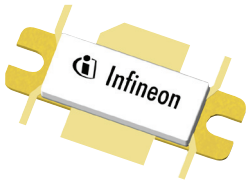
green Product

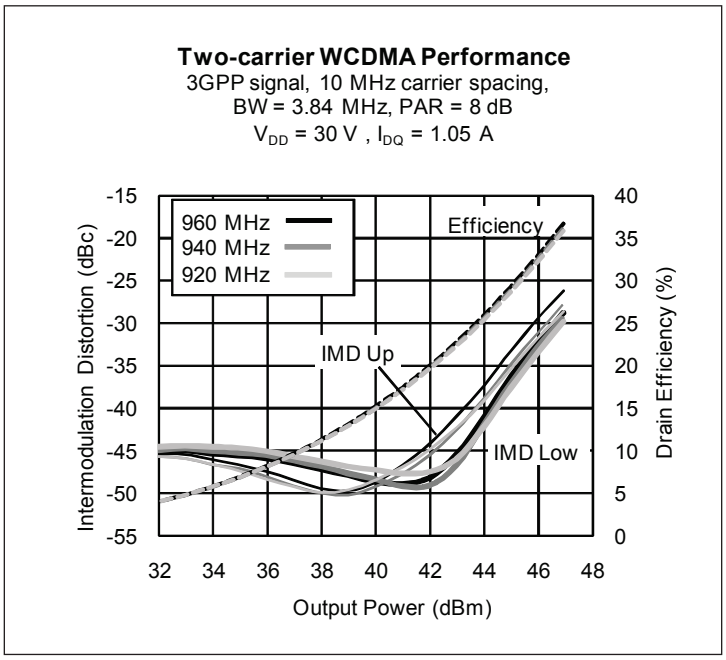
Thermally-Enhanced High Power RF LDMOS FETs
120 W, 920 – 960 MHz

Description

The PTFA091203EL is a 120-watt, internally-matched FET intended for use in power amplifier applications in the 920 to 960 MHz band. This device features internal I/O matching and thermally-enhanced open cavity ceramic package. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability..

PTFA091203EL
Package H-33288-6





Features

- Broadband internal matching
- Typical two-carrier WCDMA performance, 960 MHz, 30 V
  - Average output power = 28 W
  - Gain = 17 dB
  - Efficiency = 27%
  - Intermodulation Distortion = –36 dBc
- Typical CW performance, 960 MHz, 30 V
  - Output power at P_{1dB} = 140 W
  - Gain = 17 dB
  - Efficiency = 54%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 30 V, 120 W (CW) output power
- Pb-free and RoHS-compliant

RF Characteristics

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

V_{DD} = 30 V, I_{DQ} = 1050 mA, P_{OUT} = 28 W Avg

f_1 = 950 MHz, f_2 = 960 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8.0 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	Gps	—	17	—	dB
Drain Efficiency	ηD	—	27	—	%
Intermodulation Distortion	IMD	—	–36	—	dBc

All published data at T_{CASE} = 25°C unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Infineon test fixture)
V_{DD} = 30 V, I_{DQ} = 1050 mA, P_{OUT} = 110 W PEP, f = 960 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	17	18	—	dB
Drain Efficiency	ηD	38	40	—	%
Intermodulation Distortion	IMD	—	–30	–28	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	μA
Drain Leakage Current	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	μA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.07	—	Ω
Operating Gate Voltage	V_{DS} = 30 V, I_{DQ} = 1050 mA	V_{GS}	2.0	2.5	3.0	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	μA

