

CGHV40030

30 W, DC - 6 GHz, 50V, GaN HEMT

Cree's CGHV40030 is an unmatched, gallium nitride (GaN) high electron mobility transistor (HEMT) designed specifically for high efficiency, high gain and wide bandwidth capabilities. The device can be deployed for L, S and C-Band amplifier applications. The datasheet specifications are based on a 0.96 - 1.4 GHz amplifier. The CGHV40030 operates on a 50 volt rail circuit while housed in a 2-lead flange or pill package.



Package Type: 440166 and 440196
PN: CGHV40030

Typical Performance 0.96 - 1.4 GHz ($T_c = 25^\circ\text{C}$), 50 V

Parameter	0.96 GHz	1.1 GHz	1.25 GHz	1.4 GHz	Units
Gain @ P_{SAT}	15.6	15.8	16.6	15.8	dB
Saturated Output Power	29	30	36	31	W
Drain Efficiency @ P_{SAT}	62	74	64	67	%

Note:
Measured CW in the CGHV40030-TB1 application circuit.

Features

- Up to 6 GHz Operation
- 30 W Typical Output Power
- 16 dB Gain at 1.2 GHz
- Application circuit for 0.96 - 1.4 GHz
- 70% Efficiency at P_{SAT}
- 50 V Operation

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

Parameter	Symbol	Rating	Units	Notes
Drain-Source Voltage	V_{DS}	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}	5.2	mA	25 °C
Maximum Drain Current ¹	I_{DMAX}	4.2	A	25 °C
Soldering Temperature ²	T_S	245	°C	
Case Operating Temperature ^{3,4}	T_C	-40, +150	°C	
Thermal Resistance, Junction to Case ⁵	R_{JC}	5.9	°C/W	85 °C

Note:

¹ Current limit for long term, reliable operation

² Refer to the Application Note on soldering at www.cree.com/rf/document-library

³ Simulated at $P_{DISS} = 23.4$ W

⁴ T_C = Case temperature for the device. It refers to the temperature at the ground tab underneath the package. The PCB will add additional thermal resistance.

⁵ CW

Electrical Characteristics ($T_C = 25$ °C) - 50 V Typical

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, $I_D = 5.2$ mA
Gate Quiescent Voltage	$V_{GS(Q)}$	-	-2.6	-	V_{DC}	$V_{DS} = 50$ V, $I_D = 150$ mA
Saturated Drain Current ²	I_{DS}	4.2	5.2	-	A	$V_{DS} = 6.0$ V, $V_{GS} = 2.0$ V
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	100	-	-	V_{DC}	$V_{GS} = -8$ V, $I_D = 5.2$ mA
RF Characteristics³ ($T_C = 25$ °C, $F_0 = 1.2$ GHz unless otherwise noted)						
Power Gain	G_p	-	16	-	dB	$V_{DD} = 50$ V, $I_{DQ} = 150$ mA, $P_{OUT} = P_{SAT}$
Output Power ⁴	P_{OUT}	-	30	-	W	$V_{DD} = 50$ V, $I_{DQ} = 150$ mA, $P_{OUT} = P_{SAT}$
Drain Efficiency ⁴	η	-	65	-	%	$V_{DD} = 50$ V, $I_{DQ} = 150$ mA, $P_{OUT} = P_{SAT}$
Output Mismatch Stress ⁴	VSWR	-	-	10 : 1	Ψ	No damage at all phase angles, $V_{DD} = 50$ V, $I_{DQ} = 150$ mA, $P_{OUT} = 30$ W CW
Dynamic Characteristics						
Input Capacitance ⁵	C_{GS}	-	7.4	-	pF	$V_{DS} = 50$ V, $V_{gs} = -8$ V, $f = 1$ MHz
Output Capacitance ⁵	C_{DS}	-	2	-	pF	$V_{DS} = 50$ V, $V_{gs} = -8$ V, $f = 1$ MHz
Feedback Capacitance	C_{GD}	-	0.15	-	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 Measured in CGHV40030-TB

