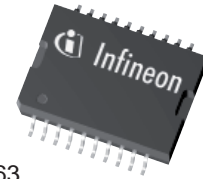


# Wideband RF LDMOS Integrated Power Amplifier

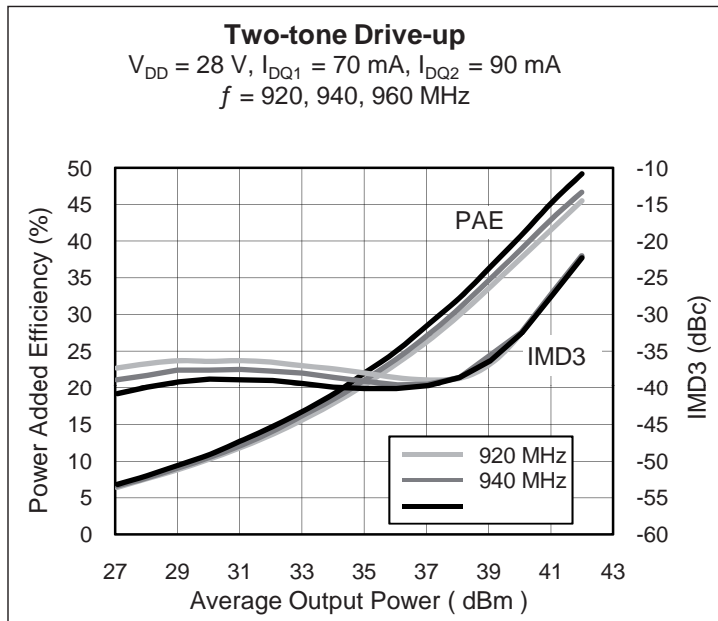
## 15 W, 28 V, 700 – 1000 MHz

### Description

The PTMA080152M is a wideband, on-chip-matched, 15-watt, 2-stage LDMOS integrated power amplifier intended for wideband driver applications in the 700 to 1000 MHz frequency range. It is offered in a 20-lead thermally-enhanced overmolded package for cool and reliable operation.



PTMA080152M  
Package PG-DSO-20-63



### Features

- Broadband on-chip matching, 50-ohm input and ~10-ohm output
- Typical GSM/EDGE performance at 28 V, 920 to 960 MHz
  - Gain = 30 dB
  - Efficiency = 34% at 8 W output power
  - EVM @ 8 W = 1.5%
  - ACPR @ 400 kHz = -61 dBc
  - ACPR @ 600 kHz = -75 dBc
- Typical CW performance, 940 MHz, 28 V
  - Output power at  $P_{1dB}$  = 20 W
  - Efficiency = 49%
- Integrated ESD protection. Meets HBM Class 1B (minimum), per JESD22-A114F.
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 20 W (CW) output power
- RoHS-compliant package

### RF Characteristics

**GSM/EDGE Characteristics** (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$ ,  $I_{DQ1} = 70\text{ mA}$ ,  $I_{DQ2} = 120\text{ mA}$ ,  $f = 920\text{ to }960\text{ MHz}$ ,  $P_{OUT} = 8\text{ W Avg.}$

Characteristic	Symbol	Min	Typ	Max	Unit
Input Return Loss	IRL	—	-15	—	dB
Gain	$G_{ps}$	—	30	—	dB
Power Added Efficiency	PAE	—	34	—	%
Error Vector Magnitude	EVM (RMS)	—	1.5	—	%

table continued next page

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

**RF Characteristics (cont.)**
**GSM/EDGE Characteristics (cont.)**
 $V_{DD} = 28\text{ V}$ ,  $I_{DQ1} = 70\text{ mA}$ ,  $I_{DQ2} = 120\text{ mA}$ ,  $f = 920\text{ to }960\text{ MHz}$ ,  $P_{OUT} = 8\text{ W Avg.}$ 

Characteristic		Symbol	Min	Typ	Max	Unit
Modulation Spectrum	400 kHz offset	ACPR1	—	-61	—	dBc
	600 kHz offset	ACPR2	—	-75	—	dBc
Spurs Load 3:1		—	—	—	-60	dBc
Gain Flatness		$\Delta G$	—	0.2	—	dB

**Two-tone Measurements (tested in Infineon test fixture)**
 $V_{DD} = 28\text{ V}$ ,  $I_{DQ1} = 70\text{ mA}$ ,  $I_{DQ2} = 90\text{ mA}$ ,  $P_{OUT} = 8\text{ W avg.}$ ,  $f = 940\text{ MHz}$ , tone spacing = 1 MHz

Characteristic		Symbol	Min	Typ	Max	Unit
Gain		$G_{ps}$	29	30	—	dB
Drain Efficiency		$\eta_D$	32.5	33.5	—	%
Third Order Intermodulation Distortion		IMD3	—	-34	-31	dBc

