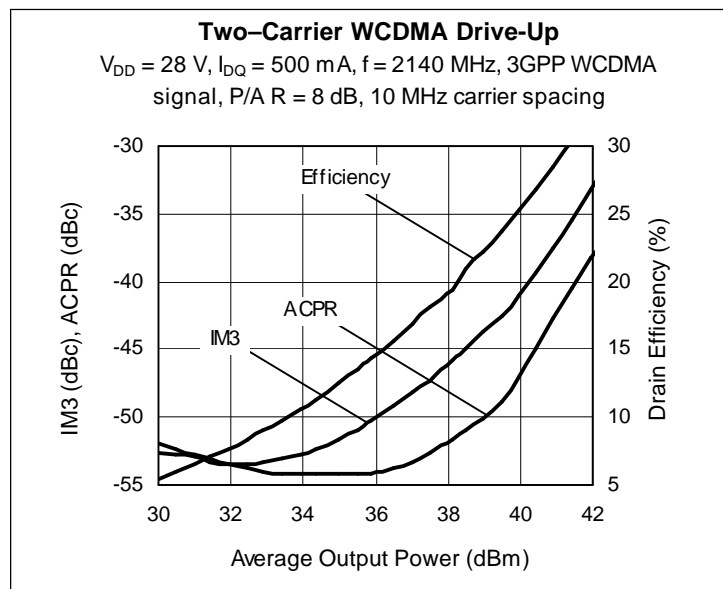




LDMOS RF Power Field Effect Transistor 45 W, 2110–2170 MHz

Description

The PTF210451 is a 45 W internally matched GOLDMOS FET intended for WCDMA applications from 2110 to 2170 MHz. Full gold metallization ensures excellent device lifetime and reliability.



Features

- Internal matching for wideband performance
- Typical two-carrier WCDMA performance
 - Average output power = 11.5 W
 - Gain = 14 dB
 - Efficiency = 27%
 - IM3 = -37 dBc
- Typical CW performance
 - Output power at P-1dB = 50 W
 - Linear gain = 14 dB
 - Efficiency = 53%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI Drift
- Capable of handling 10:1 VSWR @ 28 V, 45 W (CW) output power



PTF210451E
Package 30265

ESD: Electrostatic discharge sensitive device — observe handling precautions!

RF Performance at $T_{CASE} = 25^{\circ}\text{C}$ unless otherwise indicated

WCDMA Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 11.5\text{ W AVG}$

$f_1 = 2140\text{ MHz}$, $f_2 = 2150\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Units
Intermodulation Distortion	IMD	—	-37	—	dBc
Gain	G_{ps}	—	14	—	dB
Drain Efficiency	η_D	—	27	—	%

Two-Tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 45\text{ W PEP}$, $f = 2170\text{ MHz}$, Tone Spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Gain	G_{ps}	13	14	—	dB
Drain Efficiency	η_D	35	38	—	%
Intermodulation Distortion	IMD	—	-32	-30	dBc

