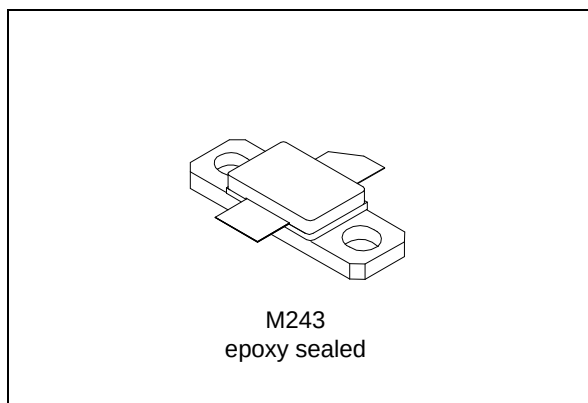


RF power transistor from the LdmoST family of N-channel enhancement-mode lateral MOSFETs

Datasheet - production data



Features

- Excellent thermal stability
- Common source configuration
- P_{OUT} (@ 28 V)= 60 W with 13.8 dB gain @ 1600 MHz
- BeO free package
- In compliance with the 2002/95/EC European directive

Description

The LET16060C is a common source N-channel enhancement-mode lateral field-effect RF power transistor designed for broadband commercial and industrial applications at frequencies up to 1.6 GHz. The LET16060C is designed for high gain and broadband performance operating in common source mode at 28 V. It is ideal for INMARSAT satellite communications.

Figure 1. Pin out

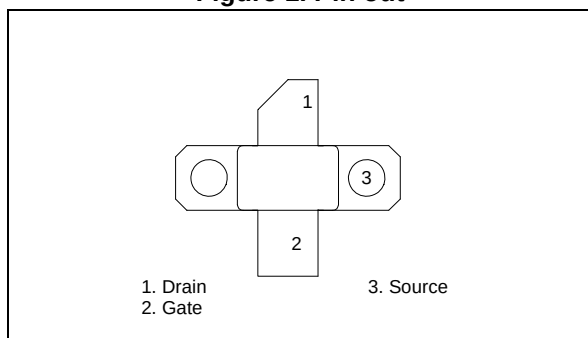


Table 1. Device summary

Order code	Package	Branding
LET16060C	M243	LET16060C

1 Maximum ratings

Table 2. Absolute maximum ratings ($T_{CASE} = 25\text{ °C}$)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	80	V
V_{GS}	Gate-source voltage	-0.5 to +15	V
I_D	Drain current	12	A
P_{DISS}	Power dissipation (@ $T_C = 70\text{ °C}$)	100	W
T_J	Max. operating junction temperature	200	°C
T_{STG}	Storage temperature	-65 to +150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{th(JC)}$	Junction-case thermal resistance	1.3	°C/W

2 Electrical characteristics

$T_C = 25\text{ }^{\circ}\text{C}$

Table 4. Static

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}; I_{DS} = 10\text{ mA}$	80			V
I_{DSS}	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$			1	μA
I_{GSS}	$V_{GS} = 5\text{ V}; V_{DS} = 0\text{ V}$			1	μA
$V_{GS(Q)}$	$V_{DS} = 28\text{ V}; I_D = 400\text{ mA}$	2		5	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}; I_D = 3\text{ A}$		0.8	1.2	V
G_{FS}	$V_{DS} = 10\text{ V}; I_D = 3\text{ A}$	2.5			mho
C_{ISS}	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		77		pF
C_{OSS}	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		39		pF
C_{RSS}	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$		1.2		pF

Table 5. Dynamic

Symbol	Test conditions	Min.	Typ.	Max.	Unit
P_{OUT}	$V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{IN} = 4\text{ W}; f = 1600\text{ MHz}$	60	70	-	W
G_{PS}	$V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{OUT} = 60\text{ W}; f = 1600\text{ MHz}$	12.5	13.8		dB
h_D	$V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{IN} = 4\text{ W}; f = 1600\text{ MHz}$	50	55		%
Load mismatch	$V_{DD} = 28\text{ V}; I_{DQ} = 400\text{ mA}; P_{OUT} = 60\text{ W}; f = 1600\text{ MHz}$ All phase angles		20:1		VSWR

Table 6. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	1.3	$^{\circ}\text{C/W}$

