SHF-0186

DC-12 GHz, 0.5 Watt AlGaAs/GaAs HFET

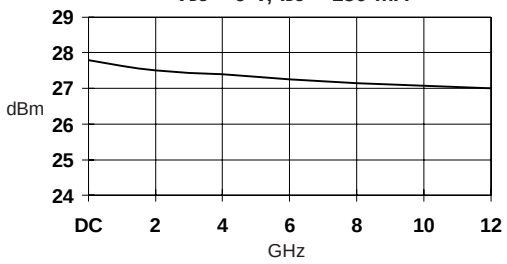
Product Description

Stanford Microdevices' SHF-0186 is a AlGaAs/GaAs Heterostructure FET housed in a low cost surface-mount plastic package. HFET technology improves breakdown voltage for high drain voltage operation. Its low Schottky leakage current improves power added efficiency.

These HFETs are an ideal choice as output stages of subscriber products or as drivers for higher power applications. Its high output third order intercept point of +38 dBm makes it suitable for use in high dynamic range requirements.

These devices have 0.5 micron gate lengths with a total gate periphery of 1200 microns. These transistors have proven gold based metallization and nitride passivation.

Output Power vs Frequency
V_{DS} = 9 V, I_{DS} = 150 mA



Product Features

- **AlGaAs/GaAs Heterostructure FET Technology**
- **High Power Added Efficiency**
- **High Associated Gain : 16 dB Typical at 2 GHz**
- **Low Cost Surface Mount Plastic Package**
- **Available in Tape and Reel Format**

Applications

- **Subscriber Products**
- **Driver for High Power Applications**

Electrical Specifications at Ta = 25C

Symbol	Parameters: Test Conditions		Units	Min.	Typ.	Max.
P1dB	Output Power at 1dB Compression: Vds = 9.0V, Ids = 150mA	f = 0.9-12 GHz	dBm	26	27.5	
G1dB	Gain at P1dB: Vds = 9.0V, Ids = 150mA	f = 6.0 GHz f = 12.0 GHz	dB dB	11 5	13 6	
PAE	Power Added Efficiency: Vds = 9.0V, Ids = 150mA	f = 0.9-12 GHz	%		40	
TOIP	Third Order Intercept Point: Vds = 9.0V, Ids = 150mA	f = 0.9-12 GHz	dBm		38	
Idss	Saturated Drain Current: Vds = 3.0V, Vgs = 0V		mA	210	330	450
Gm	Tranconductance: Vds = 3.0V, Vgs = 0V		mS	130	190	250
Vp	Pinch-Off Voltage: Vds = 3.0V, Ids = 1mA		V	-4.0	-2.2	-0.5
Vbgs	Gate-to-Source Breakdown Voltage		V	-30	-22	-17
Vbgd	Gate-to-Drain Breakdown Voltage		V	-30	-22	-17

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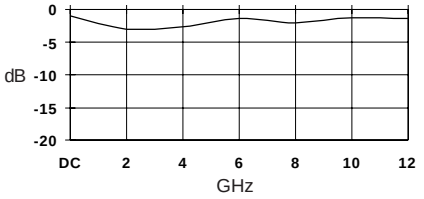
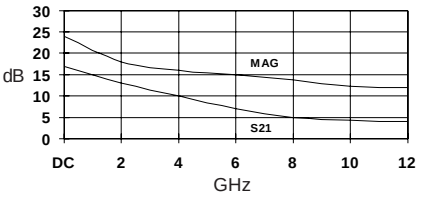
SHF-0186 DC-12 GHz 0.5 Watt HFET

Typical Performance at 25° C (Vds = 9V, Ids = 150mA)

