

SPF-2086, -2086K
0.1-12GHz Medium Power
PHEMT GaAs FET
 October, 1995

Features

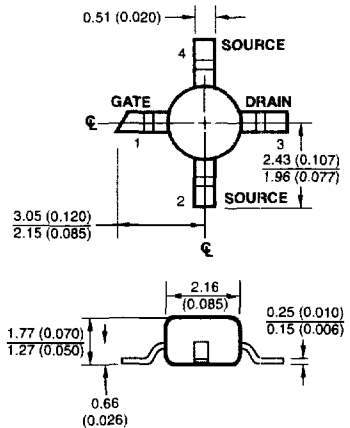
- High Associated Gain: 17dB @ 2GHz, 10dB @ 12GHz
- 0.2dB Noise Figure @ 2GHz, 0.9dB NF @ 12GHz
- +21dBm Output Power at P1dB
- 50% Power Added Efficiency
- Low Harmonic Distortion

Description

Stanford Microdevices' SPF-2086 and SPF-2086K are high performance PHEMT GaAs FETs utilizing E-beam written 0.25 micron long by 200 micron wide Schottky barrier gates.

1dB output power is +21dBm when biased at 5V and 50mA. Housed in an 85 mil diameter surface-mount plastic package, these devices may also be biased at +3V and 25mA for battery-powered applications.

These devices are ideal as output stages for 100mW WLAN transmitters or as drivers for VSAT, PCS/PCN, PHP, AMPS, GSM, and DECT subscriber units.



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Electrical Specifications at Ta = 25°C

Symbol	Parameters: Test Conditions	Model	Units	Min	Typ	Max
P1dB	Output Power at 1dB Compression Vds = 5.0 V, Ids = 50 mA f = 0.1-12 GHz	SPF-2086	dB	20.0	21.0	
G1dB	Gain at 1dB Compression Vds = 5.0 V, Ids = 50 mA f = 6.0 GHz f = 12.0 GHz		dB	11.0	13.0	
P1dB	Output Power at 1dB Compression Vds = 5.0 V, Ids = 50 mA f = 0.1-4 GHz	SPF-2086K	dB	20.0	21.0	
G1dB	Gain at 1dB Compression Vds = 5.0 V, Ids = 50 mA f = 2.0 GHz f = 4.0 GHz		dB	15.0	17.0	
TOIP	Third Order Intercept Point. Vd = 5V @50mA		dbm		36.0	
Idss	Saturated Drain Current: Vds=2.0V, Vgs=0V		mA	30	70	100
Gm	Transconductance: Vds=2.0V, Ids=15mA		mmho		75	
Vp	Pinch-off Voltage: Vds=2.0V, Ids=1mA		V		-0.6	
Vbgs	Gate-to-Source Breakdown Voltage		V		-3.0	
Vbgd	Gate-to-Drain Breakdown Voltage		V		-3.0	

Typical Scattering Parameters: Common Source, $Z_0 = 50$ ohms

$T_A = 25^\circ \text{C}$, $V_d = 5.0\text{V}$, $I_d = 40 \text{ mA}$

Freq. GHz	S_{11}			S_{21}			S_{12}			S_{22}		
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang	dB	
.1	0.99	95	15.60	6.03	-174	-51.82	0.003	87	0.61	97		
.5	0.98	81	16.57	6.74	172	-38.81	0.001	96	0.61	86		
1.0	0.91	63	16.69	6.83	161	-30.22	0.03	89	0.59	73		
1.5	0.81	46	15.65	6.06	146	-27.86	0.04	79	0.55	61		
2.0	0.73	29	16.25	6.49	142	-24.71	0.06	83	0.53	48		
2.5	0.63	14	16.35	6.57	124	-22.60	0.07	69	0.45	35		
3.0	0.53	29	14.60	5.37	114	-22.46	0.08	65	0.40	29		
3.5	0.45	-8	14.03	5.03	107	-21.49	0.08	63	0.36	22		
4.0	0.36	-23	12.81	4.37	97	-20.95	0.09	55	0.29	14		
4.5	0.25	-30	11.54	3.77	93	-21.30	0.09	51	0.26	14		
5.0	0.24	-37	11.05	3.57	92	-21.75	0.08	53	0.25	14		
5.5	0.21	-48	10.69	3.42	86	-21.51	0.08	59	0.24	8		
6.0	0.19	-51	10.43	3.32	86	-21.43	0.09	62	0.26	4		
6.5	0.18	-60	10.38	3.30	82	-21.42	0.09	67	0.27	-5		
7.0	0.17	-72	10.40	3.31	78	-20.87	0.09	77	0.27	-17		
7.5	0.17	-76	9.45	2.97	76	-20.23	0.10	89	0.29	-28		
8.0	0.20	-93	10.74	3.48	78	-15.90	0.14	103	0.29	-53		

ABSOLUTE MAXIMUM RATINGS AT 25° C

SYMBOL	PARAMETER	RATING ¹
V_{DS}	Drain-Source Voltage	10V
V_{GS}	Gate-Source Voltage	-6V
I_{DS}	Drain Current	I_{DSS}
I_{GSF}	Forward Gate Current	10mA
P_{IN}	RF Input Power	100mW
T_{CH}	Channel Temperature	175°C
T_{STG}	Storage Temperature	-65/175°C
P_T	Power Dissipation	400mW

NOTE 1: Operating Conditions exceeding any of the above ratings may result in permanent damage