CEL

RF Low Noise FET

CE3521M4

20 GHz Low Noise FET in Dual Mold Plastic PKG

DESCRIPTION

- Low Noise and High Gain
- Original Dual Mold Plastic package

FEATURES

- Low noise figure and high associated gain:
  NF = 0.70 dB TYP., Ga = 11.9 dB TYP.
  @V_{DS} = 2 V, I_D = 10 mA, f = 20 GHz

PACKAGE

- Flat-lead 4-pin thin-type super minimold package

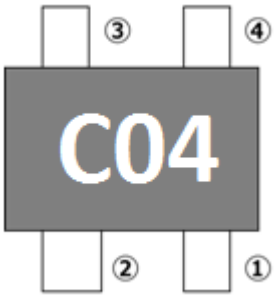
APPLICATIONS

- DBS LNB gain-stage, Mix-stage
- Low noise amplifier for microwave communication systems

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CE3521M4	CE3521M4-C2	Flat-lead 4-pin thin-type super minimold package	C04	• Embossed tape 8 mm wide • Pin 1 (source), Pin 2 (drain) face the perforation side of the tape • MOQ 15 kpcs/reel

PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	Source
2	Drain
3	Source
4	Gate

ABSOLUTE MAXIMUM RATINGS

(T_A = +25°C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain to Source Voltage	V_{DS}	4.0	V
Gate to Source Voltage	V_{GS}	-3.0	V
Drain Current	I_D	I_{DSS}	mA
Gate Current	I_G	80	μA
Total Power Dissipation	P_{tot}	125	mW
Channel Temperature	T_{ch}	+150	°C
Storage Temperature	T_{stg}	-55 to +125	°C
Operation Temperature	T_{op}	-55 to +125[Note]	°C

Note Refer to Total Power Dissipation vs. Ambient Temperature graph on page 4

RECOMMENDED OPERATING RANGE

(T_A = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}	+1	+2	+3	V
Drain Current	I_D	5	10	15	mA

ELECTRICAL CHARACTERISTICS

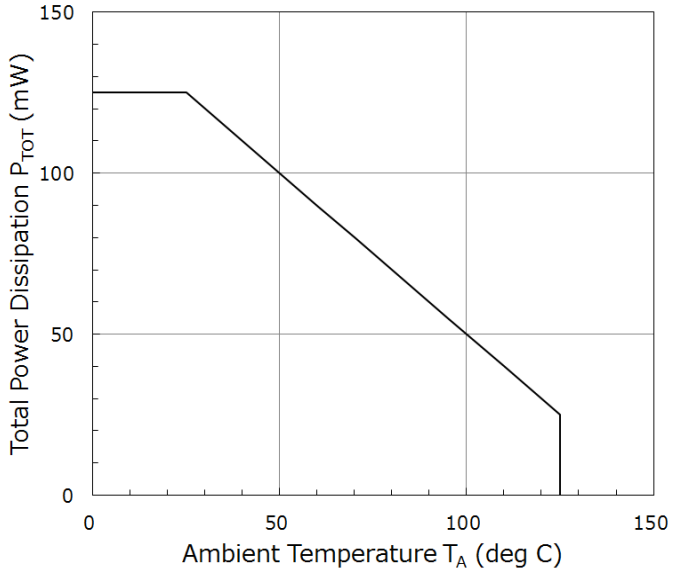
(T_A = +25˚C, unless otherwise specified)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSO}	V_{GS} = -3.0V	-	0.4	10	µA
Saturated Drain Current	I_{DSS}	V_{DS} = 2V, V_{GS} = 0V	23	40	57	mA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 2V, I_D = 100µA	-1.10	-0.75	-0.39	V
Transconductance	Gm	V_{DS} = 2V, I_D = 10mA	47	62	-	mS
Noise Figure	NF	V_{DS} = 2V, I_D = 10mA, f = 20GHz	-	0.70	1.05	dB
Associated Gain	Ga		9.9	11.9	-	dB

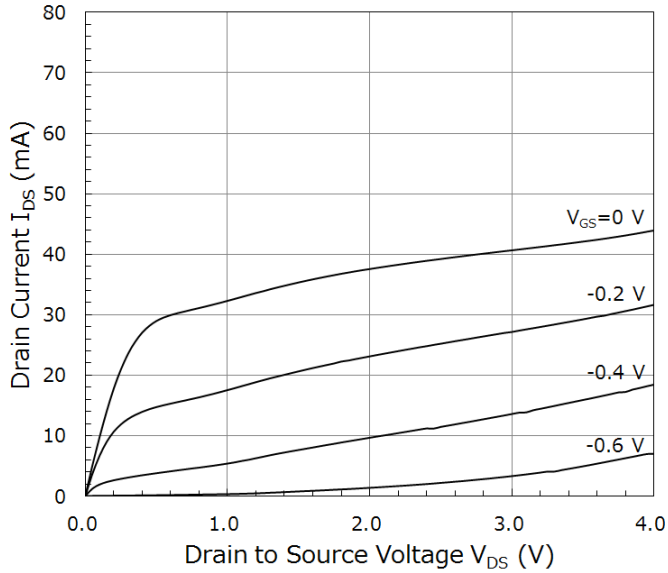
TYPICAL CHARACTERISTICS :

(TA=+25℃, unless otherwise specified)

