

# IP4264CZ8-20; IP4264CZ8-40

Integrated USIM/SIM card passive filter arrays with ESD protection

Rev. 3 — 22 July 2010

Product data sheet

## 1. Product profile

### 1.1 General description

The IP4264CZ8-20 and IP4264CZ8-40 are 3-channel RC low-pass filter arrays which are designed to provide filtering of undesired RF signals in the 800 MHz-to-6000 MHz frequency band. In addition, the IP4264CZ8-20 and IP4264CZ8-40 incorporate diodes to provide protection to downstream components from ElectroStatic Discharge (ESD) voltages up to  $\pm 25$  kV contact and higher than  $\pm 25$  kV air discharge far exceeding IEC 61000-4-2, level 4.

Both IP4264CZ8-20 and IP4264CZ8-40 support ESD protection of the USB data pins of an Universal Subscriber Identity Module (USIM) interface as well as the digital standard SIM interface ESD protection and ElectroMagnetic Interface (EMI) filtering.

The IP4264CZ8-20 and IP4264CZ8-40 are fabricated using monolithic silicon technology. They integrate three resistors and seven high-level ESD protection diodes in a 0.4 mm pitch 8-pin Micropak (compatible with Quad Flat-pack No-leads (QFN)) lead-free plastic package with a height of only 0.5 mm.

These features make the IP4264CZ8-20 and IP4264CZ8-40 ideal for use in applications requiring component miniaturization such as mobile phone handsets, cordless telephones and personal digital devices.

The devices are also available in Wafer Level Chip-Size Package (WLCSP): WLCSP11 (for USIM) with 0.4 mm pitch (IP4365CX11), and WLCSP8 (for SIM) with both 0.4 mm pitch (IP4364CX8/LF) and 0.5 mm pitch (IP4064CX8/LF).

### 1.2 Features and benefits

- Pb-free, Restriction of Hazardous Substances (RoHS) compliant and free of halogen and antimony (Dark Green compliant)
- 3-channel SIM card interface with integrated RC-filter array and SIM voltage ESD protection
- 2 USIM (USB1.1) compliant ESD protection diodes with 20 pF channel capacitance
- Integrated 100  $\Omega$ /100  $\Omega$ /47  $\Omega$  series channel resistors
- Total channel capacitance of 20 pF (IP4264CZ8-20) or 40 pF (IP4264CZ8-40)
- Downstream ESD protection up to  $\pm 25$  kV (contact) according to IEC 61000-4-2
- Micropak (QFN compatible) plastic package with 0.4 mm pitch
- Also available in WLCSP11: IP4365CX11 (USIM interface) and in WLCSP8: IP4364CX8/LF (0.4 mm pitch) and IP4064CX8/LF or IP4044CX8/LF (both using 0.5 mm pitch, SIM interface)

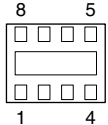
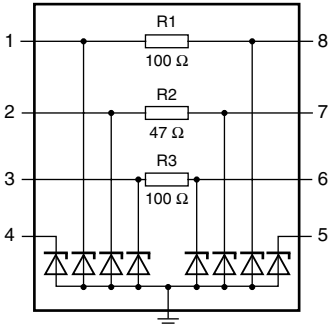


## 1.3 Applications

- USIM and SIM interfaces in e.g. cellular and Personal Communication System (PCS) mobile handsets

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1 and 8	filter channel 1	 <p>Transparent top view</p>	
2 and 7	filter channel 2		
3 and 6	filter channel 3		
4 and 5	ESD protection		
GND	ground		

018aaa015

## 3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
IP4264CZ8-20	HXSON8U	plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; UTLP based; body 1.35 × 1.7 × 0.5 mm	SOT983-1
IP4264CZ8-40			

## 4. Marking

Table 3. Marking codes

Type number	Marking code
IP4264CZ8-20	N2
IP4264CZ8-40	N4

## 5. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

Symbol	Parameter	Conditions	Min	Max	Unit
$V_I$	input voltage	at I/O pins	-0.5	+5.5	V
$V_{ESD}$	electrostatic discharge voltage	all pins to ground			
		IP4264CZ8-20	contact discharge	[1] -	±15
		air discharge	[1] -	±15	kV
	IP4264CZ8-40	contact discharge	[2] -	±25	kV
		air discharge	[2] -	±25	kV
		IEC 61000-4-2, level 4; all pins to ground			
		contact discharge	-	±8	kV
	air discharge	-	±15	kV	
$P_{ch}$	channel power dissipation	$T_{amb} = 70\text{ °C}$	-	60	mW
$P_{tot}$	total power dissipation	$T_{amb} = 70\text{ °C}$	-	180	mW
$T_{stg}$	storage temperature		-55	+150	°C
$T_{reflow(peak)}$	peak reflow temperature	$t_p \leq 10\text{ s}$	-	260	°C
$T_{amb}$	ambient temperature		-35	+85	°C

