DATA SHEET

IP2100 series
8-channel RC T filter array with 2 kV ESD protection

Preliminary specification
1999 Jul 29

File under Advanced Ceramics and Modules, ACM4

Philips
Components

PHILIPS

FEATURES

- One chip solution
- 8-channel RC T filter in 20-pin SOIC or QSOP package
- ESD protection: >2 kV
- Undershoot protection

APPLICATIONS

EMI/RFI filtering of digital signals for:

- Workstations
- Desktop and portable computers
- PDAs
- PCMICA cards.

DESCRIPTION

The Philips IP2100 series of Application Specific Integrated Products (ASIPs) is an 8-channel T filter incorporating ESD protection of >2 kV. IP2100 devices are fabricated using thin film-on-silicon technology and integrate 16 resistors, 8 capacitors and 16 diodes in a single 20-pin SOIC or QSOP package.

Resistance and capacitance variation, channel to channel, using thin film-on-silicon technology is far superior in comparison to resistance and capacitance variation using thick film-on-ceramic devices.

The IP2100 should be used to provide line termination and EMI/RFI filtering of undesired high frequency signals in Electronic Data Processing (EDP) or telecommunication applications.

The IP2100 series of devices, together with their self-contained ESD protection, help maintain signal integrity on digital transmission lines by reducing digital undershoot conditions.

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Electrical characteristics at 25 °C	
Resistance	±10%; see Table 1
Capacitance	±20%; see Table 1
Operating voltage, V_{CC}	0 to +5.5 V
ESD protection	IEC 61000-4-2, level 1 (2 kV contact)
Power rating per channel	100 mW, package limited
Package ratings	
Maximum dissipation at:	
T_{amb} = 70 °C	1 W
T_{amb} = 85 °C	0.83 W
Operating temperature	–25 to +85 °C
Storage temperature	–60 to +150 °C

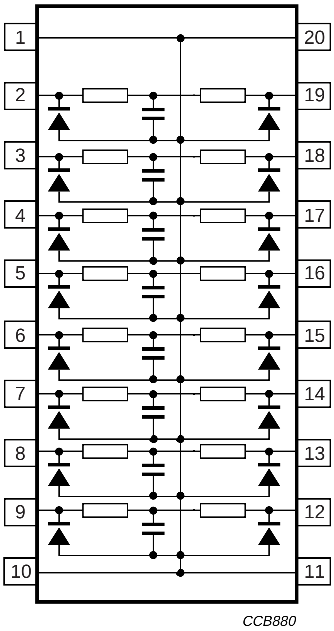
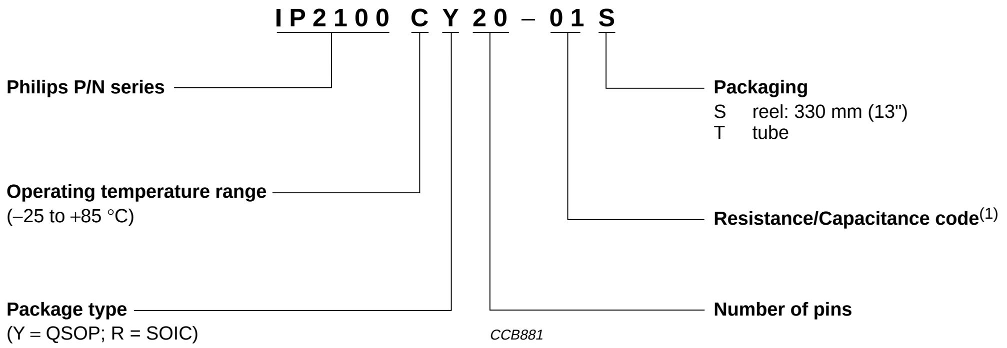


Fig.1 Functional diagram.

ORDERING INFORMATION

Ordering code



(1) For R/C codes, see Table 1.

