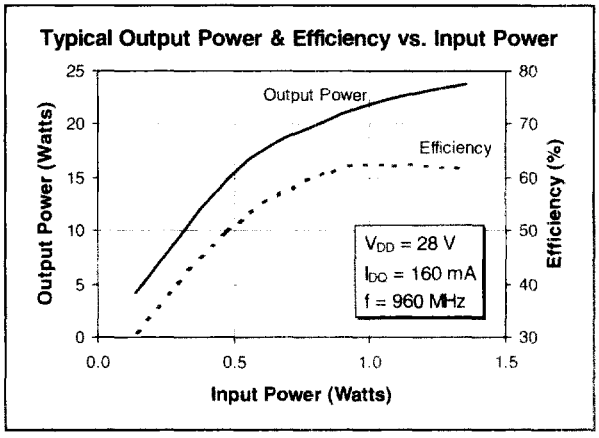
ERICSSON

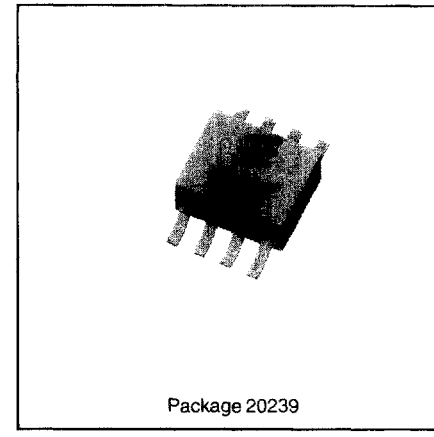
PTF 10027
12 Watts, 1.0 GHz
LDMOS Field Effect Transistor

Description

The 10027 is a common source n-channel enhancement-mode lateral MOSFET intended for large signal amplifier applications to 1.0 GHz. It is rated at 12 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 = 12 Watts
  - Efficiency = 60% Typ
  - Power Gain = 15 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	°C
Total Device Dissipation at T_{flange} = 25°C Above 25°C derate by	P_D	47 0.27	Watts W/°C
Storage Temperature	T_{STG}	150	°C
Thermal Resistance	$R_{\theta JC}$	3.7	°C/W

Electrical Characteristics (100% Tested)

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 25 mA	$V_{(BR)DSS}$	65	68	—	Volts
Drain-Source Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 75 mA	$V_{GS(th)}$	—	2.7	—	Volts
Forward Transconductance	V_{DS} = 10 V, I_D = 0.5 A	g_{fs}	—	0.9	—	Siemens

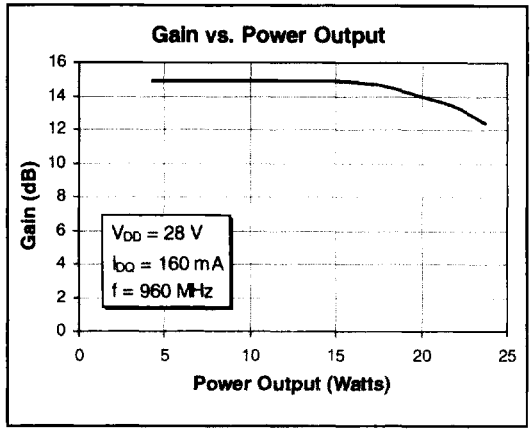
Dynamic Characteristics

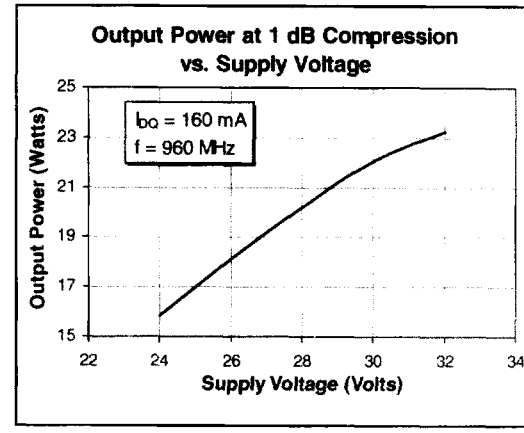
Characteristic	Symbol	Min	Typ	Max	Units
Input Capacitance (V_{DS} = 28 V, V_{GS} = 0 V, f = 1 MHz)	C_{iss}	—	34	—	pF
Output Capacitance (V_{DS} = 28 V, V_{GS} = 0 V, f = 1 MHz)	C_{oss}	—	12	—	pF
Reverse Transfer Capacitance (V_{DS} = 28 V, V_{GS} = 0 V, f = 1 MHz)	C_{rss}	—	0.7	—	pF

