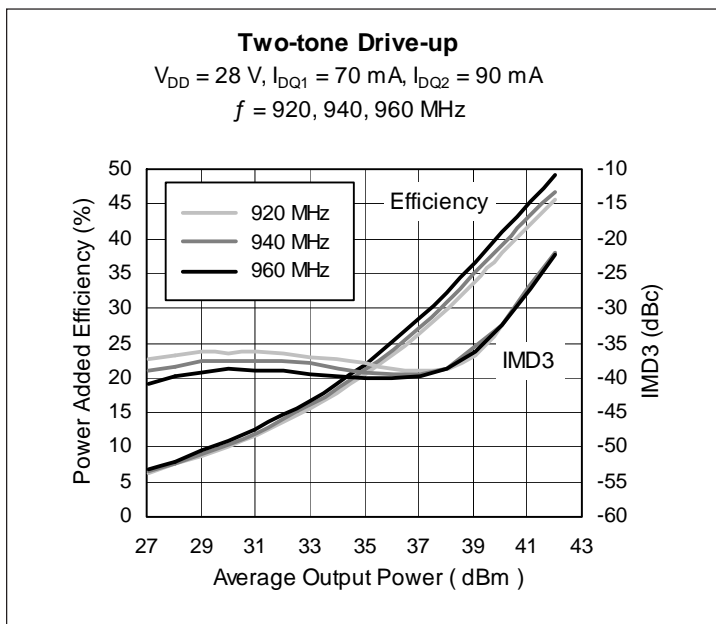


## Wideband RF LDMOS Integrated Power Amplifier 15 W, 700 – 1000 MHz

### 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 Measurements** (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	$\eta$	—	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 Measurements** (cont.) (not subject to production test—verified by design/characterization in Infineon test fixture)

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

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)

 $V_{DD} = 28\text{ V}$ ,  $I_{DQ1} = 70\text{ mA}$ ,  $I_{DQ2} = 90\text{ mA}$ ,  $P_{OUT} = 8\text{ W PEP}$ ,  $f = 940\text{ MHz}$ , tone spacing = 1 MHz

Characteristic		Symbol	Min	Typ	Max	Unit
Gain		$G_{ps}$	29	30	—	dB
Power Added Efficiency		$\eta$	33	35	—	%
Intermodulation Distortion		IMD3	—	-34	-31	dBc

**DC Characteristics**

Characteristic		Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage		$V_{GS} = 0\text{ V}$ , $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	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	$\mu\text{A}$
On-state Resistance	Stage 1	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.6	—	$\Omega$
	Stage 2	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	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
		$V_{DS} = 28\text{ V}$ , $I_{DQ2} = 90\text{ mA}$	$V_{GS}$	2.0	—	3.0	V
Gate Leakage Current		$V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	1.0	$\mu\text{A}$

## 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	W	
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	$R_{\theta JOC}$	2.5	°C/W