[1] IP4264CZ8-20 is qualified to 1000 contact discharges of ±15 kV using the IEC 61000-4-2 model far exceeding the specified IEC 61000-4-2, level 4 (8 kV contact discharge).

[2] IP4264CZ8-40 is qualified to 1000 contact discharges of ±25 kV using the IEC 61000-4-2 model far exceeding the specified IEC 61000-4-2, level 4 (8 kV contact discharge).

## 6. Characteristics

**Table 5. Channel resistance**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{s(ch)}$	channel series resistance	R1, R3	75	100	125	$\Omega$
		R2	35.2	47	58.8	$\Omega$

**Table 6. Channel characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>IP4264CZ8-20</b>						
$C_{ch}$	channel capacitance	$f = 1\text{ MHz}$	<a href="#">[1][2]</a>			
		$V_{bias(DC)} = 0\text{ V}$	-	17	20	pF
		$V_{bias(DC)} = 2.5\text{ V}$	-	11	15	pF
<b>IP4264CZ8-40</b>						
$C_{ch}$	channel capacitance	$f = 1\text{ MHz}$	<a href="#">[1][2]</a>			
		$V_{bias(DC)} = 0\text{ V}$	-	35	40	pF
		$V_{bias(DC)} = 2.5\text{ V}$	-	23	28	pF
<b>IP4264CZ8-20; IP4264CZ8-40</b>						
$C_d$	diode capacitance	$f = 1\text{ MHz}$	<a href="#">[3]</a>			
		$V_{bias(DC)} = 0\text{ V}$	12	16	20	pF
		$V_{bias(DC)} = 2.5\text{ V}$	8	11	14	pF
$I_{RM}$	reverse leakage current	$V_I = 3\text{ V}$	-	-	50	nA
$V_{BR}$	breakdown voltage	$I_{test} = 1\text{ mA}$	6	-	10	V

[1] Guaranteed by design.

[2] Total line capacitance including diode capacitance, per channel.

[3] Measured between pins 4 and 5.

7. Application information

7.1 Insertion loss

The IP4264CZ8-20 and IP4264CZ8-40 are mainly designed as EMI/Radio Frequency Interference (RFI) filters for SIM card interfaces. The setup for measuring the return loss is shown in [Figure 1](#).

The insertion loss in a 50 Ω system for all three channels of the IP4264CZ8-20 with a line capacitance of ≤ 20 pF total channel capacitance is shown in [Figure 2](#).

And the insertion loss for IP4264CZ8-40 with a line capacitance of ≤ 40 pF channel capacitance is shown in [Figure 3](#).

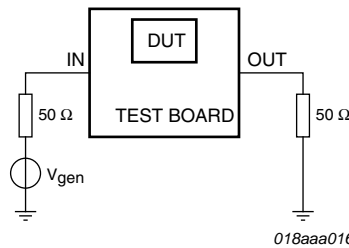
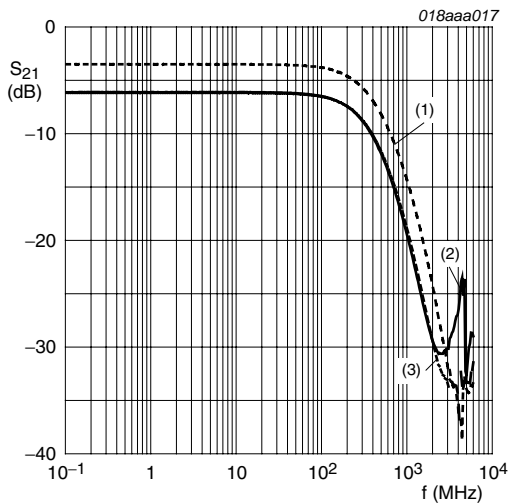
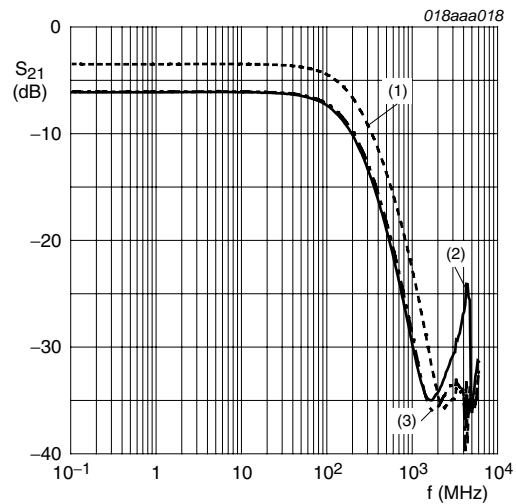


