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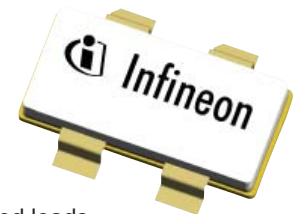
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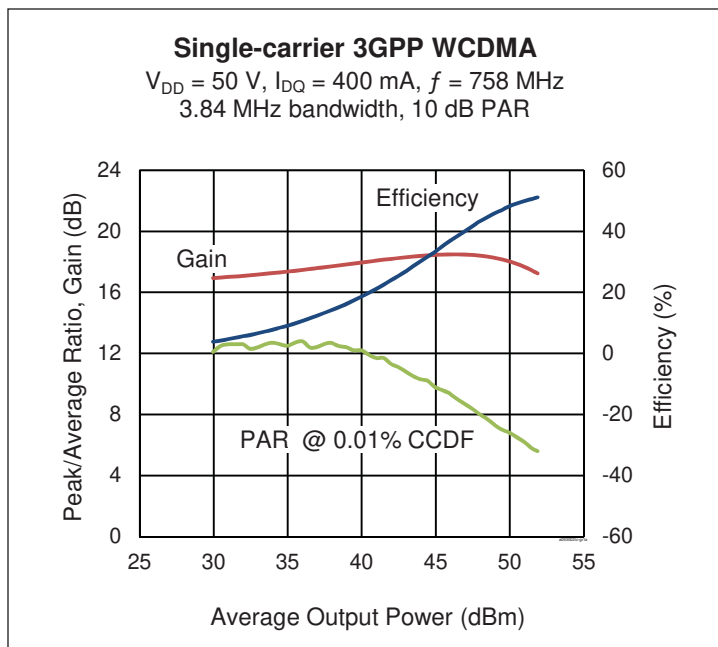
## Thermally-Enhanced High Power RF LDMOS FET 300 W, 50 V, 703 – 960 MHz

### 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  $P_{1dB} = 158\text{ W}$
  - 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  $P_{3dB} = 280\text{ W}$
  - 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	$\eta_D$	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	$\mu\text{A}$
	$V_{DS} = 105\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	10.0	$\mu\text{A}$
Gate Leakage Current	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	1.0	$\mu\text{A}$
On-state Resistance	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.265	—	$\Omega$
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

