

**Ultra-linear Mixer with Integrated IF Amp and LO Buffer**

**Description**

CMY213 is a general purpose down-converter device designed for receiver applications such as cellular and PCS mobile phones, ISM bands, GPS receivers, L-band satellite terminals, WLAN and pagers. It is particularly suited for CDMA receiver applications due to its excellent intermodulation characteristics and its high conversion gain.

The device combines an ultra-linear mixer with LO - driver and a single stage IF-amplifier in a very small SCT598 package. The mixer section of CMY213 combines low conversion losses and excellent intermodulation characteristics with low requirements of LO - and DC-power. The internal level controlled LO-Buffer enables a good performance over a wide LO level range. The input and output matching of the IF amplifier can be adapted externally within a frequency range from 45 to 250 MHz.

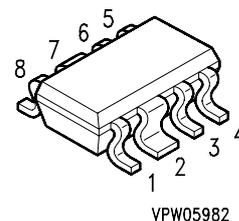
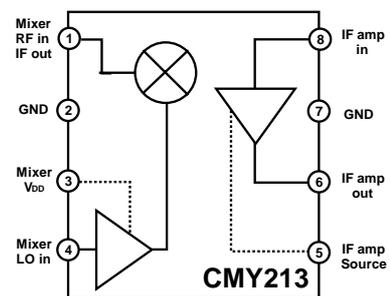
**Features**

- Typical overall performance at cellular frequencies (for  $P_{LO} = -5\text{dBm}$  operation conditions: 3V, 8 mA;  $f_{RF} = 850\text{ MHz}$ ;  $f_{LO} = 740\text{ MHz}$ ):
  - Gain: 9.5 dB
  - Input IP3: 10 dBm
  - Noise figure: 8 dB
- RF-frequency range 0.5 - 2.5 GHz
- Operating voltage range: 2.6 to 5V
- Small SCT598 plastic package

**Applications**

- Down Converter for Multiple Wireless Applications
- Cellular and PCS Mobile Phones
- Particularly Suited for CDMA Receivers
- ISM and WLAN Receivers
- GPS Receivers

**Package Outline and Pin Configuration, SCT598**



VPW05982

# CMY213 Datasheet

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## Maximum Ratings

Parameter	Port	Symbol	Value		Unit
			min	max	
Supply Voltage	3,6	$V_{DD}$	0	5	V
DC-Voltage at LO Input	4	$V_6$	-3	0,5	V
DC-Voltage at Mixer RF-IF Port	1	$V_8$	- 0,5	+ 0,5	V
Power into Mixer RF Port	1	$P_{RF}$		10	dBm
Power into LO Input	4	$P_{in,LO}$	-10	10	dBm
Channel Temperature		$T_{Ch}$		150	°C
Operating Temperature		$T_{op}$	-30	85	°C
Storage Temperature		$T_{stg}$	-55	150	°C
<b>Thermal Resistance*</b>					
Channel to Soldering Point (GND)		$R_{thChS}$		260	K/W

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## Electrical Characteristics

Parameter,	Comment	min	typ	max	Unit
RF - frequency range	external match	0.5	-	2.5	GHz
LO - Frequency range	external match	0.5	-	2.5	GHz
IF Frequency range	external match	45		250	MHz

### Typical performance at cellular frequencies\*:

$T_a = 25^\circ\text{C}$ ;  $V_{DD} = 3\text{V}$ ,  $f_{RF} = 850\text{MHz}$ ;  $f_{LO} = 740\text{MHz}$ ;  $P_{LO} = -5\text{dBm}$ ;  $f_{IF} = 110\text{MHz}$ ,  
 $Z_S = Z_L = 50\ \Omega$ ; unless otherwise specified

Parameter, Test Conditions	Symbol	min	typ	max	Unit
Total operating Current (Mixer + IF amplifier)	$I_{op}$	-	8.0	9.5	mA
Conversion Gain	$G_c$	8.0	9.5	-	dB
SSB Noise Figure	$F_{ssb}$	-	8	-	dB
RF Input -/ IF Output return loss (external matching required)	RFIrl / IFOrl	-	10	-	dB
3rd Order Input Intercept Point	IIP3	8	10	-	dBm
LO-RF Isolation	Iso	-	10	-	DB

