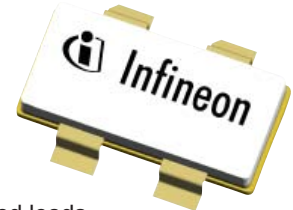


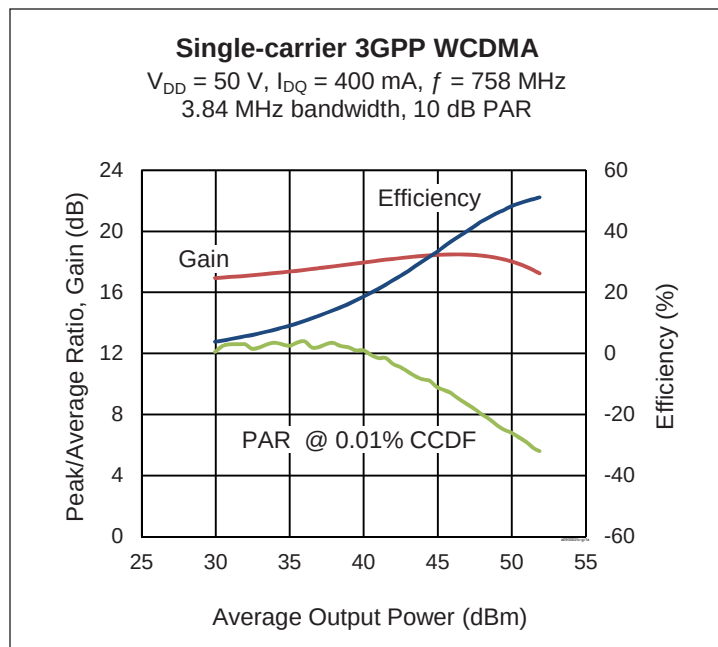
Thermally-Enhanced High Power RF LDMOS FET 300 W, 50 V, 703 – 960 MHz

Description

The PTVA093002TC is a 300-watt LDMOS FET. Designed for use in multi-standard cellular power amplifier applications, it can be used as single-ended or in a Doherty configuration. It features dual-path design, input matching, and a thermally-enhanced surface-mount package. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTVA093002TC
Package H-49248H-4, formed leads



Features

- Typical CW performance in a combined-lead 50-ohm single-ended fixture, 780 MHz, 50 V
 - Output power at P_{1dB} = 158 W
 - Gain = 18.2 dB
 - Efficiency = 52%
- Typical pulsed CW performance in a combined-lead 50-ohm single-ended fixture, 870 MHz, 50 V
 - Output power at P_{3dB} = 280 W
 - Gain = 16.2 dB
 - Efficiency = 50%
- Integrated ESD protection, Human Body Model class 2 (per JESD22-A114)
- Capable of withstanding a 10:1 load mismatch at 50 V, 63 W (CW) output power
- Low thermal resistance
- Pb-free and RoHS compliant

RF Specifications

Single-carrier WCDMA Characteristics (device with flat leads tested in an Infineon Doherty production test fixture)

$V_{DD} = 50\text{ V}$, $I_{DQ} = 400\text{ mA}$, $V_{GSpeak} = 1.9\text{ V}$, $P_{OUT} = 63\text{ W}$ average, $f = 803\text{ MHz}$.

3GPP WCDMA signal: 3.84 MHz bandwidth, 10 dB PAR @0.01% CCDF.

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	17.5	18.5	—	dB
Drain Efficiency	η_D	40	45	—	%
Adjacent Channel Power Ratio	ACPR	—	-34	-32	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	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	105	—	—	V
Drain Leakage Current	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 105\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA
On-state Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.265	—	Ω
Operating Gate Voltage	(main) $V_{DS} = 50\text{ V}$, $I_{DQ} = 400\text{ mA}$	V_{GS}	—	3.8	—	V
	(peak) $V_{DS} = 50\text{ V}$, $I_{DQ} = 0\text{ A}$	V_{GS}	—	1.9	—	V