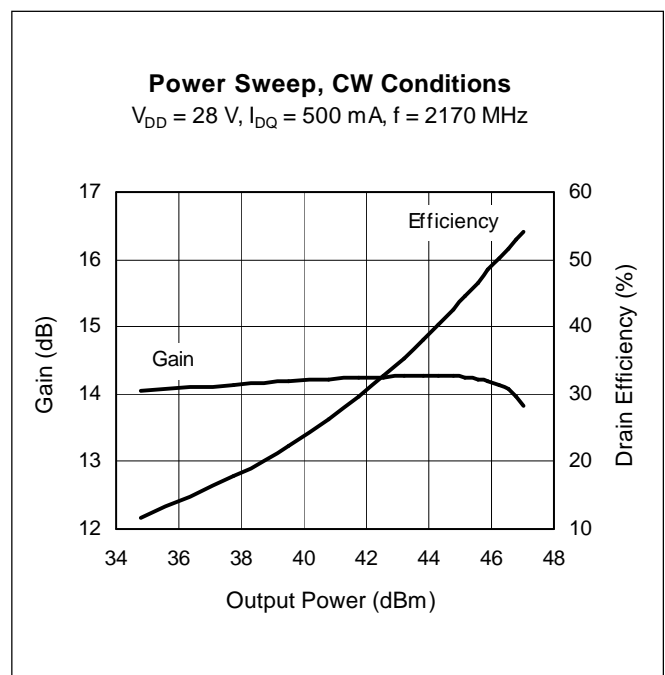
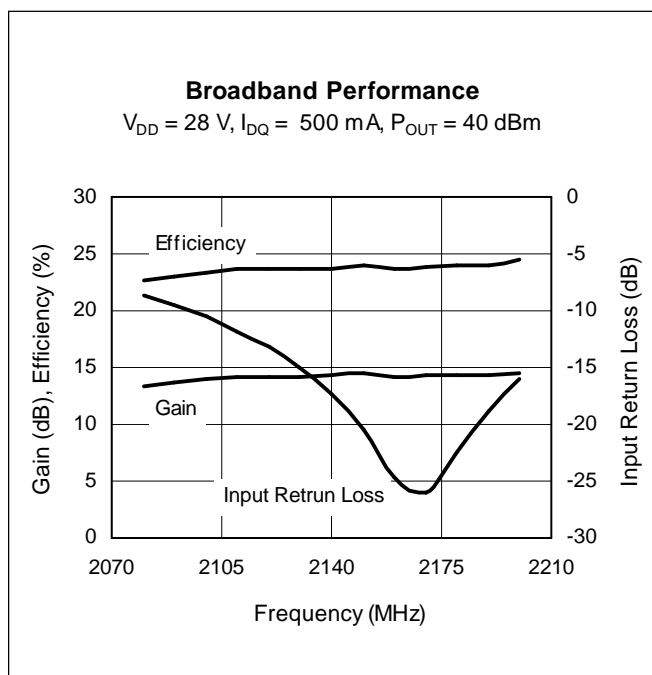
DC Characteristics at $T_{CASE} = 25^{\circ}C$ unless otherwise indicated

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain–Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 10 \mu A$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28 V, V_{GS} = 0 V$	I_{DSS}	—	—	1.0	μA
On–State Resistance	$V_{GS} = 10 V, V_{DS} = 0.1 V$	$R_{DS(on)}$	—	0.2	—	Ω
Operating Gate Voltage	$V_{DS} = 28 V, I_{DQ} = 500 mA$	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	$V_{GS} = 10 V, V_{DS} = 0 V$	I_{GSS}	—	—	1.0	μA

