

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

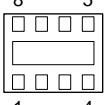
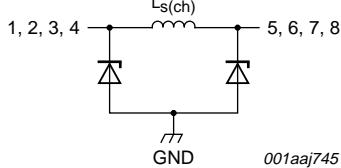
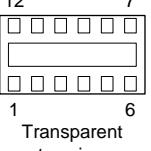
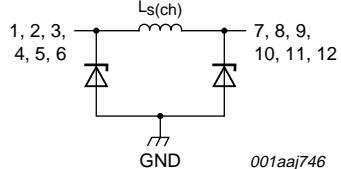
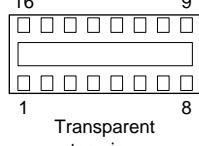
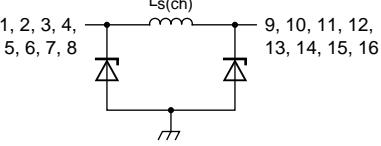
- Pb-free and Restriction of Hazardous Substances (RoHS) compliant
- 4-, 6- and 8-channel integrated π -type LC filter network
- ESD protection to ± 15 kV contact discharge according to IEC 61000-4-2, level 4
- ESD protection to ± 30 kV contact discharge according to MIL-STD-883 (Method 3015) Human Body 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	 Transparent top view	 001aa745
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	 Transparent top view	 001aa746
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	 Transparent top view	 001aa747

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	kV
I_{ch}	channel current (DC)	$T_{amb} = 85^\circ\text{C}$ IP3253CZ8/CZ12/CZ16 IP3254CZ8/CZ12/CZ16	-	30	mA
			-	30	mA
P_{ch}	channel power dissipation	IP3253CZ8/CZ12/CZ16 IP3254CZ8/CZ12/CZ16	-	10	mW
$P_{tot/pack}$	total power dissipation per package	$T_{amb} = 85^\circ\text{C}$	-	500	mW
T_{stg}	storage temperature		-65	+150	°C
T_{amb}	ambient temperature		-40	+85	°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 $T_{amb} = 25^{\circ}\text{C}$ 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; $f_i = 100$ kHz					
		IP3253CZ8/CZ12/CZ16					
		$V_{bias(DC)} = 2.5$ V	[1]	20	25	30	pF
		$V_{bias(DC)} = 0$ V	[1]	34	43	52	pF
		IP3254CZ8/CZ12/CZ16					
		$V_{bias(DC)} = 2.5$ V	[1]	25	33	40	pF
		$V_{bias(DC)} = 0$ V	[1]	38	50	60	pF
I_{LR}	reverse leakage current	per channel; $V_I = 3.5$ V	-	-	0.1	μA	
V_{BR}	breakdown voltage	positive clamp; $I_I = 1$ mA	5.8	-	10	V	
V_F	forward voltage	negative clamp; $I_F = -1$ mA	-1.5	-	-0.4	V	
$R_{(ch-ch)}$	resistance between channels	$V_I = 3.5$ V	10	-	-	$\text{M}\Omega$	
$R_{s(ch)}$	channel series resistance		-	8	-	Ω	

[1] Guaranteed by design.

Table 5. Frequency characteristics $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified.