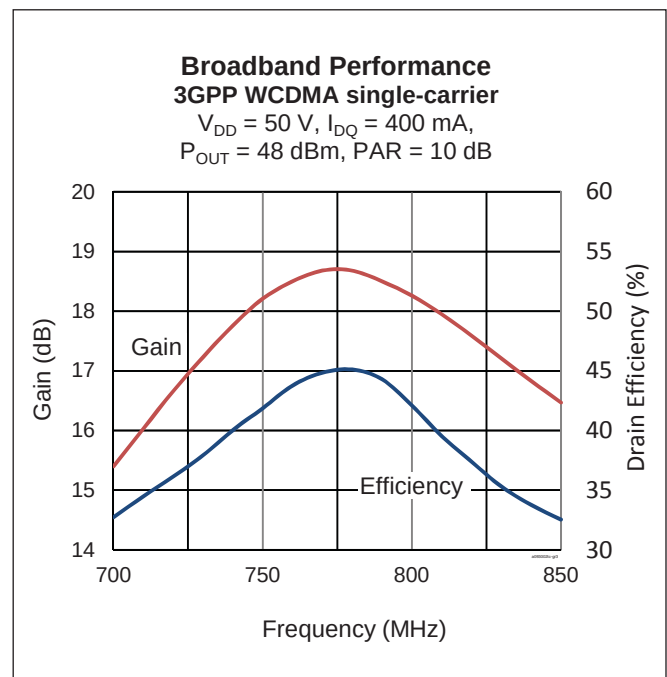
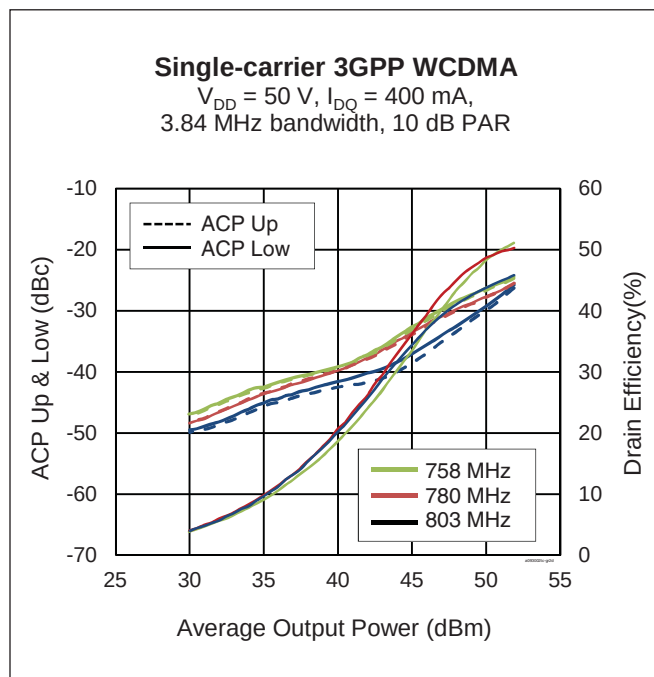
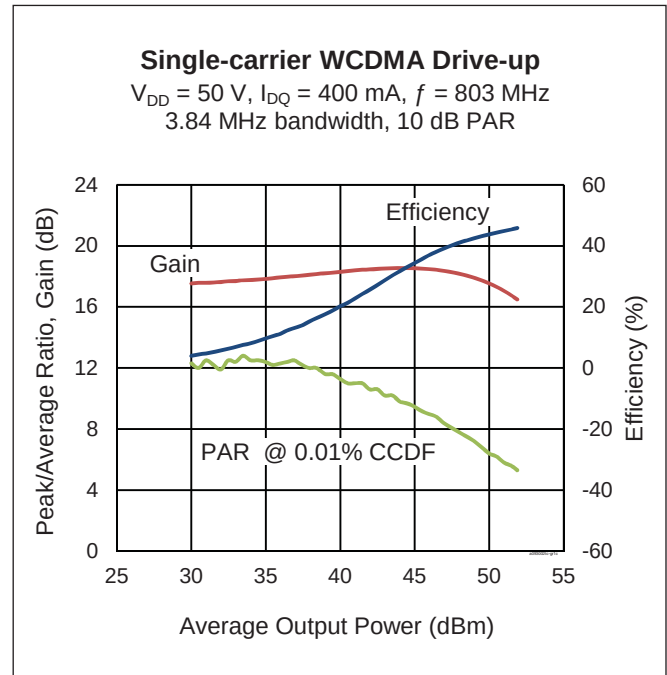
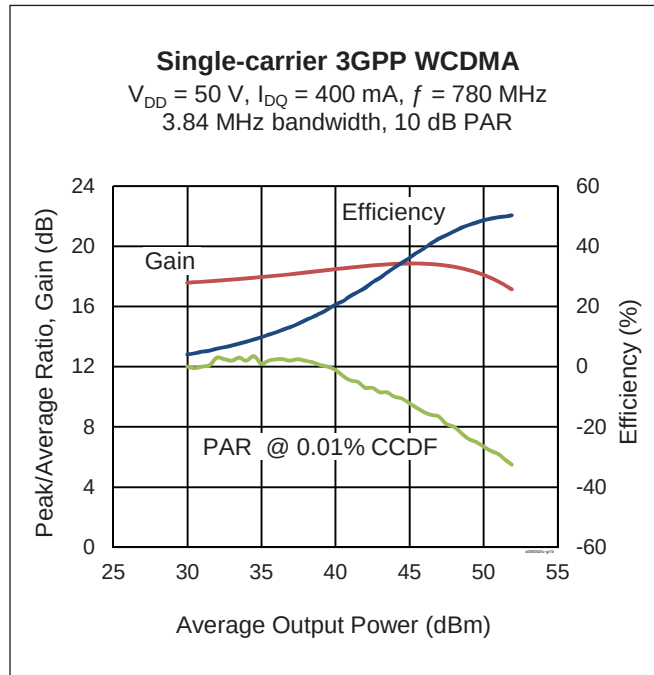
Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	105	V
Gate-source Voltage	V_{GS}	−6 to +12	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−65 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 200 W CW)	$R_{\theta JC}$	0.44	$^{\circ}\text{C/W}$

