CEL

RF Low Noise FET
CE3520K3

20 / 24 GHz Super Low Noise FET in Hollow Plastic PKG

DESCRIPTION

- Super Low Noise and High Gain
- Hollow (Air cavity) Plastic package

FEATURES

- Super Low noise figure and high associated gain:

  NF = 0.55 dB TYP., Ga = 13.8 dB TYP.
  @V_{DS} = 2 V, I_D = 10 mA, f = 20 GHz

  NF = 0.80 dB TYP., Ga = 13.9 dB TYP.
  @V_{DS} = 2 V, I_D = 10 mA, f = 24 GHz

PACKAGE

- Micro-X plastic package

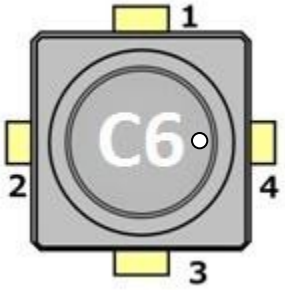
APPLICATIONS

- K-Band LNB (Low Noise Block)
- Doppler Sensor
- Low Noise Amplifier for microwave communication systems

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CE3520K3	CE3520K3-C1	Micro-X plastic package	C6	• Embossed tape 8 mm wide • Pin 4 (Gate) faces the perforation side of the tape • MOQ 10k pcs/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)

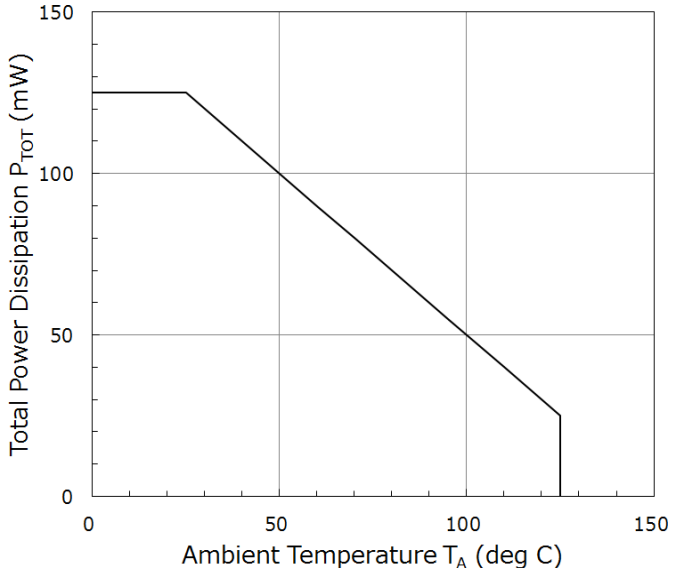
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSO}	V_{GS} = -3.0V	-	0.4	10	μA
Saturated Drain Current	I_{DSS}	V_{DS} = 2V, V_{GS} = 0V	23.0	40.0	57.0	mA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 2V, I_D = 100μA	-1.10	-0.75	-0.39	V
Transconductance	Gm	V_{DS} = 2V, I_D = 10mA	47.0	62.0	-	mS
Noise Figure[1]	NF	V_{DS} = 2V, I_D = 10mA, f = 20GHz	-	0.55	0.80	dB
Associated Gain[1]	Ga		11.5	13.8	-	dB
Noise Figure[2]	NF	V_{DS} = 2V, I_D = 10mA, f = 24GHz	-	0.80	1.30	dB
Associated Gain[2]	Ga		11.5	13.9	-	dB

1. 100% tested on production devices
2. Not tested on production devices

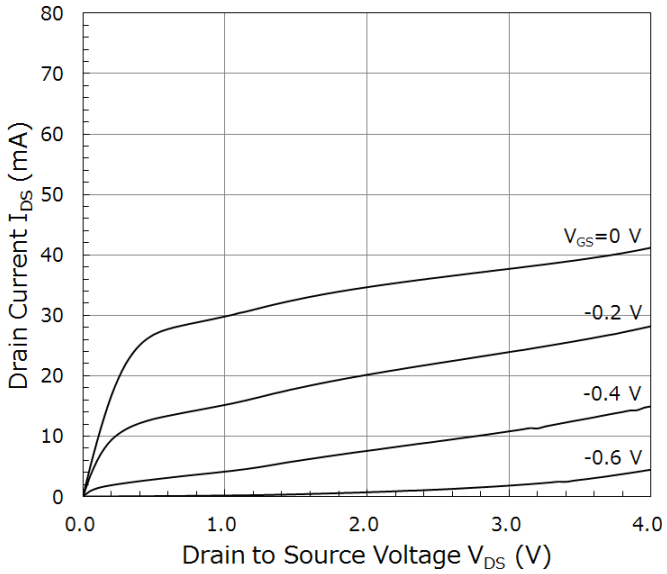
TYPICAL CHARACTERISTICS:

