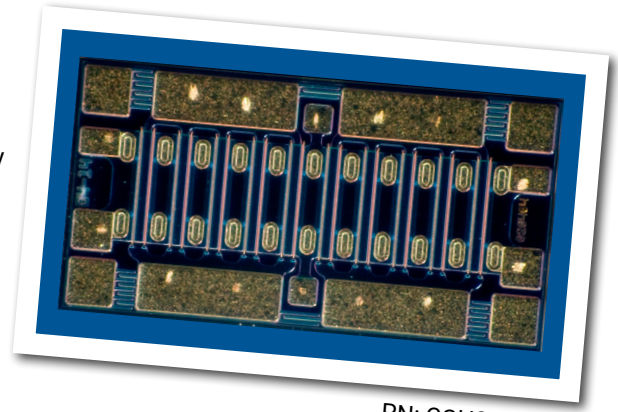


CGH80030D

30 W, 8.0 GHz, GaN HEMT Die

Cree's CGH80030D is a gallium nitride (GaN) High Electron Mobility Transistor (HEMT), based on Cree's 28V, 0.25um GaN-on-SiC process technology. GaN has superior properties compared to silicon or gallium arsenide, including higher breakdown voltage, higher saturated electron drift velocity, and higher thermal conductivity. GaN HEMTs offer greater power density and wider bandwidths compared to Si and GaAs transistors.



PN: CGH80030D

FEATURES

- 17 dB Typical Small Signal Gain at 4 GHz
- 12 dB Typical Small Signal Gain at 8 GHz
- 30 W Typical P_{SAT}
- 28 V Operation
- High Breakdown Voltage
- High Temperature Operation
- Up to 8 GHz Operation
- High Efficiency

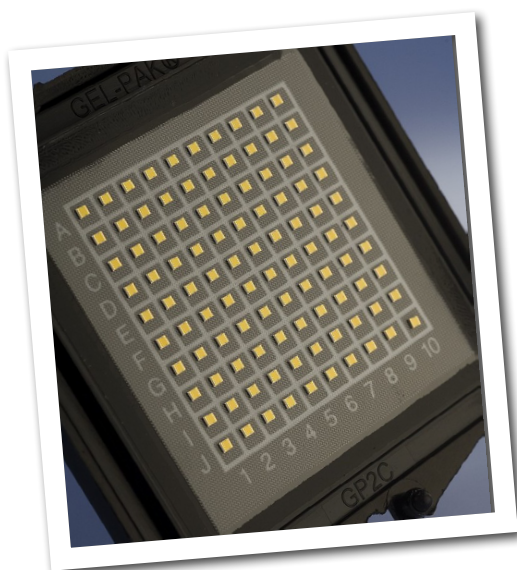
APPLICATIONS

- 2-Way Private Radio
- Broadband Amplifiers
- Cellular Infrastructure
- Test Instrumentation
- Class A, AB, Linear amplifiers suitable for OFDM, W-CDMA, EDGE, CDMA waveforms

Packaging Information



- Bare die are shipped in Gel-Pak® containers.
- Non-adhesive tacky membrane immobilizes die during shipment.



Large Signal Models Available for ADS and MWO

Absolute Maximum Ratings (not simultaneous) at 25°C

Parameter	Symbol	Rating	Units	Conditions
Drain-source Voltage	V_{DSS}	84	VDC	25°C
Gate-source Voltage	V_{GS}	-10, +2	VDC	25°C
Storage Temperature	T_{STG}	-65, +150	°C	
Operating Junction Temperature	T_J	225	°C	
Maximum Forward Gate Current	I_{GMAX}	7.0	mA	25°C
Maximum Drain Current ¹	I_{DMAX}	3.0	A	25°C
Thermal Resistance, Junction to Case (packaged) ²	$R_{\theta JC}$	4.9	°C/W	85°C, 28.8W Dissipation
Thermal Resistance, Junction to Case (die only)	$R_{\theta JC}$	2.74	°C/W	85°C, 28.8W Dissipation
Mounting Temperature (30 seconds)	T_S	320	°C	30 seconds

Note¹ Current limit for long term, reliable operation

Note² Eutectic die attach using 80/20 AuSn mounted to a 10 mil thick Cu15Mo85 carrier.

