Product Specifications
July 1997 *(1 of 4)*

2.3 to 2.5 GHz +30 dBm Power GaAs FET

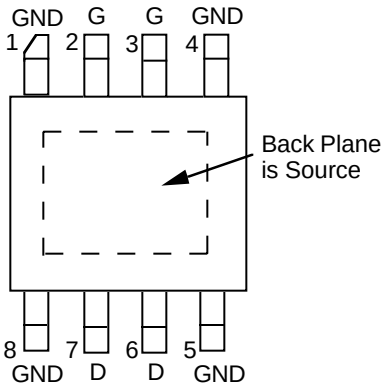
Features

- ❑ **High Gain**
- ❑ **+30 dBm Power Output**
- ❑ **Proprietary Power FET Process**
- ❑ **>40% Linear Power Added Efficiency**
- ❑ **Surface Mount SO-8 Power Package**

Applications

- ❑ **ISM Band Base Stations and Terminals**
- ❑ **RF ID/POS Base Stations**
- ❑ **Wireless Local Loop**

Package Diagram



Description

The CFK2062-P5 is a high-gain FET intended for driver amplifier applications in high-power systems, and output stage usage in medium power applications at power levels up to +30 dBm. The device is easily matched and provides excellent linearity at 1 Watt. Manufactured in Celeritek's proprietary power FET process, this device is assembled in an industry standard surface mount SO-8 power package that is compatible with high volume, automated board assembly techniques.

Specifications (TA = 25°C)

The following specifications are guaranteed at room temperature in Celeritek test fixture at 2.45 GHz.

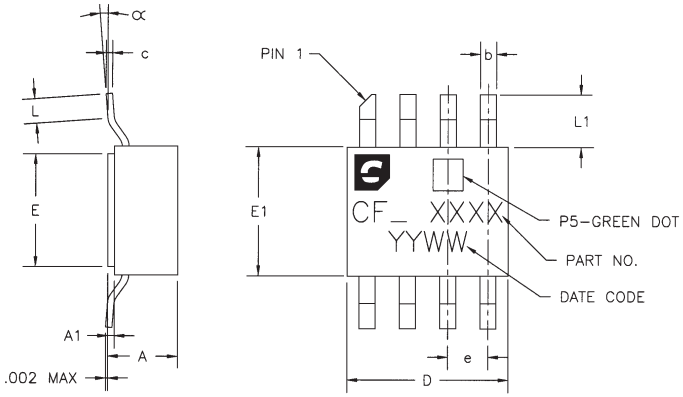
Parameters	Conditions	Min	Typ	Max	Units
V_d = 8V, I_d = 400 mA (Quiescent)					
P_{-1dB}		30.0	31.0	—	dBm
SSG		12.0	13.0	—	dB
3rd Order Products (1)		—	30	—	dBc
Efficiency	@ P1dB	—	40	—	%
V_d = 5V, I_d = 600 mA (Quiescent)					
P_{-1dB}		—	30.5	—	dBm
SSG		—	12.0	—	dB

Parameters	Conditions	Min	Typ	Max	Units
g_m	Vds = 2.0V, Vgs = 0V	—	650	—	mS
I_{dss}	Vds = 2.0V, Vgs = 0V	—	1.4	—	A
V_p	Vds = 3.0V, Ids = 25 mA	—	-1.8		Volts
BV_{GD}	Igd = 2.5 mA	15	17	—	Volts
Θ_{JL} (2)	@150°C TCH	—	12	—	°C/W

Absolute Maximum Ratings

Parameter	Symbol	Rating
Drain-Source Voltage	V_{DS}	10V (3)
Gate-Source Voltage	V_{GS}	-5V
Drain Current	I_{DS}	Idss
Continuous Dissipation	P_T	6W
Channel Temperature	T_{CH}	175°C
Storage Temperature	T_{STG}	-65°C to +175°C

SO-8 Power Package Physical Dimensions



DIMENSION	MINIMUM	NOMINAL	MAXIMUM
A		.086[2.184]	.100[2.540]
A1	.005[.1270]	.008[.2032]	.011[.2794]
b	.017[.4318]	.020[.5080]	.023[.5842]
c	.007[.1778]	.008[2032]	.009[.2286]
D	.195[4.953]	.200[5.080]	.205[5.207]
E	.135[3.429]	.140[3.556]	.145[3.683]
E1	.155[3.937]	.160[4.064]	.165[4.191]
e		.050[1.270]	
L	.020[.5080]		.040[1.016]
L1	.055[1.397]	.065[1.651]	.075[1.905]
α	0°		8°

