PLESSEY

T-31-25

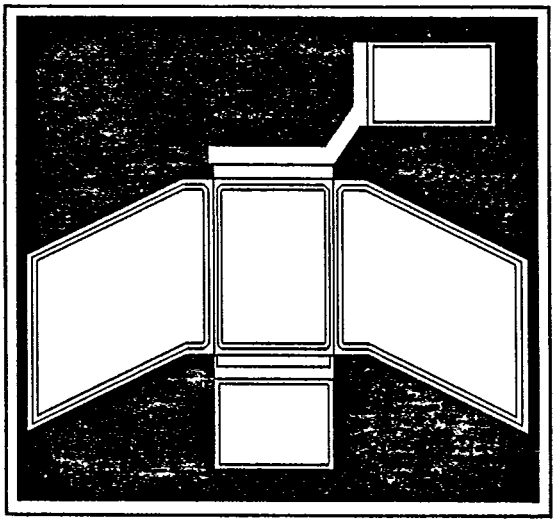
Three Five Product Information

GaAs Dual Gate MESFET P35-1310

The versatile dual gate MESFET has been designed for improved performance and is ideally suited for:

Applications

- Automatic gain control
- Fast, high dynamic range switching such as biphase or quadriphase modulators with direct carrier modulation up to 1 Gbit data rates
- Amplifiers with switching capability for signal routing such as switching matrices for satellite -switched TDMA applications (less than 1 nanosecond switching time)
- Mixers with conversion gain and inherent port-to-port isolation to minimise filter requirements



Features

- New chip layout for improved isolation, stability and ease of bonding
- All gold bond pads
- Silicon nitride passivation for improved handling and long term stability
- New package (P110) for ease of mounting and improved electrical characteristics
- Unique characterisation data for optimum switching
- Space qualified

RF Electrical Characteristics (at 25°C)

Symbol	Parameters and Conditions	Units	P35-1310-0			P35-1310-1		
			Min.	Typ.	Max.	Min.	Typ.	Max.
f_{max}	Maximum frequency of oscillation at V_{DS} = 5V, I_{DS} = 20mA, V_{G2S} = 0V	GHz		60			50	
MAG*	Maximum available gain at V_{DS} = 5V, I_{DS} = 20mA, V_{G2S} = 0V							
	f = 4GHz	dB	-	22	-	-	22	-
	f = 8GHz	dB	-	17	-	-	16	-
	f = 12GHz	dB	-	14	-	-	12.5	-
NF	Noise figure at V_{DS} = 5V, I_{DS} = 10mA, V_{G2S} = 0V							
	f = 4GHz	dB	-	1.5	-	-	1.6	-
	f = 8GHz	dB	-	2.8	-	-	3.1	-
	f = 12GHz	dB	-	3.6	-	-	4.0	-
GNF_{OPT}	Associated power gain when matched for NF_{OPT} at V_{DS} = 5V, I_{DS} = 10mA, V_{G2S} = 0V							
	f = 4GHz	dB	-	21	-	-	21	-
	f = 8GHz	dB	-	16	-	-	15	-
	f = 12GHz	dB	-	13	-	-	11.5	-
P_{OUT}	Output power at V_{DS} = 5V, I_{DS} = 20mA, V_{G2S} = 0V 1 dB gain compression point f = 12GHz	dBm	-	10	-	-	10	-
AGC	Available gain control at V_{DS} = 5V, I_{DS} = 20mA, V_{G2S} = 0 to −4V							
	f = 12GHz, Z_{G2} = 50Ω	dB	-	25	-	-	25	-
	Z_{G2} = optimum	dB	-	40	-	-	40	-

*The quoted values of maximum available gain are those obtained with the second gate termination adjusted to give a stability factor close to unity.

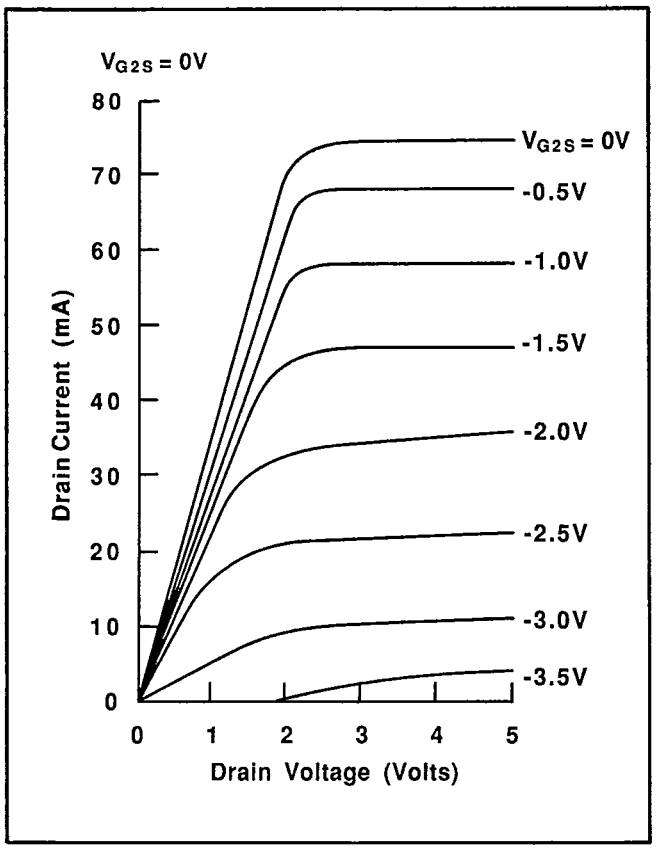
DC Electrical Characteristics (25°C)