Table 7. Impedance data

Frequency (MHz)	Z source (Ω)	Z load (Ω)
1600	$1.3 - j2.3$	$0.2 - j.96$

3 Typical performances

Figure 2. Gain and efficiency vs output power

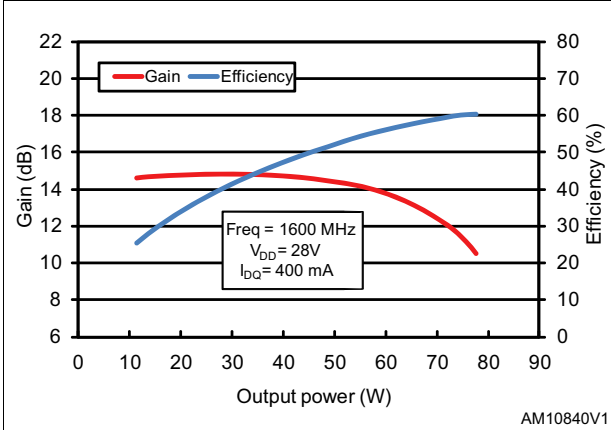


Figure 3. Gain vs output power and bias current

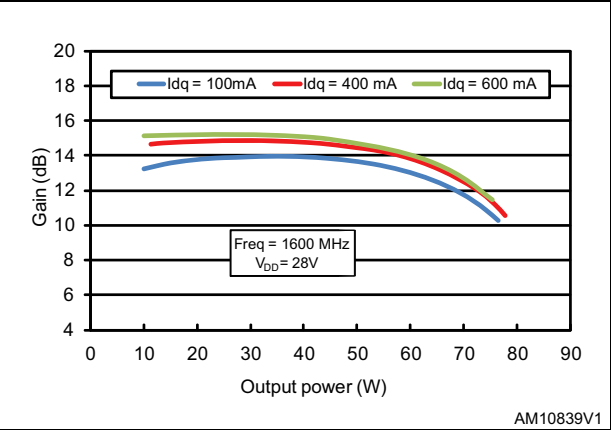
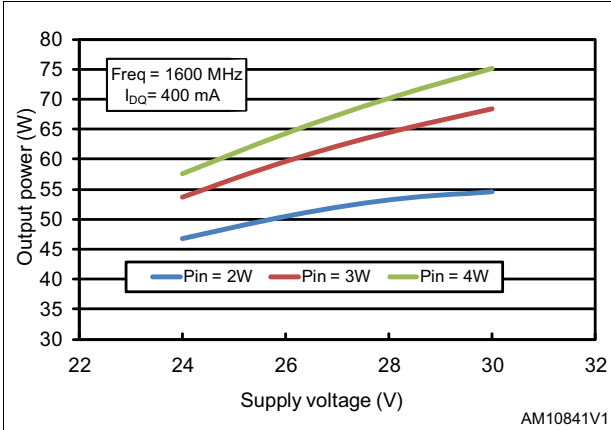