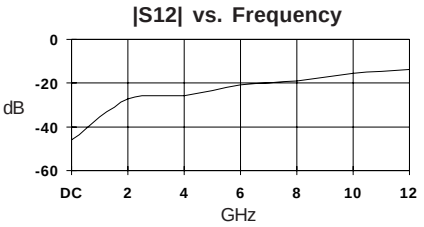
|S11| vs. Frequency



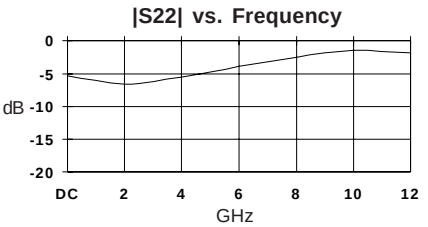
|S21| and MAG vs. Frequency



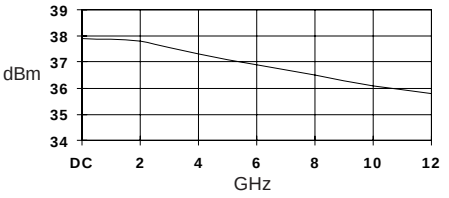
|S12| vs. Frequency



|S22| vs. Frequency



TOIP vs. Frequency



Typical S-Parameters Vds = 9.0V, Ids = 150mA

Freq GHz	|S11|	S11 Ang	|S21|	S21 Ang	|S12|	S12 Ang	|S22|	S22 Ang
.100	0.891	-12	11.82	177	.005	89	.539	-4
.500	0.928	-64	10.84	150	.023	70	.529	-27
1.00	0.888	-97	9.44	122	.037	63	.477	-48
2.00	0.804	-138	7.94	97	.043	47	.468	-74
3.00	0.813	-167	5.69	70	.049	44	.493	-103
4.00	0.804	172	3.98	52	.053	60	.531	-123
5.00	0.846	155	2.76	35	.074	65	.603	-145
6.00	0.914	137	2.02	20	.092	69	.670	-159
7.00	0.917	119	1.66	-1	.137	58	.822	147
8.00	0.926	101	1.45	-4	.115	60	.802	148
9.00	0.967	87	1.37	-11	.205	56	.942	132
10.00	0.970	65	1.33	-34	.167	41	.947	100
11.00	0.937	54	1.38	-31	.186	42	.952	89
12.00	0.906	21	1.33	-38	.207	39	.879	51

(S-Parameters include the effects of two 1.0 mil diameter bond wires, each 30 mils long, connected to the gate and drain pads on the die)

Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum
Drain to Source Voltage	V_{DS}	+10V
Gate to Source Voltage	V_{GS}	-17V
Drain Current	I_{DS}	IDSS
RF Input Power	P_{IN}	100 mW
Channel Temperature	T_{CH}	175 C
Storage Temperature	T_{STG}	-65 to +175 C

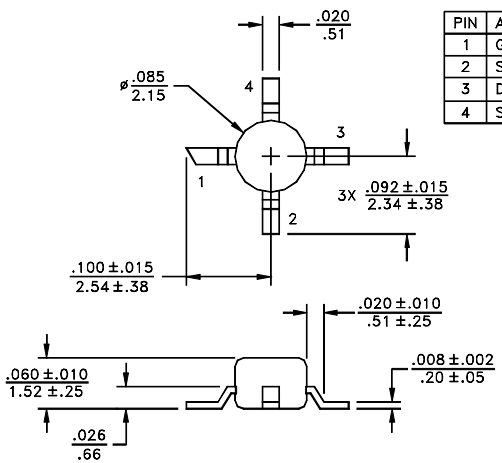
Notes:

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Mounting Surface Temperature = 25° C

Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
SHF-0186-TR1	1000	7"
SHF-0186-TR2	3000	13"
SHF-0186-TR3	5000	13"

86 Package Outline



PIN	ASSIGNMENT
1	GATE
2	SOURCE
3	DRAIN
4	SOURCE

Dimensions are in $\frac{\text{in.}}{\text{mm}}$ Tolerances: $\frac{\pm.005 \text{ in.}}{\pm.13 \text{ mm}}$