RoHS Pb FREE

■ Europe: LNBs for Satellite Broadcast

◆ Features

(1) Wide band type receiving all broadcasting channels (analog & digital) of Europe. [Universal LNB]

(2) Originally developed feed-horn waveguide makes the wide-band, low-noise characteristics possible.

(3) One of the industry's most compact and lightweight package

(4) Low consumption current design for energy saving [80 mA (TYP.): BS1R9EL100A]

◆ Specifications

Destination		Europe, Astra/Eutelsat Satellite etc.			
Receiving polarization		Horizontal/Vertical polarization			
Model No. <Type>		BS1R8EL500A <4 output>	BS1R8EL400A <4 output>	BS1R8EL200A <2 output>	BS1R9EL100A <1 output>
Input frequency (GHz)		10.7 to 11.7 [Low band], 11.7 to 12.75 [High band]			
Output frequency (MHz)		950 to 1 950 [Low band], 1 100 to 2 150 [High band]			
Local oscillation frequency (GHz)		9.75 [Low band], 10.6 [High band]			
NF (dB)		0.7 (TYP.)			0.4 (TYP.)
Conversion gain (dB)		56 (TYP.)			58 (TYP.)
Phase noise		–55 dBc/Hz @1 kHz (TYP.)			
Cross-polar discrimination (dB)		25 (TYP.)			
Supply voltage (V DC) (Polarization switching)	Vertical polarization	11.5 to 14.0 (0/22 kHz)			
	Horizontal polarization	16.0 to 19.0 (0/22 kHz)			
Current consumption (mA)		210 (TYP.)/250 (MAX.)	310 (TYP.)/350 (MAX.)	190 (TYP.)/250 (MAX.)	80 (TYP.)/120 (MAX.)
Waveguide		Feed-horn (F/D = 0.6)			
Output impedance (Ω)		75			
Output connector (F-type)		4-output (H/H, H/L, V/H, V/L)	4-output (H/V, High and low switching)	2-output (H/V, High and low switching)	1-output (H/V, High and low switching)
Outline dimensions (W) × (D) × (H) (mm)		133.0 × 103.6 × 60.0	133.0 × 103.6 × 60.0	123.5 × 97.0 × 60.0	98.0 × 49.5 × 42.7
Weight (g)		Approx. 255	Approx. 256	Approx. 215	Approx. 80

BS1R8EL500A

BS1R8EL400A

BS1R8EL200A

BS1R9EL100A

RF Components

■ Japan/Asia/Australia: LNBs for CS Digital Satellite Broadcast

◆ Specifications

Destination		Japan, Asia, Australia, CS Satellite
Receiving polarization		Horizontal/Vertical polarization
Model No. <Type>		BS1R8AR100A
Input frequency (GHz)		11.70 to 12.75
Output frequency (MHz)		1 000 to 2 050
Local oscillation frequency (GHz)		10.7
NF (dB)		0.7 (TYP.) / 0.9 (MAX.)
Conversion gain (dB)		55 to 64
Phase noise		–75 dBc/Hz @1 kHz (TYP.)
Cross-polar discrimination (dB)		25 (TYP.)
Supply voltage (V DC) (Polarization switching)	Vertical polarization	11.5 to 14.0
	Horizontal polarization	16.0 to 19.0
Current consumption (mA)		80 (TYP.)/120 (MAX.)
Waveguide		Feed-horn (F/D = 0.6)
Output impedance (Ω)		75
Output connector (F-type)		1-output (H/V switching)
Outline dimensions (mm)		107.3 (W) × 60 (D) × 60 (H)
Weight (g)		Approx. 110

BS1R8AR100A

■ Japan: LNBs for BS/CS 110° Satellite Broadcast

◆ Features

(1) Can receive 2 satellite broadcasts of 110° BS/CS digital
[Employs wide-band (1 GHz) circular' linear polarization conversion technology (septum waveguide structure)]

(2) Outstanding noise figure (NF) characteristics enabling compact design of antenna diameter. [NF: 0.45 dB (TYP.)/BS1F6JU300A]

(3) Low current consumption design for improved energy saving. [80 mA (TYP.)]

