

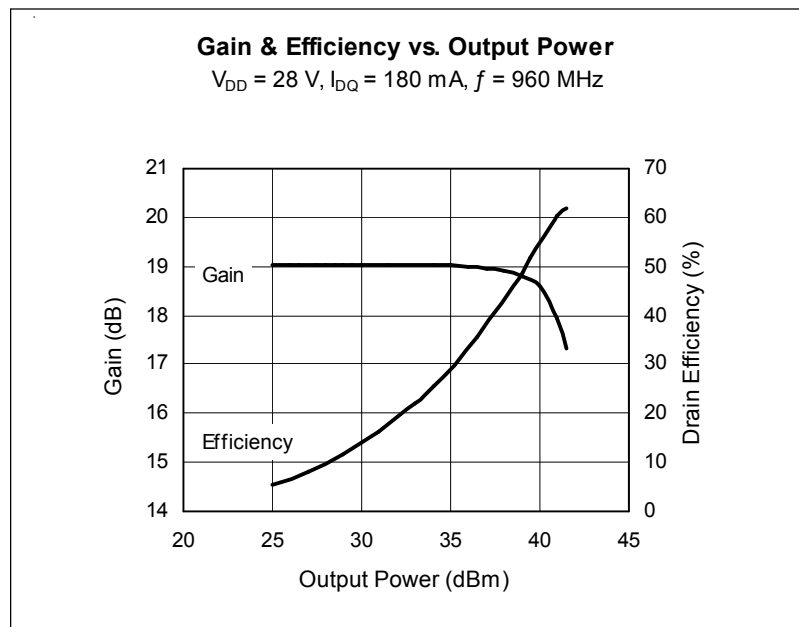
High Power RF LDMOS Field Effect Transistor 10 W, 450 – 960 MHz

Description

The PTF080101M is an unmatched 10-watt **GOLDMOS®** FET intended for class AB base station applications in the 450 MHz to 960 MHz band. This LDMOS device offers excellent gain, efficiency and linearity performance in a small footprint.



PTF080101M
Package PG-RFP-10



Features

- Typical EDGE performance
 - Average output power = 5.0 W
 - Gain = 19 dB
 - Efficiency = 37%
 - EVM = 2.0%
- Typical CW performance
 - Output Power at P-1dB = 12.5 W
 - Gain = 18 dB
 - Efficiency = 50%
- 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
- Pb-free and RoHS compliant

RF Characteristics

Two-Tone Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 180\text{ mA}$, $P_{OUT} = 10\text{ W PEP}$, $f = 960\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	16	—	—	dB
Drain Efficiency	η_D	35	—	—	%
Intermodulation Distortion	IMD	—	—	-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

