

IP3253/54CZ8/CZ12/CZ16

Integrated 4-, 6- and 8-channel passive EMI-filter network with high level ESD protection to IEC 61000-4-2 level 4

Rev. 03 — 23 March 2010

Objective data sheet

1. Product profile

1.1 General description

The IP3253/54CZ8/CZ12/CZ16 family consists of 4-, 6- and 8-channel LC low-pass filter arrays designed to filter unwanted RF signals on the I/O ports of portable communication and computing devices. In addition, the IP3253/54CZ8/CZ12/CZ16 family incorporates diodes which protect downstream components from ElectroStatic Discharge (ESD) voltages up to ± 15 kV.

These devices are fabricated using monolithic silicon technology integrating up to 8 inductors and 16 diodes in a 0.4 mm pitch 8-, 12- or 16-pin ultra-thin leadless plastic package, compatible with QFN.

1.2 Features

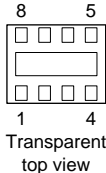
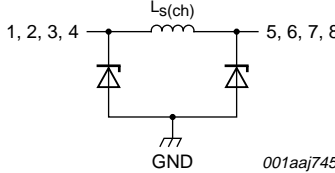
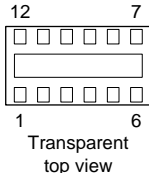
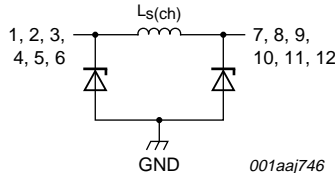
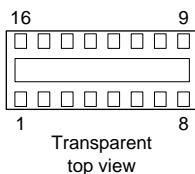
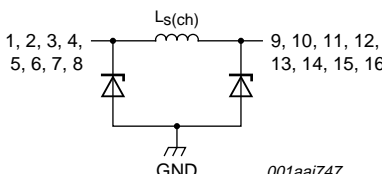
- Pb-free and Restriction of Hazardous Substances (RoHS) compliant
- 4-, 6- and 8-channel integrated π -type LC filter network
- ESD protection to ± 15 kV contact discharge according to IEC 61000-4-2, level 4
- ESD protection to ± 30 kV contact discharge according to MIL-STD-883 (Method 3015) Human Body Model
- UTLP (QFN compatible) plastic package with 0.4 mm pitch and 0.5 mm height

1.3 Applications

- General purpose ElectroMagnetic Interference (EMI), Radio-Frequency Interference (RFI) filtering and downstream ESD protection for:
 - ◆ Cellular phone and Personal Communication System (PCS) mobile handsets
 - ◆ Cordless telephones
 - ◆ Wireless data (WAN/LAN) systems

2. Pinning information

Table 1. Pinning IP3253/54CZ8/CZ12/CZ16

Pin	Description	Simplified outline	Symbol
CZ8			
1 and 8	filter channel 1		
2 and 7	filter channel 2		
3 and 6	filter channel 3		
4 and 5	filter channel 4		
ground pad	ground		
CZ12			
1 and 12	filter channel 1		
2 and 11	filter channel 2		
3 and 10	filter channel 3		
4 and 9	filter channel 4		
5 and 8	filter channel 5		
6 and 7	filter channel 6		
ground pad	ground		
CZ16			
1 and 16	filter channel 1		
2 and 15	filter channel 2		
3 and 14	filter channel 3		
4 and 13	filter channel 4		
5 and 12	filter channel 5		
6 and 11	filter channel 6		
7 and 10	filter channel 7		
8 and 9	filter channel 8		
ground pad	ground		

