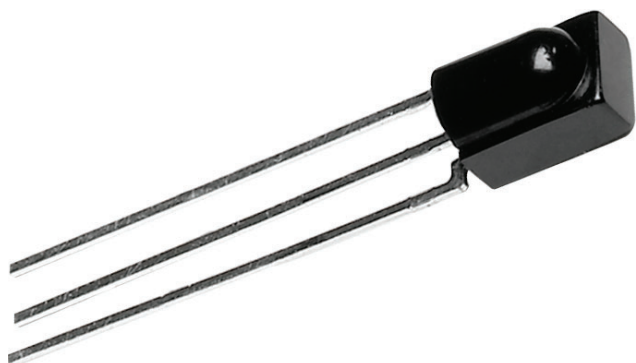


IR Receiver Modules for Remote Control Systems



DESCRIPTION

This IR receiver series is optimized for long burst remote control systems in different environments. The customer can choose between different IC settings (AGC variants), to find the optimum solution for his application. The higher the AGC, the better noise is suppressed, but the lower the code compatibility.

The devices contain a PIN diode and a preamplifier assembled on a lead frame. The epoxy package contains an IR filter. The demodulated output signal can be directly connected to a microprocessor for decoding. These components have not been qualified to automotive specifications.

FEATURES

- Individual IC settings to reach maximum performance
- Immunity against noise (lamps, LCD TV, Wi-Fi)
- Low supply current
- Photo detector and preamplifier in one package
- Supply voltage: 2.0 V to 5.5 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



LINKS TO ADDITIONAL RESOURCES



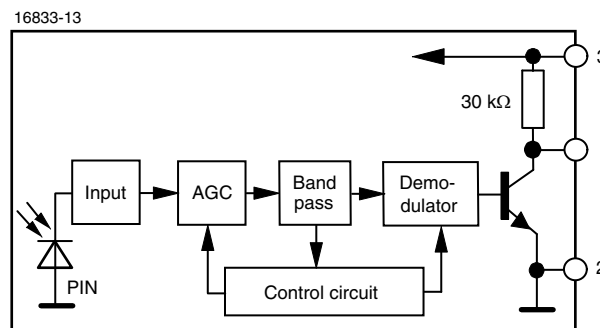
APPLICATIONS

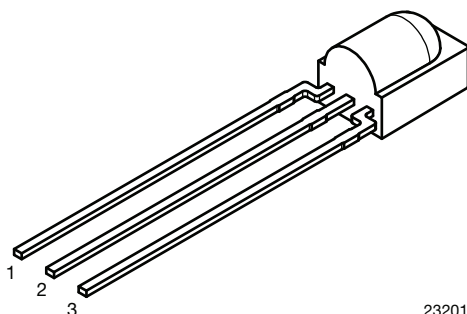
- Infrared remote control systems

DESIGN SUPPORT TOOLS

- [3D models](#)
- [Window size calculator](#)

BLOCK DIAGRAM

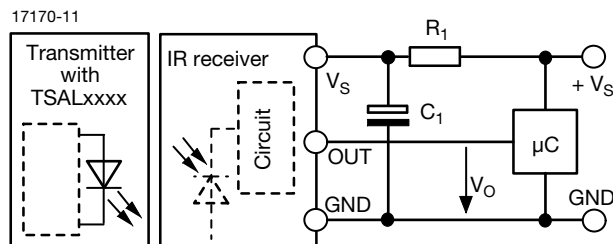


**MECHANICAL DATA****Pinning for TSOP18...:**1 = OUT, 2 = GND, 3 = V_S 

23201

ORDERING CODE

TSOP18... - 1500 pieces in bags

APPLICATION CIRCUIT R_1 and C_1 recommended to reduce supply ripple for $V_S < 2.8\text{ V}$ **PARTS TABLE**