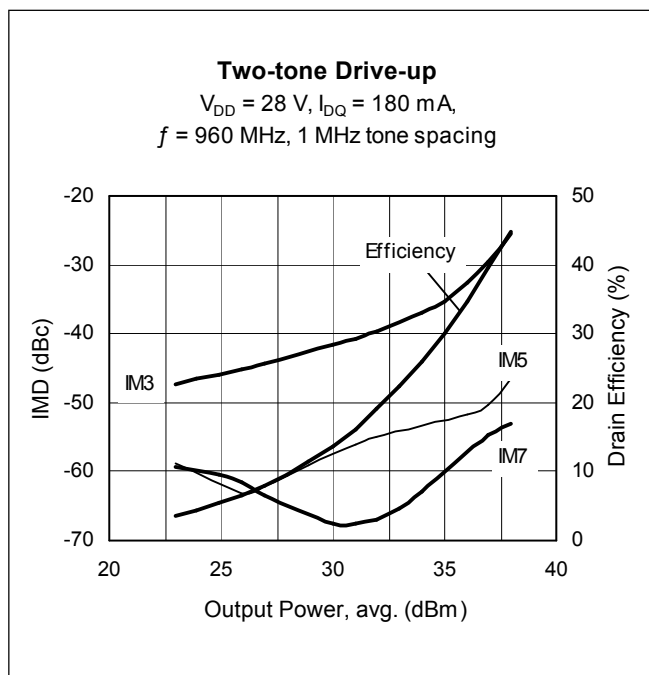
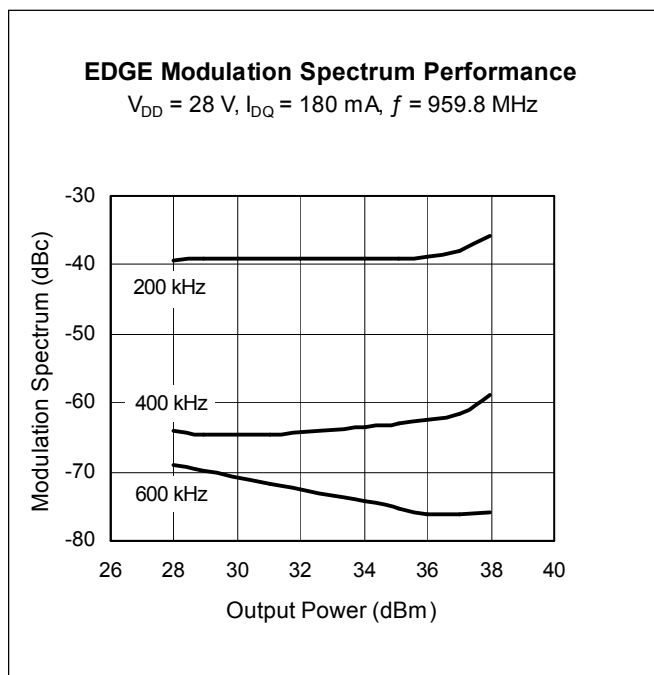
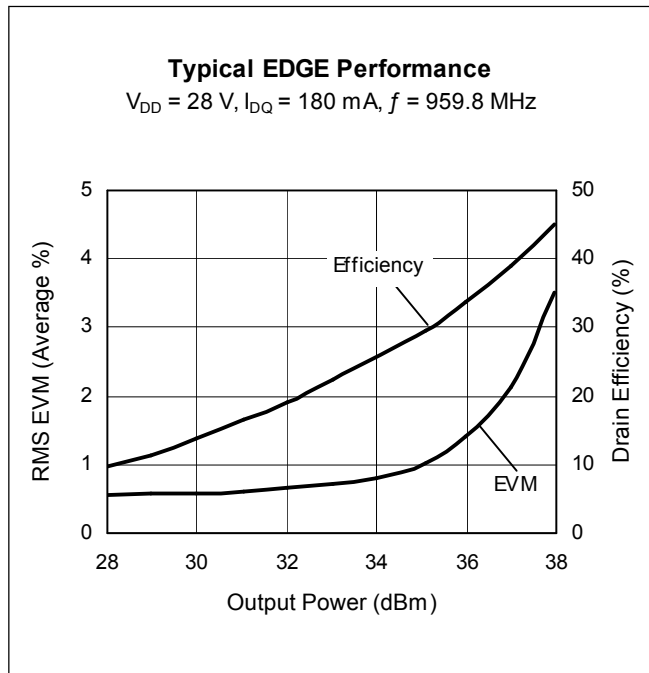
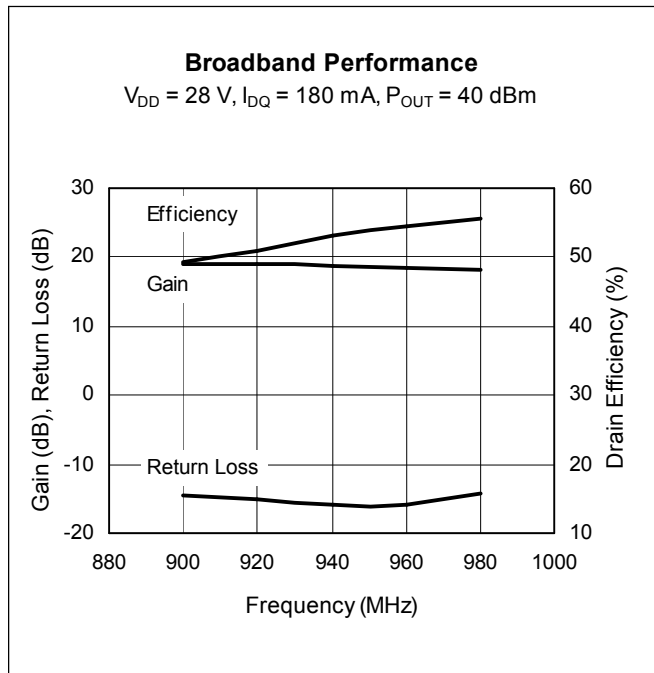
Maximum Ratings