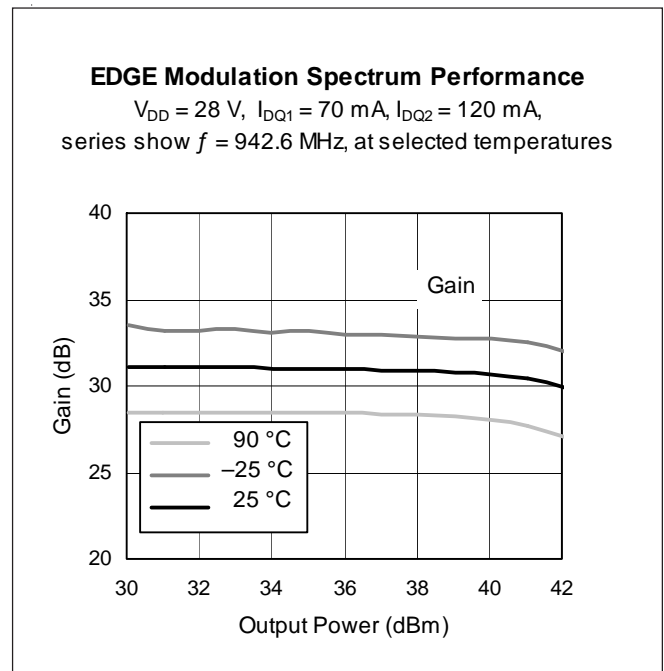
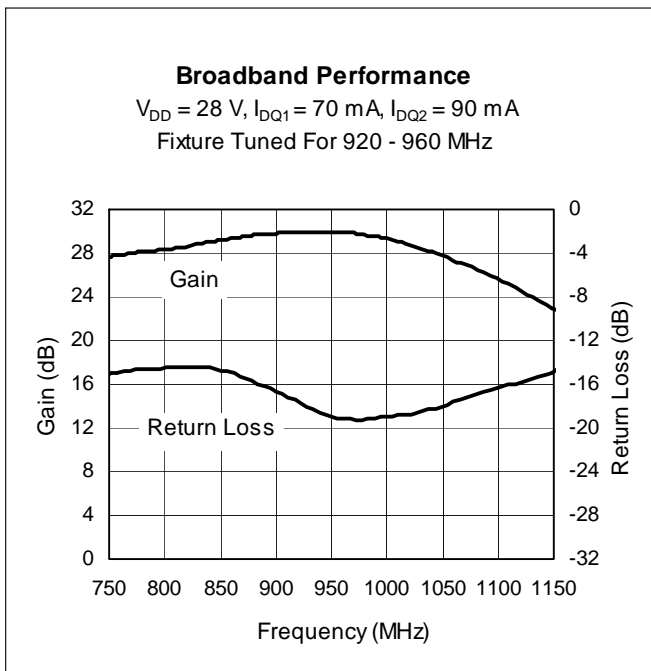
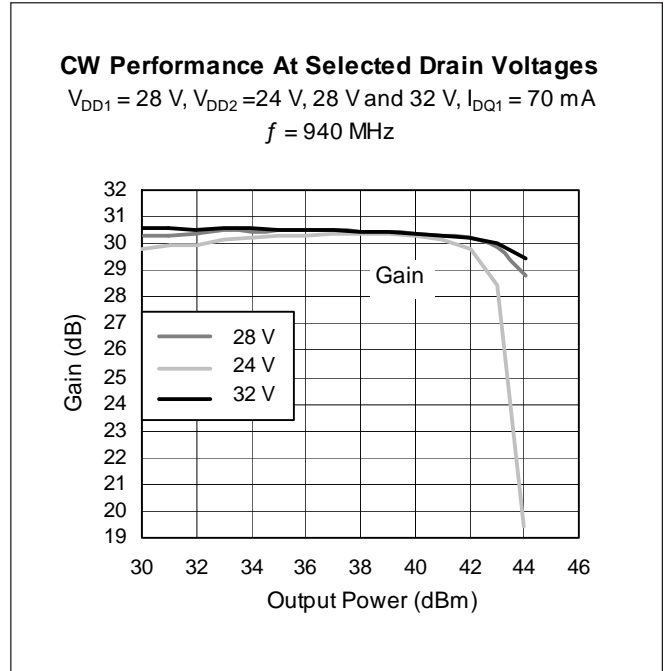
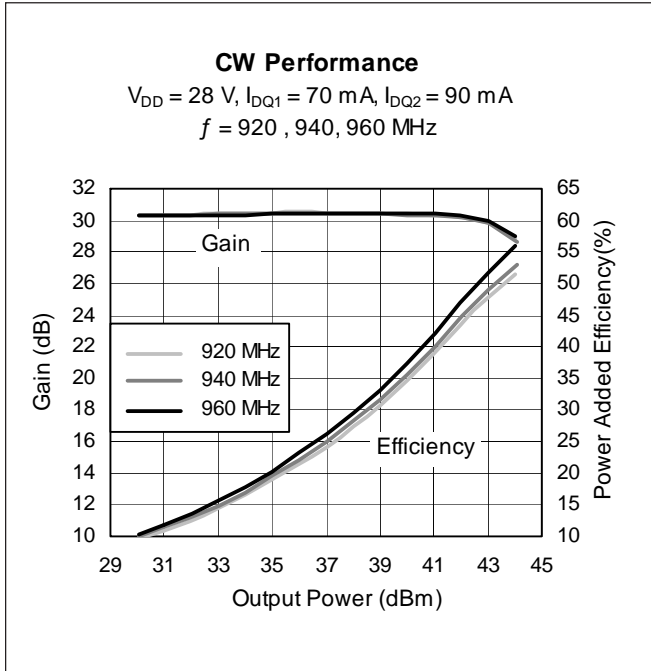
## Moisture Sensitivity Level