AGC		BASIC NOISE SUPPRESSION (AGC2)	ENHANCED NOISE SUPPRESSION (AGC4)	MAXIMIZED NOISE SUPPRESSION (AGC6)
Carrier frequency	30 kHz	TSOP18230	TSOP18430	TSOP18630
	33 kHz	TSOP18233	TSOP18433	TSOP18633
	36 kHz	TSOP18236	TSOP18436 ⁽⁴⁾⁽⁶⁾	TSOP18636 ⁽⁵⁾
	38 kHz	TSOP18238	TSOP18438 ⁽²⁾⁽³⁾⁽⁹⁾⁽¹⁰⁾	TSOP18638
	40 kHz	TSOP18240 ⁽¹¹⁾	TSOP18440	TSOP18640
	56 kHz	TSOP18256 ⁽¹⁾	TSOP18456 ⁽⁸⁾	TSOP18656 ⁽⁷⁾
Package		Minicast		
Pinning		1 = OUT, 2 = GND, 3 = V_S		
Dimensions (mm)		5.0 W x 6.95 H x 4.8 D		
Mounting		Leaded		
Application		Remote control		
Best choice for		⁽¹⁾ Cisco ⁽²⁾ Mitsubishi ⁽³⁾ NEC ⁽⁴⁾ Panasonic ⁽⁵⁾ RC-5 ⁽⁶⁾ RC-6 ⁽⁷⁾ RCA ⁽⁸⁾ r-step ⁽⁹⁾ Sejin 4PPM ⁽¹⁰⁾ Sharp ⁽¹¹⁾ Sony		

Note

- 30 kHz and 33 kHz only available on written request

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	$T_{amb} \leq 85\text{ °C}$	P_{tot}	10	mW
Soldering temperature	$t \leq 10\text{ s}$, 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current	$E_v = 0$, $V_s = 3.3\text{ V}$	I_{SD}	0.25	0.35	0.45	mA
	$E_v = 40\text{ klx}$, sunlight	I_{SH}	-	0.45	-	mA
Supply voltage		V_s	2.0	-	5.5	V
Transmission distance	$E_v = 0$, test signal see Fig. 1, IR diode TSAL6200, $I_F = 50\text{ mA}$	d	-	30	-	m
Output voltage low	$I_{OSL} = 0.5\text{ mA}$, $E_e = 0.7\text{ mW/m}^2$, test signal see Fig. 1	V_{OSL}	-	-	100	mV
Minimum irradiance	Test signal: RC5 code	$E_{e\text{ min.}}$	-	0.08	0.20	mW/m^2
	Test signal: NEC code	$E_{e\text{ min.}}$	-	0.12	0.25	mW/m^2
Maximum irradiance	Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 5/f_0$, test signal see Fig. 1	$E_{e\text{ max.}}$	30	-	-	W/m^2
Directivity	Angle of half transmission distance	$\phi_{1/2}$	-	± 45	-	$^{\circ}$