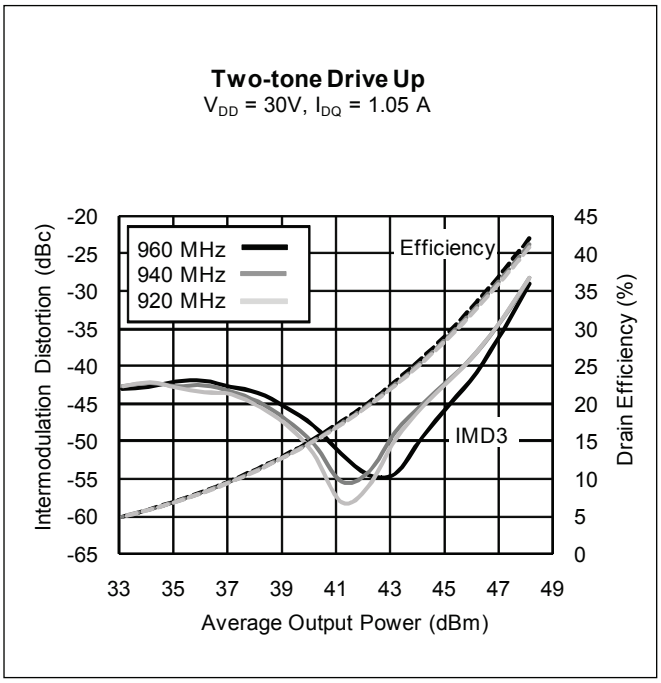
Maximum Ratings

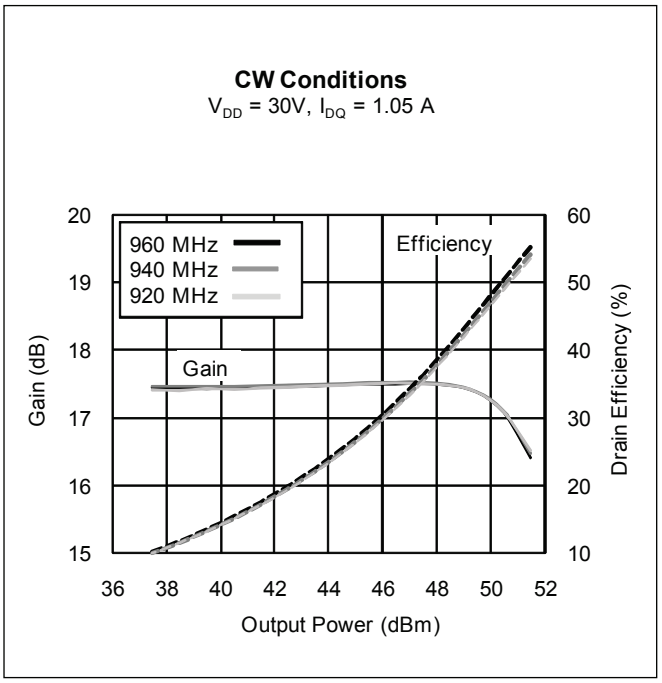
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–0.5 to +12	V
Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 120 W CW)	$R_{\theta JC}$	0.42	°C/W

Ordering Information

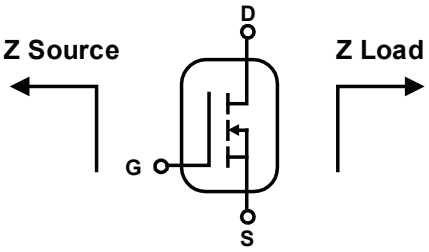
Type and Version	Package Type	Package Description	Shipping
PTFA091203EL V4	H-33288-6	Thermally-enhanced slotted flange, single-ended	Tray
PTFA091203EL V4 R250	H-33288-6	Thermally-enhanced slotted flange, single-ended	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