3. Ordering information

Table 2. Ordering information

Type number	Package			Version
	Name	Description		
IP3253CZ8-4	HXSON8U	plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; UTLP based; body $1.35 \times 1.7 \times 0.5$ mm		SOT983-1
IP3253CZ12-6	HXSON12U	plastic thermal enhanced extremely thin small outline package; no leads; 12 terminals; UTLP based; body $1.35 \times 2.5 \times 0.5$ mm		SOT984-1
IP3253CZ16-8	HXSON16U	plastic thermal enhanced extremely thin small outline package; no leads; 16 terminals; UTLP based; body $1.35 \times 3.3 \times 0.5$ mm		SOT985-1
IP3254CZ8-4	HXSON8U	plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; UTLP based; body $1.35 \times 1.7 \times 0.5$ mm		SOT983-1
IP3254CZ12-6	HXSON12U	plastic thermal enhanced extremely thin small outline package; no leads; 12 terminals; UTLP based; body $1.35 \times 2.5 \times 0.5$ mm		SOT984-1
IP3254CZ16-8	HXSON16U	plastic thermal enhanced extremely thin small outline package; no leads; 16 terminals; UTLP based; body $1.35 \times 3.3 \times 0.5$ mm		SOT985-1

4. Limiting values

Table 3. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		-0.5	+5.6	V
V_{ESD}	electrostatic discharge voltage	all pins to ground; contact discharge			
		Human Body Model; MIL-STD-883, Method 3015	-30	+30	kV
		IEC 61000-4-2, level 4	[1] -15	+15	kV
I_{ch}	channel current (DC)	$T_{amb} = 85\text{ }^{\circ}\text{C}$			
		IP3253CZ8/CZ12/CZ16	-	30	mA
		IP3254CZ8/CZ12/CZ16	-	30	mA
P_{ch}	channel power dissipation	IP3253CZ8/CZ12/CZ16	-	10	mW
		IP3254CZ8/CZ12/CZ16	-	10	mW
$P_{tot/pack}$	total power dissipation per package	$T_{amb} = 85\text{ }^{\circ}\text{C}$	-	500	mW
T_{stg}	storage temperature		-65	+150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-40	+85	$^{\circ}\text{C}$

[1] Device tested with 1000 pulses of ± 15 kV contact discharges, according to the IEC 61000-4-2 model, which far exceed IEC 61000-4-2 level 4 (8 kV contact discharge).

5. Characteristics

Table 4. Channel characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$L_{s(ch)}$	channel series inductance	IP3253CZ8/CZ12/CZ16	-	18	-	nH
		IP3254CZ8/CZ12/CZ16	-	18	-	nH
C_{ch}	channel capacitance	for the total channel; $f_i = 100\text{ kHz}$				
		IP3253CZ8/CZ12/CZ16				
		$V_{bias(DC)} = 2.5\text{ V}$	[1] 20	25	30	pF
		$V_{bias(DC)} = 0\text{ V}$	[1] 34	43	52	pF
		IP3254CZ8/CZ12/CZ16				
		$V_{bias(DC)} = 2.5\text{ V}$	[1] 25	33	40	pF
		$V_{bias(DC)} = 0\text{ V}$	[1] 38	50	60	pF
I_{LR}	reverse leakage current	per channel; $V_I = 3.5\text{ V}$	-	-	0.1	μA
V_{BR}	breakdown voltage	positive clamp; $I_I = 1\text{ mA}$	5.8	-	10	V
V_F	forward voltage	negative clamp; $I_F = -1\text{ mA}$	-1.5	-	-0.4	V
$R_{(ch-ch)}$	resistance between channels	$V_I = 3.5\text{ V}$	10	-	-	$\text{M}\Omega$
$R_{s(ch)}$	channel series resistance		-	8	-	Ω

[1] Guaranteed by design.

