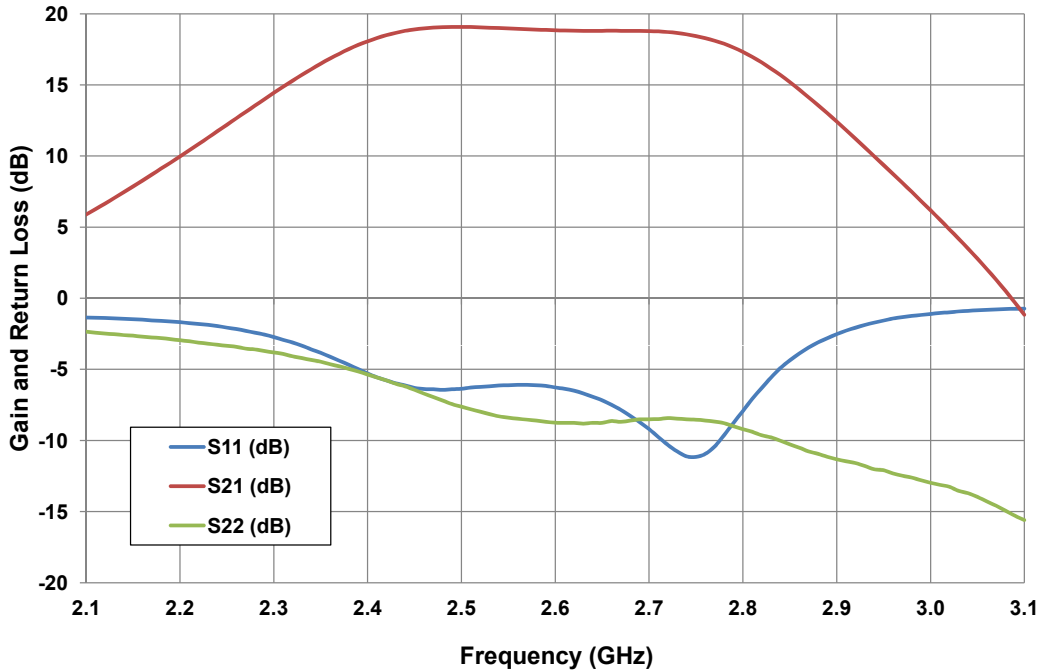
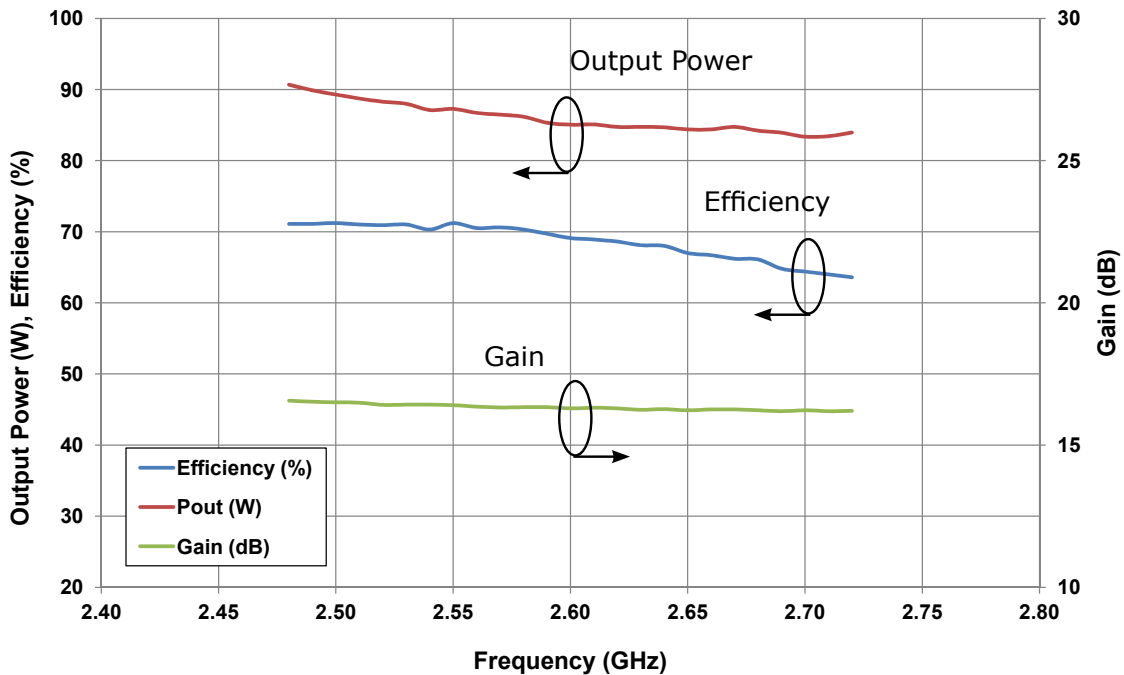
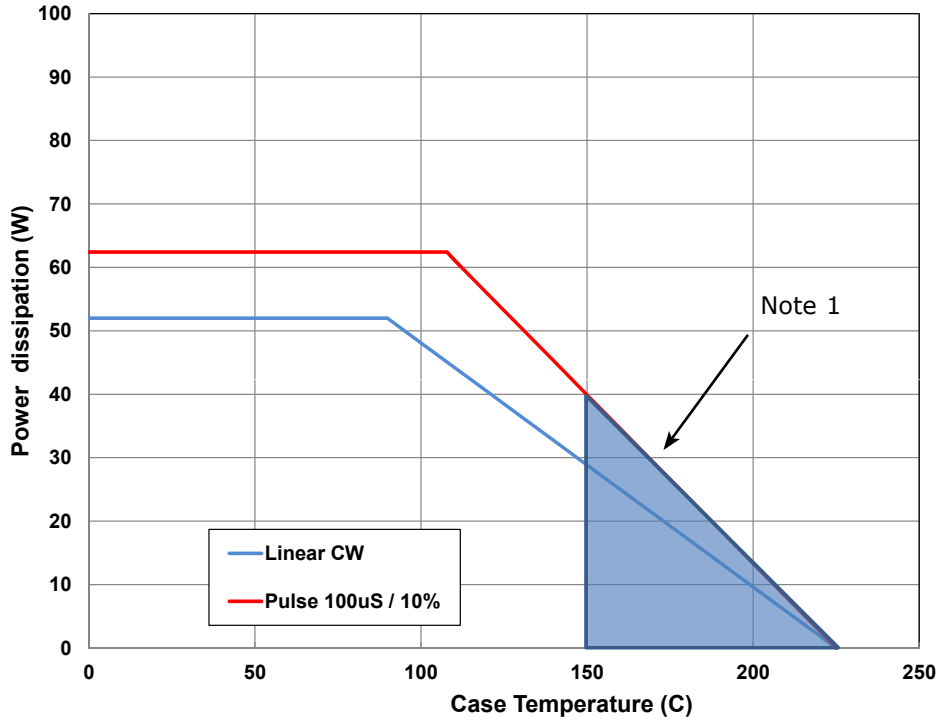