Table 1 Standard R/C values, ordering information and nominal packaging quantities

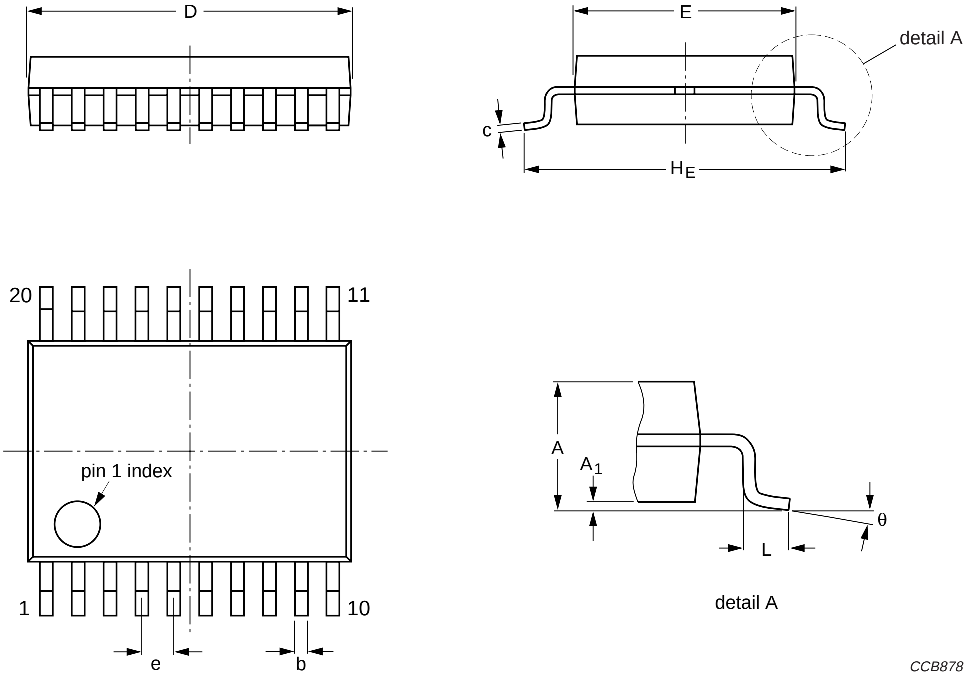
R/C CODES	RESISTANCE VALUE (Ω)	CAPACITANCE VALUE (pF)	CATALOGUE NUMBER IP2100CY(R)20-...	
			13" REEL	TUBE
SOIC20 package outline			**1000 units**	**36 units**
-01	10/10	15	01S	01T
-02	10/10	47	02S	02T
-03	25/25	200	03S	03T
-04	33/33	15	04S	04T
-05	33/33	47	05S	05T
-06	33/33	220	06S	06T
-07	47/47	33	07S	07T
-08	100/100	47	08S	08T
QSOP20 package outline			**1000 units**(1)	**56 units**
-01	10/10	15	01S	01T
-02	10/10	47	02S	02T
-03	25/25	200	03S	03T
-04	33/33	15	04S	04T
-05	33/33	47	05S	05T
-06	33/33	220	06S	06T
-07	47/47	33	07S	07T
-08	100/100	47	08S	08T

