

Infrared Receivers for 3D Active Glasses

Compliant to CEA-2038 Standard for Long Encoding Commands



RESOURCES

- For technical questions contact 3DTVanswers@vishay.com
- More IR Receiver products at: <http://www.vishay.com/ir-receiver-modules/>
- More IR Emitter products at: <http://www.vishay.com/ir-emitting-diodes/>
- Full Optoelectronics portfolio at: <http://www.vishay.com/optoelectronics/>
- Optoelectronic videos at: <http://www.vishay.com/videos/optoelectronics/3dtv-ir-receivers-and-emitters>

CEA-2038 Compliant

The infrared synchronization signal from the 3DTV to the active glasses must be unaffected by the TV remote control signal. It must also be immune from other optical noise like fluorescent, CFL and plasma light sources. The Consumer Electronics Association's "Command-Driven IR-Synchronized Active Eyewear Standard", CEA-2038, accomplishes this by tailoring the transmission signal, carrier frequency and wavelength used by the 3D system. The TSOP35D26 and TSOP75D26 IR receivers are compliant to the CEA-2038 standard.

Command Codes

The CEA-2038 command coding system uses modulation and band-pass filtering to create a high signal-to-noise ratio. Each command consists of two ON periods separated by a single OFF period; all commands are of equal length. The proportional relationship between the ON and OFF periods can be used to decode the commands; determining the actual number of carrier cycles in each period is not required. To provide the most robust interference rejection in the noisiest environments, Vishay's TSOP35D26 and TSOP75D26 support the long command encoding. Integrated automatic gain control (AGC) further enhances noise immunity by discriminating and suppressing noise from typical light sources such as fluorescent lights and CFLs.

Command	Long Encoding
After1 "A1"	111111111111111111110000000011111111
Before1 "B1"	11111111000000001111111111111111
After2 "A2"	11111111000000000000000011111111
Before2 "B2"	11111111111111000000001111111111

Carrier Frequency and Wavelength

TV remote control systems typically use a carrier frequency between 36 kHz and 56 kHz and an infrared wavelength of 940 nm. Two ways to reduce or eliminate interference between TV remote and 3D systems is by using a carrier frequency outside of the remote control range and by using a different wavelength for the 3D emitter in the TV. The TSOP35D26 and TSOP75D26 feature a band pass filter of **26.2 kHz** and have a peak sensitivity at 830 nm, while the remote control receiver (e.g. TSOP38438) blocks this wavelength.

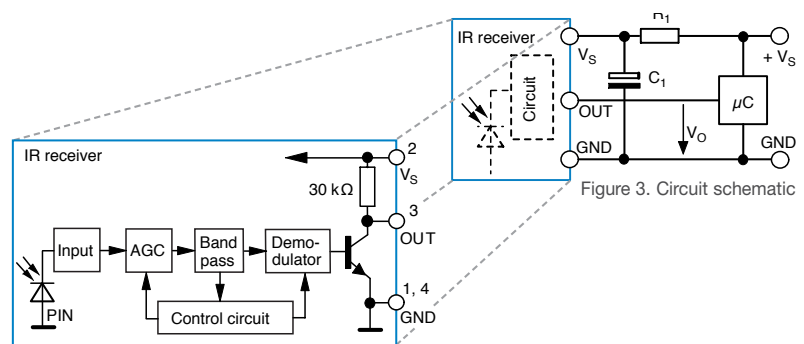
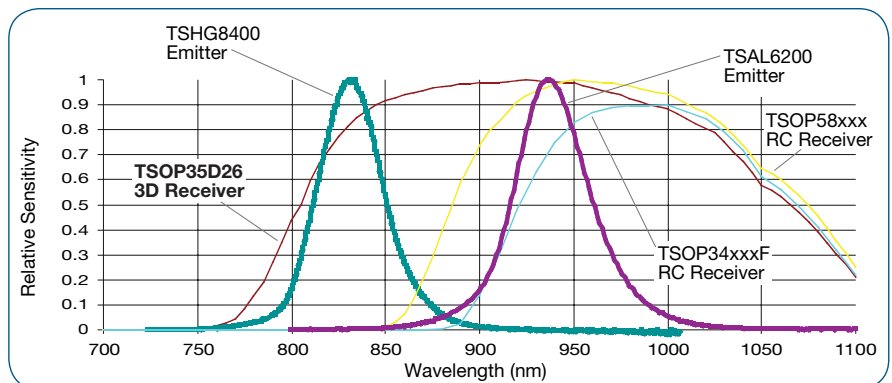







Figure 2. Highly integrated

Range

Vishay's remote control receivers have an industry leading transmission range of up to 45 meters. A high sensitivity is needed because a large part of the signal is often lost passing through the front panel material. In addition, the remote should continue to work even when not pointed directly at the TV's receiver. Similarly, the 3D specification should allow some freedom of movement of a person's head without losing synchronization. The TSOP35D26 and TSOP75D26 can receive signals from **37 meters** away, meaning you will be able to turn your head and stay in synch.