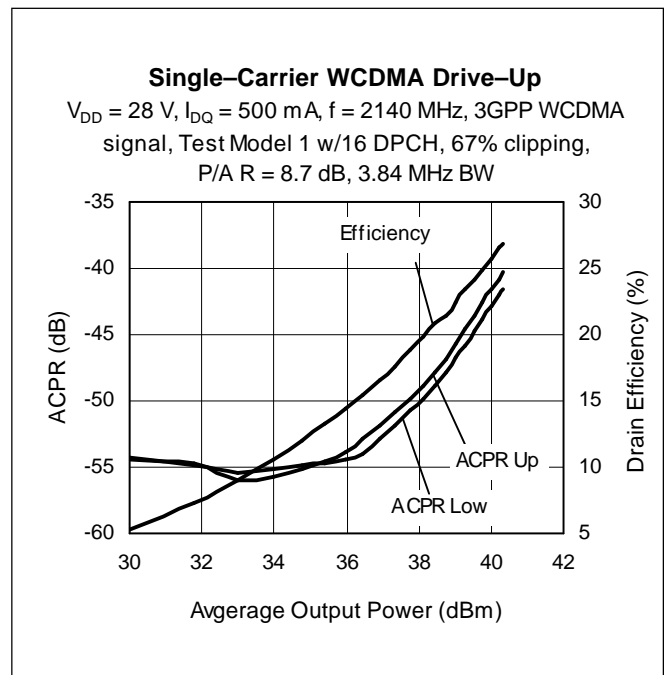
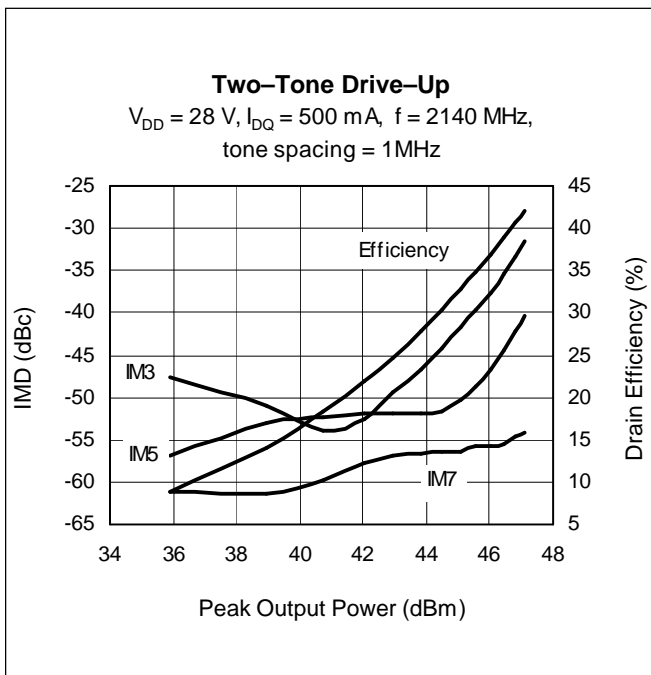
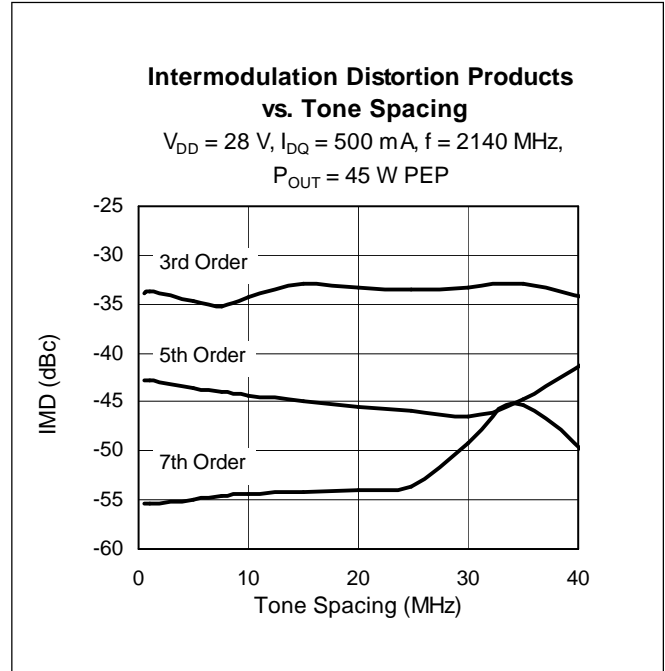
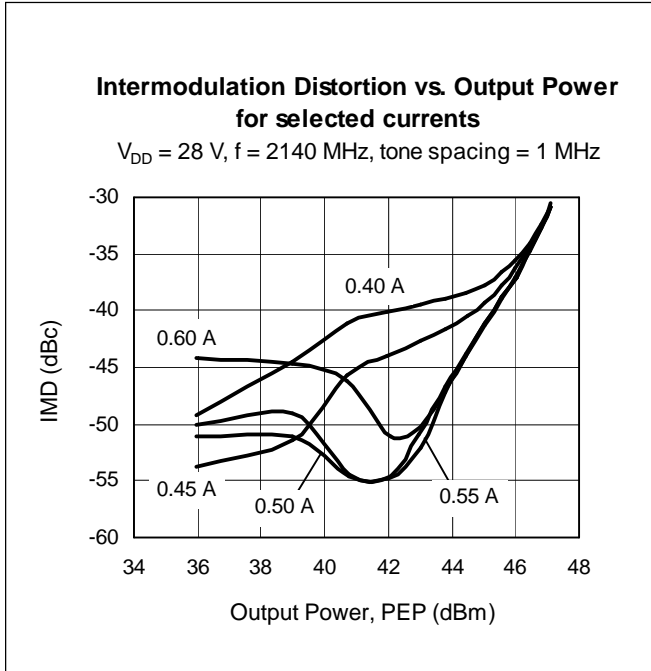
Maximum Ratings

Parameter	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	65	V
Gate–Source Voltage	V_{GS}	-0.5 to +12	V
Junction Temperature	T_J	200	$^{\circ}C$
Total Device Dissipation Above $25^{\circ}C$ derate by	P_D	175 1.0	W W/ $^{\circ}C$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}C$
Thermal Resistance ($T_{CASE} = 70^{\circ}C, 45 W CW$)	$R_{\theta JC}$	1.0	$^{\circ}C/W$