⁴ P_{SAT} is defined as $I_G = 0.52$ mA

⁵ Includes package

Typical Performance

Figure 1. - Typical Small Signal Response of CGHV40030-TB1 Application Circuit
 $V_{DD} = 50 \text{ V}$, $I_{DQ} = 150 \text{ mA}$

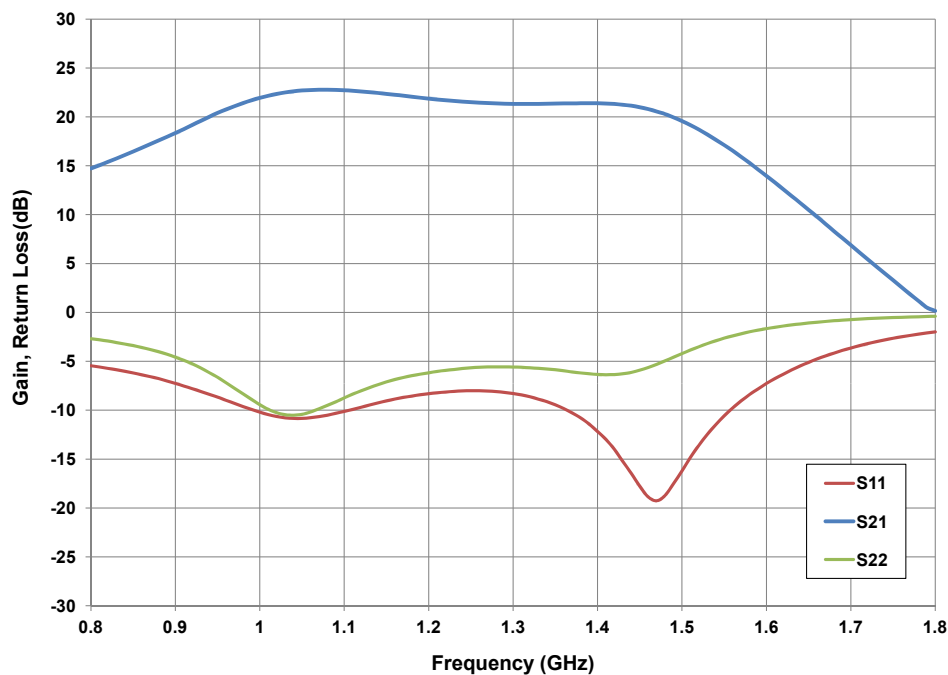
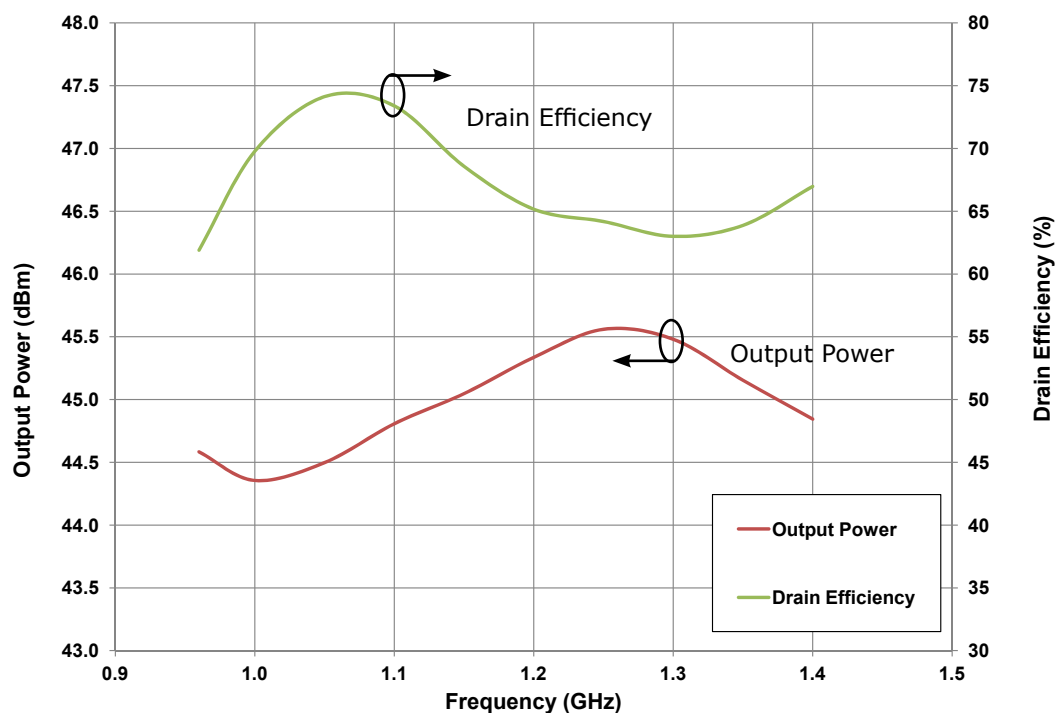


