

## DIO2583

### Low-Cost, 3-Channel, SD/ED/HD1080i/1080p Video Filter

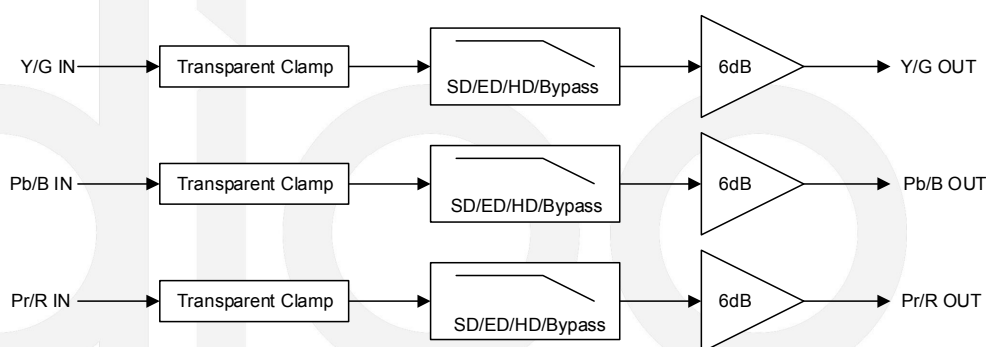
#### Features

- Three channel 6<sup>th</sup>-order video filter with bandwidth 10MHz, 17MHz, 40MHz, or 60MHz selectable for SD/ED/HD 1080i, HD 1080p application
- Supports Component YPrPb or RGB video
- Single Video Load Driver (2V<sub>PP</sub>, 150Ω, Av=6dB)
- Selectable clamp or bias mode on Pb/B, Pr/ R inputs
- Compatible for AC- or DC-Coupled inputs and outputs
- DC-Coupled outputs, no need for coupling capacitors
- Output disable
- Single 5V supply
- DIO2583 offers package of TSSOP-14
- 8kV HBM ESD protection

#### Applications

- DVD Players
- Video Amplifiers
- Cable set-top boxes
- Personal Video Recorders
- Communications Devices
- Video on Demand

#### Block Diagram



#### Ordering Information

Order Part Number	Top Marking		T <sub>A</sub>	Package	
DIO2583TP14	DIO2583	RoHS or Green	-40 to +85°C	TSSOP-14	Tape & Reel, 2500

#### Descriptions

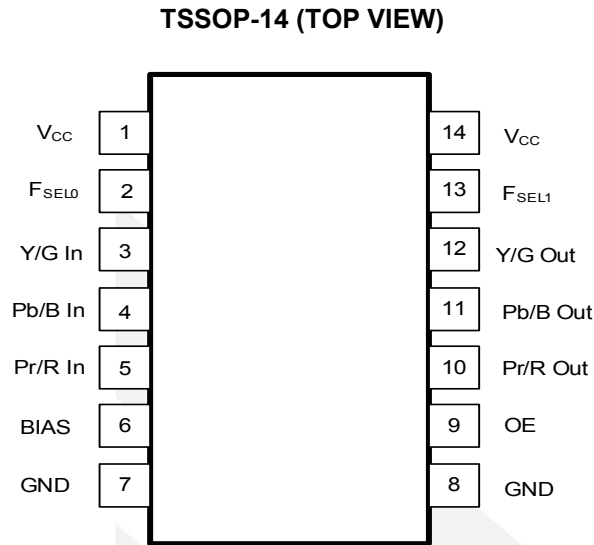
DIO2583 is a comprehensive filter for applications such as set-top box or DVD players. It could be a replacement for passive LC filters and drivers with a low-cost integrated device.

DIO2583 filter channels supports either component YPbPr or RGB video signals. Frequency response of the filter channels offers selectable 10, 17, 40, or 60MHz. DIO2583 also has output disable.

DIO2583 could be driven directly by DC-coupled DAC output or AC-coupled video load. The all inputs are compatible for standard 1V<sub>PP</sub> video signals.

DIO2583 has an output amplifier in each channel, which can drive a single 150Ω AC- or DC-coupled video load. These amplifiers can be disabled to save power when DC-coupled.

