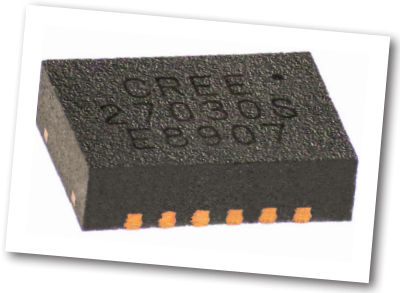
CGH27030S

30 W, DC - 6.0 GHz, 28 V, GaN HEMT

Cree's CGH27030S is an unmatched, gallium nitride (GaN) high electron mobility transistor (HEMT) designed specifically for high efficiency, high gain and wide bandwidth capabilities, which makes the CGH27030S ideal for LTE, 4G Telecom and BWA amplifier applications. The CGH27030S operates from a 28 volt rail. The transistor is available in a 3mm x 4mm, surface mount, dual-flat-no-lead (DFN) package.



Package Type: 3x4 DFN
PN: CGH27030S

Typical Performance 1.8 - 2.2 GHz (T_c = 25°C), 28 V

Parameter	1.8 GHz	2.0 GHz	2.2 GHz	Units
Small Signal Gain	20.0	20.4	19.5	dB
Adjacent Channel Power @ P_{AVE} =5 W	-39.5	-42.1	-39.1	dBc
Drain Efficiency @ P_{AVE} = 5 W	31.8	32.8	33.8	%
Input Return Loss	-4.2	-6.4	-7.7	dB

Note:
Measured in the CGH27030S-AMP1 application circuit.
Under 7.5 dB PAR single carrier WCDMA signal test model 1 with 64 DPCH.

Typical Performance 2.3 - 2.7 GHz (T_c = 25°C), 28 V

Parameter	2.3 GHz	2.5 GHz	2.7 GHz	Units
Small Signal Gain	21.1	20.6	20.0	dB
Adjacent Channel Power @ P_{AVE} = 5 W	-32.0	-36.4	-33.6	dBc
Drain Efficiency @ P_{AVE} = 5 W	37.8	36.2	35.0	%
Input Return Loss	-7.3	-7.9	-7.2	dB

Note:
Measured in the CGH27030S-AMP2 application circuit.
Under 7.5 dB PAR single carrier WCDMA signal test model 1 with 64 DPCH.

Features for 28 V in CGH27030S-AMP1

- 1.8 - 2.2 GHz Operation
- 30 W Typical Output Power
- 18 dB Gain at 5 W P_{AVE}
- -39 dBc ACLR at 5 W P_{AVE}
- 33% efficiency at 5 W P_{AVE}
- High degree of APD and DPD correction can be applied

Features for 28 V in CGH27030S-AMP2

- 2.3 - 2.7 GHz Operation
- 30 W Typical Output Power
- 18.5 dB Gain at 5 W P_{AVE}
- -39 dBc ACLR at 5 W P_{AVE}
- 36% efficiency at 5 W P_{AVE}
- High degree of APD and DPD correction can be applied

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

Parameter	Symbol	Rating	Units	Notes
Drain-Source Voltage	V_{DSS}	84	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}	7.2	mA	25˚C
Maximum Drain Current[1]	I_{DMAX}	3.0	A	25˚C
Soldering Temperature[2]	T_S	245	˚C	
Case Operating Temperature[3]	T_C	-40, +150	˚C	
Thermal Resistance, Junction to Case[4,5]	$R_{\theta JC}$	3.62	˚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] 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.

[4] Simulated for the CGH27030S at P_{DISS} = 21.6 W

[5] The R_{TH} for Cree's demonstration amplifier, CGH27030S-AMP1, with 33 x 0.011 via holes designed on a 20 mil thick Rogers 4350 PCB, is 3.51 °C. The total R_{TH} from the heat sink to the junction is 3.62 °C + 3.51 °C = 7.13 °C/W.

Electrical Characteristics (T_C = 25˚C)

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 = 7.2 mA
Gate Quiescent Voltage	$V_{GS(Q)}$	–	-2.7	–	V_{DC}	V_{DS} = 28 V, I_D = 0.20 A
Saturated Drain Current	I_{DS}	5.0	7.0	–	A	V_{DS} = 6.0 V, V_{GS} = 2.0 V
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	84	–	–	V_{DC}	V_{GS} = -8 V, I_D = 7.2 mA
RF Characteristics[2,3] (T_C = 25˚C, F_0 = 2.65 GHz unless otherwise noted)						
Gain	G	–	19.1	-	dB	V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{IN} = 10 dBm
Output Power[4]	P_{OUT}	–	44.9	–	dBm	V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{IN} = 30 dBm
Drain Efficiency[4]	η	–	72	-	%	V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{IN} = 30 dBm
Output Mismatch Stress	VSWR	-	10 : 1	-	Ψ	No damage at all phase angles, V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{IN} = 30 dBm
Dynamic Characteristics						
Input Capacitance[5]	C_{GS}	–	8.6	–	pF	V_{DS} = 28 V, V_{gs} = -8 V, f = 1 MHz
Output Capacitance[5]	C_{DS}	–	2.0	–	pF	V_{DS} = 28 V, V_{gs} = -8 V, f = 1 MHz
Feedback Capacitance	C_{GD}	–	0.4	–	pF	V_{DS} = 28 V, V_{gs} = -8 V, f = 1 MHz

Notes:

[1] Measured on wafer prior to packaging

[2] Scaled from PCM data

[3] Measured in Cree's production test fixture. This fixture is designed for high volume test at 2.65 GHz

[4] Un-modulated Pulsed Signal, 100 µs, 10% duty cycle

[5] Includes package and internal matching components

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Typical Performance in CGH27030S-AMP1

Figure 1. - Small Signal Gain and Return Losses vs Frequency
V_{DD} = 28 V, I_{DQ} = 0.20 A