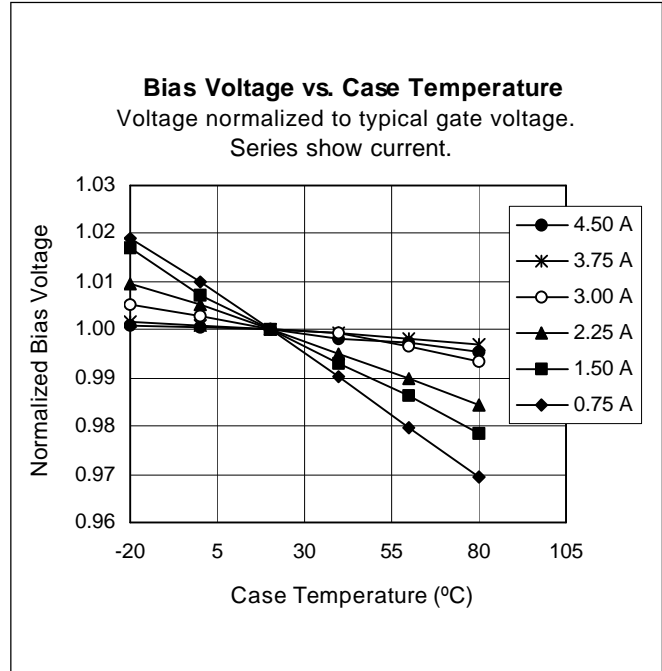
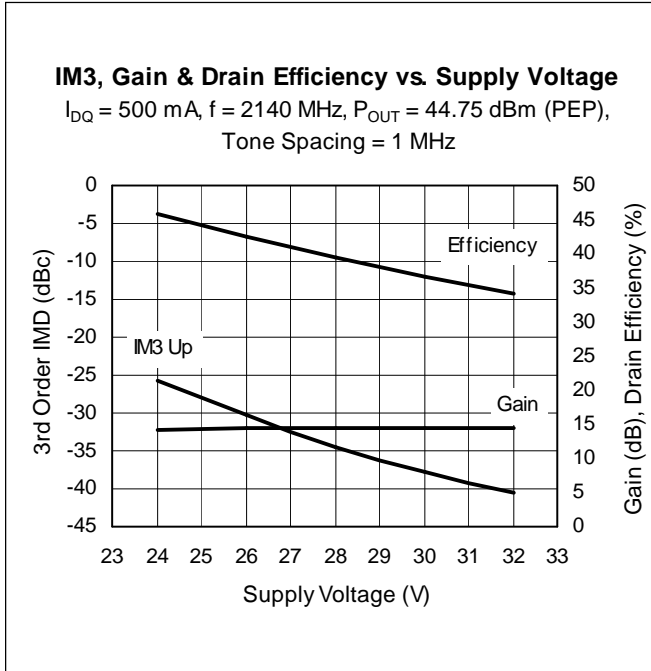
Typical Performance (data taken in production test fixture)



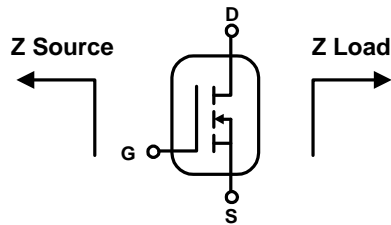
Typical Performance (cont.)



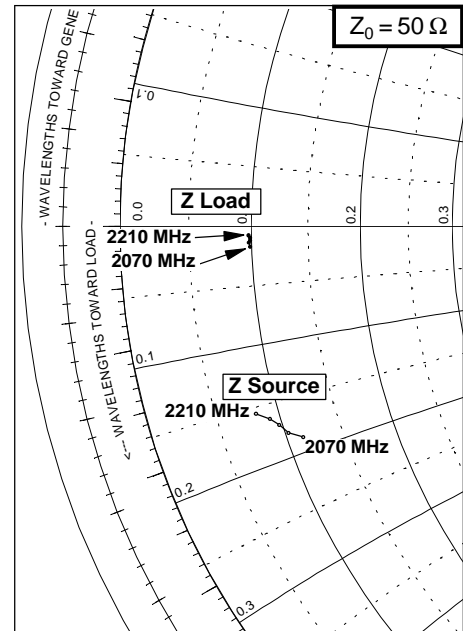
Typical Performance (cont.)