### Test conditions at PCS frequencies:

$T_a = 25^\circ\text{C}$ ;  $V_{DD} = 3\text{V}$ ,  $f_{RF} = 1960\text{MHz}$ ;  $f_{LO} = 1750\text{MHz}$ ;  $P_{LO} = -5\text{dBm}$ ;  $f_{IF} = 210\text{MHz}$ ,  
 $Z_S = Z_L = 50\ \Omega$ ; unless otherwise specified

Parameter, Test Conditions	Symbol	min	typ	max	Unit
Total operating Current (Mixer + IF amplifier)	$I_{op}$	-	8.0	9.5	mA
Conversion Gain	$G_c$	7	8.5	-	dB
SSB Noise Figure	$F_{ssb}$	-	8.5	-	dB
RF Input -/ IF output return loss (external matching required)	RFIrl / IFOrl	-	10	-	dB
3rd Order Input Intercept Point	IIP3	10	12	-	dBm
LO-RF Isolation	Iso	-	6	-	dB

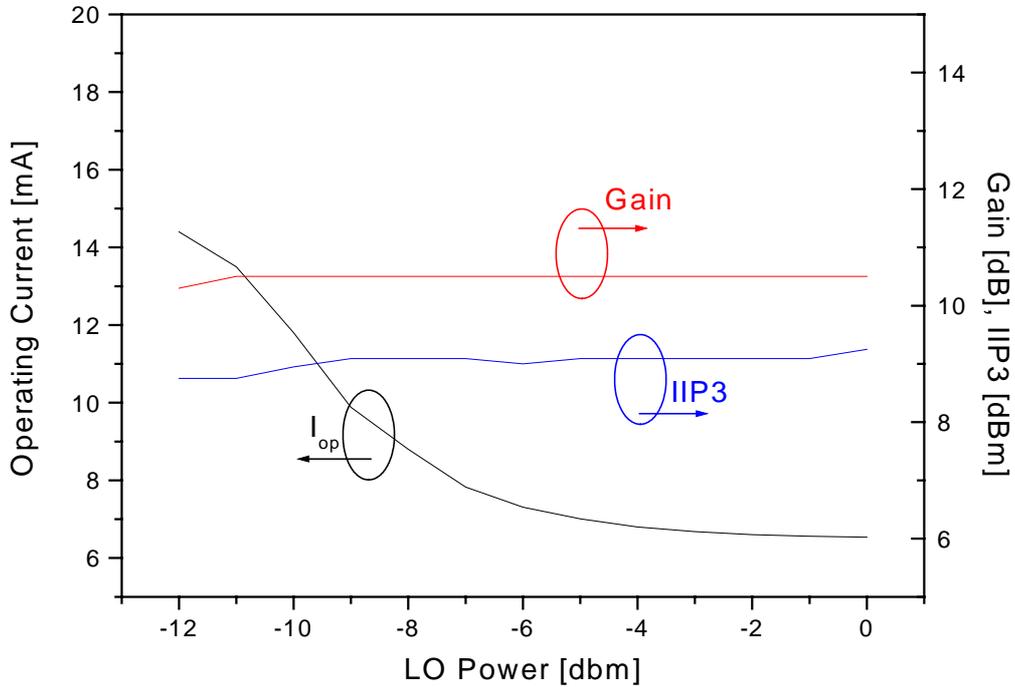
\* IMPORTANT NOTE:

During production, the RF performance at PCS frequencies is screened. The passed devices also achieve the specified RF performance at cellular frequencies.