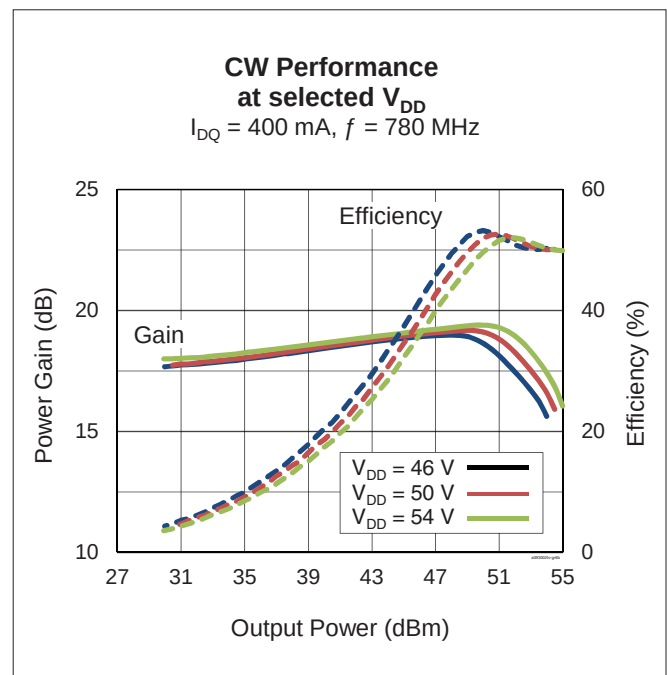
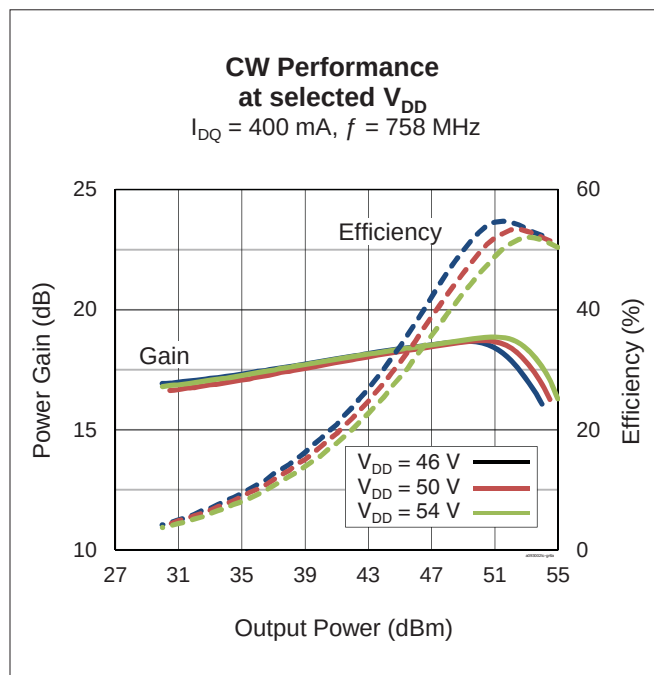
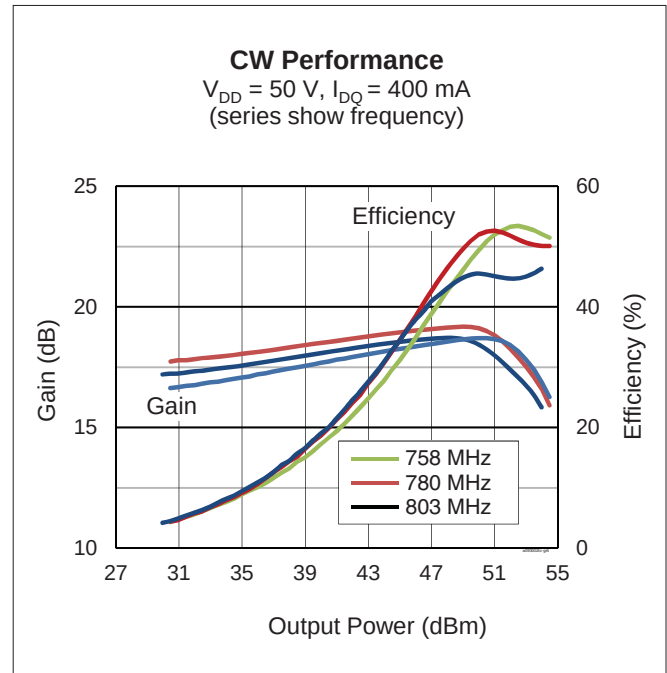
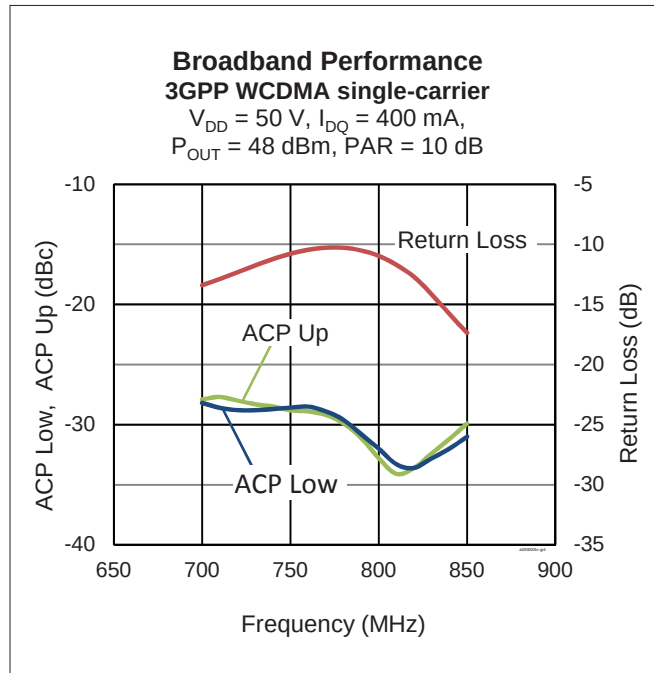
Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PTVA093002TC V1 R250	PTVA093002TCV1R250XTMA1	H-49248H-4, earless, ceramic open-cavity, formed leads, surface mount	Tape & Reel, 250 pcs