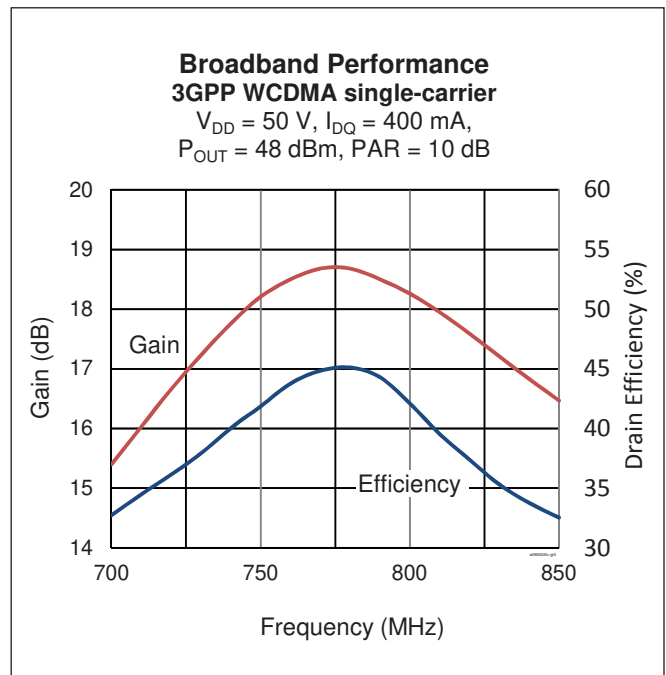
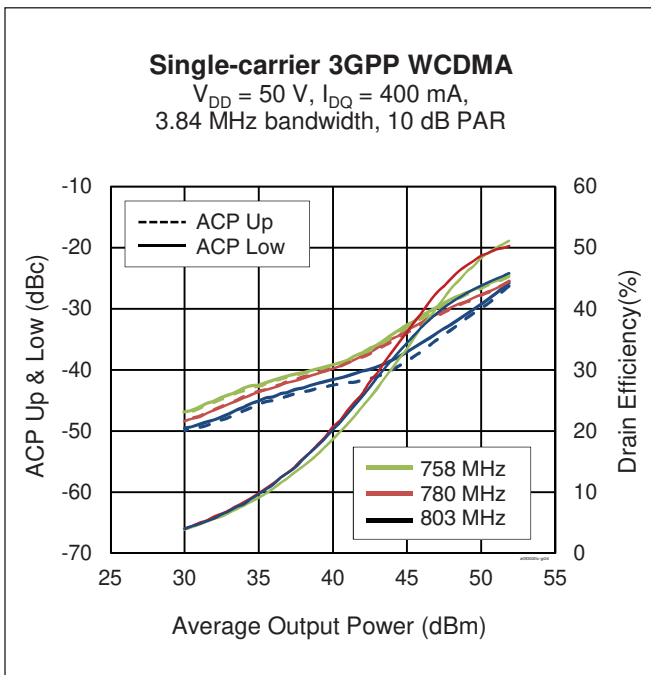
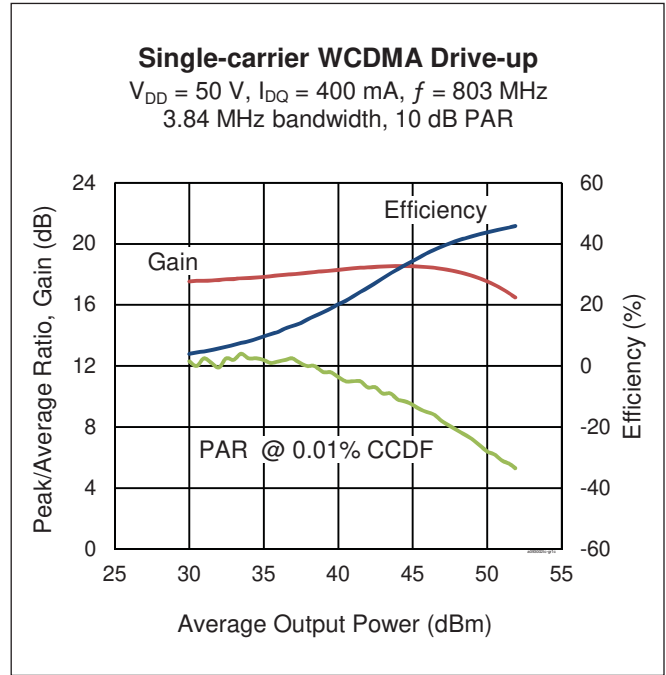
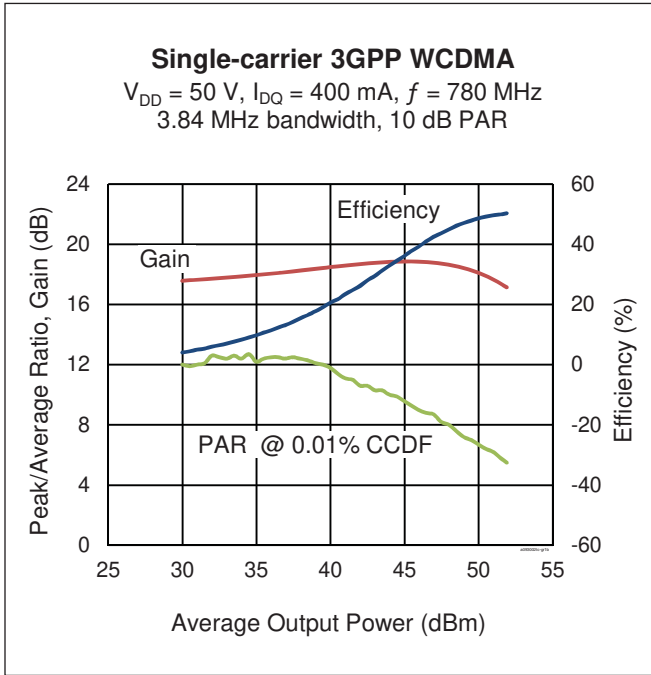
## Maximum Ratings