Figure 4. Output power vs drain supply voltage



4 Board layout, schematic and BOM

Figure 5. Board layout

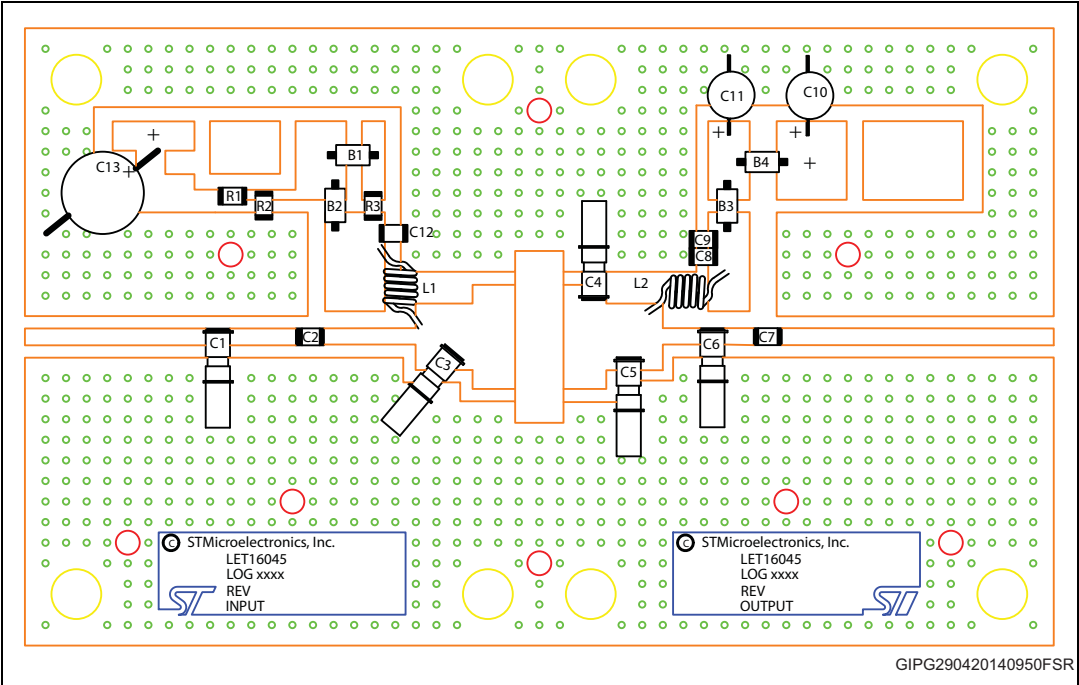


Figure 6. Schematic

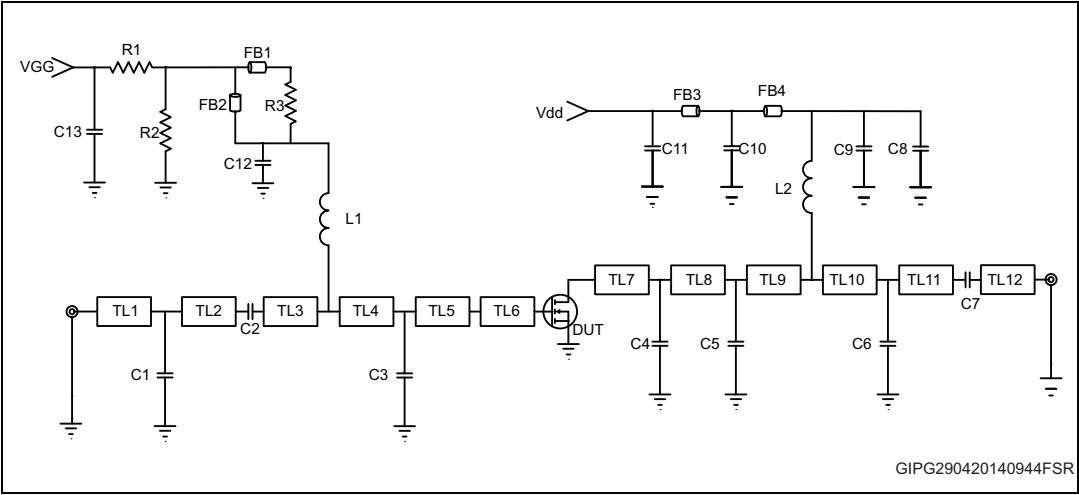


Table 8. Component list

Item	Qty	Part number	Vendor	Description
R1	1	CR1206-8W-561JB	VENKEL	560 OHM, 1/8W surface mount chip resistor
R2	1	CR1206-8W-132JB	VENKEL	1.3K OHM, 1/8W surface mount chip resistor
R3	1	CR1206-8W-100JB	VENKEL	10 OHM, 1/8W surface mount chip resistor
FB1,2,3,4,	4	2743021447	FAIR-RITE CORP	Surface Mount EMI shield bead
C1,C4,C5,C6	4		JOHANSON	0.6-4.5pF giga trim variable capacitor
C2,C7,C9,C12	4	ATC100B470XXXX	ATC	47 pF chip capacitor
C3	1	27291PC	JOHANSON	0.8-8pF giga trim variable capacitor
C8	1	ATC100B330XXXX	ATC	33pF chip capacitor
C10	1			330uF, 50V electrolytic capacitor
C11	1			10uF, 63V electrolytic capacitor
C13	1			100uF, 63V electrolytic capacitor
L1, L2	2	1812SMS-33NJ	Coilcraft	33 nH coil
TL1, TL2	2			L= 1.350in [34.29mm] W=0.082in [2.080mm]
TL3	1			L= 0.469in [11.91mm] W=0.080in [2.020mm]
TL4, TL5	2			L= 0.277in [7.03mm] W=0.323in [8.210mm]
TL6	1			L= 0.207in [5.26mm] W=0.506in [12.85mm]
TL7	1			L= 0.208in [5.28mm] W=0.506in [12.85mm]
TL8,TL9	2			L= 0.275in [6.98mm] W=0.324in [8.230mm]
TL10,TL11	2			L= 0.470in [11.93mm] W=0.080in [2.020mm]
TL12	1			L= 1.351in [34.33mm] W=0.082in [2.080mm]
Board 3X5	1		Rogers Corp	Er=2.55 t=0.0026in h=0.030in

5 Package mechanical data

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.

