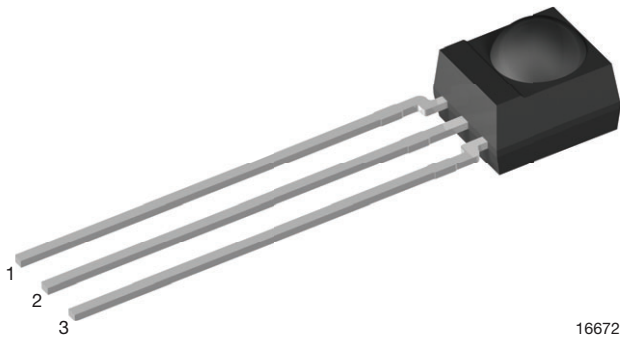
IR Receiver Modules for Remote Control Systems



FEATURES

- Very low supply current
- Photo detector and preamplifier in one package
- Optimized for Sony 12, 15, and 20 bit IR-code
- Internal filter for PCM frequency
- Improved shielding against EMI
- Supply voltage: 2.5 V to 5.5 V
- Improved immunity against ambient light
- Insensitive to supply voltage ripple and noise
- Very narrow optical filter to minimize the interference from 3D synchronizing signals and other optical noise sources
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

MECHNICAL DATA

Pinning for TSOP34S40F:

1 = OUT, 2 = GND, 3 = V_S

Pinning for TSOP32S40F:

1 = OUT, 2 = V_S, 3 = GND

DESCRIPTION

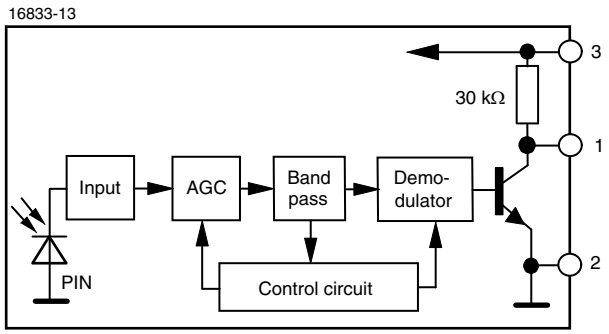
The TSOP32S40F, TSOP34S40F series are miniaturized IR receiver modules for infrared remote control systems. A PIN diode and a preamplifier are assembled on lead frame, the epoxy package contains an IR filter.

The demodulated output signal can be directly decoded by a microprocessor. The TSOP32S40F, TSOP34S40F are compatible with 12, 15, and 20 bit Sony codes. They are optimized to suppress almost all spurious pulses from energy saving fluorescent lamps but will also suppress some data signals.

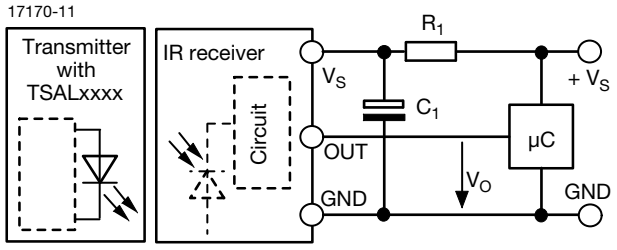
These components have not been qualified according to automotive specifications.

PARTS TABLE			
AGC		**SONY (AGC-S)**	
Carrier frequency	40 kHz	TSOP34S40F (1)	TSOP32S40F (1)
Package		Mold	
Pinning		1 = OUT, 2 = GND, 3 = V_S	1 = OUT, 2 = V_S, 3 = GND
Dimensions (mm)		6.0 W x 6.95 H x 5.6 D	
Mounting		Leaded	
Best choice for		(1) Sony 12 bit, 15 bit, and 20 bit IR-codes	

BLOCK DIAGRAM



APPLICATION CIRCUIT



R_1 and C_1 recommended to reduce supply ripple for V_S < 2.8 V

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Supply voltage		V_S	-0.3 to +6	V
Supply current		I_S	3	mA
Output voltage		V_O	-0.3 to (V_S + 0.3)	V
Output current		I_O	5	mA
Junction temperature		T_j	100	°C
Storage temperature range		T_{stg}	-25 to +85	°C
Operating temperature range		T_{amb}	-25 to +85	°C
Power consumption	$T_{amb} \leq 85$ °C	P_{tot}	10	mW
Soldering temperature	t ≤ 10 s, 1 mm from case	T_{sd}	260	°C