**DC Characteristics**

Stage 1 Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
Drain Leakage Current	$V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$
	$V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	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	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	3.48	—	$\Omega$
Operating Gate Voltage	$V_{DS} = 28\text{ V}$ , $I_{DQ1} = 70\text{ mA}$ ,	$V_{GS}$	2.0	2.5	3.0	V

Stage 2 Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	$V_{GS} = 0\text{ V}$ , $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$
	$V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	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	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.6	—	$\Omega$
Operating Gate Voltage	$V_{DS} = 28\text{ V}$ , $I_{DQ2} = 90\text{ mA}$	$V_{GS}$	2.0	—	3.0	V

## 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	
Input Power	$P_{IN}$	15	dBm	
Total Device Dissipation	$P_D$	91	W	
Above 25°C derate by		0.52	W/°C	
Storage Temperature Range	$T_{STG}$	-40 to +150	°C	
Overall Thermal Resistance ( $T_{CASE} = 70^\circ\text{C}$ )	Stage 1	$R_{\theta JC}$	8.5	°C/W
$P_{OUT} = 15\text{ W}, I_{DQ1} = 70\text{ mA}, I_{DQ2} = 90\text{ mA}$	Stage 2	$R_{\theta J0C}$	2.5	°C/W

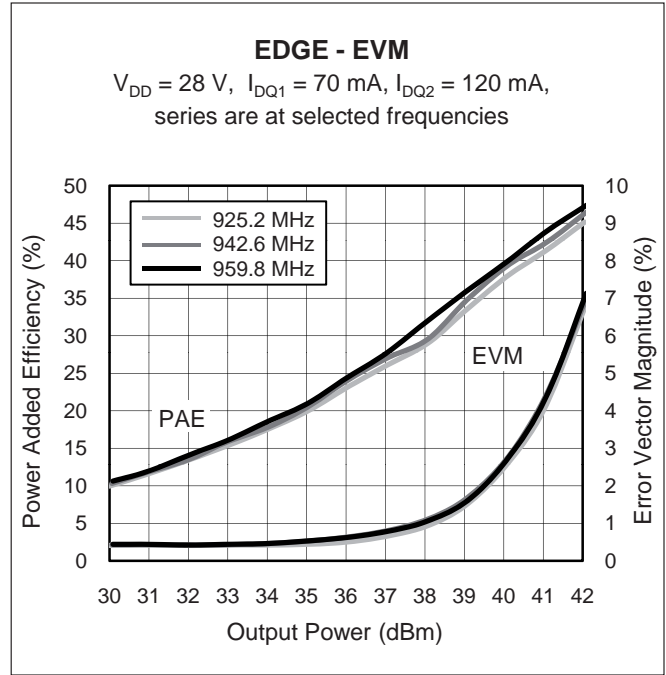
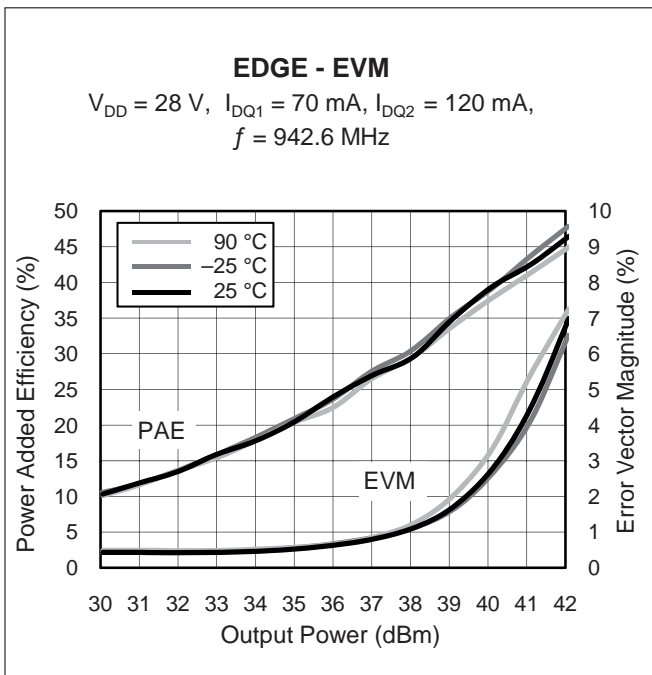
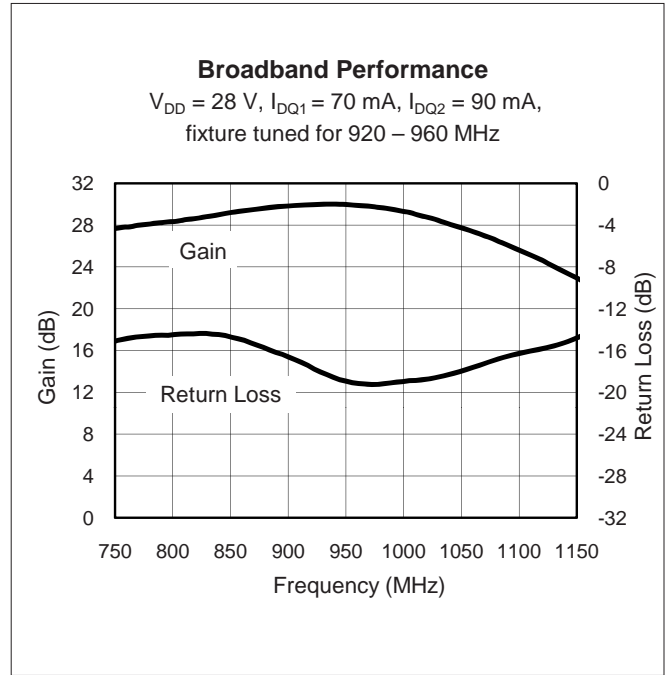
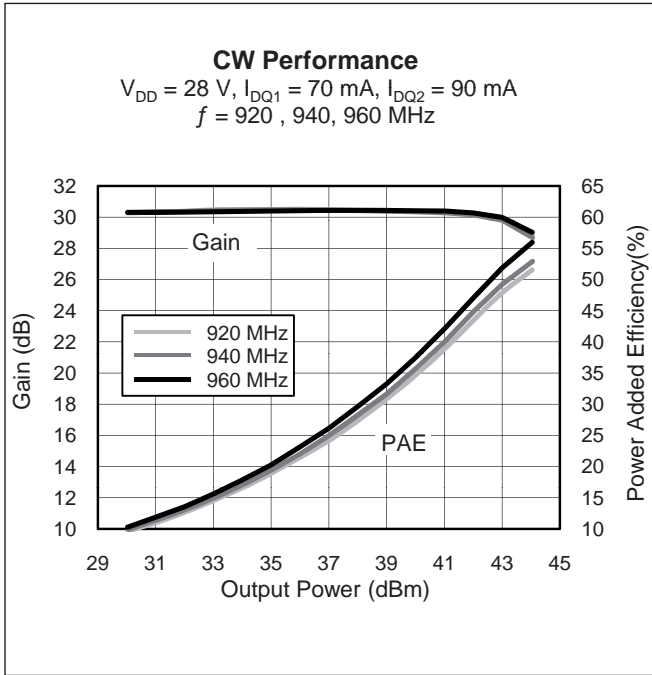
## Moisture Sensitivity Level

