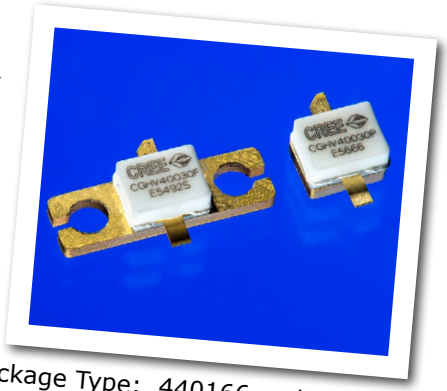
CGHV40030

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°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

Rev 0 - November 2014

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

Parameter	Symbol	Rating	Units	Notes
Drain-Source Voltage	V_{DSS}	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]	$R_{\theta JC}$	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 Characteristics[1]						
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 Characteristics[3] (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

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Typical Performance

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

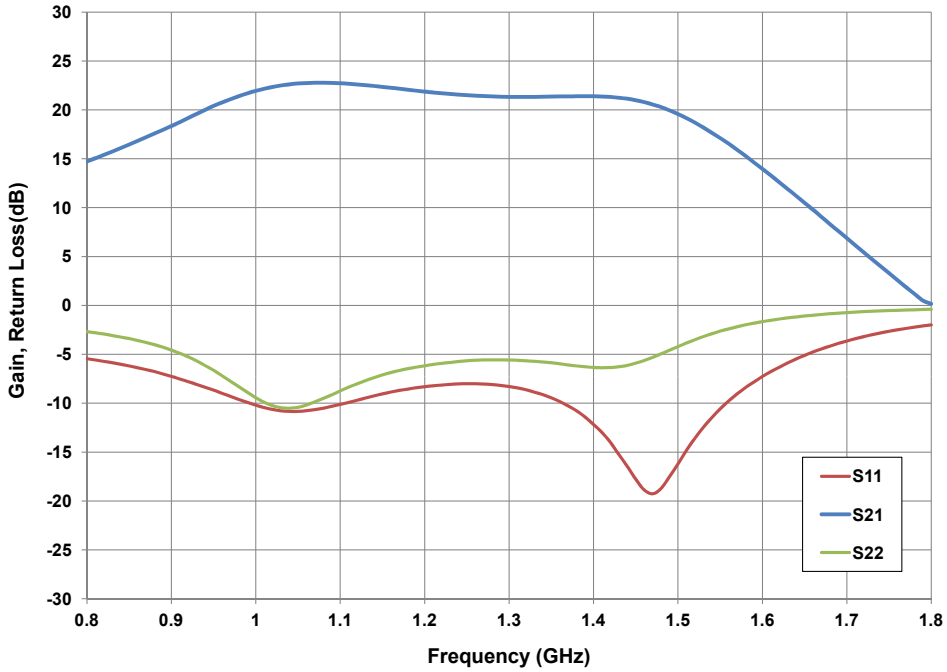
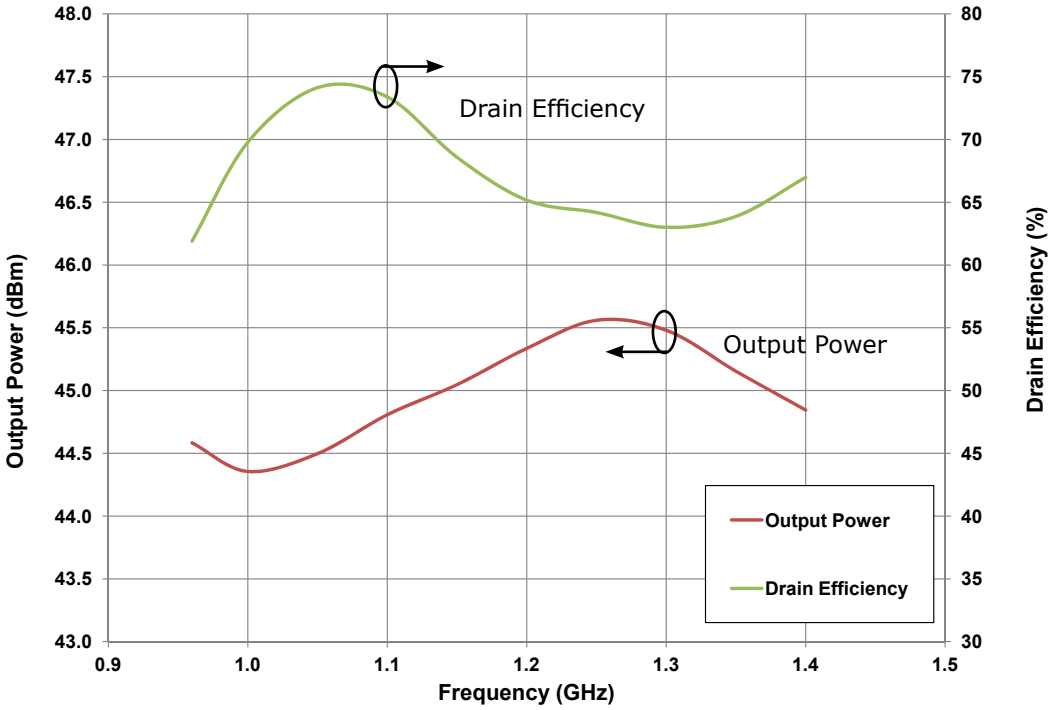