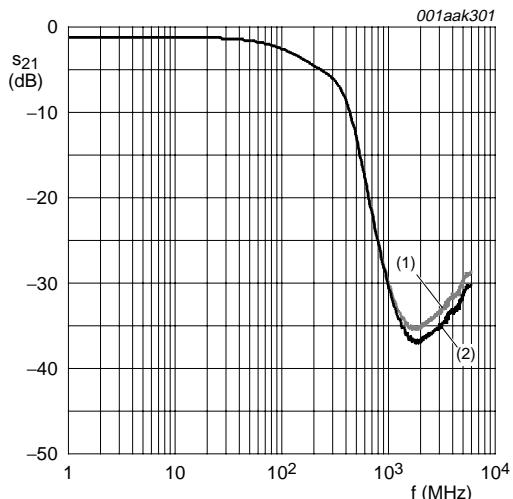
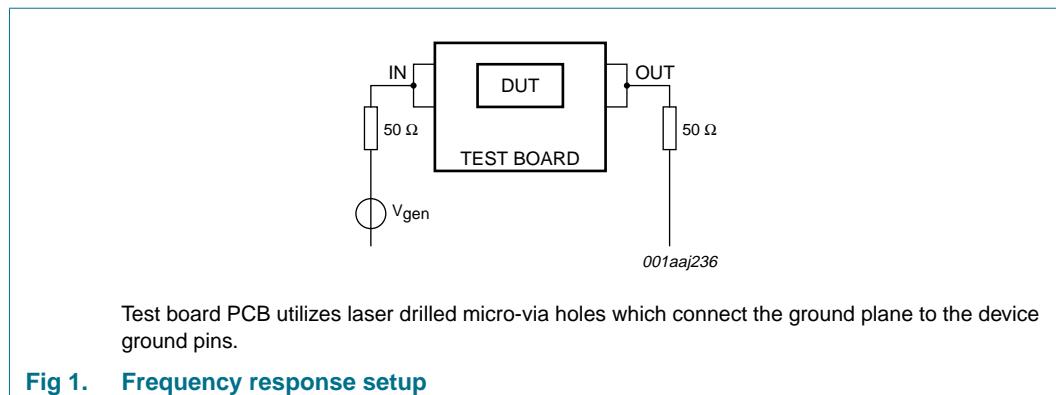
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
α_{il}	insertion loss	$R_{source} = 50 \Omega$; $R_L = 50 \Omega$; $1 \text{ GHz} < f_i < 4 \text{ GHz}$	-	30	-	dB
f_{-3dB}	cut-off frequency	$R_{source} = 50 \Omega$; $R_L = 50 \Omega$; $V_I = 0$ V				
		IP3253CZ8/CZ12/CZ16	-	175	-	MHz
		IP3254CZ8/CZ12/CZ16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

6. Application information

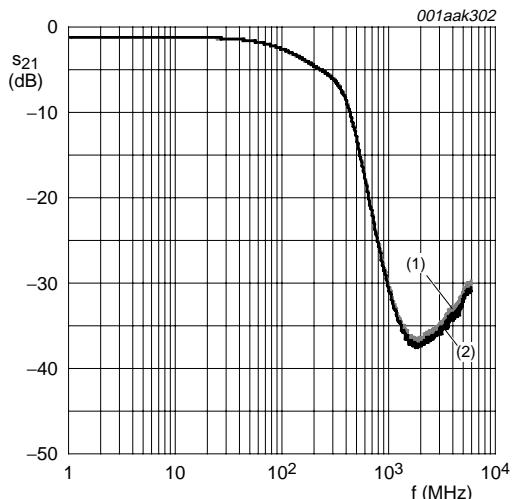
6.1 Insertion loss

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

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

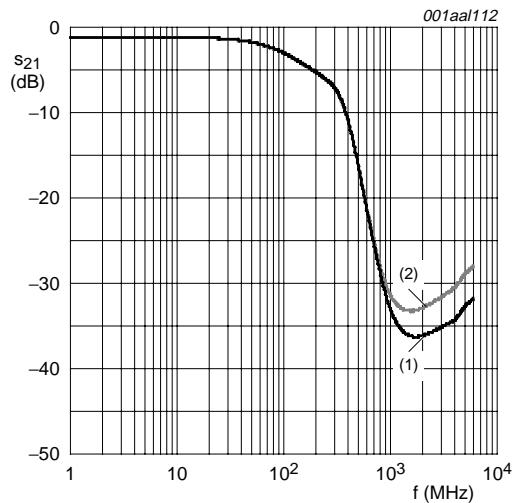


- (1) Channel 1 (pin 1 to pin 8)
- (2) Channel 4 (pin 4 to pin 5)

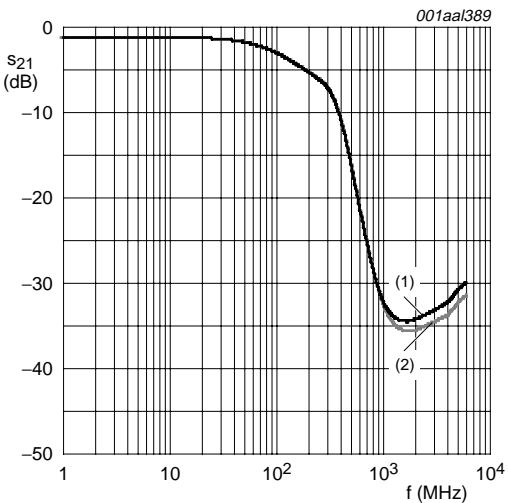


- (1) Channel 3 (pin 3 to pin 6)
- (2) Channel 2 (pin 2 to pin 7)