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	150	$^{\circ}\text{C}$
Total Device Dissipation	P_D	18.8	W
Above 25 $^{\circ}\text{C}$ derate by		0.15	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}, 10\text{ W DC}$)	$R_{\theta JC}$	6.5	$^{\circ}\text{C/W}$

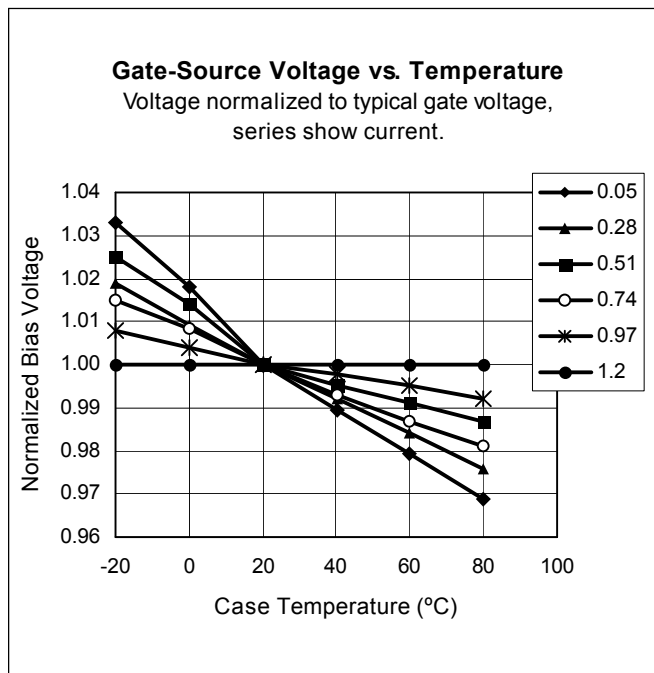
Ordering Information

Type	Package Outline	Package Description	Marking
PTF080101M	PG-RFP-10	Molded plastic, SMD	0081

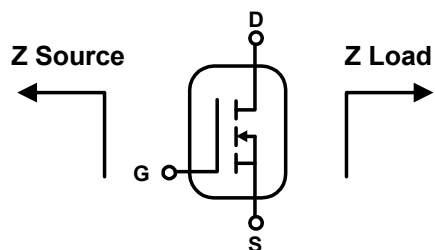
Typical Performance (data taken in production test fixture)



Typical Performance (cont.)