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

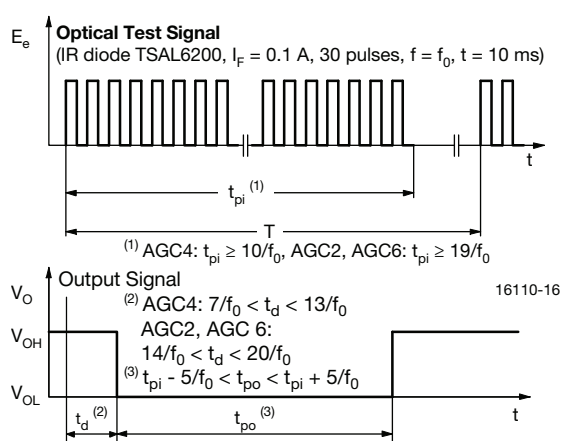


Fig. 1 - Output Delay and Pulse-Width

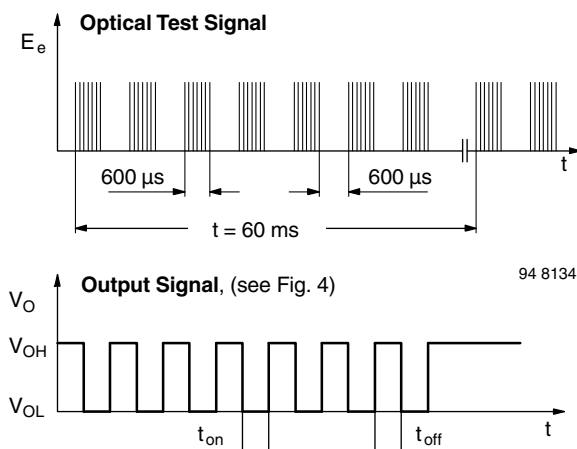


Fig. 3 - Test Signal

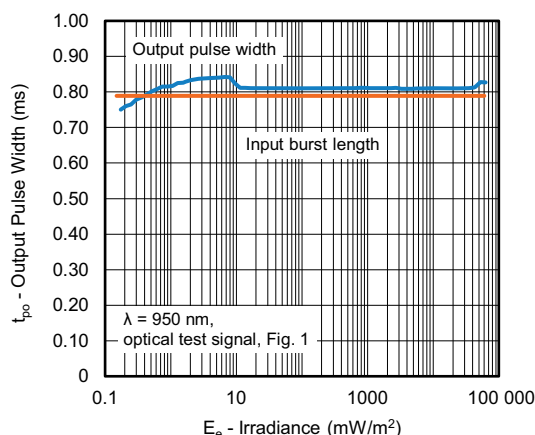


Fig. 2 - Pulse-Width vs. Irradiance in Dark Ambient

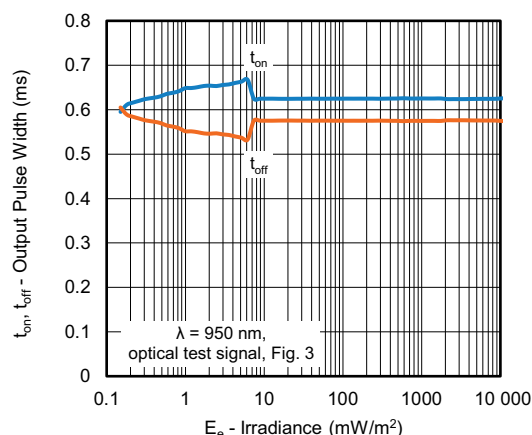


Fig. 4 - Pulse-Width vs. Irradiance in Dark Ambient

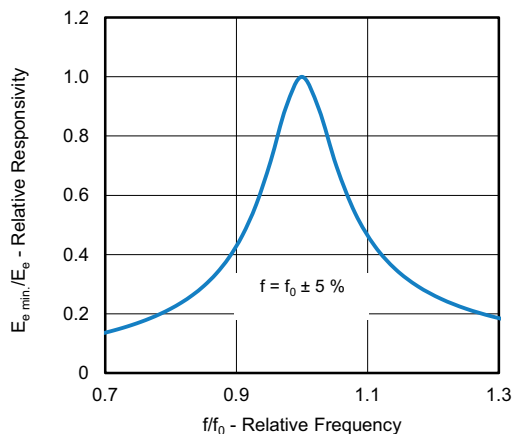


Fig. 5 - Frequency Dependence of Responsivity

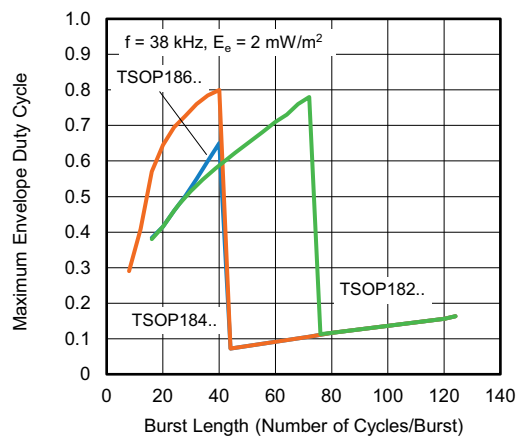


Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

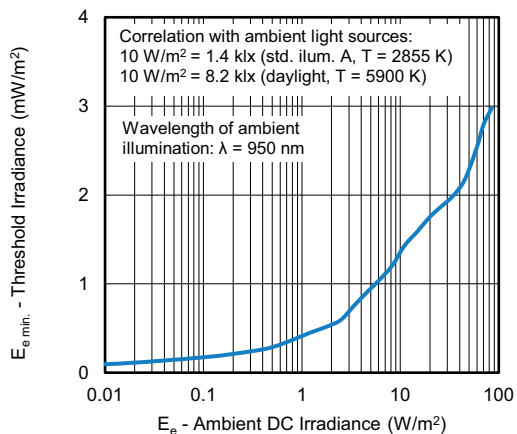


Fig. 6 - Sensitivity in Bright Ambient