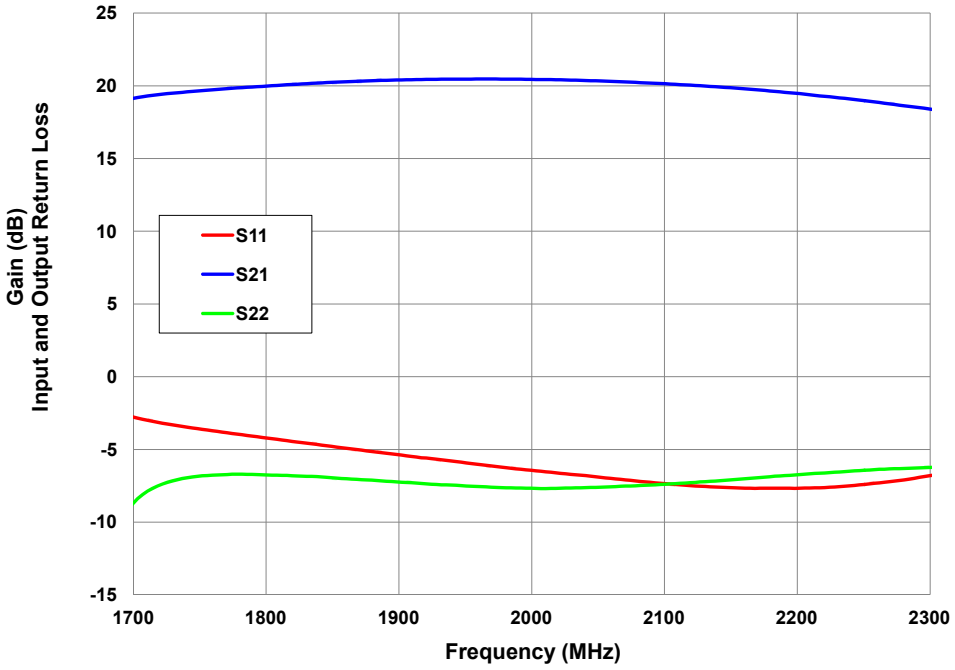
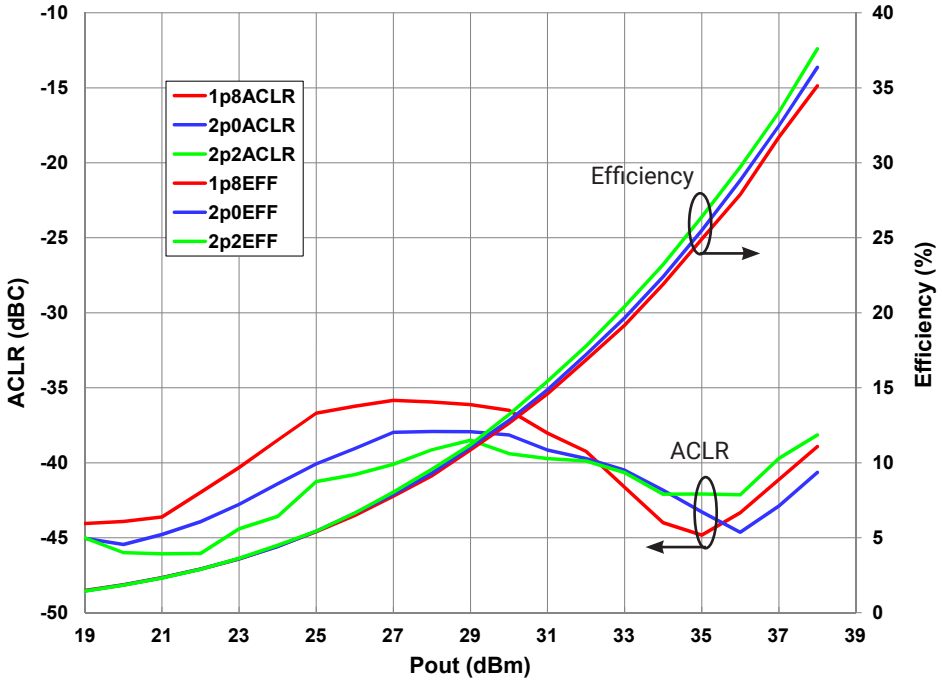


Figure 2. - Typical Drain Efficiency and ACLR vs. Output Power
V_{DD} = 28 V, I_{DQ} = 0.20 A, 1c WCDMA, PAR = 7.5 dB



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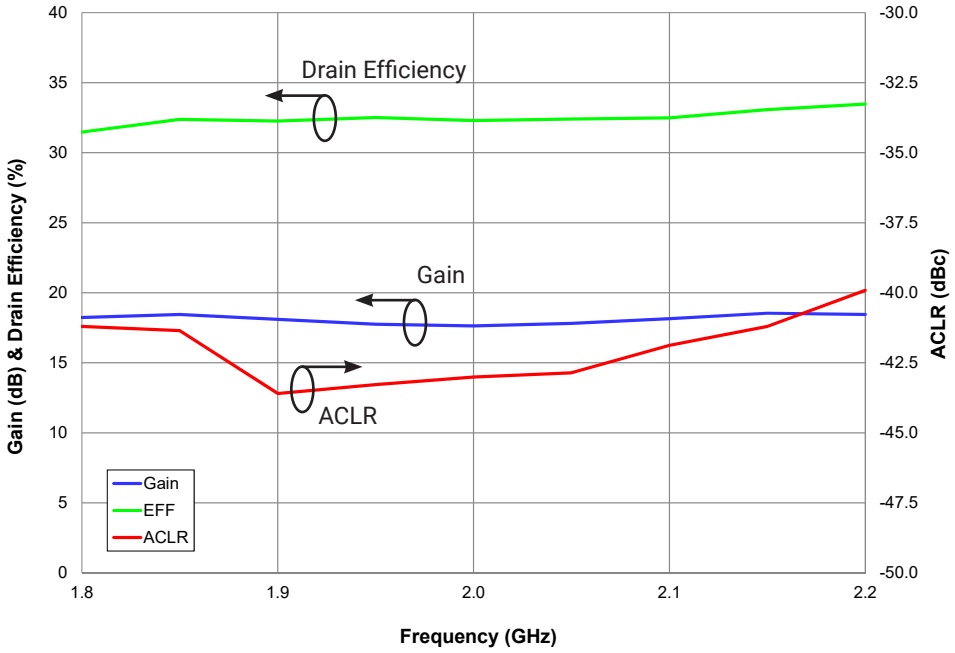
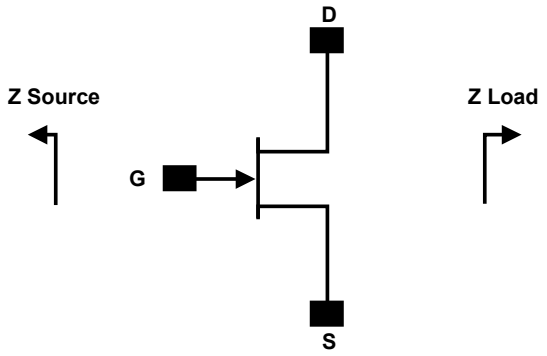
Typical Performance in CGH27030S-AMP1