Table 5. Frequency characteristics

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

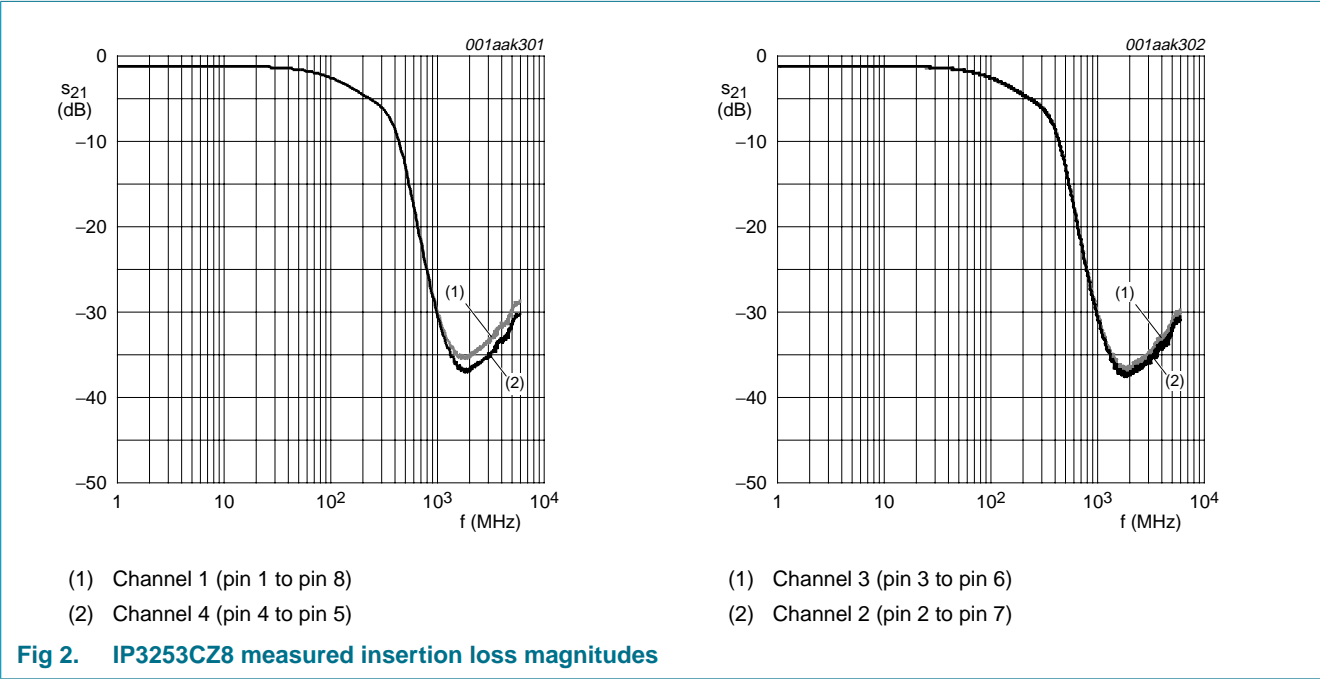
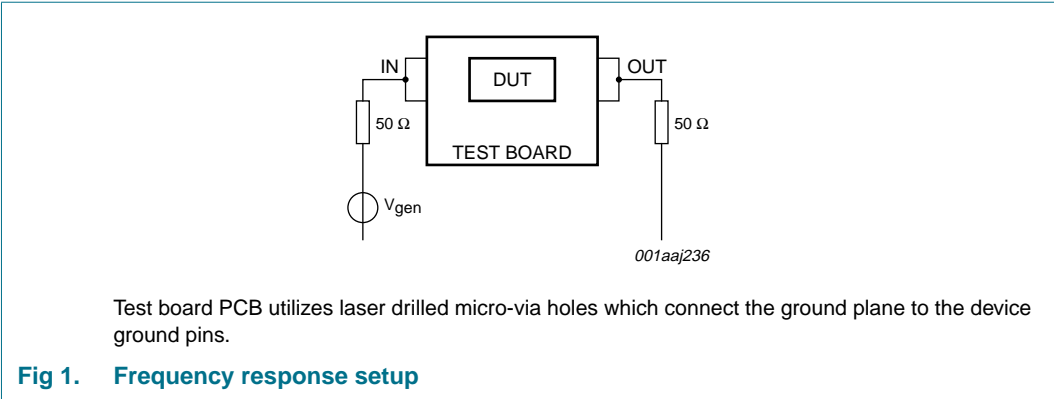
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
α_{il}	insertion loss	$R_{source} = 50\text{ }\Omega$; $R_L = 50\text{ }\Omega$; $1\text{ GHz} < f_i < 4\text{ GHz}$	-	30	-	dB
f_{-3dB}	cut-off frequency	$R_{source} = 50\text{ }\Omega$; $R_L = 50\text{ }\Omega$; $V_I = 0\text{ V}$				
		IP3253CZ8/CZ12/CZ16	-	175	-	MHz
		IP3254CZ8/CZ12/CZ16	-	145	-	MHz
$f_{rolloff}$	roll-off frequency	measured at 6 dB attenuation; $R_{source} = 50\text{ }\Omega$; $R_L = 50\text{ }\Omega$; $V_I = 0\text{ V}$				
		IP3253CZ8/CZ12/CZ16	-	350	-	MHz
		IP3254CZ8/CZ12/CZ16	-	315	-	MHz

