



## PD54003L-E

### RF Power Transistors The LdmoST Plastic FAMILY

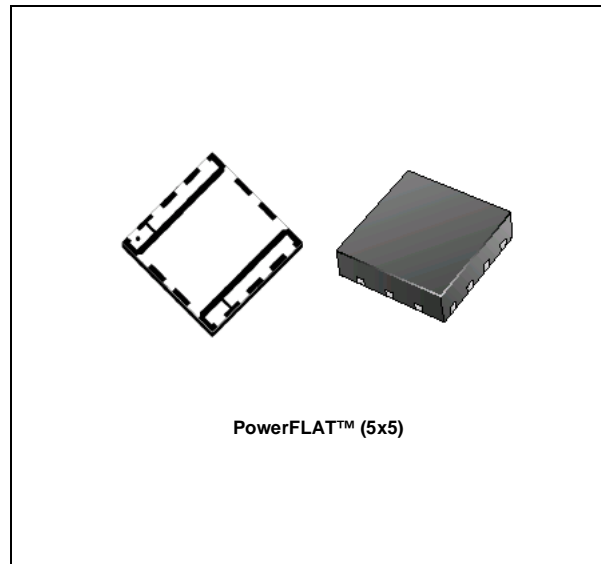
#### Features

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- $P_{OUT} = 3W$  WITH 20 dB GAIN @ 500MHz
- NEW RF PLASTIC PACKAGE
- EDS PROTECTION
- SUPPLIED IN TAPE & REEL OF 3K UNITS
- IN COMPLIANCE WITH THE 2002/93/EC EUROPEAN DIRECTIVE

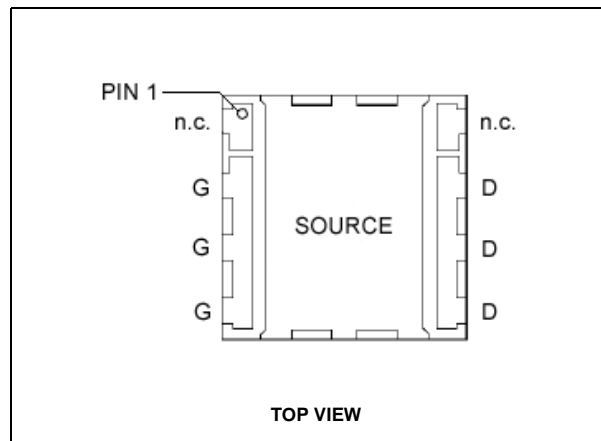
#### Description

The PD54003L-E is a common source N-Channel, enhancement-mode lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 7 V in common source mode at frequencies of up to 1 GHz. PD54003L-E boasts the excellent gain, linearity and reliability of STH1LV latest LDMOS technology mounted in the innovative leadless SMD plastic package, PowerFLAT™.

PD54003L-E's superior linearity performance makes it an ideal solution for portable radio.



#### Pin Connection



#### Order Codes

Part Number	Marking	Package	Packaging
PD54003L-E	54003	PowerFLAT (5x5)	Tape & Reel

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## Contents

<b>1</b>	<b>Electrical Data</b> .....	<b>3</b>
1.1	Maximum Ratings .....	3
1.2	Thermal Data .....	3
1.3	Electrical Characteristics .....	4
<b>2</b>	<b>Typical Performance</b> .....	<b>5</b>
2.1	Typical Performance (Broadband) .....	7
<b>3</b>	<b>Package Mechanical Data</b> .....	<b>8</b>
<b>4</b>	<b>Revision History</b> .....	<b>12</b>

# 1 Electrical Data

## 1.1 Maximum Ratings

**Table 1. Absolute Maximum Ratings**

( $T_{CASE} = 25^{\circ}C$ )

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	25	V
$V_{GS}$	Gate-Source Voltage	-0.5 to +15	V
$I_D$	Drain Current	4	A
$P_{DISS}$	Power Dissipation ( $t_{case}=70^{\circ}C$ )	19.5	W
$T_J$	Max. Operating Junction Temperature	150	$^{\circ}C$
$T_{STG}$	Storage Temperature	-65 to +150	$^{\circ}C$

