

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELETROSTATIC
SENSITIVE
DEVICES

Revision date: 12th/Mar.'02

mitsubishi RF POWER MOS FET

RD60HUF1

Silicon MOSFET Power Transistor, 520MHz 60W

DESCRIPTION

RD60HUF1 is a MOS FET type transistor specifically designed for UHF High power amplifiers applications.

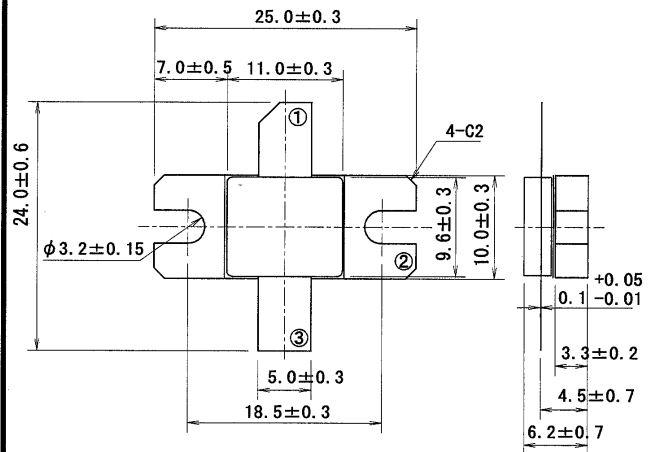
FEATURES

- High power and High Gain:
Pout>60W, Gp>7.7dB @ Vdd=12.5V, f=520MHz
- High Efficiency: 55%typ. on UHF Band

APPLICATION

For output stage of high power amplifiers in UHF band mobile radio sets.

OUTLINE DRAWING



PIN ①DRAIN ②SOURCE ③GATE

ABSOLUTE MAXIMUM RATINGS

(Tc=25deg.C UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	RATINGS	UNIT
VDSS	Drain to source voltage		30	V
VGSS	Gate to source voltage		+/-20	V
Pch	Channel dissipation	Tc=25deg.C	150	W
Tj	Junction Temperature		175	deg.C
Tstg	Storage temperature		-40 to +125	deg.C

Note 1: Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (Tc=25deg.C , UNLESS OTHERWISE NOTED)

SYMBOL	PARAMETER	CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX.	
IDSS	Zero gate voltage drain current	VDS=17V, VGS=0V	-	-	400	uA
IGSS	Gate to source leak current	VGS=10V, VDS=0V	-	-	1	uA
VTH	Gate threshold Voltage	VDS=12V, IDS=1mA	1.1	1.45	1.8	V
Pout	Output power	VDS=12.5V, Pin=10W,	60	65		W
η d	Drain efficiency	f=520MHz	50	55		%

Note : Above parameters , ratings , limits and conditions are subject to change.

Keep safety first in your circuit designs!