Electrical Characteristics (Frequency = 4 GHz unless otherwise stated; $T_C = 25^\circ\text{C}$)

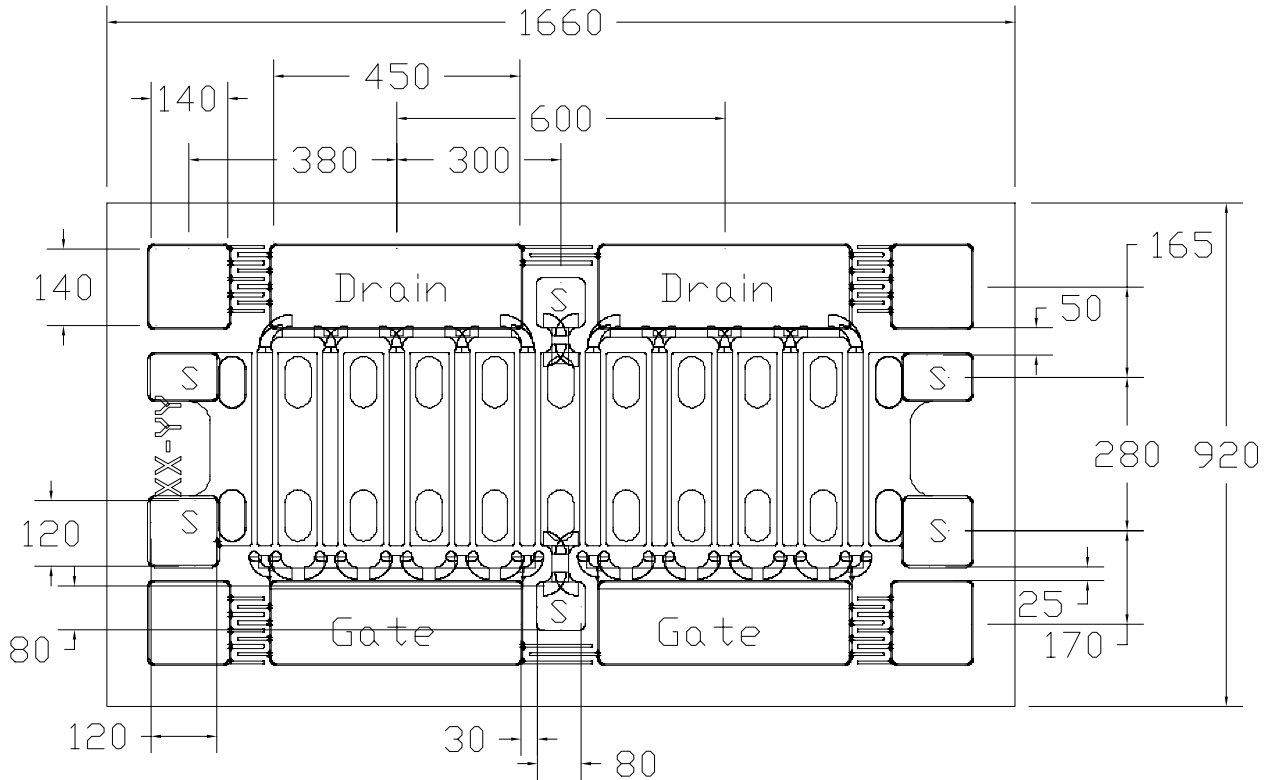
Characteristics	Symbol	Min.	Typ.	Max.	Units	Conditions
DC Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	-3.6	-3.0	-2.4	V	$V_{DS} = 10\text{ V}, I_D = 7.2\text{ mA}$
Gate Quiescent Voltage	$V_{GS(Q)}$	-	-2.7	-	V _{DC}	$V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}$
Drain-Source Breakdown Voltage	V_{BD}	120	-	-	V	$V_{GS} = -8\text{ V}, I_D = 7.2\text{ mA}$
On Resistance	R_{ON}	0.26	0.33	0.41	Ω	$V_{DS} = 0.1\text{ V}$
RF Characteristics						
Small Signal Gain	G_{SS}	-	16.5	-	dB	$V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}$
Saturated Power Output ¹	P_{SAT}	-	30	-	W	$V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}$
Drain Efficiency ²	η	-	65	-	%	$V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}, P_{SAT} = 30\text{ W}$
Output Mismatch Stress	VSWR	-	-	10 : 1	Y	No damage at all phase angles, $V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA},$ $P_{OUT} = 30\text{ W CW}$
Dynamic Characteristics						
Input Capacitance	C_{GS}	-	7.3	-	pF	$V_{DS} = 28\text{ V}, V_{gs} = -8\text{ V}, f = 1\text{ MHz}$
Output Capacitance	C_{DS}	-	2.2	-	pF	$V_{DS} = 28\text{ V}, V_{gs} = -8\text{ V}, f = 1\text{ MHz}$
Feedback Capacitance	C_{GD}	-	0.37	-	pF	$V_{DS} = 28\text{ V}, V_{gs} = -8\text{ V}, f = 1\text{ MHz}$