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	$^{\circ}\text{C/W}$

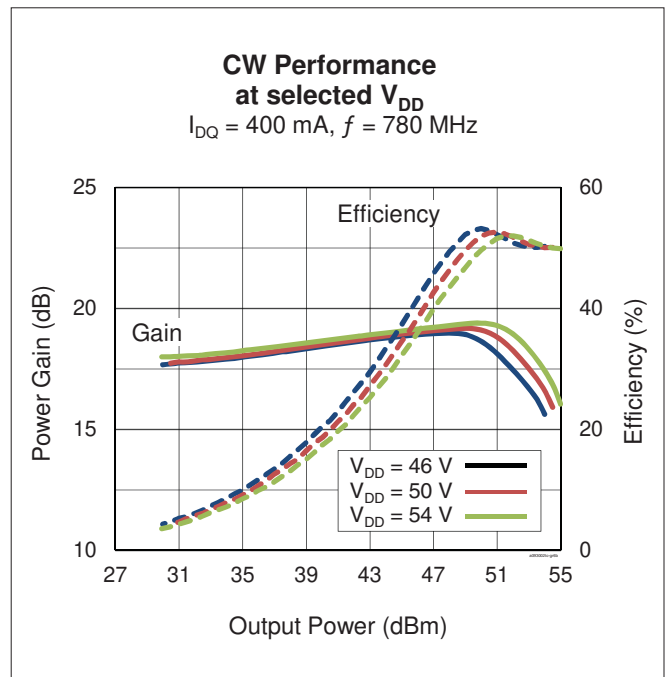
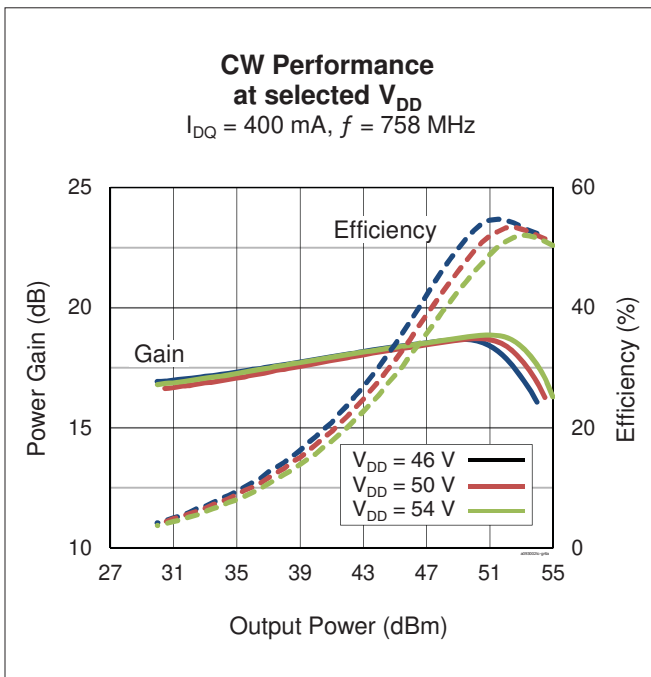
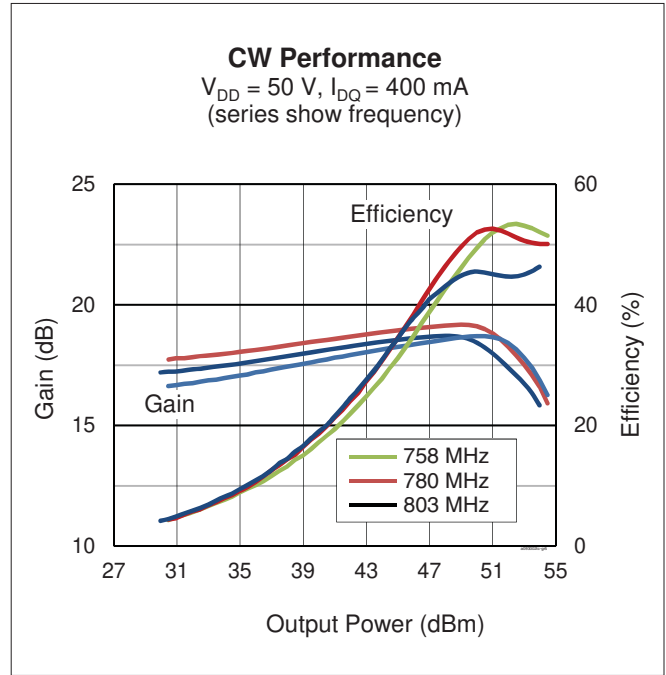
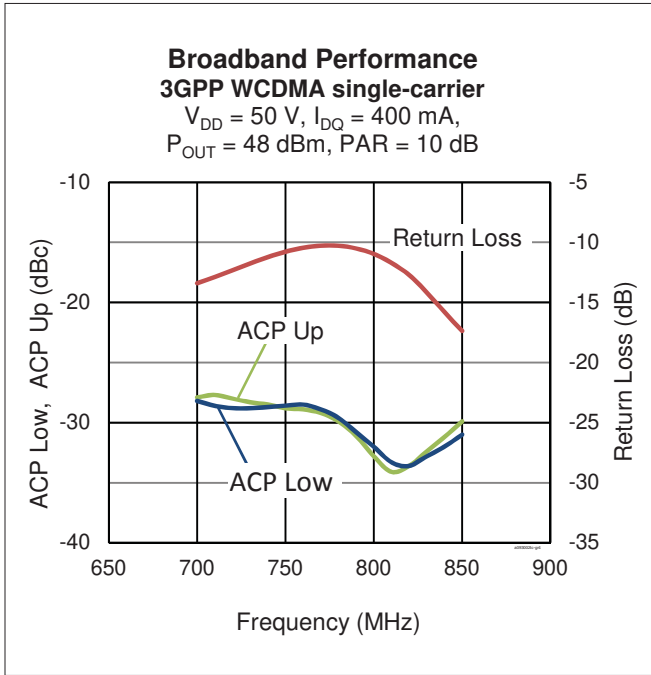
## Ordering Information