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

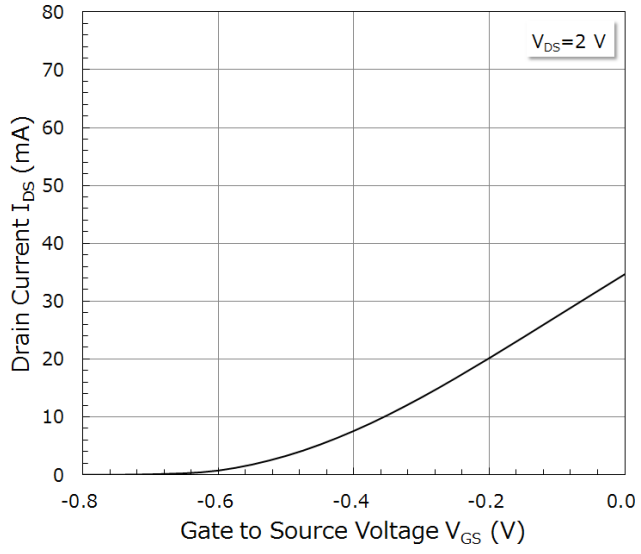
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



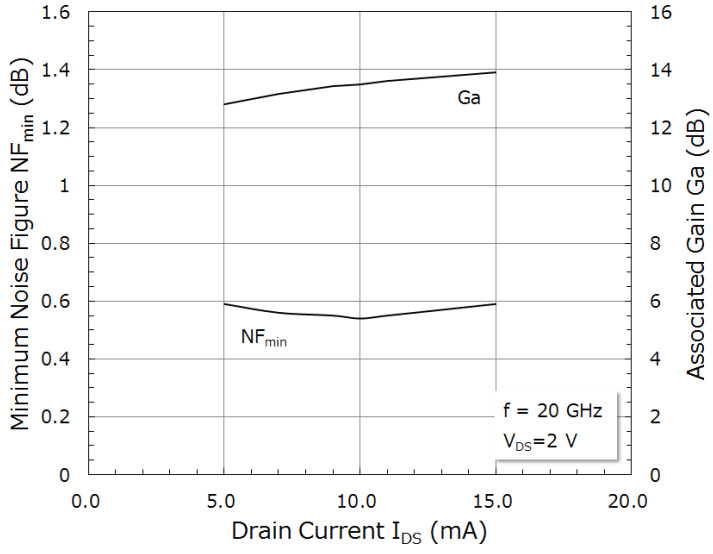
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