Level	Test Standard	Package Temperature	Unit
3	IPC/JEDEC J-STD-020	260	°C

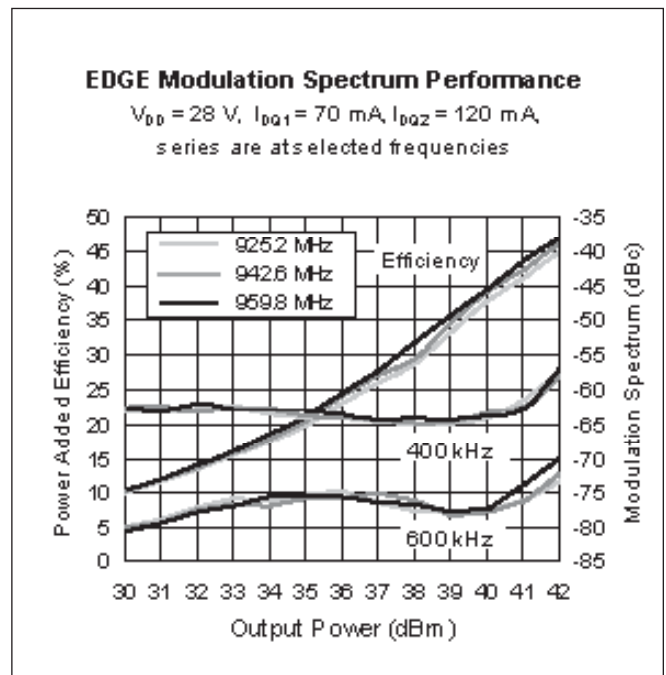
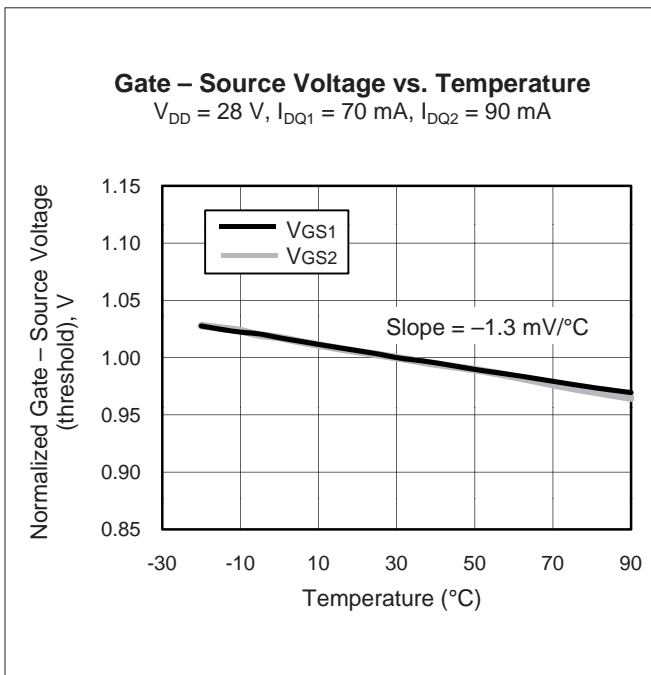
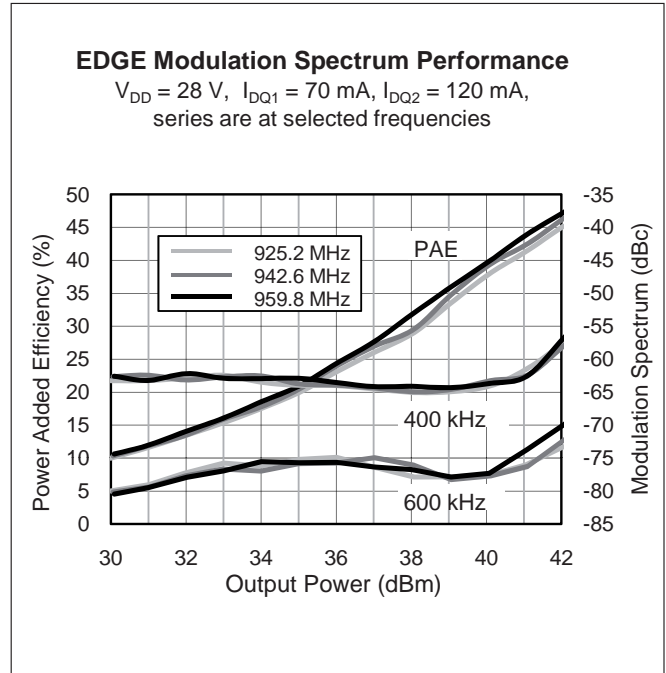
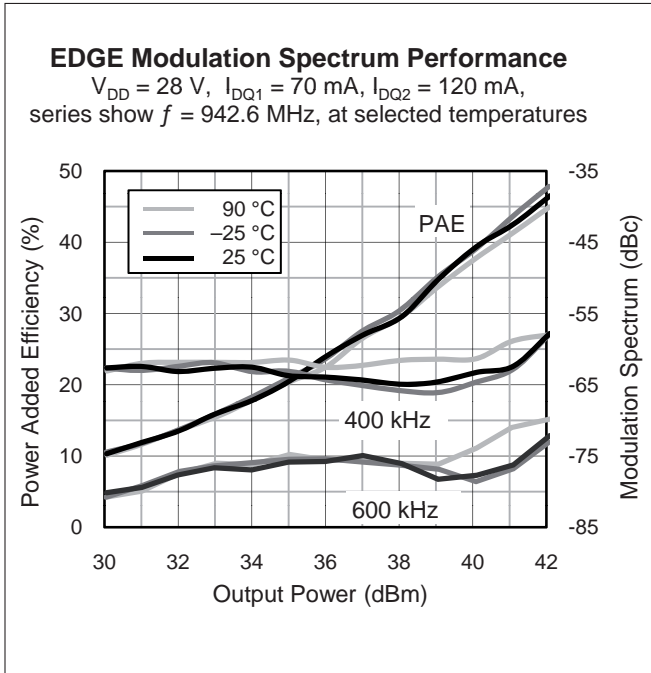
## Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PTMA080152M V1	