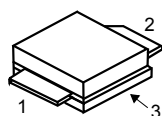


45 W, 28 V, 0.7 to 1.7 GHz RF Power LDMOS transistor



A2

Pin connection	
Pin	Connection
1	Gate
2	Drain
3	Source (bottom side)

Features

Order code	Frequency	V _{DD}	P _{OUT}	Gain	Efficiency
ST16045	1330 MHz	28 V	45 W	20 dB	55 %

- High efficiency and linear gain operations
- Integrated ESD protection
- Internally input matched for ease of use
- Large positive and negative gate-source voltage range for improved class C operation
- In compliance with the european directive 2002/95/EC

Applications

- GPS
- Telecom
- Industrial, scientific and medical driver

Description

The **ST16045** is a 45 W, 28 V input matched LDMOS transistor designed for global positioning system and communication/ISM applications with frequencies from 700 to 1700 MHz. It can be used in class AB, B or C for all typical modulation formats.



Product status link
ST16045

Product summary	
Order code	ST16045
Marking	ST16045
Package	A2
Packing	Tape and reel 13"
Base / Bulk Qty	160 / 160

1 Electrical ratings

Table 1. Absolute maximum ratings ($T_C = 25\text{ °C}$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	65	V
V_{GS}	Gate-source voltage	-6 to 10	V
V_{DD}	Maximum operating voltage	32	V
T_{STG}	Storage temperature range	-65 to +150	°C
T_J	Maximum junction temperature	+200	°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thJC}^{(1)}$	Thermal resistance, junction-to-case	0.7	°C/W

1. $T_C=85\text{ °C}$, $T_J=200\text{ °C}$, DC test

Table 3. ESD protection

Symbol	Parameter	Class
HBM	Human body model (according to ANSI/ESDA/JEDEC JS001-2017)	1B
CDM	Charge device model (according to ANSI/ESDA/JEDEC JS-002-2014)	C3

2 Electrical characteristics

($T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise specified).

Table 4. Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$	65	-		V
I_{DSS}	Zero-gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = 28\text{ V}$		-	1	μA
		$V_{GS} = 0\text{ V}$, $V_{DS} = 50\text{ V}$		-		
I_{GSS}	Gate-body leakage current	$V_{GS} = -6/10\text{ V}$, $V_{DS} = 0\text{ V}$		-	± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = 28\text{ V}$, $I_D = 300\text{ }\mu\text{A}$	1.5	-	2.5	V
$V_{GS(Q)}$	Gate quiescent voltage	$V_{DS} = 1\text{ V}$, $I_{DS} = 50\text{ mA}$	1.7	-	3.2	V
$V_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 1\text{ V}$, $I_D = 500\text{ mA}$		-	0.22	V

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
f	Frequency		0.7		1.7	GHz
P_{OUT}	Output power	f = 1330 MHz		45		W
G_{PS}	Power gain			20		dB
η_D	Drain efficiency			55		%
VSWR	Load mismatch	$P_{OUT} = 45\text{ W}$ all phases			10:1	

Note: $V_{DD} = 28\text{ V}$, $I_{DQ} = 200\text{ mA}$, CW test signal.

3 Typical performance

Figure 1. Power gain and efficiency versus output power (f = 1330 MHz)