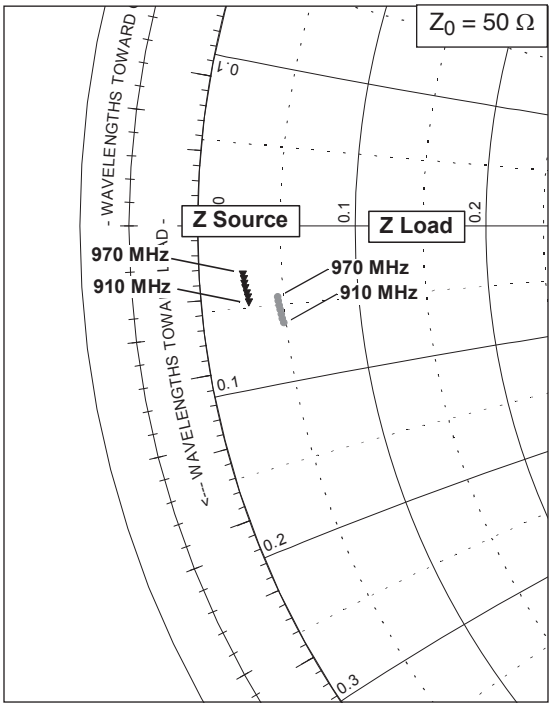




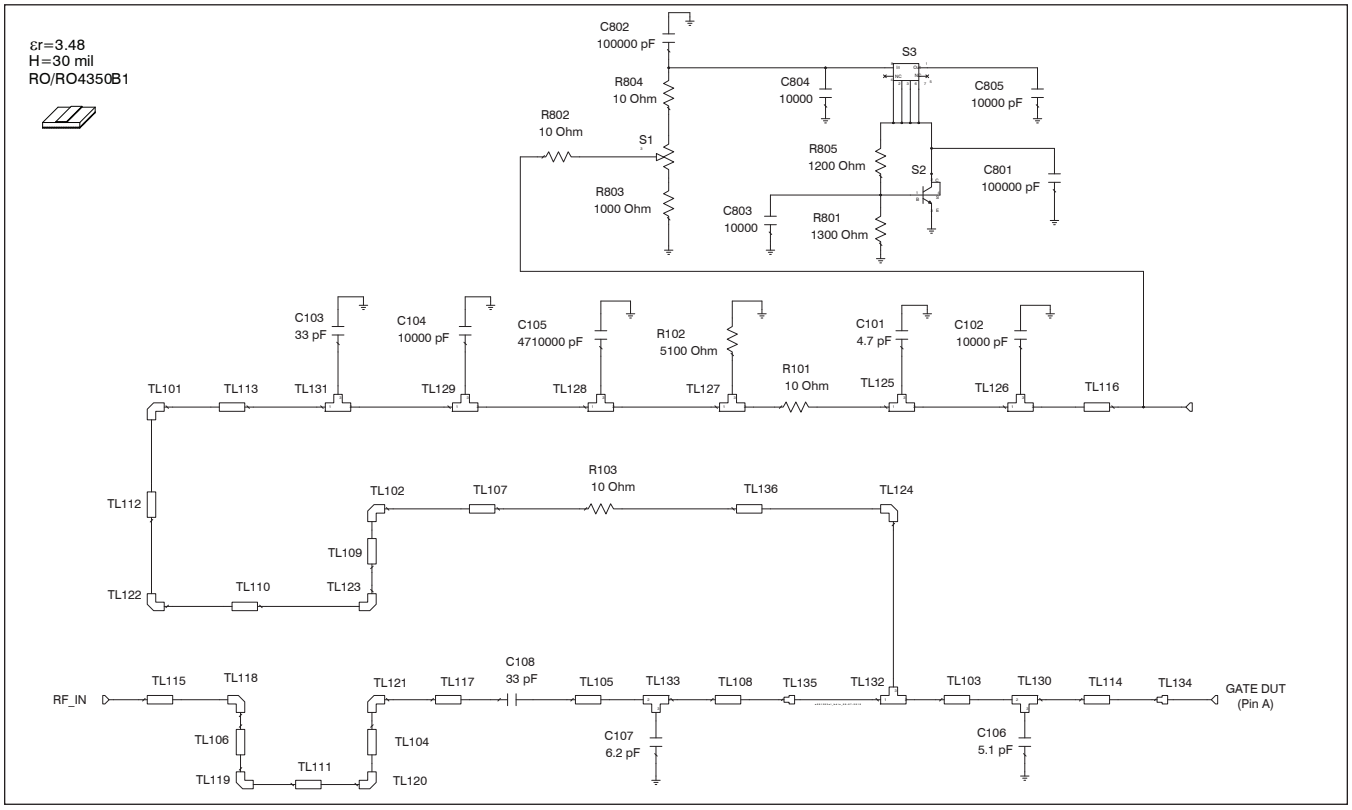
Broadband Circuit Impedance



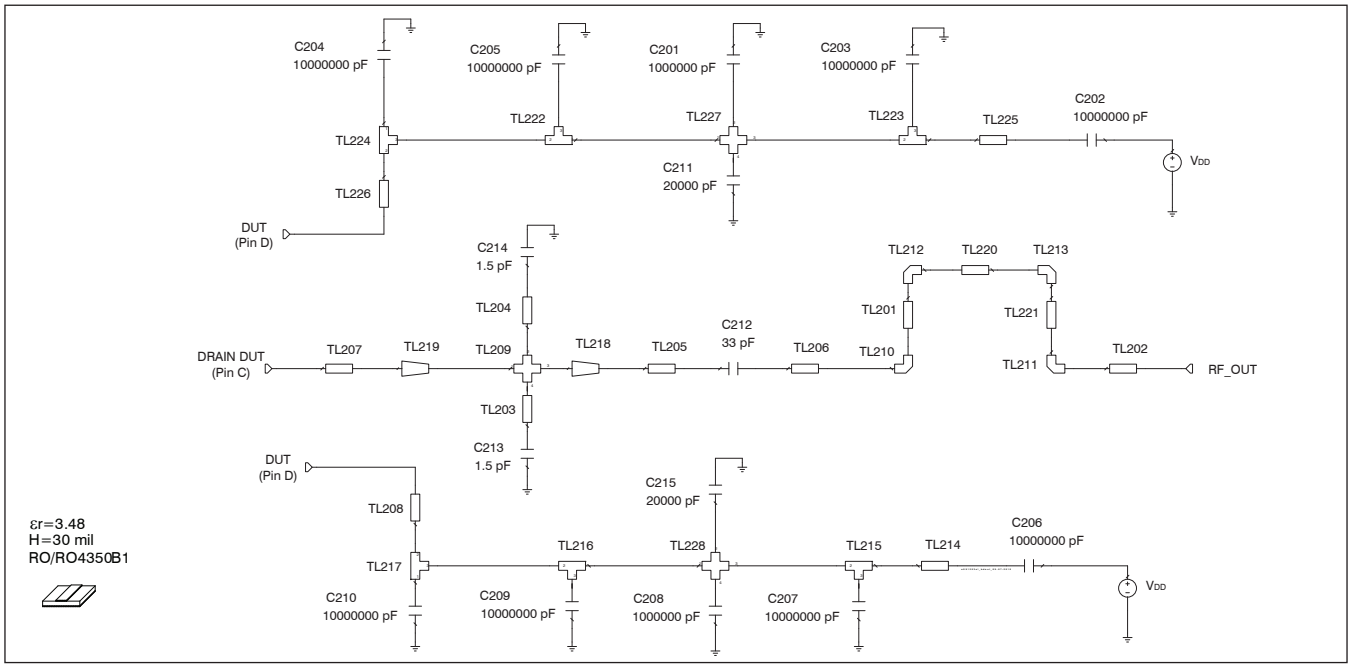
Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
910	1.42	–2.36	2.43	–3.11
920	1.40	–2.21	2.41	–2.97
930	1.38	–2.07	2.39	–2.83
940	1.35	–1.92	2.37	–2.68
950	1.33	–1.78	2.36	–2.54
960	1.32	–1.64	2.34	–2.40
970	1.30	–1.50	2.33	–2.26



Reference Circuit



Reference circuit input schematic for ƒ = 960 MHz



Reference circuit output schematic for ƒ = 960 MHz

Reference Circuit (cont.)