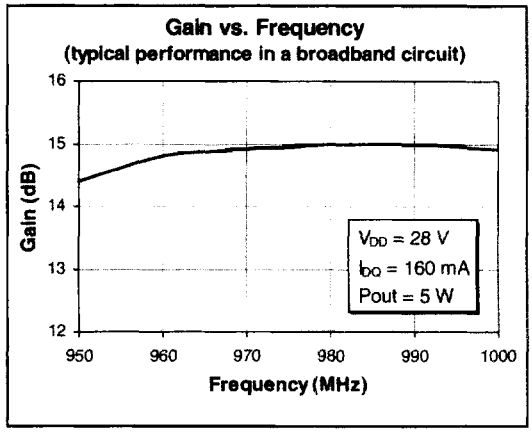
RF Specifications (100% Tested)

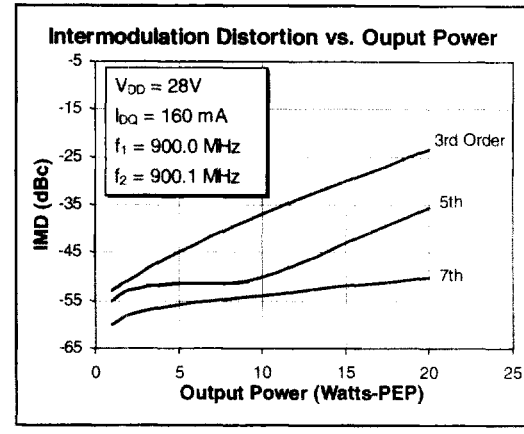
Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain (V_{DD} = 28 V, P_{out} = 5 W, I_{DQ} = 160 mA, f = 960 MHz)	G_{ps}	13	14.5	—	dB
Power Output at 1 dB Compressed (V_{DD} = 28 V, I_{DQ} = 160 mA, f = 960 MHz)	P-1dB	18	20	—	Watts
Drain Efficiency (V_{DD} = 28 V, P_{out} = 18 W, I_{DQ} = 160 mA, f = 960 MHz)	η	55	60	—	%
Load Mismatch Tolerance (V_{DD} = 28 V, P_{out} = 18 W, I_{DQ} = 160 mA, f = 960 MHz —all phase angles at frequency of test)	Ψ	—	—	10:1	—

Typical Performance



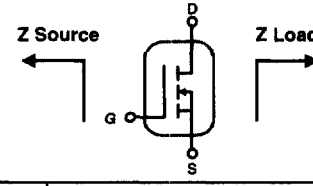


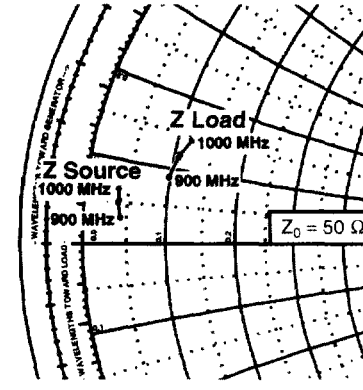




Impedance Data (shown for fixed-tuned broadband circuit)

V_{DD} = 28 V, I_{DQ} = 160 mA, P-1dB = 18 W





Frequency	Z Source		Z Load	
MHz	R	jX	R	jX
900	2.1	1.6	4.8	4.4
950	2.0	2.5	5.3	5.8
960	2.0	2.6	5.4	6.1
1000	1.9	3.3	5.9	7.2

