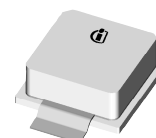


Thermally-Enhanced High Power RF LDMOS FET 10 W, 2400 – 2700 MHz

Description

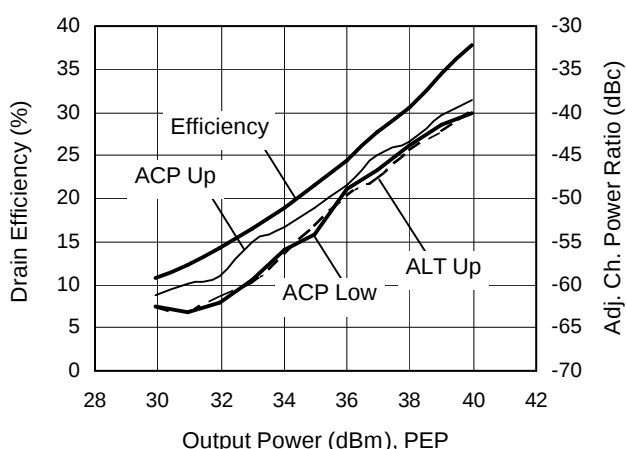
The PTF240101S is a 10-watt, internally-matched *GOLDMOS*® FET device intended for CDMA2000 and WiMAX applications in the 2.4 to 2.7 GHz band. Full gold metallization ensures excellent device lifetime and reliability.

PTF240101S
Package 32259



Three-Carrier CDMA2000 Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $f = 2680\text{ MHz}$



Features

- Typical CDMA2000 performance
 - Average output power = 2.0 W
 - Gain = 16 dB
 - Efficiency = 18%
 - ACPR = -55 dBc
- Typical CW performance
 - Output power at P-1dB = 15 W
 - Efficiency = 45%
- Integrated ESD protection:
Human Body Model Class 1 (minimum)
- Excellent thermal stability
- Low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 10 W (CW) output power

RF Characteristics, CDMA2000 Operation

CDMA2000 Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $P_{OUT} = 2\text{ W}$, $f = 2680\text{ MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit
Adjacent Channel Power Ratio	ACPR	—	-55	—	dBc
Gain	G_{ps}	—	16	—	dB

Two-Tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $P_{OUT} = 10\text{ W PEP}$, $f = 2680\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15.5	16	—	dB
Intermodulation Distortion	IMD	—	-31	-28	dBc

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 10\text{ }\mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ A}$	$R_{DS(on)}$	—	0.83	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ} = 180\text{ mA}$	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

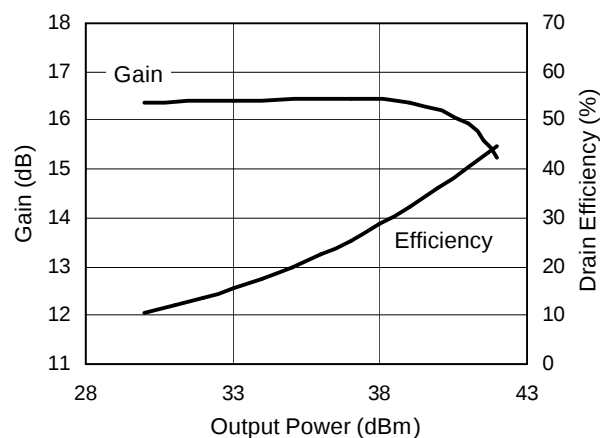
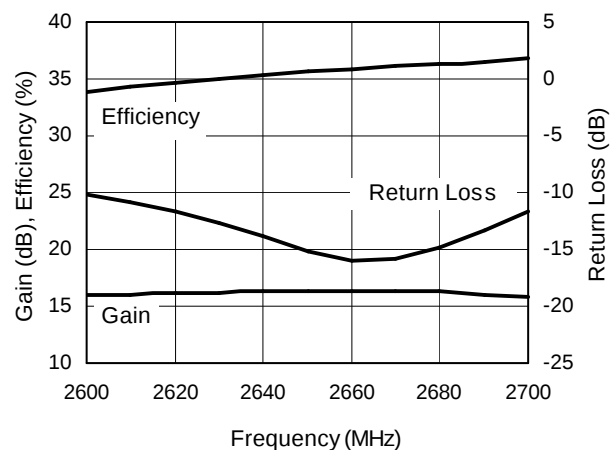
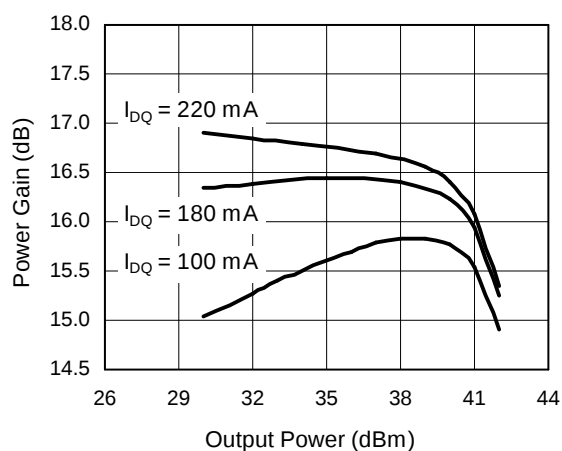
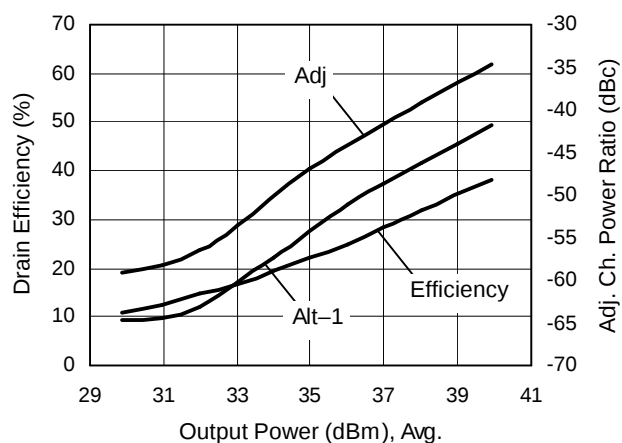
Maximum Ratings