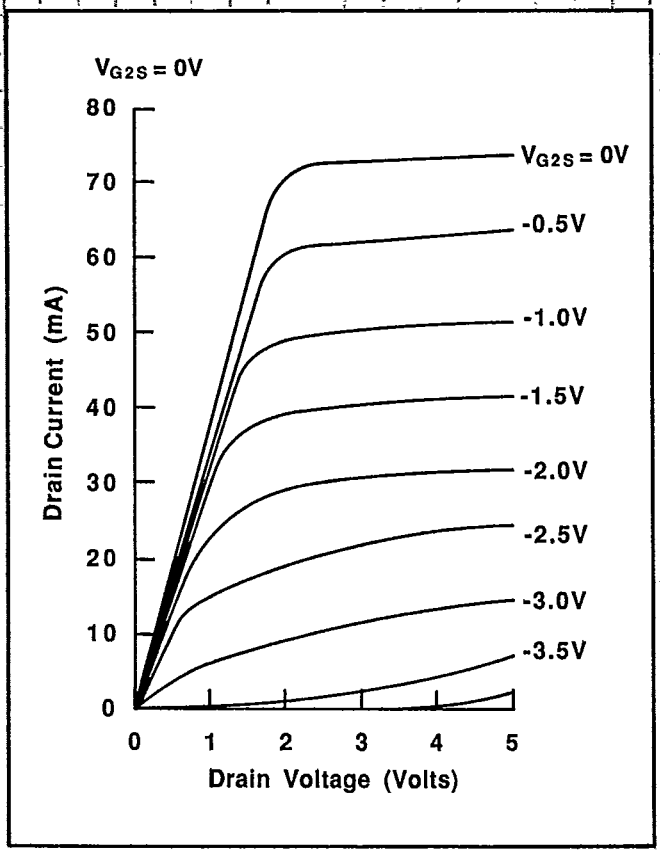
Symbol	Parameters and Conditions	Units	Min.	Typ.	Max.
I_{DSS}	Drain Current at V_{DS} = 5V, V_{G1S} = V_{G2S} = 0V	mA	40	55	100
V_P	Pinch-off voltage at V_{DS} = 5V, V_{G2S} = 0V, I_{GS} = 10μA	V	−2	−3.2	−5
G_M	Transconductance at V_{DS} = 5V, V_{G2S} = 0V, V_{G1S} = 0 to −1V	mS	12	20	25
I_{GS}	Gate to source leakage current at V_{DS} = 0V, V_{G1S} = 5V, V_{G2S} = 0V	μA	-	0.1	1.0
	V_{G2S} = 5V, V_{G1S} = 0V		-	0.1	1.0
R_{TH}	Thermal Resistance (channel to package)	°C/W	-	-	150

Absolute Maximum Ratings

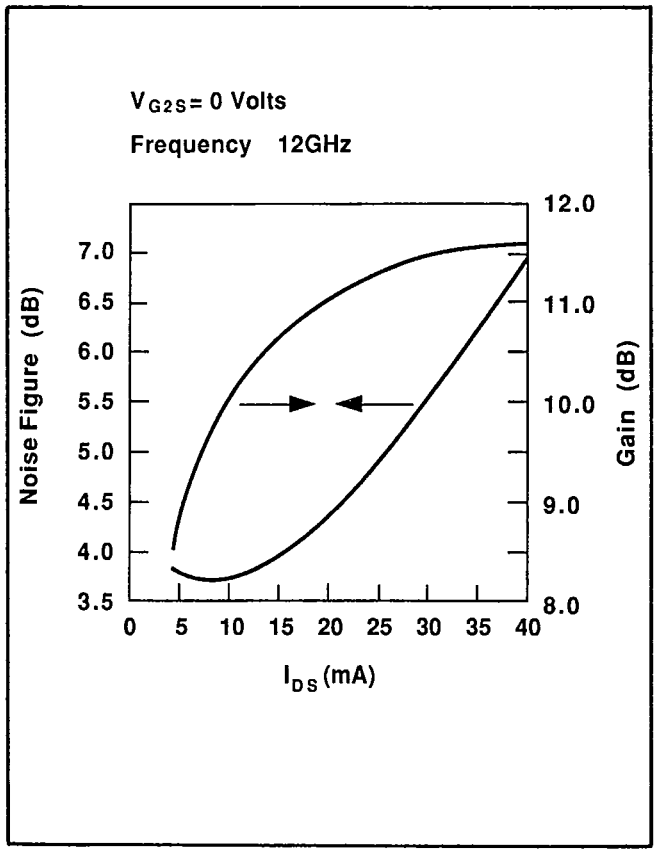
Drain to source voltage	V_{DS} = 6 volts	Total power dissipation	P_T = 500mW
Gate to source voltage	V_{G1S} = V_{G2S} = −10 volts	Channel temperature	150°C maximum
Drain current	I_{DSS} = 100 mA	Storage temperature	−65°C to 150°C

