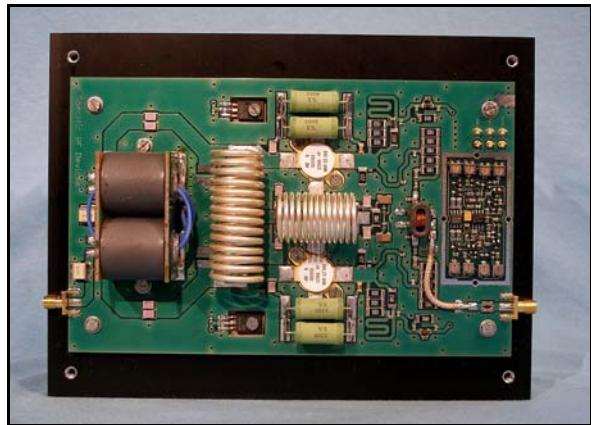


### Features

- Excellent thermal stability
- Frequency: 1.8 - 54 MHz
- Supply voltage: 48 V
- Output power: 450 W typ.
- Input power 10 W max.
- Efficiency: 55 % - 76 %
- IMD at 300 WPEP < -24 dBc
- Load mismatch: 3:1 all phases



### Description

The STEVAL-TDR005V1 is a RF broadband power amplifier intended for linear or nonlinear operation over the band 1.8 to 54 MHz using 2x SD2943 gold metallized N-channel MOS field-effect transistors. The temperature compensating biasing circuit supports class B and class AB operation.

STEVAL-TDR005V1 is designed in cooperation with Specific RF Devices (Germany).

**Table 1. Device summary**

Order code
STEVAL-TDR005V1

## Contents

<b>1</b>	<b>Electrical data</b>	<b>3</b>
1.1	Maximum ratings	3
<b>2</b>	<b>Electrical characteristics</b>	<b>4</b>
<b>3</b>	<b>Typical performance</b>	<b>5</b>
<b>4</b>	<b>Photos of STEVAL-TDR005V1 amplifier</b>	<b>6</b>
<b>5</b>	<b>STEVAL-TDR005V1 class of operation</b>	<b>7</b>
<b>6</b>	<b>SD2943 mounting recommendations</b>	<b>8</b>
6.1	Mounting recommendations	8
6.2	Mounting sequence	8
<b>7</b>	<b>Revision history</b>	<b>10</b>

# 1 Electrical data

## 1.1 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$P_{IN}$	Input power	16	W
$P_{OUT}$	Output power	500	W
$V_{DD}^{(1)}$	Drain supply voltage	50	V
$V_{GG}$	Gate biasing voltage	15	V
$I_{DD}$	Drain current	20	A
$P_{DISS}$	Power dissipation	400	W

1.  $V_{GG}$  from 9 to 15 V and  $P_{IN} < 16$  W

## 2 Electrical characteristics

$T_A = +25^\circ\text{C}$ ,  $V_{DD} = 48\text{ V}$ ,  $I_{DQ} = 2 \times 900\text{ mA}$

**Table 3. Electrical specification**

Symbol	Test Conditions	Min	Typ	Max	Unit
Freq.	Frequency range	1.8		54	MHz
$P_{OUT}$	$P_{IN} = 10\text{ W}$	350	450		W
Gain	$P_{IN} = 10\text{ W}$	$16.6 \pm 0.6\text{ dB}$			dB
ND	$P_{IN} = 10\text{ W}$	55 - 76			%
H2	$2^{\text{ND}}$ Harmonic @ $P_{OUT} = 300\text{ W}$	-24 / -49			dBc
H3	$3^{\text{RD}}$ Harmonic @ $P_{OUT} = 300\text{ W}$	-15 / -58			dBc
VSWR	Load mismatch all phases @ $P_{OUT} = 300\text{ W}$			3:1	