Figure 3. - Typical Gain, Drain Efficiency and ACLR vs Frequency
V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{AVE} = 5 W, 1c WCDMA, PAR = 7.5 dB



Source and Load Impedances for Application Circuit CGH27030S-AMP1



Frequency (MHz)	Z Source	Z Load
1800	3.2 - j1.6	11 + j0.2
2000	3.6 - j0.6	10.5 + j1.8
2200	3.3 - j0.1	11 + j3.3

Note[1]: V_{DD} = 28 V, I_{DQ} = 0.20 A in the DFN package.
Note[2]: Impedances are extracted from the CGH27030S-AMP1 application circuit and are not source and load pull data derived from the transistor.

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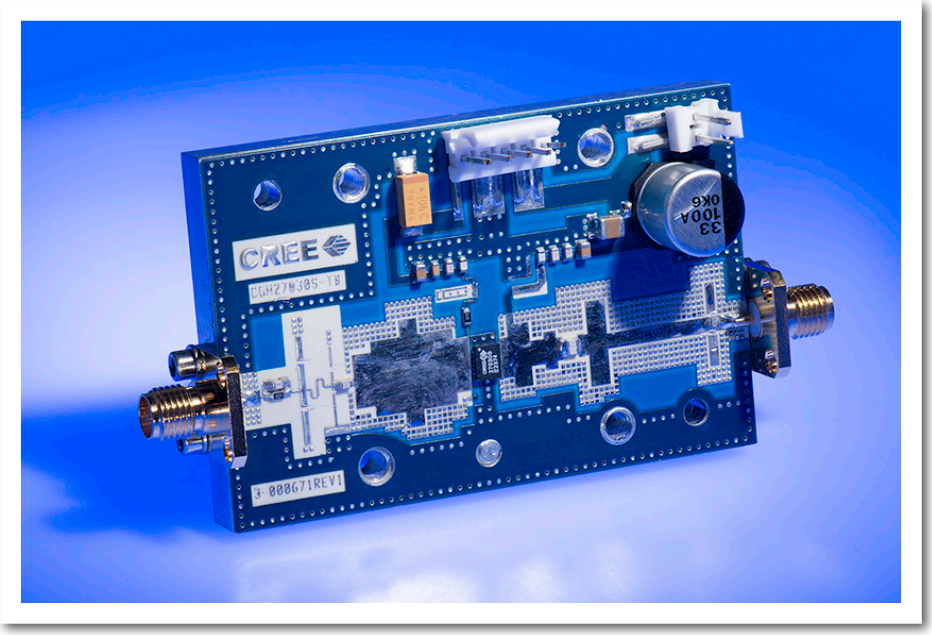
CGH27030S-AMP1 Application Circuit Bill of Materials

Designator	Description	Qty
R1	RES, 1/16 W, 0603, 1%, 100 OHMS	1
R2	RES, 1/16 W, 0603, 1%, 5.1 OHMS	1
C1	CAP, 6.8 pF, ±0.25 pF, 0603, ATC	1
C2	CAP, 2.4 pF, ±0.01 pF, 0603, ATC	1
C3, C8, C9, C10	CAP, 10.0 pF, ±0.5 pF, 0603, ATC	3
C12	CAP, 100.0 pF, 5%, 0603, ATC	1
C5	CAP, 470 pF, 5%, 100 V, 0603	1
C6, C13	CAP, 33000 pF, 0805, 10%, 100 V, X7R	2
C14	CAP, 1.0 UF, 100 V, 10%, X7R, 1210	1
C7	CAP, 10 UF, 16 V, TANTALUM	1
C15	CAP, 33 UF, 20%, G CASE	1
J1, J2	CONN, SMA, PANEL MOUNT JACK, FLANGE, 4-HOLE, BLUNT POST	2
Q1	CGH27030S, QFN	1