## 1.2 Thermal Data

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Junction to Case thermal resistance	4.1	$^{\circ}C/W$

## 1.3 Electrical Characteristics

( $T_{CASE} = 25^{\circ}C$ )

**Table 3. Static**

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$I_{DSS}$	$V_{GS} = 0 V$	$V_{DS} = 25 V$			1	$\mu A$
$I_{GSS}$	$V_{GS} = 20 V$	$V_{DS} = 0 V$			1	$\mu A$
$V_{GS(Q)}$	$V_{DS} = 10 V$	$I_D = 50 mA$	2.0		3.3	V
$V_{DS(ON)}$	$V_{GS} = 10 V$	$I_D = 0.5 A$		0.13	0.16	V
$g_{FS}$	$V_{DS} = 10 V$	$I_D = 3.2 A$		TBD		mho
$C_{ISS}$	$V_{GS} = 0 V$	$V_{DS} = 7.5 V$		54		pF
$C_{OSS}$	$V_{GS} = 0 V$	$V_{DS} = 7.5 V$		43		pF
$C_{RSS}$	$V_{GS} = 0 V$	$V_{DS} = 7.5 V$		4.0		pF

**Table 4. Dynamic**

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$P_{OUT}$	$V_{DD} = 7.5 V$	$I_{DQ} = 50 mA$ $f = 500MHz$	3			W
$G_{PS}$	$V_{DD} = 7.5 V$	$I_{DQ} = 50 mA$ $P_{OUT} = 3 W$ $f = 500MHz$	16	20		dB
$\eta_D$	$V_{DD} = 7.5 V$	$I_{DQ} = 50 mA$ $P_{OUT} = 3 W$ $f = 500MHz$	50	55		%
Load Mismatch	$V_{DD} = 9.5 V$	$I_{DQ} = 50 mA$ $P_{OUT} = 3W$ $f = 500MHz$ All Phase Angles	20:1			VSWR