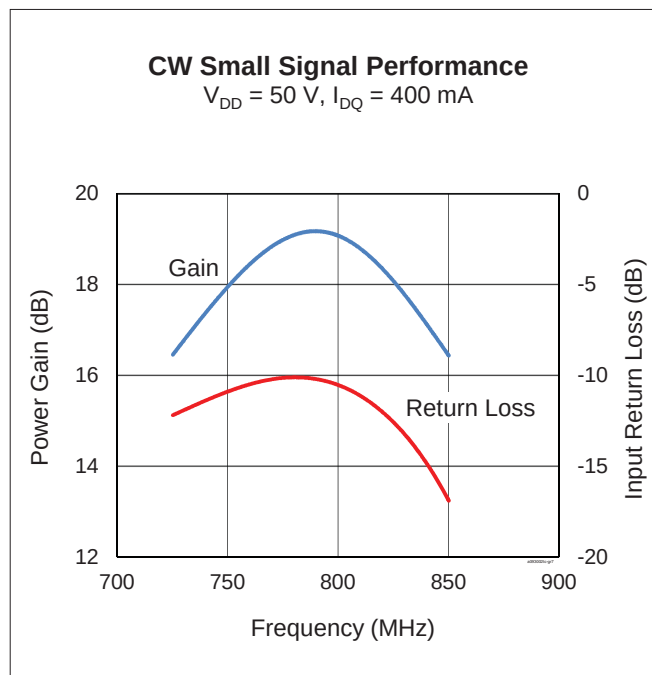
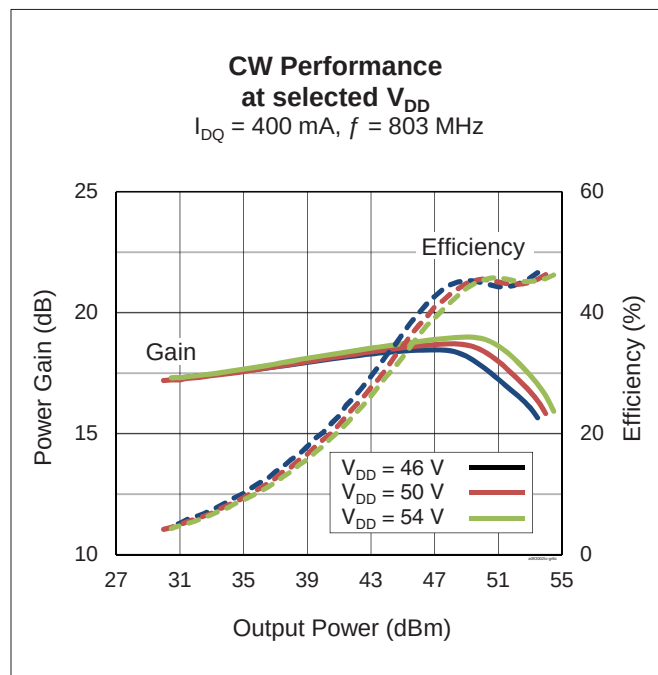
Typical Performance (data taken in a reference test fixture)