CGH27030S-AMP1 Application Circuit, 28 V, 1.8 - 2.2 GHz



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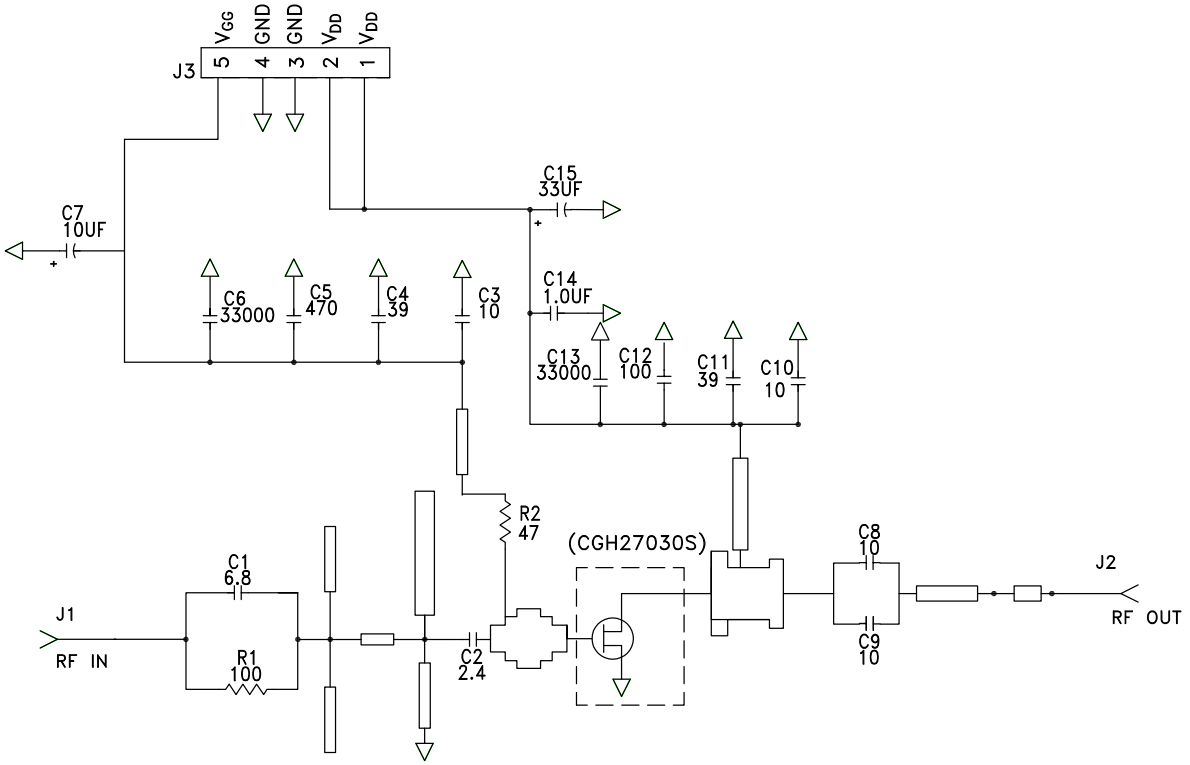
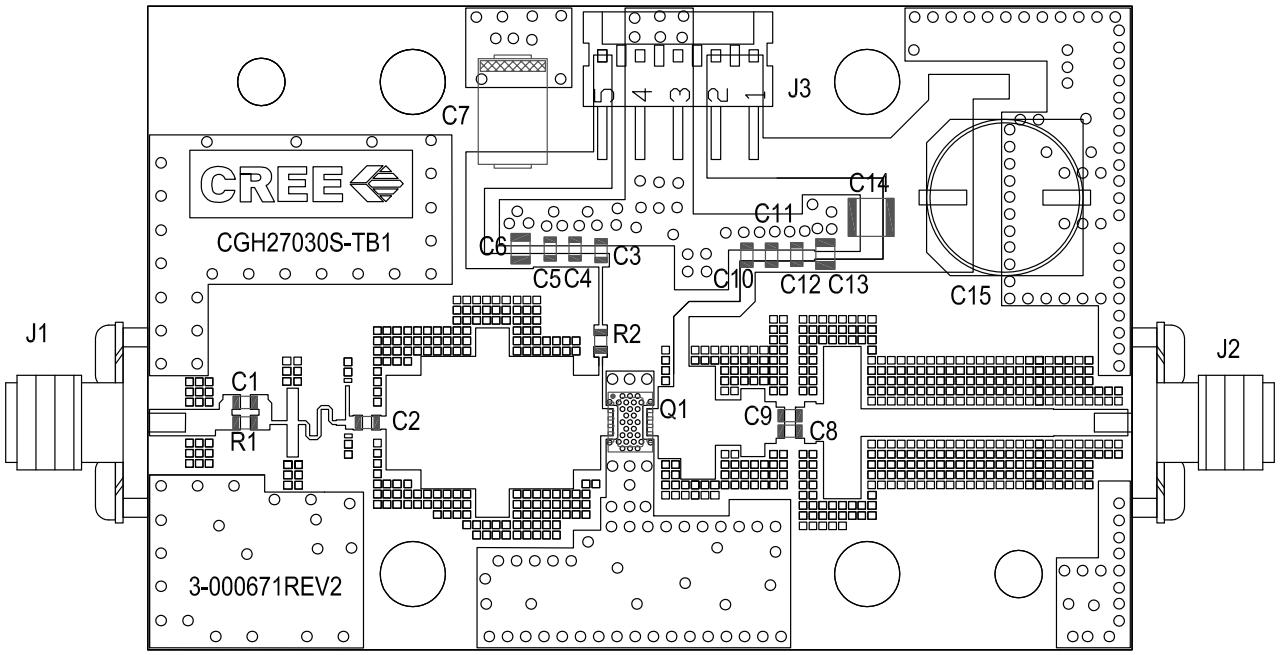
CGH27030S-AMP1 Application Circuit Schematic, 28 V, 1.8 - 2.2 GHz



CGH27030S-AMP1 Application Circuit, 28 V, 1.8 - 2.2 GHz



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Typical Performance in Application Circuit CGH27030S-AMP2

Figure 4. - Small Signal Gain and Return Losses vs Frequency
V_{DD} = 28 V, I_{DQ} = 0.20 A