Description	
DUT	PTFA091203EL
PCB	0.760 mm [.030"] thick, εr = 3.48, Rogers 4350, 1 oz. copper

Electrical Characteristics at 960 MHz

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
Input			
TL101, TL102, TL122, TL123, TL124		W = 0.762	W = 30
TL103	0.059 λ, 8.94 Ω	W = 15.240, L = 10.287	W = 600, L = 405
TL104, TL106	0.040 λ, 51.58 Ω	W = 1.651, L = 7.620	W = 65, L = 300
TL105	0.086 λ, 38.82 Ω	W = 2.540, L = 15.900	W = 100, L = 626
TL107	0.007 λ, 78.27 Ω	W = 0.762, L = 1.270	W = 30, L = 50
TL108	0.002 λ, 38.82 Ω	W = 2.540, L = 0.330	W = 100, L = 13
TL109	0.015 λ, 78.27 Ω	W = 0.762, L = 2.921	W = 30, L = 115
TL110	0.098 λ, 78.27 Ω	W = 0.762, L = 19.050	W = 30, L = 750
TL111	0.004 λ, 51.58 Ω	W = 1.651, L = 0.762	W = 65, L = 30
TL112	0.026 λ, 78.27 Ω	W = 0.762, L = 5.080	W = 30, L = 200
TL113	0.014 λ, 36.29 Ω	W = 2.794, L = 2.642	W = 110, L = 104
TL114	0.039 λ, 8.94 Ω	W = 15.240, L = 6.731	W = 600, L = 265
TL115	0.033 λ, 51.58 Ω	W = 1.651, L = 6.302	W = 65, L = 248
TL116	0.001 λ, 36.29 Ω	W = 2.794, L = 0.254	W = 110, L = 10
TL117	0.007 λ, 51.58 Ω	W = 1.651, L = 1.270	W = 65, L = 50
TL118, TL119, TL120, TL121		W = 1.651	W = 65
TL125, TL126, TL127, TL128	0.011 λ, 36.29 Ω	W1 = 2.794, W2 = 2.794, W3 = 2.032	W1 = 110, W2 = 110, W3 = 80
TL129, TL131	0.012 λ, 36.29 Ω	W1 = 2.794, W2 = 2.794, W3 = 2.286	W1 = 110, W2 = 110, W3 = 90
TL130	0.015 λ, 8.94 Ω	W1 = 15.240, W2 = 15.240, W3 = 2.540	W1 = 600, W2 = 600, W3 = 100
TL132	0.004 λ, 8.94 Ω	W1 = 15.240, W2 = 15.240, W3 = 0.762	W1 = 600, W2 = 600, W3 = 30
TL133	0.000 λ, 38.82 Ω	W1 = 2.540, W2 = 2.540, W3 = 0.025	W1 = 100, W2 = 100, W3 = 1
TL134		W1 = 17.780, W2 = 12.700	W1 = 700, W2 = 500
TL135		W1 = 2.540, W2 = 15.240	W1 = 100, W2 = 600
TL136	0.003 λ, 78.27 Ω	W = 0.762, L = 0.508	W = 30, L = 20

table continued on page 6

Reference Circuit (cont.)