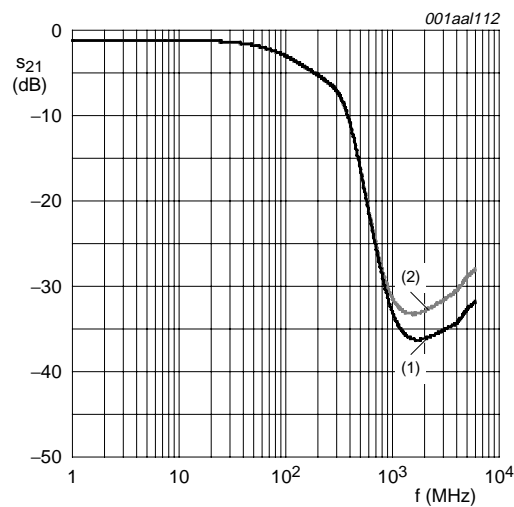
6. Application information

6.1 Insertion loss

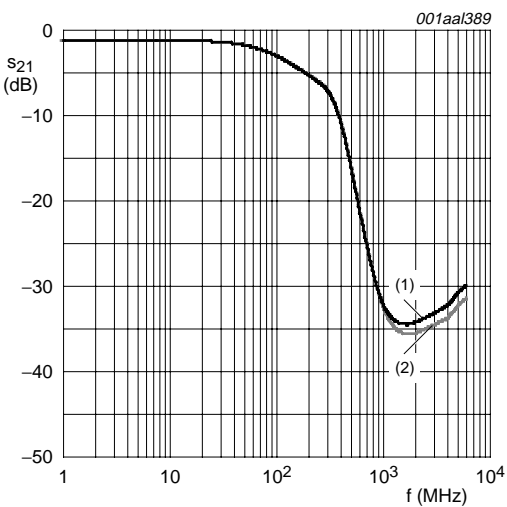
The devices are specifically designed as EMI/RFI filters for multichannel interfaces.

The block schematic for measuring insertion loss in a $50\text{ }\Omega$ system is shown in [Figure 1](#). An example of the measurement curves for all channels is shown in [Figure 2](#).





- (1) Channel 1 (pin 1 to pin 8)
- (2) Channel 4 (pin 4 to pin 5)



- (1) Channel 3 (pin 3 to pin 6)
- (2) Channel 2 (pin 2 to pin 7)

