

PTF 10147

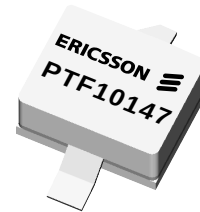
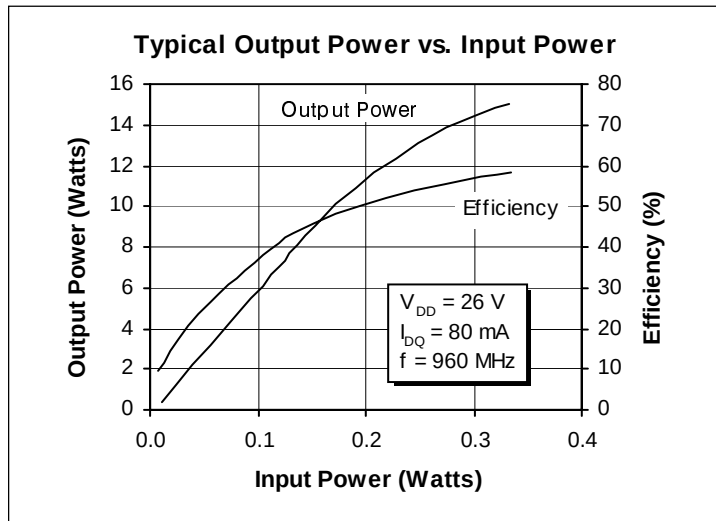
GOLDMOS® Field Effect Transistor

10 Watts, 1.0 GHz

Description

The PTF 10147 is a 10-watt GOLDMOS FET intended for large signal amplifier applications to 1.0 GHz. It operates with 58% efficiency and 16.5 dB gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **Performance at 960 MHz, 26 Volts**
 - Output Power = 10 Watts
 - Efficiency = 58% Typ
 - Power Gain = 16.5 dB Typ
- Full Gold Metallization
- Silicon Nitride Passivated
- Surface Mountable
- Available in Tape and Reel
- 100% Lot Traceability



Package 20244

RF Specifications (Guaranteed)

Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain ($V_{DD} = 26\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DQ} = 80\text{ mA}$, $f = 960\text{ MHz}$)	G_{ps}	15.0	16.5	—	dB
Output Power at 1 dB Compressed ($V_{DD} = 26\text{ V}$, $I_{DQ} = 80\text{ mA}$, $f = 960\text{ MHz}$)	P-1dB	10	12	—	Watts
Drain Efficiency ($V_{DD} = 26\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DQ} = 80\text{ mA}$, $f = 960\text{ MHz}$)	η	50	58	—	%
Load Mismatch Tolerance ($V_{DD} = 26\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DQ} = 80\text{ mA}$, $f = 960\text{ MHz}$ — all phase angles at frequency of test)	Ψ	—	—	10:1	—

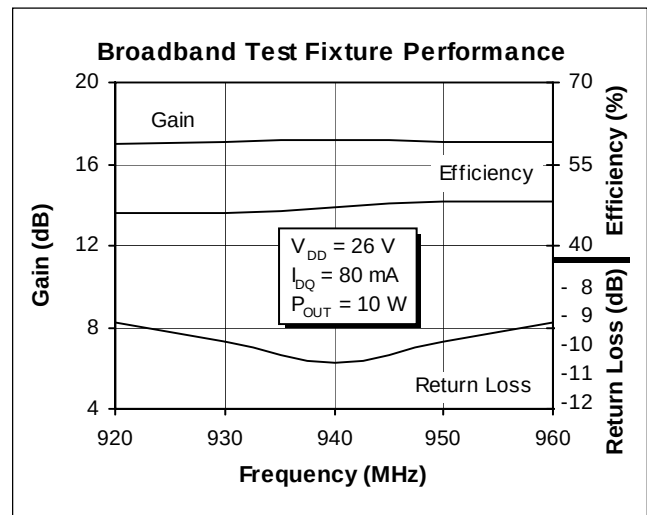
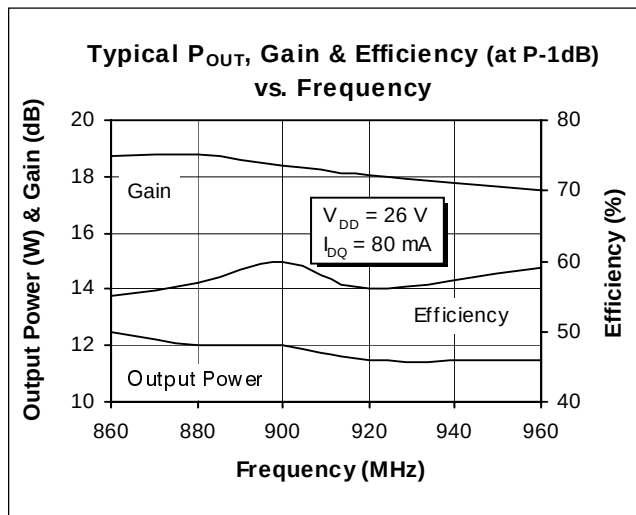
All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated.