Notes:

¹ P_{SAT} is defined as $I_G = 0.7\text{ mA}$.

² Drain Efficiency = P_{OUT} / P_{DC} .

DIE Dimensions (units in microns)



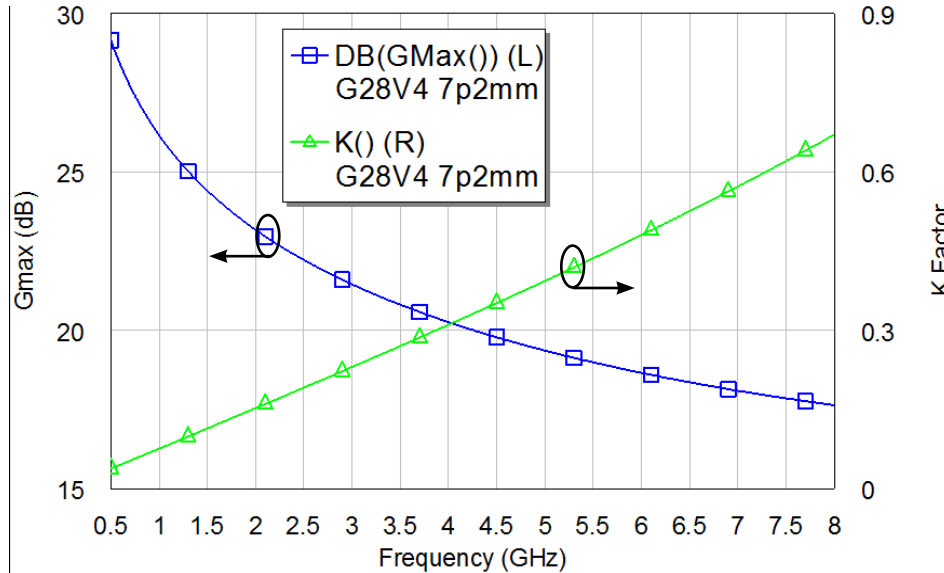
Overall die size 1660 x 920 (+0/-50) microns, die thickness 100 (+/- 10) microns.
All Gate and Drain pads must be wire bonded for electrical connection.

Assembly Notes:

- Recommended solder is AuSn (80/20) solder. Refer to Cree's website for the Eutectic Die Bond Procedure application note at www.cree.com/RF/Document-Library
- Vacuum collet is the preferred method of pick-up.
- The backside of the die is the Source (ground) contact.
- Die back side gold plating is 5 microns thick minimum.
- Thermosonic ball or wedge bonding are the preferred connection methods.
- Gold wire must be used for connections.
- Use the die label (XX-YY) for correct orientation.