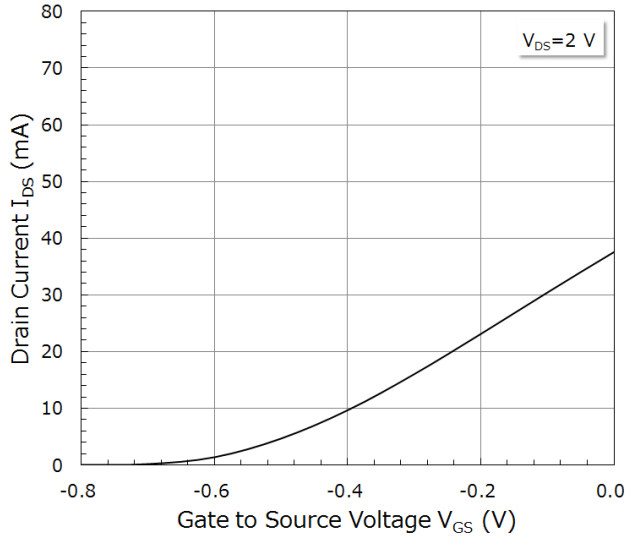
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



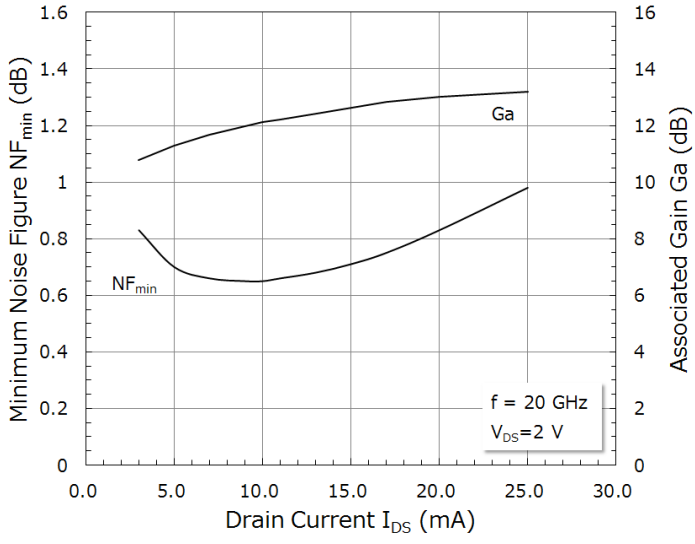
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



MINIMUM NOISE FIGURE & ASSOCIATED GAIN vs. DRAIN CURRENT



S-PARAMETERS

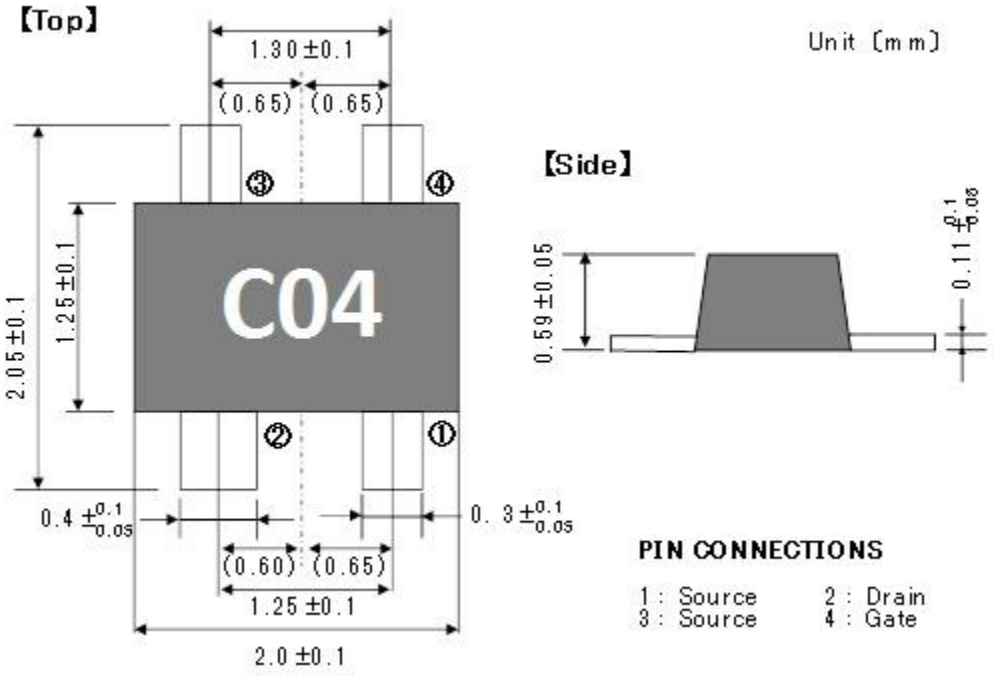
S-Parameters are available on the CEL web site.

RECOMMENDED SOLDERING CONDITIONS

Recommended Soldering Conditions are provided on the CEL web site.

PACKAGE DIMENSIONS

Flat-lead 4-pin thin-type super minimold package



REVISION HISTORY

Version	Change to current version	Page(s)
CDS-0020-03 (Issue A) February 19, 2016	Initial datasheet	N/A
CDS-0020-03 (Issue B) April 27, 2016	Updated Marking Information	1, 2, 3
CDS-0020-04 (Issue A) July 29, 2016	Updated Specs in “Absolute Maximum Ratings” Table Added “Typical Characteristics” section (graphs) Added “S-Parameters” and “Recommended Soldering Conditions” sections	2, 4, 5

[CAUTION]

- All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice.

- You should not alter, modify, copy, or otherwise misappropriate any CEL product, whether in whole or in part.

- CEL does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of CEL products or technical information described in this document. No license, expressed, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of CEL or others.

- Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. CEL assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.

- CEL has used reasonable care in preparing the information included in this document, but CEL does not warrant that such information is error free. CEL assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.

- Although CEL endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a CEL product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures
  Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.

- Please use CEL products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive.
  CEL assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.

- This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of CEL.

- Please contact CEL if you have any questions regarding the information contained in this document or CEL products, or if you have any other inquiries.