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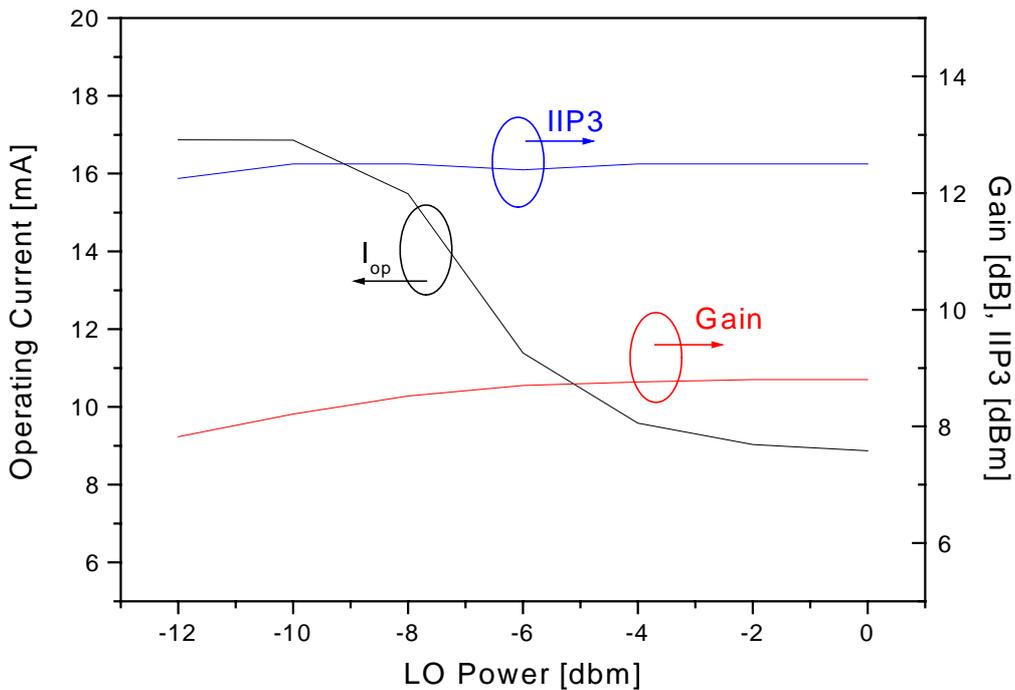
## Typical device behavior at cellular frequencies:

$T_a = 25^\circ\text{C}$ ;  $V_{DD} = 3\text{V}$ ;  $f_{RF} = 850\text{MHz}$ ;  $f_{LO} = 740\text{MHz}$ ;  $f_{IF} = 110\text{MHz}$ ,  
 $Z_S = Z_L = 50\ \Omega$ ; unless otherwise specified



## Typical device behavior at PCS frequencies:

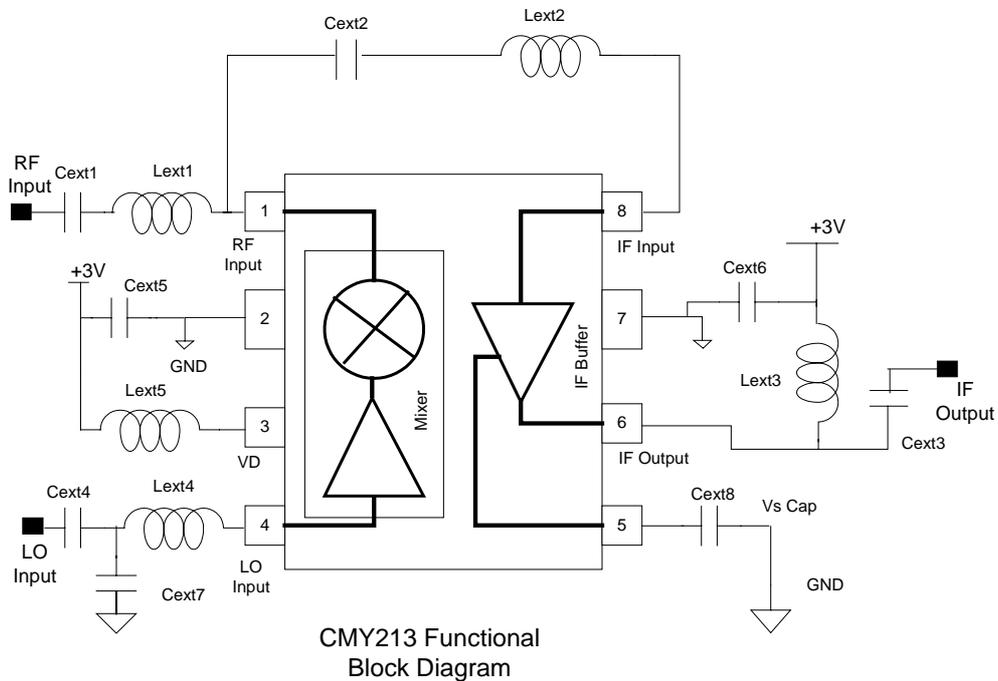
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## Applications Information