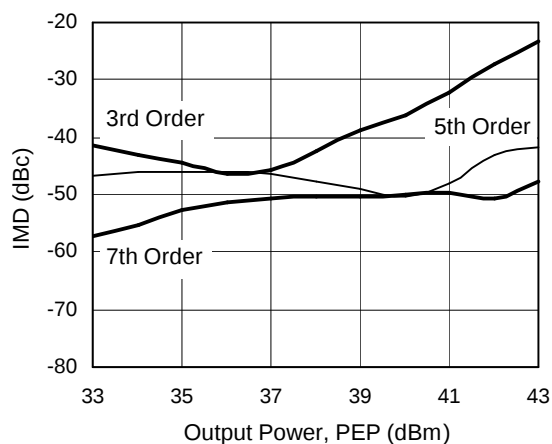
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	−0.5 to +12	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Total Device Dissipation	P_D	58	W
Above 25 $^{\circ}\text{C}$ derate by		0.333	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}, 10\text{ W CW}$)	$R_{\theta JC}$	3.0	$^{\circ}\text{C/W}$

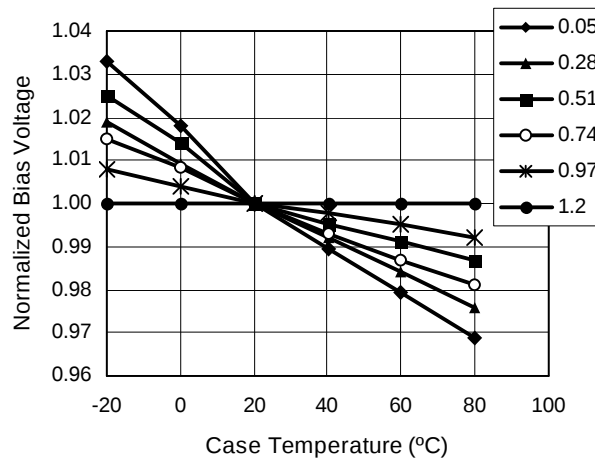
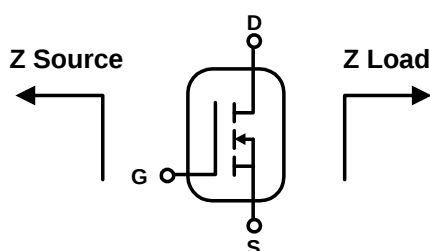
Ordering Information

Type	Package Outline	Package Description	Marking
PTF240101S	32259	Thermally-enhanced, surface mount	PTF240101S

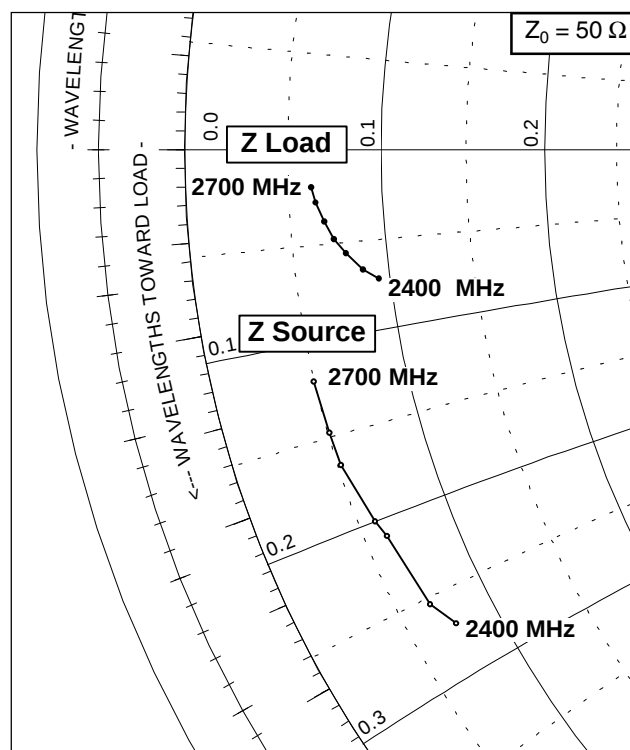
Typical Performance (measurements taken in broadband test fixture)

Gain & Efficiency vs. Output Power
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $f = 2680\text{ MHz}$

Broadband Performance
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $P_{OUT} = 10\text{ W}$

Gain vs. Output Power
 $V_{DD} = 28\text{ V}$, $f = 2680\text{ MHz}$

IS-95 CDMA Performance
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $f = 2680\text{ MHz}$