Fig 2. IP3253CZ8 measured insertion loss magnitudes



- (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

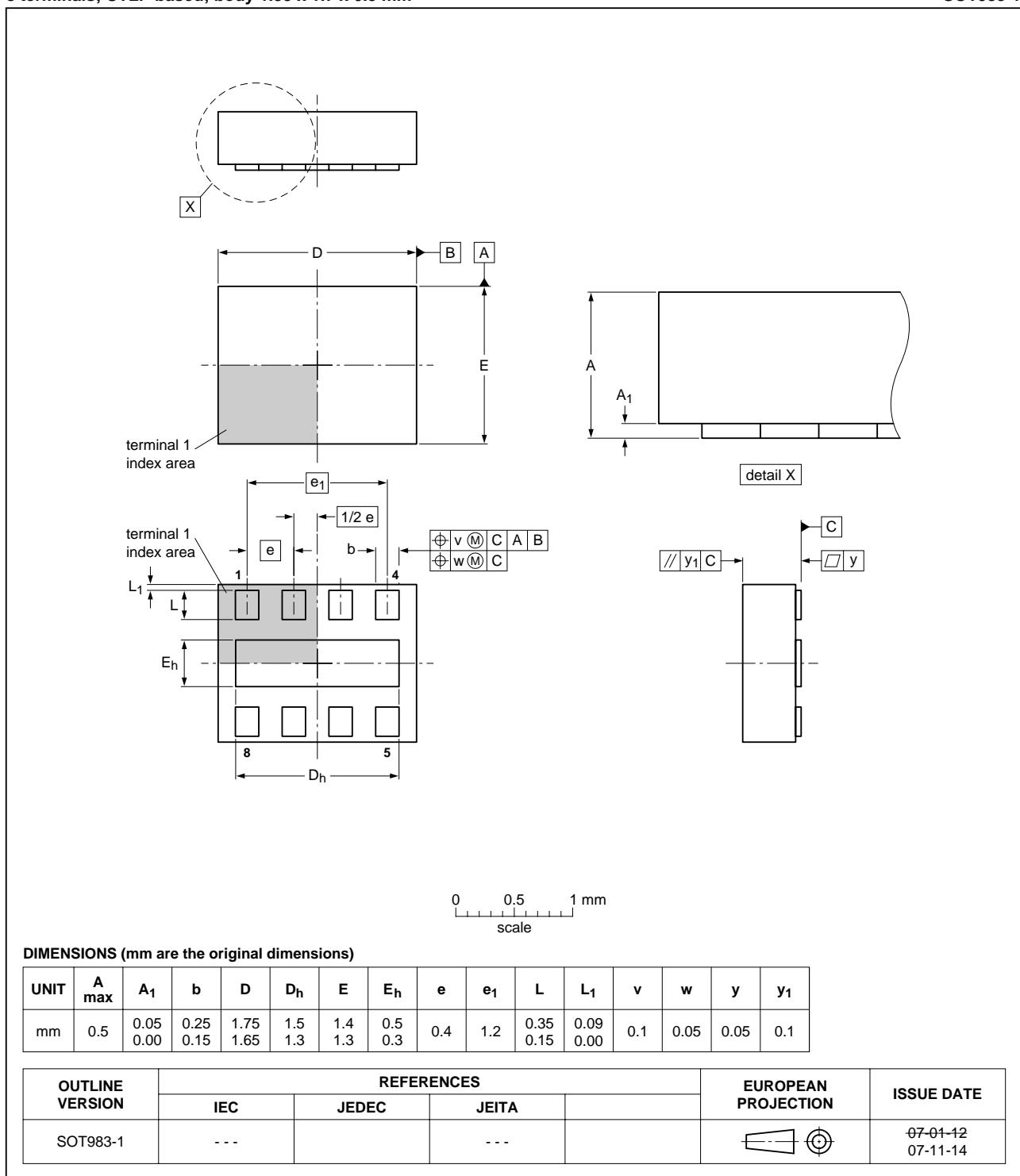


Fig 4. Package outline SOT983-1 (HXSON8U)