Dual Gate DC Characteristics (typical)

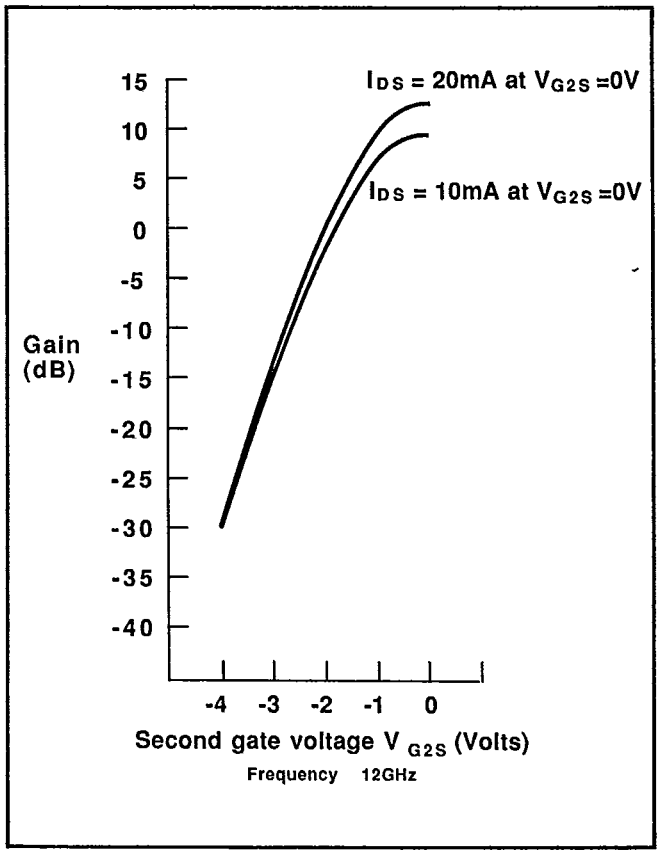




Noise Figure and Associated Gain versus 1_{DS}



Gain Control versus V_{G2S} Voltage



Typical Small Signal S-Parameters

P35-1310-0 (Chip) - minimum noise basis V_{DS}=5volts, I_{DS}=10mA, V_{G2S}=0volts, Gate 1 is Port 1, Gate 2 is Port 2, Drain is Port 3
Reference planes at package interface

Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.985	−43	0.051	37	0.030	53	0.140	−152	1.000	−46	0.075	52	1.630	127	0.180	130	0.940	−40
3	0.950	−70	0.050	28	0.042	35	0.270	−179	0.985	−62	0.106	32	1.580	98	0.252	105	0.890	−56
4	0.910	−93	0.045	17	0.051	17	0.370	155	0.960	−78	0.127	13	1.540	72	0.300	83	0.855	−72
5	0.880	−116	0.040	7	0.059	−1	0.455	132	0.960	−95	0.138	−4	1.505	47	0.320	61	0.830	−88
6	0.840	−137	0.034	−4	0.065	−17	0.518	110	0.960	−113	0.143	−20	1.470	24	0.320	41	0.815	−103
7	0.815	−157	0.029	−16	0.068	−34	0.570	87	0.960	−133	0.143	−36	1.450	2	0.320	22	0.810	−120
8	0.785	−177	0.024	−30	0.070	−51	0.620	66	0.965	−153	0.142	−51	1.430	−21	0.310	4	0.805	−135
9	0.750	162	0.020	−47	0.072	−68	0.650	43	0.970	−173	0.140	−65	1.410	−43	0.300	−14	0.800	−153
10	0.720	140	0.018	−65	0.075	−85	0.700	21	0.970	165	0.140	−82	1.400	−67	0.290	−33	0.800	−170
11	0.700	117	0.017	−85	0.077	−102	0.750	−2	0.950	145	0.148	−97	1.400	−93	0.300	−51	0.793	170
12	0.670	92	0.020	−110	0.080	−120	0.800	−26	0.940	124	0.160	−115	1.400	−120	0.320	−71	0.780	150
13	0.630	65	0.024	−133	0.085	−138	0.850	−52	0.910	105	0.183	−133	1.400	177	0.360	−92	0.760	128
14	0.590	35	0.031	−165	0.093	−158	0.940	−80	0.860	85	0.217	−152	1.400	177	0.430	−114	0.730	104
15	0.550	2	0.043	161	0.102	172	1.040	−108	0.810	67	0.266	−173	1.400	140	0.530	−139	0.680	78
16	0.510	−36	0.060	122	0.115	160	1.150	−140	0.730	50	0.330	162	1.400	99	0.670	−165	0.630	50
17	0.470	−77	0.080	80	0.130	138	1.300	−177	0.630	33	0.415	137	1.400	53	0.850	168	0.540	20
18	0.410	−125	0.105	35	0.150	115	1.500	150	0.500	17	0.518	110	1.400	2	1.100	134	0.450	−10