Figure 2. - Typical Large Signal Response of CGHV40030-TB1 Application Circuit
V_{DD} = 50 V, I_{DQ} = 150 mA, P_{IN} = 29 dBm, T_{CASE} = 25°C, CW

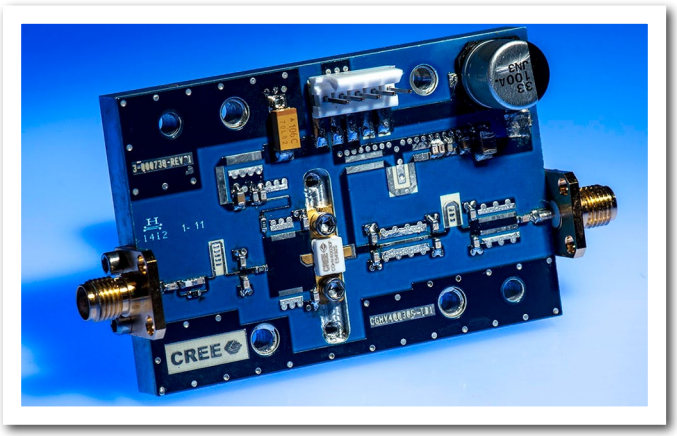


Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

CGHV40030-TB1 Application Circuit Bill of Materials

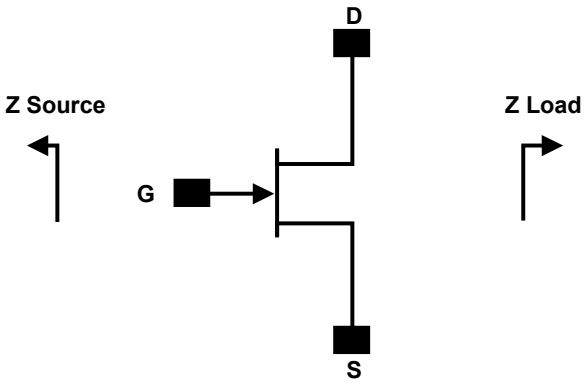
Designator	Description	Qty
R1	RES,1/16W,0603,1%,187 OHMS	1
R2	RES, 2.2 OHMS, +/- 1%, 1/16W,0603	1
R3	RES,1/16W,0603,1%,15.4 OHMS	1
L1	IND, 5.6nH, 0603	1
C3, C4	CAP, 2.7,+/-0.1pF, 0603, ATC	2
C5, C6, C11, C12	CAP, 1.2pF,+/-0.1pF, 0603, ATC	4
C2, C7, C8	CAP 1.8pF,+/-0.1pF 0603, ATC	2
C9, C10	CAP, 3.9pF,+/-0.1pF 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



Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

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

Note[1]: V_{DD} = 50 V, I_{DQ} = 150 mA
Note[2]: 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