PTMA080152MV1AUMA1	PG-DSO-20-63, molded plastic	Tape & Reel, 250 pcs
PTMA080152M V1 R500	PTMA080152MV1R500AUMA1	PG-DSO-20-63, molded plastic	Tape & Reel, 500 pcs

**Typical Performance** (data taken in Infineon production test fixture)

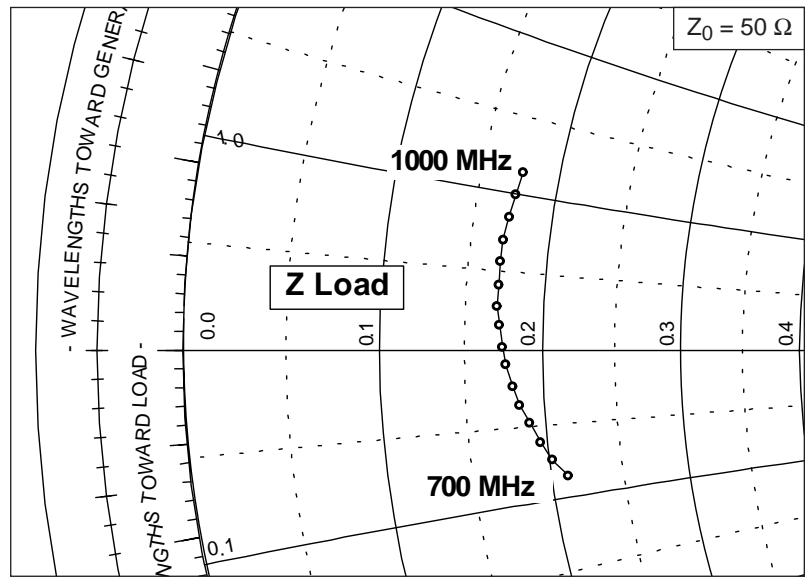
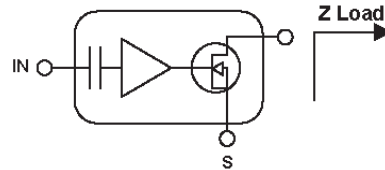