Note

1. Higher quantities per reel are available on request.

PACKAGING

SOIC20 Package outline



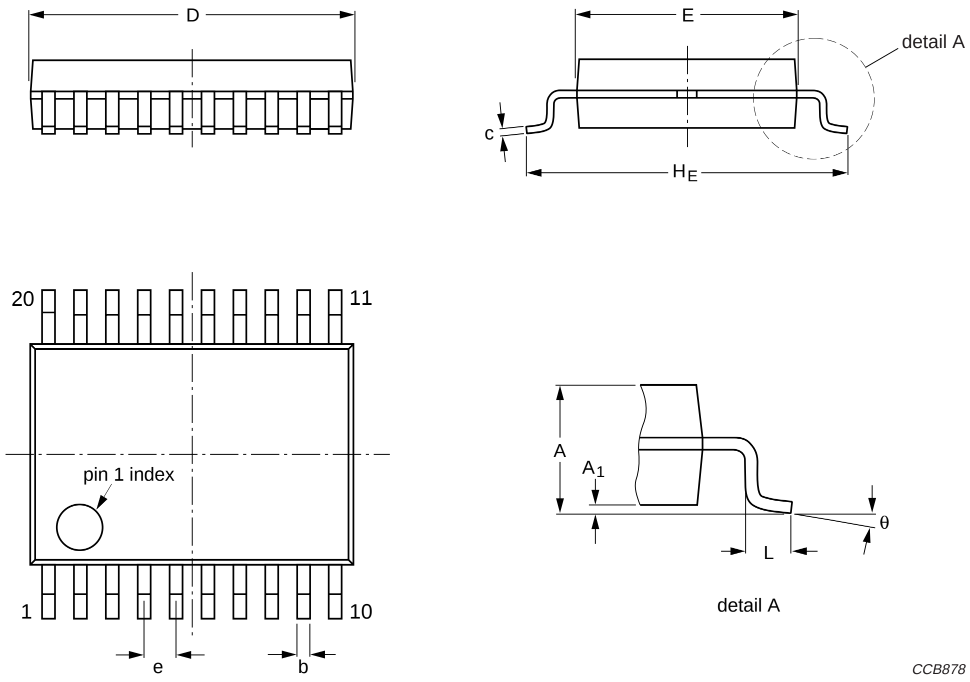
For dimensions see Table 2.

Fig.2 SOIC20 plastic shrink small outline package; 20 leads; wide body 7.39 mm.

Table 2 Package dimensions; see Fig.2

DIMENSION	VALUE		UNIT
	MIN.	MAX.	
A	2.43	2.64	mm
A_1	0.10	0.30	mm
b	0.36	0.46	mm
c	0.23	0.32	mm
D	12.65	12.85	mm
E	7.39	7.60	mm
H_E	10.06	10.52	mm
e	1.27 NOM.		mm
L	0.51	1.02	mm
θ	0	8	deg

QSOP20 Package outline



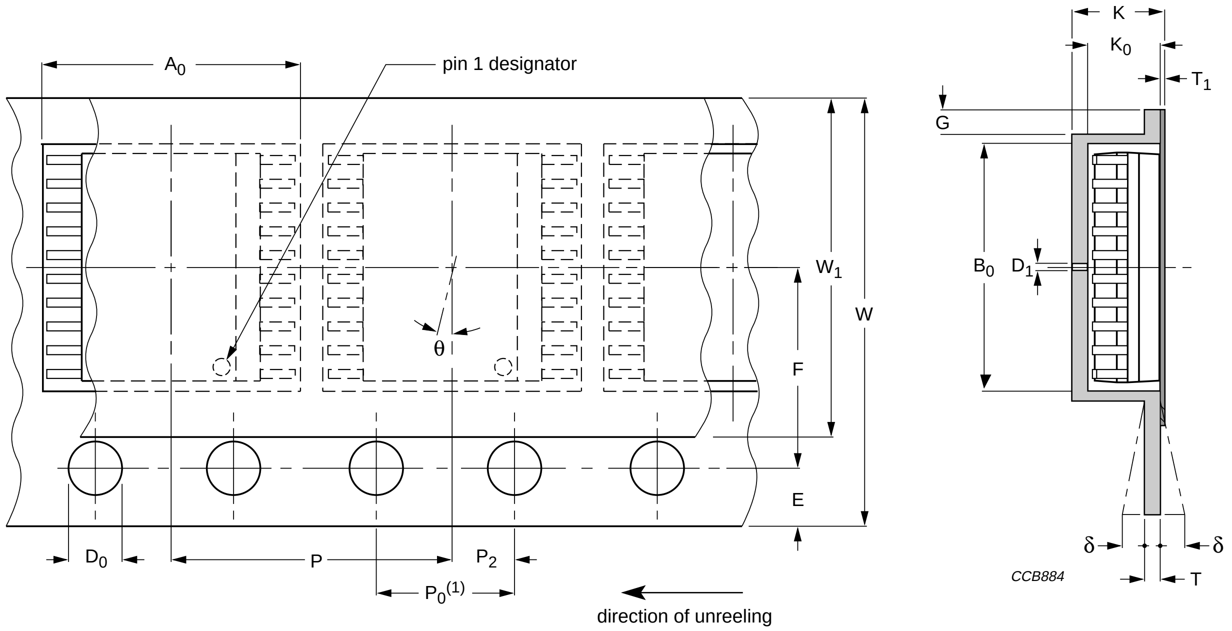
For dimensions see Table 3.