### Test circuit / application example



### External components for cellular frequencies

$$f_{RF} = 850\text{MHz}; f_{LO} = 740\text{MHz}; f_{IF} = 110\text{MHz}$$

Capacitors	(Murata 0402)	Inductors	(Toko)
Cext1	1.5 pF	Lext1	27 nH LL1005
Cext2	1 nF	Lext2	180 nH LL1608
Cext3	18 pF	Lext3	150 nH LL1608
Cext4	100 pF	Lext4	27 nH LL1005
Cext5	1 nF	Lext5	27 nH LL1005
Cext6	1 nF		
Cext7	3 pF		
Cext8	100 nF		

### External components for PCS frequencies

$$f_{RF} = 1960\text{MHz}; f_{LO} = 1750\text{MHz}; f_{IF} = 210\text{MHz}$$

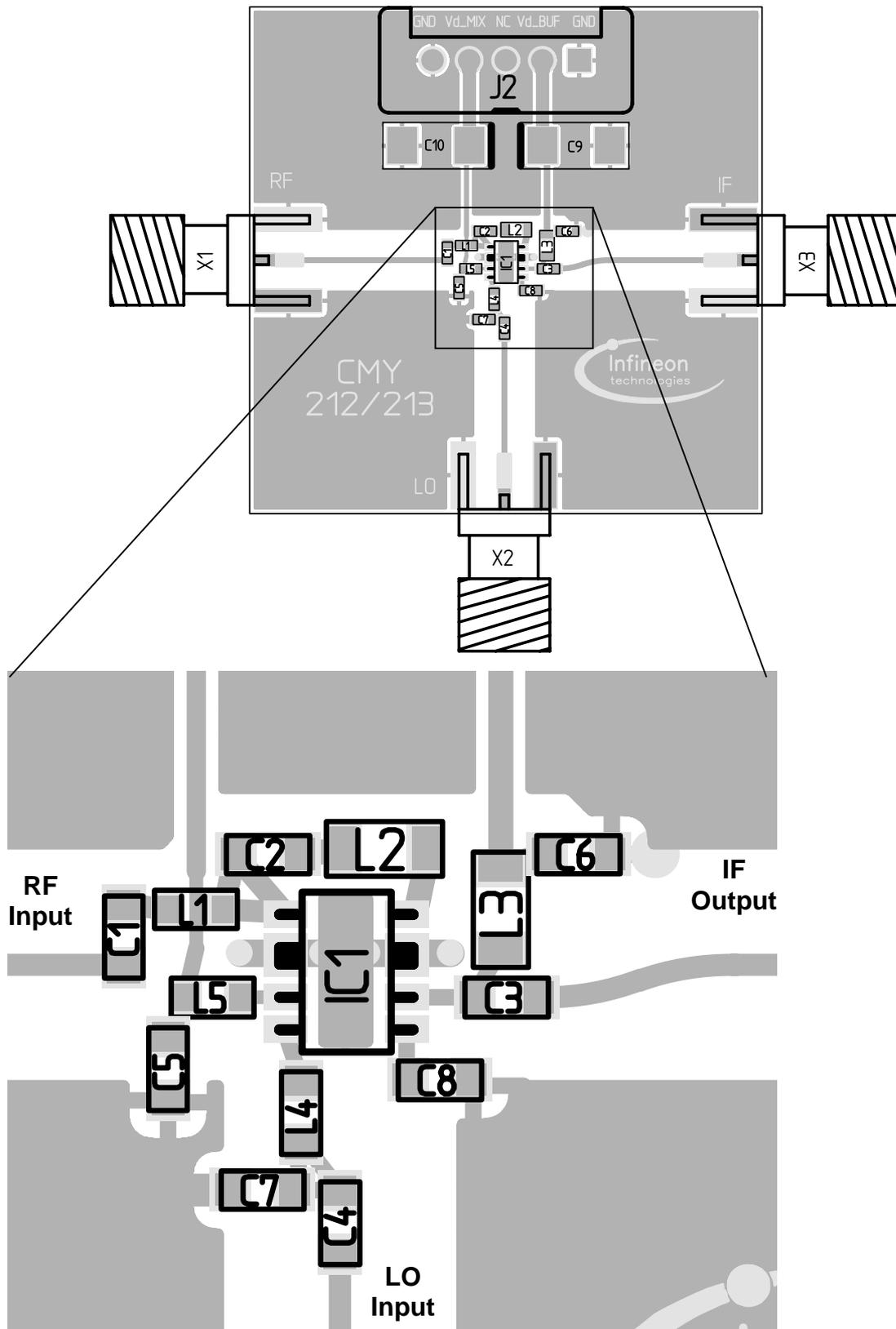
Capacitors	(Murata 0402)	Inductors	(Toko)
Cext1	1 pF	Lext1	5.6 nH LL1005
Cext2	1 nF	Lext2	68 nH LL1608
Cext3	8 pF	Lext3	68 nH LL1608
Cext4	22 pF	Lext4	4.7 nH LL1005
Cext5	1 nF	Lext5	4.7 nH LL1005
Cext6	1 nF		
Cext7	3 pF		
Cext8	100 nF		