Electrical Characteristics (Guaranteed)

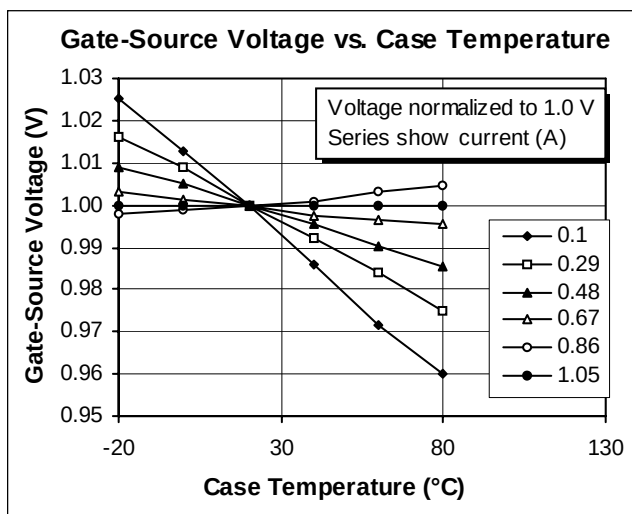
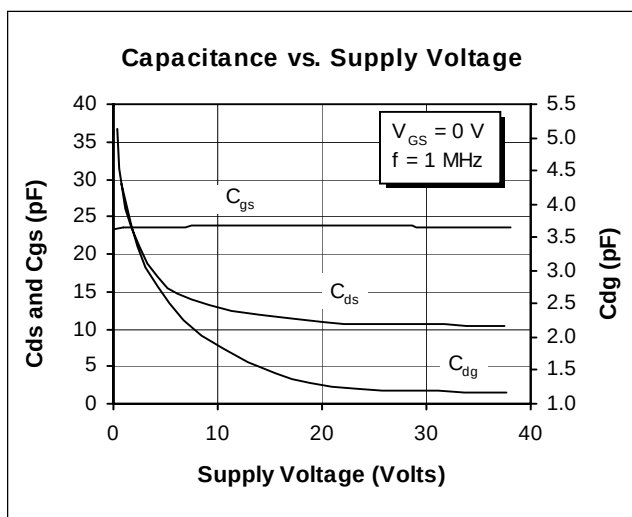
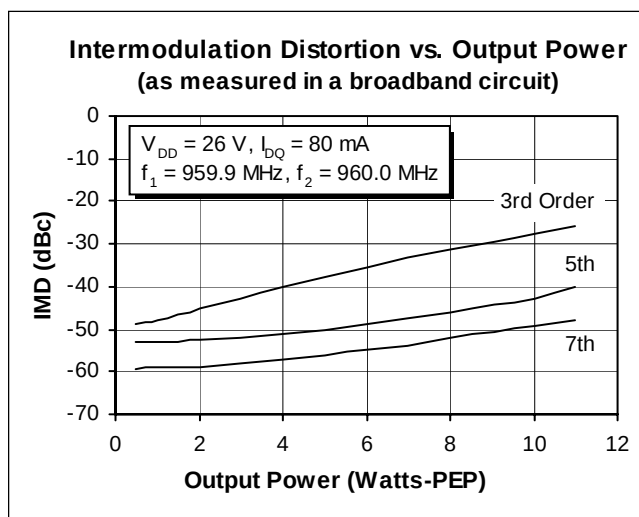
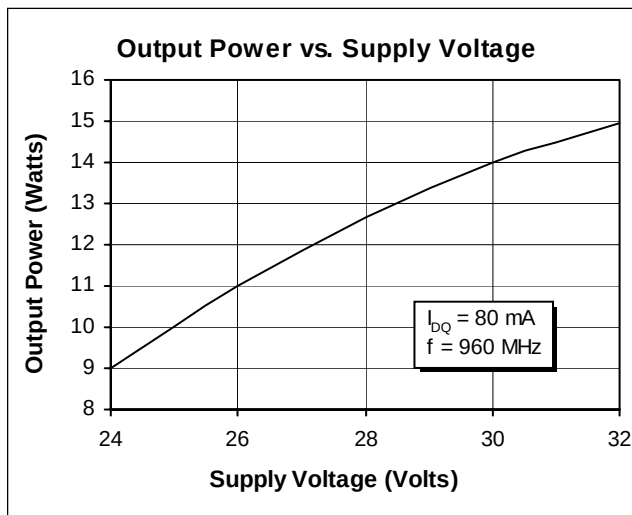
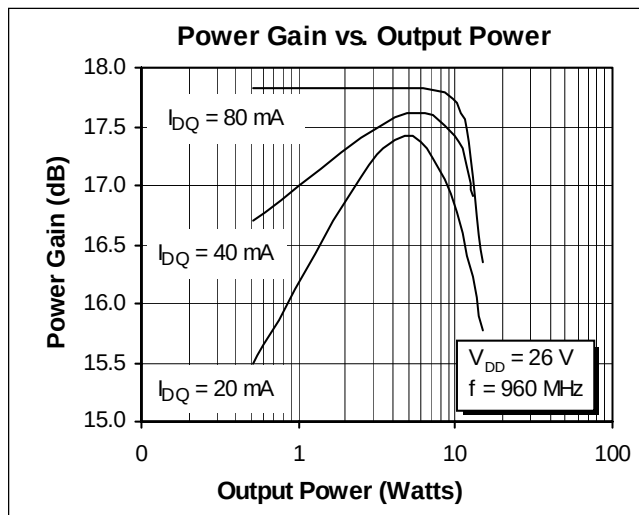
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 25\text{ mA}$	BV_{DSS}	65	—	—	Volts
Drain-Source Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	μA
Gate on Voltage	$V_{DS} = 26\text{ V}$, $I_D = 80\text{ mA}$	$V_{GS(on)}$	3	—	5	Volts