Typical Performance

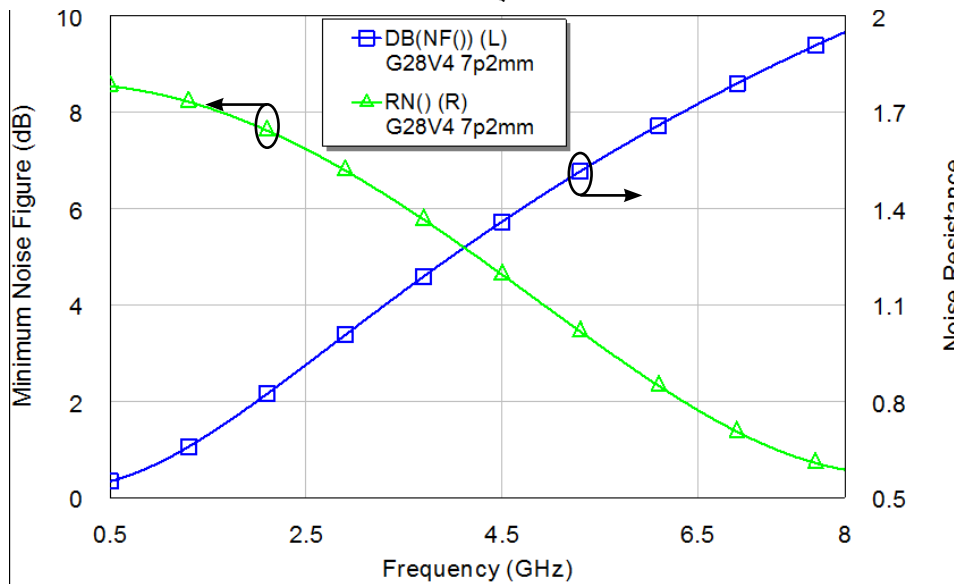
Simulated Maximum Available Gain and K Factor of the CGH80030D
 $V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}$



Intrinsic die parameters - reference planes at centers of gate and drain bonding pads. No wire bonds assumed.

Typical Noise Performance

Simulated Minimum Noise Figure and Noise Resistance vs Frequency of the CGH80030D
 $V_{DD} = 28\text{ V}, I_{DQ} = 200\text{ mA}$





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 its use or 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 the planning, construction, maintenance or direct operation of a nuclear facility. CREE and the CREE logo are registered trademarks of Cree, Inc.

For more information, please contact:

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
www.cree.com/RF

Sarah Miller
Marketing
Cree, RF Components
1.919.407.5302

Ryan Baker
Marketing & Sales
Cree, RF Components
1.919.407.7816

Tom Dekker
Marketing & Sales Director
Cree, RF Components
1.919.407.5639

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [RF JFET Transistors](#) category:

Click to view products by [Wolfspeed](#) manufacturer:

Other Similar products are found below :

[XF1001-SC-EV1](#) [CE3514M4](#) [CE3514M4-C2](#) [CE3520K3-C1](#) [CE3521M4](#) [CE3521M4-C2](#) [CE3512K2-C1](#) [NPT25100B](#) [CE3520K3](#)
[CGH55030F1](#) [CGH27030F](#) [QPD0020](#) [CGH25120F](#) [CMPA801B030F](#) [TGF2023-2-01](#) [TGF2023-2-02](#) [CGH40006P](#) [QPD1009](#) [MAGX-](#)
[011086](#) [QPD1014SR](#) [T2G6000528-Q3](#) [CG2H40025F](#) [CGHV40200PP](#) [CGHV14800F](#) [CGH27030P](#) [CGH09120F](#) [CG2H80015D-GP4](#)
[CG2H40045F](#) [T2G4003532-FL](#) [TGF2942](#) [T2G6003028-FS](#) [T2G6003028-FL](#) [T2G6000528-Q3 28V](#) [T2G4003532-FS](#) [T1G2028536-FL](#)
[QPD1015L](#) [QPD1015](#) [QPD1010](#) [QPD1008L](#) [QPD1008](#) [QPD1000](#) [JANTXV2N4858](#) [ATF-521P8-BLK](#) [J175D26Z](#) [AGX-1/2](#) [CE3512K2](#)
[2N3819](#) [CGH55030F2](#) [CGHV40180F](#) [CGHV27015S](#)