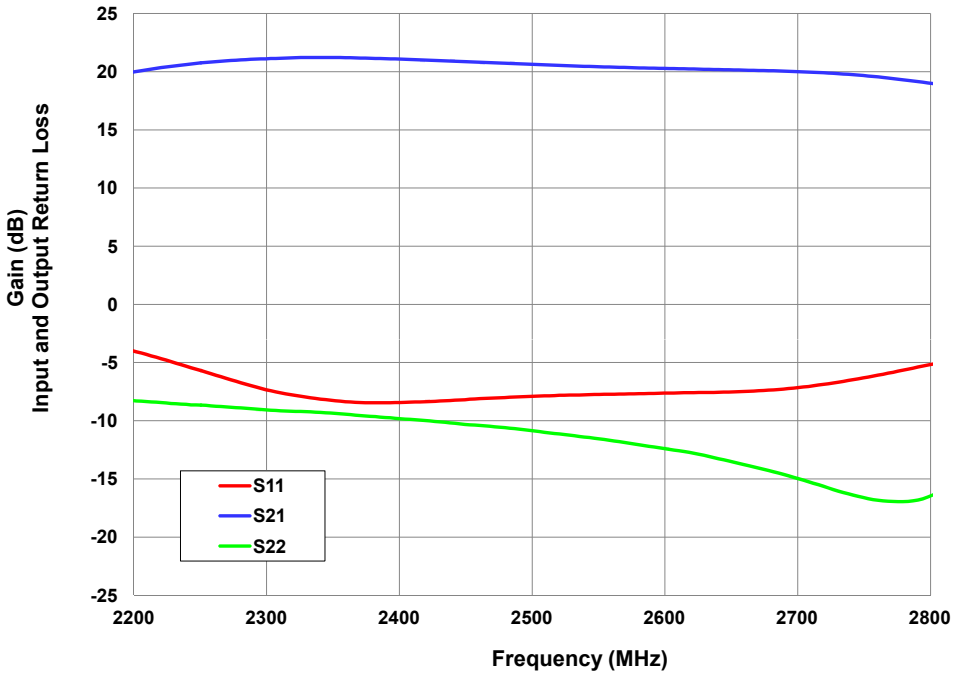
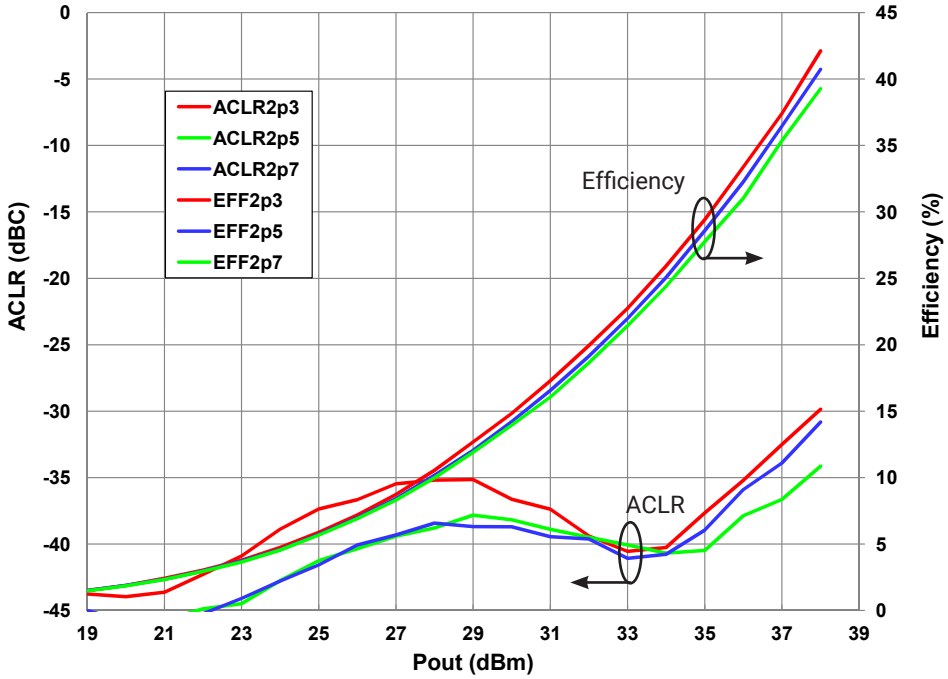


Figure 5. - Typical Drain Efficiency and ACLR vs. Output Power
V_{DD} = 28 V, I_{DQ} = 0.20 A, 1c WCDMA, PAR = 7.5 dB



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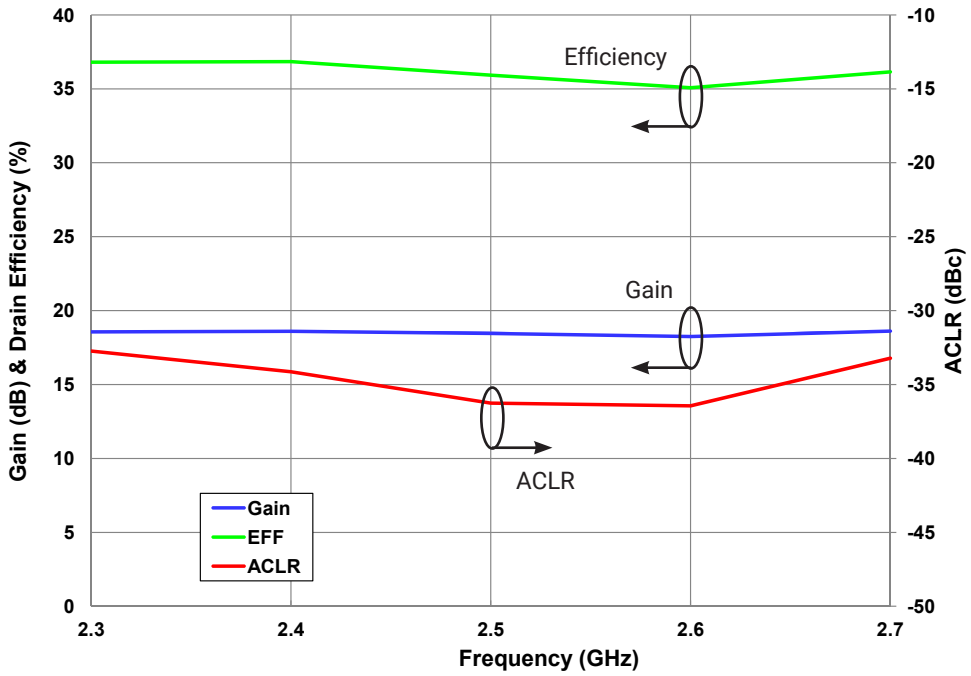
Typical Performance in Application Circuit CGH27030S-AMP2

Figure 6. - Typical Gain, Drain Efficiency and ACLR vs Frequency
V_{DD} = 28 V, I_{DQ} = 0.20 A, P_{AVE} = 5 W, 1c WCDMA, PAR = 7.5 dB