## Pin Assignments



**Figure 1 Pin Assignment**

## Pin Description

Pin	Name	Type	Description
1	V <sub>CC</sub>	Input	+5V supply
2	F <sub>SEL0</sub>	Input	Selects filter corner frequency
3	Y/G In	Input	Selectable video input
4	Pb/B In	Input	Selectable video input
5	Pr/R In	Input	Selectable video input
6	BIAS	Input	Input bias on Pb/B Pr/R: 0=Bias 1=Clamp
7/8	GND	Input	Must be tied to ground. Do not float
9	OE	Input	Output enable control: 0=Disable, 1=Enable
10	Pr/R Out	Output	Filtered SD, PS, HD, BP video output
11	Pb/B Out	Output	Filtered SD, PS, HD, BP video output
12	Y/G Out	Output	Filtered SD, PS, HD, BP video output
13	F <sub>SEL1</sub>	Input	Selects filter corner frequency
14	V <sub>CC</sub>	Input	+5V supply

## Truth Table for Frequency Select

F <sub>SEL1</sub>	F <sub>SEL0</sub>	Filter Frequency	Video Format	Sync Format
0	0	10MHz	SD, 480i	Bi-level, 4.7µs Pulse Width
0	1	17MHz	ED, 480p	Bi-level, 2.35µs Pulse Width
1	0	40MHz	HD, 1080i, 720p	Tri-level, 589ns Pulse Width
1	1	60MHz	HD, 1080p	Tri-level, 295ns Pulse Width

## Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage/ $V_{DD}$		-0.3 to 6	V
Analog and Digital I/O, $V_{IO}$		-0.3 to $V_{CC}+0.3$	V
Output Current, Any One Channel, Do Not Exceed/ $I_{OUT}$		50	mA
Package Thermal Resistance/ $\theta_{JA}$		97	$^{\circ}C/W$
Maximum Junction Temperature/ $T_{JMAX}$		150	$^{\circ}C$
Storage Temperature/ $T_{STO}$		-65 to 150	$^{\circ}C$
Maximum Lead Temperature Rating		300	$^{\circ}C$
ESD	HBM, JEDEC: JESD22-A114	8	kV

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Parameter	Rating	Unit
Supply Voltage	4.75 to 5.25	V
Operating Temperature Range	-40 to 85	$^{\circ}C$



## Electrical Characteristics

Typical value:  $T_A = 25^\circ\text{C}$ ,  $V_{CC}=5\text{V}$ ,  $R_{SOURCE}=37.5\Omega$ , inputs AC coupled with  $0.1\mu\text{F}$ , all outputs AC coupled with  $220\mu\text{F}$  into  $150\Omega$  loads, unless otherwise specified.

Symbol	Parameters	Conditions	Min	Typ.	Max	Unit
<b>DC Electrical Characteristics</b>						
$A_V$	Channel Gain	DC	5.8	6.0	6.2	dB
$I_{CC}$	Supply Current	No Load, SD, ED, HD 1080i		36		mA
		No Load, HD 1080i		44		mA
		No Load, HD 1080p		53	80	mA
$I_{CC\_SD}$	Shutdown Supply Current	No Load, Output Disable		18	40	mA
$V_{IN}$	Video Input Voltage Range	Referenced to GND if DC Coupled		1.0		$V_{PP}$
PSRR	Power Supply Rejection	DC (All Channels)		70		dB
$V_{IL}$	Digital Input Low	$F_{SEL0}, F_{SEL1}$	0		1.0	V
$V_{IH}$	Digital Input High	$F_{SEL0}, F_{SEL1}$	2.0		$V_{CC}$	V
$T_{ENABLE}$	Output Enable Time	150Ω DC Load		70		ns
<b>Standard Definition Electrical Characteristics (480i)</b>						
$AV_{SD}$	Channel Gain Error		-0.2	0	0.2	dB
$f_{1dBSD}$	-1dB Bandwidth		6.0	8.5		MHz
$f_{3dBSD}$	-3dB Bandwidth		7.5	10.2		MHz
$f_{SBSB}$	Attenuation (Stop band Reject)	$f=27\text{MHz}$	40	45		dB
THD	Total Harmonic Distortion, Output	$V_{OUT}=1.4V_{PP}, 3.58\text{MHz}$		0.25		%
DG	Differential Gain			0.1		%
DP	Differential Phase			0.8		°
$X_{TALKSD}$	Crosstalk (Channel-to-Channel)	1MHz		-75		dB
SNR	Signal-to-Noise Ratio	NTC-7 Weighting, 100kHz to 4.2MHz		74		dB
$t_{pdSD}$	Propagation Delay	Delay from Input to Output, 4.5MHz		80		ns
<b>Enhanced Definition Electrical Characteristics (480p)</b>						
$AV_{ED}$	Channel Gain Error	DC	-0.2	0	0.2	dB
$f_{1dBED}$	-1dB Bandwidth		10	14		MHz
$f_{3dBED}$	-3dB Bandwidth		13	17		MHz
$f_{SBEED}$	Attenuation (Stop Band Reject)	$f=54\text{MHz}$	38	48		dB
THD	Total Harmonic Distortion, Output	$V_{OUT}=1.4V_{PP}, 7\text{MHz}$		0.1		%