Note

- Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect the device reliability

ELECTRICAL AND OPTICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Supply current	E_v = 0, V_S = 3.3 V	I_{SD}	0.27	0.35	0.45	mA
	E_v = 40 klx, sunlight	I_{SH}	-	0.45	-	mA
Supply voltage		V_S	2.5	-	5.5	V
Transmission distance	E_v = 0, test signal see Fig. 1, IR diode TSAL6200, I_F = 50 mA	d	-	30	-	m
Output voltage low	I_{OSL} = 0.5 mA, E_e = 0.7 mW/m², test signal see Fig. 1	V_{OSL}	-	-	100	mV
Minimum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see Fig. 1	$E_{e\ min.}$	-	0.08	0.15	mW/m²
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see Fig. 1	$E_{e\ max.}$	30	-	-	W/m²
Directivity	Angle of half transmission distance	$\varphi_{1/2}$	-	± 45	-	°

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

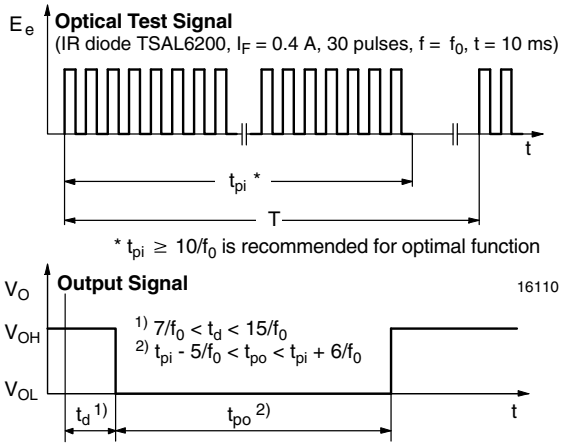


Fig. 1 - Output Active Low