Fig 1. Frequency response setup



C<sub>ch</sub> = 20 pF  
 (1) Pin 2 to 7  
 (2) Pin 1 to 8  
 (3) Pin 3 to 6

Fig 2. Frequency response curves for IP4264CZ8-20



C<sub>ch</sub> = 40 pF  
 (1) Pin 2 to 7  
 (2) Pin 1 to 8  
 (3) Pin 3 to 6

Fig 3. Frequency response curves for IP4264CZ8-40

7.2 Crosstalk

The setup for measuring crosstalk between channels in a 50 Ω system is shown in Figure 4. The crosstalk for the IP4264CZ8-20 is shown in Figure 5 and Figure 6 for the IP4264CZ8-40. Unused channels are terminated with a 50 Ω resistor to ground.

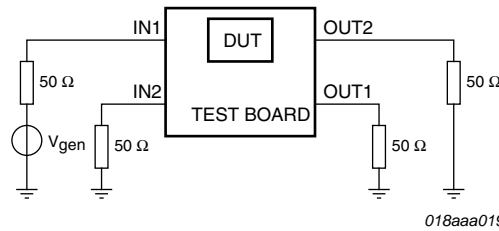
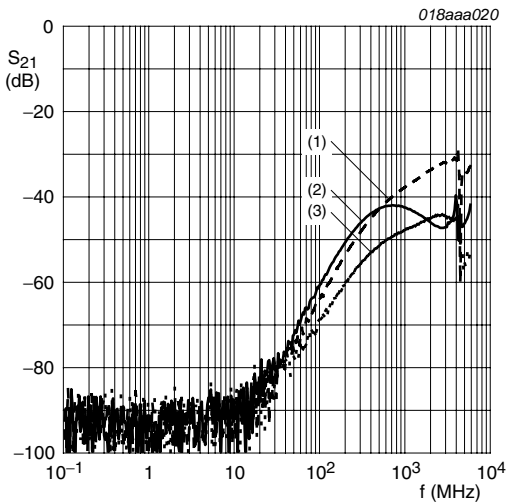
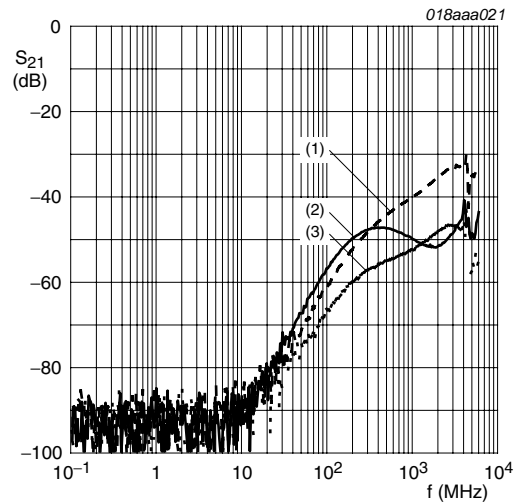


Fig 4. Crosstalk measurement setup



C<sub>ch</sub> = 20 pF  
 (1) Pin 1 to 7  
 (2) Pin 2 to 6  
 (3) Pin 3 to 8

Fig 5. Crosstalk behavior for IP4264CZ8-20



C<sub>ch</sub> = 40 pF  
 (1) Pin 1 to 7  
 (2) Pin 2 to 6  
 (3) Pin 3 to 8

Fig 6. Crosstalk behavior for IP4264CZ8-40

### 7.3 USIM interface application schematic

The application schematic diagram depicted in [Figure 7](#) demonstrates how the NXP SIM card EMI filter and ESD protection devices IP4264CZ8 are used in a typical USIM interface application.