Fig 3. IP3254CZ8 measured insertion loss magnitudes

7. 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

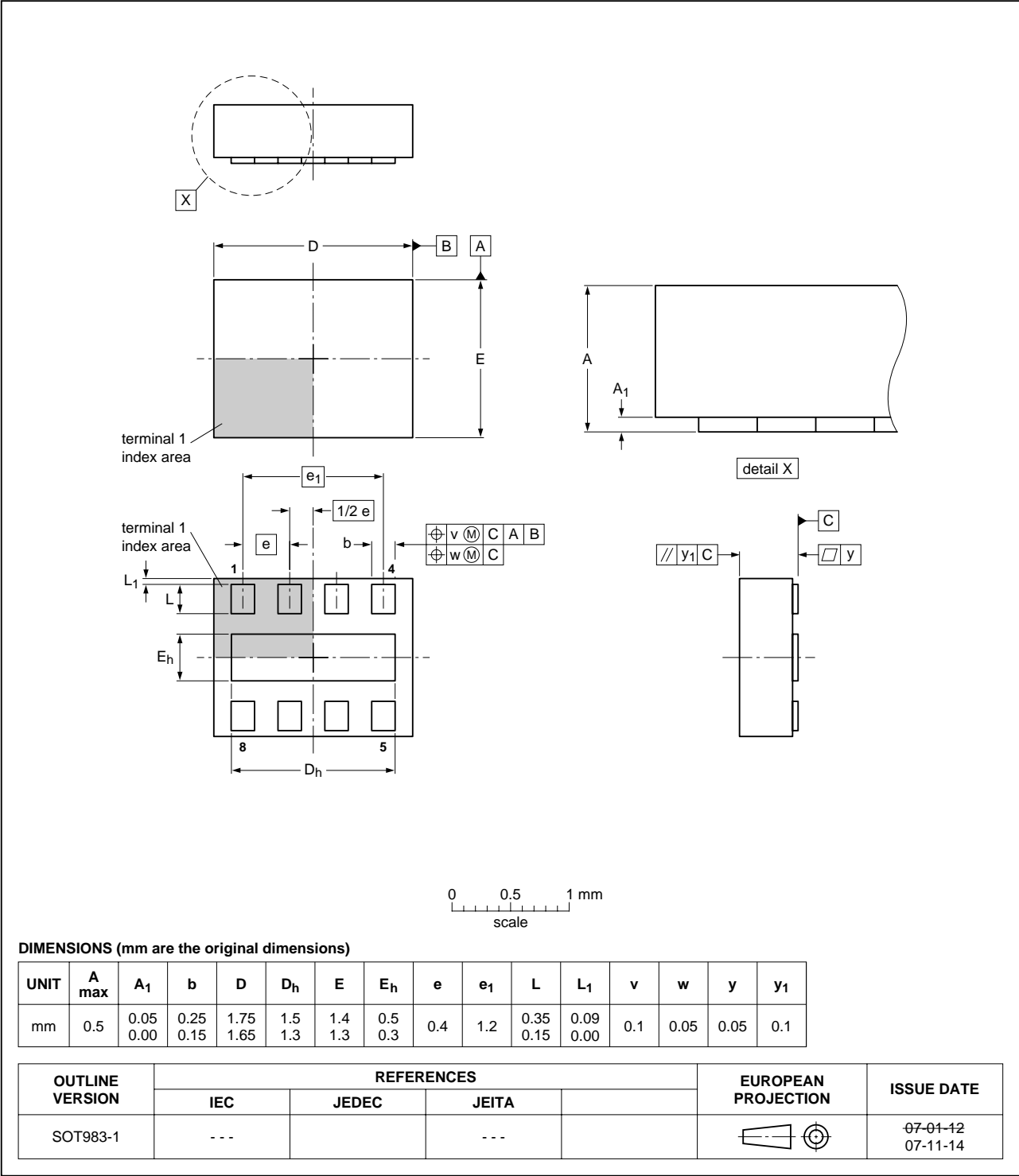


Fig 4. Package outline SOT983-1 (HXSON8U)

HXSON12U: plastic thermal enhanced extremely thin small outline package; no leads;