Figure 2. - Gain, Power Added Efficiency & Average Power Output at 10% Duty Cycle for the CGHV27060MP Measured in Demonstration Amplifier Circuit CGHV27060MP-TB



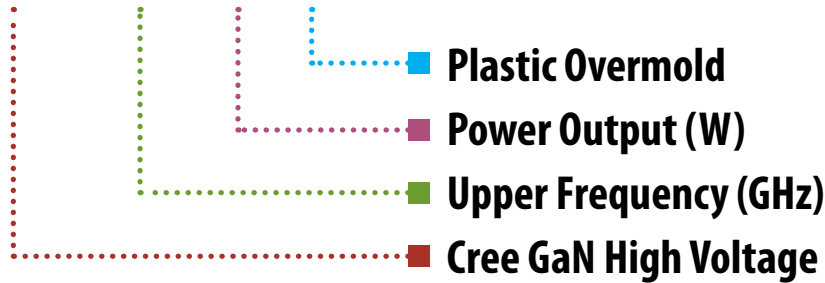
CGHV27060MP Power Dissipation De-rating Curve



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

Part Number System

CGHV27060MP



Parameter	Value	Units
Upper Frequency ¹	2.7	GHz
Power Output	60	W
Package	MP	-

Table 1.

Note¹: 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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