Typical Scattering Parameters

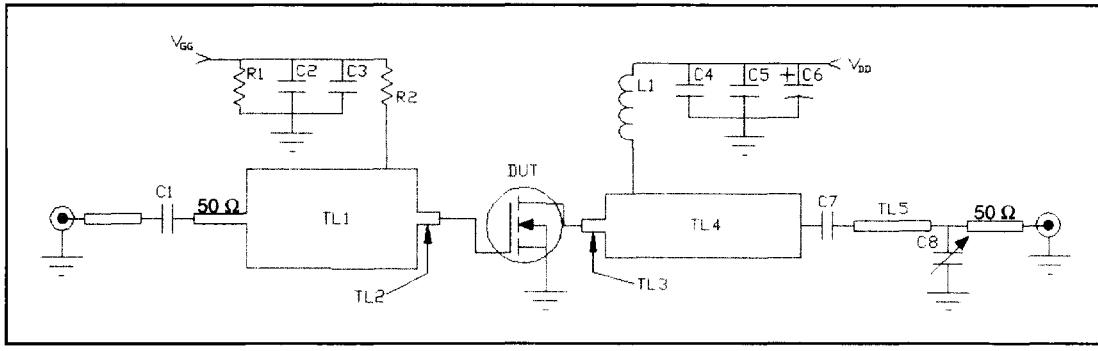
(V_{DS} = 28 V, I_{DQ} = 500 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.828	-120	27.9	103	0.015	20.6	0.597	-65.9
150	0.821	-138	19.2	87.8	0.014	10.7	0.576	-79.6
200	0.817	-148	14.1	77.5	0.013	6.0	0.571	-91.7
250	0.825	-155	10.8	69.6	0.011	6.5	0.602	-102
300	0.836	-160	8.75	62.7	0.009	9.7	0.628	-110
350	0.847	-164	7.09	56.4	0.007	20.7	0.661	-118
400	0.859	-167	5.96	51.3	0.006	41.5	0.698	-124
450	0.870	-170	5.02	45.6	0.007	64.2	0.723	-130
500	0.883	-172	4.31	42.2	0.008	83.2	0.754	-135
550	0.892	-174	3.71	36.9	0.011	92.6	0.783	-140
600	0.902	-176	3.20	33.3	0.014	97.9	0.805	-144
650	0.909	-179	2.81	29.6	0.016	98.5	0.831	-149
700	0.919	180	2.48	26.7	0.020	98.6	0.845	-152
750	0.922	178	2.19	23.6	0.022	98.7	0.860	-155
800	0.930	176	1.97	21.1	0.025	99.3	0.880	-158
850	0.934	174	1.77	17.5	0.028	98.6	0.890	-161
900	0.941	173	1.61	16.3	0.032	98.3	0.904	-164
950	0.943	171	1.47	12.5	0.035	95.8	0.916	-166
1000	0.944	170	1.31	10.8	0.039	95.4	0.922	-168
1050	0.946	169	1.21	8.51	0.043	92.5	0.930	-171
1100	0.950	167	1.12	5.94	0.046	91.7	0.937	-172
1150	0.950	166	1.02	3.97	0.049	91.4	0.945	-174
1200	0.952	164	0.952	4.03	0.053	90.5	0.945	-176
1250	0.952	163	0.902	0.16	0.057	87.1	0.955	-178
1300	0.952	162	0.805	-0.92	0.060	87.6	0.951	-180
1350	0.953	160	0.781	-1.19	0.065	86.6	0.958	178
1400	0.956	159	0.732	-5.01	0.068	84.9	0.955	177
1450	0.954	157	0.688	-5.67	0.072	84.9	0.963	175
1500	0.952	156	0.660	-6.40	0.078	84.2	0.953	173
1550	0.952	154	0.619	-6.60	0.084	83.9	0.967	172
1600	0.949	153	0.573	-7.30	0.085	83.7	0.950	170
1650	0.948	151	0.591	-7.58	0.097	83.1	0.959	169
1700	0.947	150	0.523	-7.59	0.096	82.2	0.950	167
1750	0.946	148	0.492	-7.59	0.106	81.6	0.949	166
1800	0.945	147	0.498	-7.60	0.113	81.4	0.953	163
1850	0.943	145	0.453	-7.64	0.119	80.9	0.952	163
1900	0.942	143	0.442	-6.40	0.124	79.8	0.947	160
1950	0.945	142	0.433	-6.23	0.134	79.6	0.957	159
2000	0.947	140	0.406	-6.20	0.135	79.5	0.953	157
2050	0.949	139	0.401	-5.74	0.150	80.1	0.946	156
2100	0.951	137	0.392	-5.20	0.154	79.4	0.955	153
2150	0.952	136	0.376	-4.36	0.171	79.0	0.950	153
2200	0.956	134	0.357	-4.30	0.171	76.1	0.949	150

