Triple 16x5 Differential to Single-Ended Crosspoint Switch (Operates in Single-Ended or Differential Input Modes)

The EL4544 is a high bandwidth 16x5 RGB video crosspoint with embedded video sync extraction. The device has double latched control signals that allow for synchronous channel switching but also has an asynchronous mode. See block diagram for details. The device would operate in both a synchronous and asynchronous mode.

EL4544 has a fast disable feature to reduce power consumption. The device also provides a presence of signal indicator by looking for syncs on a preassigned channel.

Ordering Information

PART NUMBER	PACKAGE	TAPE & REEL	PKG. DWG. #
EL4544IGZ (See Note)	356-Pin (27x27mm) BGA (Pb-Free)	-	
EL4544IGZE9058 (See Note)	356-Pin (27x27mm) BGA (Pb-Free)	-	

NOTE: Intersil Pb-free products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

Features

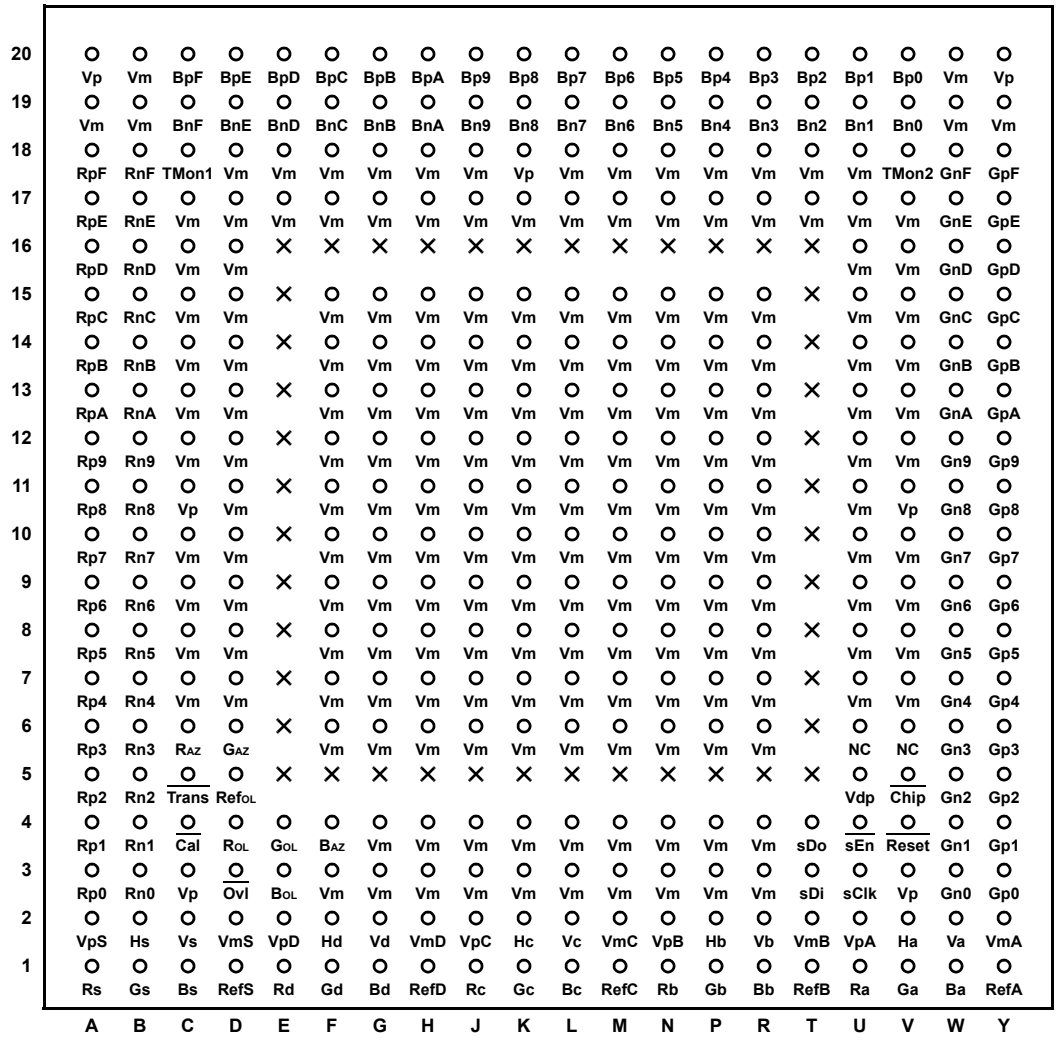
- Serial programming of switch array
- Serial data out to allow daisy chaining
- High Z output disable
- Drives 150Ω loads
- 60MHz 0.1dB gain flatness
- -3dB bandwidth of 300MHz
- Crosstalk rejection: 75dB @ 100MHz
- Channels settle to 5% within 10ns after overlay switching
- 356-pin BGA packaging
- Pb-Free available (RoHS Compliant)