P35-1310-1 (P110 package) - optimum gain basis V_{DS}=5volts, I_{DS}=20mA, V_{G2S}=0volts

Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.975	−50	0.047	30	0.030	51	0.175	−152	1.000	−32	0.075	50	2.000	126	0.210	130	0.925	−40
3	0.945	−74	0.046	30	0.042	30	0.320	−176	0.980	−63	0.100	30	1.930	99	0.280	108	0.880	−60
4	0.905	−93	0.042	24	0.050	19	0.435	152	0.970	−78	0.120	12	1.870	72	0.320	86	0.845	−75
5	0.880	−118	0.038	15	0.056	4	0.525	130	0.950	−95	0.130	−6	1.810	48	0.340	66	0.820	−89
6	0.830	−138	0.033	6	0.061	−16	0.600	105	0.950	−113	0.130	−22	1.770	26	0.350	46	0.805	−102
7	0.805	−160	0.028	−10	0.063	−38	0.650	84	0.950	−132	0.130	−36	1.730	2	0.340	26	0.795	−120
8	0.770	178	0.024	−25	0.065	−55	0.700	60	0.965	−152	0.125	−50	1.700	−20	0.320	10	0.790	−138
9	0.725	152	0.020	−44	0.066	−80	0.750	40	0.975	−174	0.125	−65	1.680	−44	0.310	−8	0.790	−154
10	0.700	132	0.018	−60	0.068	−89	0.800	16	0.980	165	0.125	−82	1.660	−66	0.300	−28	0.780	−174
11	0.675	112	0.018	−84	0.070	−100	0.850	−6	0.980	145	0.140	−98	1.650	−95	0.300	−46	0.770	170
12	0.645	85	0.018	−112	0.073	−118	0.900	−32	0.970	125	0.150	−110	1.650	−122	0.330	−64	0.760	145
13	0.615	50	0.024	−146	0.076	−136	0.850	−55	0.950	105	0.170	−130	1.650	−150	0.390	−86	0.745	124
14	0.580	26	0.030	−180	0.085	−155	1.000	−84	0.915	85	0.200	−150	1.640	172	0.470	−108	0.725	100
15	0.550	−10	0.040	144	0.093	−174	1.050	−112	0.835	68	0.250	−172	1.630	140	0.580	−132	0.680	80
16	0.525	−45	0.055	105	0.108	162	1.110	−135	0.750	50	0.315	160	1.620	100	0.740	−160	0.620	52
17	0.490	−86	0.072	65	0.125	140	1.200	−170	0.650	30	0.400	140	1.600	58	0.930	180	0.550	25
18	0.455	−130	0.092	25	0.146	120	1.300	145	0.525	18	0.510	110	1.550	10	1.170	140	0.410	−4

P35-1310-1 (P110 package) - optimum switching basis V_{DS}=5volts, V_{G1S}=I_{DS} of 20mA, V_{G2S}=−4volts

Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.990	−42	0.018	60	0.029	50	0.015	60	1.000	−53	0.070	50	0.031	50	0.085	74	0.990	−42
3	0.960	−70	0.017	55	0.036	33	0.015	60	0.980	−64	0.100	32	0.040	33	0.120	52	0.970	−54
4	0.920	−94	0.018	85	0.042	17	0.017	96	0.960	−79	0.120	13	0.045	16	0.140	32	0.955	−68
5	0.885	−116	0.028	105	0.045	2	0.032	110	0.950	−92	0.130	−5	0.050	0	0.150	12	0.950	−82
6	0.850	−136	0.044	100	0.048	−12	0.050	100	0.940	−110	0.140	−22	0.054	−16	0.160	−5	0.945	−98
7	0.820	−156	0.060	88	0.050	−26	0.070	80	0.940	−130	0.140	−40	0.055	−32	0.160	−24	0.945	−116
8	0.790	180	0.080	72	0.053	−41	0.086	62	0.935	−151	0.135	−58	0.057	−47	0.170	−40	0.945	−135
9	0.750	157	0.090	48	0.055	−55	0.097	40	0.930	−173	0.130	−75	0.058	−62	0.170	−58	0.950	−155
10	0.720	135	0.097	25	0.057	−69	0.105	16	0.918	164	0.130	−90	0.059	−79	0.170	−77	0.950	−175
11	0.680	110	0.105	5	0.061	−84	0.112	−5	0.900	143	0.135	−110	0.060	−93	0.170	−95	0.940	165
12	0.640	84	0.110	−22	0.066	−100	0.120	−32	0.872	122	0.150	−126	0.063	−110	0.180	−112	0.930	144
13	0.600	60	0.117	−50	0.072	−115	0.125	−55	0.833	103	0.170	−144	0.067	−125	0.200	−134	0.910	122
14	0.550	32	0.123	−80	0.082	−134	0.132	−80	0.780	86	0.200	−160	0.073	−142	0.230	−155	0.870	100
15	0.500	−2	0.129	−100	0.094	−153	0.138	−110	0.730	71	0.230	−178	0.080	−160	0.280	−175	0.825	80
16	0.450	−40	0.134	−130	0.109	−173	0.145	−140	0.650	60	0.280	155	0.090	−177	0.340	160	0.770	58
17	0.400	−80	0.140	180	0.127	163	0.152	−170	0.570	52	0.350	132	0.105	163	0.420	130	0.690	36
18	0.320	−130	0.150	150	0.150	140	0.156	145	0.450	44	0.450	110	0.120	143	0.500	110	0.580	16