Fig.3 QSOP20 plastic shrink small outline package; 20 leads; narrow body width 3.81 mm.

Table 3 Package dimensions; see Fig.3

DIMENSION	VALUE		UNIT
	MIN.	MAX.	
A	1.35	1.75	mm
A_1	0.10	0.30	mm
b	0.20	0.30	mm
c	0.15	0.25	mm
D	8.55	8.74	mm
E	3.81	3.99	mm
H_E	5.79	6.20	mm
e	0.635 NOM.		mm
L	0.40	1.27	mm
θ	0	8	deg

Blister tape specifications



K_0: so chosen that the orientation of the component cannot change.

For dimensions see Table 4.

(1) Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Fig.4 Blister tape.

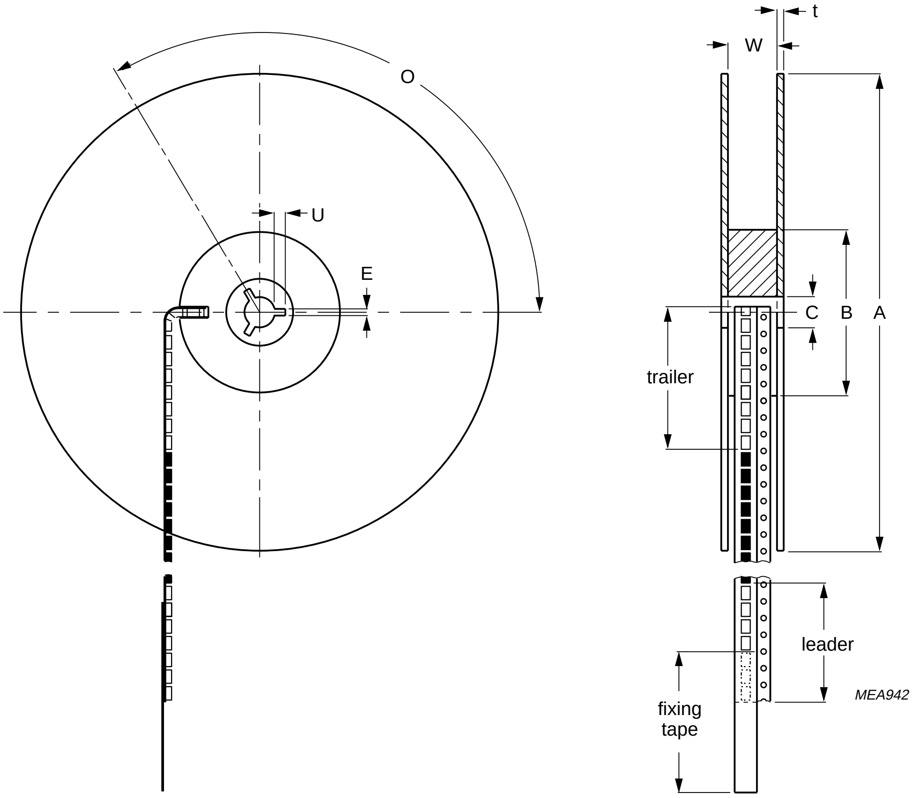
Table 4 Dimensions of blister tape; see Fig.4