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

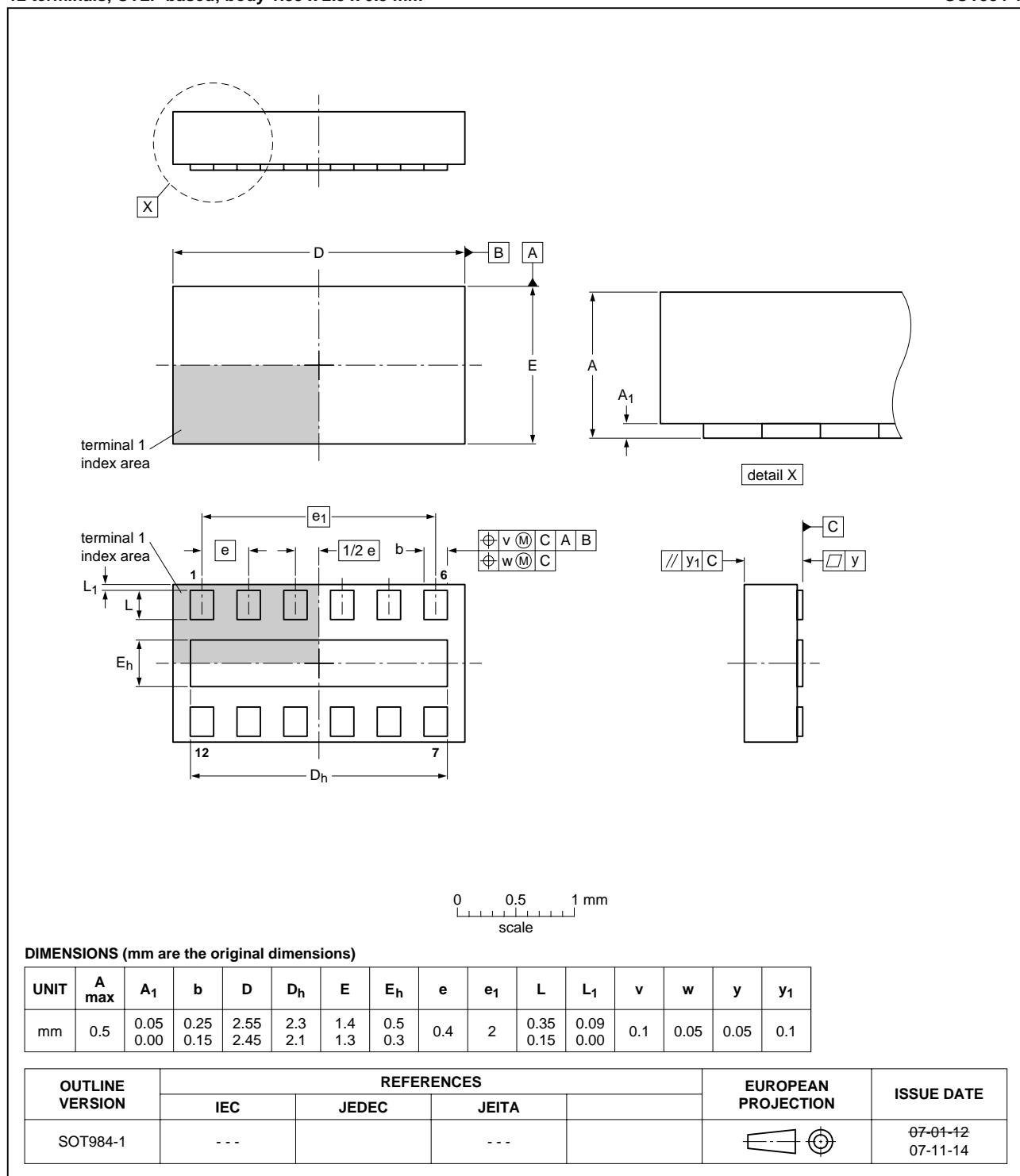


Fig 5. Package outline SOT984-1 (HXSON12U)