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

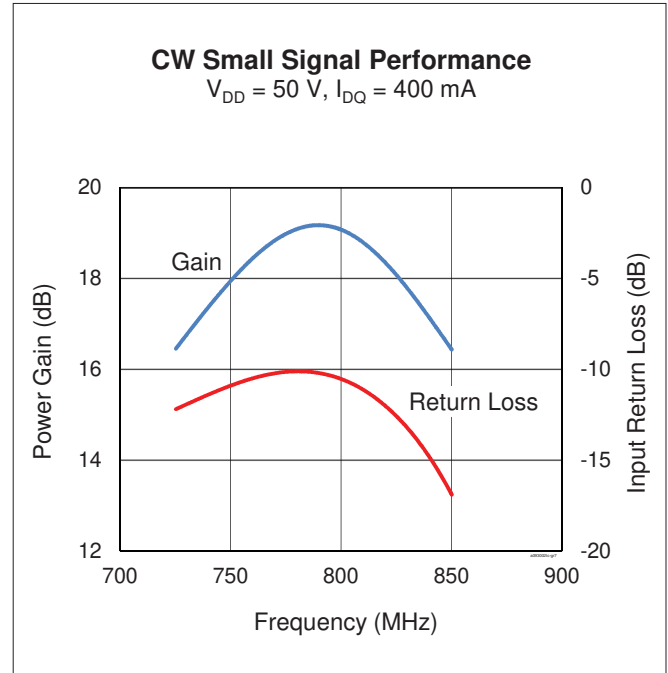
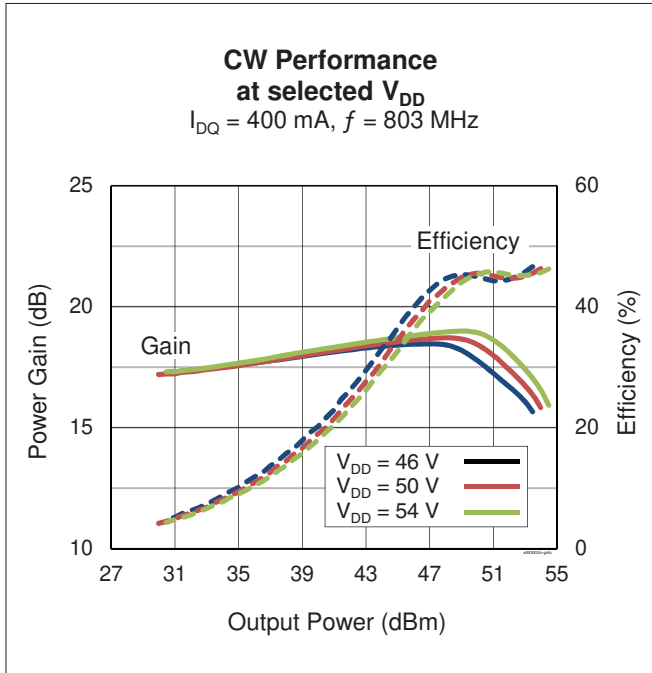
**Typical Performance** (data taken in a reference test fixture)