**Table 5. ESD Protection Characteristics**

Test Conditions	Class
Human Body Model	2
Machine Model	M3

**Table 6. Moisture Sensitivity Level**

Test Methodology	Rating
J-STD-020B	MSL 3

## 2 Typical Performance

Figure 1. Capacitance vs. Supply Voltage

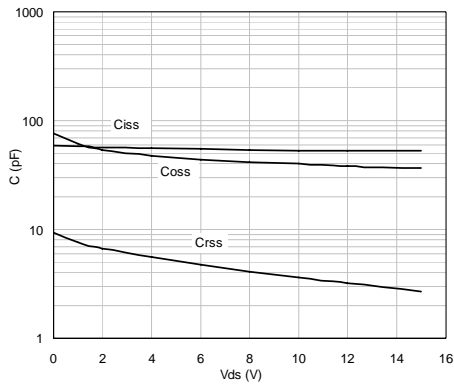


Figure 2. Output Power vs. Input Power

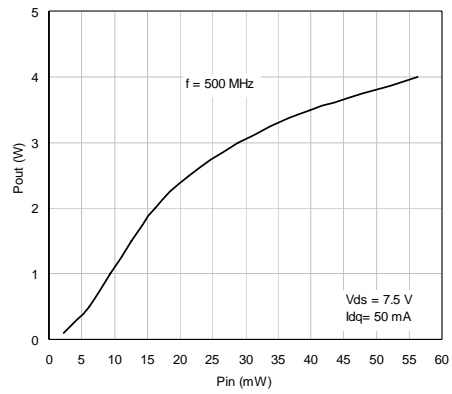


Figure 3. Power Gain vs. Output Power

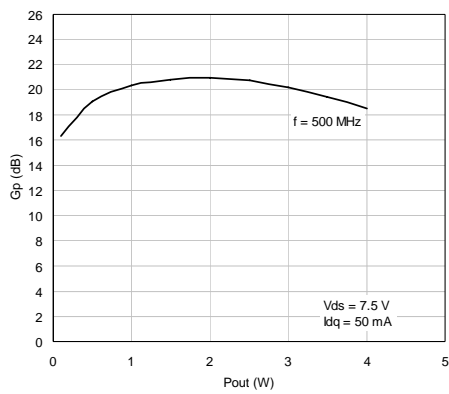


Figure 4. Efficiency vs. Output Power

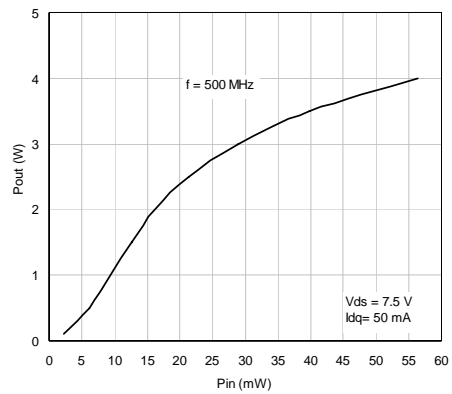


Figure 5. Output Power vs. Bias Current

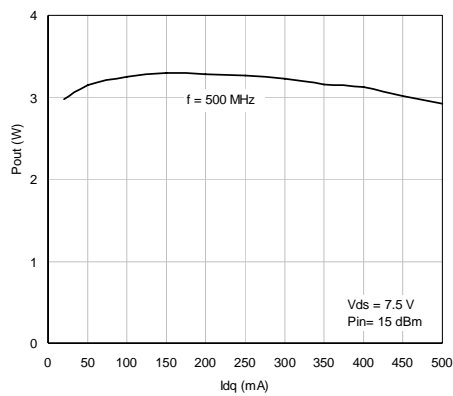


Figure 6. Efficiency vs Bias Current

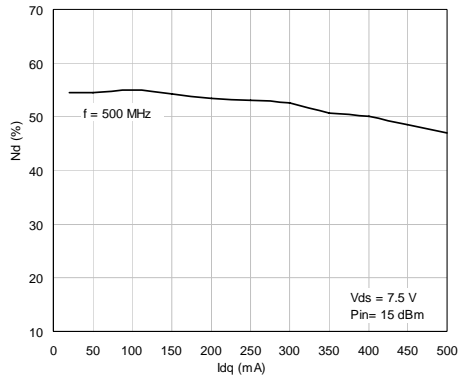


Figure 7. Output Power vs Supply Voltage

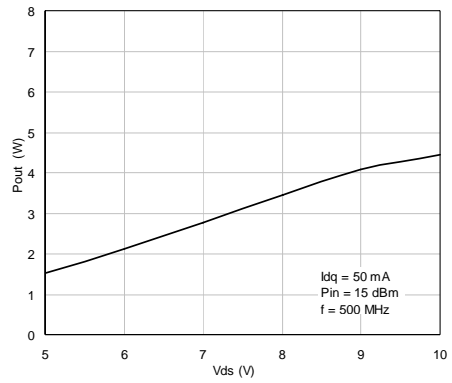
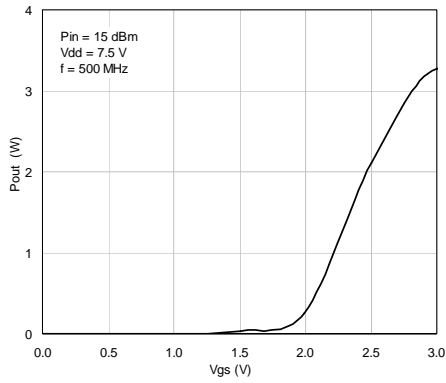