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

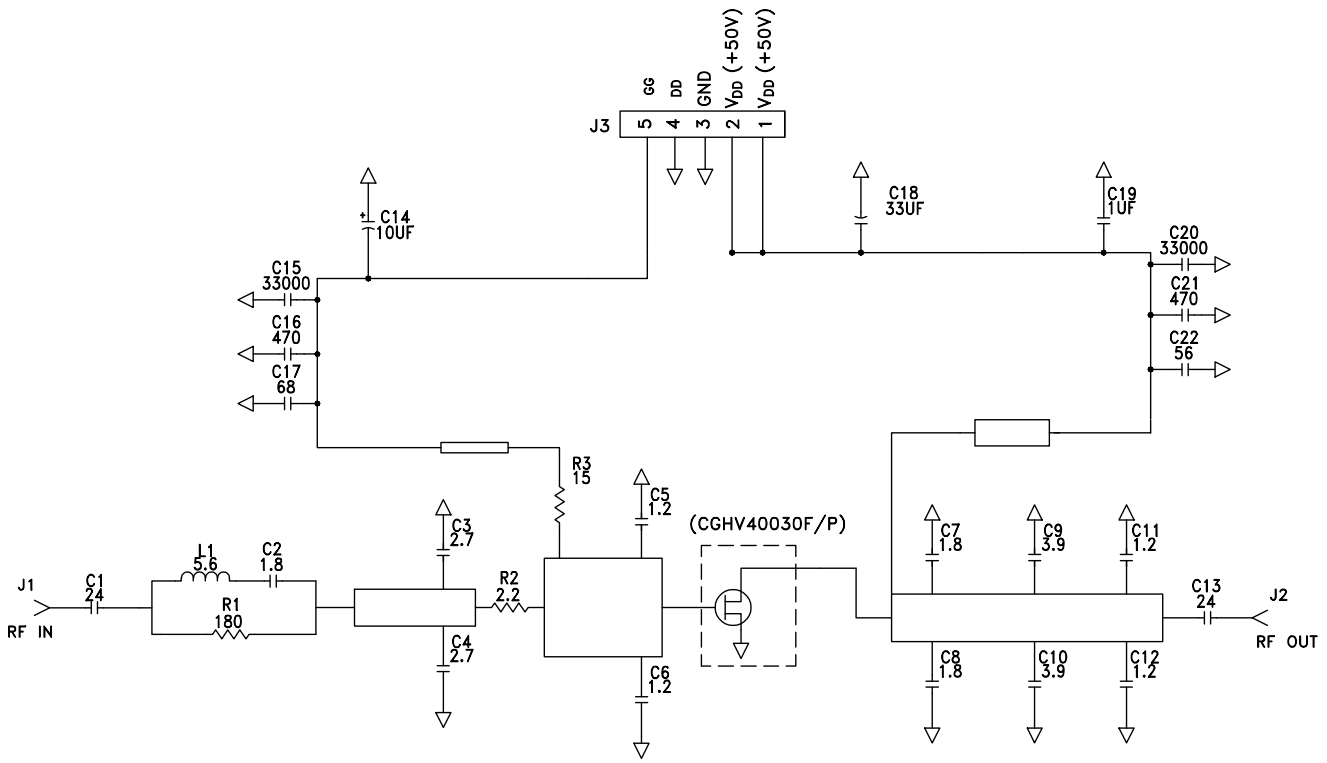
Typical Package S-Parameters for CGHV40030
(Small Signal, V_{DS} = 50 V, I_{DQ} = 0.52 mA, angle in degrees)