Electrostatic Discharge (ESD) Classifications

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

Moisture Sensitivity Level (MSL) Classification

Parameter	Symbol	Level	Test Methodology
Moisture Sensitivity Level	MSL	3 (168 hours)	IPC/JEDEC J-STD-20

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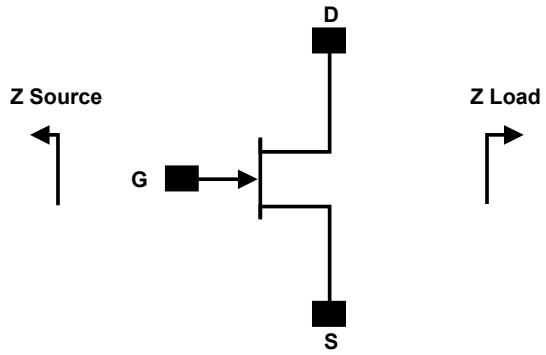
Source and Load Impedances for Application Circuit CGH27030S-AMP2



Frequency (MHz)	Z Source	Z Load
2300	1.7 - j0.5	7.7 + j7.7
2500	2.2 - j0.2	8.0 + j6.8
2700	1.5 - j0.1	6.6 + j6.3

Note[1]: V_{DD} = 28 V, I_{DQ} = 0.20 A in the DFN package.
Note[2]: Impedances are extracted from the CGH27030S-AMP2 application circuit and are not source and load pull data derived from the transistor.

CGH27030S-AMP2 Application Circuit Bill of Materials

Designator	Description	Qty
R1, R2	RES, 22.6, OHM, +/-1%, 1/16W, 0603	2
C1	CAP, 3.3 pF, ±0.1 pF, 0603, ATC	1
C2	CAP, 0.9 pF, ±0.1 pF, 0603, ATC	1
C3	CAP, 1.2 pF, ±0.1 pF, 0603, ATC	1
C4	CAP, 1.5 pF, ±0.1 pF, 0603, ATC	1
C5, C9	CAP, 8.2 pF, ±0.25 pF, 0603, ATC	2
C6, C10	CAP, 470 pF, 5%, 100 V, 0603, X	2
C7, C11	CAP, 33000 pF, 0805, 100 V, X7R	2
C12	CAP, 1.0 UF, 100 V, 10%, X7R, 1210	1
C8	CAP, 10 UF 16 V TANTALUM	1
C14	CAP, 27 pF, ±5%, 0603, ATC	1
C13	CAP, 33 UF, 20%, G CASE	1
J1, J2	CONN, SMA, PANEL MOUNT JACK, FLANGE, 4-HOLE, BLUNT POST	1
Q1	CGH27030S, QFN	2

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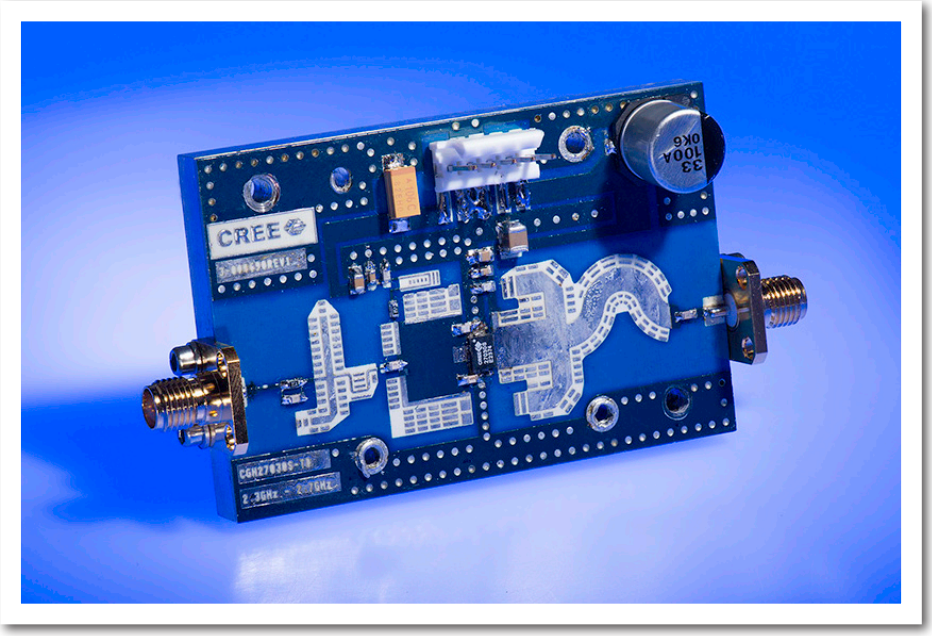
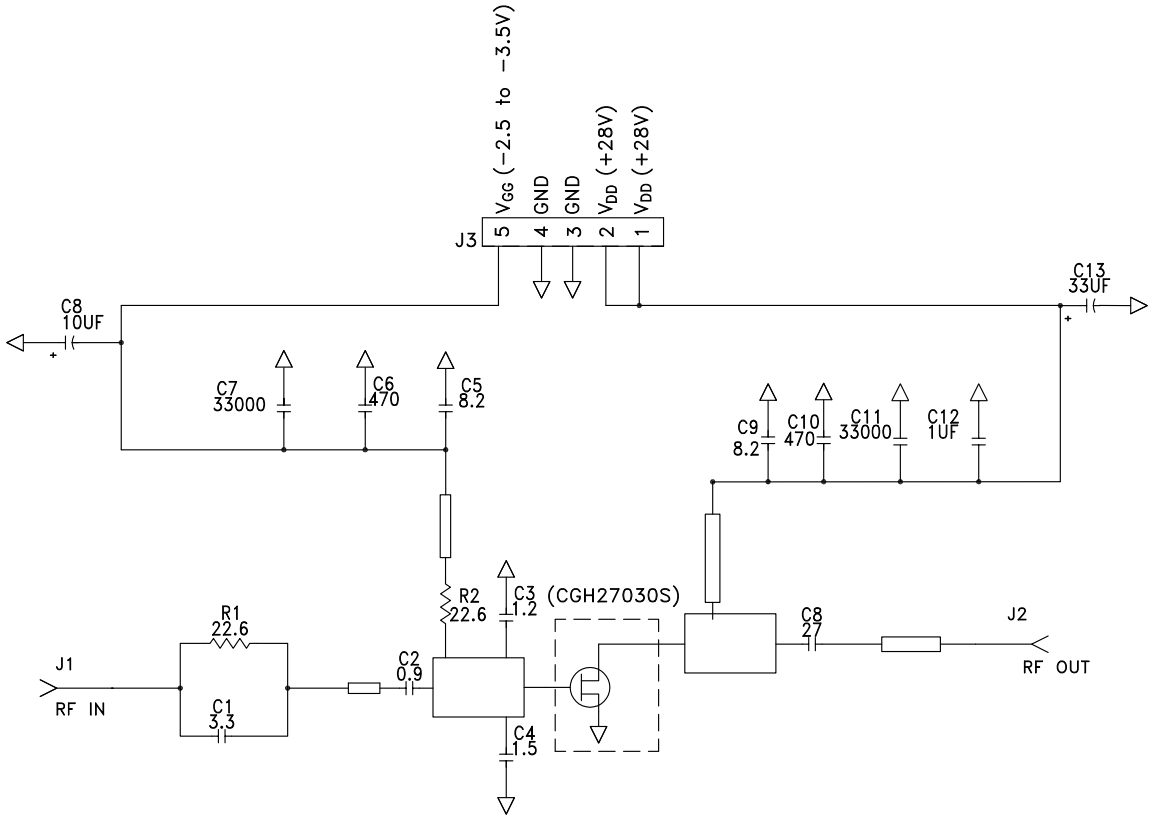
CGH27030S-AMP2 Application Circuit, 28 V, 2.3 - 2.7 GHz