Typical Performance (cont.)

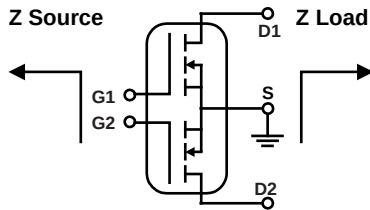


Typical Performance (cont.)



See next page for Load Pull

Load Pull Performance



Main side pulsed CW signal: 160 μ sec, 10% duty cycle; 50 V, $V_{GS} = 3.8$ V, $I_{DQ} = 350$ mA

Class AB		P _{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z _s [Ω]	Z _L [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _L [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]
758	1.62 – j4.90	2.53 – j2.78	21.16	53.39	218	59.8	2.25 – j0.37	23.46	51.01	126	71.9
791	2.16 – j5.30	2.59 – j2.99	21.12	53.32	215	60.7	1.78 – j0.51	23.61	50.31	107	73.2
803	2.54 – j5.29	2.16 – j2.82	21.08	53.39	218	61.4	1.81 – j0.56	23.59	50.38	109	74.1

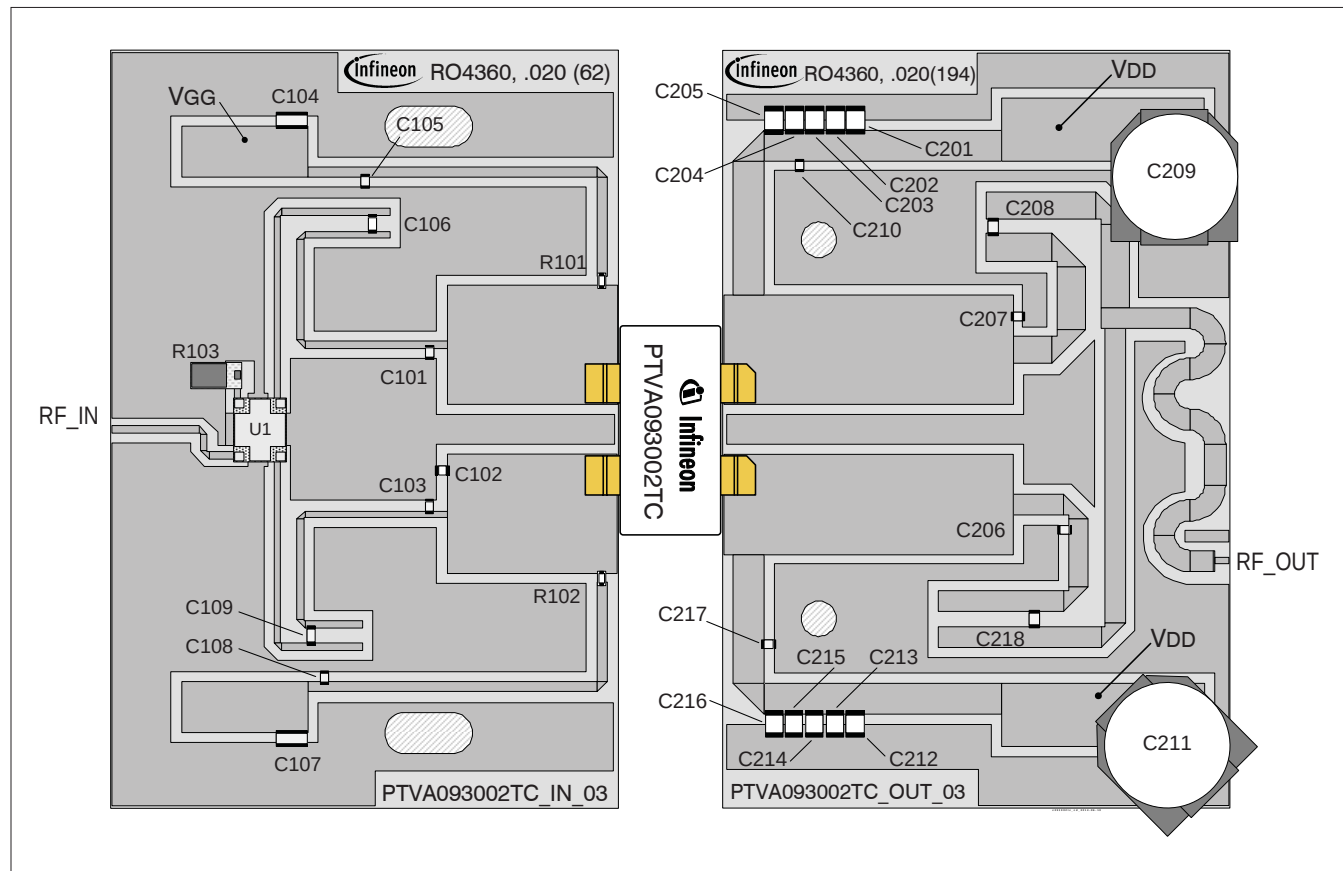
Peak side pulsed CW signal: 160 μ sec, 10% duty cycle; 28 V, $I_{DQ} = 75$ mA