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

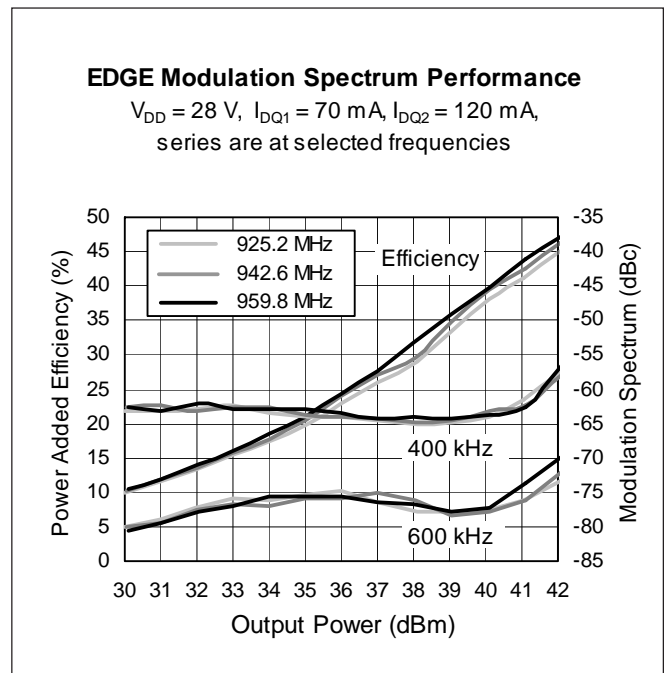
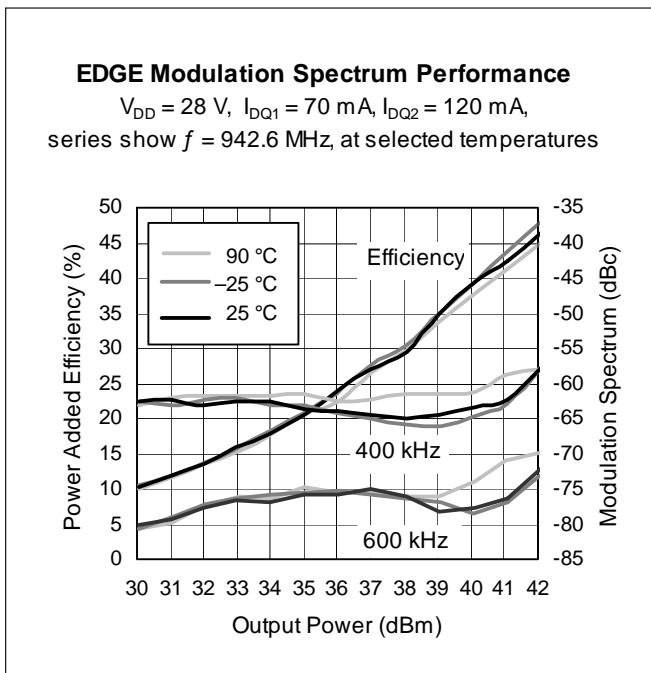
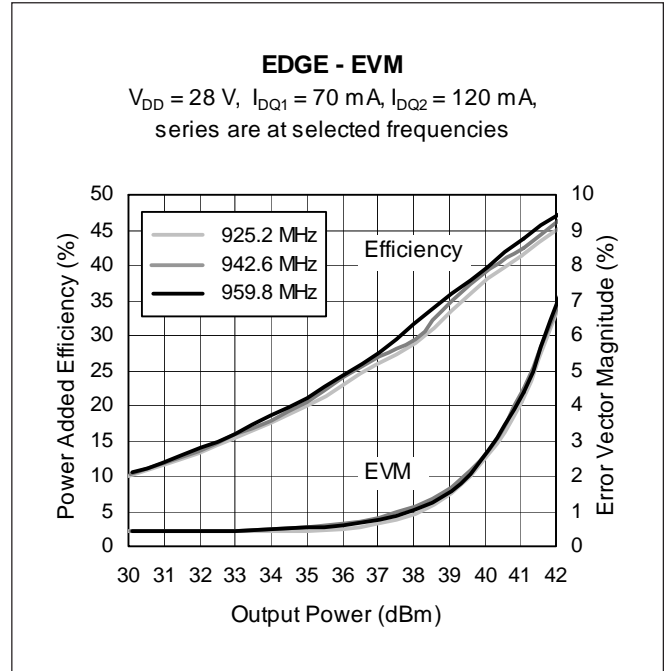
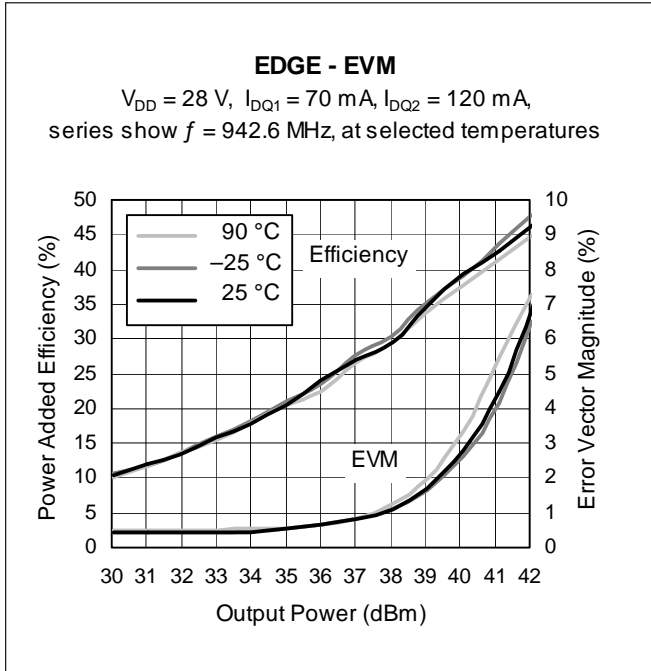
## Ordering Information