Applications

- Video switching

Pinout

EL4544
(356-PIN BGA)
TOP VIEW



	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	Y
20	Vp	Vm	BpF	BpE	BpD	BpC	BpB	BpA	Bp9	Bp8	Bp7	Bp6	Bp5	Bp4	Bp3	Bp2	Bp1	Bp0	Vm	Vp
19	Vm	Vm	BnF	BnE	BnD	BnC	BnB	BnA	Bn9	Bn8	Bn7	Bn6	Bn5	Bn4	Bn3	Bn2	Bn1	Bn0	Vm	Vm
18	RpF	RnF	TMon1	Vm	Vm	Vm	Vm	Vm	Vm	Vp	Vm	Vm	Vm	Vm	Vm	Vm	Vm	TMon2	GnF	GpF
17	RpE	RnE	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	GnE	GpE
16	RpD	RnD	Vm	Vm	×	×	×	×	×	×	×	×	×	×	×	×	Vm	Vm	GnD	GpD
15	RpC	RnC	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	GnC	GpC
14	RpB	RnB	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	GnB	GpB
13	RpA	RnA	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	GnA	GpA
12	Rp9	Rn9	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	Gn9	Gp9
11	Rp8	Rn8	Vp	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vp	Gn8	Gp8
10	Rp7	Rn7	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	Gn7	Gp7
9	Rp6	Rn6	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	Gn6	Gp6
8	Rp5	Rn5	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	Gn5	Gp5
7	Rp4	Rn4	Vm	Vm	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	Vm	Vm	Gn4	Gp4
6	Rp3	Rn3	R_{AZ}	G_{AZ}	×	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	×	NC	NC	Gn3	Gp3
5	Rp2	Rn2	$\overline{Trans}$	Ref_{OL}	×	×	×	×	×	×	×	×	×	×	×	×	Vdp	$\overline{Chip}$	Gn2	Gp2
4	Rp1	Rn1	$\overline{Cal}$	R_{OL}	G_{OL}	B_{AZ}	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	sDo	$\overline{sEn}$	$\overline{Reset}$	Gn1	Gp1
3	Rp0	Rn0	Vp	$\overline{Ovl}$	B_{OL}	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	Vm	sDi	sClk	Vp	Gn0	Gp0
2	VpS	Hs	Vs	VmS	VpD	Hd	Vd	VmD	VpC	Hc	Vc	VmC	VpB	Hb	Vb	VmB	VpA	Ha	Va	VmA
1	Rs	Gs	Bs	RefS	Rd	Gd	Bd	RefD	Rc	Gc	Bc	RefC	Rb	Gb	Bb	RefB	Ra	Ga	Ba	RefA

× = EMPTY LOCATION (UNPOPULATED)
O = BALLGRID

Absolute Maximum Ratings (T_A = 25°C)

V_{SA} 5.5V
Input Voltage . . . . . .V_S
V_{SD} 3.3V
Output Current 80mA

Storage Temperature Range . . . . . .-65°C to +150°C
Operating Junction Temperature . . . . . .+135°C
Recommended Operating Temperature . . . . . .-40°C to +85°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

Electrical Specifications

V_{SA} = 5V, V_{SD} = 3.3V, Gain = 2, R_L = 150Ω, C_L = 2.7pF, T_A = 25°C.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
SUPPLY CHARACTERISTICS						
V_{SA}	Recommended Analog Supply Voltage		4.75	5.0	5.25	V
V_{SD}	Recommended Digital Supply Voltage		2.4	3.3	3.6	V
I_{SD}	Digital Supply Current			3	10	mA
I_{SA}	Analog Supply Current	Enabled - no load, all amplifiers enabled	545	685	790	mA
		Disabled		33	50	mA
PSRR	Power Supply Rejection Ratio		30			dB
CHARACTERISTICS OF DIFFERENTIAL INPUTS						
CMRR	Input Common Mode Rejection Ratio	0V to 1.5V	45	66		dB
A_V	Gain Accuracy for A, B, C, D, S Channels	Range of deviation from gain of 2 (excluding overlay)	1.85	2.0	2.15	%
V_N	Input Referred Voltage Noise	A_V = +2		100		nV/$\sqrt{Hz}$
V_{OS}	Input Referred Offset Voltage	Includes muxes and output amps; A, B, C, D channels	-70	0	+70	mV
		S channel in auto-calibration mode	-10	+5	+12	mV
V_{IN}	Maximum Recommended Input Range		0		V_{SA}	V
C_{IN}	Input Capacitance			2		pF
R_{IN}	Input Resistance, Single-ended		1100	1320	1550	Ω
V_{INSET}	Input Biasing Voltage		1.49	1.53	1.57	V
OVERLAY INPUT CHARACTERISTICS						
V_{OS}	Input Referred Offset Voltage	S channel overlay inputs at A_V = 2	-10	5	12	mV
OVERLAY SWITCHING CHARACTERISTICS						
V_G	Output Glitch During Overlay Switching	Pixel overlay switching		±20		mV
$P_{APERTURE}$	Pixel Mux Aperture of Uncertainty	5% setting for max signal charge		10		ns
A_V	Gain Accuracy for S Channel	S channel overlay inputs				
OUTPUT CHARACTERISTICS						
Output Impedance		Enabled		100		mΩ
		Disabled		10		MΩ
V_{OUT}	Maximum Recommended Output Range		0		3.3	V
I_{OUT}	Output Current	Short-circuit (5Ω)		60		mA

Electrical Specifications V_{SA} = 5V, V_{SD} = 3.3V, Gain = 2, R_L = 150Ω, C_L = 2.7pF, T_A = 25°C.

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
AC PERFORMANCE						
SR	Slew Rate	$2V_{P-P}$ symmetrical, R_L = 150Ω, A_V = 2, guaranteed by design		900		V/µs
BW	-3dB Bandwidth	-3dB, 200mV_{P-P}, load of 150Ω		300		MHz
	0.1dB Bandwidth	0.1dB, 200mV_{P-P}, load of 150Ω		60		MHz
Settling Time	1% Settling Time	$2V_O$ step, load of 150Ω		10		ns
Crosstalk	Hostile Crosstalk Between any 2 Channels	100MHz		-70		dB
	Worst Case Hostile Crosstalk One Channel Affected by all Other Channels Running the Same Signal	100MHz		-50		dB