Chip Parameter Data

P35-1310-0 (Chip) - minimum noise basis V_{DS}=5volts, I_{DS}=10mA, V_{G2S}=0volts

Reference planes at chip bond pads

Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.997	−20	0.039	76	0.018	83	0.207	−121	1.000	−11	0.084	78	1.765	152	0.261	159	0.903	−11
3	0.966	−30	0.045	68	0.029	71	0.308	−136	1.000	−17	0.116	72	1.698	137	0.287	147	0.889	−17
4	0.937	−39	0.048	62	0.039	63	0.396	−150	0.992	−23	0.142	64	1.622	123	0.312	137	0.875	−22
5	0.912	−48	0.051	58	0.046	56	0.470	−163	0.983	−29	0.163	59	1.537	110	0.335	128	0.862	−28
6	0.899	−56	0.051	56	0.051	52	0.532	−174	0.975	−35	0.181	55	1.446	98	0.357	120	0.850	−32
7	0.868	−63	0.051	56	0.055	50	0.583	175	0.966	−40	0.194	51	1.350	88	0.377	113	0.838	−37
8	0.860	−69	0.050	58	0.057	50	0.622	166	0.956	−46	0.204	48	1.251	78	0.395	106	0.827	−41
9	0.834	−74	0.048	60	0.058	51	0.652	158	0.946	−50	0.210	46	1.151	69	0.410	101	0.816	−45
10	0.820	−79	0.046	63	0.058	53	0.673	151	0.934	−55	0.214	44	1.051	61	0.422	96	0.806	−49
11	0.807	−84	0.043	67	0.058	55	0.686	144	0.922	−59	0.215	42	0.953	53	0.430	91	0.796	−53
12	0.796	−87	0.040	70	0.057	58	0.691	137	0.908	−63	0.213	41	0.858	47	0.434	87	0.787	−56
13	0.786	−90	0.037	74	0.056	61	0.690	131	0.893	−67	0.210	40	0.768	41	0.434	83	0.778	−60
14	0.778	−93	0.036	78	0.055	63	0.383	125	0.876	−70	0.205	39	0.686	35	0.429	79	0.770	−63
15	0.770	−95	0.034	80	0.054	65	0.672	119	0.857	−73	0.198	39	0.612	31	0.420	76	0.763	−65
16	0.764	−96	0.033	82	0.053	66	0.656	113	0.836	−76	0.191	37	0.548	26	0.404	72	0.756	−68
17	0.758	−97	0.033	83	0.054	65	0.637	107	0.813	−79	0.183	36	0.495	23	0.363	68	0.750	−70
18	0.753	−98	0.034	82	0.055	63	0.616	100	0.787	−81	0.175	35	0.457	19	0.356	64	0.745	−72

P35-1310-0 (Chip) - optimum gain basis V_{DS}=5volts, I_{DS}=20mA, V_{G2S}=0volts