Type and Version	Package Outline	Package Description	Shipping
PTMA080152M V1	PG-DSO-20-63	Molded plastic	Tape & Reel

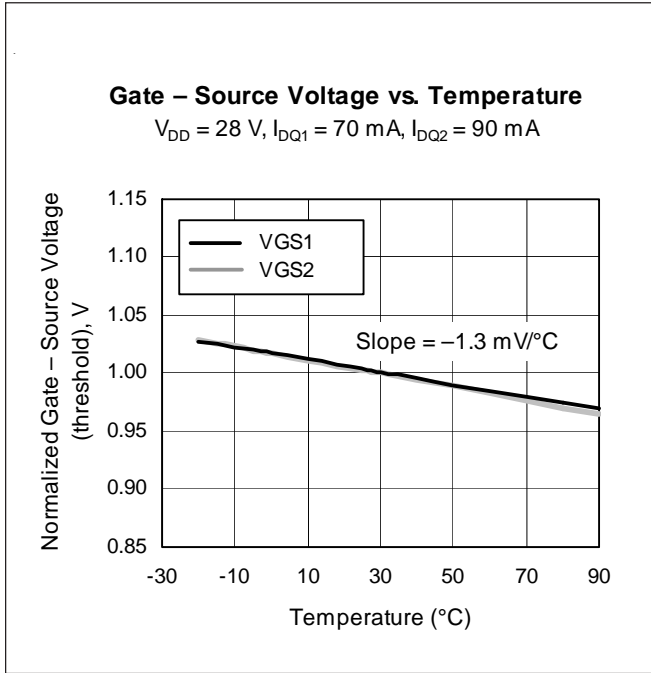
**Typical Performance** (data taken in Infineon production test fixture)



Typical Performance (cont.)

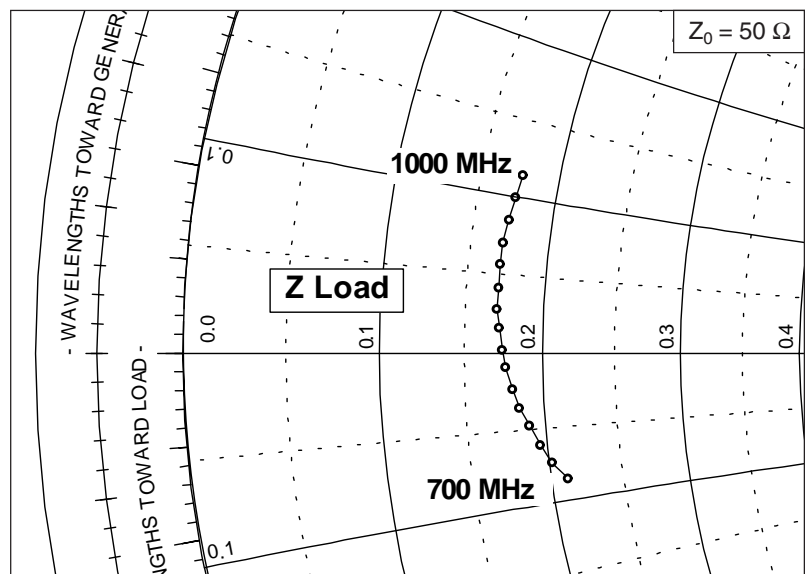
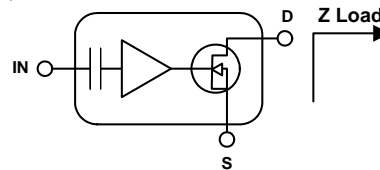