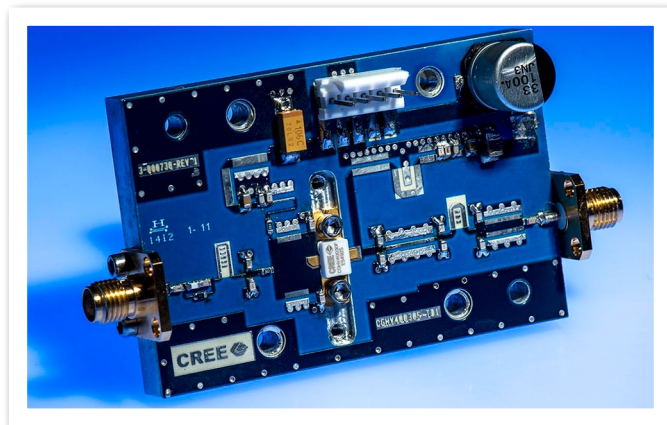
Figure 2. - Typical Large Signal Response of CGHV40030-TB1 Application Circuit
 $V_{DD} = 50 \text{ V}$, $I_{DQ} = 150 \text{ mA}$, $P_{IN} = 29 \text{ dBm}$, $T_{CASE} = 25^\circ\text{C}$, CW



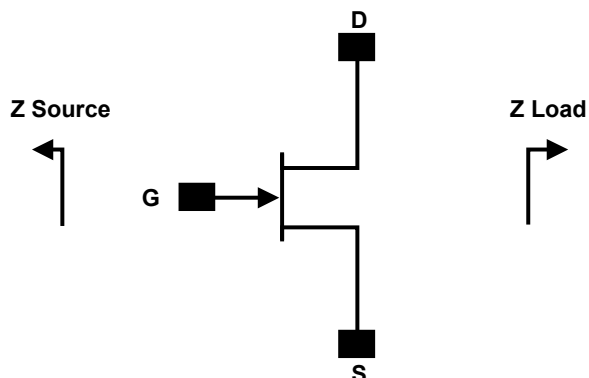
CGHV40030-TB1 Application Circuit Bill of Materials