Application	Package	Part Number	Carrier Frequency (kHz)	Dimensions L x W x H (mm)	Sensitivity (mW/m ²)	Range ¹ (m)	Recommended for Codes
3D Active Glasses		TSOP35D26	26.2	7.5 x 5.3 x 4.0	0.15	37	Compliant to CEA-2038 for long command encoding
		TSOP75D26		6.8 x 3.0 x 3.2	0.15	37	Compliant to CEA-2038 for long command encoding
Remote Control (RC)		TSOP58xx	30, 33, 36, 38, 40, 56	6.9 x 5.0 x 4.8	0.30	26	TSOP58436 - RC5, RC6 TSOP58438 - NEC TSOP58240 - Sony
		TSOP38xx			0.15	37	TSOP38436 - RC5, RC6 TSOP38438 - NEC
		TSOP348xx	30, 33, 36, 38, 40, 56	8.2 x 6.0 x 5.6	0.10	45	TSOP34436 - RC5, RC6 TSOP34438 - NEC TSOP4840 - Sony
		TSOP75xx TSOP77xx		6.0 x 5.6 x 6.9	0.15 0.30	37 26	TSOP75436 - RC5, RC6 TSOP75438 - NEC TSOP77240 - Sony

¹TSAL6200, I_F = 200 mA, I_e = 100 mW/sr

Infrared Emitters

With Vishay's 3D IR Receivers, only **one emitter** is required in the TV to transmit the 3D synchronization signal.

Application	Peak Wavelength (nm)	Part Number	Package	Radiant Intensity ¹ (mW/sr)	Angle of Half Intensity (°)	Rise, Fall Time (ns ₁)
3D Active Glasses	830	TSHG5510	5 mm	32	± 38	15
		TSHG8400	5 mm (T1 3/4)	70	± 22	20
		VSMG2720	PLCC2	14	± 60	15
	850	TSHG6400	5 mm (T1 3/4)	70	± 22	20
		TSHG6410	5 mm (T1 3/4)	90	± 18	20
		VSLY3850	3 mm	70	± 18	10
		VSMG3700	PLCC2	10	± 60	20
		VSMY1850	0805	10	60	10
		VSMY3850	PLCC2	17	60	10
		VSMY7852X01	Little Star	42	60	10
VSMY7850X01	Little Star	170	60	15		
Remote Control	940	VSLB3940	3 mm (T1)	65	± 22	15
		TSAL6100	5 mm (T1 3/4)	130	± 10	800
		TSAL6200	5 mm (T1 3/4)	60	± 17	

¹I_F = 100 mA

For technical support, contact: 3DTVanswers@vishay.com



WORLDWIDE SALES CONTACTS

THE AMERICAS

UNITED STATES

VISHAY AMERICAS
ONE GREENWICH PLACE
SHELTON, CT 06484
UNITED STATES
PH: +1-402-563-6866
FAX: +1-402-563-6296

ASIA

SINGAPORE

VISHAY INTERTECHNOLOGY ASIA PTE LTD.
37A TAMPINES STREET 92 #07-00
SINGAPORE 528886
PH: +65-6788-6668
FAX: +65-6788-0988

P.R. CHINA

VISHAY CHINA CO., LTD.
15D, SUN TONG INFOPORT PLAZA
55 HUAI HAI WEST ROAD
SHANGHAI 200030
P.R. CHINA
PH: +86-21-5258 5000
FAX: +86-21-5258 7979

JAPAN

VISHAY JAPAN CO., LTD.
SHIBUYA PRESTIGE BLDG. 4F
3-12-22, SHIBUYA
SHIBUYA-KU
TOKYO 150-0002
JAPAN
PH: +81-3-5466-7150
FAX: +81-3-5466-7160

EUROPE

GERMANY

VISHAY ELECTRONIC GMBH
GEHEIMRAT-ROSENTHAL-STR. 100
95100 SELB
GERMANY
PH: +49-9287-71-0
FAX: +49-9287-70435

FRANCE

VISHAY S.A.
199, BLVD DE LA MADELEINE
06003 NICE, CEDEX 1
FRANCE
PH: +33-4-9337-2727
FAX: +33-4-9337-2726

UNITED KINGDOM

VISHAY LTD.
SUITE 6C, TOWER HOUSE
ST. CATHERINE'S COURT
SUNDERLAND ENTERPRISE PARK
SUNDERLAND SR5 3XJ
UNITED KINGDOM
PH: +44-191-516-8584
FAX: +44-191-549-9556