◆ Standard Specifications

Destination		Japan BS/CS 110° Satellite		
Receiving polarization		Right circular polarization		Right/Left circular polarization
Model No.		BS1F6JU300A	BS1F6JP300A	BS1F6JP100A
Input frequency (GHz)		11.71023 to 12.751		
Output frequency (MHz)		1 032.23 to 2 073		
Local oscillation frequency (GHz)		10.678		
NF (dB)		0.45 (TYP.) / 0.6 (MAX.)	0.7 (TYP.) / 1.1 (MAX.)	
Conversion gain (dB)		48 to 60		
Phase noise		–65 dBc/Hz @1 kHz (TYP.)		
Cross-polar discrimination (dB)		25 (TYP.)/20 (MIN.)		
Supply voltage (V DC) (Polarization switching)	Right circular polarization	9.5 to 18.0		13.5 to 16.5
	Left circular polarization	—		9.5 to 12.0
Current consumption (mA)		80 (TYP.)/110 (MAX.)		
Waveguide		Feed-horn (F/D = 0.5)		
Output impedance (Ω)		75		
Output connector (F-type)		1-output		1-output (R/L switching)
Outline dimensions (mm)		96 (W) × 53.07 (D) × 71 (H)		
Weight (g)		Approx. 130 (not including outer cabinet)		

BS1F6JP300A

* Outer cabinet is made upon request.

■ Digital DBS Front-End Units

◆ Features

(1) Equipped with a direct conversion IC developed by Sharp. Reliability is improved by reducing power consumption and component counts.

(2) Wide-band reception design also covering CS broadcast band. [Reception frequency: 950 to 2 150 MHz]

(3) Wide product line-up of LINK integrated types for contributing to set development time reduction. [Compatible with DVB-S/DVB-S2/ISDB-S/ABS-S demodulation]

(4) User support tools can be provided. [Sample/evaluation boards and software are available.]

◆ Standard Specifications <IQ output type>

Destination	Global	
Demodulator system	DVB-S	ISDB-S/DVB-S2/ABS-S
Input type	1-input/1-loop through output	1-input
Model No.	BS2S7HZ0502	BS2S7HZ6306
Input frequency (MHz)	950 to 2 150	
Input signal level (dBm)	–65 to –25	
The 1st intermediate frequency (MHz)	Zero-IF (Direct conversion)	
Base band frequency bandwidth (MHz)	10 to 30, 2.0 MHz step (BB LPF)	
RF input local leak (dBm)	–70 and below	
Output type	I/Q	
Channel selection system	PLL (I²C-bus)*1	
Noise figure (dB)	7 (TYP.)	
Tuning voltage (V DC)	Shared with a 3.3 V power source	
Supply voltage (V DC)	3.3	
LNB power supply	DC 25 V, 400 mA (MAX.)	
Input impedance (Ω)	75	
Outline dimensions (mm)	29.6 (W) × 29.4 (D) × 13.0 (H)	30.6 (W) × 25.0 (D) × 13.0 (H)

BS2S7HZ0502

BS2S7HZ6306

※ Contact SHARP for custom design product.
*1 I²C-bus is a trademark of Philips Corporation.

RF Components

■ Digital DBS Front-End Unit

◆ Standard Specifications <IQ dual output type>

Destination	Global
Input type	1-input
Model No.	BS2S7HZ7302
Input frequency (MHz)	950 to 2 150
Input signal level (dB m)	–65 to –25
The 1st intermediate frequency (MHz)	Zero-IF (Direct conversion)
Base band frequency bandwidth (MHz)	10 to 30, 2.0 MHz step (BB LPF)
RF input local leak (dB m)	–70 and below
Output type	I/Q × 2
Channel selection system	PLL (I²C-bus)*1
Noise figure (dB)	7 (TYP.)
Tuning voltage (V DC)	Shared with a 3.3 V power source
Supply voltage (V DC)	3.3
LNB power supply	25 V DC, 400 mA (MAX.)
Input impedance (Ω)	75
Outline dimensions (mm)	55.1 (W) × 29.6 (D) × 13.2 (H)

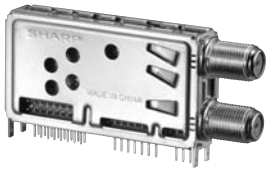
BS2S7HZ7302

※ Contact SHARP for custom design product.
*1 I²C-bus is a trademark of Philips Corporation.