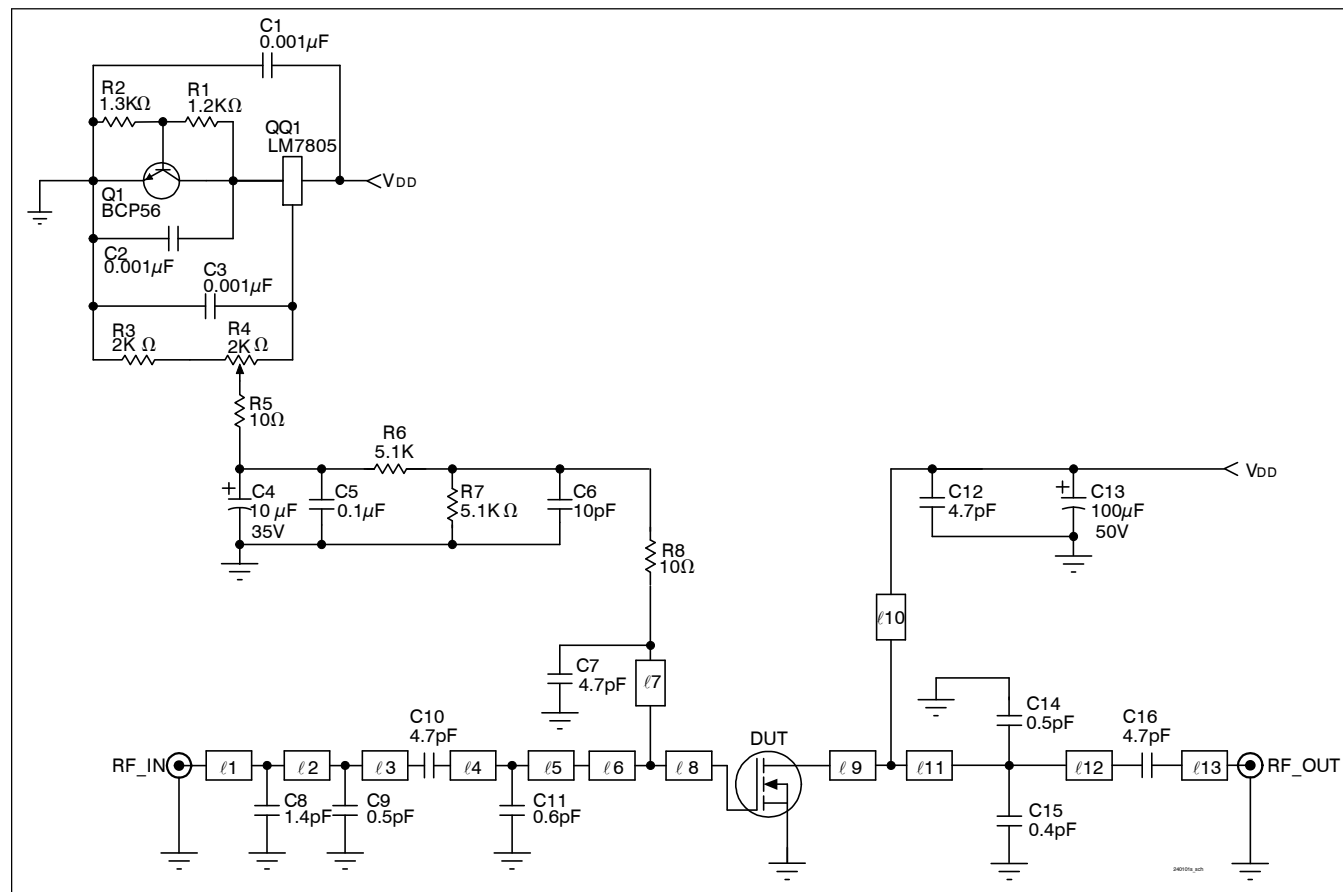
Typical Performance (cont.)
Intermodulation Distortion vs. Output Power
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $f_1 = 2679\text{ MHz}$, $f_2 = 2680\text{ MHz}$

Gate-Source Voltage vs. Temperature

 Voltage normalized to typical gate voltage,
series show current.

Broadband Circuit Impedance Data


Frequency MHz	Z Source W		Z Load W	
	R	jX	R	jX
2400	3.8	-13.5	4.7	-3.6
2450	3.4	-12.7	4.3	-3.3
2500	3.1	-10.5	4.0	-2.8
2550	3.3	-10.0	3.6	-2.4
2600	2.6	-8.3	3.4	-1.9
2650	2.9	-7.4	3.2	-1.4
2700	2.5	-6.0	3.1	-1.0