Electrical Characteristics at 960 MHz

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
Output			
TL201, TL221	0.058 λ, 51.58 Ω	W = 1.651, L = 10.922	W = 65, L = 430
TL202	0.014 λ, 51.58 Ω	W = 1.651, L = 2.720	W = 65, L = 107
TL203, TL204	0.000 λ, 146.88 Ω	W = 0.025, L = 0.025	W = 1, L = 1
TL205	0.014 λ, 38.82 Ω	W = 2.540, L = 2.540	W = 100, L = 100
TL206	0.013 λ, 51.58 Ω	W = 1.651, L = 2.540	W = 65, L = 100
TL207	0.128 λ, 10.17 Ω	W = 13.208, L = 22.352	W = 520, L = 880
TL208, TL226	0.014 λ, 23.03 Ω	W = 5.080, L = 2.540	W = 200, L = 100
TL209		W1 = 5.080, W2 = 0.025, W3 = 5.080 W4 = 0.025	W1 = 200, W2 = 1, W3 = 200, W4 = 1
TL210, TL211, TL212, TL213		W = 1.651	W = 65
TL214, TL225	0.090 λ, 28.85 Ω	W = 3.810, L = 16.398	W = 150, L = 646
TL215, TL223	0.021 λ, 28.85 Ω	W1 = 3.810, W2 = 3.810, W3 = 3.810	W1 = 150, W2 = 150, W3 = 150
TL216, TL222	0.004 λ, 28.85 Ω	W1 = 3.810, W2 = 3.810, W3 = 0.762	W1 = 150, W2 = 150, W3 = 30
TL217, TL224	0.021 λ, 23.03 Ω	W1 = 5.080, W2 = 5.080, W3 = 3.810	W1 = 200, W2 = 200, W3 = 150
TL218 (taper)	0.015 λ, 23.03 Ω / 38.82 Ω	W1 = 5.080, W2 = 2.540, L = 2.794	W1 = 200, W2 = 100, L = 110
TL219 (taper)	0.064 λ, 10.17 Ω / 23.03 Ω	W1 = 13.208, W2 = 5.080, L = 11.176	W1 = 520, W2 = 200, L = 440
TL220	0.004 λ, 51.58 Ω	W = 1.651, L = 0.762	W = 65, L = 30
TL227, TL228		W1 = 3.810, W2 = 2.540, W3 = 3.810 W4 = 2.540	W1 = 150, W2 = 100, W3 = 150, W4 = 100

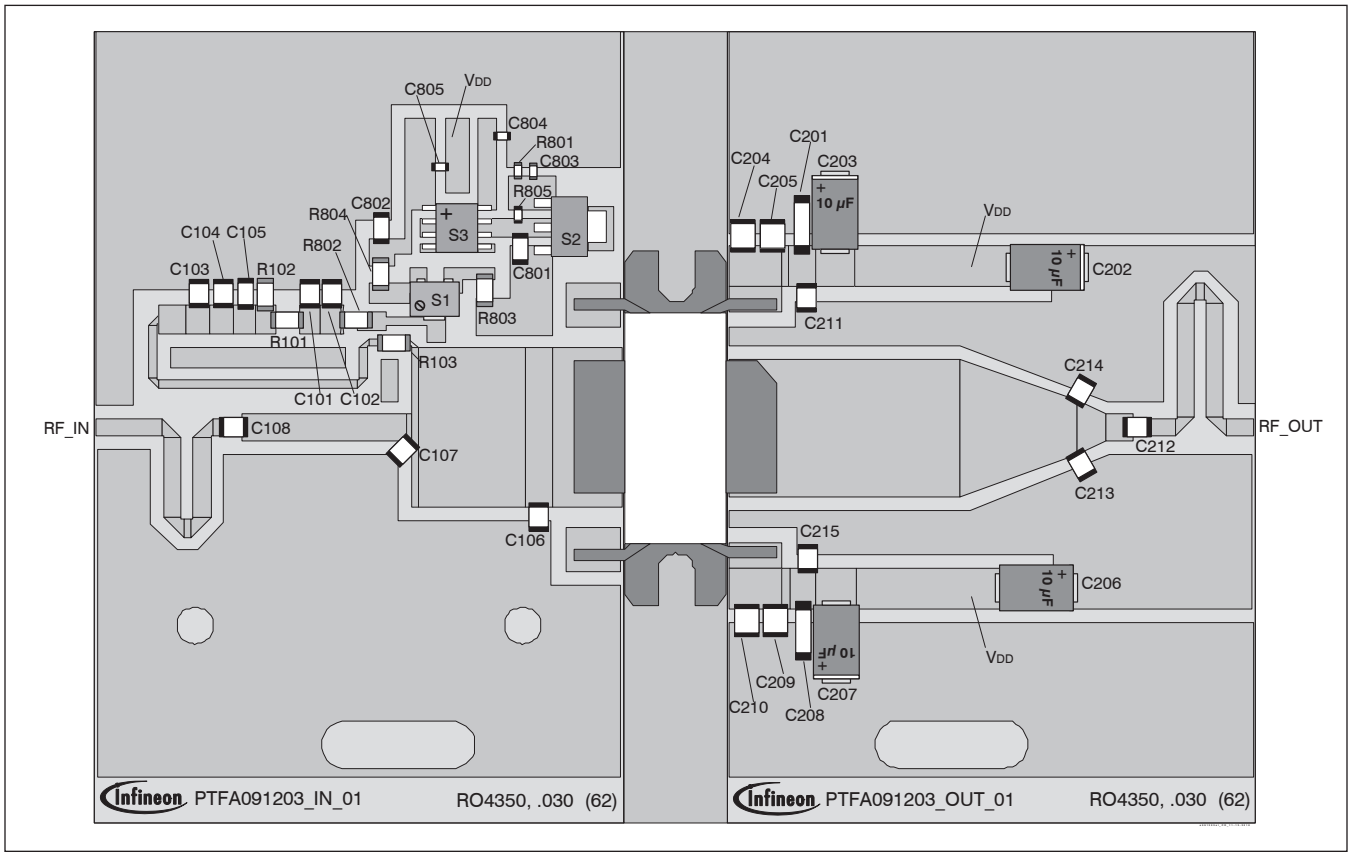
See further reference circuit information on next page