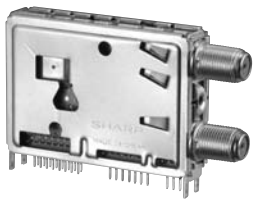
■ Digital DBS Front-End Units

◆ Standard Specifications

Destination	Global (DVB-S)	Europe (DVB-S2)
Input type/Features	1-input, 1-loop through output	1-input, 1-loop through output
Model No.	BS2F7VZ7395	BS2S7VZ0169
Input frequency (MHz)	950 to 2 150	
Input signal level (dB m)	–65 to –25	
The 1st intermediate frequency (MHz)	Zero-IF (Direct conversion)	
Base band frequency bandwidth (MHz)	10 to 30, 2.0 MHz step (BB LPF)	10 to 30
RF input local leak (dB m)	–70 and below	
Output type	Transport stream (parallel/serial)	
Symbol rate (M baud)	45 (MAX.)	10 to 30
Channel selection system	PLL (I²C-bus)*1	
Noise figure (dB)	7 (TYP.)	
Tuning voltage (V DC)	Shared with a 3.3 V power source	
Supply voltage (V DC)	3.3, 2.5	3.3, 1.0
LNB power supply	25 V DC, 400 mA (MAX.)	
Input impedance (Ω)	75	
Outline dimensions (mm)	57.5 (W) × 29.6 (D) × 13.2 (H)	55.1 (W) × 37.9 (D) × 13.2 (H)



BS2F7VZ7395



BS2F7VZ0169

※ Contact SHARP for custom design product.
*1 I²C-bus is a trademark of Philips Corporation.

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■ Combination Front-End Units for Digital Terrestrial, Analog Terrestrial and Digital Satellite Broadcasting

◆ Features

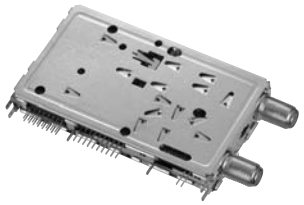
(1) Enables simultaneous reception of digital terrestrial and digital satellite broadcasting.

(2) Contributes to making LCD TVs, etc. thinner.

◆ Standard Specifications

Destination	Japan (ISDB-T/S/NTSC)		
Model No.	VA1R5JF7012		
	Digital terrestrial	Analog terrestrial	Digital DBS
Input frequency (MHz)	VHF, UHF, CATV VHF Low: 93 to 167 VHF High: 173 to 399 UHF: 405 to 767		950 to 2 150
Input signal level*1 (dBm)	–75 to –20	–	–65 to –25
Output type	Transport stream (Serial)	CVBS/SIF	Transport stream (Serial)
IF bandwidth (MHz)	6		–
Base band frequency bandwidth	–		10 MHz to 30 MHz, 2.0 MHz step (BB LPF)
Noise figure (dB)	6 (TYP.)		6 (TYP.)
Phase noise (dBc/Hz)	–90 (TYP.) at 10 kHz offset		–80 (TYP.) at 10 kHz offset
Image rejection (dB)	–65 (TYP.)		–
Channel selection system	PLL (I²C-bus)*2		
Supply voltage (V DC)	1.2, 2.5, 3.3, 5.0		
Outline dimensions (mm)	85.5 (W) × 45.2 (D) × 12.7 (H)		

*1 It conforms to the ARIB standard.
*2 I²C-bus is a trademark of Philips Corporation.



VA1R5JF7012

RF Components

Notice
In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

■ Front-End Units for ISDB-T/DVB-T/DTMB/CATV

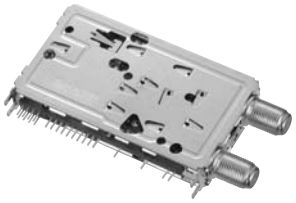
◆ Features

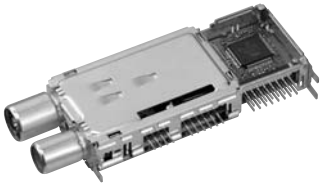
(1) Low phase noise characteristics, high elimination of adjacent channel interference.
(2) Transport stream output front-end units with built-in OFDM demodulation IC.
(3) Compact, low power consumption.
(4) Other types are available with various forms of chassis (vertical or horizontal type) and input connectors (F or DIN type), etc.