Reference Circuit



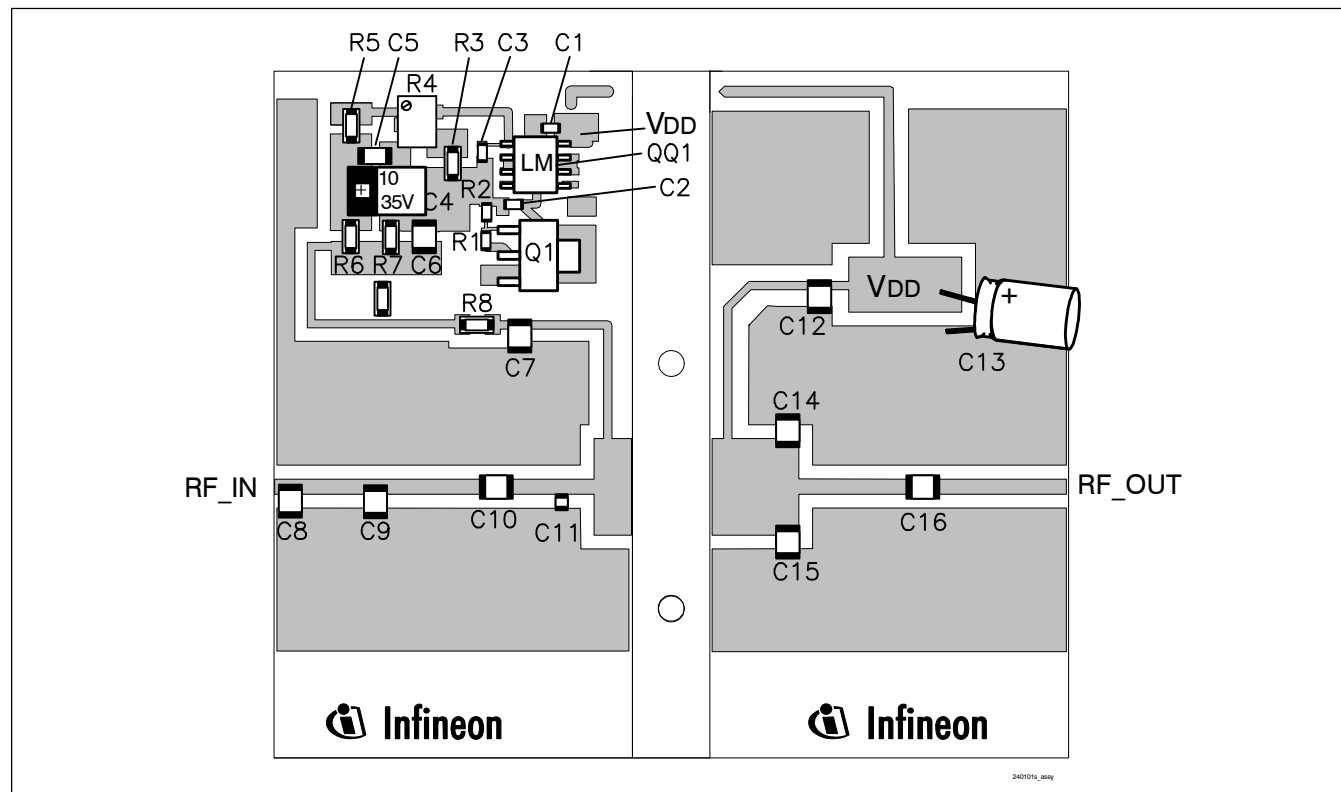
Reference Circuit Schematic $f = 2650 \text{ MHz}$

Circuit Assembly Information

DUT	PTF240101S	LDMOS Transistor	
Circuit Board	0.76 mm [0.030"] thick, $\epsilon_r = 4.5$	Rogers TMM4, 2 oz. Copper	

Microstrip	Electrical Characteristics at 2650 MHz	Dimensions: L x W (mm)	Dimensions: L x W (in.)
$\ell 1$	0.043λ , 50.0Ω	2.67×1.35	0.105×0.053
$\ell 2$	0.119λ , 50.0Ω	7.37×1.35	0.290×0.053
$\ell 3$	0.173λ , 50.0Ω	10.67×1.35	0.420×0.053
$\ell 4$	0.114λ , 50.0Ω	7.06×1.35	0.278×0.053
$\ell 5$	0.030λ , 50.0Ω	1.83×1.35	0.072×0.053
$\ell 6$	0.019λ , 13.3Ω	1.09×8.81	0.043×0.347
$\ell 7$	0.278λ , 75.0Ω	17.60×0.69	0.693×0.027
$\ell 8$	0.038λ , 13.3Ω	2.18×8.81	0.086×0.347
$\ell 9$	0.027λ , 13.3Ω	1.52×8.81	0.060×0.347
$\ell 10$	0.327λ , 75.0Ω	20.73×0.69	0.816×0.027
$\ell 11$	0.086λ , 13.3Ω	4.83×8.81	0.190×0.347
$\ell 12$	0.177λ , 50.0Ω	10.92×1.35	0.430×0.053
$\ell 13$	0.217λ , 50.0Ω	13.41×1.35	0.528×0.053

Reference Circuit (cont.)