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	$^{\circ}\text{C}$
Total Device Dissipation Above 25°C derate by	P_D	46 0.26	Watts $\text{W}/^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to $+150$	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	3.8	$^{\circ}\text{C}/\text{W}$

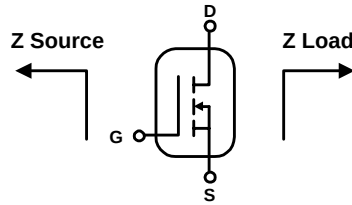
Typical Performance

Typical Performance (cont.)

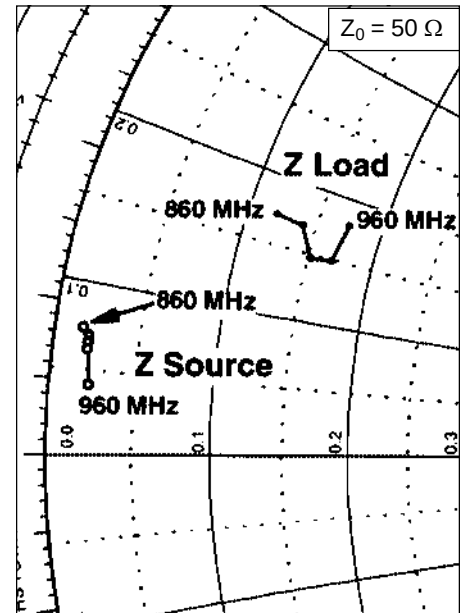


Impedance Data

$V_{DD} = 26 \text{ V}$, $I_{DQ} = 80 \text{ mA}$, $P_{-1\text{dB}} = 10 \text{ W}$