Designator	Description	Qty
R1	RES,1/16W,0603,1%,187 OHMS	1
R2	RES, 2.2 OHMS, +/- 1%, 1/16W,0603	1
R3	RES,1/16W,0603,1%,15.4 OHMS	1
L1	IND, 5.6nH, 0603	1
C3, C4	CAP, 2.7,+/-0.1pF, 0603, ATC	2
C5, C6, C11, C12	CAP, 1.2pF,+/-0.1pF, 0603, ATC	4
C2, C7, C8	CAP 1.8pF,+/-0.1pF 0603, ATC	2
C9, C10	CAP, 3.9pF,+/-0.1pF 0603, ATC	2
C1, C13	CAP, 24pF,+/-5% 0603, ATC	2
C14	CAP 10UF 16V TANTALUM	1
C15, C20	CAP, 33000pF, 0805, ATC	2
C16,C21	CAP, 470PF, 5%, 100V, 0603,	2
C17	CAP, 68pF,+/-0.1pF 0603, ATC	1
C22	CAP, 56PF +/- 5%, 0603 , ATC600S	1
C18	CAP, 33UF, 20%, G CASE	1
C19	CAP, 1.0UF, 100V, 10%, X7R, 1210	1
J1,J2	CONN, SMA, PANEL MOUNT JACK, FLANGE, 4-HOLE, BLUNT POST	2
J3	HEADER RT>PLZ .1CEN LK 5POS	1
	BASEPLATE, CGH35015, 2.60 X 1.7	1
	CGHV40030F/P PCB, RO4350, 0.020" THK	1

CGHV40030-TB1 Application Circuit



Source and Load Impedances



Frequency (MHz)	Z Source	Z Load
500	$5.5 + j0.9$	$43 + j20.8$
1000	$2.6 - j1.3$	$25.5 + j29.1$
2000	$3.8 - j0.9$	$11.5 + j17.3$
3000	$2.7 - j7.0$	$6.7 + j7.8$
4000	$2.8 - j13.4$	$6.5 + j1.7$

Note¹: $V_{DD} = 50 \text{ V}$, $I_{DQ} = 150 \text{ mA}$

Note²: Impedances are extracted from source and load pull data derived from the transistor.

Electrostatic Discharge (ESD) Classifications

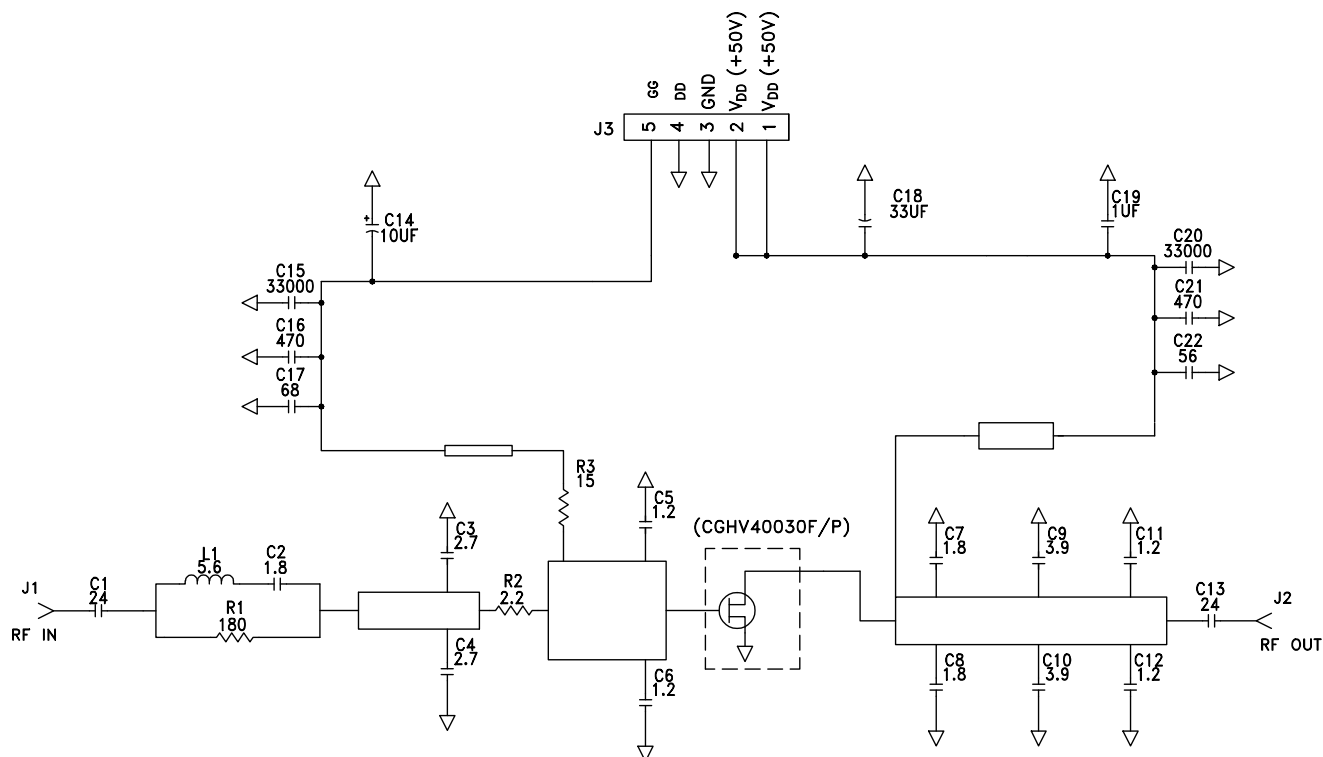
Parameter	Symbol	Class	Test Methodology
Human Body Model	HBM	1A (> 250 V)	JEDEC JESD22 A114-D
Charge Device Model	CDM	II (200 < 500 V)	JEDEC JESD22 C101-C