Typical Performance (cont.)

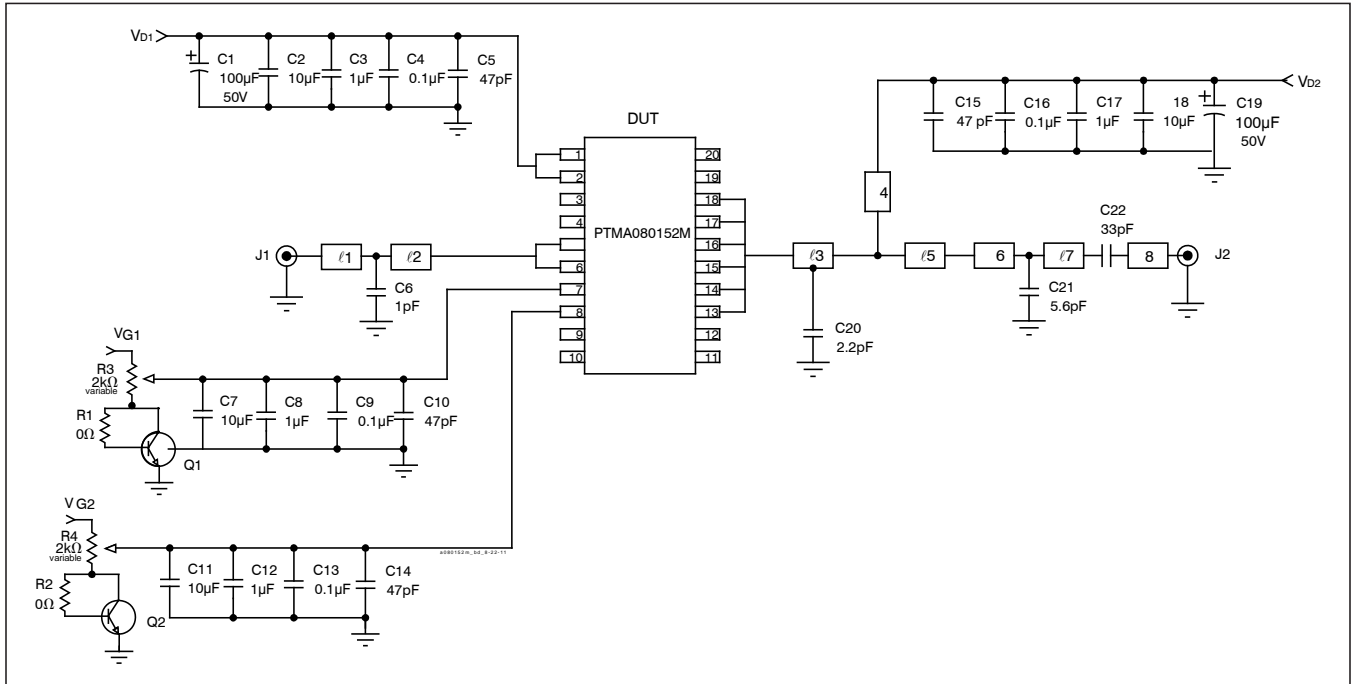


### Broadband Circuit Impedance

Frequency MHz	Z Load $\Omega$	
	R	jX
700	10.6	-4.3
720	10.1	-3.7
740	9.8	-3.1
760	9.5	-2.4
780	9.2	-1.8
800	9.0	-1.2
820	8.8	-0.5
840	8.7	0.1
860	8.6	0.8
880	8.5	1.4
900	8.5	2.1
920	8.5	2.8
940	8.5	3.5
960	8.6	4.3
980	8.7	5.0
1000	8.8	5.8



See next page for reference circuit information

**Reference Circuit**

*Reference circuit schematic for  $f = 940$  MHz*
**Circuit Assembly Information**