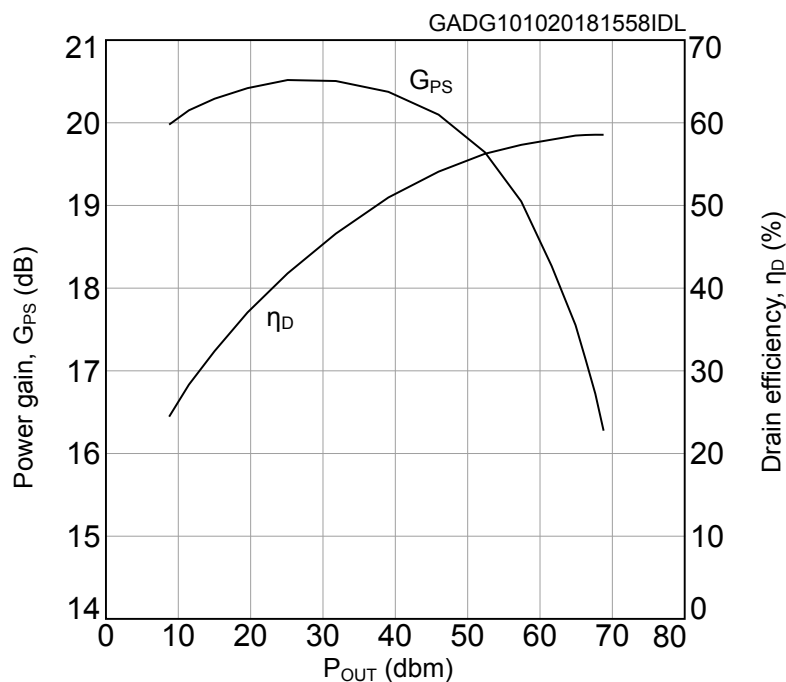


Figure 2. Power gain and drain efficiency vs frequency at P_{AVG} = 42dBm (broadband, 1350 - 1650 MHz)

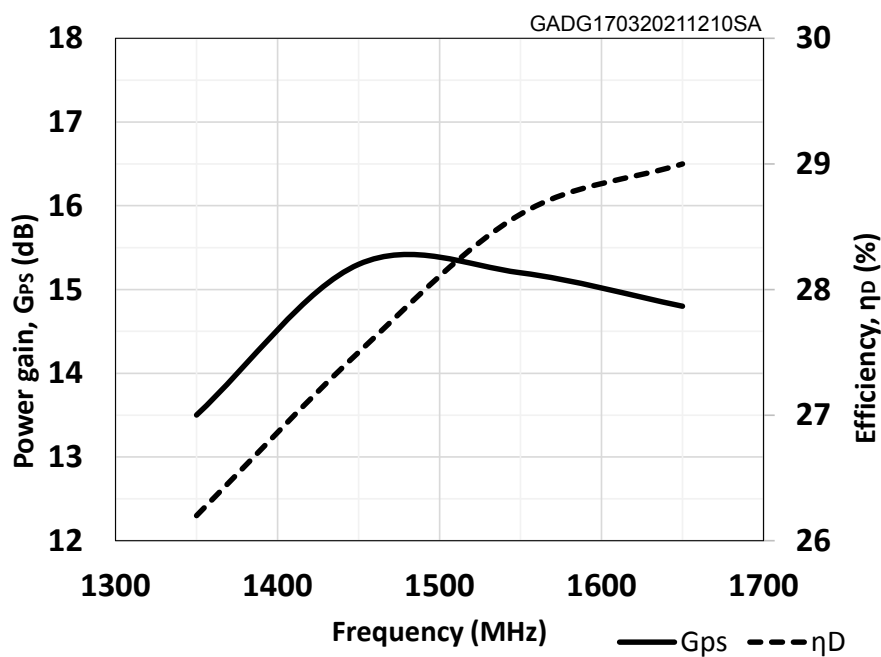
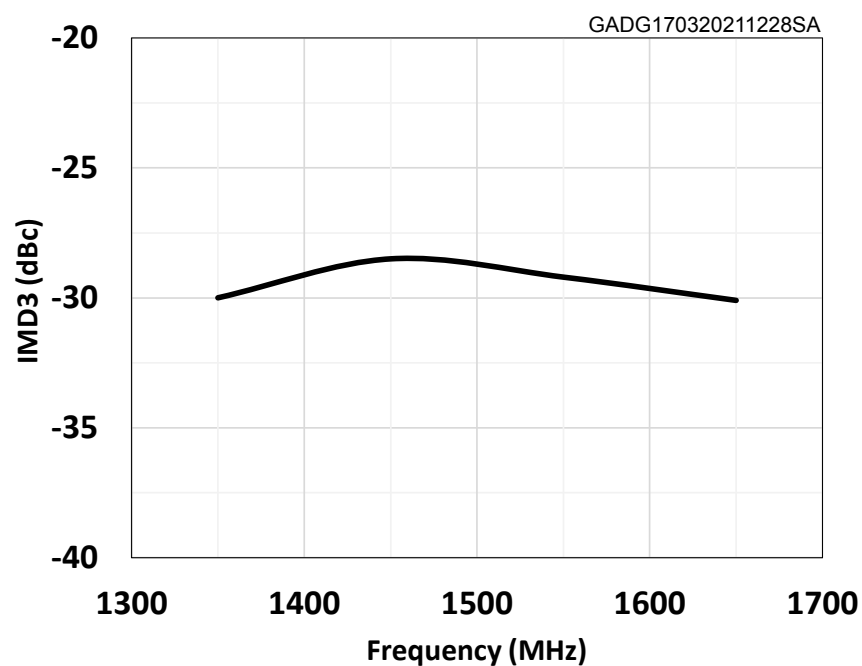
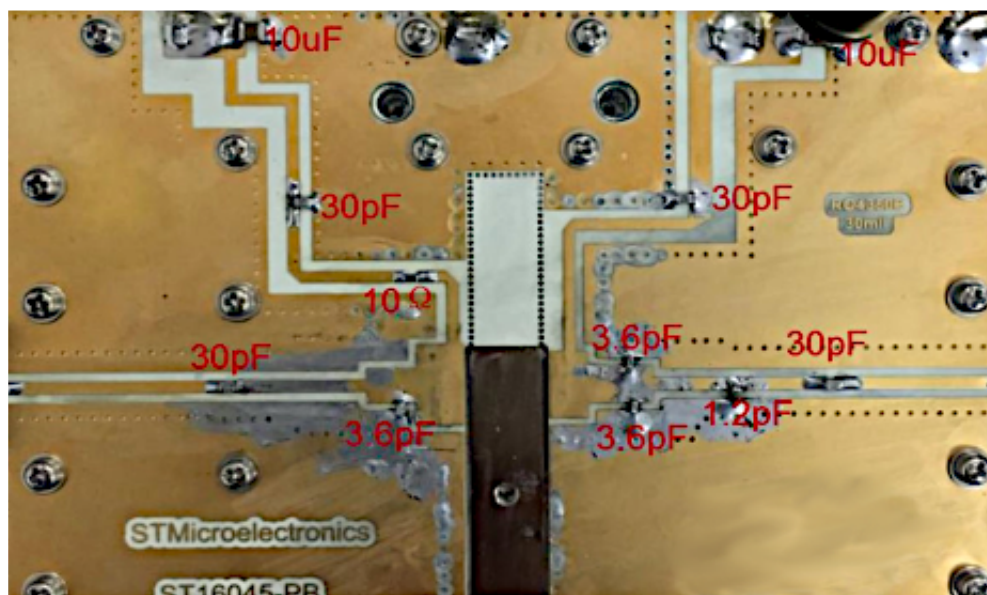