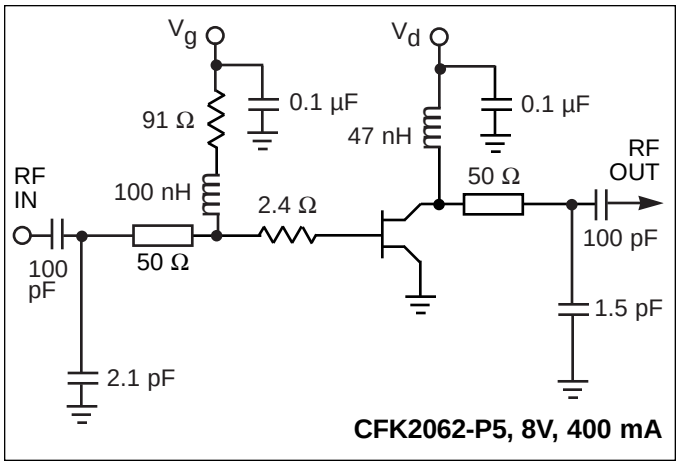
DIMENSIONS IN INCHES [MILIMETERS]

Notes:
1. Sum to two tones with 1 MHz spacing = 25 dBm.
2. See thermal considerations information on page 4.
3. Maximum potential difference across the device (Vd + Vg) cannot exceed 12V.

Typical Scattering Parameters (TA = 25°C, Vds = 5 V, Ids = 600 mA)

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
0.6	0.927	-129.75	8.7	102.7	0.024	21.95	0.576	-178.45
1.0	0.914	-154.69	5.449	84.82	0.025	8.72	0.6	175.04
1.8	0.889	-174.42	3.768	61.32	0.033	-5.24	0.53	163.11
1.9	0.866	-178.39	3.693	57.12	0.035	-8.52	0.52	159.17
2.0	0.883	177.09	3.605	52.62	0.05	-10.6	0.512	154.61
2.1	0.78	171.92	3.504	48.01	0.035	-14.75	0.508	149.35
2.2	0.879	166.48	3.386	42.82	0.036	-18.18	0.509	143.77
2.3	0.88	160.6	3.243	37.96	0.036	-22.89	0.515	137.96
2.4	0.884	154.86	3.09	32.93	0.035	-26.59	0.528	132.84
2.5	0.887	150.54	2.944	28.96	0.035	-30.13	0.539	128.94
2.6	0.891	145.9	2.757	24.85	0.035	-32.91	0.555	124.99
2.7	0.899	141.82	2.57	20.93	0.035	-37.19	0.574	122.00
3.0	0.917	135.01	2.081	13.19	0.03	-41.27	0.623	118.42
3.5	0.932	137.14	1.635	8.18	0.028	-41.69	0.643	124.18
4.0	0.913	143.42	1.641	3.36	0.032	-41.15	0.557	131.38
				(TA = 25°C, Vds = 8 V, Ids = 400 mA)				
0.6	0.91	-131.25	9.129	100.5	0.026	17.07	0.521	-174.04
1.0	0.904	-155.33	5.68	82.61	0.027	6.34	0.548	178.8
1.8	0.883	-174.77	3.86	58.87	0.034	-7.72	0.483	168.5
1.9	0.88	-178.6	3.783	54.83	0.034	-9.68	0.472	164.9
2.0	0.877	176.74	3.696	50.36	0.035	-13.77	0.463	160.21
2.1	0.873	171.86	3.589	45.5	0.036	-16.17	0.458	154.9
2.2	0.874	166.29	3.46	40.56	0.037	-21.9	0.458	149.35
2.3	0.876	160.6	3.324	35.55	0.036	-26.41	0.463	143.16
2.4	0.878	154.94	3.159	30.56	0.036	-29.59	0.475	137.57
2.5	0.882	150.43	3.014	26.66	0.036	-31.65	0.486	133.49
2.6	0.888	145.65	2.872	22.43	0.035	-33.01	0.504	129.21
2.7	0.893	141.74	2.643	18.41	0.035	-39.11	0.524	125.87
3.0	0.915	135.06	2.136	10.26	0.031	-46.6	0.579	121.99
3.5	0.93	137.37	1.662	4.59	0.027	-43.86	0.611	128.44
4.0	0.912	143.75	1.642	-0.35	0.031	-43.95	0.541	137.64