DUT PTMA080152M, LDMOS IC

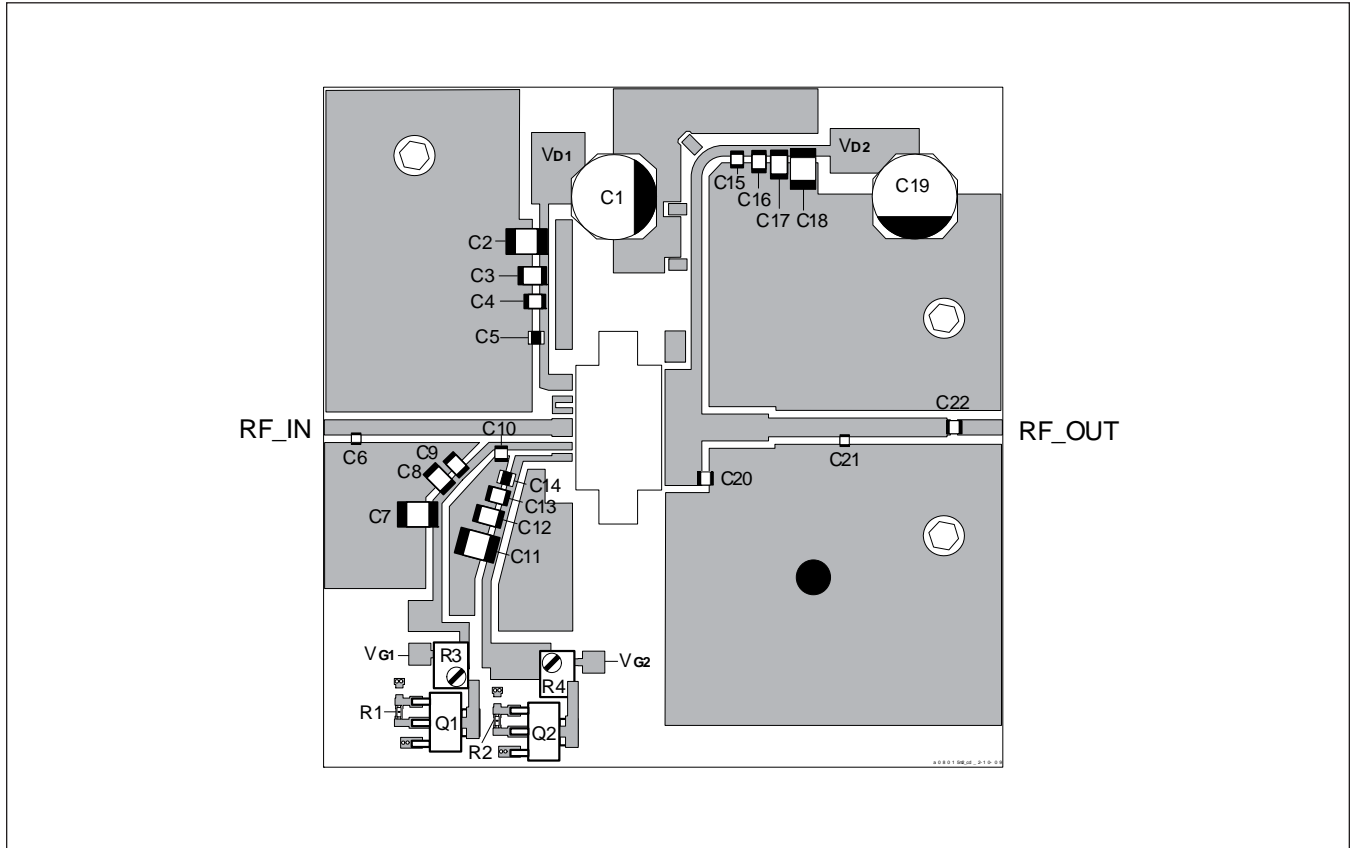
Reference Fixture Part No. LTN/PTMA080152M

PCB 0.76 mm [.030"] thick,  $\epsilon_r = 3.48$ , Rogers RO4350, 1 oz. copper

Find Gerber files for this reference fixture on the Infineon Web site at (<http://www.infineon.com/rfpower>)

Microstrip	Electrical Characteristics at 940 MHz	L x W (mm)	L x W (in.)
l1	0.017 $\lambda$ , 50.0 $\Omega$	3.00 x 1.70	0.118 x 0.067
l2	0.143 $\lambda$ , 50.0 $\Omega$	24.71 x 1.70	0.973 x 0.067
l3	0.024 $\lambda$ , 10.6 $\Omega$	4.09 x 12.70	0.161 x 0.500
l4	0.144 $\lambda$ , 59.0 $\Omega$	24.77 x 1.30	0.975 x 0.051
l5	0.044 $\lambda$ , 34.0 $\Omega$	7.57 x 3.02	0.298 x 0.119
l6	0.044 $\lambda$ , 44.0 $\Omega$	8.33 x 2.11	0.328 x 0.083
l7	0.0702 $\lambda$ , 44.0 $\Omega$	12.12 x 2.11	0.477 x 0.083
l8	0.030 $\lambda$ , 44.0 $\Omega$	5.18 x 2.11	0.204 x 0.083

Reference Circuit (cont.)