Class C		P _{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z _s [Ω]	Z _L [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _L [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]
MHz	Ohm	Ohm	dB	dBm	W	%	Ohm	dB	dBm	W	%
758	1.62 – j4.90	2.47 – j2.74	20.43	53.46	222	63.9	2.14 – j0.55	22.20	51.32	135	75.0
791	2.16 – j5.30	2.15 – j2.66	20.46	53.38	218	66.1	1.92 – j0.99	22.02	51.41	138	76.3
803	2.54 – j5.29	2.14 – j2.82	20.30	53.49	224	65.7	1.91 – j0.89	22.08	51.19	131	77.4

Reference Circuit, tuned for 758 – 803 MHz

DUT	PTVA093002TC
Test Fixture Part No.	LTD/PTVA093002TC V1
PCB	Rogers RO4360, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 6.4$
Find Gerber files for this reference fixture on the Infineon Web site at (www.infineon.com/rfpower)	

Reference Circuit, tuned for 758 – 803 MHz (cont.)



Reference circuit assembly diagram (not to scale)

Component Information

Component	Description	Manufacturer	P/N
Input			
C101	Chip capacitor, 3.6 pF	ATC	ATC100A3R6CW150XB
C102	Chip capacitor, 3.9 pF	ATC	ATC800A3R9CW150XB
C104, C107	Capacitor, 10 µF	Murata Electronics North America	LLL31BC70G106MA01L
C105, C106, C108, C109	Chip capacitor, 6 pF	ATC	ATC100A6R0CW150XB
R101, R102	Resistor, 10 Ohm	Panasonic – ECG	ERJ-3GEYJ100V
R103	Resistor, 50 Ohm	Anaren	RFP-060120A15Z50
U1	Hybrid Coupler, 4 dB, 90°	Anaren	X3C07P-04S

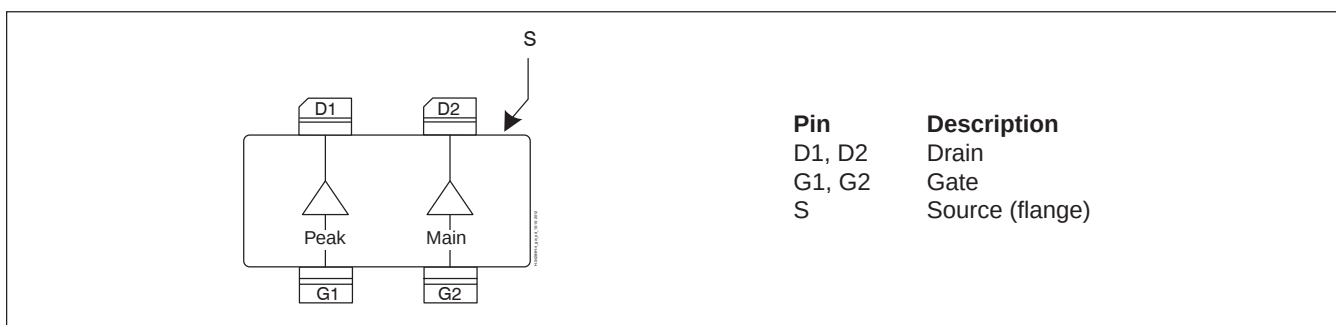
(table continued on page 8)

Reference Circuit (cont.)

Component Information (cont.)

Component	Description	Manufacturer	P/N
Output			
C206	Chip capacitor, 3.3 pF	ATC	ATC100A3R3CW150XB
C207	Chip capacitor, 5.6 pF	ATC	ATC800A5R6CW150XB
C208, C210, C217, C218	Chip capacitor, 6 pF	ATC	ATC100A6R0CW150XB
C207, C209	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C209, C211	Capacitor, 100 μ F, 100 V	United Chemi-Con	EMVE101ARA101MKE0S

Pinout Diagram (top view)