◆ Standard Specifications

Destination	Japan (ISDB-T/S)		Europe (DVB-T)/Asia (DVB-T)	
Model No.	VA1J5JF7007*1		VA1T1ED5065	VA1K5ED5255
	Digital terrestrial	Digital satellite		
Input frequency (MHz)	VHF, UHF, CATV VHF Low: 93 to 167 VHF High: 173 to 399 UHF: 405 to 767	950 to 2 150	VHF: 143.5 to 430 UHF: 430 to 862	VHF: 146 to 430 UHF: 430 to 862
Output type	Transport stream (Serial)		Direct IF	Transport stream (Serial)
IF bandwidth (MHz)	6	—	7, 8, selectable	8
Noise figure (dB)	6 (TYP.)	8 (TYP.)	6 (TYP.)	
Phase noise	–90 dBc/Hz (TYP.) at 10 kHz offset	–80 dBc/Hz (TYP.) at 10 kHz offset	–90 dBc/Hz (TYP.) at 10 kHz offset	
Image rejection (dB)	–65 (TYP.)	—	–55 (TYP.)	—
Channel selection system	PLL (I²C-bus)*2			
Power consumption (W)	2.0*3		0.75	1.33
Supply voltage (V DC)	1.2, 2.5, 3.3, 5		5 (DC-DC converter)	5, 3.3, 1.8 (DC-DC converter)
Outline dimensions (mm)	70.0 (W) x 40.0 (D) x 12.7 (H)		52.0 (W) x 35.9 (D) x 13.4 (H)	70.0 (W) x 29.6 (D) x 13.2 (H)

*1 Enables simultaneous reception of digital terrestrial and digital satellite broadcasting.
*2 I²C-bus is a trademark of Philips Corporation.
*3 During simultaneous OFDM/8PSK demodulation operation.


VA1J5JF7007


VA1K5ED5255

FRONT-END UNITS FOR ISDB-T/DVB-T/DTMB/CATV

◆ Standard Specifications

Destination	Brazil (SBTVD-T)	China (DTMB)	Europe/China/India (DVB-C)
Model No.	VA1J5BF6009	VA1T1EF2096	VA1K5CD5405
	Digital terrestrial	Digital terrestrial	CATV
Input frequency (MHz)	54 to 864	47 to 862	
Output type	Transport stream (Serial)	Direct IF	Transport stream (Parallel/serial)
IF frequency/IF bandwidth (MHz)	44/6	36/8	
Noise figure (dB)	6 (TYP.)		
Phase noise	–90 dBc/Hz (TYP.) at 10 kHz offset	–87 dBc/Hz (TYP.) at 10 kHz offset	
Image rejection (dB)	–65 (TYP.)	–55 (TYP.)	
Channel selection system	PLL (I^2C-bus)*1		
Power consumption (W)	2.0	0.75	1.3
Supply voltage (V DC)	1.2, 2.5, 3.3, 5	5	2.5, 3.3, 5
Outline dimensions (mm)	70.0 (W) x 37.0 (D) x 12.5 (H)	68.2 (W) x 35.9 (D) x 14.1 (H)	70.0 (W) x 29.4 (D) x 13.0 (H)

*1 I^2C-bus is a trademark of Philips Corporation.

VA1J5BF6009

VA1T1EF2096

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■ Front-End Units for Digital Terrestrial and Analog Terrestrial Broadcasting

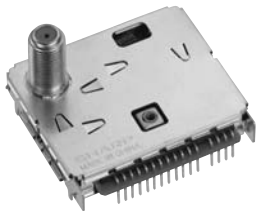
◆ Features

Contributing to the development of thinner LCD TVs and similar products by combining compatibility with digital and analog terrestrial broadcasts into a single unit.

