

## 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<sub>DS</sub> = 2 V, I<sub>D</sub> = 10 mA, f = 20 GHz

### PACKAGE

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



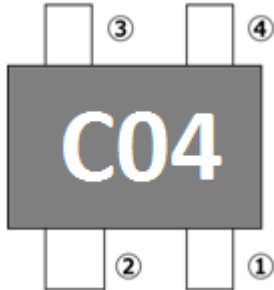
### APPLICATIONS

- 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	<ul style="list-style-type: none"><li>• Embossed tape 8 mm wide</li><li>• Pin 1 (source), Pin 2 (drain) face the perforation side of the tape</li><li>• MOQ 15 kpcs/reel</li></ul>

## PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM



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

## ABSOLUTE MAXIMUM RATINGS

(TA = +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	$\mu A$
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 <sup>Note</sup>	°C

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

## RECOMMENDED OPERATING RANGE

(TA = +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

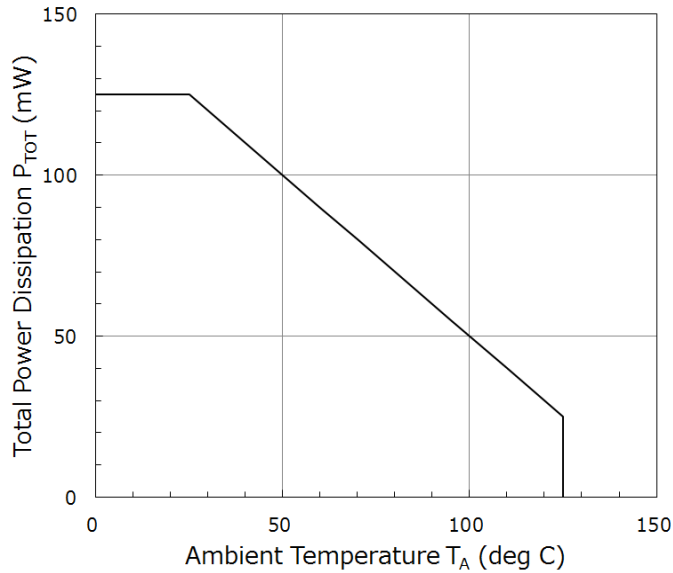
(TA = +25°C, unless otherwise specified)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	$I_{GSO}$	$V_{GS} = -3.0V$	-	0.4	10	$\mu A$
Saturated Drain Current	$I_{DSS}$	$V_{DS} = 2V, V_{GS} = 0V$	23	40	57	mA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 2V, I_D = 100\mu A$	-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

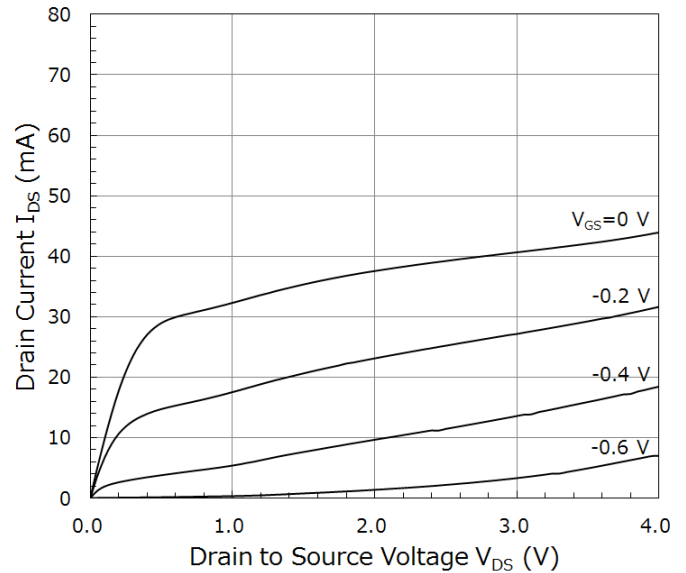
## TYPICAL CHARACTERISTICS :

( $T_A=+25^{\circ}\text{C}$ , unless otherwise specified)