Typical Performance (cont.)

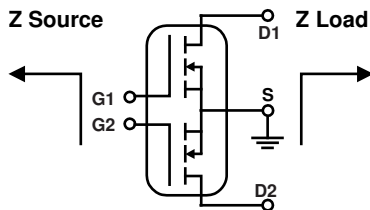


Typical Performance (cont.)



See next page for Load Pull

## Load Pull Performance



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

Class AB		P <sub>1dB</sub>									
		Max Output Power					Max PAE				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [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  $\mu$ sec, 10% duty cycle; 28 V,  $I_{DQ} = 75$  mA

Class C		P <sub>1dB</sub>									
		Max Output Power					Max PAE				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [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

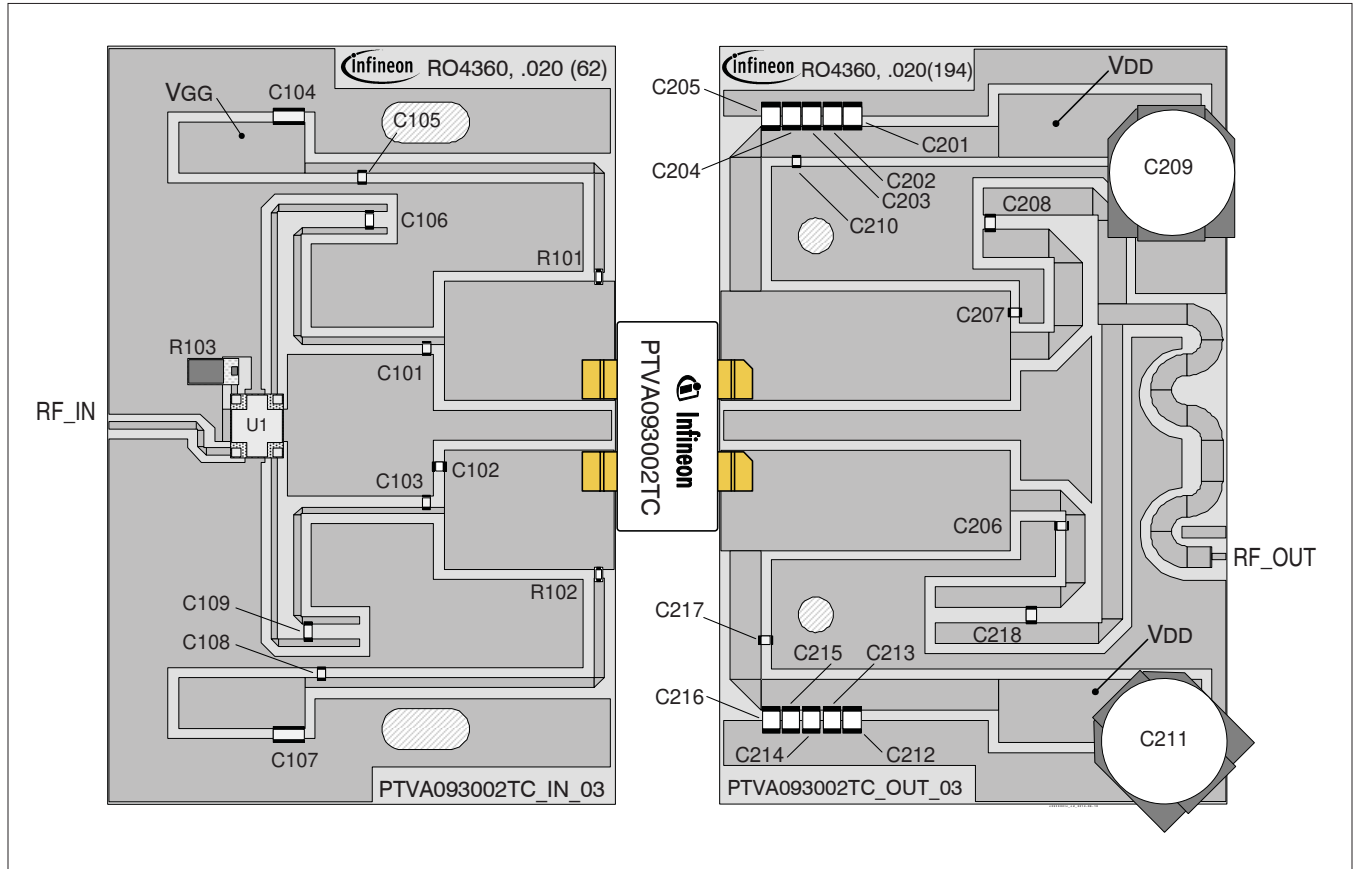
DUT PTVA093002TC

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](http://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
<b>Input</b>			
C101	Chip capacitor, 3.6 pF	ATC	ATC100A3R6CW150XB
C102	Chip capacitor, 3.9 pF	ATC	ATC800A3R9CW150XB
C104, C107	Capacitor, 10 $\mu$ F	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)