Figure 3. IMD3 versus frequency at $P_{AVG} = 42\text{dBm}$ (broadband, 1350 - 1650 MHz, 1MHz spacing)



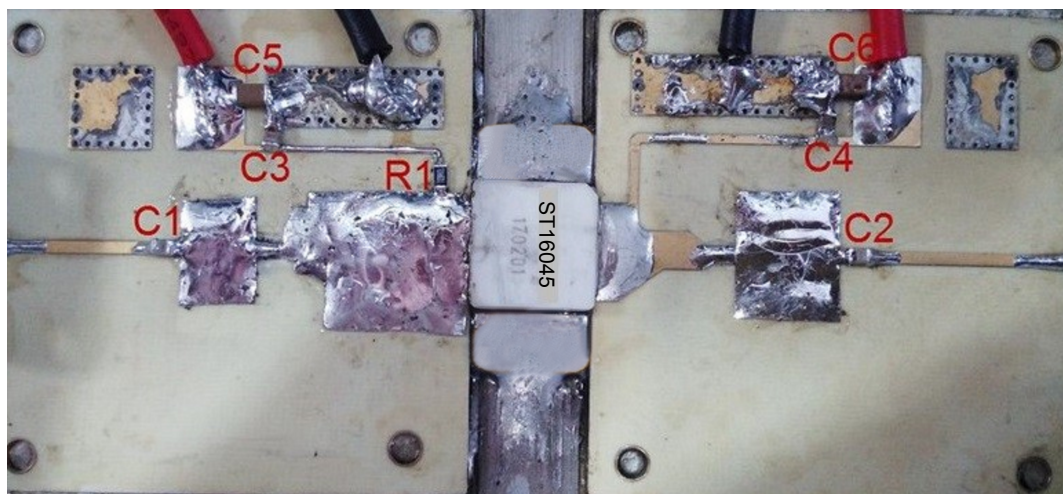
4 Test circuits

Figure 4. Test circuit photo (f=1330 MHz)