12 terminals; UTLP based; body 1.35 x 2.5 x 0.5 mm

SOT984-1

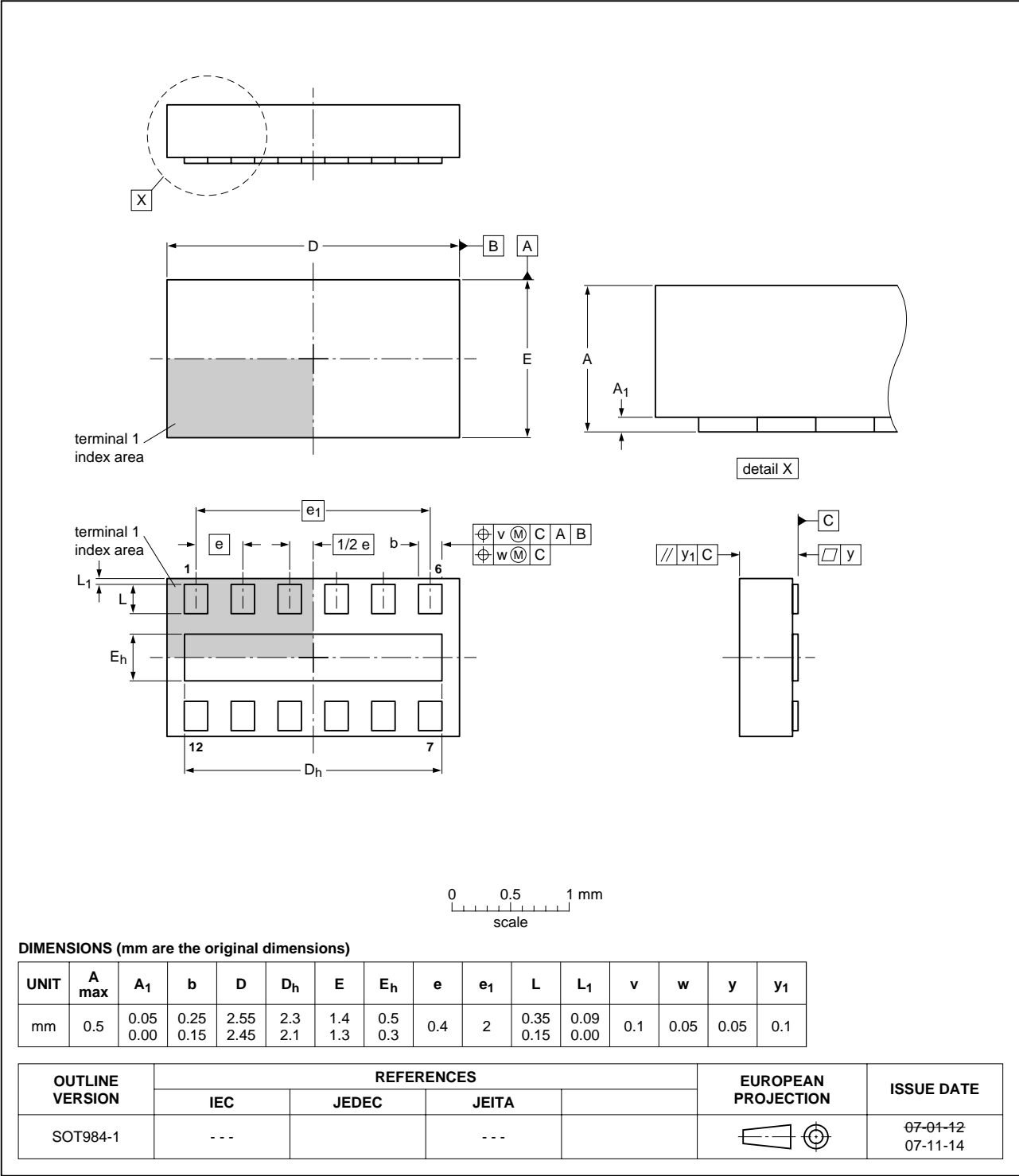


Fig 5. Package outline SOT984-1 (HXSON12U)

HXSON16U: plastic thermal enhanced extremely thin small outline package; no leads;
16 terminals; UTLP based; body 1.35 x 3.3 x 0.5 mm