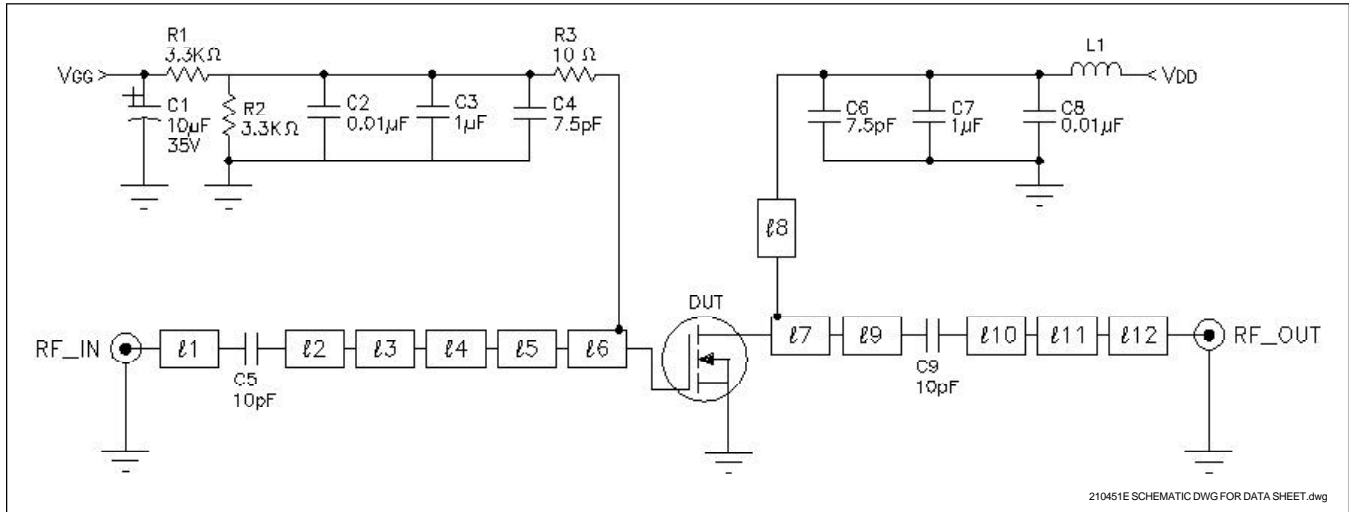
Broadband Circuit Impedance Data



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
2070	5.72	-9.36	4.94	-0.87
2110	5.17	-8.97	4.90	-0.69
2140	4.88	-8.52	4.96	-0.60
2170	4.59	-8.16	4.96	-0.49
2210	4.08	-7.79	4.88	-0.39