Figure 7. M243 package dimensions

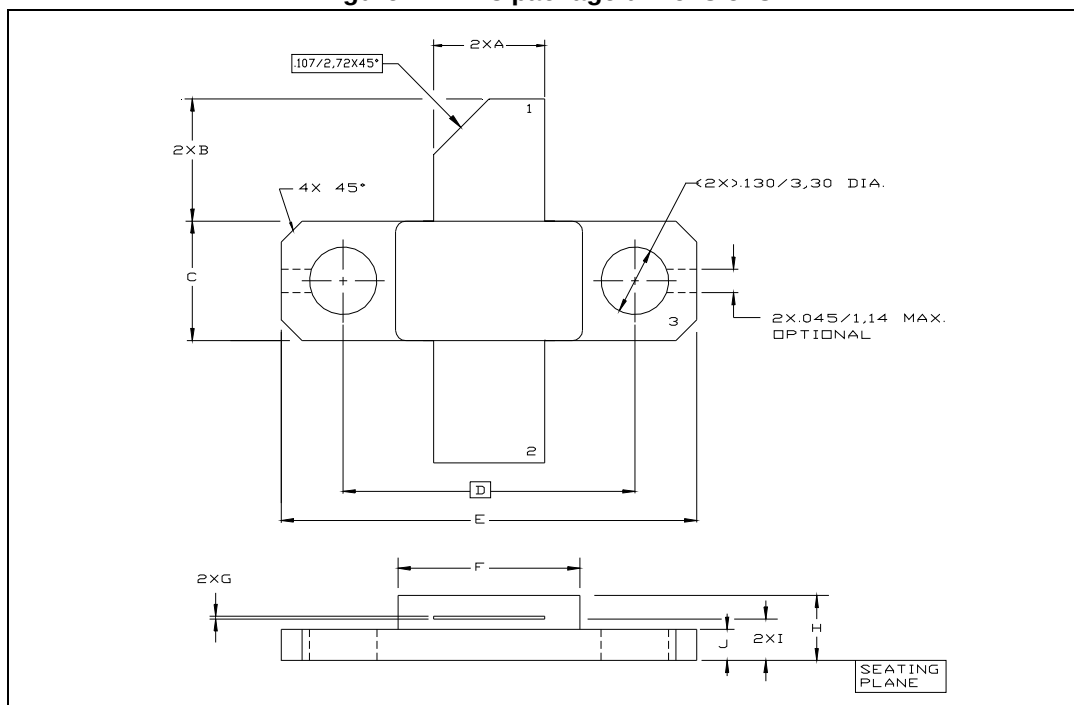


Table 9. M243 (.230 x .360 2L N/HERM W/FLG) mechanical data

Dim.	mm			inch		
	Min.	Typ	Max.	Min.	Typ	Max.
A	5.21		5.72	0.205		0.225
B	5.46		6.48	0.215		0.255
C	5.59		6.1	0.22		0.24
D		14.27			0.562	
E	20.07		20.57	0.79		0.81
F	8.89		9.4	0.35		0.37
G	0.1		0.15	0.004		0.006
H	3.18		4.45	0.125		0.175
I	1.83		2.24	0.072		0.088
J	1.27		1.78	0.05		0.07

6 Revision history

Table 10. Document revision history

Date	Revision	Changes
20-Sep-2011	1	Initial release.
15-Nov-2011	2	Modified Table 4 : $V_{GS(Q)}$ and $V_{DS(ON)}$ Modified Table 5 and 6 Inserted: Table 7 Inserted: Figure 2 , 3 and 4
19-Apr-2014	3	Added Section 4: Board layout, schematic and BOM .

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.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

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.

© 2014 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