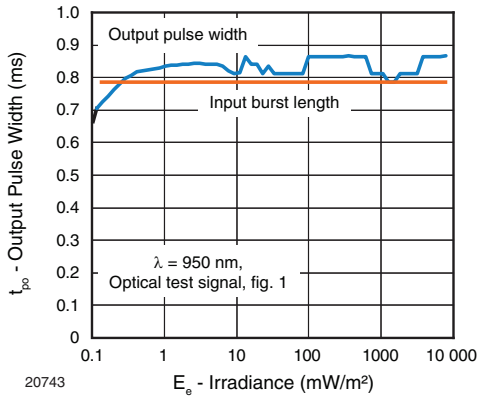


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

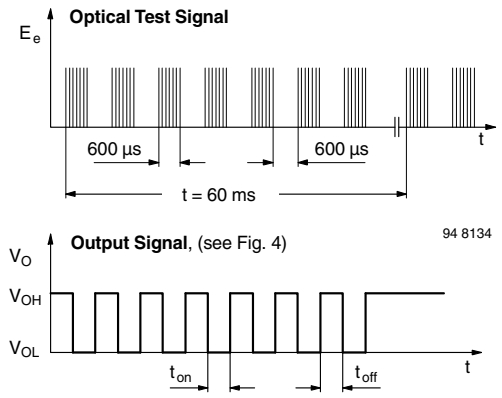


Fig. 3 - Output Function

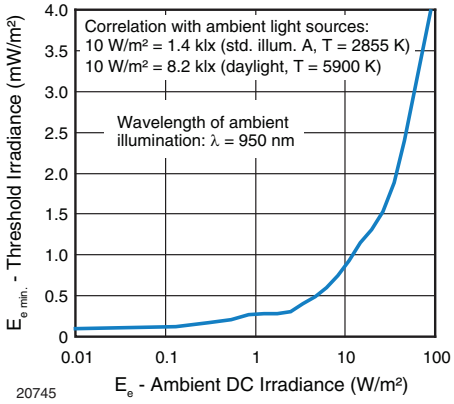


Fig. 6 - Sensitivity in Bright Ambient

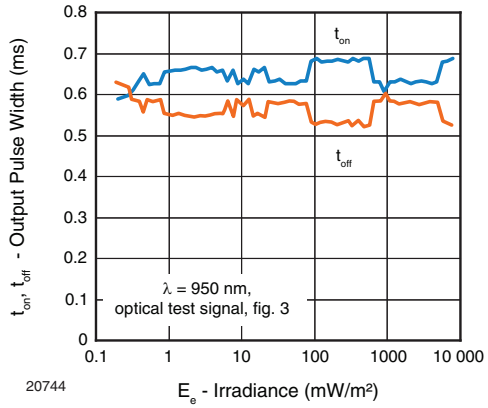


Fig. 4 - Output Pulse Diagram

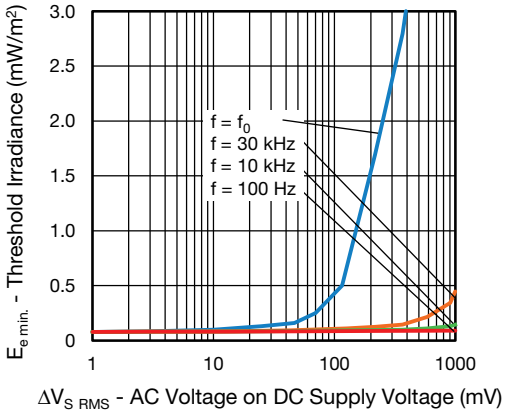


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

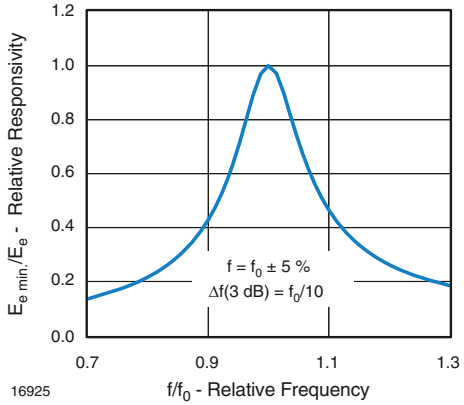


Fig. 5 - Frequency Dependence of Responsivity

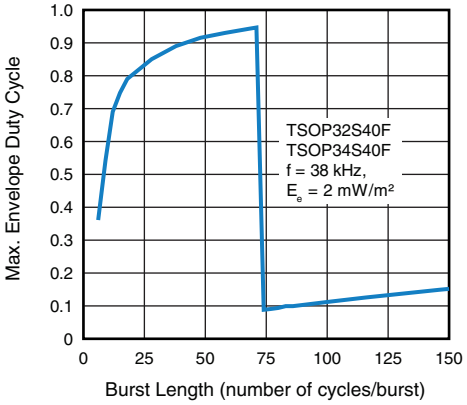


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

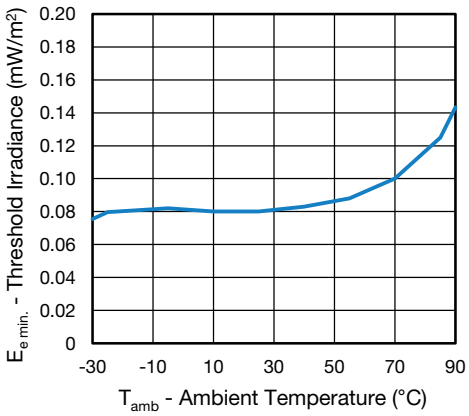


Fig. 9 - Sensitivity vs. Ambient Temperature

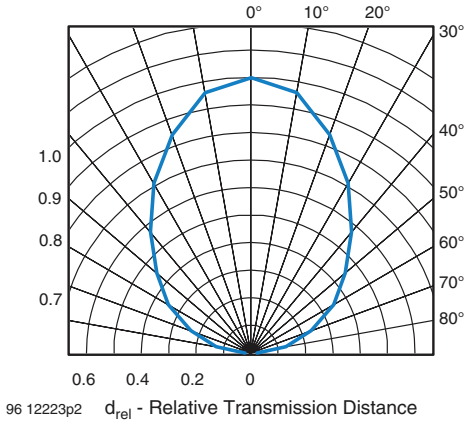


Fig. 11 - Horizontal Directivity

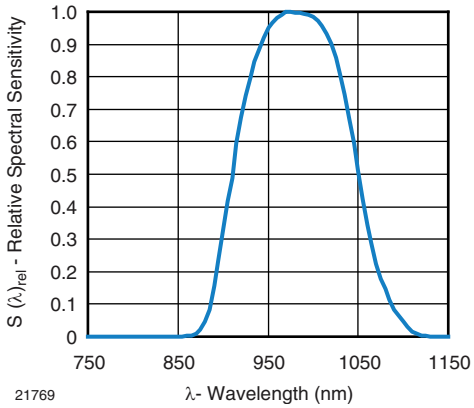


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