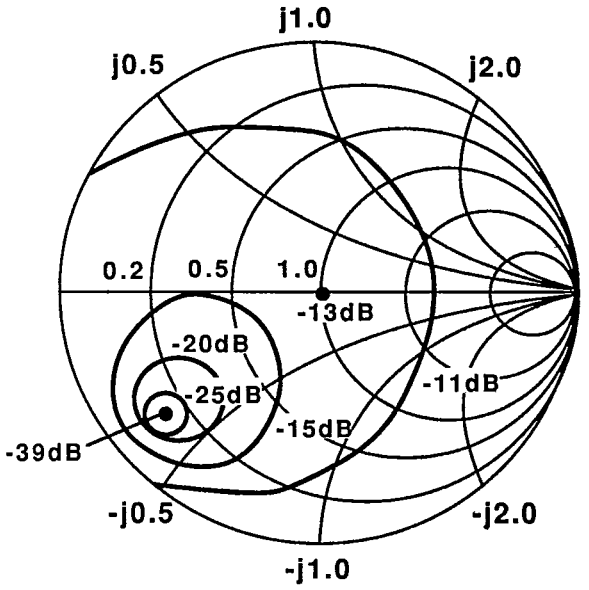
Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.994	−21	0.038	76	0.018	84	0.258	−120	1.000	−11	0.081	78	2.240	151	0.293	162	0.902	−11
3	0.958	−32	0.042	68	0.028	71	0.372	−136	1.000	−17	0.109	71	2.131	137	0.322	151	0.884	−17
4	0.926	−42	0.045	63	0.037	62	0.471	−151	0.993	−23	0.133	64	2.016	124	0.348	141	0.868	−22
5	0.898	−51	0.046	60	0.043	56	0.554	−163	0.985	−30	0.152	59	1.897	111	0.372	132	0.853	−27
6	0.873	−59	0.047	60	0.048	52	0.624	−174	0.977	−35	0.168	55	1.774	100	0.393	124	0.840	−32
7	0.851	−66	0.046	61	0.051	51	0.680	176	0.968	−41	0.179	52	1.649	89	0.412	117	0.828	−36
8	0.833	−72	0.045	64	0.053	52	0.724	168	0.957	−46	0.188	49	1.524	79	0.427	111	0.817	−41
9	0.817	−78	0.044	68	0.053	54	0.757	160	0.946	−51	0.193	48	1.399	71	0.440	105	0.806	−44
10	0.804	−83	0.042	72	0.053	57	0.779	153	0.993	−55	0.196	47	1.276	62	0.499	100	0.797	−48
11	0.792	−87	0.040	78	0.052	61	0.793	147	0.920	−60	0.197	46	1.157	55	0.455	96	0.789	−52
12	0.782	−91	0.038	83	0.052	65	0.798	141	0.905	−63	0.196	45	1.043	49	0.458	92	0.781	−55
13	0.774	−94	0.036	88	0.051	69	0.796	135	0.889	−67	0.193	45	0.935	43	0.456	88	0.773	−58
14	0.767	−96	0.035	92	0.050	73	0.789	129	0.872	−71	0.189	45	0.834	38	0.451	84	0.767	−61
15	0.761	−98	0.034	96	0.049	75	0.776	123	0.854	−74	0.185	44	0.742	34	0.441	81	0.760	−64
16	0.755	−100	0.034	98	0.050	77	0.758	116	0.834	−76	0.180	43	0.661	31	0.428	77	0.754	−66
17	0.749	−102	0.035	98	0.051	76	0.738	108	0.813	−79	0.174	42	0.591	28	0.410	72	0.748	−69
18	0.744	−103	0.038	96	0.053	74	0.716	99	0.790	81	0.170	40	0.534	26	0.387	68	0.742	−71

P35-1310-0 (Chip) - optimum switching basis V_{DS}=5volts, V_{G1S}≡I_{DS} of 20mA, V_{G2S}=−4volts

Freq	S_{11}		S_{12}		S_{13}		S_{21}		S_{22}		S_{23}		S_{31}		S_{32}		S_{33}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	1.000	−20	0.005	109	0.019	87	0.003	130	1.000	−12	0.070	79	0.021	97	0.098	114	0.972	−10
3	0.975	−31	0.011	126	0.024	67	0.011	143	0.994	−19	0.102	74	0.033	73	0.131	102	0.968	−15
4	0.951	−41	0.019	139	0.028	54	0.020	153	0.980	−26	0.128	69	0.042	56	0.158	91	0.964	−20
5	0.928	−50	0.027	149	0.031	48	0.031	159	0.968	−32	0.149	64	0.047	44	0.180	82	0.959	−25
6	0.907	−58	0.037	155	0.033	46	0.042	163	0.956	−38	0.164	60	0.049	38	0.197	74	0.954	−30
7	0.888	−65	0.048	159	0.034	49	0.054	164	0.945	−43	0.175	57	0.049	37	0.210	68	0.949	−34
8	0.870	−72	0.059	160	0.035	55	0.066	163	0.933	−49	0.181	54	0.047	39	0.218	62	0.943	−39
9	0.853	−78	0.070	159	0.035	63	0.077	160	0.922	−54	0.183	51	0.045	44	0.221	58	0.938	−43
10	0.838	−83	0.081	157	0.036	73	0.089	156	0.910	−59	0.182	49	0.041	51	0.221	55	0.933	−48
11	0.823	−88	0.092	153	0.037	84	0.100	151	0.898	−63	0.177	48	0.038	61	0.218	52	0.927	−52
12	0.810	−92	0.101	149	0.039	94	0.110	146	0.884	−68	0.169	48	0.036	71	0.211	51	0.922	−56
13	0.797	−95	0.110	144	0.041	103	0.118	140	0.870	−72	0.159	48	0.034	81	0.200	49	0.917	−59
14	0.785	−97	0.117	139	0.045	111	0.125	135	0.854	−75	0.147	49	0.035	92	0.188	49	0.912	−63
15	0.774	−99	0.122	134	0.051	115	0.131	131	0.836	−79	0.132	50	0.037	101	0.172	49	0.907	−66
16	0.763	−100	0.126	131	0.059	116	0.134	127	0.817	−82	0.117	53	0.043	108	0.155	49	0.902	−69
17	0.753	−101	0.127	128	0.068	112	0.136	125	0.795	−85	0.101	57	0.052	113	0.135	49	0.898	−72
18	0.743	−101	0.125	127	0.080	102	0.134	125	0.771	−88	0.083	61	0.065	115	0.114	50	0.894	−74