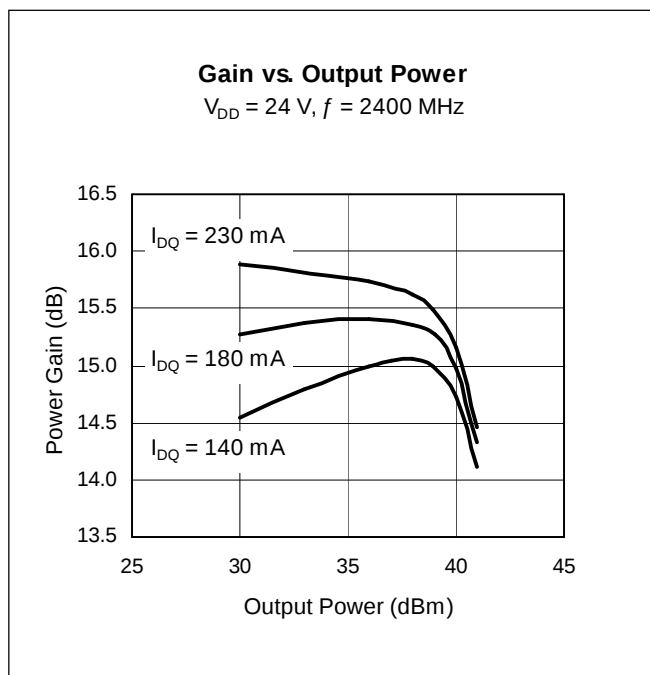
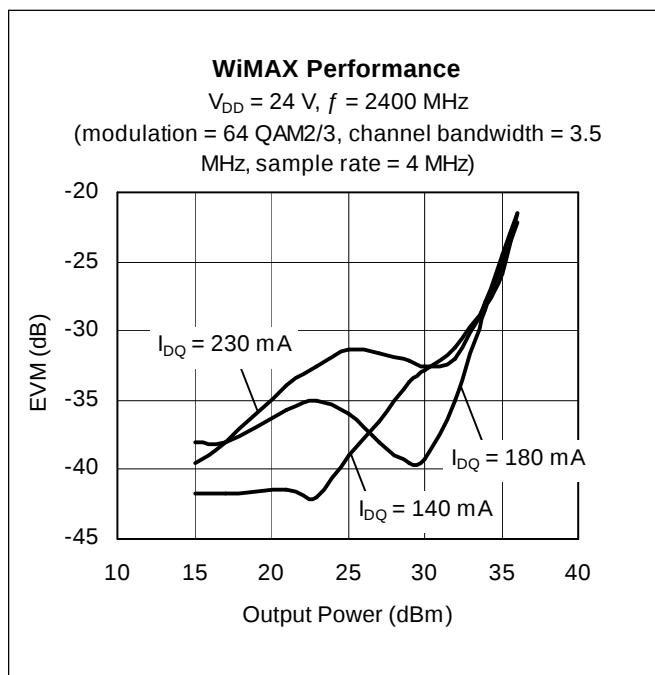
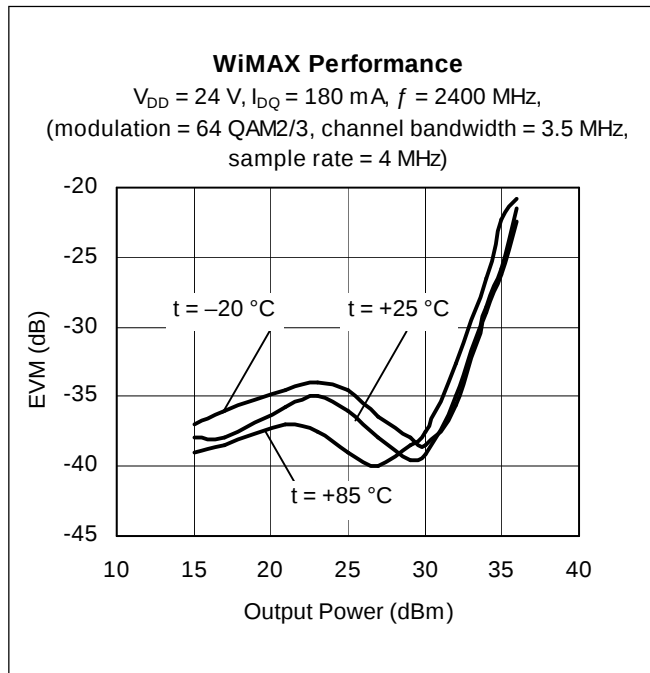
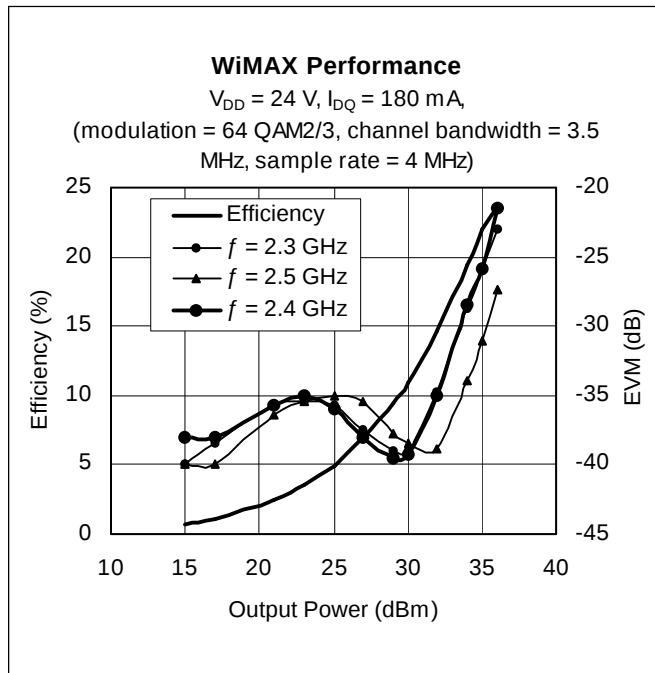