Typical Package S-Parameters for CGHV40030 **(Small Signal, $V_{DS} = 50\text{ V}$, $I_{DQ} = 0.52\text{ mA}$, angle in degrees)**

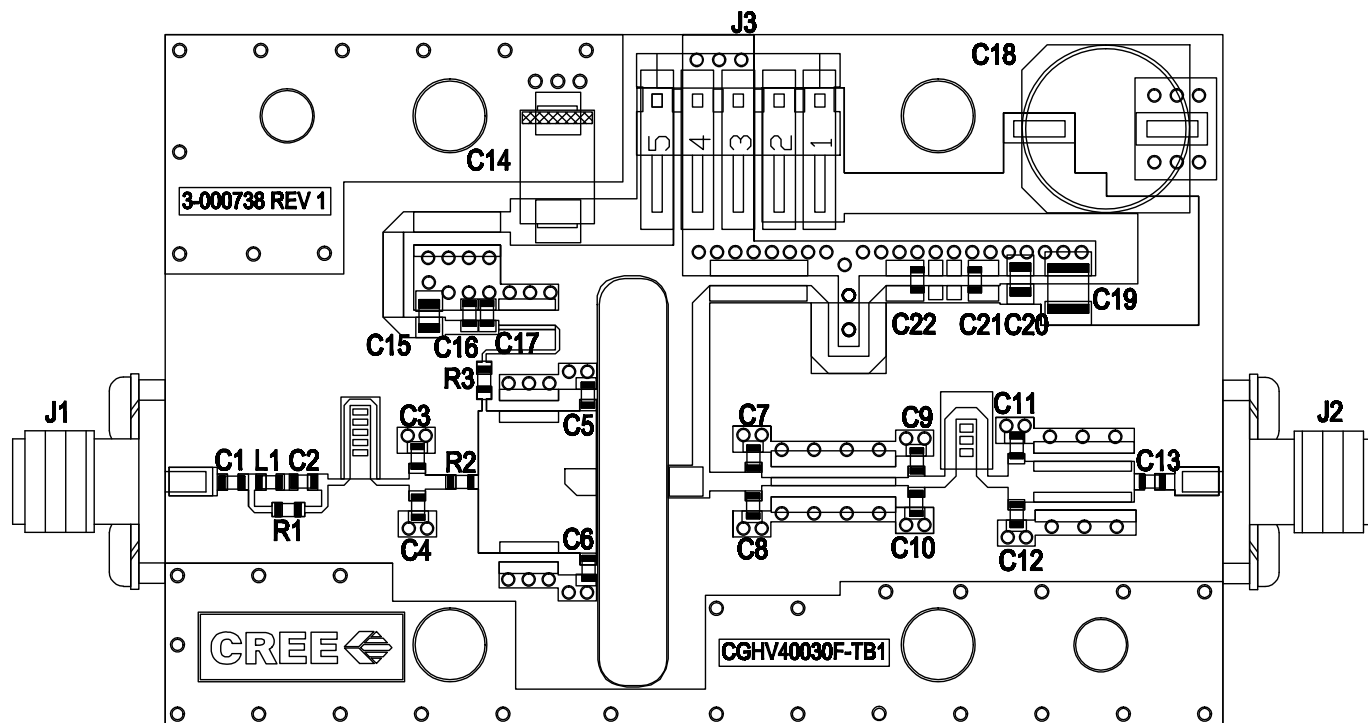
Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
500 MHz	0.92	-135.45	21.23	101.31	0.01	16.50	0.32	-74.10
600 MHz	0.92	-143.51	18.06	95.44	0.01	11.72	0.32	-79.66
700 MHz	0.91	-149.71	15.66	90.50	0.01	7.89	0.31	-84.44
800 MHz	0.91	-154.67	13.78	86.16	0.01	4.69	0.32	-88.69
900 MHz	0.91	-158.75	12.27	82.26	0.01	1.97	0.33	-92.58
1.0 GHz	0.91	-162.21	11.04	78.67	0.01	-0.41	0.34	-96.19
1.1 GHz	0.91	-165.20	10.02	75.32	0.01	-2.50	0.35	-99.57
1.2 GHz	0.91	-167.83	9.15	72.16	0.01	-4.34	0.36	-102.79
1.3 GHz	0.91	-170.19	8.41	69.14	0.01	-5.98	0.37	-105.86
1.4 GHz	0.92	-172.34	7.76	66.24	0.01	-7.43	0.39	-108.80
1.5 GHz	0.92	-174.30	7.20	63.45	0.01	-8.69	0.40	-111.64
1.6 GHz	0.92	-176.13	6.70	60.74	0.01	-9.77	0.42	-114.39
1.7 GHz	0.92	-177.83	6.26	58.11	0.01	-10.67	0.43	-117.06
1.8 GHz	0.92	-179.44	5.86	55.54	0.01	-11.39	0.45	-119.65
1.9 GHz	0.92	179.04	5.50	53.03	0.01	-11.90	0.46	-122.18
2.0 GHz	0.92	177.58	5.18	50.58	0.01	-12.20	0.48	-124.64
2.1 GHz	0.92	176.19	4.89	48.17	0.01	-12.26	0.49	-127.05
2.2 GHz	0.92	174.84	4.62	45.81	0.01	-12.07	0.51	-129.41