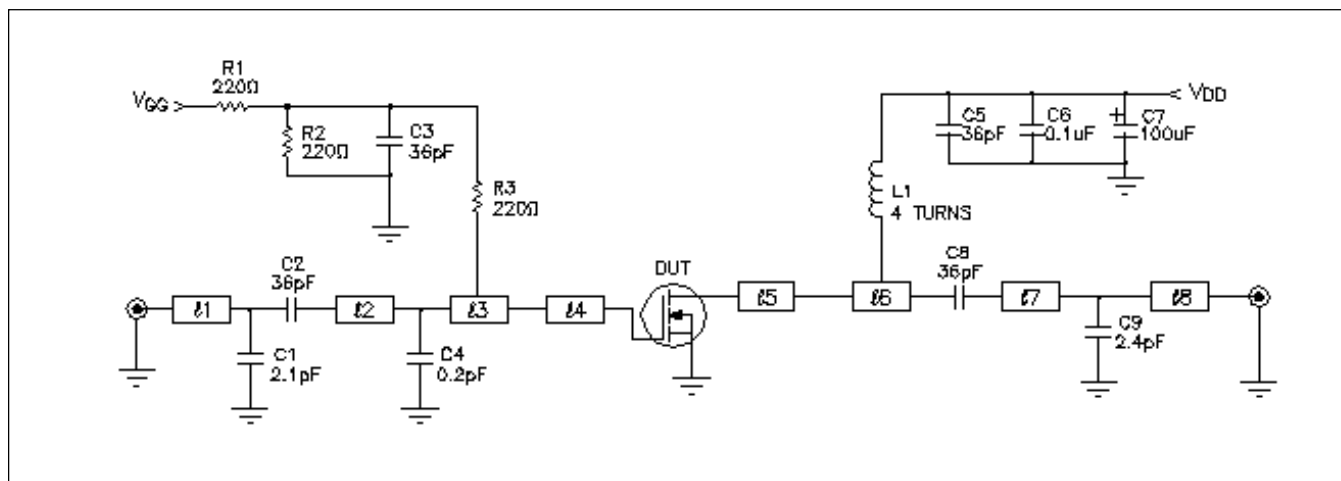
Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
860	0.8	3.7	6.0	8.6
880	1.0	3.5	7.0	8.5
900	1.0	3.3	7.6	7.4
920	1.0	3.1	8.4	7.5
960	1.0	2.0	8.7	9.0



Typical Scattering Parameters

($V_{DS} = 26 \text{ V}$, $I_D = 200 \text{ mA}$)