### 3 Typical performance

Figure 1. Output power vs frequency

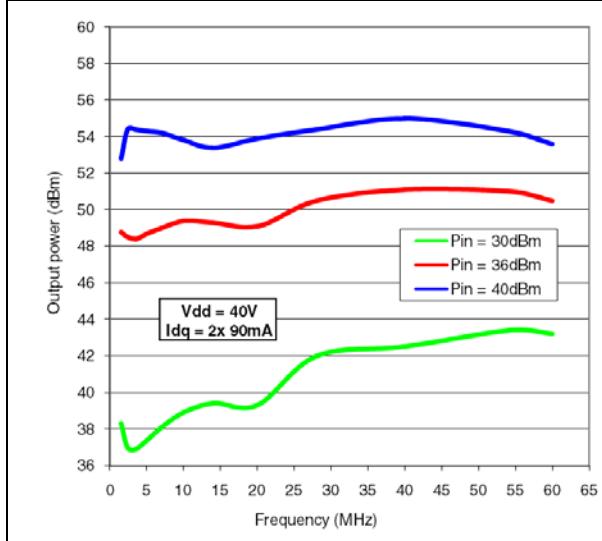
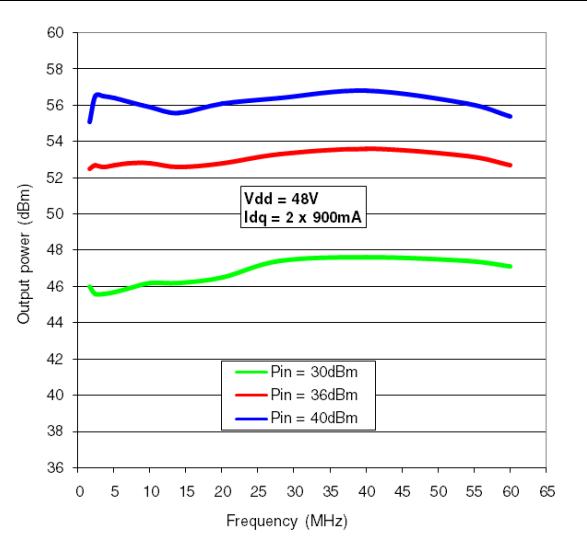


Figure 2. Output power vs frequency



## 4 Photos of STEVAL-TDR005V1 amplifier

Figure 3. Top view

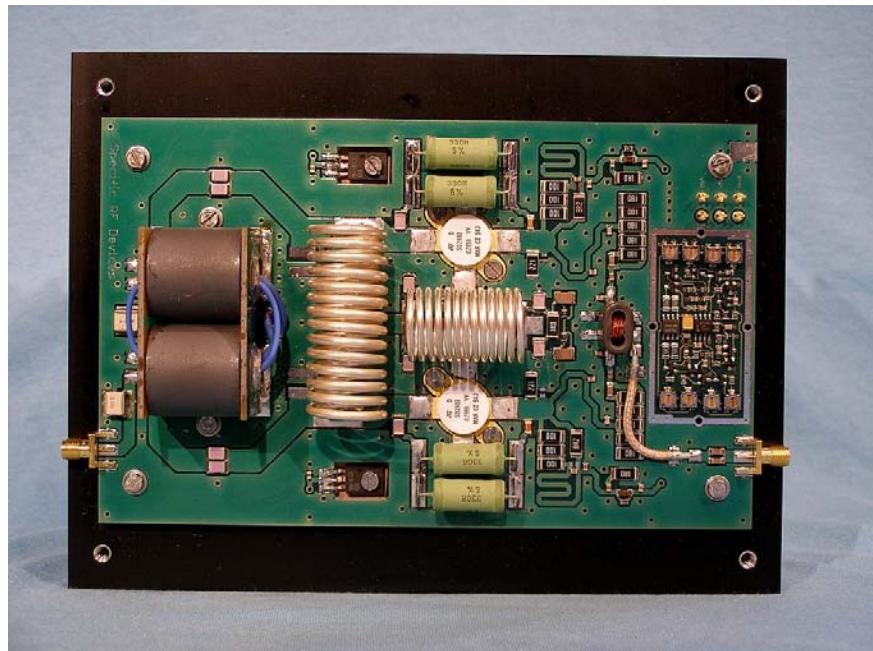
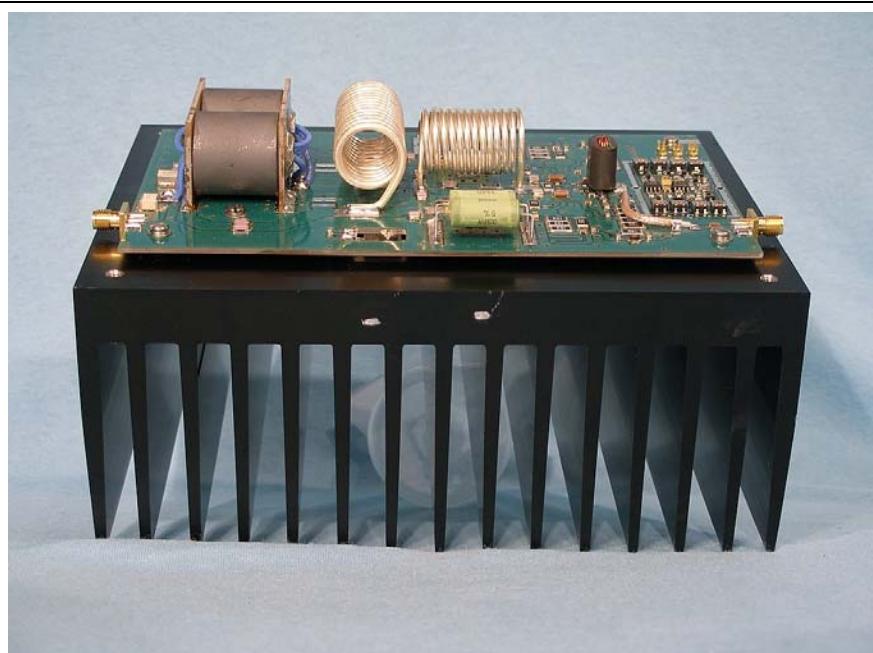