CGH27030S-AMP2 Application Circuit Schematic, 28 V, 2.3 - 2.7 GHz



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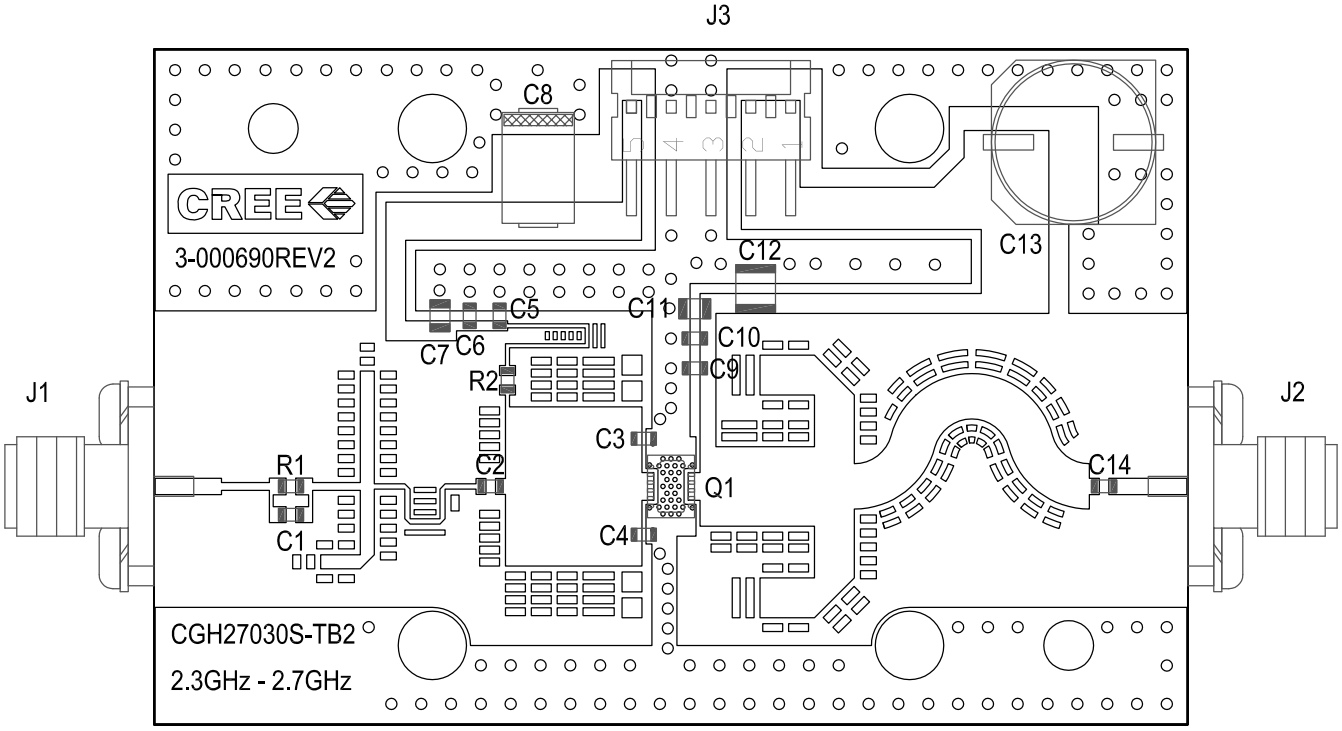
CGH27030S-AMP2 Application Circuit, 28 V, 2.3 - 2.7 GHz



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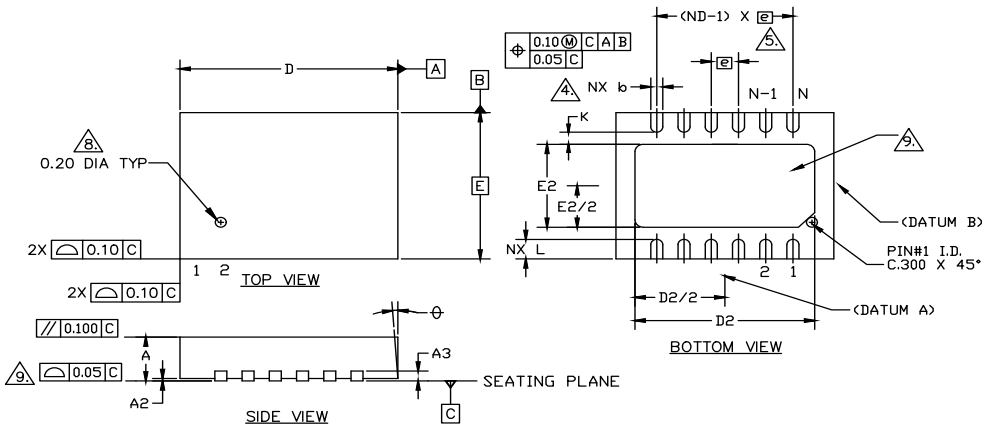
Product Dimensions CGH27030S (Package 3 x 4 DFN)