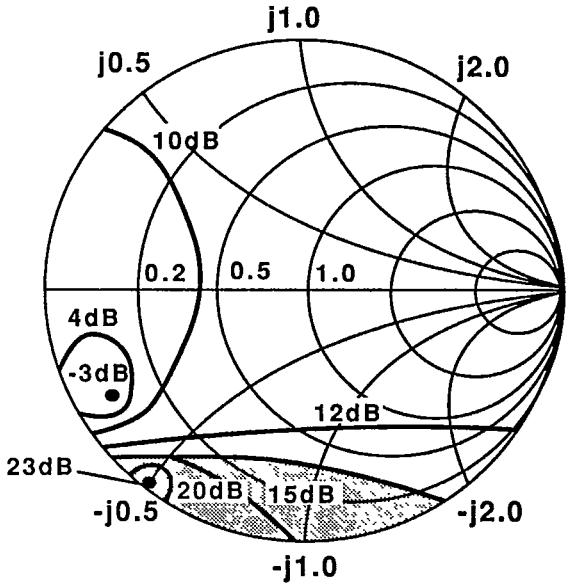
Package

Gate 2 Impedance Plane
Loss Mapping
P35 - 1310 - 1



Test Conditions
V_{G1S} ≡ I_{DS} of 20mA
V_{G2S} = -4 volts
Frequency 12GHz

Gate 2 Impedance Plane
Gain Mapping
P35 - 1310 - 1

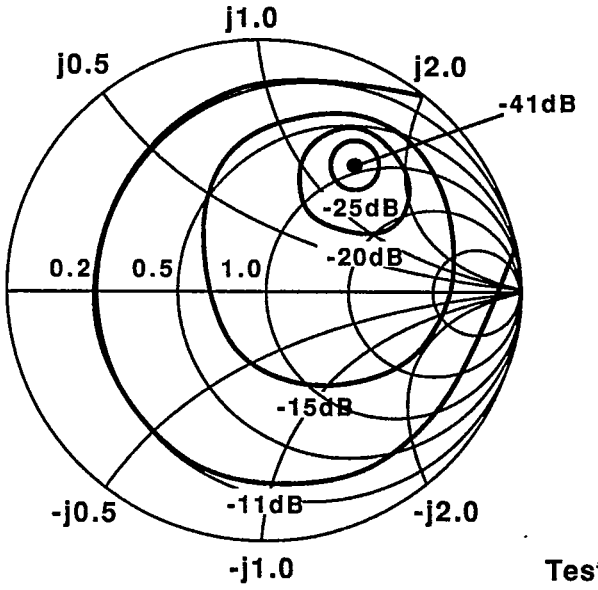


Potentially Unstable Area

Test Conditions
I_{DS} = 20mA
V_{G2S} = 0 volts
Frequency 12GHz

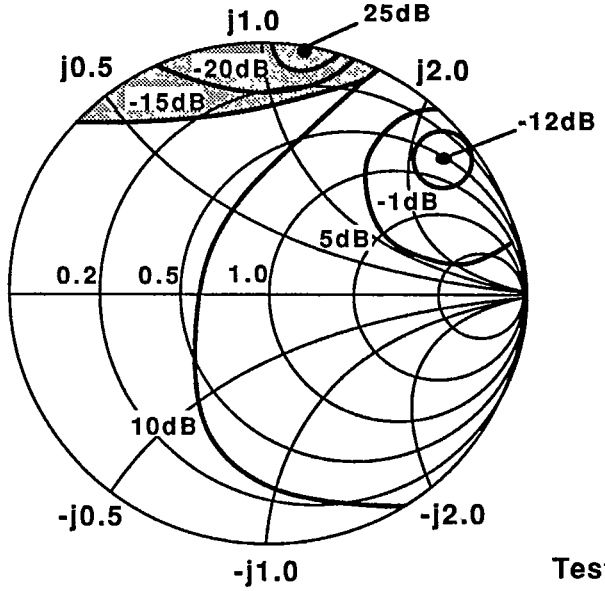
Chip

Gate 2 Impedance Plane
Loss Mapping
P35 - 1310 - 1



Test Conditions
$V_{G1S} \equiv I_{DS}$ of 20mA
V_{G2S} = -4 volts
Frequency 12GHz

Gate 2 Impedance Plane
Gain Mapping
P35 - 1310 - 1



Potentially Unstable Area

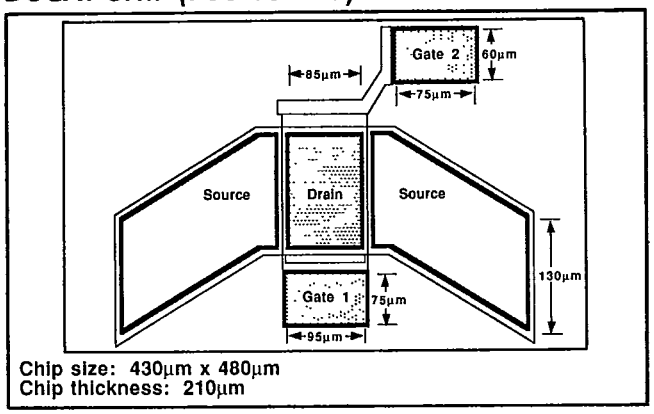
Test Conditions
I_{DS} = 20mA
V_{G2S} = 0 volts
Frequency 12GHz