Typical Performance (cont.)

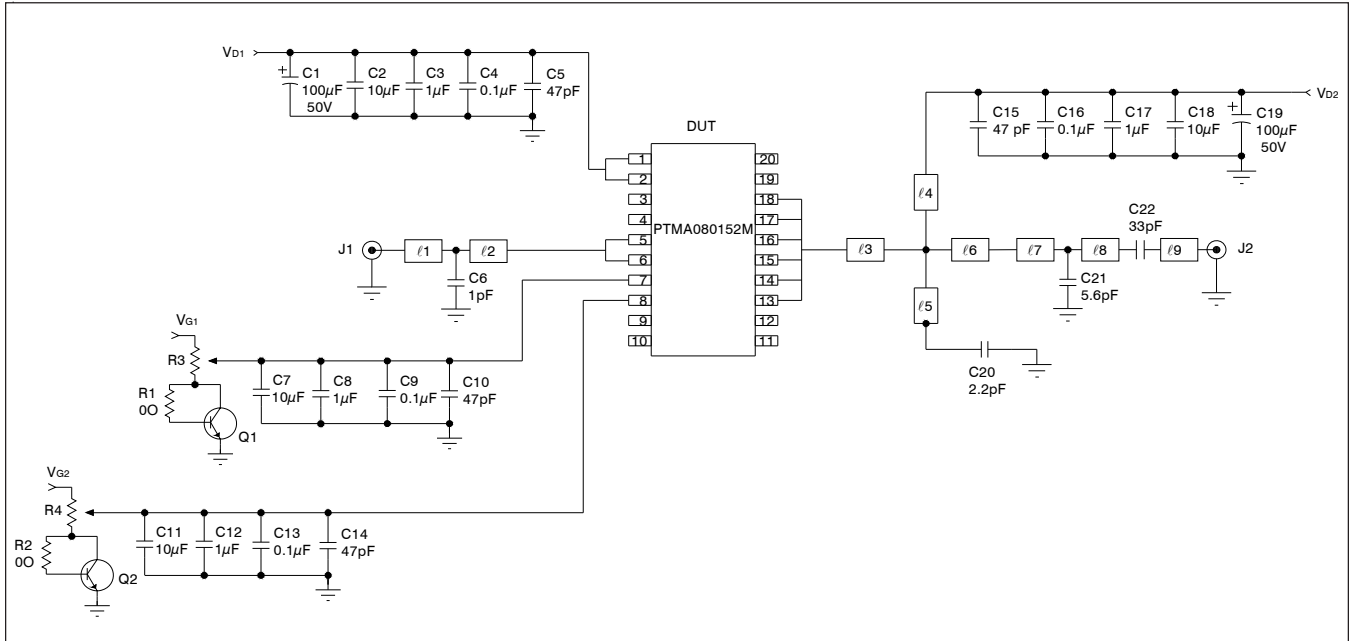


Broadband Circuit Impedance

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



Reference Circuit



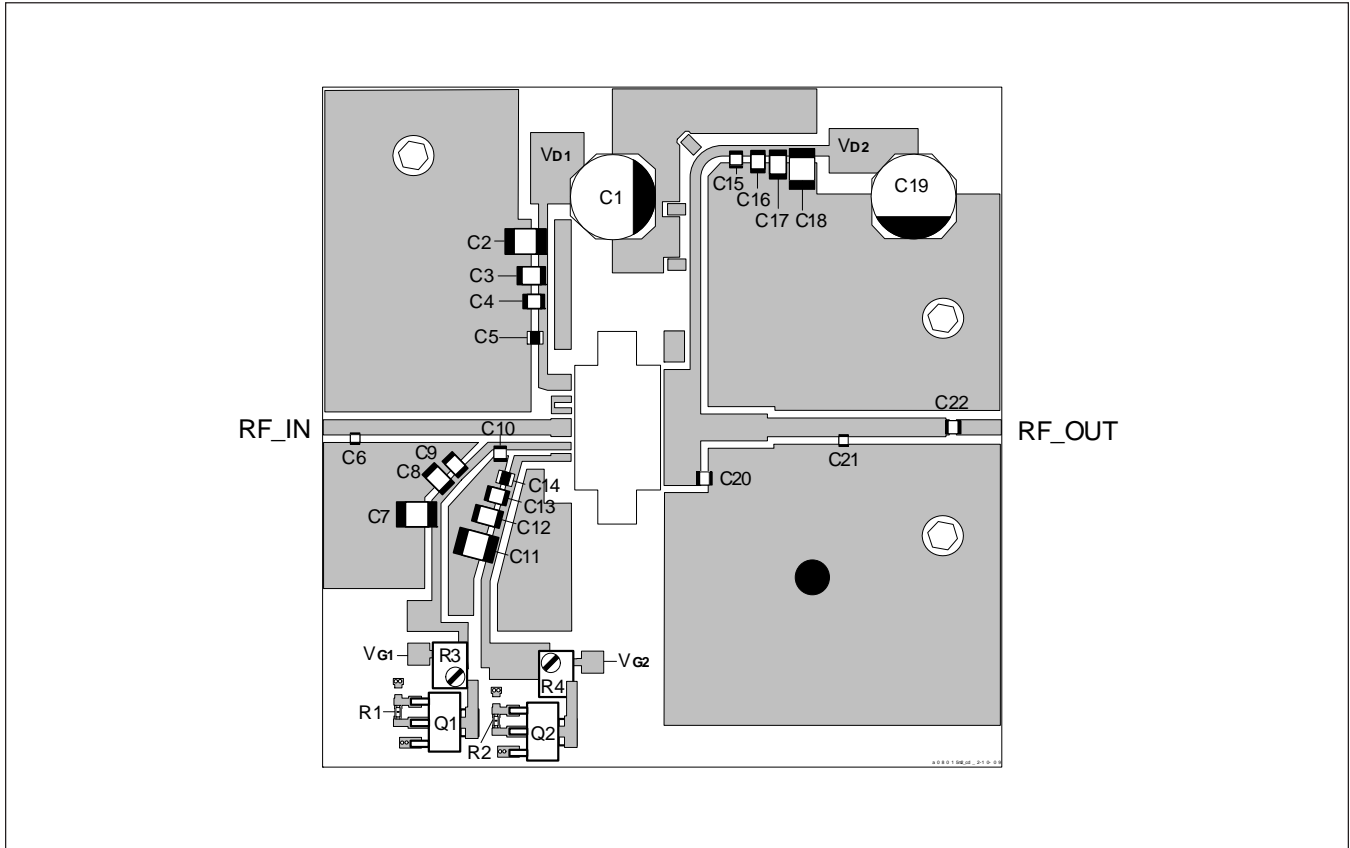
Reference circuit schematic for  $f = 940$  MHz

Circuit Assembly Information

DUT	PTMA080152M	LDMOS IC	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 4.5$	Rogers RO4350	2 oz. copper

Microstrip	Electrical Characteristics at 940 MHz	L x W (mm)	L x W (in.)
$\ell_1$	$0.017 \lambda$ , 50.0 $\Omega$	3.00 x 1.70	0.118 x 0.067
$\ell_2$	$0.143 \lambda$ , 50.0 $\Omega$	24.71 x 1.70	0.973 x 0.067
$\ell_3$	$0.024 \lambda$ , 15.0 $\Omega$	4.09 x 8.64	0.161 x 0.340
$\ell_4$	$0.144 \lambda$ , 59.0 $\Omega$	24.77 x 1.30	0.975 x 0.051
$\ell_5$	$0.024 \lambda$ , 27.0 $\Omega$	4.22 x 4.11	0.166 x 0.162
$\ell_6$	$0.044 \lambda$ , 34.0 $\Omega$	7.57 x 3.02	0.298 x 0.119
$\ell_7$	$0.044 \lambda$ , 44.0 $\Omega$	8.33 x 2.11	0.328 x 0.083
$\ell_8$	$0.0702 \lambda$ , 44.0 $\Omega$	12.12 x 2.11	0.477 x 0.083
$\ell_9$	$0.030 \lambda$ , 44.0 $\Omega$	5.18 x 2.11	0.204 x 0.083

Reference Circuit (cont.)