2.3 GHz	0.93	173.54	4.37	43.50	0.01	-11.60	0.52	-131.72
2.4 GHz	0.93	172.28	4.14	41.22	0.01	-10.82	0.53	-133.98
2.5 GHz	0.93	171.06	3.93	38.98	0.01	-9.70	0.55	-136.21
2.6 GHz	0.93	169.86	3.73	36.78	0.01	-8.20	0.56	-138.39
2.7 GHz	0.93	168.70	3.55	34.62	0.01	-6.30	0.57	-140.53
2.8 GHz	0.93	167.55	3.38	32.49	0.01	-3.97	0.59	-142.63
2.9 GHz	0.93	166.43	3.23	30.39	0.01	-1.18	0.60	-144.70
3.0 GHz	0.94	165.33	3.08	28.33	0.01	2.04	0.61	-146.73
3.2 GHz	0.94	163.18	2.81	24.29	0.01	9.69	0.64	-150.70
3.4 GHz	0.94	161.08	2.57	20.36	0.01	18.36	0.66	-154.54
3.6 GHz	0.94	159.05	2.36	16.55	0.01	27.05	0.68	-158.26
3.8 GHz	0.95	157.05	2.17	12.85	0.01	34.79	0.70	-161.87
4.0 GHz	0.95	155.10	2.00	9.25	0.01	41.04	0.72	-165.37
4.2 GHz	0.95	153.19	1.85	5.75	0.01	45.73	0.73	-168.77
4.4 GHz	0.95	151.31	1.72	2.35	0.01	49.02	0.75	-172.07
4.6 GHz	0.96	149.46	1.59	-0.96	0.01	51.19	0.76	-175.28
4.8 GHz	0.96	147.65	1.48	-4.18	0.01	52.48	0.78	-178.39
5.0 GHz	0.96	145.86	1.37	-7.31	0.01	53.11	0.79	178.58
5.2 GHz	0.96	144.11	1.28	-10.36	0.01	53.24	0.80	175.63
5.4 GHz	0.96	142.38	1.19	-13.33	0.01	52.98	0.82	172.76
5.6 GHz	0.96	140.68	1.11	-16.22	0.02	52.43	0.83	169.97
5.8 GHz	0.97	139.00	1.04	-19.03	0.02	51.65	0.84	167.25
6.0 GHz	0.97	137.35	0.98	-21.76	0.02	50.70	0.85	164.60