Chip Handling, Mounting and Bonding

The back of the chip is metallized with Au-Ge and can be die-attached onto gold manually, eutectically, with Au-Ge or Au-Sn preforms or with low temperature epoxy. The maximum allowable chip temperature is 280°C.

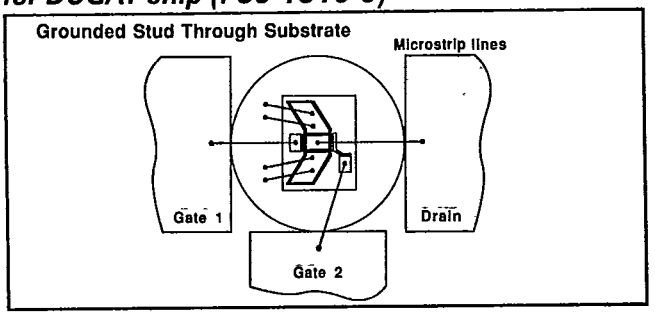
The chip is fully passivated with silicon nitride and should be bonded onto the exposed gold pads with 15 or 25 microns pure gold, half-hard wire or gold mesh. Bonding should be achieved with the chip face at 250 to 270°C with a heated wedge (approx 200°C) and a force of 60 grams. Ball bonds are not recommended as resultant gold area can come too close to the channel vicinity, increasing the probability of device destruction due to transients.

Physical Dimensions of DUGAT CHIP (P35-1310-0)



Chip size: 430µm x 480µm
Chip thickness: 210µm

Recommended Bonding Configuration for DUGAT chip (P35-1310-0)



Handling Precautions

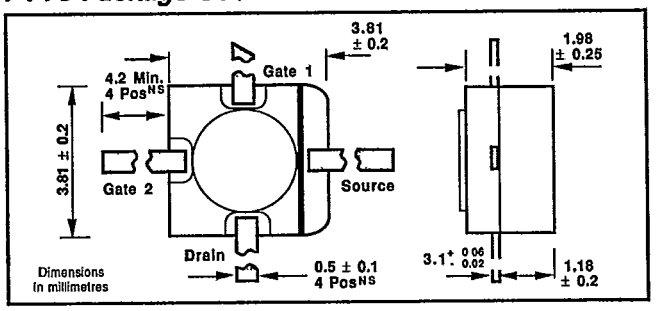
Owing to its small dimensions the microwave FET can be damaged or destroyed if subjected to large transient voltages. Such transients can be generated by some bonding equipments and power supplies when switched on, or if the output is shorted accidentally. It is also possible to induce large spikes from other equipment into long unscreaned bias leads.

Four simple precautions will prevent the destruction of devices from transient breakdown:

1. D.C. ground all equipment and operators
2. D.C. ground the device gate unless it is to be negatively biased.
3. Ensure all power supplies are switched on and set to minimum before connecting the device. Apply gate bias first, then drain bias. When removing bias, remove gate bias last.
4. Decouple all bias points near the device with low inductance capacitors (1 µF tantalum) shunted with a zener diode (5.8V, 1.3W).

GaAs FETs are light sensitive and measurements should be made in the same environment as that in which they are used.

P110 Package Outline



The leads of the P110 package can be soldered to microstrip circuity using solders with melting points below 170°C. Low melting point solders, such as 50Sn/50 In; 80 In/15Pb/1Ag and 37.5Sn/37.5Pb, 25.0 In are recommended. Silver loaded epoxies can also be used and cured at below 150°C for times of up to 2 hours.

Suitable solders available from:

Multicore Solders Limited
Maylands Avenue, Hemel Hempstead, Herts, UK, HP2 7EP

Indium Corporation of America
1676 Lincoln Avenue, PO Box 269, Utica
New York 13503, USA

Alpha Metals Limited
457 Kingston Road, Ewell, Surrey, UK, KT19 0DB

Ablebond 36-2 silver loaded epoxy resin, manufactured by:

Ablestick Laboratories
833 West 182nd Street, Gardena, California 90248, USA

Ordering Information

P35-1310-0 Chip P35-1310-1 P110 Package

PLESSEY

Plessey Research & Technology
Caswell, Towcester,
Northamptonshire, NN12 8EQ, UK
Telephone: (0327) 50581 *Telex:* 31572
Facsimile: (0327) 53410

North American Office
4350 La Jolla Village Drive, Suite 300,
San Diego, California 92122, USA
Telephone: 619 546 4457
Facsimile: 619 558 9221

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