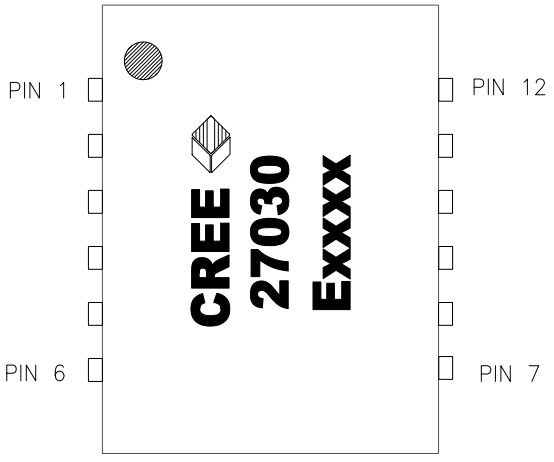
SYMBOL	COMMON DIMENSIONS			NOTE
	MIN.	NOM.	MAX.	
A	0.80	0.85	0.90	
A1	0.00	0.02	0.05	
A3		0.203 REF.		
θ	0	——	12	2
D		4.00 BSC		
E		3.00 BSC		
e		0.50 BSC		
N		12		3
ND		6		5
L	0.35	0.40	0.45	
b	0.18	0.25	0.30	4
D2	3.20	3.30	3.40	
E2	1.60	1.7	1.80	
K	0.20	——	——	



NOTES :

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M – 1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS, θ IS IN DEGREES.
3. N IS THE TOTAL NUMBER OF TERMINALS.
4. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN .15 AND .30mm FROM TERMINAL TIP.
5. ND REFERS TO THE NUMBER OF TERMINALS ON D SIDE
6. MAXIMUM PACKAGE WARPAGE IS .05 mm.
7. MAXIMUM ALLOWABLE BURRS IS .076 mm IN ALL DIRECTIONS.
8. PIN #1 ID ON TOP WILL BE LASER MARKED.
9. UNILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.
10. THIS DRAWING CONFORMS TO JEDEC REGISTERED OUTLINE MO–229.
11. ALL PLATED SURFACES TIN 0.010 mm +/– 0.005 mm

Pin	Input/Output
1	GND
2	RF IN
3	RF IN
4	RF IN
5	RF IN
6	GND
7	GND
8	RF OUT
9	RF OUT
10	RF OUT
11	RF OUT
12	GND



Note: Leadframe finish for 3x4 DFN package is Nickel/Palladium/Gold. Gold is the outer layer.

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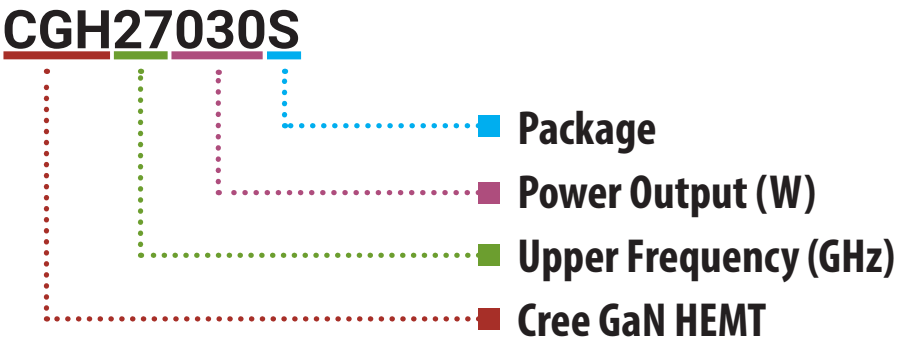
Part Number System



Parameter	Value	Units
Upper Frequency[1]	2.7	GHz
Power Output	30	W
Package	Surface Mount	-

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.

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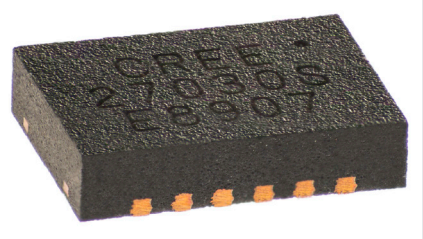
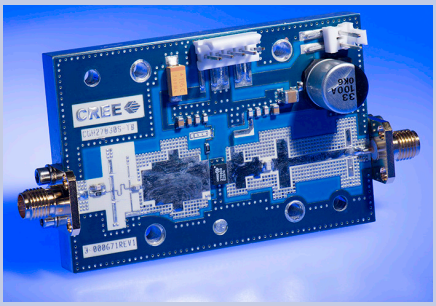
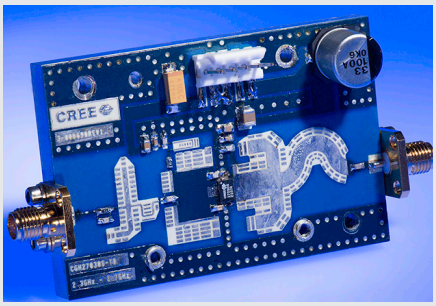
Product Ordering Information

Order Number	Description	Unit of Measure	Image
CGH27030S	GaN HEMT	Each	
CGH27030S-AMP1	Test board without GaN HEMT	Each	
CGH27030S-AMP2	Test board with GaN HEMT installed	Each	
CGH27030S-TR	Delivered in Tape and Reel	250 parts / reel	

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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.*

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