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

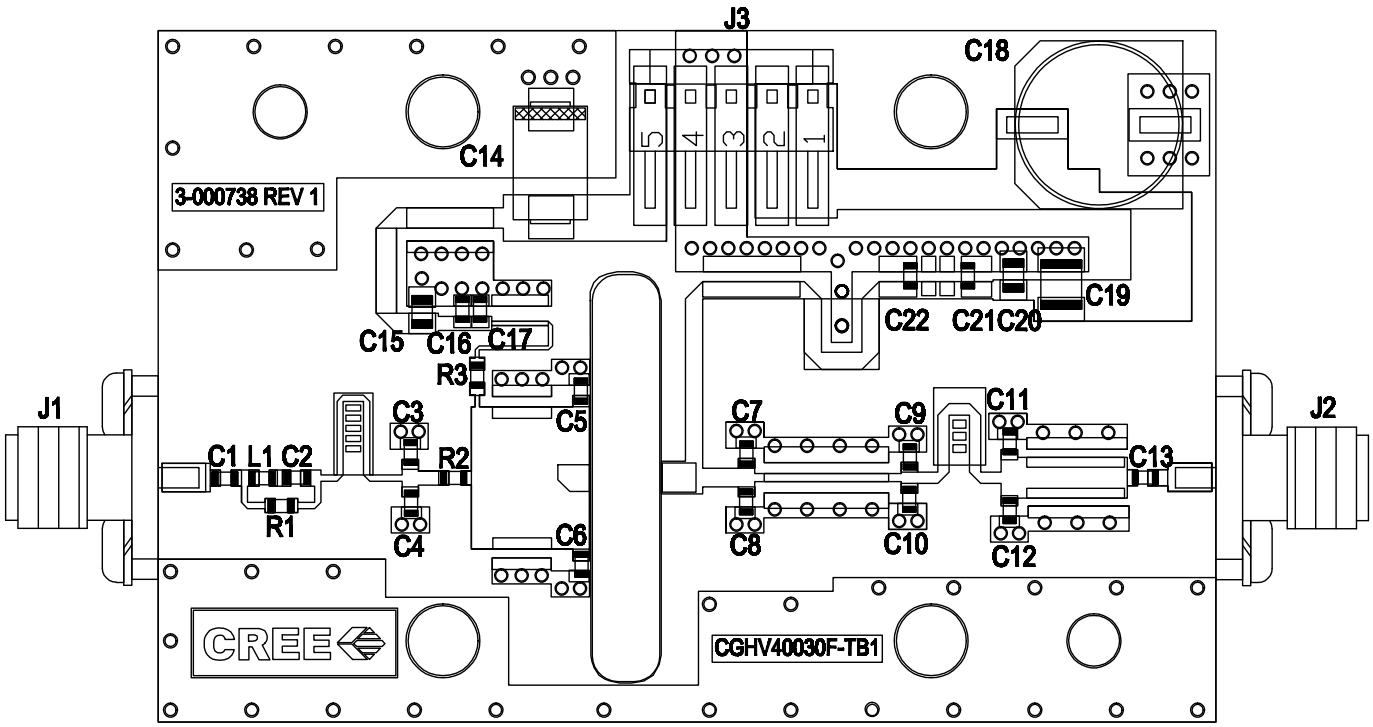
To download the s-parameters in s2p format, go to the CGHV40030 Product Page and click on the documentation tab.

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

CGHV40030-TB1 Application Circuit Schematic

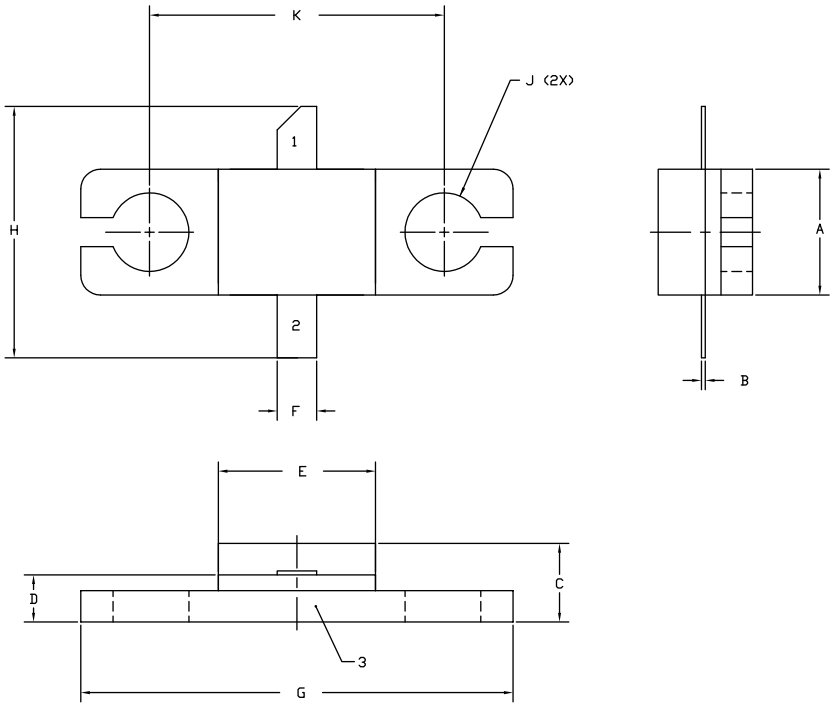


CGHV40030-TB1 Application Circuit Outline



Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Product Dimensions CGHV40030F (Package Type - 440166)