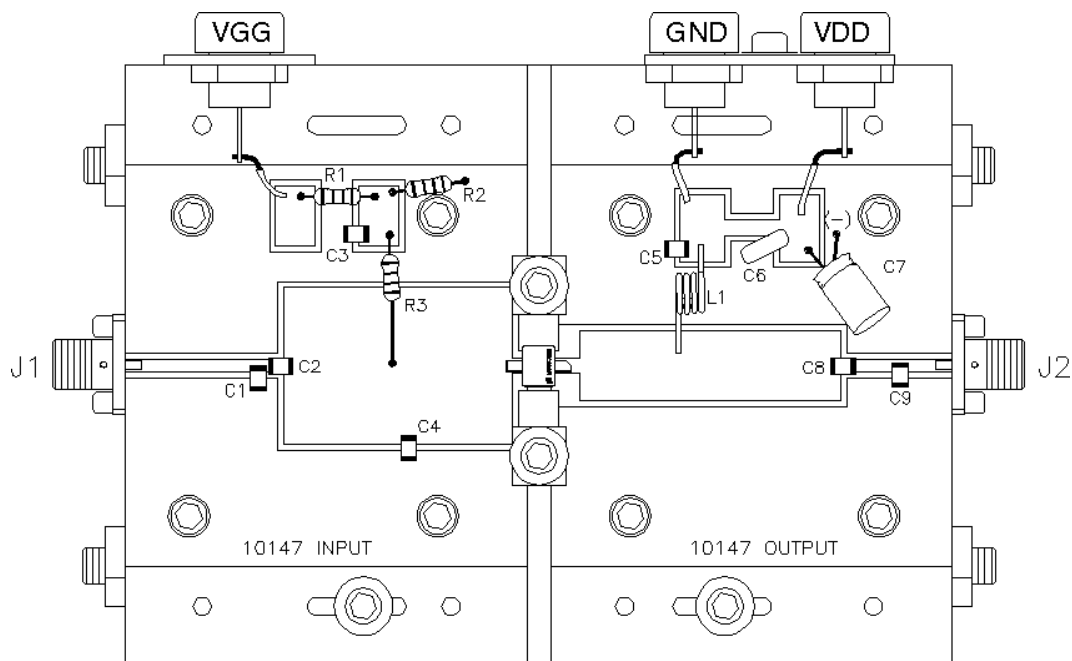
f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.939	-94.3	22.5	117	0.021	30.6	0.782	-51.1
150	0.917	-117	17.3	101	0.023	14.8	0.714	-65.5
200	0.903	-130	13.5	88.6	0.023	3.14	0.689	-76.1
250	0.898	-139	10.9	79.3	0.023	-5.63	0.691	-85.3
300	0.897	-145	8.90	71.5	0.022	-12.3	0.702	-92.8
350	0.904	-150	7.43	64.9	0.021	-17.9	0.722	-99.7
400	0.908	-154	6.29	58.7	0.020	-23.3	0.741	-106
450	0.910	-156	5.41	53.3	0.018	-27.1	0.763	-111
500	0.916	-159	4.68	48.4	0.017	-30.7	0.784	-116
550	0.919	-161	4.08	44.0	0.016	-32.8	0.802	-120
600	0.924	-163	3.60	40.0	0.014	-35.8	0.814	-125
650	0.931	-165	3.20	36.3	0.013	-37.8	0.835	-128
700	0.934	-166	2.86	33.0	0.012	-40.8	0.846	-131
750	0.937	-168	2.57	29.9	0.011	-40.7	0.850	-135
800	0.936	-169	2.31	26.7	0.009	-41.2	0.866	-138
850	0.942	-171	2.09	24.1	0.008	-40.0	0.875	-140
900	0.948	-172	1.91	21.5	0.007	-37.0	0.884	-142
950	0.947	-173	1.72	19.6	0.006	-38.5	0.879	-145
1000	0.950	-175	1.57	17.3	0.006	-37.7	0.884	-148
1050	0.953	-176	1.45	14.6	0.004	-25.4	0.897	-149
1100	0.956	-177	1.34	12.8	0.004	-17.8	0.896	-151
1150	0.956	-178	1.24	11.5	0.003	-9.27	0.895	-153
1200	0.959	-179	1.13	9.6	0.003	4.67	0.908	-155
1250	0.960	180	1.05	7.6	0.003	18.0	0.909	-156
1300	0.962	179	0.978	5.3	0.003	40.5	0.910	-158
1350	0.966	178	0.912	4.3	0.004	48.5	0.920	-160
1400	0.967	177	0.851	3.2	0.004	61.5	0.922	-161
1450	0.969	176	0.791	0.9	0.004	61.7	0.917	-163
1500	0.972	175	0.747	-0.3	0.005	66.6	0.928	-164