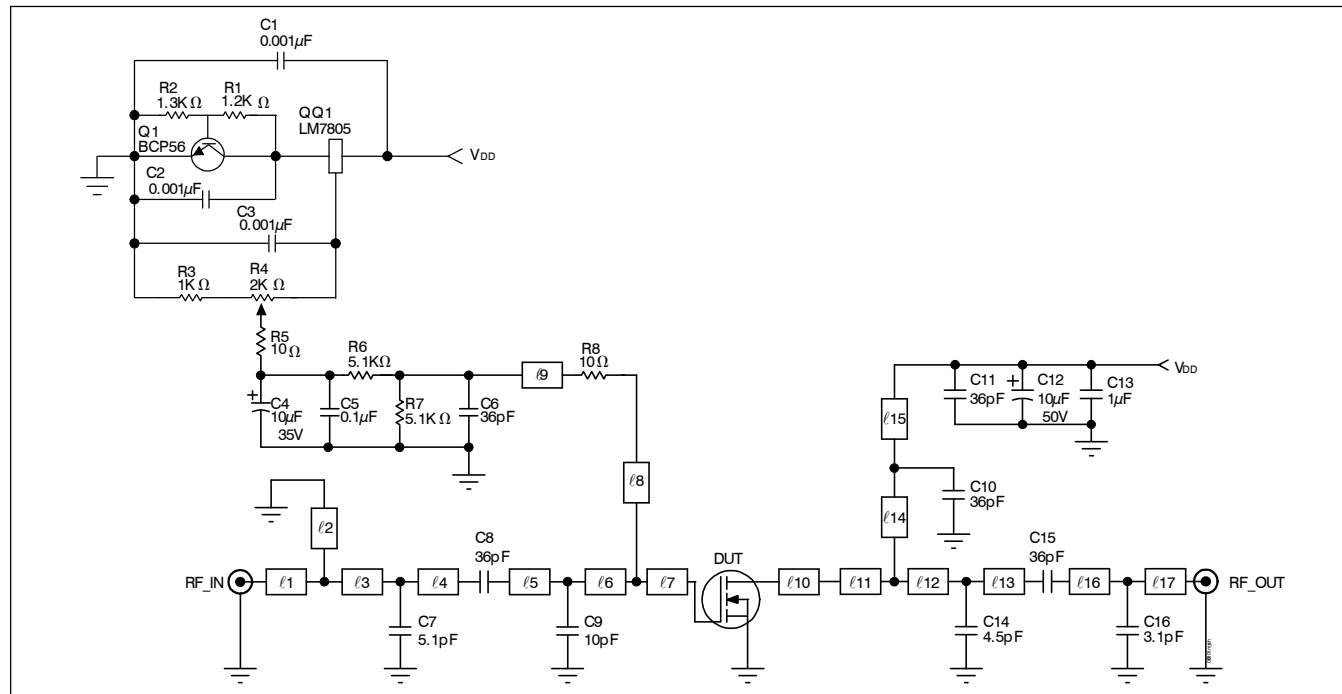


Broadband Circuit Impedance



Frequency MHz	Z Source W		Z Load W	
	R	jX	R	jX
820	3.73	2.10	10.41	3.92
840	3.81	2.22	9.61	4.14
860	3.83	2.30	9.00	4.48
880	3.76	2.39	8.55	4.89
900	3.61	2.50	8.24	5.32
920	3.37	2.69	8.02	5.76
940	3.08	2.96	7.89	6.20
960	2.76	3.35	7.84	6.63
980	2.43	3.86	7.85	7.04
1000	2.13	4.47	7.91	7.43