◆ Standard Specifications

Destination		North America	Europe	Brazil*2	China/Asia
Model No.		VA1Y2UF2446	VA1Y2ED2001	VA1G5BF8010	VA1Y2CD2001
Input frequency		Low: 54 to 160.9 MHz Mid: 161 to 425.9 MHz High: 426 to 864 MHz	VHF: 47 to 430 MHz UHF: 430 to 862 MHz	VHF Low: 54 to 160.9 MHz VHF High: 161 to 425.9 MHz UHF: 426 to 864 MHz	47 to 870 MHz
Analog intermediate frequency (MHz)	Video	45.75	B/G, I, D/K, L: 38.9 L': 33.9	45.75	38.0
	Audio	41.25	D/K, L: 32.4 I: 32.9 B/G: 33.4 L': 40.4	41.25	D/K: 31.5, I: 32.0, B/G: 32.5, M/N: 33.5
Digital intermediate frequency (MHz)		44	36.167	44	36
Digital IF bandwidth (MHz)		6	7/8 (switchable)	6	8
Phase noise		–85 dBc/Hz (TYP.) at 20 kHz offset	–85 dBc/Hz (TYP.) at 10 kHz offset	–90 dBc/Hz (TYP.) at 10 kHz offset	–85 dBc/Hz (TYP.) at 10 kHz offset
Supply voltage (V DC)		5.0	5.0	1.2, 2.5, 3.3, 5	5.0
Noise figure (dB)		TYP. 6 (54 to 806 MHz), TYP. 7 (806 to 861 MHz)	TYP. 6		
Channel selection system		PLL (I²C-bus)*1			
Image rejection (dB)		Low: –65.0, Mid: –65.0, High: –60.0	TYP. –65		
Outline dimensions (W) × (D) × (H) (mm)		52.6 × 38.1 × 10	61.5 × 35.0 × 10.9	70.0 × 37.0 × 10.0	62.0 × 39.0 × 10.9

*1 I²C-bus is a trademark of Philips Corporation.
*2 Transport stream output front-end units with built-in OFDM demodulation IC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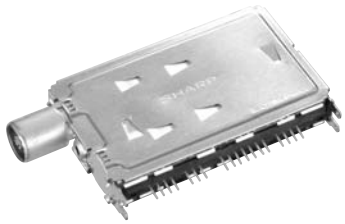

VA1Y2ED2001


VA1G5BF8010

RoHS Pb FREE

■ RF-separation Type Digital Terrestrial Compound Receiver Module

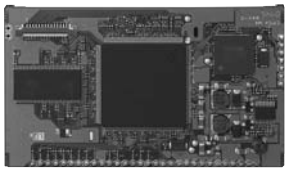
◆ Features

(1) An OFDM demodulator, MPEG decoder, and video encoder circuit are combined into a single package for reception of ISDB-T.

(2) Comes with built-in standard reception software, with a simple EPG included, based on the ARIB standard.
Compatible with Ministry of Internal Affairs and Communications specifications for a "simple tuner."

(3) The tuner (RF) section is separate, making it possible to select between digital/analog and digital tuners.

Recommended tuner { Digital terrestrial: VA1T1JF2091
Analog terrestrial/Digital terrestrial: VA1W2JF2008



DU6M4JZ00xx

◆ Standard Specifications

Model No.	DU6M4JZ00xx
Circuit configuration	[RF (separate body) +] OFDM + MPEG
Receiving channel (ch)	[VHF] 1 to 13, [UHF] 14 to 62, [CATV] C13 to C63
Video output	Component (Half HD)*
Audio output	Analog stereo (L/R)
B-CAS	Built-in control software
EPG	Built-in simple EPG
ES (Engineering service)	Compatible
Firm ware upgrades	Compatible (USB)
Supply voltage	DC 5 V single power supply
Power consumption (W)	Approx. 2.75
Outline dimensions (mm)	93 (W) × 53 (D) × 17.6 (H)

* Composite video output (SD) is also supported.

■ One-Seg Tuner Module

◆ Features

(1) High sensitivity: -109 dBm [TYP.] (QPSK, CR1/2 ch13)

(2) Compact and thin design: 5.9 × 5.9 × 1.05 mm

(3) Low power consumption: 80 mW

(4) Output interface: TS serial output

VA3A5JZ922

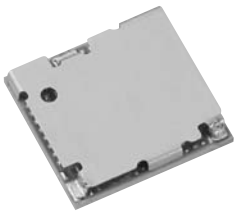
◆ Standard Specifications

Destination	Japan
Model No.	VA3A5JZ922
Input frequency (MHz)	470 to 770 (UHF: 13 to 62)
Input signal level (dBm)	–109 [TYP.] (QPSK, CR1/2, ch13)
Outline dimensions (mm)	5.9 (W) × 5.9 (D) × 1.05 (H)
Supply voltage (V DC)	1.8 (RF) 2.8 (RF OSC) 1.2 (OFDM Core) 1.7 to 2.8 (I/O)
Power consumption (mW)	80
Operating temperature (degree C)	–20 to 85
Control I/F	I²C-bus*1

*1 I²C-bus is a trademark of Philips Corporation.