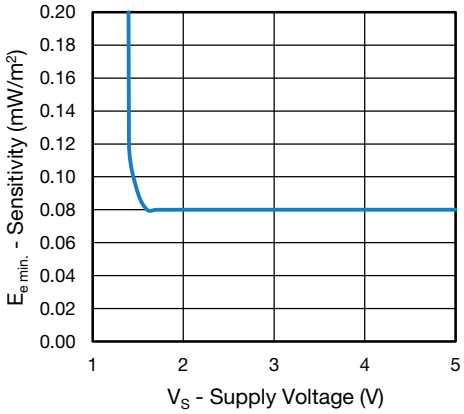


Fig. 12 - Sensitivity vs. Supply Voltage

SUITABLE DATA FORMAT

The TSOP32S40F, TSOP34S40F parts are designed to suppress spurious output pulses due to noise or disturbance signals. Data and disturbance signals can be distinguished by the devices according to carrier frequency, burst length and envelope duty cycle. The data signal should be close to the band-pass center frequency (40 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the TSOP32S40F, TSOP34S40F in the presence of a disturbance signal, the sensitivity of the receiver is reduced to insure that no spurious pulses are present at the output. Some examples of disturbance signals which are suppressed are:

- DC light (e.g. from tungsten bulb or sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated noise from fluorescent lamps with electronic ballasts (see Fig. 13 or Fig. 14).