Test Circuit



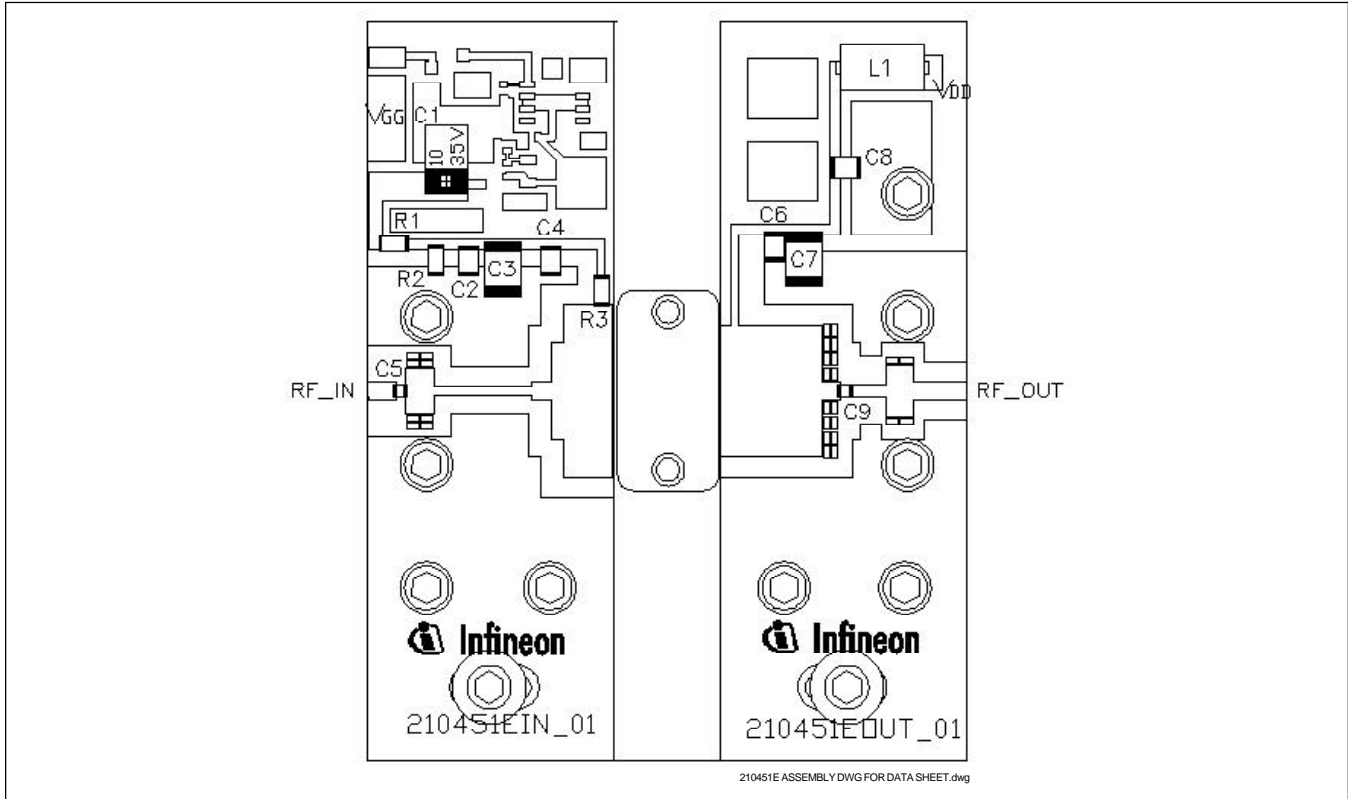
Test Circuit Schematic for 2170 MHz

Circuit Assembly Information

DUT	PTF210451E	LDMOS Transistor	
Circuit Board	0.79 mm. [.031"] thick, $\epsilon_r = 4.5$	Rogers TMM4, 2 oz. copper	

Microstrip	Electrical Characteristics at 2170 MHz	Dimensions: L x W (mm.)	Dimensions: L x W (in.)
ℓ1	0.047 λ , 45 Ω	3.48 x 1.78	0.137 x 0.070
ℓ2	0.040 λ , 23 Ω	2.87 x 4.57	0.113 x 0.180
ℓ3	0.132 λ , 66 Ω	10.08 x 0.89	0.397 x 0.035
ℓ4	0.028 λ , 45 Ω	2.08 x 1.78	0.082 x 0.070
ℓ5	0.018 λ , 12 Ω	26.67 x 10.06	1.050 x 0.396
ℓ6	0.074 λ , 7 Ω	4.98 x 17.68	0.196 x 0.696
ℓ7	0.152 λ , 9 Ω	10.34 x 13.56	0.407 x 0.534
ℓ8	0.257 λ , 68 Ω	19.76 x 0.84	0.778 x 0.033
ℓ9	0.027 λ , 44 Ω	1.98 x 1.83	0.078 x 0.072
ℓ10	0.056 λ , 56 Ω	4.22 x 1.22	0.166 x 0.048
ℓ11	0.036 λ , 19 Ω	2.57 x 5.74	0.101 x 0.226
ℓ12	0.076 λ , 44 Ω	5.64 x 1.80	0.222 x 0.071

Test Circuit (cont.)



Reference Circuit¹ (not to scale)

Component	Description	Manufacturer	P/N or Comment
C1	Capacitor, 10 μ F, 35 V, Tantalum TE, SMD	Digi-Key	PCS6106TR-ND
C2, C8	Capacitor, 0.01 μ F	ATC	X08J103AFB ATC 200B103MW
C3, C7	Capacitor, 1 μ F	ATC	X24L105BVC
C4, C6	Capacitor, 7.5 pF	ATC	100B 7R5
C5, C9	Capacitor, 10 pF	ATC	100A 100
L1	Ferrite Bead	Elne Magnetic	#BDS31314.6-452
R1, R2	Resistor, 3.3K ohm, 1/4 W	Digi-Key	P3.3K ECT-ND
R3	Resistor, 10 ohm, 1/4 W	Digi-Key	P10 ECT-ND

¹ Gerber files for this circuit available on request

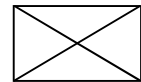
Page	Subjects (major changes since last revision)

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