Reference Circuit (cont.)

Circuit Assembly Information

Test Fixture Part No.	LTN/PTFA091203EF

Find Gerber files for this test fixture on the Infineon Web site at *http://www.infineon.com/rfpower*



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

Component	Description	Suggested Manufacturer	P/N
Input			
C101	Chip capacitor, 4.7 pF	ATC	ATC100B4R7BW500XB
C102	Chip capacitor, 10000 pF	ATC	ATC200B103MW
C103, C108	Chip capacitor, 33 pF	ATC	ATC100B330FW500XB
C104	Chip capacitor, 0.01 µF	ATC	ATC200B103MW
C105	Chip capacitor, 4.71 µF	Digi-Key	493-2372-2-ND
C106	Chip capacitor, 5.1 pF	ATC	ATC100B5R1BW500XB
C107	Chip capacitor, 6.2 pF	ATC	ATC100B6R2BW500XB
C801, C802	Chip capacitor, 0.1 µF	Digi-Key	PCC104BCT-ND
C803, C804, C805	Capacitor, 0.01 µF	Digi-Key	PCC1772CT-ND
R101, R103, R802, R804	Resistor, 10 Ω	Digi-Key	P10ECT-ND
R102	Resistor, 5100 Ω	Digi-Key	P5.1KECT-ND
R801	Resistor, 1300 Ω	Digi-Key	P1.3KGCT-ND
R803	Resistor, 1000 Ω	Digi-Key	P1.0KECT-ND
R805	Resistor, 1200 Ω	Digi-Key	P1.2KGCT-ND
S1	Potentiometer, 2k Ω	Digi-Key	3224W-202ECT-ND
S2	Transistor	Digi-Key	BCP5616TA-ND
S3	Voltage Regulator	Digi-Key	LM78L05ACM-ND
Output			
C201, C208	Chip capacitor, 1 µF	Digi-Key	478-3993-2-ND
C202, C203, C206, C207	Capacitor, 10 µF	Digi-Key	281M5002106K
C204, C205, C209, C210	Capacitor, 10 µF	Digi-Key	587-1818-2-ND
C211, C215	Chip capacitor, 20000 pF	ATC	ATC200B203MW
C212	Chip capacitor, 33 pF	ATC	ATC100B330FW500XB
C213, C214	Chip capacitor, 1.5 pF	ATC	ATC100B1R5BW500XB