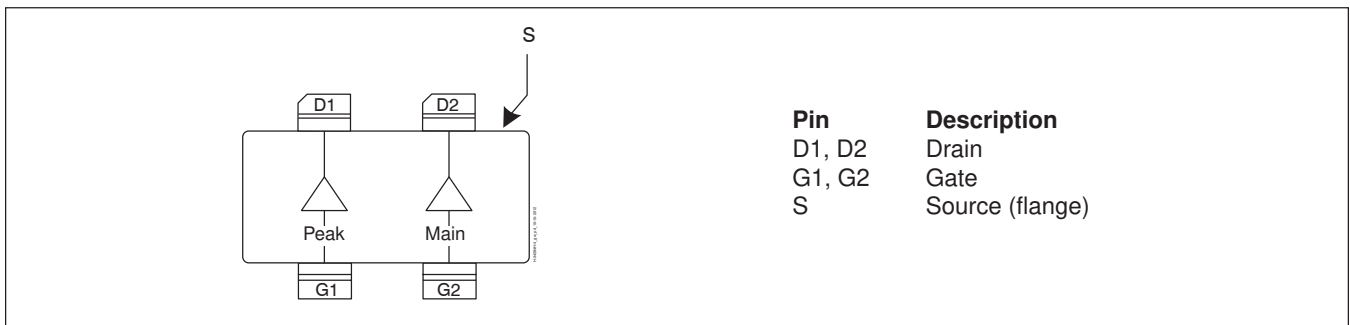


**Reference Circuit** (cont.)

**Component Information** (cont.)

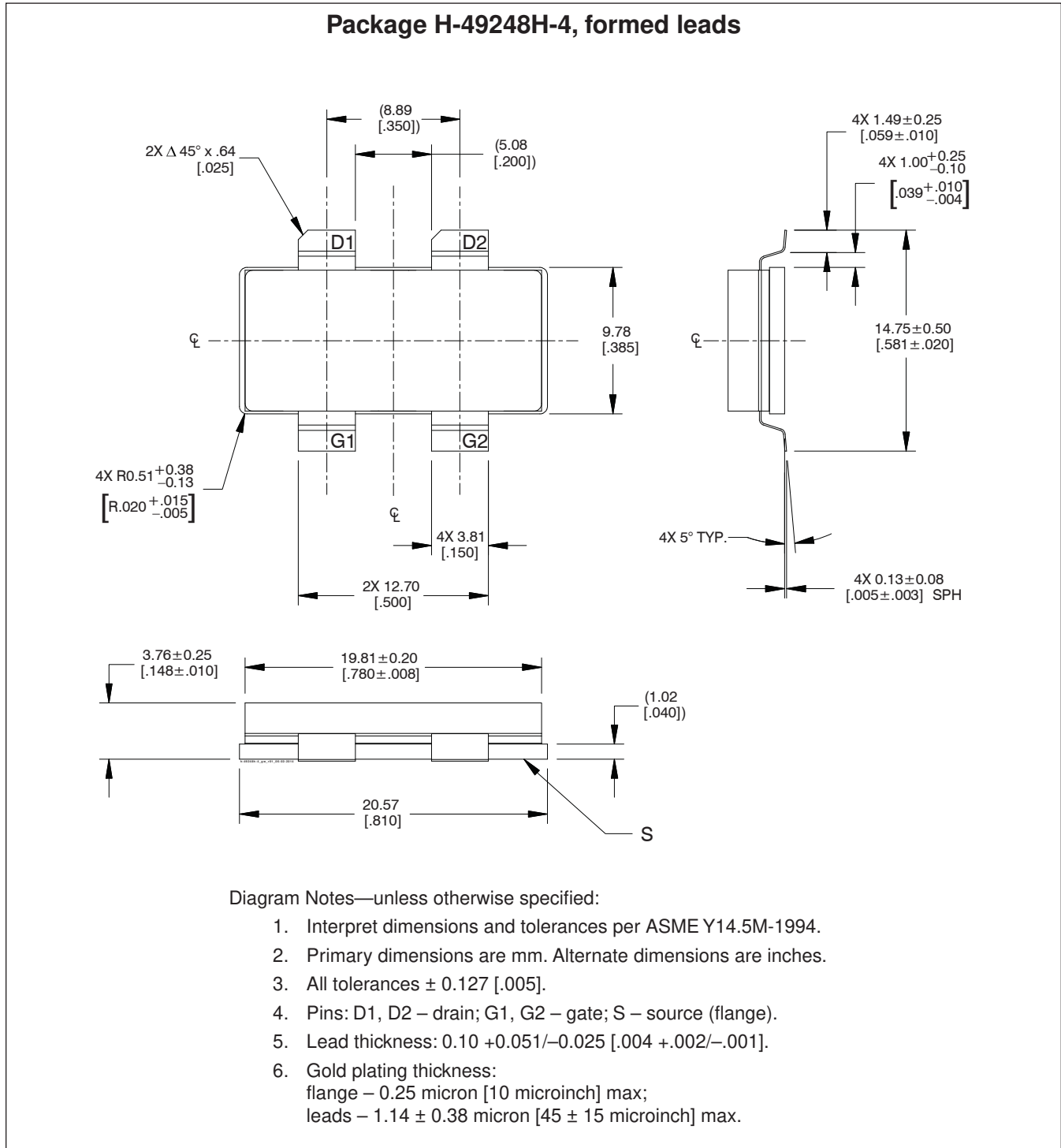
Component	Description	Manufacturer	P/N
<b>Output</b>			
C206	Chip capacitor, 3.3 pF	ATC	ATC100A3R3CW150XB
C207	Chip capacitor, 5.6 pF	ATC	ATC800A5R6CW150XB
C208, C210, C217, C218	Chip capacitor, 6 pF	ATC	ATC100A6R0CW150XB
C207, C209	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C209, C211	Capacitor,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

**Pinout Diagram** (top view)



Lead connections for PTVA093002TC

Package Outline Specifications



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

## Revision History

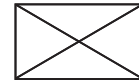
Revision	Date	Data Sheet	Page	Subjects (major changes since last revision)
01	2014-01-08	Advance	All	New product, proposed only.
02	2014-01-29	Advance	All	Package type number and configuration revised.
03	2014-05-02	Advance	All	Package type number revised.
04	2014-06-16	Production	All	Data Sheet now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

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