Reference circuit assembly diagram (not to scale)*

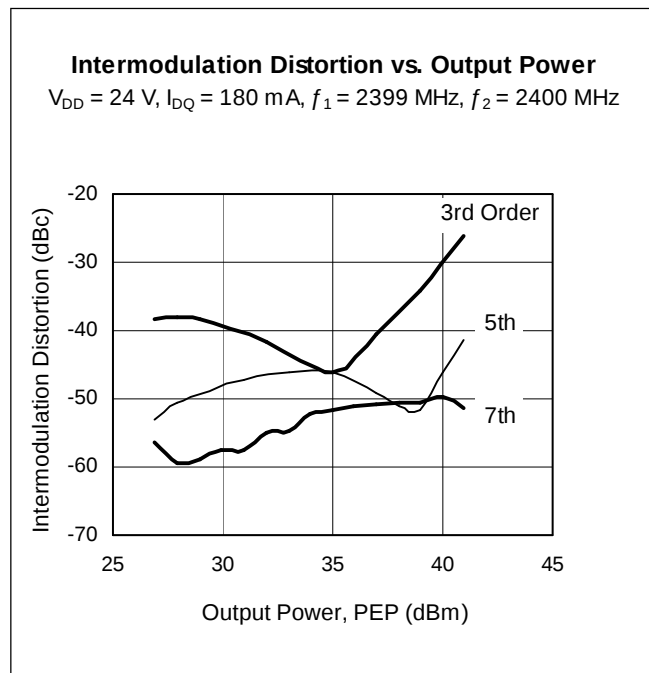
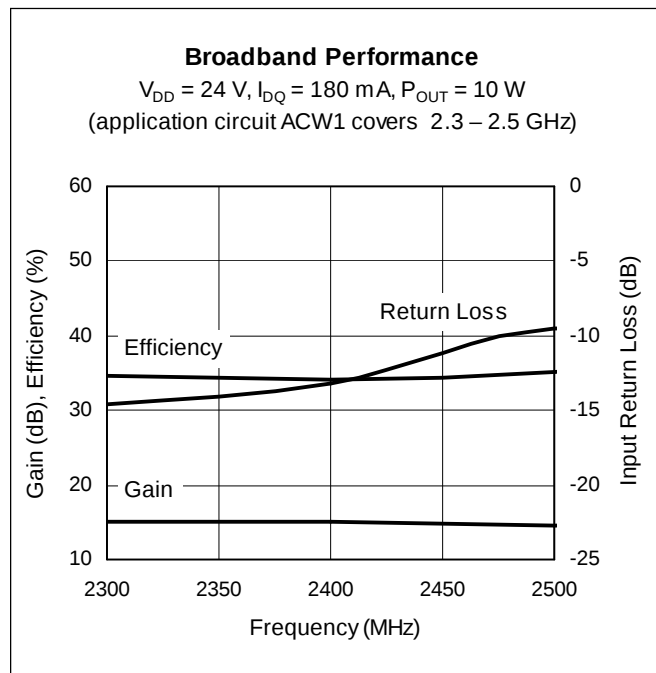
Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 μ F	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 μ F, 35 V	Digi-Key	PCS6106TR-ND
C5	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C6	Ceramic capacitor, 10 pF	ATC	100B 100
C7, C10, C12, C16	Ceramic capacitor, 4.7 pF	ATC	100B 4R7
C8	Ceramic capacitor, 1.4 pF	ATC	100B 1R4
C9, C14	Ceramic capacitor, 0.5 pF	ATC	100B 0R5
C11	Ceramic capacitor, 0.6 pF	ATC	100A 0R6
C13	Tantalum capacitor, 100 μ F, 50 V	Digi-Key	P5571-ND
C15	Ceramic capacitor, 0.4 pF	ATC	100B 0R4
Q1	Transistor	Infineon	BCP56
QQ1	Voltage Regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor, 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3	Chip resistor, 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer, 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R8	Chip resistor, 10 ohms	Digi-Key	P10ECT-ND
R6, R7	Chip resistor, 5.1 k-ohms	Digi-Key	P5.1KECT-ND

*Gerber files for this circuit are available upon request.

Typical WiMAX Performance (measurements taken in broadband test fixture)

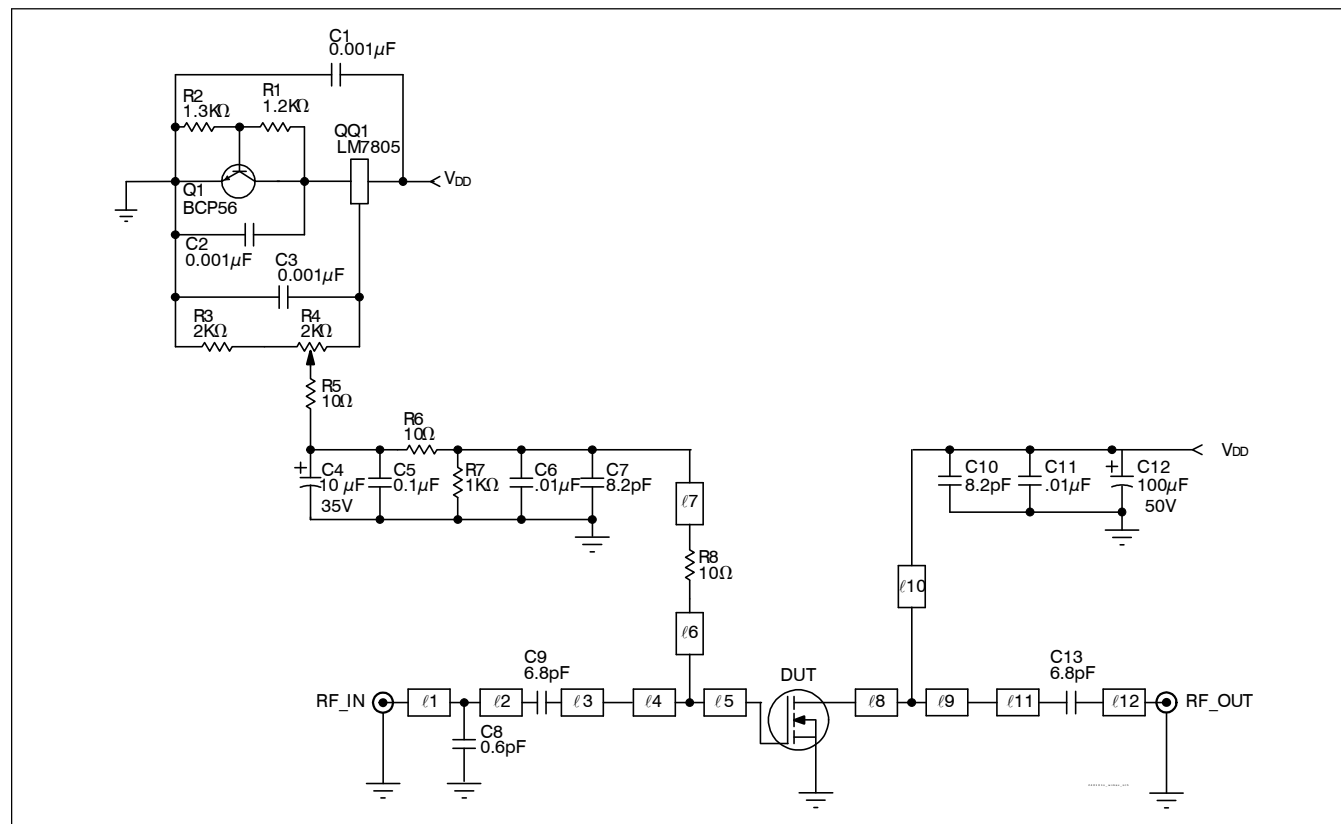


Typical WiMAX Performance (cont.)