(V_{DS} = 13.5 V, I_{DQ} = 500 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.786	-129	25.5	98.4	0.018	16.6	0.522	-91.4
150	0.788	-145	17.3	84.7	0.018	8.8	0.515	-105
200	0.787	-153	12.6	75.2	0.016	3.7	0.528	-116
250	0.801	-158	9.65	68.1	0.014	4.4	0.574	-123
300	0.814	-162	7.76	61.5	0.012	5.8	0.603	-129
350	0.829	-165	6.28	55.8	0.010	12.5	0.644	-135
400	0.842	-169	5.29	50.8	0.009	27.6	0.687	-140
450	0.855	-171	4.42	45.6	0.008	43.1	0.712	-144
500	0.868	-173	3.81	42.2	0.009	61.2	0.748	-148
550	0.883	-175	3.28	37.5	0.011	75.2	0.773	-152
600	0.892	-177	2.83	34.2	0.013	82.3	0.798	-155
650	0.901	-179	2.49	30.7	0.016	85.7	0.823	-159
700	0.910	179	2.19	28.0	0.019	91.4	0.841	-161
750	0.915	177	1.95	24.9	0.022	92.2	0.855	-164
800	0.922	176	1.74	22.2	0.025	92.4	0.874	-167
850	0.928	174	1.57	19.5	0.028	92.3	0.881	-169
900	0.932	173	1.40	18.2	0.032	92.3	0.897	-171
950	0.939	171	1.29	14.5	0.036	89.8	0.906	-173
1000	0.939	170	1.16	13.0	0.038	89.6	0.912	-175
1050	0.942	168	1.08	10.8	0.043	88.0	0.921	-177
1100	0.945	167	0.992	9.22	0.046	87.5	0.926	-178
1150	0.947	165	0.900	6.10	0.049	85.6	0.933	180
1200	0.947	164	0.855	5.30	0.053	85.0	0.933	178
1250	0.948	163	0.806	2.97	0.057	84.8	0.944	176
1300	0.948	161	0.719	2.17	0.059	84.1	0.938	175
1350	0.949	160	0.695	1.76	0.065	83.3	0.947	173
1400	0.949	159	0.650	-0.23	0.069	83.1	0.942	172
1450	0.949	157	0.607	-1.02	0.072	83.0	0.947	170
1500	0.950	156	0.591	-1.23	0.078	82.9	0.941	168
1550	0.948	154	0.560	-1.50	0.084	82.3	0.952	167
1600	0.946	153	0.512	-2.35	0.085	81.8	0.938	165
1650	0.943	151	0.523	-2.38	0.098	80.1	0.950	164
1700	0.942	149	0.471	-5.76	0.097	78.8	0.941	162
1750	0.940	148	0.453	-5.30	0.108	78.6	0.942	161
1800	0.940	146	0.445	-4.69	0.114	78.3	0.941	159
1850	0.940	145	0.421	-3.52	0.121	78.4	0.946	158
1900	0.940	143	0.409	-2.52	0.125	78.1	0.938	156
1950	0.940	142	0.401	-0.49	0.134	77.5	0.948	154
2000	0.941	140	0.373	-0.49	0.137	76.9	0.945	153
2050	0.941	139	0.370	0.80	0.152	76.7	0.940	151
2100	0.942	137	0.369	1.77	0.157	76.5	0.949	149
2150	0.945	135	0.367	4.30	0.174	76.6	0.943	149
2200	0.951	134	0.349	4.49	0.174	73.8	0.944	146

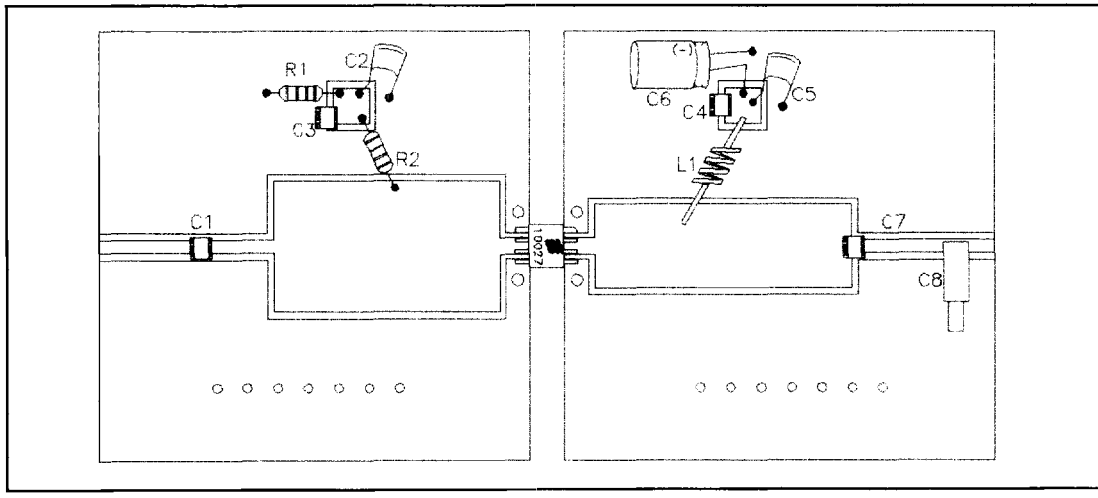
Test Circuit



Test Circuit Schematic for f = 960 MHz

DUT	PTF 10027	
TL1	0.16 λ 960 MHz	Microstrip 8.5 Ω
TL2, TL3	0.18 λ 960 MHz	Microstrip 44.0 Ω
TL4	0.185 λ 960 MHz	Microstrip 12.7 Ω
TL5	0.07 λ 960 MHz	Microstrip 50 Ω
C1, C3, C4, C7	51 pF, Capacitor ATC 100 B	
C2, C5	0.1 µF, 50 V, Capacitor Digi-Key P4917-ND	

C6	100 µF, 50 V, Electrolytic Capacitor, Digi-Key P5276
C8	0.6–6.0 pF, Trimmer Capacitor, Johanson, 5801-PC
L1	4 Turn, #20 AWG, 0.120" I.D.
R1	1 K, 1/4 W Resistor
R2	10 K, 1/4 W Resistor
Circuit Board	0.031" Thick, ε_r = 4.0, AlliedSignal, G200



Placement Diagram (not to scale)

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