For example, in case a standard SIM interface without USB1.1 is used, the two single diodes (pins 4 and 5) can protect the VSIM line.

Please note that this is only one example dependent on layout constraints e.g. channels 1 to 8 can be swapped with channels 3 to 6.

Also, the USB interface ESD protection pins 4 and 5 can be exchanged. Due to both sides of the devices containing identical protection diodes, baseband and SIM card side can be swapped, too (pin 1 with pin 8, pin 2 with pin 7 etc.).

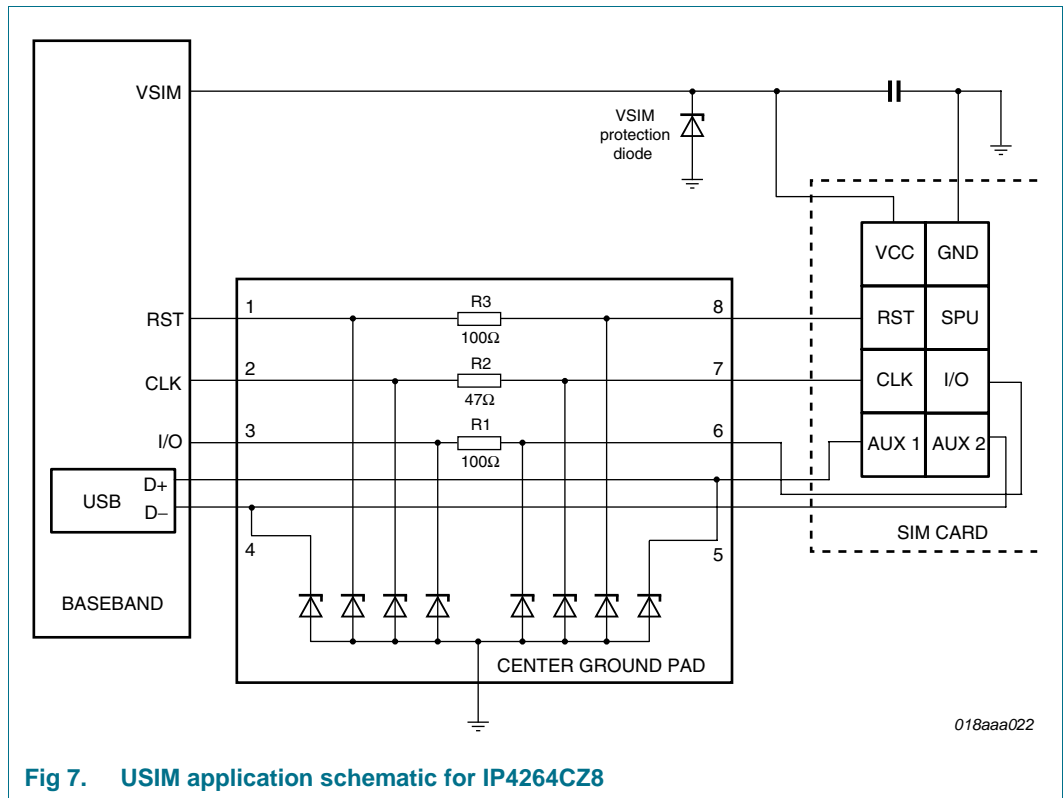


Fig 7. USIM application schematic for IP4264CZ8

## 8. Package outline

**HXSON8U:** plastic thermal enhanced extremely thin small outline package; no leads;  
8 terminals; UTLP based; body 1.35 x 1.7 x 0.5 mm