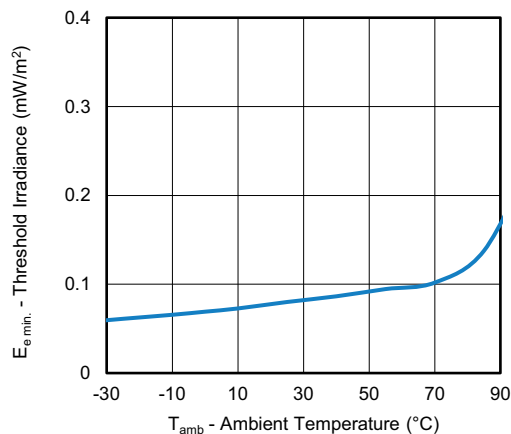


Fig. 9 - Sensitivity vs. Ambient Temperature

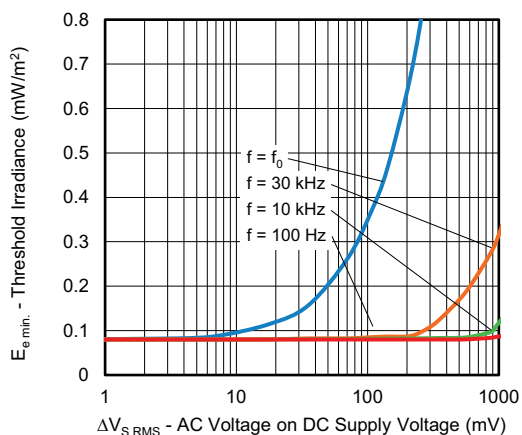


Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

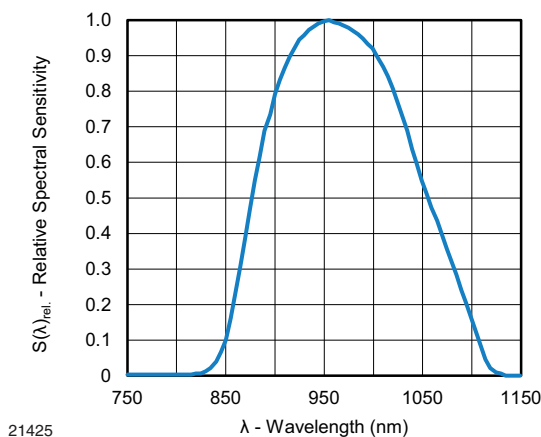


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

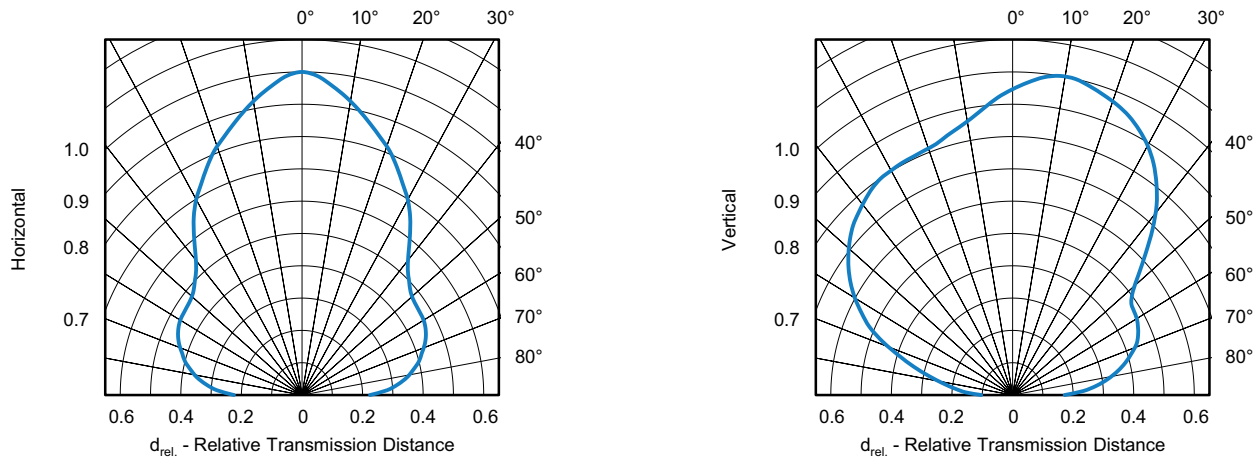


Fig. 11 - Horizontal and Vertical Directivity

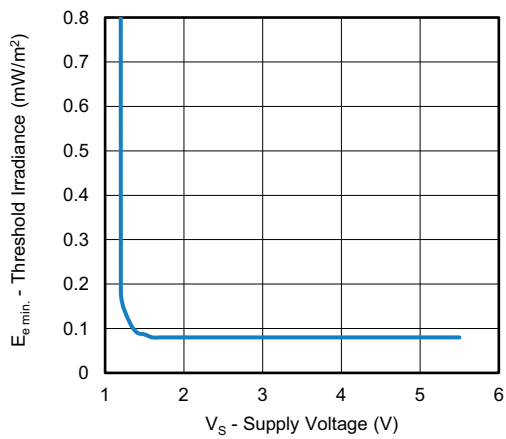


Fig. 12 - Sensitivity vs. Supply Voltage

SUITABLE DATA FORMAT

This series is designed to suppress spurious output pulses due to noise or disturbance signals. The devices can distinguish data signals from noise due to differences in frequency, burst length, and envelope duty cycle. The data signal should be close to the device's band-pass center frequency (e.g. 38 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the product in the presence of a disturbance, the sensitivity of the receiver is automatically reduced by the AGC to insure that no spurious pulses are present at the receiver's output.

Some examples which are suppressed are:

- DC light (e.g. from tungsten bulbs sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated patterns from fluorescent lamps with electronic ballasts (see Fig. 13 or Fig. 14)
- 2.4 GHz and 5 GHz Wi-Fi