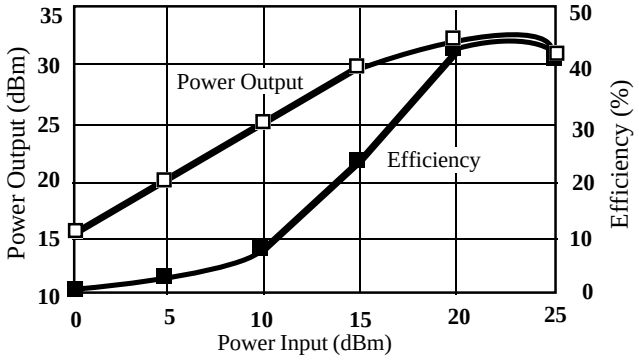
RF Match Data shown in the performance graphs was taken in the test circuit shown at right. Layout is important for proper operation. Phase length of input and output 50Ω line varies as a function of exact desired frequency of operation. Output shunt inductor effects output performance. Celeritek recommends the use of a high impedance printed inductor Lambda/4 in length. Please contact the factory for an evaluation board and/or more detailed application support.



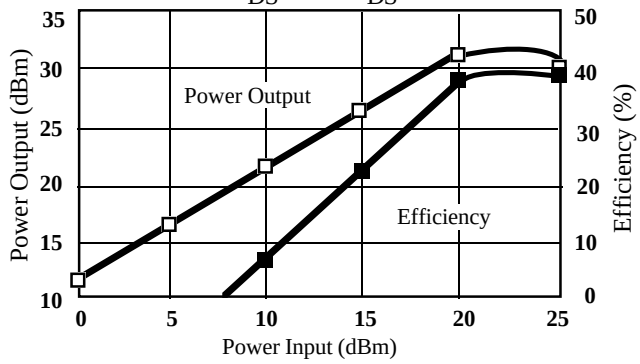
CFK2062-P5, 8V, 400 mA

Typical Performance

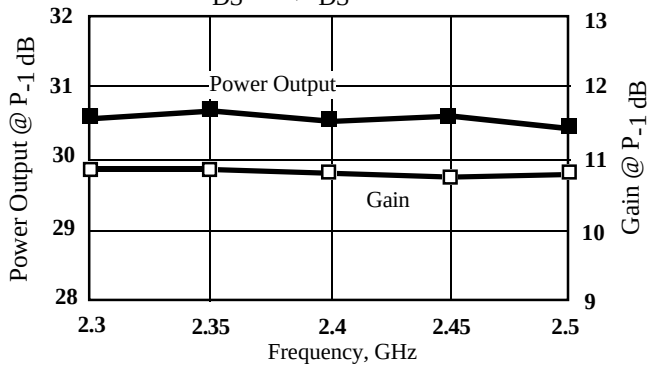
Power Output & Power Added Efficiency vs Power Input
2.45 GHz, V_{DS} = 8 V, I_{DS} = 400 mA



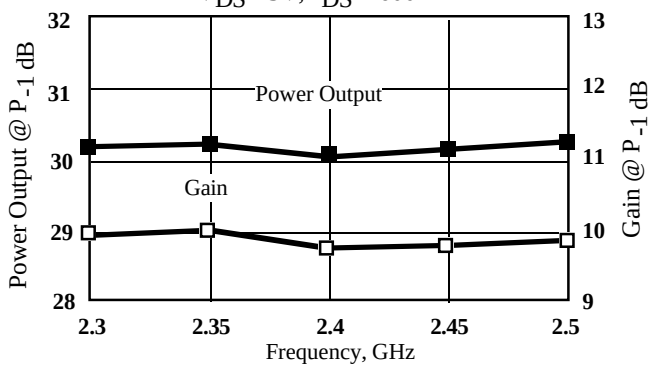
Power Output & Power Added Efficiency vs Power Input
2.45 GHz, V_{DS} = 5 V, I_{DS} = 600 mA



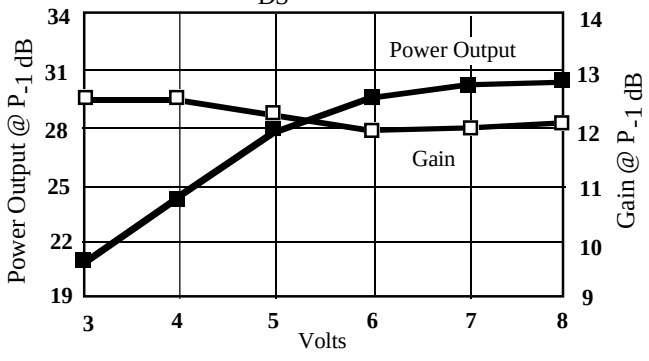
Power Output and Gain vs Frequency
V_{DS} =8V, I_{DS} = 400 mA