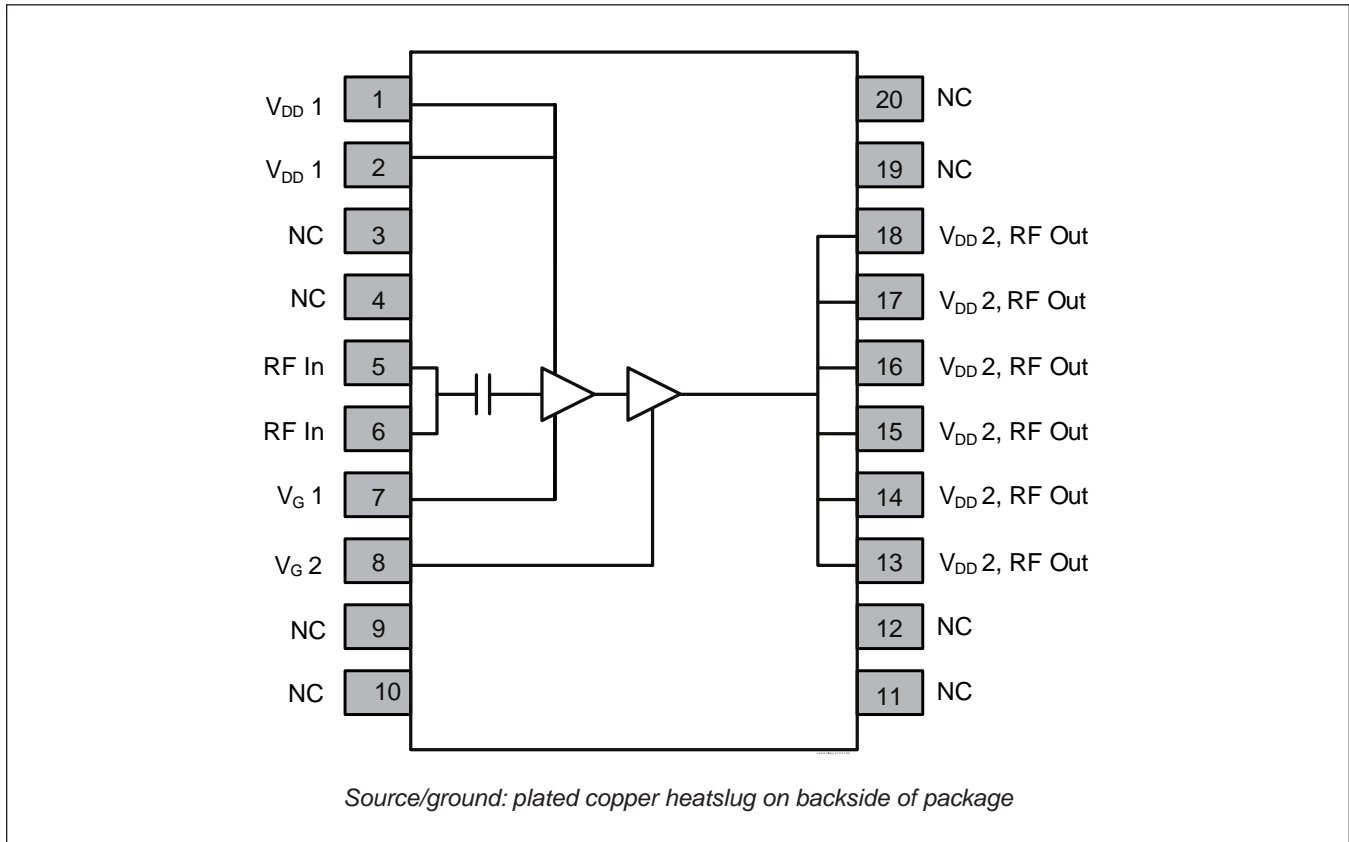


Reference circuit assembly diagram (not to scale)

Component	Description	Suggested Manufacturer	P/N or Comment
C3, C8, C12, C17	Ceramic capacitor, 1 $\mu$ F	Digi-Key	445-1411-2-ND
C4, C9, C13, C16	Capacitor, 0.1 $\mu$ F	Digi-Key	PCC104BCT-ND
C2, C7, C11, C18	Tantalum capacitor, 10 $\mu$ F, 50 V	Digi-Key	P5571-ND
C1, C19	Electrolytic capacitor, 100 $\mu$ F, 50 V	Digi-Key	PCE3718CT-ND
C6	Ceramic capacitor, 1.0 pF	ATC	600S 1R0 CT
C20	Ceramic capacitor, 2.2 pF	ATC	600S 2R2 CT
C21	Ceramic capacitor, 5.6 pF	ATC	600S 5R6 CT
C22	Ceramic capacitor, 33 pF	ATC	600S 330 JT
C5, C10, C14, C15	Ceramic capacitor, 47 pF	ATC	600S 470 JT
Q1, Q2	Transistor	Infineon Technologies	BCP56
R1, R2	Chip resistor, 0 ohms	Digi-Key	PXXECT-ND
R3, R4	Variable resistor, 2K ohms	Digi-Key	3224W-202ETR-ND