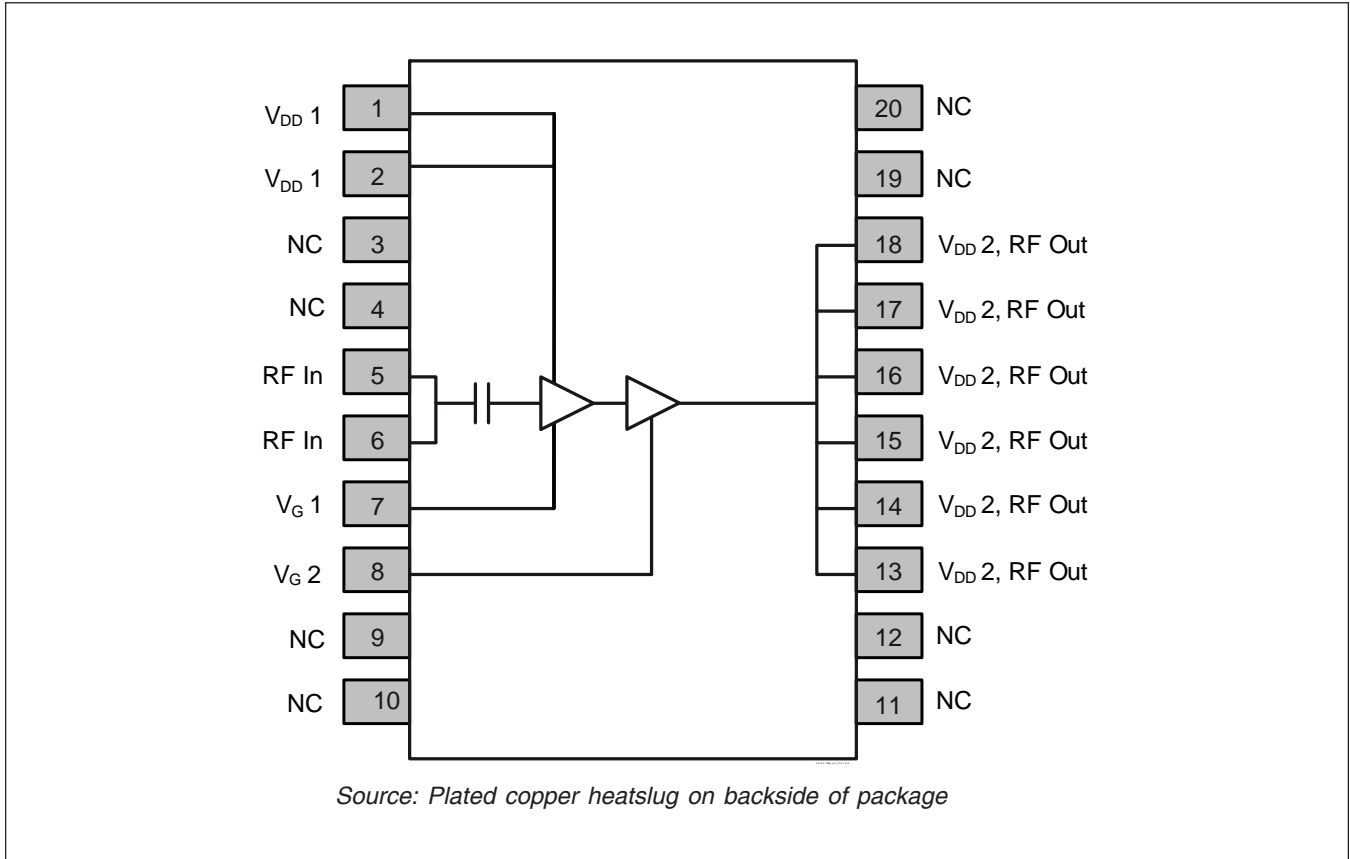
Reference circuit assembly diagram (not to scale)\*