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## Applications Information (cont)

PCB-Layout

Size: 35 x 35 mm<sup>2</sup>



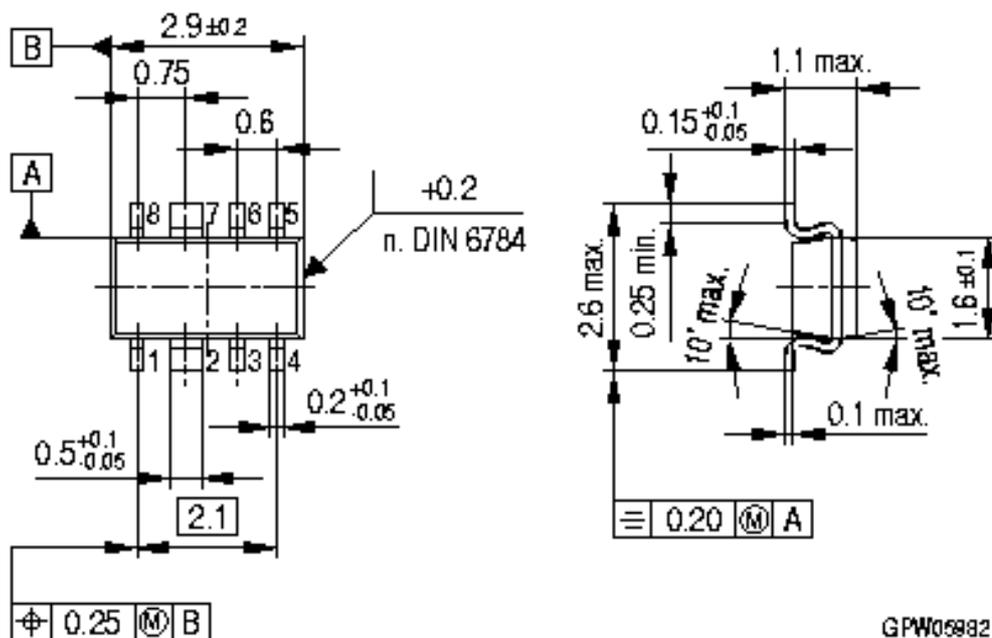
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## General description and notes

CMY213 is a general purpose down-converter device designed for multiple applications such as cellular and PCS mobile phones, ISM bands, GPS receivers, L-band satellite terminals, WLAN and pagers. Due to its excellent intermodulation characteristics and its high conversion gain, CMY213 is particularly suited for CDMA receiver applications.

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## Semiconductor Device Outline SCT598-8-1



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## Ordering Information

Type	Marking	Ordering code (tape and reel)	Package <sup>1)</sup>
<b>CMY213</b>	<b>213</b>	<b>CMY213</b>	<b>SCT598-8-1</b>

## Additional Information

This part is compliant with RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

The part is rated Moisture Sensitivity Level 1 at 260°C per JEDEC standard IPC/JEDEC J-STD-020.

ESD: **E**lectro**s**tatic **d**ischarge sensitive device. Observe handling Precautions.

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