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

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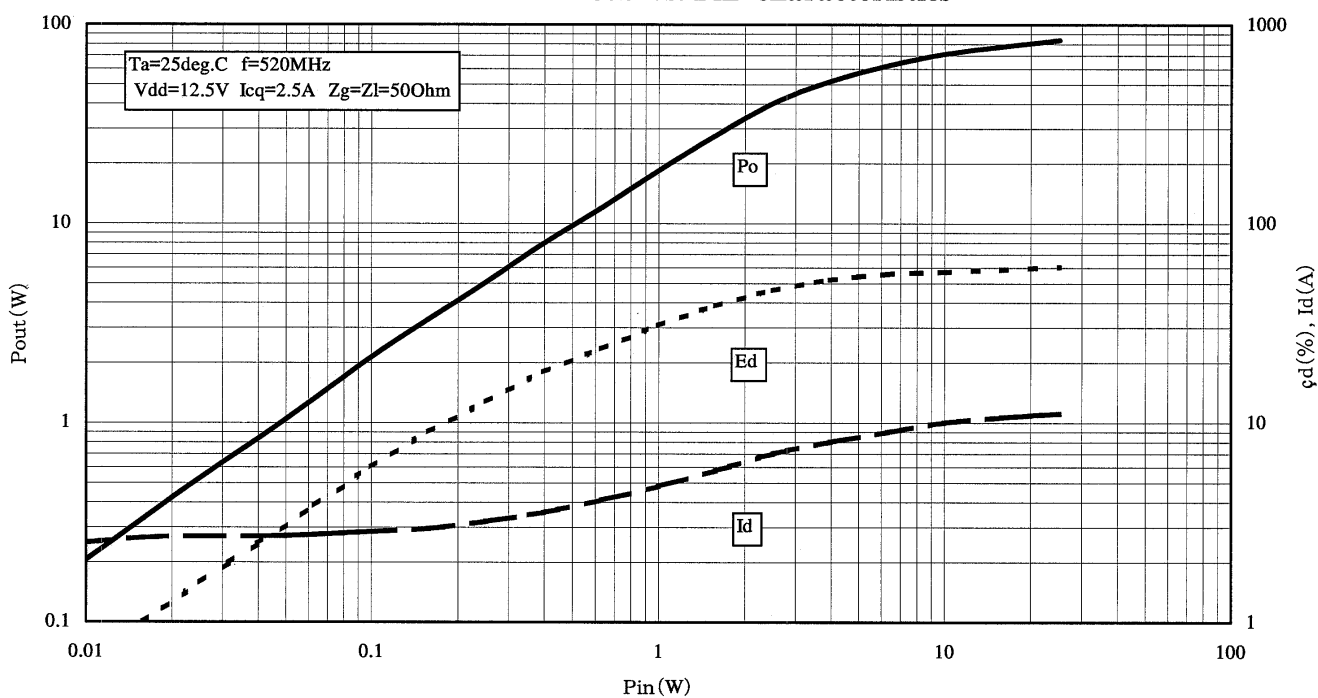
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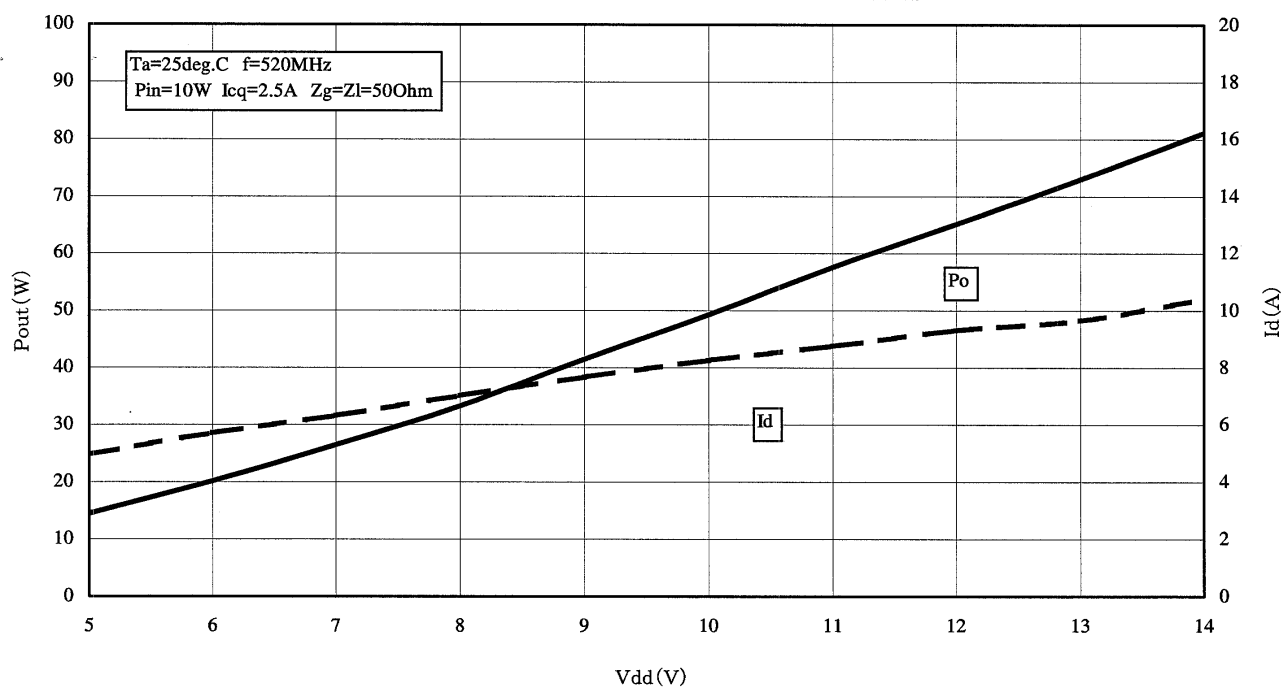
Silicon MOSFET Power Transistor, 520MHz 60W