To download the s-parameters in s2p format, go to the CGHV40030 Product Page and click on the documentation tab.

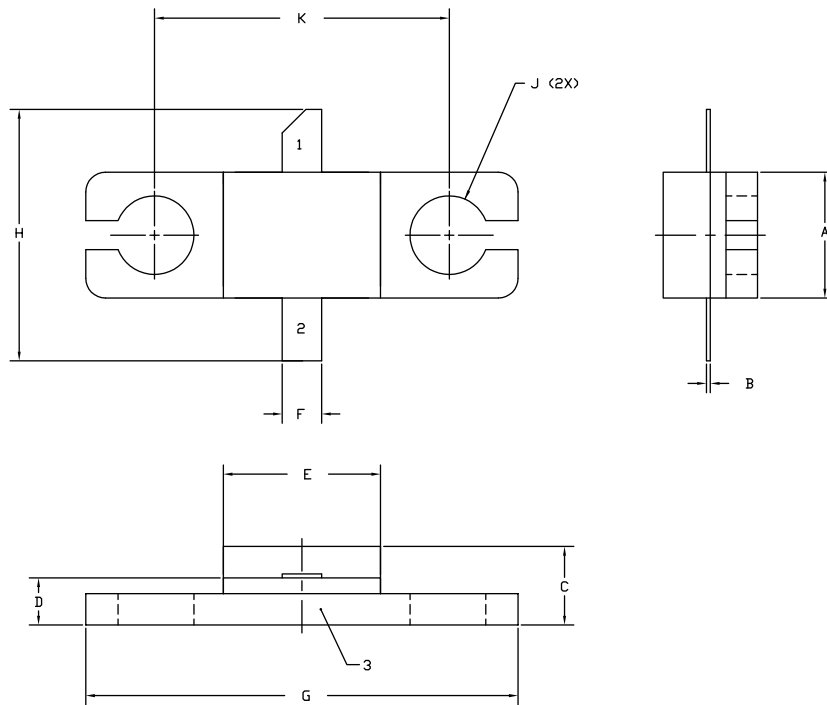
CGHV40030-TB1 Application Circuit Schematic



CGHV40030-TB1 Application Circuit Outline



Product Dimensions CGHV40030F (Package Type - 440166)