★Under development

■ Embedded Wireless LAN Module



DC2J1DZ150

◆ Features

(1) LSI implementation of MAC functionality for reduced load on host CPU and high throughput
Transmission: 8.0 Mbps
Reception: 10.7 Mbps
Test environment: Xscale platform + SDIO I/F base (PXA270 + 520 MHz clock)

(2) Low power consumption
Continuous transmission: 530 mW (11g: +10 dBm output)
Continuous reception: 326 mW
Sleep mode: 81 µW

(3) Wake on WLAN support

(4) LSI implementation of encryption function for reduced load on host CPU

◆ Standard Specifications

Standard	IEEE802.11b/g
Model No.	★DC2J1DZ150
Operating frequency (MHz)	2 400 to 2 484
Data rate (Mbps)	1/2/5.5/11 & 6/9/12/18/24/36/48/54
Number of channels	13
Demodulator system	CCK/DQPSK/DBPSK (11b) OFDM (11g)
Transmission output (dBm)	13/10
Receiving sensitivity (dBm)	TYP.: –87 (11 Mbps CCK) TYP.: –70 (54 Mbps OFDM)
Channel selection system	PLL (I^2C)
Security	WEP TKIP AES
Outline dimensions (mm)	7.9 (W) × 8.5 (D) × 1.4 (H)

Driver software consults separately.

EMBEDDED WIRELESS LAN-BLUETOOTH COMBO MODULE

★Under development

■ Embedded Wireless LAN-Bluetooth Combo Module

◆ Features

(1) A two-in-one module compliant with the latest Bluetooth standard (v2.1)
Wireless LAN: 11b/g, Bluetooth: v2.1+EDR* (3 Mbps)

(2) Compatible with IEEE802.15.2 standard compliant wireless LAN and Bluetooth coexistence functions.

(3) Thin, compact configuration—the smallest class in the industry.
10.0 x 10.0 x 1.4 mm

*EDR: Enhanced Data Rate

DC2K1DZ145

◆ Standard Specifications

Model No.	★DC2K1DZ145	
Standard	WLAN (IEEE802.11b/g)	Bluetooth v2.1+EDR; HCI
Outline dimensions (mm)	10.0 (W) × 10.0 (D) × 1.4 (H)	
Supply voltage (V DC)	VCCIF_WLAN 1.7 to 1.9 or 2.3 to 2.7 VCCPA 2.7 to 3.6 VCC285 2.7 to 2.9 VCC120 1.1 to 1.3	VCCIF_BT 1.7 to 1.9 or 2.3 to 2.7 Vcc275_BT 2.65
Input frequency (MHz)	2,400 to 2,484	2,402 to 2,480
Data rate (Mbps)	1/2/5.5/11 & 6/9/12/18/24/36/48/54	1/2/3
Number of channels	13	79
Modulation system	CCK/DQPSK/DBPSK (11b) OFDM (11g)	GFSK (1 Mbps) DQPSK (2 Mbps) 8-DPSK (3 Mbps)
Transmission output (dBm)	13/10	Class 2 4 (Max.)
Receiving sensitivity (dBm)	TYP.: –87 (11 Mbps, PER 8%) TYP.: –70 (54 Mbps, PER 10%)	TYP.: –82 (1 Mbps, BER 0.1%) TYP.: –84 (2 Mbps, BER 0.01%) TYP.: –76 (3 Mbps, BER 0.01%)
Security	WEP TKIP AES	by driver software
Interface	SPI/SDIO	PCM (64 kbps), SPI/UART

Driver software consults separately.