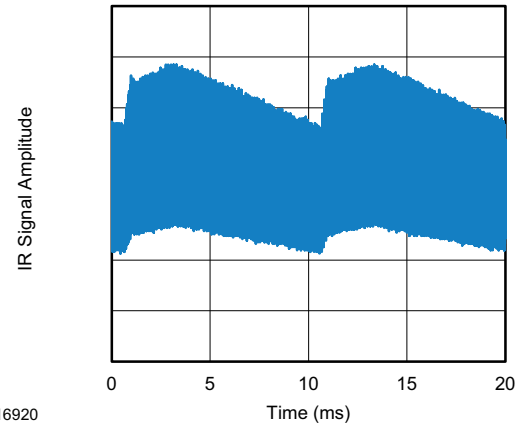


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

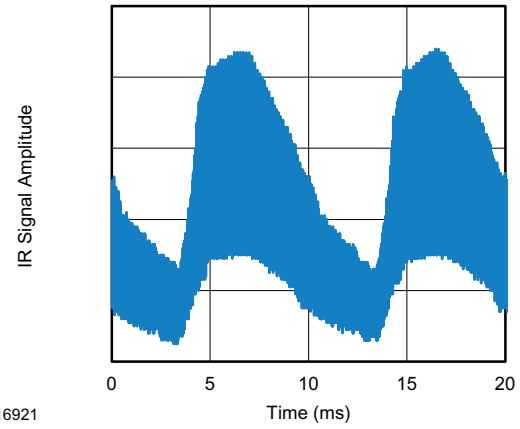
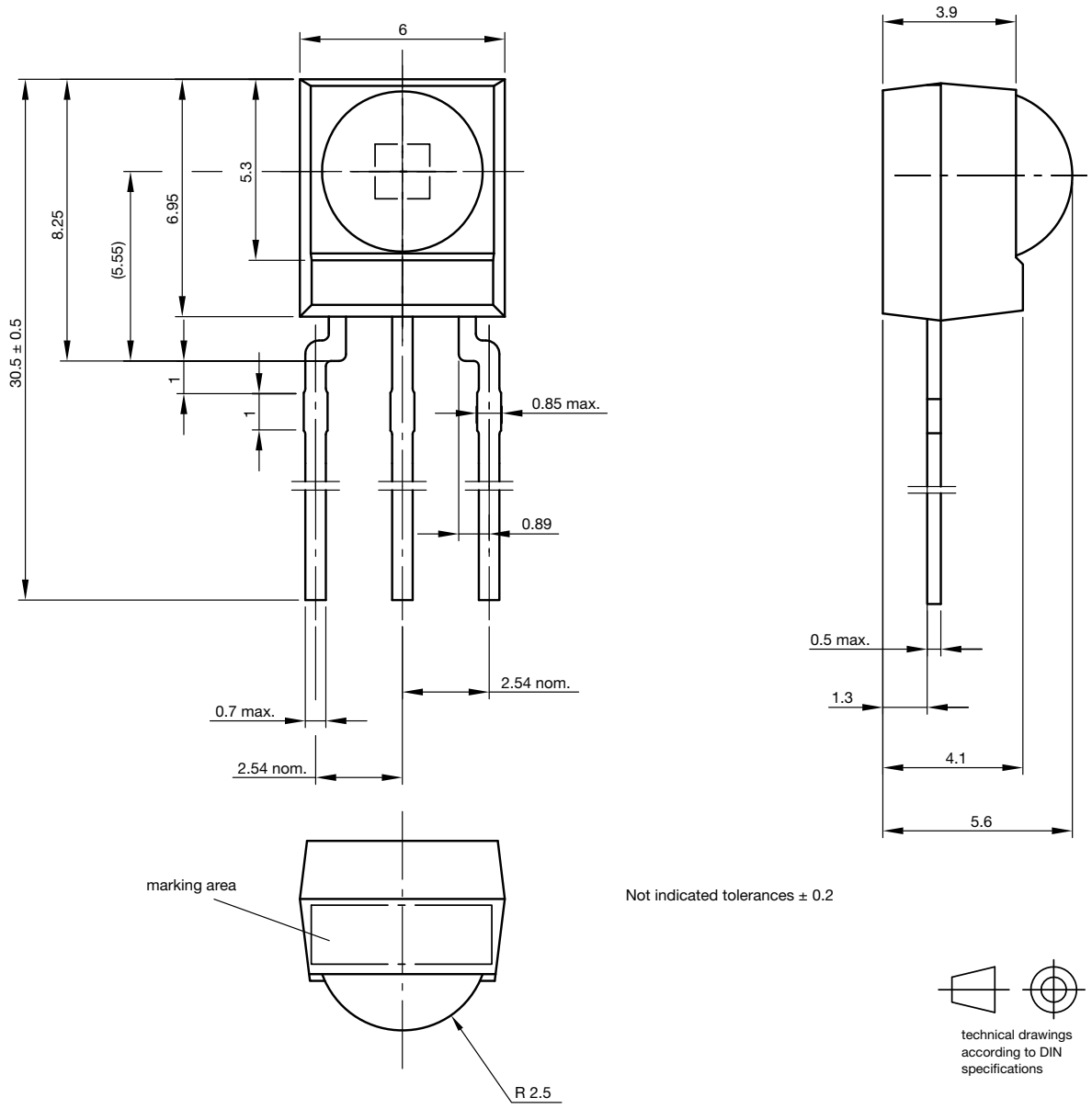


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP32S40F, TSOP34S40F
Minimum burst length	10 cycles/burst
After each burst of length a minimum gap time is required of	10 to 70 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles > 10 x burst length
Maximum number of continuous short bursts/second	1800
Suppression of interference from fluorescent lamps	Most common disturbance patterns are suppressed

PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.2

technical drawings
according to DIN
specifications

Drawing-No.: 6.550-5169.01-4
Issue: 9; 03.11.10
13655

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.