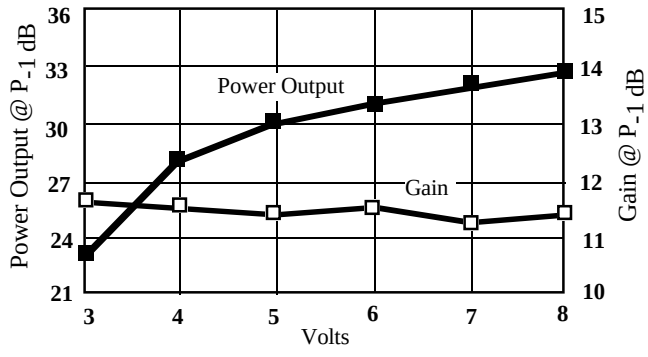
Power Output and Gain vs Frequency
V_{DS} =5V, I_{DS} = 600 mA



Power Output and Gain vs Voltage @ 2.45 GHz
I_{DS} = 400 mA



Power Output and Gain vs Voltage @ 2.45 GHz
I_{DS} = 600 mA



Thermal Considerations

The data shown was taken on a 31 mil thick FR-4 board with 1 ounce copper on both sides. The board was mounted to a base-plate with 3 screws as shown. The screws bring the top side copper temperature to the same value as the baseplate. The thermal resistance to the indicated reference lead, Θ_{JL}, is 12°C/W. The thermal resistance to the reference screw is 14°C/W.

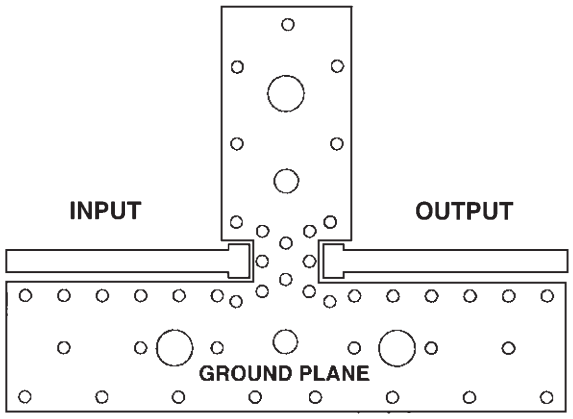
1. Use 1 or 2 ounce copper if possible.

2. Solder all eight leads of the CFK2062-P5 package to the appropriate electrical connection.

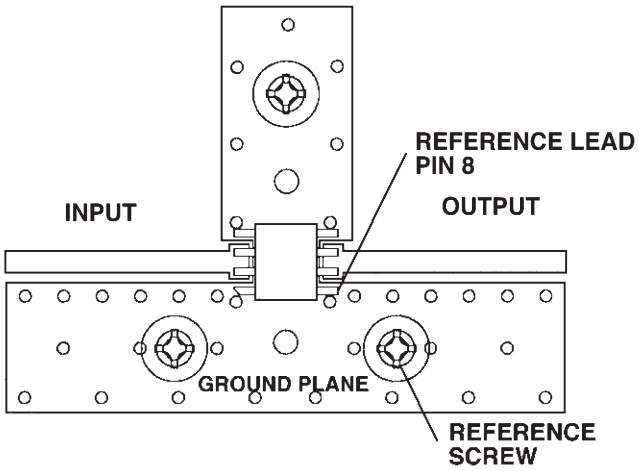
3. Solder the copper pad on the backside of the CFK2062-P5 package to the ground plane.

4. Use a large ground pad area with many plated through-holes as shown.

5. If possible, use at least one screw no more than 0.2 inches from the CFK2062-P5 package to provide a low thermal resistance path to the baseplate of the package.



BOARD LAYOUT



THERMAL MOUNTING DIAGRAM

Ordering Information

The CFK2062-P5 power stage is available in a SO-8 surface mount package. Devices are available in tape and reel. Ordering part numbers are listed.

Part Number for Ordering	Function	Package
CFK2062-P5	**2.3 - 2.5 GHz Power Stage**	**SO-8 surface mount power package**
CFK2062-P5-000T	**2.3 - 2.5 GHz Power Stage**	**SO-8 surface mount power package in tape and reel**