■ Switching Power Supplies (Custom)

◆ Features

(1) Satisfies energy saving regulations thanks to the high conversion efficiency
(2) Compact and high reliability thanks to the modulated main switching and chopper circuits
(3) EMI filter built-in, low noise design
(4) Environmentally safe types are also available. [RoHS, Pb-free]

◆ Specification examples

Applications	LCD TV (20 to 22″)	LCD TV (26 to 37″)
Input voltage (V AC)	90 to 110	90 to 264
Input frequency (Hz)	50/60	50/60
Output voltage (V) (Current capacity)	+24 (1.9 A) +12 (3.5 A)	+24 (5.0 A) +12 (4.0 A) +5 (5.5 A) +5 (1.5 A) +3.3 (3.0 A)
Rated output power (W)	87.6	213
Stand-by power loss (W)	0.07 (without load)	0.1
Protection circuit	Overcurrent and overvoltage protection	
Configuration	On-board	
Outline dimensions (mm)	118 (W) × 208 (D) × 36 (H)	140 (W) × 244 (D) × 35.6 (H)

* Types with input voltage of AC 100 V, 120 V, 200 V are also available. Types with other specification are also available upon request.
For LCD TVs (20″ to 22″), an integrated power source with an inverter circuit for backlights is also available.

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■ Advanced Flex Printed Circuit Boards

The advanced flex printed circuit board is a multilayered composite wiring board comprised of flexible printed circuits (FPC) laminated into a multilayer configuration. The PWBs and FPCs are connected to each other via copper-plated through holes. It is ideal for compact, light-weight equipment design.

◆ Features

(1) For selecting optimal specifications to suit specific applications, special specifications such as for mobile phones are available.
- Minimum thickness in multi-layer part: 0.26 mm (4-layer), 0.33 mm (6-layer)
- Minimum pattern width/pitch: 0.06/0.07 mm
- Flexibility of single/double sided FPC part (dedicated for hinge): More than 200 000 times 180-degree bending of radius 3 mm

(2) Capable of board-to-board connection without connectors, which enables space-saving and 3-dimensional equipment assembly.

(3) Through hole plating connection of multi-layer (3 to 8) part to flexible part significantly improves reliability.

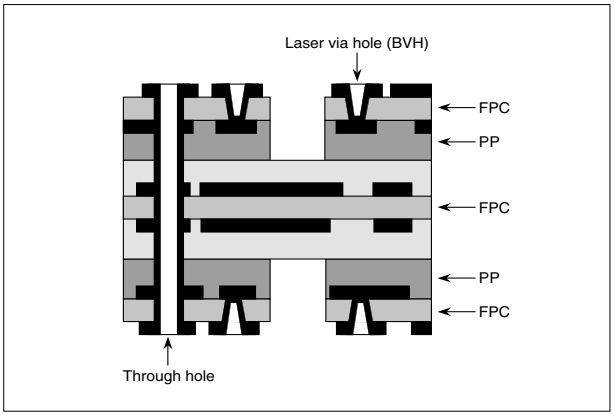
(4) Blind Via Hole (BVH) forming with laser via drilling of small diameter.

(5) Sheet design provides excellent mountability, equivalent to that of PWB.

◆ Outline Specifications

Type		Folding type/Flying tail type
Min. base thickness (mm)		0.26 (4-layer), 0.33 (6-layer), 0.40 (8-layer)
Min. line width/spacing (mm)		0.06/0.07
Min. through hole diameter (mm)		ø0.25
Min. via hole land diameter	Through hole (mm)	Outer layer: ø0.5, Inner layer: ø0.5
	Blind via hole (mm)	ø0.09
	Inner via hole (mm)	ø0.30
Solder resist		Multi layer: Liquid photo solder resist, FPC: Film cover ray
Surface finish		Heat-resistant preflux, Ni-Au plating (Ni-Au plating for flying tail)
Safety standard (UL approval)		94V-0

■ Construction of Advanced Flex Board (example of 6-layer BVH)



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■ Flexible Build-Up Multilayer PCBs

<Flex-rigid specifications>

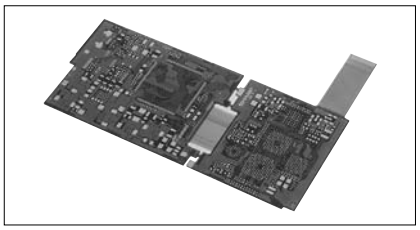
Advanced flex specifications are used for the inner layer core material of this build-up multilayer PCB, so the board can handle finer mounting patterns and achieve connectorless between-board connections using an inner layer flexible printed circuit (FPC). This facilitates greater equipment design flexibility and ultra-compact designs.