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

\*Gerber Files for this circuit available on request

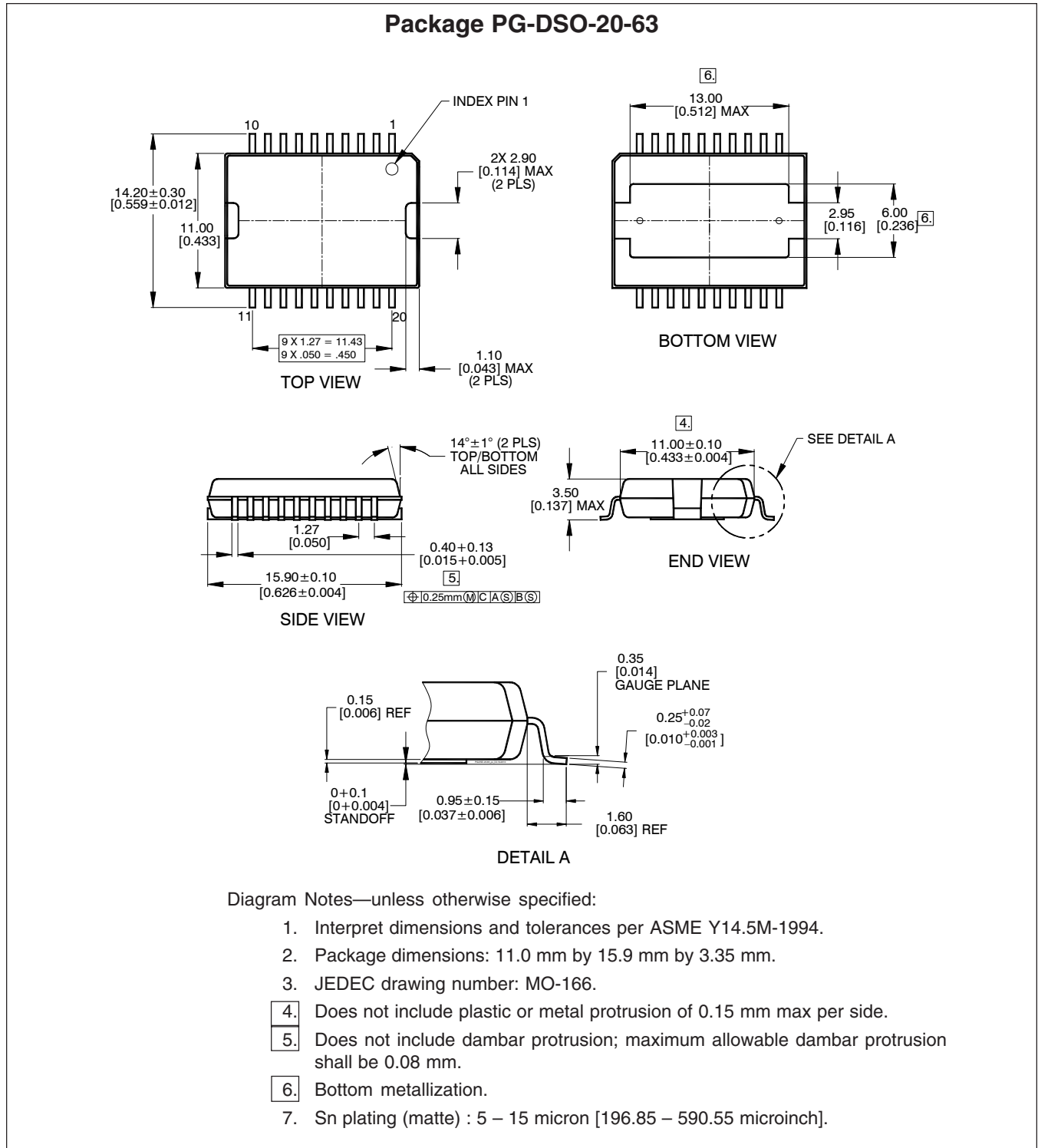


**Pinout Diagram**



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

Package Outline Specifications



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

Revision History: 2010-04-16 Data Sheet

Previous Version: 2009-08-31, Data Sheet

Page	Subjects (major changes since last revision)
3	Added moisture sensitivity level table
10	Updated package outline notes

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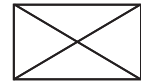
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