**Pinout Diagram** (top view)



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

Package Outline Specifications

Package PG-DSO-20-63

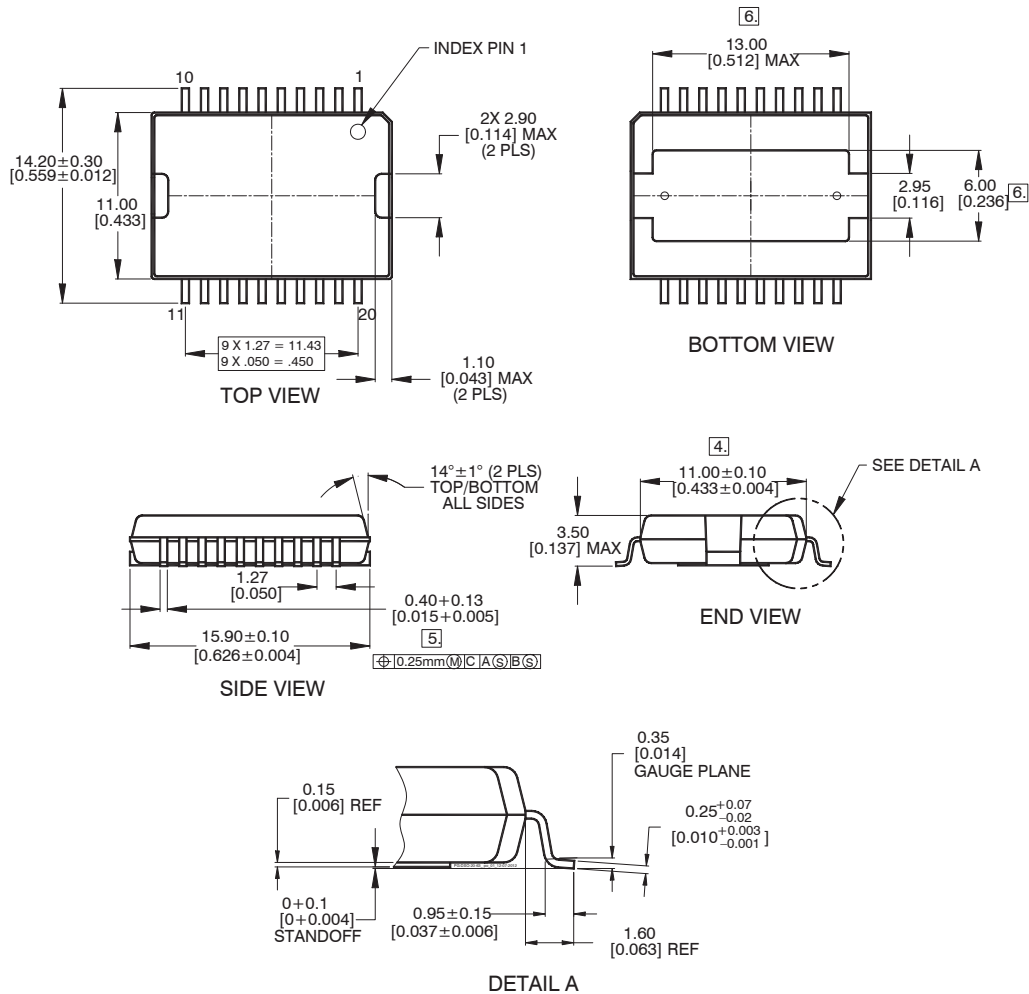


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Package dimensions: 11.0 mm by 15.9 mm by 3.35 mm.
3. JEDEC drawing number: MO-166.
4. Does not include plastic or metal protrusion of 0.15 mm max per side.
5. Does not include dambar protrusion; maximum allowable dambar protrusion shall be 0.08 mm.
6. Bottom metallization.
7. Sn plating (matte): 5 – 15 micron [196.85 – 590.55 microinch].

Refer to Application Note "Recommendations for Printed Circuit Board Assembly of Infineon DSO and SSOP Packages" for additional information.

## Revision History

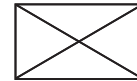
Revision	Date	Data Sheet	Page	Subjects (major changes since last revision)
01	2007-05-05	Preliminary	all	Preliminary specification for new product in development.
02	2009-02-27	Production	all	Revise package information and circuit diagrams, add impedance information.
03	2009-08-31	Production	1	Revise VSWR rating.
04	2010-04-16	Production	3; 10	Add moisture sensitivity information; update package outline notes.
05	2011-05-17	Production	2; 4	Revise DC table; remove graph.
06	2011-08-22	Production	2; all	Revise two-tone table; minor updates to graphics and diagrams for readability.
07	2014-05-07	Production	3	Add shipping option.

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