See next page for circuit information

WiMAX Reference Circuit



WiMAX reference circuit schematic $f = 2500 \text{ MHz}$

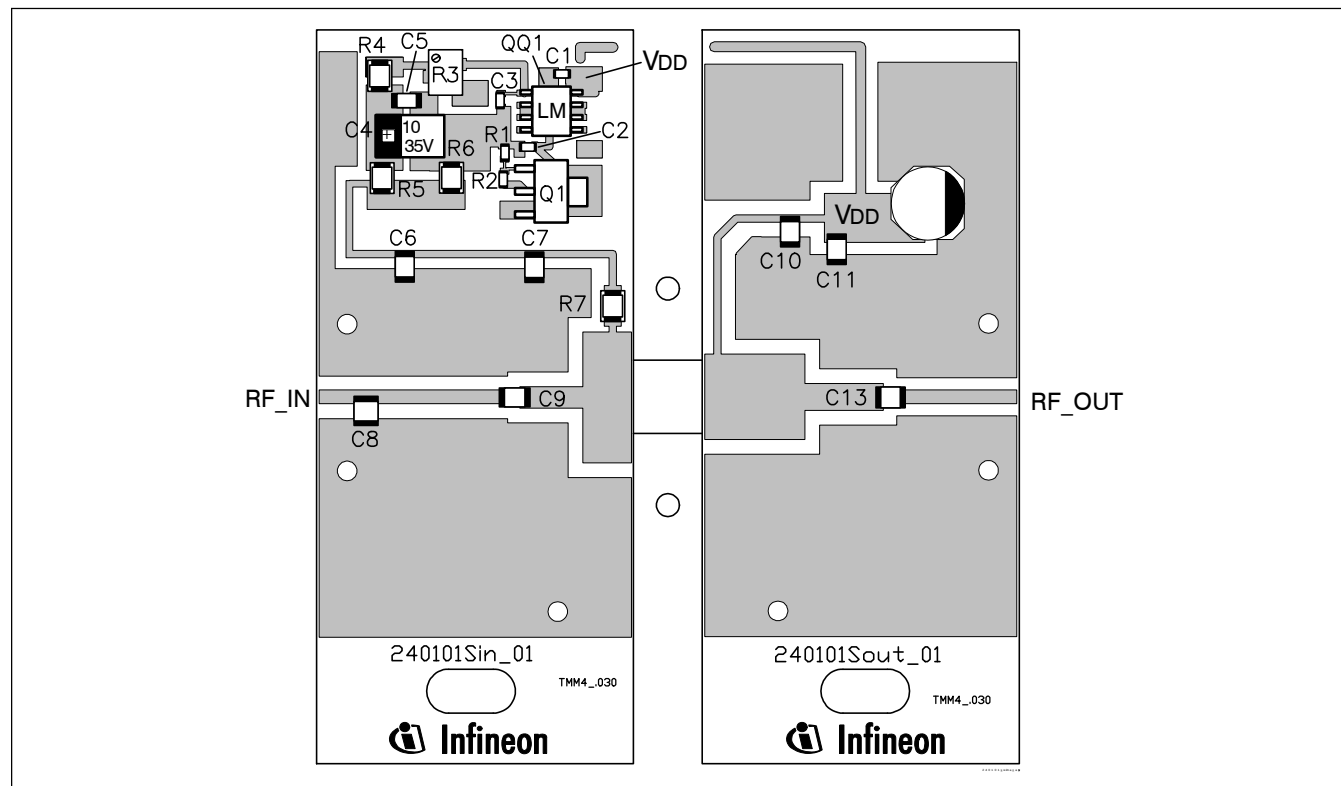
Circuit Assembly Information

DUT	PTF240101S	LDMOS Transistor	
Circuit Board	0.76 mm [0.030"] thick, $\epsilon_r = 4.5$	Rogers TMM4, 2 oz. Copper	

Microstrip	Electrical Characteristics at 2500 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
$\ell 1$	0.036 λ , 50.0 Ω	5.28 x 1.37	0.208 x 0.054
$\ell 2$	0.081 λ , 50.0 Ω	13.69 x 1.37	0.539 x 0.054
$\ell 3$	0.105 λ , 38.0 Ω	6.71 x 2.16	0.264 x 0.085
$\ell 4$	0.051 λ , 8.8 Ω	3.00 x 13.64	0.118 x 0.537
$\ell 5$	0.035 λ , 8.8 Ω	2.03 x 13.64	0.080 x 0.537
$\ell 6$	0.023 λ , 68.0 Ω	1.52 x 0.76	0.060 x 0.030
$\ell 7$	0.184 λ , 68.0 Ω	12.32 x 0.76	0.485 x 0.030
$\ell 8$	0.025 λ , 12.9 Ω	1.50 x 8.89	0.059 x 0.350
$\ell 9$	0.147 λ , 12.9 Ω	8.71 x 8.89	0.343 x 0.350
$\ell 10$	0.323 λ , 68.0 Ω	21.59 x 0.76	0.850 x 0.030
$\ell 11$	0.133 λ , 33.0 Ω	8.38 x 2.74	0.330 x 0.108
$\ell 12$	0.183 λ , 50.0 Ω	11.91 x 1.37	0.469 x 0.054

¹ Electrical Characteristics are rounded

WiMAX Reference Circuit (cont.)