PARAMETER	DIMENSION (mm)		TOLERANCE (mm)
	QSOP20 PACKAGE	SOIC20 PACKAGE	
A_0 nominal clearance; note 1	6.5	10.9	±0.1
B_0 nominal clearance; note 1	9.0	13.3	±0.1
K_0 minimum clearance; note 1	2.3	3.0	±0.1
K	<2.4	<3.2	–
G	>0.75	>0.75	–
Θ	<15°	<15°	–
δ	<0.3	<0.3	–
W	16.0	24.0	±0.3
E	1.75	1.75	±0.1
F	7.5	7.5	±0.1
D_0	1.5	1.5	+0.1/–0.0
$D_{1\ min}$	1.5	1.5	–
P_0; note 2	4.0	4.0	±0.1
P	8.0	12.0	±0.1
P_2	2.0	2.0	±0.1
T	<0.35	<0.35	–
T_1	<0.1	<0.1	–

Notes

1. Typical displacement in pocket.
2. P_0 pitch tolerance over any 10 pitches is ±0.2 mm.

Reel specifications



For dimensions see Table 5.
Minimum trailer length: 160 mm.
Minimum leader length: 390 mm.

Fig.5 Reel.

Table 5 Reel dimensions; see Fig.5

TAPE WIDTH (mm)	A NOM. (mm)	t (mm)	W (mm)	B (mm)	C (mm)	E MIN. (mm)	U MIN. (mm)	O
16	330	3 +0.0/–1.5	16.4 +2.0/–0.0	101 ±1.5	13 +0.5/–0.2	1.5	3.6	120°
24	330	3 +0.0/–1.5	24.4 +2.0/–0.0	101 ±1.5	13 +0.5/–0.2	1.5	3.6	120°

QUALITY AND RELIABILITY

Wafer fabrication and packaging technology

Philips ASIPs use well-proven semiconductor industry thin film-on-silicon fabrication and packaging technologies. Wafers are processed in a clean room wafer fabrication environment with circuit elements defined using a photolithography process. Metal disposition is performed by precision sputter process. Finished wafers are diced, assembled and tested in a state-of-the-art assembly and packaging facility fully compliant with ISO 9002.

Tests and requirements

The following tests have been conducted on representative samples of Philips ASIPs in QSOP (SSOP), SOIC and similar industry standard plastic packages in accordance with the appropriate IEC, EIA and EIAJ requirements.

Table 6 Test procedures and requirements

EIA/JESD22 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
B102-A	solderability (after ageing)	8 hours steam; immersed for 5 s in a solder bath at 215 °C	good tinning (≥95% covered); no visible damage
A113-A	SMD sequential stress	preconditioning; 5 cycles: –55 to +125 °C; 24 hours bake; temperature and humidity soak; 3 cycles of IR convection reflow at maximum 220 °C	device functional; no visible damage; SAT inspection
A104-A	temperature cycling	1000 cycles: 10 minutes minimum at –65 °C 10 minutes minimum at +150 °C	no visible damage; ΔR/R max.: ±1%; ΔC/C max.: ±1%
A102-B	autoclave (pressure pot)	336 hours: 121 °C, 100% RH	no visible damage; ΔR/R max.: ±1%; ΔC/C max.: ±1%
A101-B	temperature; humidity; bias	1000 hours: 85 °C; 85% RH; reverse voltage bias	no visible damage; ΔR/R max.: ±1%; ΔC/C max.: ±1%
A108-A	high temperature reverse bias	1000 hours: 125 °C; reverse voltage bias	no visible damage; ΔR/R max.: ±1%; ΔC/C max.: ±1%
A108-A	high temperature operating life	1000 hours: 125 °C; each channel with maximum power per spec.	no visible damage; ΔR/R max.: ±1%; ΔC/C max.: ±1%

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.