Figure 4. Side view



## 5 STEVAL-TDR005V1 class of operation

- Class B: a low bias point with ~100 mA per transistor
- Class AB: a higher bias point with ~ 900 mA per transistor

To select a bias point, STEVAL-TDR005V1 has a control port "BIAS".

- The bias point is 2x 100 mA if "BIAS" is left open and in this case a DC voltage of ~5 V is present
- The bias point is 2 x 900 mA if "BIAS" is connected to ground.

"PA\_ON" control port / ON-OFF bias current

- To switch-on biasing circuit, connect "PA\_ON" to ground.
- To switch-off biasing circuit, left open "PA\_ON"

## 6 SD2943 mounting recommendations

### 6.1 Mounting recommendations

- Ensure holes in heatsinks are free from burrs;
- Minimum depth of tapped holes in heatsinks is 6 mm;
- Use 4-40 UNC-2A cheese-head screws with a flat washer to spread the joint pressure;
- The minimum flatness of the mounting area is 0.02 mm;
- Mounting area roughness should be less than 0.5  $\mu\text{m}$  (micro);
- Avoid, as much as possible, use of flux or flux solutions because flux can penetrate even when hermetically sealed ceramic-capped transistors. Tin and wash the printed-circuit board BEFORE mounting the power transistors, then solder the transistor leads without using flux;
- Transistor leads may be tinned by dipping them full-length into a solder bath at a temperature of about 230 °C. No flux should be used during tinning;
- Recommended heatsink compounds: WPSII (silicon free) from austrelitz electronics, 340 from down corning etc.

### 6.2 Mounting sequence

- Apply a thin layer of evenly distributed heatsink compound to the flange;
- Position the device with flat washers in place;
- Tighten the screws until finger tight (0.05 Nm);
- Further tighten the screws until the specified torque is reached;
- For M174, M177 and M244 type of packages, torque should be minimum 0.6 Nm and 0.75 Nm max.

**Table 4. DMOS packages - list of materials**

Package Type	Description	Flange	Leadframe	Ceramic insulator	Plating		Torque (Nm)	
					Leads	Flange	Min	Max
M174	0.500 DIA 4L NON HERM W/FLANGE	Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (100 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	Ni(100 $\mu$ min) + Pd (10 $\mu$ min)	0.6	0.75
M174 (Moly disk)	0.500 DIA 4L NON HERM W/FLANGE (MOLY DISK)	Cu-Mo-Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (100 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	Ni(100 $\mu$ min) + Pd (10 $\mu$ min)	0.6	0.75
M177	0.550 DIA 4L NON HERM W/FLANGE	Cu-Mo-Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (60 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	Au (100 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	0.6	0.75
M244	2x 0.400x0.425 WIDE 2L LAP N/H FLANGE	W (85%) - Cu (15%)	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (60 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	Au (60 $\mu$ min) over Ni (100 $\mu$ min / 350 $\mu$ max)	0.6	0.75

## 7 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
01-Jul-2008	1	Initial release.
18-Mar-2010	2	Updated description on cover page.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[STEVAL-TDR005V1](#)