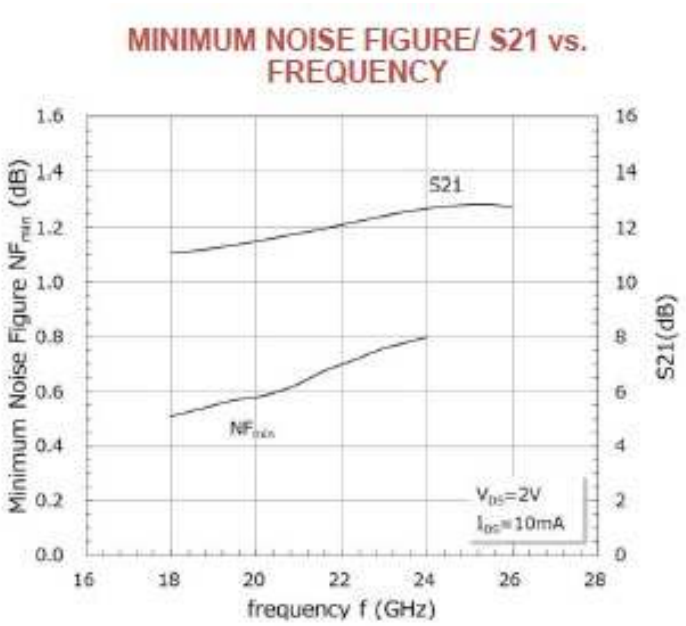


DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



MINIMUM NOISE FIGURE & ASSOCIATED GAIN vs. DRAIN CURRENT




MINIMUM NOISE FIGURE/ S21 vs. FREQUENCY
Minimum Noise Figure NFmin (dB)
S21(dB)
frequency f (GHz)
S21
NFmin
VDS=2V
IDS=10mA
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
16
14
12
10
8
6
4
2
0
16
18
20
22
24
26
28

S-PARAMETERS

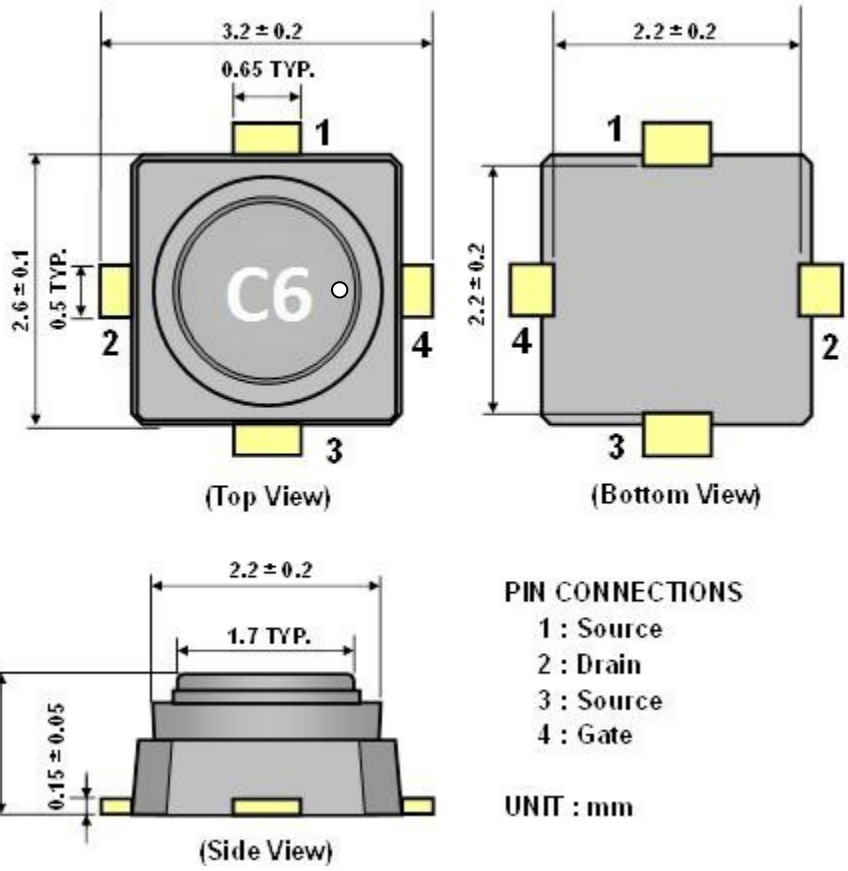
S-Parameters are available on the CEL web site.

RECOMMENDED SOLDERING CONDITIONS

Recommended Soldering Conditions are provided on the CEL web site.

PACKAGE DIMENSIONS

Micro-X plastic package



REVISION HISTORY

Version	Change to current version	Page(s)
CDS-0019-03 (Issue A) February 12, 2016	Initial datasheet	N/A
CDS-0019-03 (Issue B) April 27, 2016	Updated Marking Information	1, 2, 3
CDS-0019-04 (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, 6
CDS-0019-04 (Issue B) Dec 04, 2018	Updated Applications Updated marking by adding a dot to the package Gate	1, 2, 6
CDS-0019-04 (Issue C) July 02, 2019	Added 24GHz Electrical and Typical Characteristics	1,3, 5

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- Do not dispose in fire or break up this product.
- Do not chemically make gas or powder with this product.
- When discarding this product, please obey the laws of your country.
- Do not lick the product or in any way allow it to enter the mouth.

[CAUTION]

Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

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