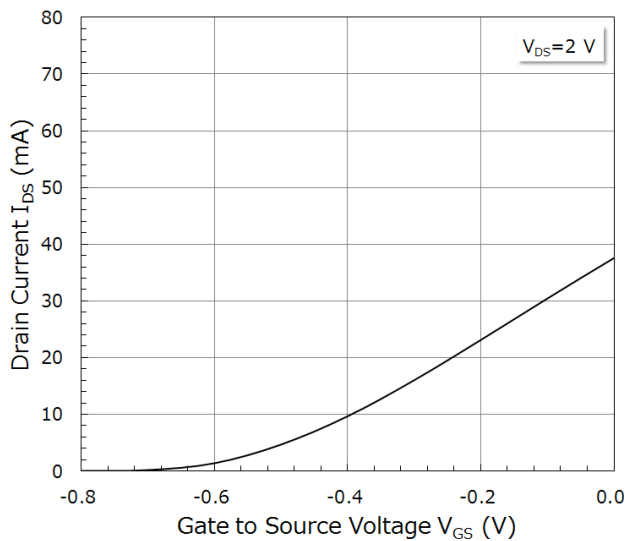
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



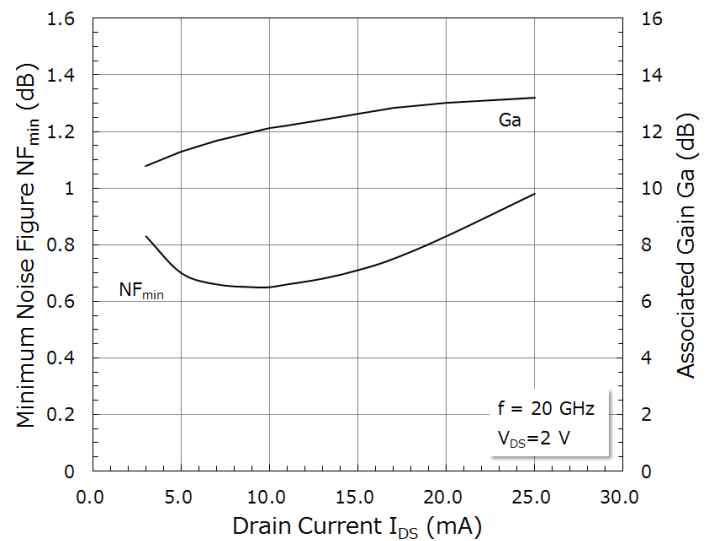
**DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE**



**DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE**



**MINIMUM NOISE FIGURE & ASSOCIATED GAIN vs. DRAIN CURRENT**



## S-PARAMETERS

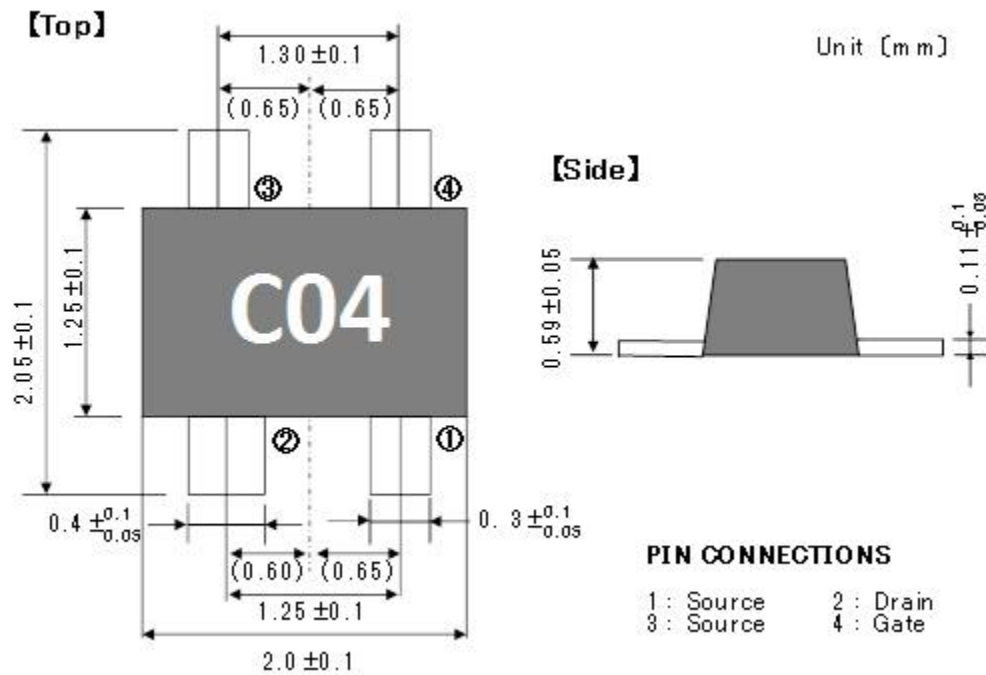
S-Parameters are available on the CEL web site.

## 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

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