Figure 8. Output Power vs Gate-Source Volt



## 2.1 Typical Performance (Broadband)

Figure 9. Power Gain vs Frequency

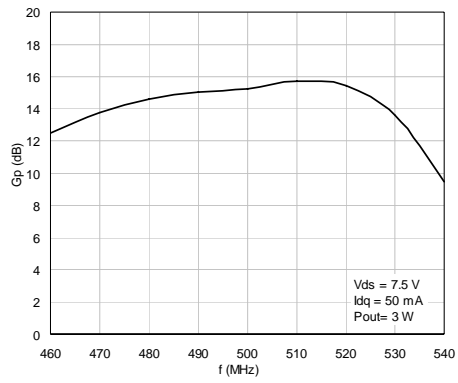


Figure 10. Efficiency vs Frequency

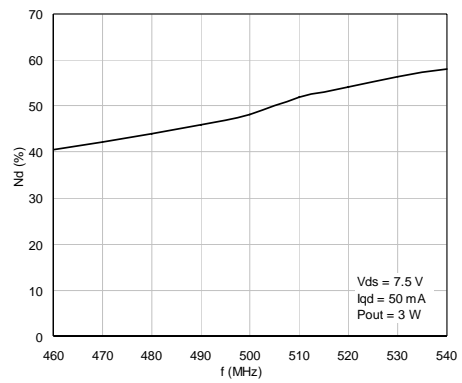
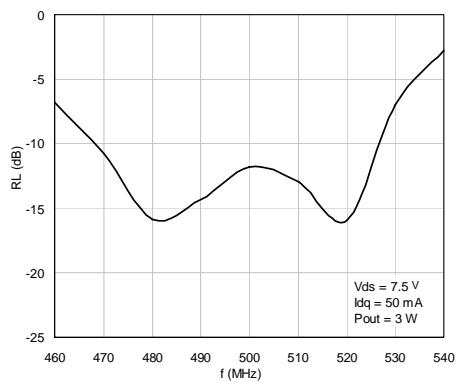


Figure 11. Return Loss vs Frequency



### 3 Package Mechanical Data

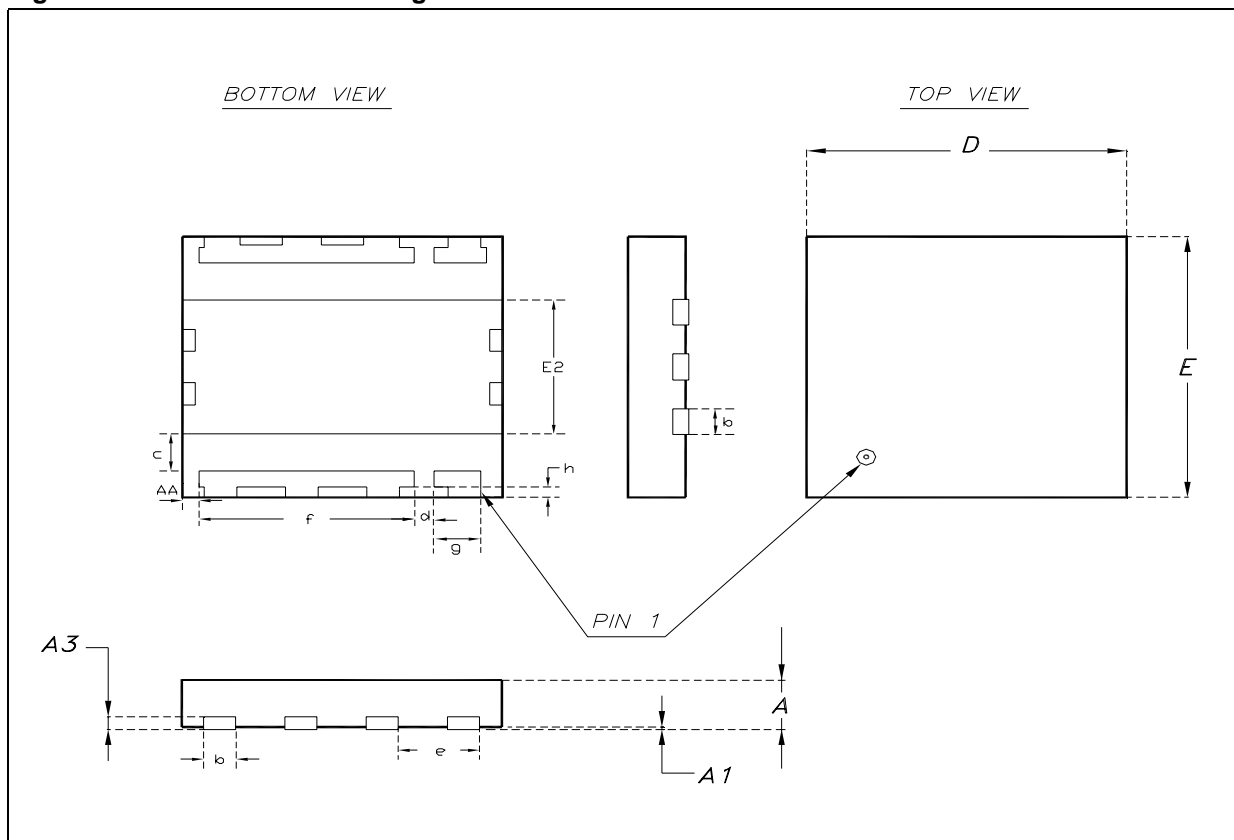
In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)