SOT983-1

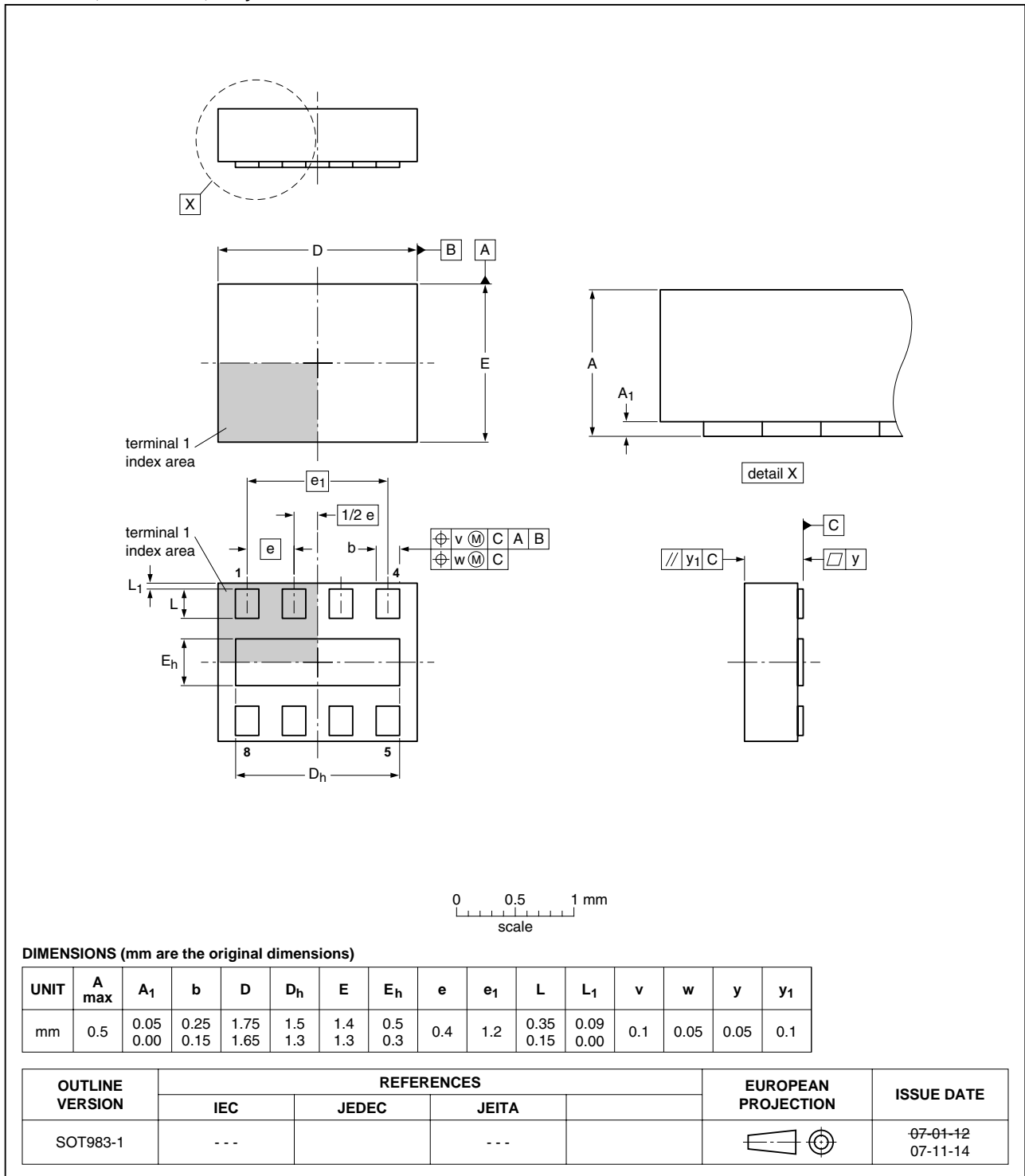


Fig 8. Package outline SOT983-1 (HXSON8U)



## 9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
IP4264CZ8-20_ IP4264CZ8-40 v.3	20100722	Product data sheet	-	IP4264CZ8-20_ IP4264CZ8-40_2
Modifications:				
				<ul style="list-style-type: none"> <li>• <a href="#">Section 1 "Product profile"</a>: added USIM application</li> <li>• <a href="#">Table 1 "Pinning"</a>: corrected graphic symbol</li> <li>• <a href="#">Table 6 "Channel characteristics"</a>: added C<sub>d</sub> maximum and minimum values</li> <li>• <a href="#">Figure 1, 2, 3, 4, 5 and 6</a>: updated</li> <li>• <a href="#">Section 7.3 "USIM interface application schematic"</a>: added</li> <li>• <a href="#">Section 10 "Legal information"</a>: updated</li> </ul>
IP4264CZ8-20_ IP4264CZ8-40_2	20090427	Product data sheet	-	IP4264CZ8-20_ IP4264CZ8-40_1
IP4264CZ8-20_ IP4264CZ8-40_1	20081106	Objective data sheet	-	-

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### 10.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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