Reference Circuit



Reference circuit schematic for $f = 960 \text{ MHz}$

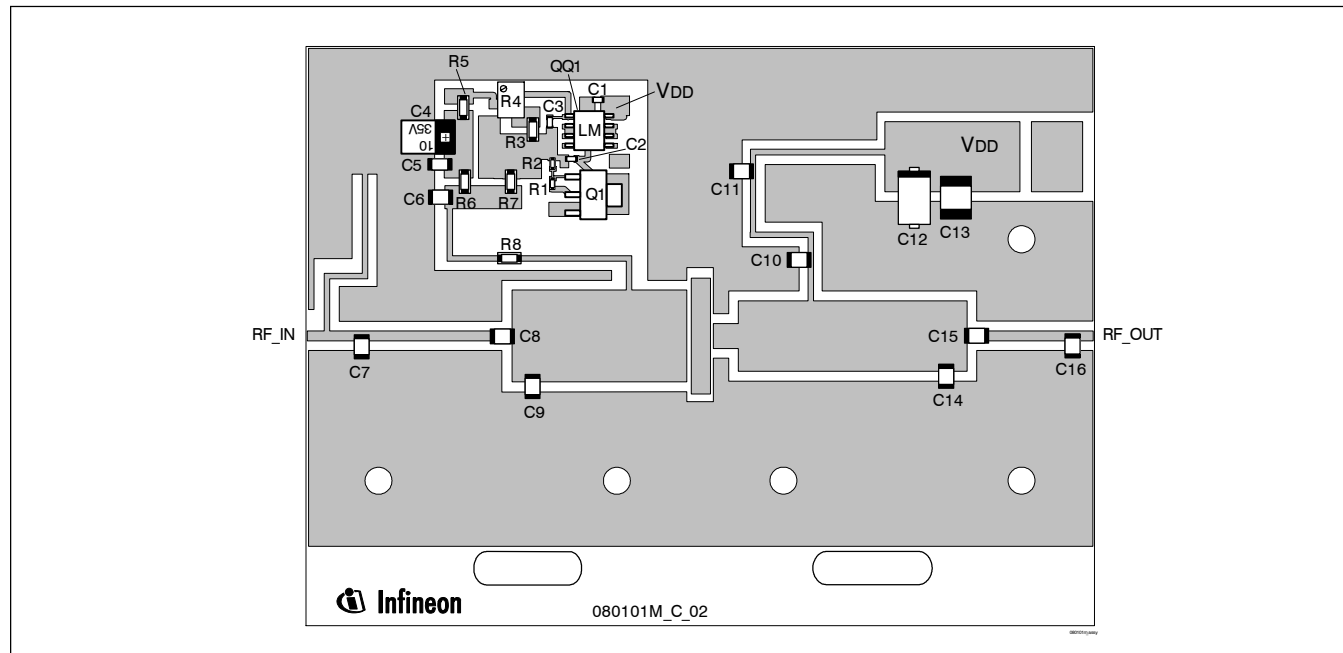
Circuit Assembly Information

DUT	PTF080101M	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 4.5$	Rogers TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 960 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
$l1$	0.016 λ , 50.0 Ω	2.77 x 1.27	0.109 x 0.050
$l2$	0.132 λ , 75.0 Ω	25.65 x 0.64	1.010 x 0.025
$l3$	0.028 λ , 50.0 Ω	4.83 x 1.27	0.190 x 0.050
$l4$	0.101 λ , 50.0 Ω	17.20 x 1.27	0.677 x 0.050
$l5$	0.015 λ , 10.0 Ω	2.39 x 11.99	0.094 x 0.472
$l6$	0.086 λ , 10.0 Ω	13.08 x 11.99	0.515 x 0.472
$l7$	0.050 λ , 10.0 Ω	7.65 x 11.99	0.301 x 0.472
$l8$	0.106 λ , 73.0 Ω	18.49 x 0.64	0.728 x 0.025
$l9$	0.086 λ , 73.0 Ω	15.16 x 0.64	0.597 x 0.025
$l10$	0.020 λ , 29.0 Ω	3.30 x 3.30	0.130 x 0.130
$l11$	0.061 λ , 12.5 Ω	9.42 x 9.19	0.371 x 0.362
$l12$	0.111 λ , 12.5 Ω	17.53 x 9.19	0.690 x 0.362
$l13$	0.022 λ , 12.5 Ω	3.35 x 9.19	0.132 x 0.362
$l14$	0.028 λ , 73.0 Ω	4.90 x 0.64	0.193 x 0.025
$l15$	0.100 λ , 73.0 Ω	17.53 x 0.64	0.690 x 0.025
$l16$	0.070 λ , 50.0 Ω	11.94 x 1.22	0.470 x 0.048
$l17$	0.016 λ , 50.0 Ω	2.67 x 1.22	0.105 x 0.048

¹Electrical characteristics are rounded.

Reference Circuit (cont.)