Test Circuit


Test Circuit Schematic for $f = 960$ MHz

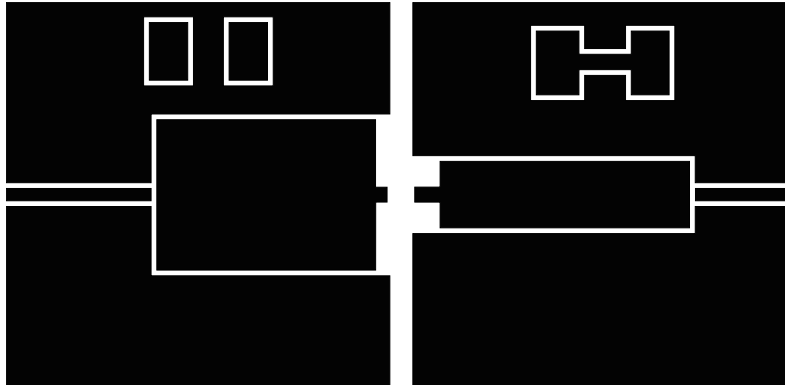
DUT	PTF 10147	LDMOS Field Effect Transistor
$l1$	0.590λ 960 GHz	Microstrip 50 Ω
$l2$	0.094λ 960 GHz	Microstrip 6.6 Ω
$l3$	0.085λ 960 GHz	Microstrip 6.6 Ω
$l4$	0.006λ 960 GHz	Microstrip 43 Ω
$l5$	0.015λ 960 GHz	Microstrip 43 Ω
$l6$	0.200λ 960 GHz	Microstrip 13.7 Ω
$l7$	0.033λ 960 GHz	Microstrip 50 Ω
$l8$	0.043λ 960 GHz	Microstrip 50 Ω

C1	2.1 pF	Capacitor, 100 B 2 R1
C2,C3,C5,C8	36 pF	Capacitor, 100 B 360
C4	0.2 pF	Capacitor, 100 B 0R2
C6	0.1 μ F	Capacitor, Digi-Key P4525
C7	100 μ F, 50 V	Capacitor, Digi-Key P5182
C9	2.4 pF	Capacitor, 100 A 2R4
L1	4 Turns, 20 AWG, .120" DIA I.D.	
R1, R2, R3	220 Ω 1/4 W	Resistor, Digi-Key 2.2QBK
Circuit Board	.031" thick, $\epsilon_r = 4.0$, G200, AlliedSignal, 2 oz. copper	



Assembly Diagram (not to scale)

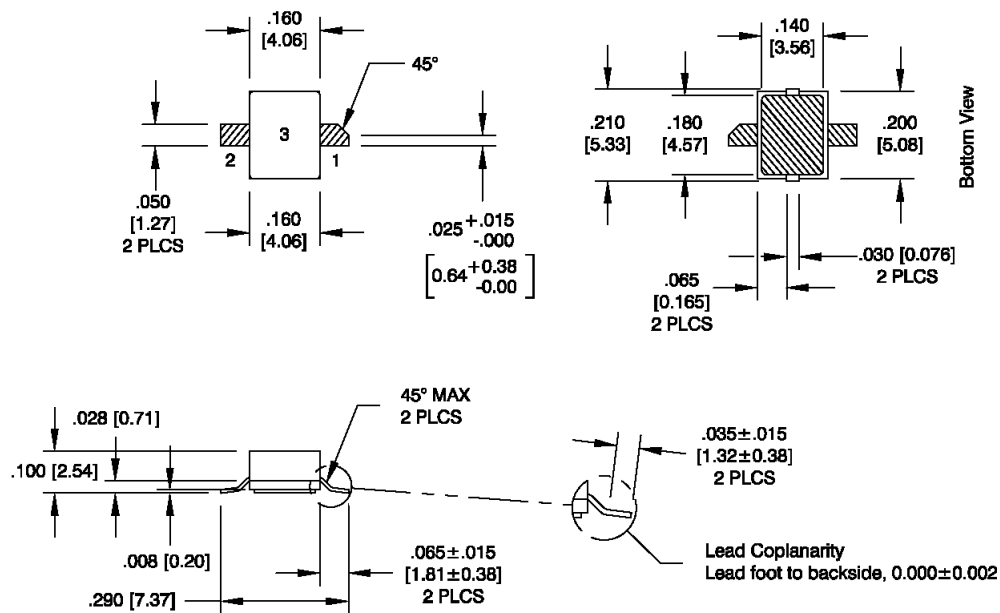
Test Circuit (cont.)



Artwork (not to scale)

Case Outline Specifications

Case 20244



Unless otherwise specified
all tolerances $\pm .005"$ [0.13mm]

Pins: 1. Drain 2. Gate 3. Source
Lead Thickness: $.008 \pm .001"$ [0.20 $\pm$ 0.03mm]