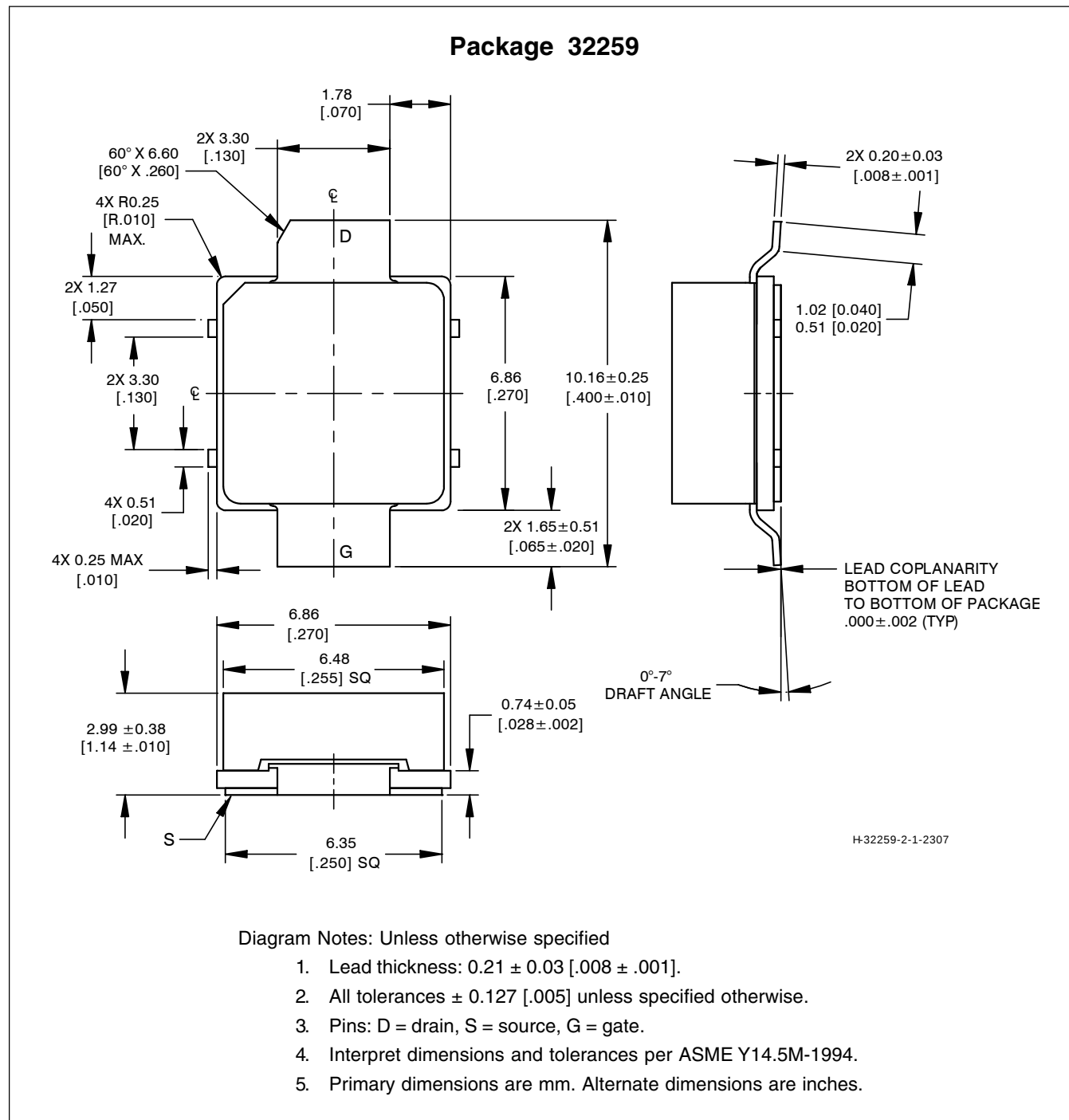


Reference circuit assembly diagram (not to scale)*

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 μ F	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 μ F, 35 V	Digi-Key	PCS6106TR-ND
C5	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C6	Ceramic capacitor, 10 pF	ATC	100B 100
C7, C10, C12, C16	Ceramic capacitor, 4.7 pF	ATC	100B 4R7
C8	Ceramic capacitor, 1.4 pF	ATC	100B 1R4
C9, C14	Ceramic capacitor, 0.5 pF	ATC	100B 0R5
C11	Ceramic capacitor, 0.6 pF	ATC	100A 0R6
C13	Tantalum capacitor, 100 μ F, 50 V	Digi-Key	P5571-ND
C15	Ceramic capacitor, 0.4 pF	ATC	100B 0R4
Q1	Transistor	Infineon	BCP56
QQ1	Voltage Regulator	National Semiconductor	LM7805
R1	Chip resistor, 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor, 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3	Chip resistor, 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer, 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R8	Chip resistor, 10 ohms	Digi-Key	P10ECT-ND
R6, R7	Chip resistor, 5.1 k-ohms	Digi-Key	P5.1KECT-ND

*Gerber files for this circuit are available upon request.

Package Outline Specifications



Find the latest and most complete information about products and packaging at the Infineon Internet page
<http://www.infineon.com/products>

Revision History: 2006-05-11

Data Sheet

Previous Version: 2005-04-27, Data Sheet

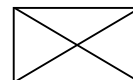
Page	Subjects (major changes since last revision)
7-10	Add information about performance in a WiMAX application

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highpowerRF@infineon.com

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