Table 7. PowerFLAT™ Mechanical Data

Dim.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		0.90	1.00		0.035	0.039
A1		0.02	0.05		0.001	0.002
A3		0.24			0.009	
AA	0.15	0.25	0.35	0.006	0.01	0.014
b	0.43	0.51	0.58	0.017	0.020	0.023
c	0.64	0.71	0.79	0.025	0.028	0.031
D		5.00			0.197	
d		0.30			0.011	
E		5.00			0.197	
E2	2.49	2.57	2.64	0.098	0.101	0.104
e		1.27			0.050	
f		3.37			0.132	
g		0.74			0.03	
h		0.21			0.008	

Figure 12. PowerFLAT™ Package Dimensions



**Table 8. PowerFLAT™ Tape & Reel Dimensions**

DIM.	mm.		
	MIN.	TYP	MAX.
Ao	5.15	5.25	5.35
Bo	5.15	5.25	5.35
Ko	1.0	1.1	1.2

**Figure 13. PowerFLAT™ Tape & Reel**

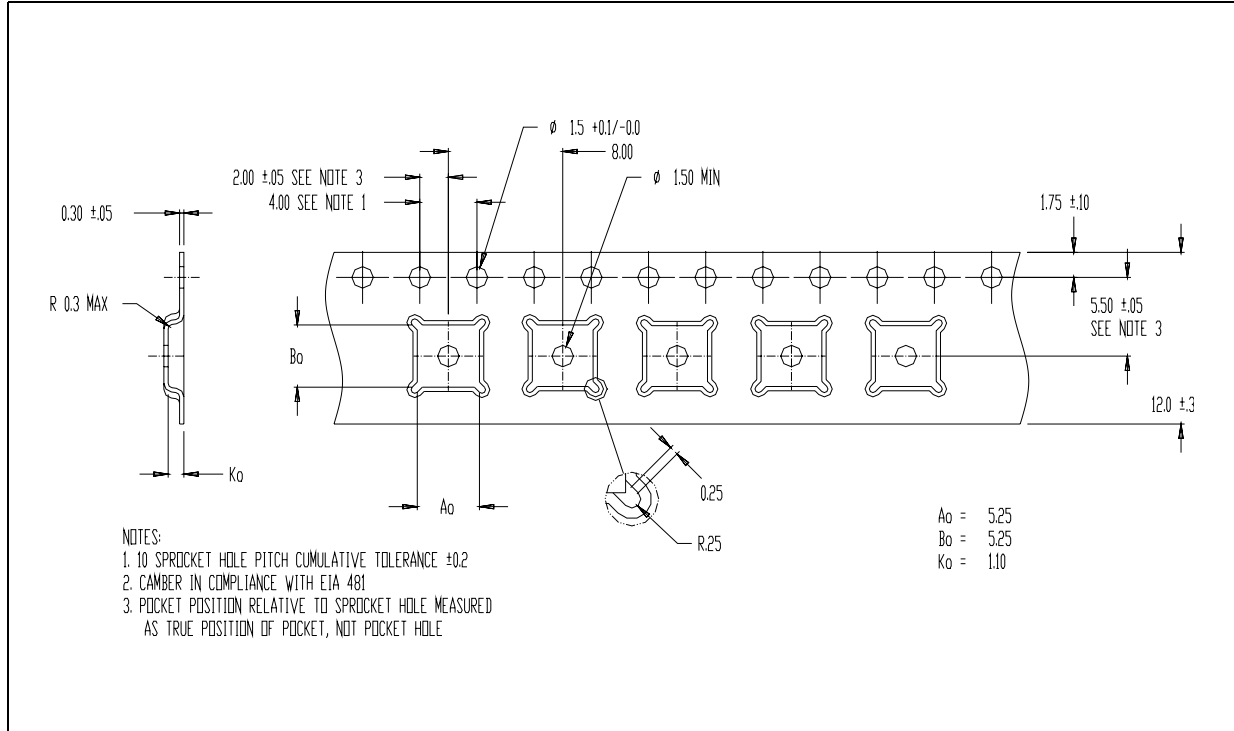
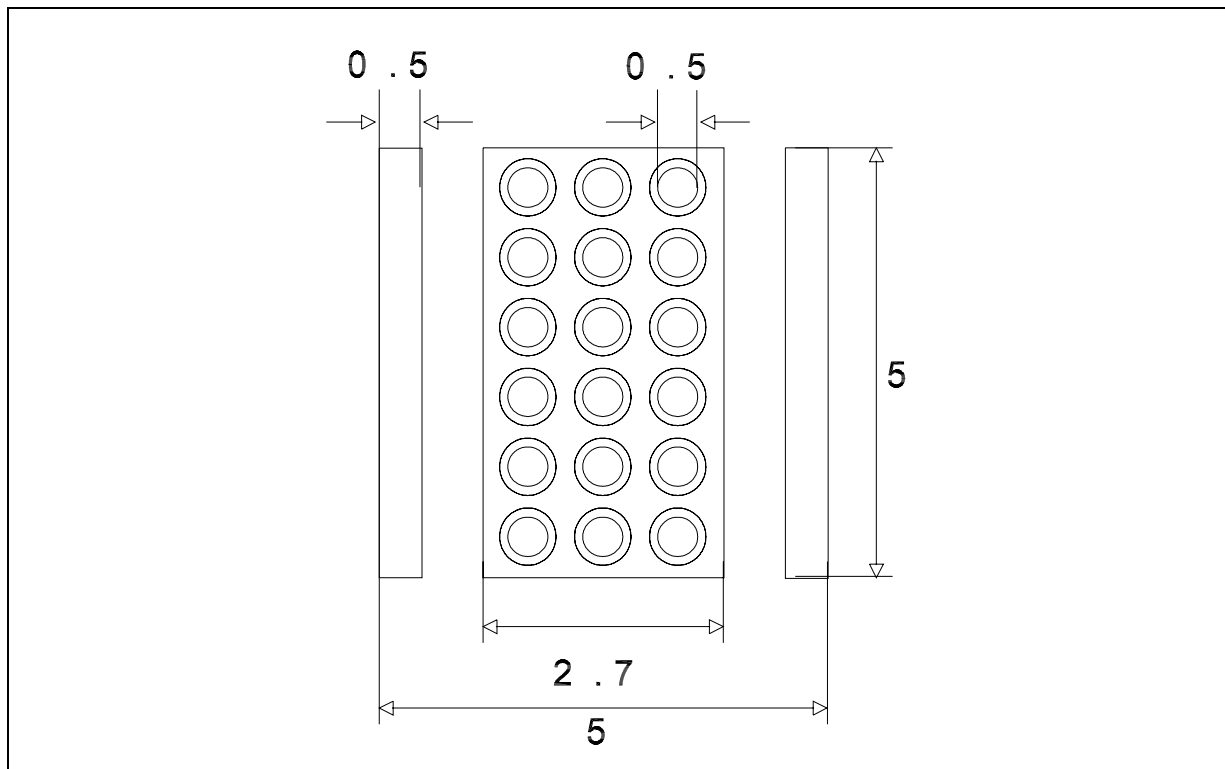


Table 9. Recommended FOOTPRINT



## 4 Revision History

Date	Revision	Description of Changes
04-Jan-2006	1	First Issue.

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