GADG180320210846SA

Figure 5. Test circuit (broadband, 1350 - 1650 MHz)



GADG180320210852SA

Table 6. Component list (broadband, 1350 - 1650 MHz)

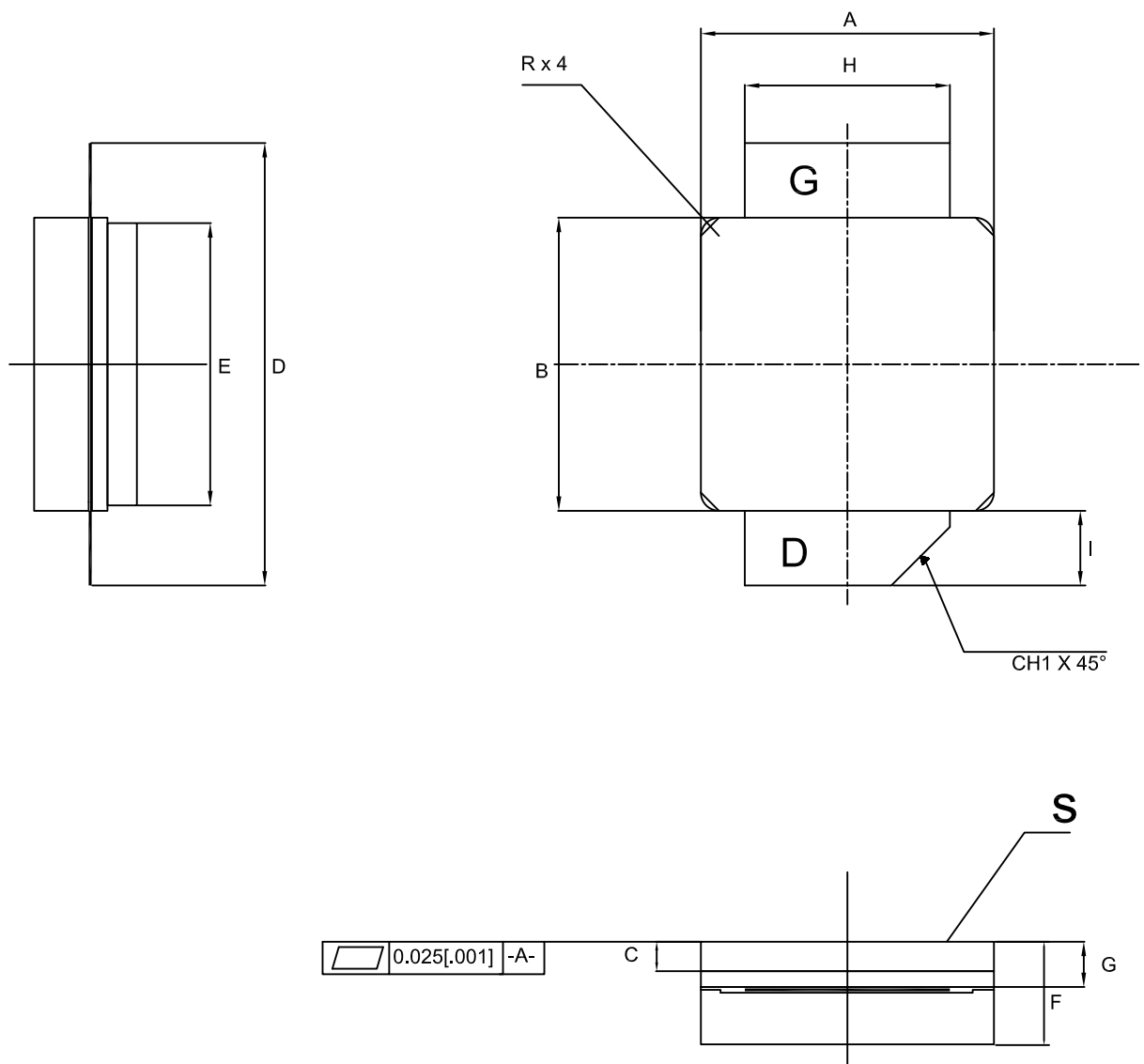
Reference	Value	Size	Reference
C1, C2, C3, C4	33 pF	0805	ATC600F
C5, C6	1 μ F	1210	50 V ceramic multilayer capacitor
R1	10 Ω	0805	chip resistor
Q1	ST16045		
PCB	0.508 mm (0.020") thick, $\epsilon_r = 3.48$, Rogers RO4350B		