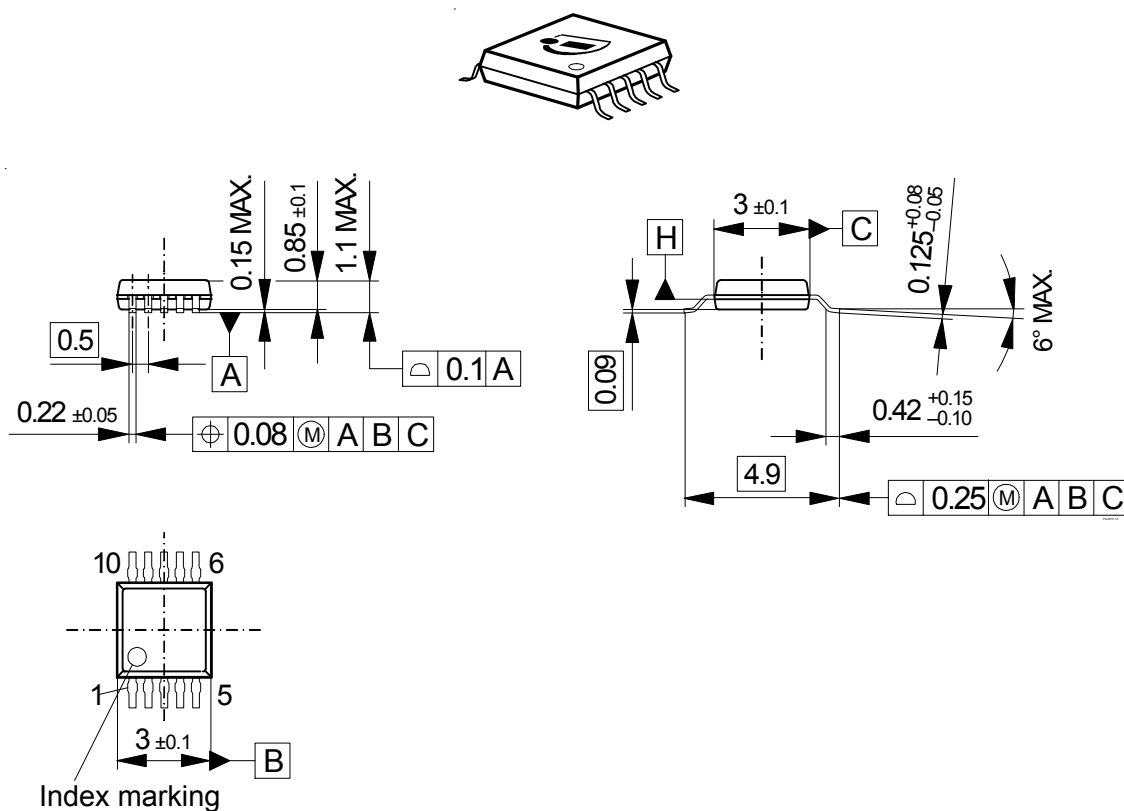
Reference circuit assembly diagram (not to scale)*

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, C8, C10, C11, C15	Ceramic capacitor, 36 pF	ATC	100B 360
C7	Ceramic capacitor, 5.1 pF	ATC	100B 5R1
C9	Ceramic capacitor, 10 pF	ATC	100B 100
C12	Tantalum capacitor, 10 μ F, 50 V	Garrett Electronics	TPS106K050R0400
C13	Capacitor, 1.0 μ F	Toshiba	C4532XTRZA105M
C14	Ceramic capacitor, 4.5 pF	ATC	100B 4R5
C16	Ceramic capacitor, 3.1 pF	ATC	100B 3R1
Q1	Transistor	Infineon Technologies	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 1 k-ohms	Digi-Key	P1KECT-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 available on request

Package Outline Specifications

Package PG-RFP-10 (TSSOP-10 Outline)



Notes: Unless otherwise specified

1. Dimensions are mm
2. Lead thickness: 0.09
3. Pins: 1 – 5 = gate, underside = source, 6 – 10 = drain

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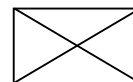
Revision History: 2009-02-18		Data Sheet
Previous version: 2005-12-16, Data Sheet		
Page	Subjects (major changes since last revision)	
4	Add Temperature graph and impedance information.	
5 – 6	Add circuit information.	
all	Remove Preliminary status	
6	Fixed typing error	

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