Lead connections for PTVA093002TC

Package Outline Specifications

Package H-49248H-4, formed leads

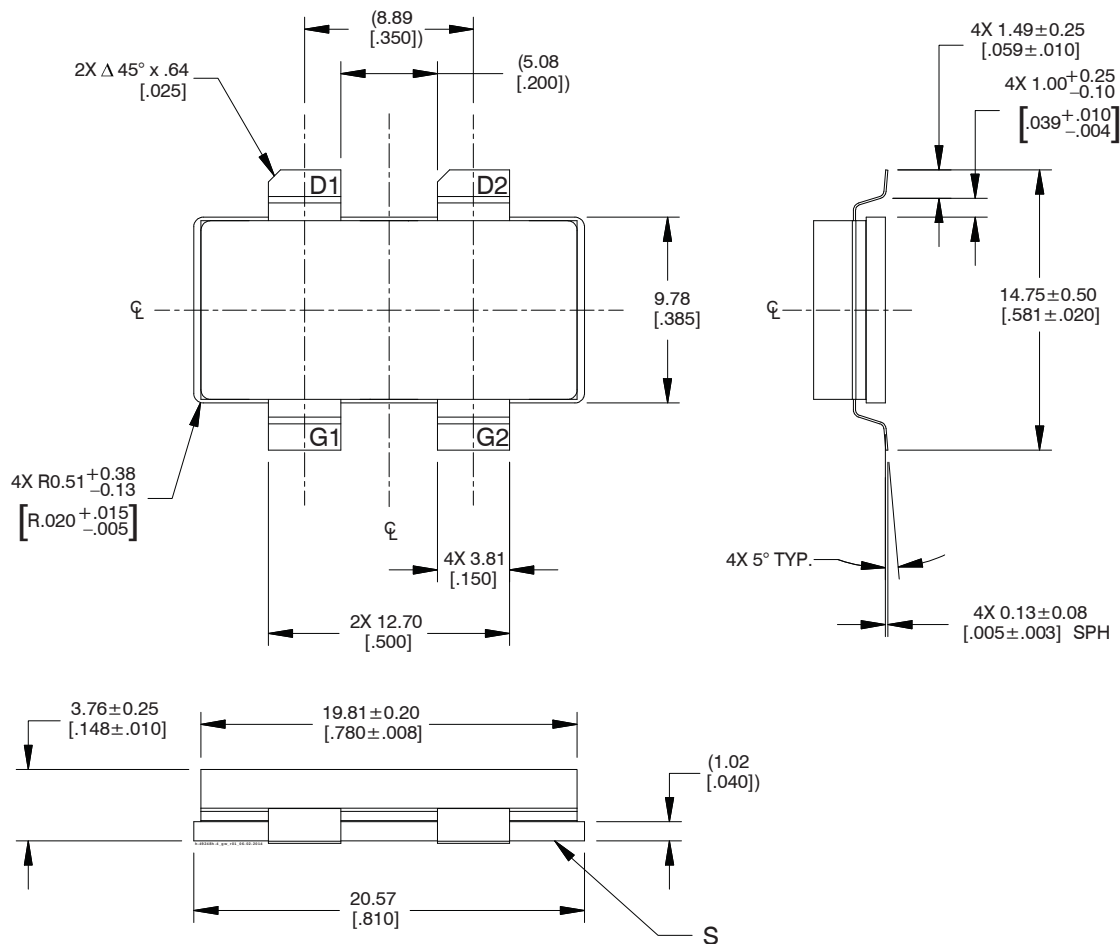


Diagram Notes—unless otherwise specified:

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].
4. Pins: D1, D2 – drain; G1, G2 – gate; S – source (flange).
5. Lead thickness: $0.10 + 0.051/-0.025$ [.004 +.002/- .001].
6. Gold plating thickness:
flange – 0.25 micron [10 microinch] max;
leads – 1.14 ± 0.38 micron [45 $\pm$ 15 microinch] max.

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

Revision History

Revision	Date	Data Sheet	Page	Subjects (major changes since last revision)
01	2014-01-08	Advance	All	New product, proposed only.
02	2014-01-29	Advance	All	Package type number and configuration revised.
03	2014-05-02	Advance	All	Package type number revised.
04	2014-06-16	Production	All	Data Sheet now represents released product specifications, including reference circuit and performance information

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Edition 2014-06-16

Published by

Infineon Technologies AG

85579 Neubiberg, Germany

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