Notes:  $SNR=20 \cdot \log(714\text{mV} / \text{rms noise})$ .

Specifications subject to change without notice.

## Electrical Characteristics (continued)

Symbol	Parameters	Conditions	Min	Typ.	Max	Unit
X <sub>TALKED</sub>	Crosstalk (Channel-to-Channel)	1MHz		-76		dB
SNR	Signal-to-Noise Ratio	Un-weighted, 100kHz to 15MHz		66		dB
t <sub>PD</sub>	Propagation Delay	Delay from Input to Output, 10MHz		46		ns
<b>High-Definition Electrical Characteristics (1080i)</b>						
AV <sub>HD</sub>	Channel Gain Error	DC	-0.2		0.2	dB
f <sub>1dBHD</sub>	-1dB Bandwidth		28	34		MHz
f <sub>3dB</sub>	-3dB Bandwidth		30	40		MHz
f <sub>SBHD</sub>	Attenuation (Stop Band Reject)	f=74.25MHz	25	27		dB
THD	Total Harmonic Distortion, Output	V <sub>OUT</sub> =1.4V <sub>PP</sub> , 22MHz, 6dB, 150Ω Load		0.5		%
X <sub>TALKHD</sub>	Crosstalk (Channel-to-Channel)	1MHz		-76		dB
		30MHz		-50		dB
SNR	Signal-to-Noise Ratio	Un-weighted, 100kHz to 30MHz		66		dB
t <sub>PDHD</sub>	Propagation Delay	Delay from Input to Output, 20MHz		23		ns
<b>High-Definition Electrical Characteristics (1080p)</b>						
AV <sub>HD</sub>	Channel Gain Error	DC	-0.2		0.2	dB
f <sub>1dBHD</sub>	-1dB Bandwidth		50	53		MHz
f <sub>3dB</sub>	-3dB Bandwidth		55	60		MHz
f <sub>SBHD</sub>	Attenuation (Stop Band Reject)	f=148MHz	30	33		dB
THD	Total Harmonic Distortion, Output	V <sub>OUT</sub> =1.4V <sub>PP</sub> , 44MHz, 6dB, 150Ω Load		0.5		%
X <sub>TALKHD</sub>	Crosstalk (Channel-to-Channel)	1MHz		-78		dB
		60MHz		-48		dB
SNR	Signal-to-Noise Ratio	Un-weighted, 100kHz to 30MHz		69		dB
t <sub>PDHD</sub>	Propagation Delay	Delay from Input to Output, 20MHz		18		ns

Specifications subject to change without notice.

## CONTACT US

Dioo is a professional design and sales corporation for high-quality and performance analog semiconductors. The company focuses on industry markets, such as, cell phone, handheld products, laptop, and medical equipments and so on. Dioo's product families include analog signal processing and amplifying, LED drivers and charger IC. Go to <http://www.dioo.com> for a complete list of Dioo product families.

For additional product information, or full datasheet, please contact with our Sales Department or Representatives.

A large, light gray watermark of the Dioo logo is centered on the page. It consists of a stylized arrow pointing right above the word "dioo" in a lowercase, sans-serif font.