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

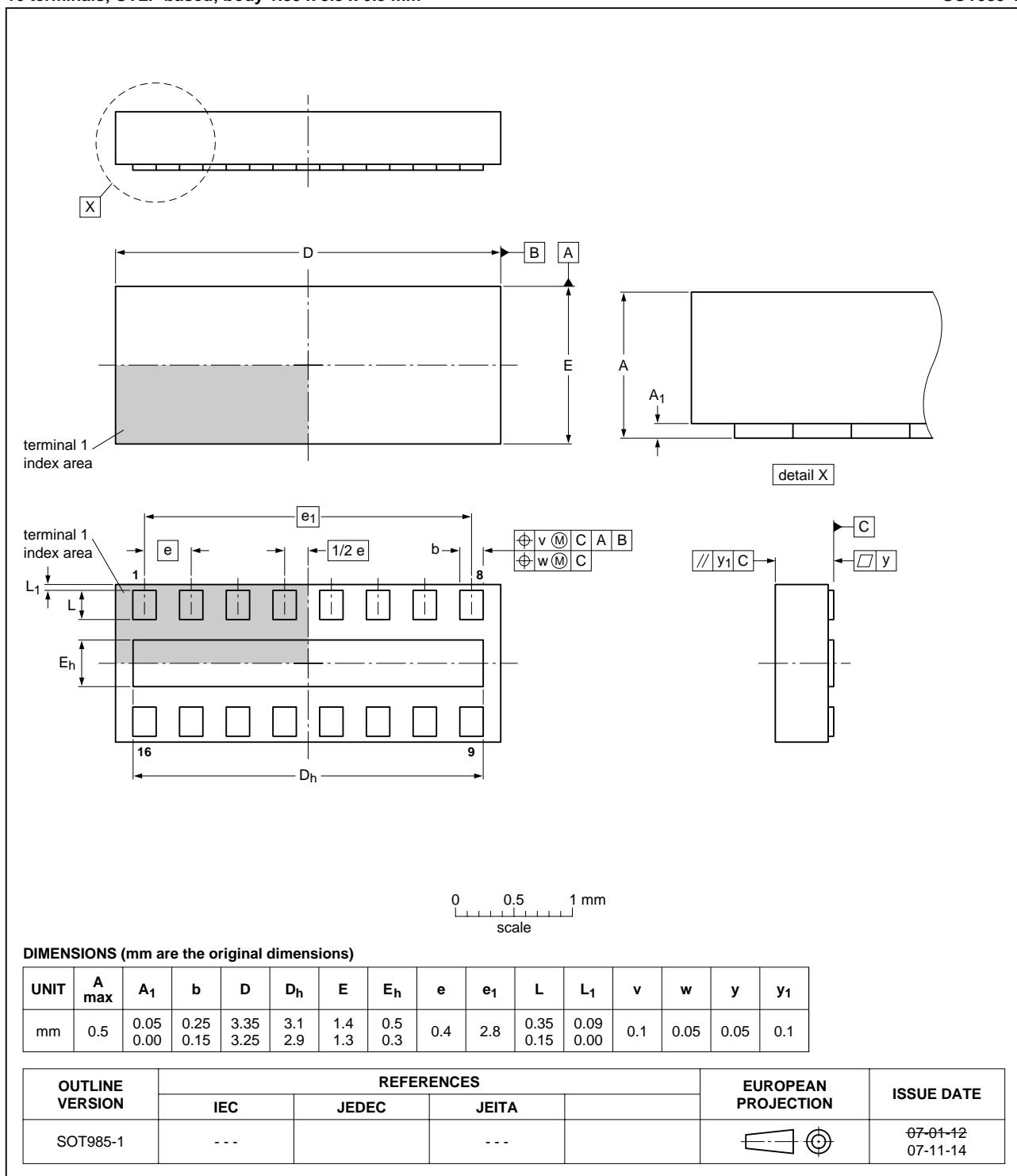


Fig 6. Package outline SOT985-1 (HXSON16U)

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:	<ul style="list-style-type: none"> 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".

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Date of release: 23 March 2010

Document identifier: IP3253_54CZ8_CZ12_CZ16_3

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