Package Outline Specifications

Package H-33288-6

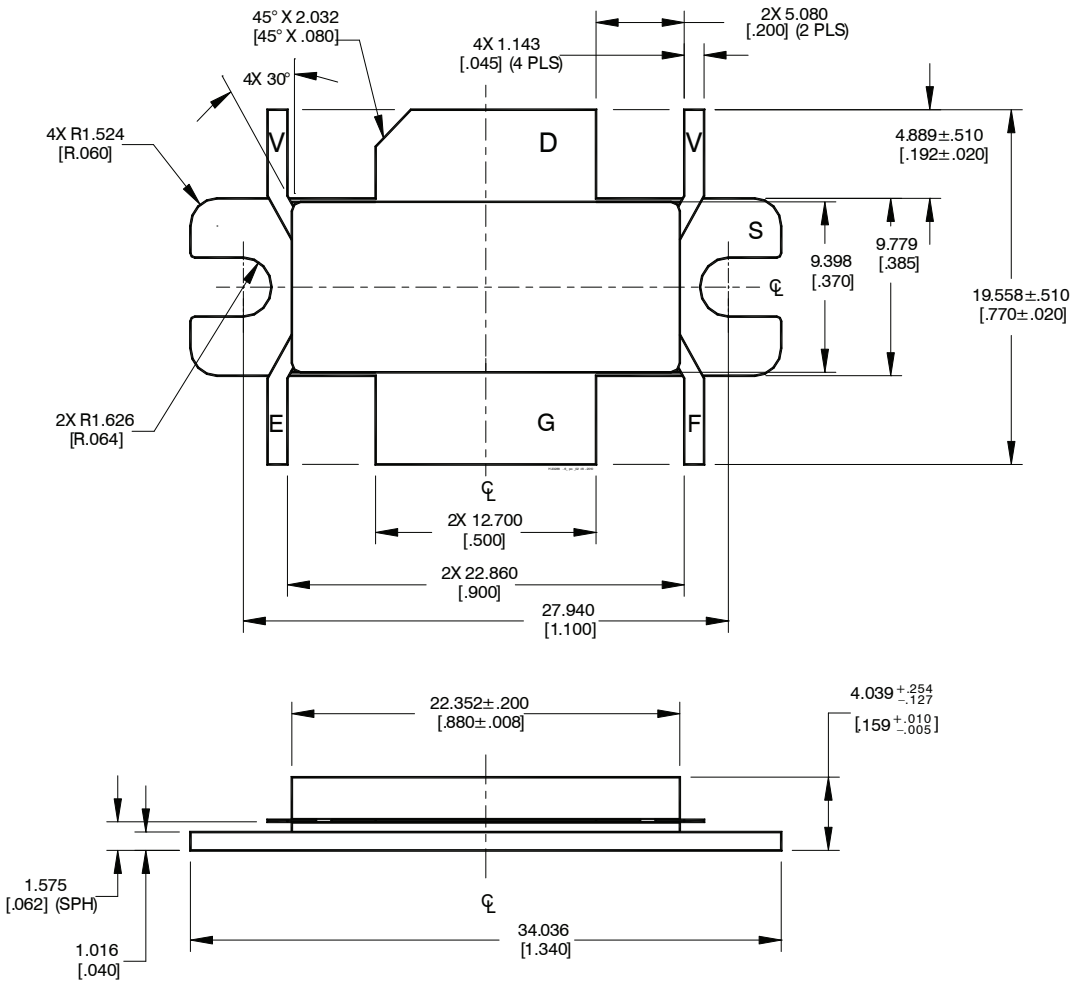


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: G = gate, S = source, D = drain, V = V_{DD}, E, F = N.C.
5. Lead thickness: 0.10 + 0.051/–0.025 mm [.004 +0.002/–0.001 inch].
6. Gold plating thickness: 0.25 micron [10 microinch] max.

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

Revision History:	2010-11-12	Data Sheet
Previous Version:	2010-10-13, Data Sheet	

Page	Subjects (major changes since last revision)
1, 2, 9	Updated eared flange package type information

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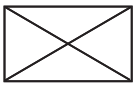

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