SOT985-1

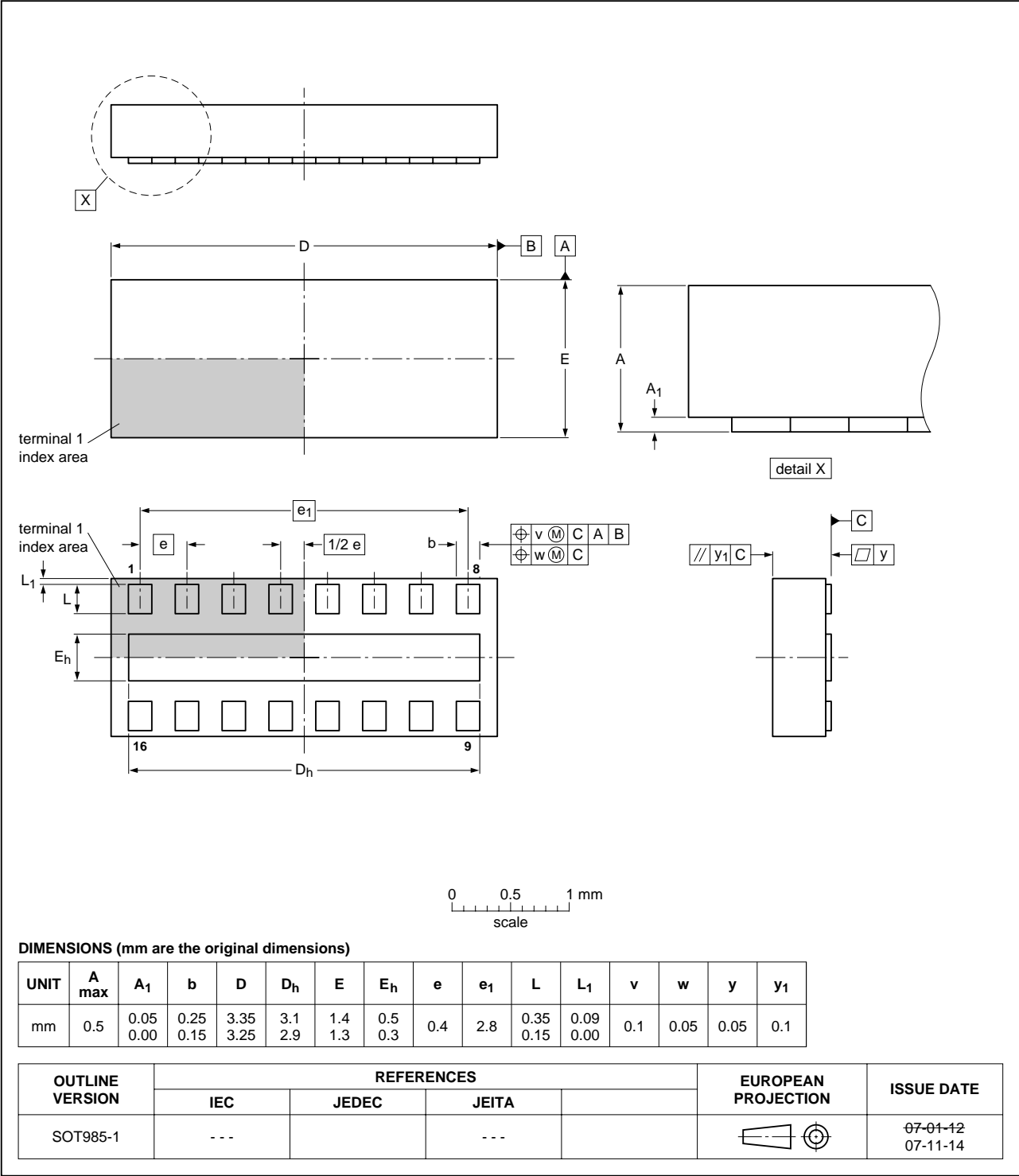


Fig 6. Package outline SOT985-1 (HXSON16U)

8. Abbreviations

Table 6. Abbreviations

Acronym	Description
DUT	Device Under Test
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharge
LAN	Local Area Network
PCB	Printed-Circuit Board
PCS	Personal Communication System
QFN	Quad Flat No leads
RFI	Radio Frequency Interference
RoHS	Restriction of Hazardous Substances
UTLP	Ultra-Thin Leadless Package
WAN	Wide Area Network

9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
IP3253_54CZ8_CZ12_CZ16_3	20100323	Objective data sheet	-	IP3253CZ8_CZ12_CZ16_2
Modifications:	• Added type numbers IP3254CZ8, IP3254CZ12 and IP3254CZ16			
IP3253CZ8_CZ12_CZ16_2	20091016	Objective data sheet	-	IP3253CZ8_CZ12_CZ16_1
IP3253CZ8_CZ12_CZ16_1	20090514	Objective data sheet	-	-

10. Legal information

10.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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