●TYPICAL CHARACTERISTICS (f=520MHz)

RD60HUF1 Pout vs. Pin characteristics



RD60HUF1 Pout vs. Vdd characteristics



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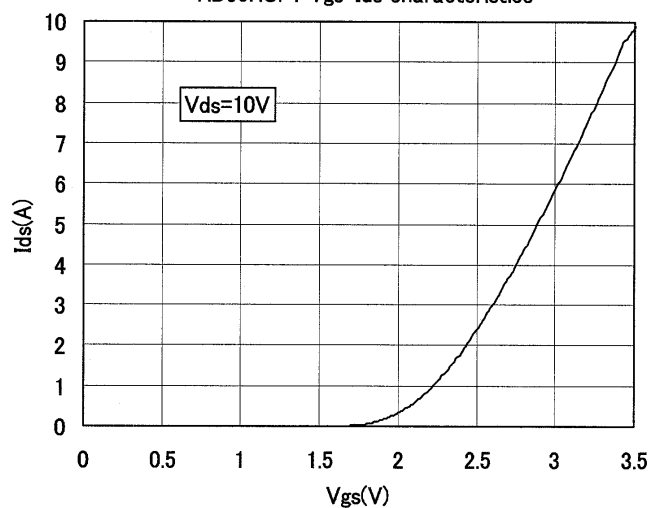
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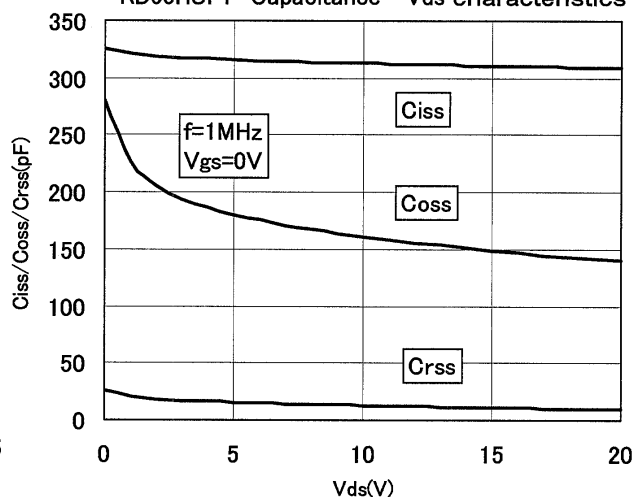
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RD60HUF1 V_{gs} - I_{ds} characteristics



RD60HUF1 Capacitance— V_{ds} characteristics



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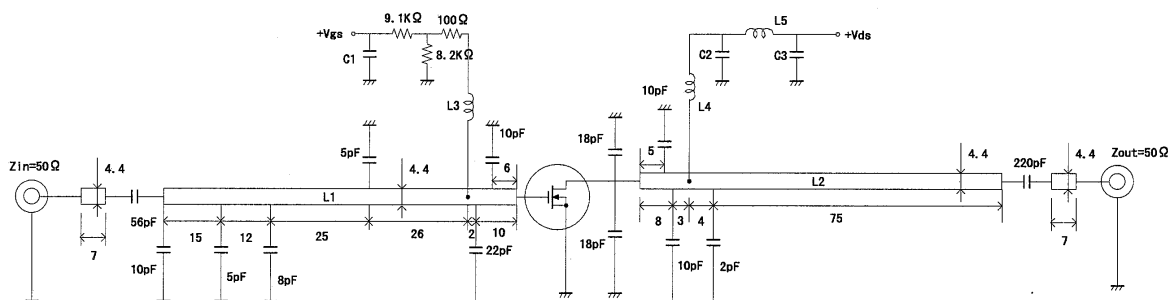
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Silicon MOSFET Power Transistor, 520MHz 60W

●EQUIVALENT CIRCUIT (f=520MHz)



L1, L2: Microstrip Board Material 1.6mm Thick glass-terflon $\epsilon_r=2.7$

L3: 6D 4T 1P Φ 1.6mm silverplated copperwire.

L4: 6D 3T 1P Φ 1.6mm silverplated copperwire.

L5: 6D 4T 1P Φ 1.6mm silverplated copperwire.

C1: 2200pF 10 μ F in parallel

C2: 2200pF 2200pF in parallel

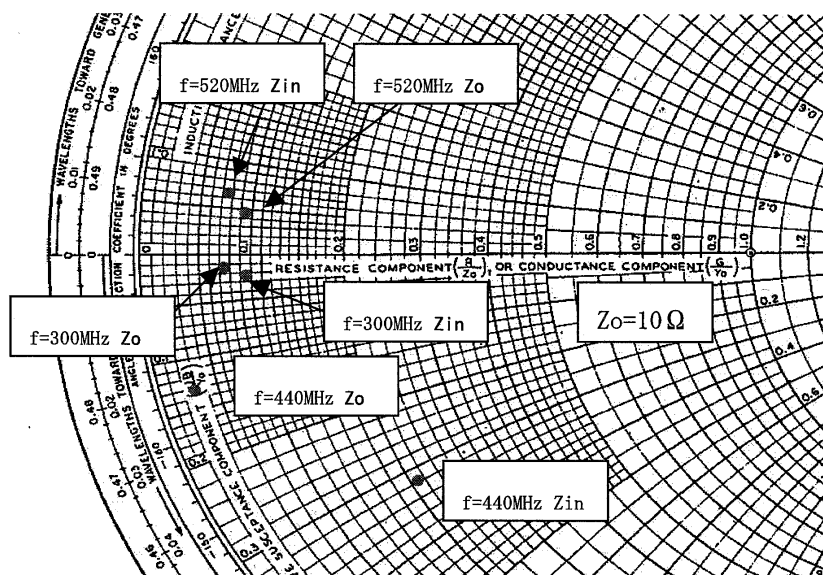
C3: 2200pF 330 μ F in parallel

D: Inner diameter of coil

T: Coil Turn

P: Coil pitch

●INPUT/OUTPUT IMPEDANCE VS.FREQUENCY CHARACTERISTICS



Zin, Zout

f (MHz)	Zin (ohm)	Zout (ohm)	Conditions
300	0.96-j0.22	0.75-j0.12	Po=70W, Vdd=12.5V, Pin=10W
440	2.00-j3.10	0.30-j1.40	Po=65W, Vdd=12.5V, Pin=10W
520	0.77+j0.66	0.96+j0.49	Po=60W, Vdd=12.5V, Pin=10W

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freq. [MHz]	S11		S12		S21		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	0.920	-178.69	0.010	-23.92	2.724	62.20	0.841	-175.31
105	0.924	-178.91	0.010	-21.27	2.577	60.84	0.847	-175.30
110	0.924	-179.23	0.010	-23.39	2.431	59.65	0.851	-175.30
115	0.924	-179.34	0.010	-25.45	2.308	57.93	0.859	-175.44
120	0.929	-179.36	0.009	-26.18	2.187	57.02	0.857	-176.24
125	0.928	-179.65	0.009	-24.00	2.086	55.41	0.864	-176.03
130	0.930	-179.81	0.009	-28.17	1.980	54.26	0.865	-176.32
135	0.930	179.91	0.009	-27.56	1.878	52.65	0.863	-176.63
140	0.933	179.73	0.008	-30.59	1.800	51.47	0.869	-176.62
145	0.934	179.45	0.009	-28.34	1.709	50.48	0.870	-176.97
150	0.934	179.41	0.008	-30.34	1.619	49.29	0.868	-177.10
155	0.939	179.12	0.008	-31.14	1.550	48.02	0.870	-177.41
160	0.937	178.93	0.008	-34.79	1.488	47.15	0.870	-177.28
165	0.940	178.74	0.008	-31.83	1.418	45.77	0.875	-177.76
170	0.940	178.59	0.007	-32.92	1.353	44.70	0.877	-177.89
175	0.939	178.64	0.007	-33.63	1.306	44.27	0.880	-177.95
180	0.943	178.27	0.007	-34.17	1.252	43.42	0.881	-178.07
185	0.945	178.08	0.007	-33.80	1.199	42.30	0.880	-178.24
190	0.946	178.20	0.007	-33.48	1.148	41.32	0.885	-178.33
195	0.945	177.81	0.007	-34.74	1.112	41.08	0.895	-178.76
200	0.945	177.66	0.007	-35.51	1.065	40.22	0.895	-178.77
205	0.947	177.37	0.007	-35.60	1.035	39.19	0.899	-178.72
210	0.948	177.24	0.006	-34.98	0.996	38.42	0.904	-178.81
215	0.949	177.13	0.006	-36.08	0.960	37.47	0.908	-179.29
220	0.951	176.80	0.006	-37.24	0.926	37.22	0.913	-179.51
225	0.952	176.73	0.006	-36.74	0.889	36.13	0.916	-179.57
230	0.951	176.37	0.006	-37.49	0.871	35.54	0.924	-179.92
235	0.955	176.23	0.005	-37.47	0.841	34.22	0.925	179.97
240	0.953	176.10	0.005	-37.73	0.819	33.72	0.927	179.80
245	0.955	175.92	0.005	-33.22	0.785	33.28	0.928	179.43
250	0.958	175.98	0.005	-35.64	0.763	32.57	0.930	179.29
255	0.958	175.73	0.005	-34.48	0.736	31.66	0.932	178.90
260	0.955	175.39	0.005	-35.06	0.714	30.77	0.934	178.83
265	0.959	175.32	0.005	-34.29	0.698	30.53	0.934	178.26
270	0.958	174.97	0.004	-38.54	0.677	29.15	0.932	178.33
275	0.960	174.75	0.004	-38.58	0.649	28.38	0.928	178.14
280	0.962	174.65	0.004	-32.92	0.634	28.37	0.932	177.91
285	0.962	174.58	0.004	-35.39	0.615	26.67	0.930	177.54
290	0.963	174.44	0.004	-36.73	0.593	27.28	0.928	177.85
295	0.961	174.10	0.004	-33.28	0.571	25.66	0.932	177.39
300	0.961	173.79	0.003	-38.13	0.558	25.71	0.932	176.86
305	0.964	173.77	0.003	-28.61	0.548	25.54	0.930	177.04
310	0.965	173.49	0.003	-35.83	0.535	23.87	0.932	176.81
315	0.962	173.45	0.003	-31.35	0.519	24.17	0.934	176.58
320	0.963	173.04	0.003	-36.59	0.494	23.78	0.936	176.47
325	0.966	173.22	0.003	-26.08	0.495	23.22	0.938	176.35
330	0.968	172.86	0.003	-24.97	0.475	22.08	0.938	175.96
335	0.963	172.68	0.003	-32.27	0.471	22.20	0.940	175.83
340	0.966	172.51	0.003	-23.13	0.447	21.21	0.943	175.60
345	0.969	172.34	0.003	-28.45	0.431	19.97	0.946	175.51

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freq. [MHz]	S11		S12		S21		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
350	0.968	172.02	0.003	-21.39	0.428	21.30	0.949	175.14
355	0.970	171.82	0.002	-27.95	0.424	19.84	0.948	174.94
360	0.969	171.65	0.002	-11.43	0.410	18.81	0.951	174.53
365	0.968	171.68	0.002	-22.47	0.394	19.85	0.954	174.64
370	0.971	171.47	0.002	-18.75	0.401	18.82	0.955	174.46
375	0.972	171.30	0.002	-8.66	0.377	19.67	0.957	174.16
380	0.969	171.29	0.002	-12.65	0.365	17.77	0.954	174.05
385	0.970	170.95	0.002	-17.45	0.360	16.21	0.961	173.75
390	0.972	170.79	0.002	-9.23	0.351	16.36	0.954	173.59
395	0.970	170.44	0.002	2.34	0.350	17.24	0.955	173.11
400	0.972	170.46	0.002	7.35	0.348	17.48	0.958	173.32
405	0.971	170.34	0.002	7.68	0.325	14.97	0.959	172.86
410	0.973	169.96	0.002	7.66	0.330	15.14	0.961	172.73
415	0.973	169.83	0.002	-3.97	0.321	14.87	0.961	172.46
420	0.974	169.74	0.002	11.59	0.307	15.54	0.960	172.42
425	0.977	169.53	0.001	31.99	0.302	14.91	0.954	172.29
430	0.973	169.29	0.002	20.15	0.304	13.35	0.953	171.96
435	0.973	169.15	0.001	35.09	0.294	15.06	0.959	171.74
440	0.975	169.02	0.002	36.52	0.282	14.92	0.956	171.72
445	0.974	168.78	0.002	49.15	0.277	12.66	0.961	171.61
450	0.975	168.77	0.002	48.13	0.275	13.36	0.957	171.34
455	0.976	168.53	0.003	37.51	0.272	11.48	0.955	171.30
460	0.977	168.49	0.003	47.87	0.257	10.49	0.959	171.24
465	0.976	168.42	0.003	45.73	0.257	13.04	0.961	170.92
470	0.976	167.95	0.002	48.23	0.251	11.19	0.959	170.80
475	0.978	168.07	0.002	54.71	0.244	10.37	0.963	170.64
480	0.976	167.80	0.002	54.73	0.232	10.33	0.961	170.28
485	0.975	167.60	0.003	53.47	0.242	11.80	0.958	170.22
490	0.977	167.52	0.002	50.36	0.234	9.16	0.963	170.18
495	0.980	167.38	0.003	56.25	0.229	9.70	0.964	170.05
500	0.978	167.21	0.003	57.08	0.219	10.74	0.966	169.74
505	0.975	167.05	0.003	57.97	0.221	9.96	0.965	169.70
510	0.977	166.87	0.003	63.29	0.218	9.94	0.970	169.37
515	0.975	166.55	0.003	62.62	0.212	9.67	0.971	169.40
520	0.978	166.63	0.003	58.20	0.214	9.75	0.968	168.70
525	0.976	166.62	0.003	56.82	0.206	9.54	0.968	168.85
530	0.978	166.21	0.003	59.69	0.214	8.34	0.968	168.54
535	0.976	165.78	0.004	58.46	0.204	6.11	0.973	168.40
540	0.981	166.09	0.003	57.04	0.195	8.40	0.970	168.44
545	0.980	165.83	0.003	61.67	0.193	7.58	0.971	168.03
550	0.979	165.64	0.004	64.52	0.192	7.56	0.970	168.25
555	0.979	165.50	0.004	64.92	0.188	9.07	0.968	167.99
560	0.979	165.38	0.004	73.42	0.188	6.90	0.967	167.65
565	0.979	165.13	0.004	64.31	0.185	7.44	0.966	167.58
570	0.980	164.93	0.003	71.14	0.171	7.16	0.968	167.44
575	0.981	164.88	0.004	64.56	0.175	3.21	0.969	167.20
580	0.981	164.61	0.004	69.35	0.170	4.13	0.969	167.14
585	0.981	164.37	0.004	64.76	0.170	6.01	0.967	166.84
590	0.980	164.32	0.004	62.73	0.165	4.65	0.965	166.88
595	0.980	164.29	0.005	67.89	0.157	7.93	0.967	166.83

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freq. [MHz]	S11		S12		S21		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
600	0.979	164.11	0.005	70.13	0.168	4.62	0.969	166.56
605	0.983	163.97	0.005	70.95	0.154	6.80	0.965	166.32
610	0.977	163.66	0.005	72.25	0.154	3.36	0.969	166.12
615	0.982	163.55	0.005	71.14	0.159	5.13	0.969	166.08
620	0.980	163.49	0.005	74.80	0.145	2.33	0.970	165.99
625	0.981	163.35	0.005	72.21	0.157	6.46	0.972	165.91
630	0.979	163.11	0.005	74.41	0.146	1.22	0.970	165.52
635	0.980	163.10	0.005	70.75	0.142	0.79	0.972	165.66
640	0.980	162.93	0.005	72.95	0.142	2.39	0.971	165.35
645	0.983	162.86	0.006	69.93	0.139	1.38	0.969	165.40
650	0.980	162.73	0.005	73.49	0.136	2.11	0.973	164.99
655	0.981	162.58	0.006	76.26	0.141	4.95	0.977	164.91
660	0.983	162.38	0.006	70.98	0.136	1.32	0.977	164.71
665	0.982	162.36	0.006	72.00	0.133	2.87	0.976	164.71
670	0.983	162.18	0.006	71.82	0.126	-0.93	0.976	164.39
675	0.983	161.92	0.006	73.77	0.133	2.43	0.978	164.24
680	0.982	161.77	0.006	70.51	0.131	2.37	0.980	164.20
685	0.982	161.68	0.006	71.83	0.127	1.20	0.978	164.29
690	0.981	161.60	0.006	72.66	0.122	-0.79	0.978	164.12
695	0.981	161.32	0.006	70.66	0.113	0.10	0.976	163.91
700	0.982	161.26	0.006	70.63	0.130	1.53	0.976	163.70
705	0.981	161.00	0.006	70.69	0.119	-1.61	0.976	163.71
710	0.982	160.90	0.006	72.17	0.116	2.68	0.978	163.58
715	0.983	160.77	0.007	70.43	0.112	-0.28	0.977	163.38
720	0.985	160.66	0.006	70.76	0.111	-0.49	0.975	163.45
725	0.980	160.62	0.006	70.55	0.109	-3.57	0.974	163.05
730	0.983	160.31	0.006	71.43	0.113	2.84	0.974	162.95
735	0.980	160.33	0.006	74.48	0.106	-0.97	0.978	162.84
740	0.985	160.07	0.006	72.63	0.104	0.13	0.976	162.81
745	0.985	159.91	0.006	70.27	0.114	-1.85	0.978	162.69
750	0.982	159.92	0.006	73.79	0.107	-0.42	0.978	162.38
755	0.982	159.72	0.006	75.58	0.104	-6.70	0.976	162.02
760	0.983	159.64	0.006	74.07	0.101	-1.29	0.980	161.90
765	0.985	159.60	0.006	73.68	0.105	-1.55	0.979	162.13
770	0.982	159.27	0.006	76.24	0.099	-2.14	0.976	161.84
775	0.983	159.15	0.006	76.98	0.099	-2.51	0.976	161.86
780	0.986	159.11	0.006	79.70	0.098	-2.81	0.979	161.83
785	0.983	159.10	0.007	79.06	0.103	-2.83	0.979	161.39
790	0.984	158.86	0.007	79.39	0.091	-2.95	0.976	161.27
795	0.986	158.82	0.008	78.53	0.101	-1.57	0.977	161.32
800	0.983	158.51	0.007	75.80	0.091	-3.42	0.980	160.95
805	0.982	158.60	0.007	73.99	0.087	-5.79	0.985	161.06
810	0.984	158.52	0.007	73.47	0.093	-4.46	0.979	160.83
815	0.984	158.21	0.007	73.47	0.088	-0.87	0.978	160.64
820	0.983	158.24	0.008	77.06	0.097	0.83	0.983	160.85
825	0.983	158.01	0.008	74.47	0.088	-6.37	0.982	160.43
830	0.988	157.86	0.008	74.37	0.083	-5.61	0.982	160.48
835	0.983	157.79	0.008	71.73	0.086	-4.11	0.981	160.31
840	0.984	157.56	0.009	72.59	0.087	-1.13	0.984	160.28
845	0.981	157.47	0.008	71.52	0.080	-11.60	0.982	160.29

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freq. [MHz]	S11		S12		S21		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
850	0.982	157.61	0.008	70.69	0.080	-5.84	0.981	159.95
855	0.985	157.23	0.008	74.77	0.082	-9.05	0.983	159.95
860	0.983	157.11	0.008	70.62	0.069	-10.41	0.977	159.92
865	0.985	157.05	0.008	71.41	0.079	-10.47	0.982	159.86
870	0.986	156.94	0.008	72.32	0.076	-10.73	0.980	159.59
875	0.985	156.82	0.008	69.72	0.078	1.13	0.979	159.43
880	0.988	156.53	0.009	72.87	0.072	-7.56	0.981	159.42
885	0.986	156.45	0.009	69.80	0.080	-0.77	0.984	159.23
890	0.985	156.41	0.008	74.39	0.065	-9.15	0.977	159.05
895	0.986	156.34	0.009	69.61	0.069	-2.98	0.983	159.07
900	0.988	156.21	0.008	71.94	0.071	-5.93	0.980	158.78
905	0.983	156.18	0.009	75.16	0.069	-8.56	0.977	158.38
910	0.982	155.93	0.009	72.53	0.064	-6.53	0.980	158.48
915	0.984	155.82	0.009	73.55	0.058	-3.53	0.979	158.55
920	0.986	155.73	0.009	71.25	0.072	-3.30	0.978	157.94
925	0.984	155.55	0.009	73.75	0.073	-3.60	0.985	157.93
930	0.982	155.52	0.009	72.78	0.066	-0.57	0.980	157.87
935	0.987	155.38	0.009	72.46	0.067	-4.77	0.985	157.66
940	0.983	155.23	0.010	71.55	0.063	-1.54	0.983	157.71
945	0.984	154.89	0.010	72.88	0.066	-5.11	0.985	157.57
950	0.983	155.06	0.009	73.83	0.058	8.88	0.981	157.55
955	0.983	155.05	0.009	74.24	0.055	-3.82	0.982	157.32
960	0.987	154.84	0.010	72.44	0.059	-8.68	0.984	157.21
965	0.984	154.68	0.010	73.68	0.058	0.84	0.983	157.31
970	0.986	154.54	0.010	72.21	0.060	-1.22	0.982	157.21
975	0.986	154.51	0.010	70.79	0.059	1.02	0.983	157.21
980	0.986	154.24	0.010	72.98	0.056	0.36	0.988	157.14
985	0.987	154.27	0.010	74.41	0.055	-5.70	0.986	156.95
990	0.984	154.14	0.010	71.88	0.061	6.80	0.988	156.99
995	0.983	154.24	0.010	72.35	0.056	-4.52	0.981	156.90
1000	0.984	154.09	0.010	72.00	0.056	3.10	0.983	156.82
1005	0.986	153.92	0.010	73.74	0.052	-0.38	0.985	156.79
1010	0.984	153.67	0.010	73.68	0.058	1.83	0.987	156.26