◆ Features

(1) Multiple build-up layers are connected internally with an FPC, thereby improving connection reliability between multilayer boards and reducing both connection space and connector weight.

(2) Enables narrow pitch (0.4 mm) CSP and bare chip mounting, and thus greater equipment compactness through ultra-high density mounting.

(3) Enables via-on-IVH (inner-via-hole) configurations, and makes it possible to achieve ultra-high density wiring designs.
(Facilitates a diverse range of designs for greater compactness and thinness.)

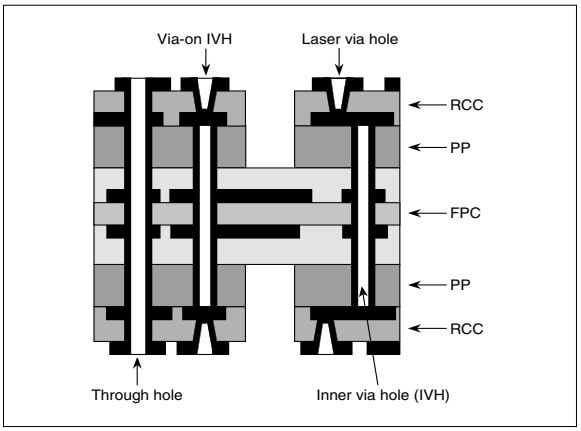


◆ Outline Specifications

Type		F1 (6- to 8-layer)
No. of build-up layers		1 for each side of core layer
Core layer configuration		3 to 6 layers (Polyimide, FR-4)
Min. board thickness*1 (mm)		0.57 (6-layer), 0.77 (8-layer)
Via hole diameter Land hole diameter	Conformal via hole (mm)	ø0.09/ø0.30
	Stacked via hole	–
Via-on IVH		Available
Inner via hole diameter (mm)		ø0.2
Min. line width/spacing*2 (mm)		0.09/0.09
CSP mountable pitch (mm)		0.4
Safety standard		UL (94V-0)

*1 Consult with SHARP if a thinner type is required for special designs.
*2 Values are measured at build-up portion.

■ Construction of Flexible Build-Up Multilayer PCBs (example of 6-layer IVH)



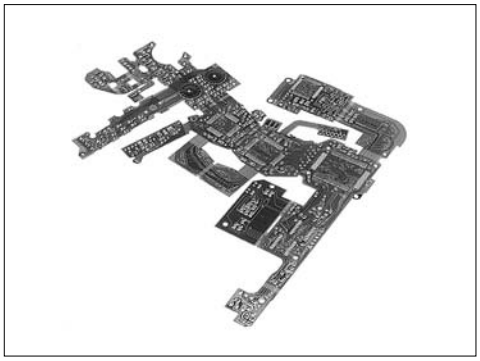
■ Flexible Printed Circuit Boards

The flexible printed circuit board is designed for high space efficiency and product design flexibility, which are now aiming at more compact and higher density mounting. It also contributes to the reduction of assembly process and to the enhancement of the reliability.

◆ Features

(1) High density mounting circuit, SMT and other most suitable flexible PCB are available.

(2) High precision type for COF with flip chip mounting and wire bonding capabilities and other connector mounting type are available.



◆ Standard specifications

Number of layers	One side	Both-side through-hole
Substrate materials	Polyimido film, non-adhesive polyimido	
Design pattern width (mm)	0.02 (MIN.)	0.05 (MIN.)
Design pattern spacing (mm)	0.04 (MIN.)	0.05 (MIN.)
Through-hole / land diameter (mm)	–	ø0.1/ø0.3 (MIN.)
Cover lay	Polyimido film, heat resistant ink, liquid soldering resist	
Safety standard	UL (94V-0)	

◆ Line-up

Multi-layer flexible PCB	Both-side flexible PCB
Single-layer flexible PCB	Flex-rigid PCB
Single-side high precision flexible PCB	Both-side high precision flexible PCB

Other line-up

Bonding Ni-Au plating
Highly flexible (bending capacity)
High density SMT