5 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

5.1 A2 package information

Figure 6. A2 package outline



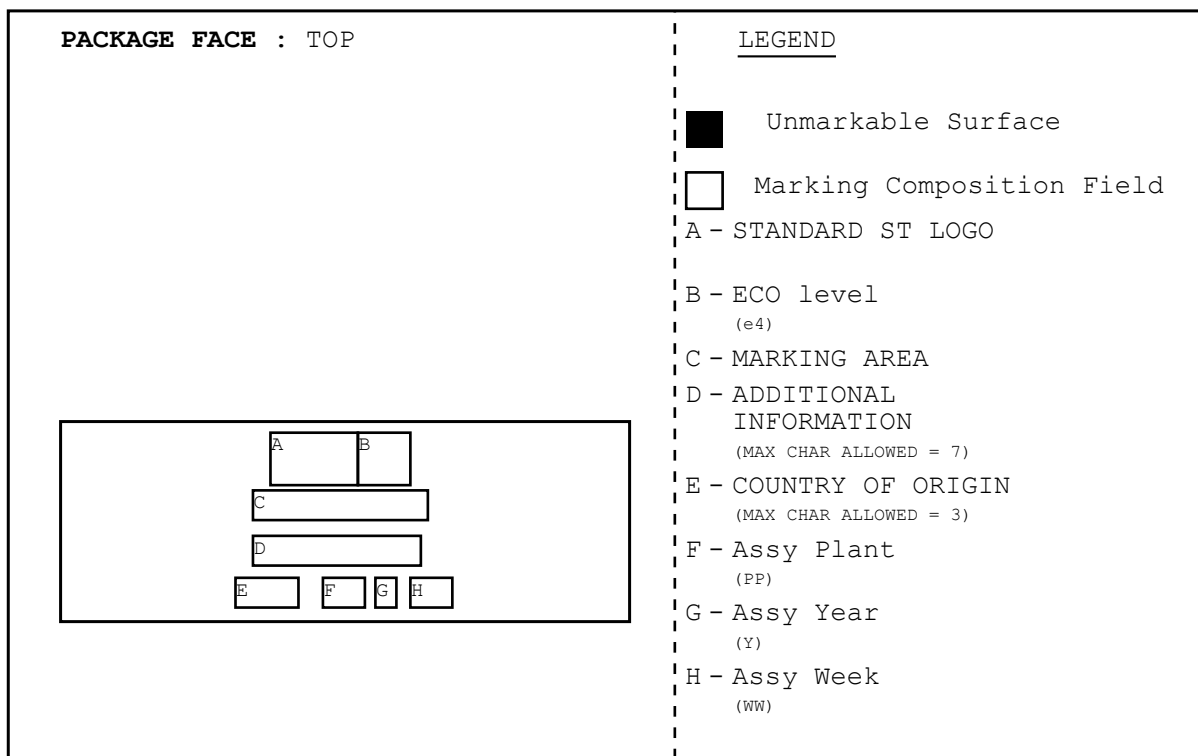
DM00418526_2

Table 7. A2 mechanical data

Symbol	Millimetres		
	Min.	Typ.	Max.
A	10.03	10.16	10.29
B	10.03	10.16	10.29
C	0.89	1.02	1.15
D	15.21	15.34	15.47
E	9.65	9.78	9.91
F	3.43	3.56	3.69
G	1.44	1.57	1.70
H	6.98	7.11	7.24
I	2.08	2.59	3.10
CH1		2.03	
R			0.63

6 Marking information

Figure 7. Marking composition



GADG040220211644GT

Revision history

Table 8. Document revision history

Date	Version	Changes
15-Oct-2018	1	Initial release.
23-Sep-2020	2	Updated <i>Section Product status / summary</i> , <i>Table 5. Dynamic</i> and <i>Section 4.1 A2 package information</i> .
18-Mar-2021	3	Modified <i>Section 1 Electrical ratings</i> , <i>Table 2. Thermal data</i> , <i>Table 3. ESD protection</i> , <i>Table 4. Static</i> and <i>Table 5. Dynamic</i> . Added <i>Section 3 Typical performance</i> . Modified the entire <i>Section 4 Test circuits</i> . Added <i>Section 6 Marking information</i> .

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