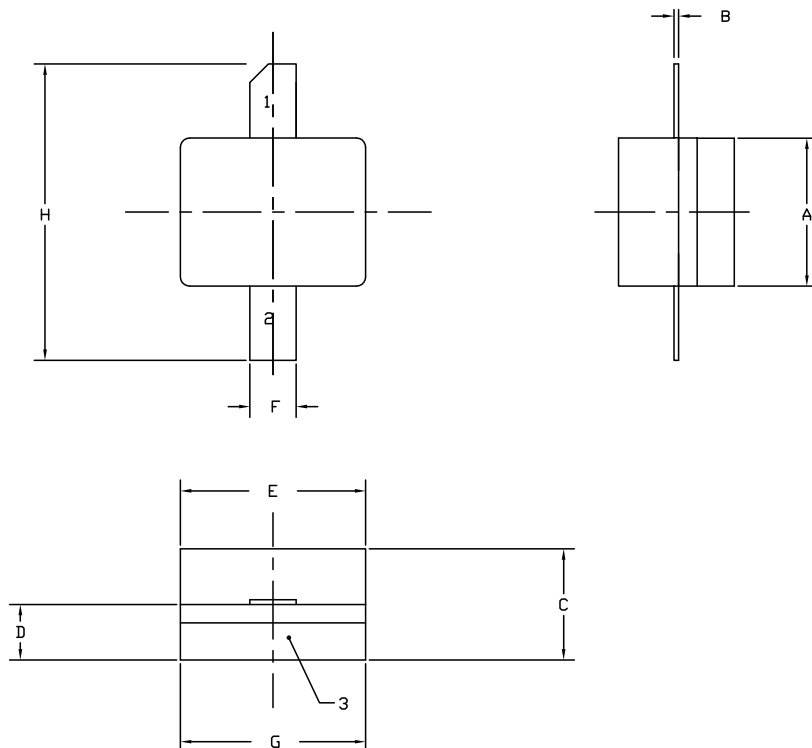
NOTES:

1. DIMENSIONING AND TOLERANCING 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	0.155	0.165	3.94	4.19
B	0.004	0.006	0.10	0.15
C	0.115	0.135	2.92	3.43
D	0.057	0.067	1.45	1.70
E	0.195	0.205	4.95	5.21
F	0.045	0.055	1.14	1.40
G	0.545	0.555	13.84	14.09
H	0.280	0.360	7.11	9.14
J	Ø .100		2.54	
K	0.375		9.53	

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

Product Dimensions CGHV40030P (Package Type - 440196)



NOTES:

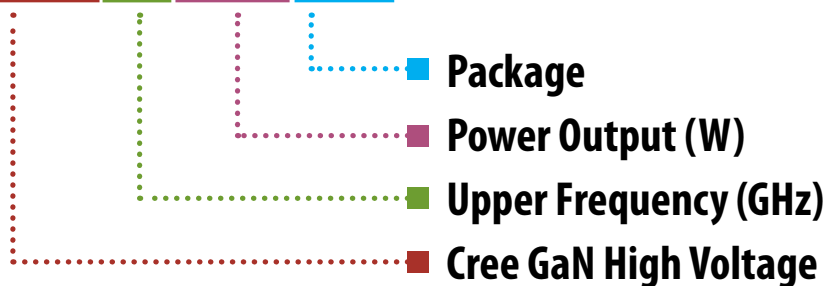
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ADHESIVE FROM LID MAY EXTEND A MAXIMUM OF 0.020" BEYOND EDGE OF LID.
4. LID MAY BE MISALIGNED TO THE BODY OF THE PACKAGE BY A MAXIMUM OF 0.008" IN ANY DIRECTION.
5. ALL PLATED SURFACES ARE NI/AU

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.155	0.165	3.94	4.19
B	0.003	0.006	0.10	0.15
C	0.115	0.135	2.92	3.17
D	0.057	0.067	1.45	1.70
E	0.195	0.205	4.95	5.21
F	0.045	0.055	1.14	1.40
G	0.195	0.205	4.95	5.21
H	0.280	0.360	7.11	9.14

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

Part Number System

CGHV40030F/P



Parameter	Value	Units
Upper Frequency ¹	6	GHz
Power Output	30	W
Package	Flanged/Pill	-

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.

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.

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
Cree, RF Components
1.919.407.7816

Tom Dekker
Sales Director
Cree, RF Components
1.919.313.5639



**Стандарт
Электрон
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331