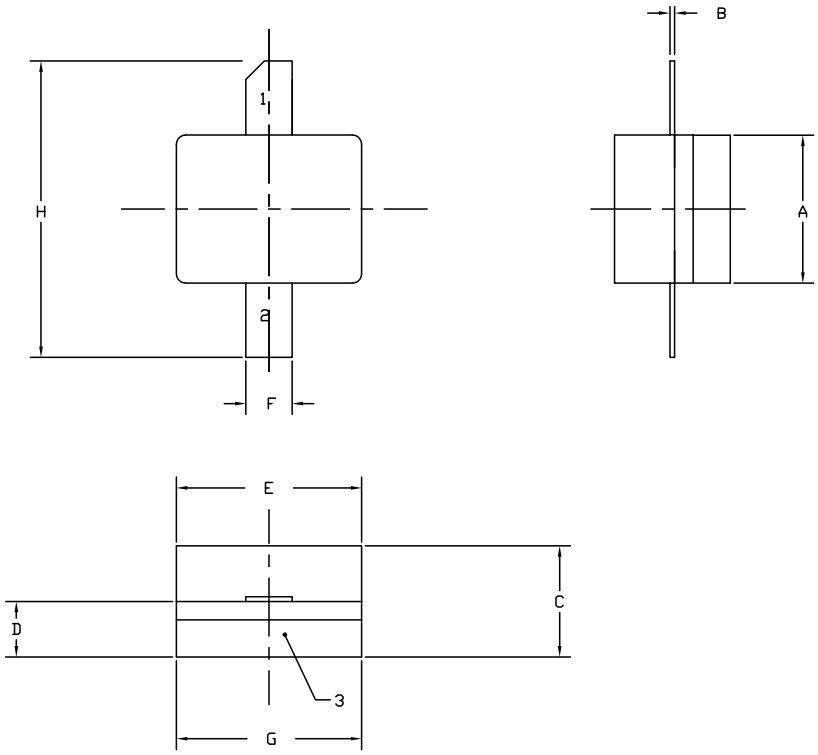
NOTES:

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

	INCHES		MILLIMETERS	
DIM	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:

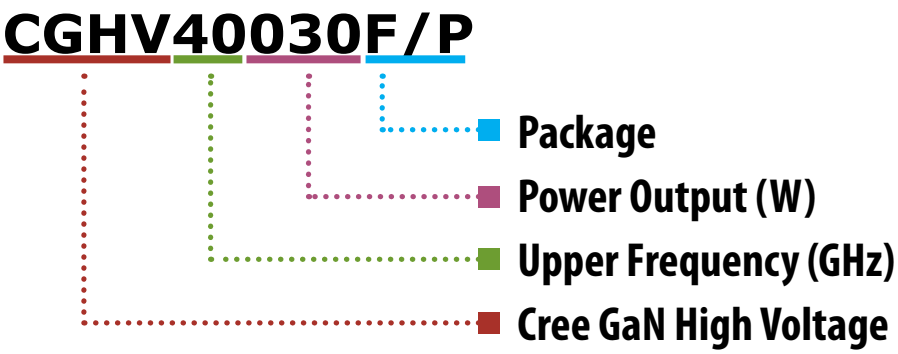
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ADHESIVE FROM LID MAY EXTEND A MAXIMUM OF 0.020" BEYOND EDGE OF LID.
4. LID MAY BE MISALIGNED TO THE BODY OF THE PACKAGE BY A MAXIMUM OF 0.008" IN ANY DIRECTION.
5. ALL PLATED SURFACES ARE NI/AU

	INCHES		MILLIMETERS	
DIM	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

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

Part Number System



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

Table 1.

Note[1]: 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.

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

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

Cree, Inc.
4600 Silicon Drive
Durham, North Carolina, USA 27703
USA Tel: +1.919.313.5300
Fax: +1.919.869.2733
www.cree.com/rf

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru