

PTF 10026

6 Watts, 1.0 GHz

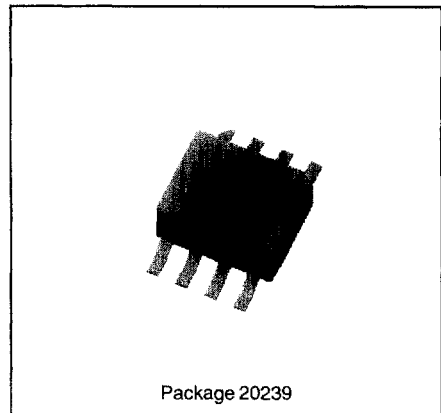
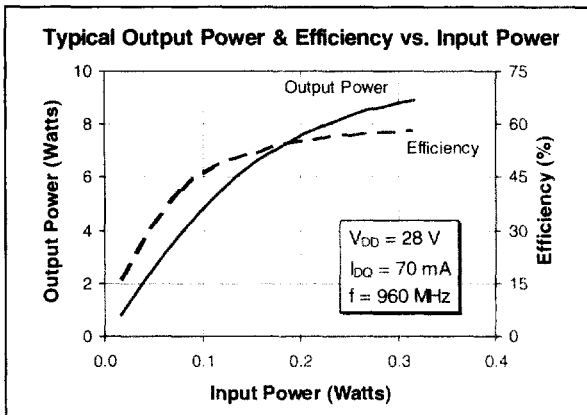
LDMOS Field Effect Transistor

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Description

The 10026 is a common source n-channel enhancement-mode lateral MOSFET intended for large signal amplifier applications to 1.0 GHz. It is rated at 6 watts minimum output power. Nitride surface passivation and gold metallization ensure excellent device lifetime and reliability. 100% lot traceability is standard.

- Performance at 960 MHz, 28 Volts
 - Output Power = 6 Watts
 - Efficiency = 55% Typ
 - Power Gain = 17 dB Typ
- Tested to solderability standards:
 - IEC-68-2-54
 - ANSI/J Std-002-A
- Gold Metallization
- Silicon Nitride Passivated
- Surface Mountable
- Available in Tape and Reel



Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	± 20	Vdc
Operating Junction Temperature	T_J	200	$^{\circ}C$
Total Device Dissipation at $T_{flange} = 25^{\circ}C$ Above $25^{\circ}C$ derate by	P_D	20 0.114	Watts $W/^{\circ}C$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}C$
Thermal Resistance	$R_{\theta JC}$	8.8	$^{\circ}C/W$

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Electrical Characteristics (100% Tested)

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 25\text{ mA}$	$V_{(BR)DSS}$	65	68	—	Volts
Drain-Source Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	mA
Gate Threshold Voltage	$V_{DS} = 10\text{ V}$, $I_D = 75\text{ mA}$	$V_{GS(th)}$	—	3.0	—	Volts
Forward Transconductance	$V_{DS} = 10\text{ V}$, $I_D = 0.5\text{ A}$	g_{fs}	—	0.13	—	Siemens

Dynamic Characteristics

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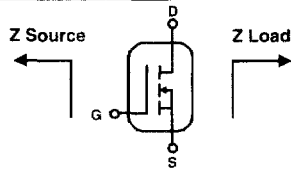
Characteristic	Symbol	Min	Typ	Max	Units
Input Capacitance ($V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{iss}	—	13	—	pF
Output Capacitance ($V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{oss}	—	5	—	pF
Reverse Transfer Capacitance ($V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{rss}	—	0.3	—	pF

RF Specifications (100% Tested)

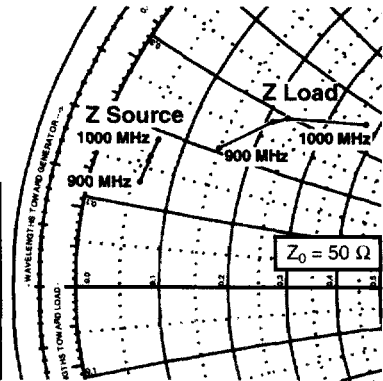
Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain ($V_{DD} = 28\text{ V}$, $P_{out} = 1\text{ W}$, $I_{DQ} = 70\text{ mA}$, $f = 960\text{ MHz}$)	G_{ps}	15.5	17	—	dB
Power Output at 1 dB Compressed ($V_{DD} = 28\text{ V}$, $I_{DQ} = 70\text{ mA}$, $f = 960\text{ MHz}$)	P-1dB	6.0	7.5	—	Watts
Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{out} = 6\text{ W}$, $I_{DQ} = 70\text{ mA}$, $f = 960\text{ MHz}$)	η	50	55	—	%
Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{out} = 6\text{ W}$, $I_{DQ} = 70\text{ mA}$, $f = 960\text{ MHz}$ — all phase angles at frequency of test)	Ψ	—	—	10:1	—

Impedance Data (shown for fixed-tuned broadband circuit)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 70\text{ mA}$, $P_{-1\text{dB}} = 6\text{ W}$

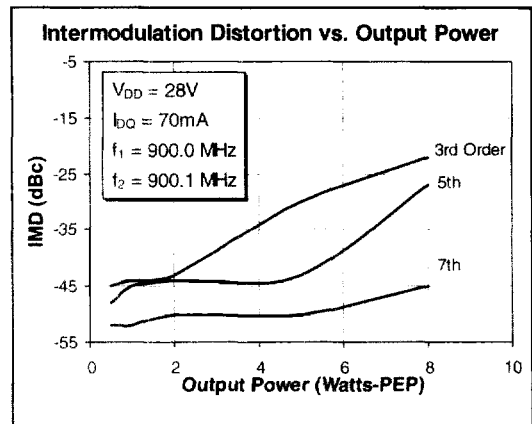
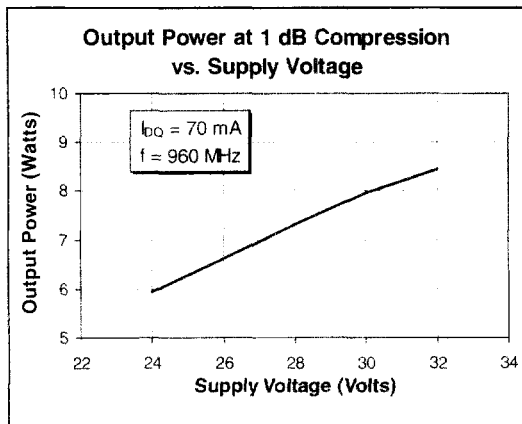
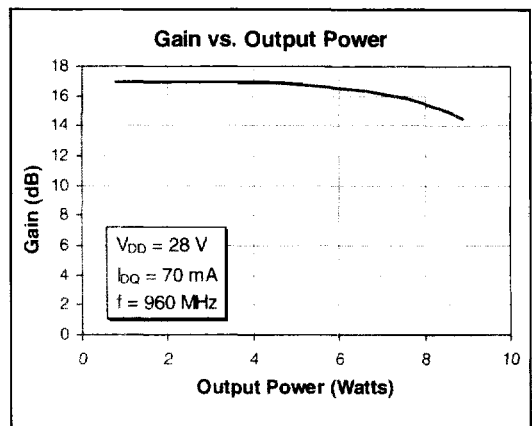
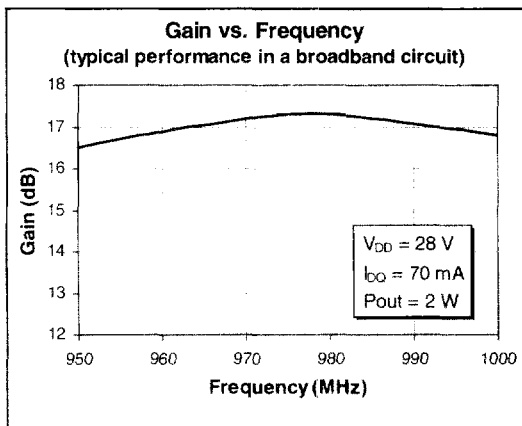


Frequency MHz	Z Source		Z Load	
	R	jX	R	jX
900	3.0	6.6	7.4	10.4
950	3.1	7.9	10.5	14.0
960	3.1	8.3	11.6	14.8
1000	3.3	9.5	18.7	17.9



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Typical Performance



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Typical Scattering Parameters

 $(V_{DS} = 28 \text{ V}, I_{DQ} = 200 \text{ mA})$

f (MHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.933	-58.5	23.1	139	0.011	52.8	0.899	-27.9
150	0.904	-80.8	19.7	123	0.014	44.8	0.856	-38.8
200	0.858	-97.9	16.6	111	0.015	31.8	0.798	-48.1
250	0.835	-111	13.8	101	0.016	25.5	0.765	-57.2
300	0.821	-122	12.0	93.5	0.016	20.3	0.740	-64.0
350	0.811	-130	10.3	85.5	0.014	17.4	0.730	-71.5
400	0.807	-137	9.01	80.0	0.014	13.4	0.724	-78.4
450	0.807	-143	8.01	73.9	0.013	9.06	0.724	-85.0
500	0.808	-148	7.09	69.3	0.011	8.59	0.725	-90.2
550	0.819	-152	6.44	63.5	0.009	13.0	0.750	-96.5
600	0.825	-155	5.72	58.8	0.007	22.8	0.761	-102
650	0.831	-159	5.19	54.3	0.006	44.7	0.777	-108
700	0.841	-162	4.68	50.6	0.006	62.7	0.784	-113
750	0.846	-165	4.28	46.4	0.008	72.7	0.798	-117
800	0.854	-168	3.91	43.2	0.009	86.7	0.815	-122
850	0.861	-170	3.62	38.8	0.011	95.3	0.831	-126
900	0.866	-172	3.29	36.2	0.014	97.8	0.843	-129
950	0.872	-175	3.10	32.4	0.016	99.0	0.861	-133
1000	0.877	-177	2.83	29.3	0.019	104	0.867	-136
1050	0.879	-179	2.64	26.7	0.022	102	0.883	-139
1100	0.887	180	2.48	23.9	0.025	102	0.894	-142
1150	0.892	178	2.32	20.4	0.028	102	0.904	-145
1200	0.895	176	2.16	19.2	0.031	102	0.909	-147
1250	0.899	174	2.10	15.6	0.036	100	0.916	-150
1300	0.900	172	1.90	12.4	0.038	100	0.917	-152
1350	0.903	170	1.86	12.3	0.044	99.5	0.921	-155
1400	0.904	169	1.77	8.28	0.047	97.0	0.923	-157
1450	0.904	167	1.65	5.96	0.050	96.6	0.931	-159
1500	0.902	165	1.59	5.95	0.055	96.6	0.930	-162
1550	0.900	164	1.56	2.08	0.060	95.2	0.930	-164
1600	0.899	162	1.52	0.97	0.062	94.7	0.928	-166
1650	0.897	160	1.44	-1.39	0.071	93.2	0.928	-168
1700	0.890	158	1.36	-3.00	0.072	93.0	0.927	-170
1750	0.890	157	1.28	-3.60	0.080	92.0	0.926	-171
1800	0.889	155	1.26	-5.14	0.085	90.6	0.924	-175
1850	0.889	153	1.19	-6.84	0.091	90.1	0.924	-176
1900	0.889	151	1.12	-7.47	0.095	89.9	0.920	-179
1950	0.889	150	1.11	-8.80	0.104	89.2	0.920	179
2000	0.890	148	1.06	-8.80	0.108	88.5	0.920	177
2050	0.891	146	1.03	-9.80	0.119	88.2	0.911	175
2100	0.891	144	0.991	-10.9	0.123	86.5	0.911	172
2150	0.892	142	0.968	-10.9	0.138	86.5	0.911	170
2200	0.894	140	0.911	-13.1	0.141	83.2	0.915	168

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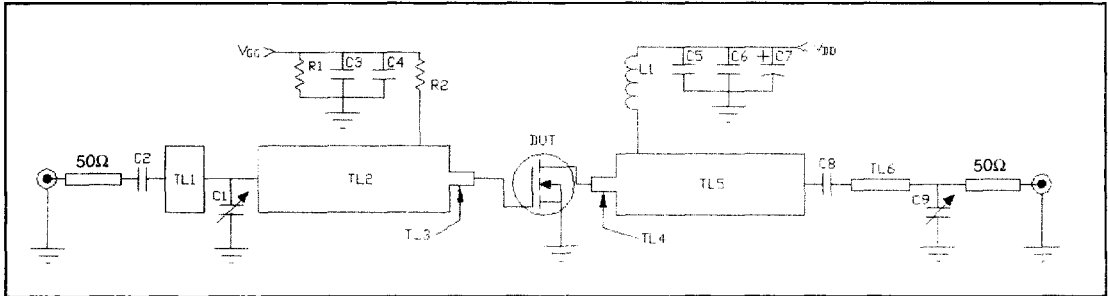
($V_{DS} = 13.5\text{ V}$, $I_{DQ} = 200\text{ mA}$)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.913	-62.6	23.3	136	0.016	50.0	0.862	-36.4
150	0.873	-85.3	19.4	119	0.019	38.3	0.801	-49.8
200	0.827	-102	16.0	107	0.021	27.9	0.735	-60.7
250	0.805	-115	13.2	97.2	0.021	21.0	0.702	-70.8
300	0.793	-125	11.3	89.7	0.021	14.3	0.681	-78.3
350	0.788	-133	9.66	81.9	0.019	10.0	0.675	-86.3
400	0.786	-139	8.40	76.5	0.019	8.3	0.674	-93.3
450	0.787	-145	7.41	70.4	0.017	4.5	0.678	-99.8
500	0.791	-149	6.55	66.1	0.015	1.9	0.685	-105
550	0.802	-153	5.88	60.4	0.012	6.6	0.711	-111
600	0.813	-157	5.21	55.9	0.010	15.3	0.727	-117
650	0.820	-160	4.69	51.6	0.009	23.3	0.746	-122
700	0.831	-163	4.22	47.8	0.009	40.7	0.760	-126
750	0.836	-166	3.83	44.0	0.008	49.6	0.775	-131
800	0.845	-169	3.51	40.8	0.010	66.1	0.794	-134
850	0.854	-171	3.22	36.6	0.011	76.3	0.809	-138
900	0.860	-173	2.93	34.1	0.014	84.6	0.822	-141
950	0.870	-175	2.76	30.6	0.017	87.5	0.841	-145
1000	0.870	-177	2.49	27.5	0.019	91.4	0.849	-148
1050	0.876	-179	2.33	25.1	0.023	92.1	0.863	-150
1100	0.883	179	2.19	22.6	0.026	92.9	0.873	-153
1150	0.888	177	2.03	19.4	0.029	93.4	0.883	-156
1200	0.892	175	1.90	18.2	0.032	94.7	0.888	-158
1250	0.897	173	1.84	14.2	0.037	92.9	0.896	-160
1300	0.897	172	1.66	12.2	0.039	92.8	0.898	-163
1350	0.899	170	1.61	11.4	0.045	90.8	0.906	-165
1400	0.901	168	1.53	7.90	0.048	90.7	0.903	-167
1450	0.901	167	1.42	6.02	0.052	90.7	0.910	-169
1500	0.902	165	1.38	5.79	0.057	90.1	0.912	-171
1550	0.902	163	1.35	2.07	0.063	89.9	0.913	-173
1600	0.898	161	1.23	1.62	0.064	89.7	0.908	-176
1650	0.897	159	1.26	1.40	0.075	88.0	0.908	-177
1700	0.891	157	1.17	-2.40	0.076	86.1	0.907	-179
1750	0.888	156	1.12	-2.69	0.083	85.6	0.906	179
1800	0.888	154	1.08	-4.90	0.089	85.5	0.905	176
1850	0.887	153	1.03	-5.55	0.095	85.3	0.904	175
1900	0.887	151	0.982	-5.50	0.100	84.0	0.903	172
1950	0.887	149	0.964	-5.45	0.109	83.4	0.902	170
2000	0.890	147	0.921	-8.16	0.113	83.1	0.902	168
2050	0.890	145	0.894	-8.50	0.124	82.6	0.900	166
2100	0.890	143	0.871	-8.58	0.130	81.7	0.899	163
2150	0.890	141	0.849	-8.70	0.144	81.6	0.897	162
2200	0.891	139	0.793	-11.0	0.147	78.4	0.896	159

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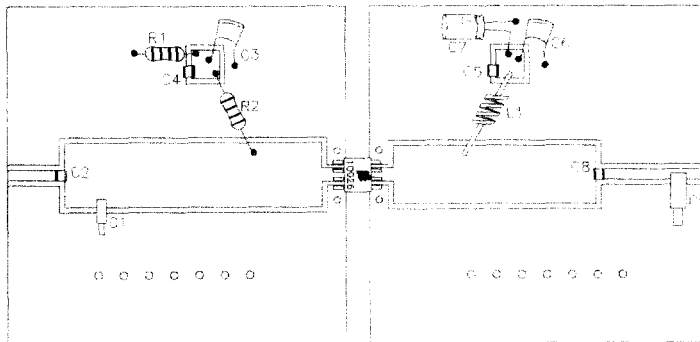
Test Circuit



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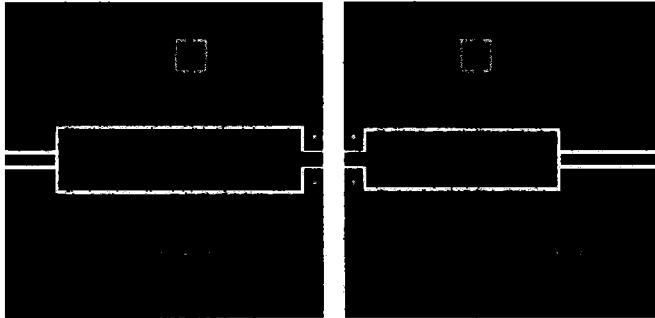
Test Circuit Schematic for $f = 960$ MHz

DUT	10026
C1	0.3-3.5 pF, Trimmer Capacitor, Johanson, 5801-PC
C2, C4, C5, C8	51 pF, Capacitor ATC 100 B
C3, C6	0.1 μ F, 50 V, Capacitor, Digi-Key P4917-ND
C7	100 μ F, 50 V, Electrolytic Capacitor, Digi-Key P5276
C9	0.6-6.0 pF, Trimmer Capacitor, Johanson, 5701-PC
L1	4 Turn, #20 AWG, .120" I.D.
R1	1 K, 1/4 W Resistor
R2	10 K, 1/4 W Resistor
TL1	$Z_o = 13.0 \Omega$, $\ell = 0.031 \lambda$
TL2	$Z_o = 13.0 \Omega$, $\ell = 0.208 \lambda$
TL3, TL4	$Z_o = 44 \Omega$, $\ell = 0.018 \lambda$
TL5	$Z_o = 13.9 \Omega$, $\ell = 0.185 \lambda$
TL6	$Z_o = 50 \Omega$, $\ell = 0.030 \lambda$
Circuit Board	.031" Thick, $\epsilon_r = 4.0$, AlliedSignal, G200



Placement Diagram (not to scale)

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Artwork (1 inch )

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