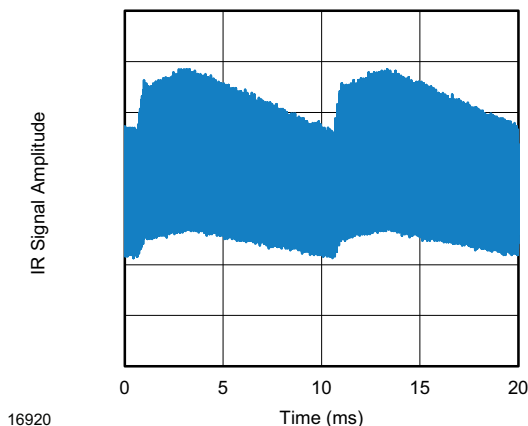


Fig. 13 - IR Disturbance from Fluorescent Lamp With Low Modulation

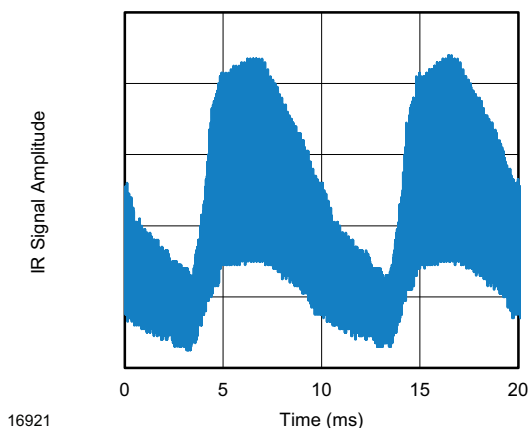


Fig. 14 - IR Disturbance from Fluorescent Lamp With High Modulation

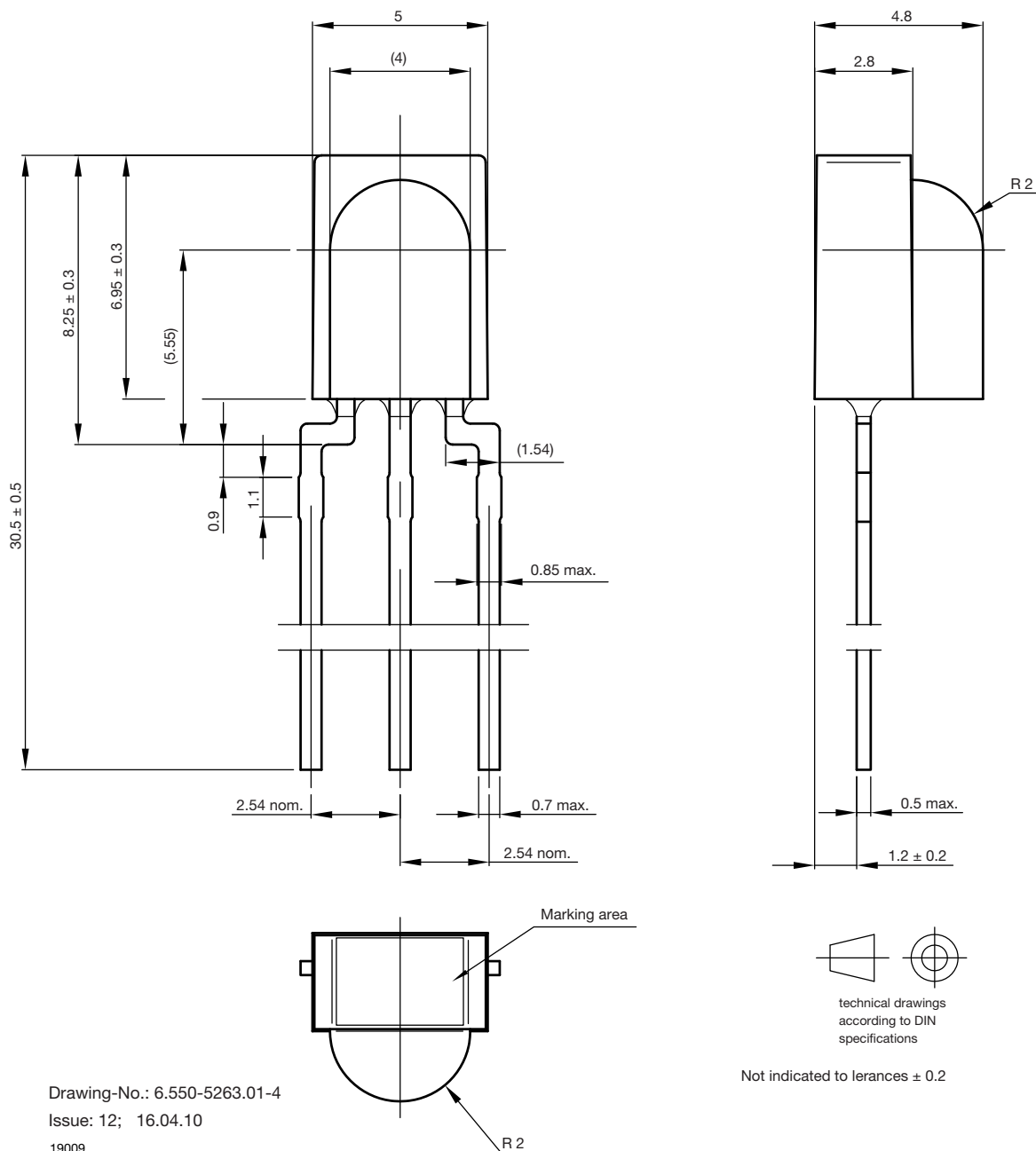
	TSOP182..	TSOP184..	TSOP186..
Minimum burst length	19 cycles/burst	10 cycles/burst	19 cycles/burst
After each burst of length a minimum gap time is required of	19 to 72 cycles ≥ 20 cycles	10 to 40 cycles ≥ 11 cycles	19 to 40 cycles ≥ 20 cycles
For bursts greater than a minimum gap time in the data stream is needed of	72 cycles > 6 x burst length	40 cycles > 10 x burst length	40 cycles > 10 x burst length
Maximum number of continuous short bursts/second	750	1300	750
RC-5 code	Yes	Yes	Preferred
RC-6 code	No	Preferred	No
NEC code	Yes	Preferred	Yes
r-step code	No	Preferred	No
Sony code	Preferred	No	No
RCA 56 kHz code	Yes	Yes	Preferred
Suppression of interference from fluorescent lamps	Fig. 13	Fig. 13 and Fig. 14	Fig. 13 and Fig. 14

Note

- For data formats with short bursts please see the datasheet for TSOP181.., TSOP183.., TSOP185..



PACKAGE DIMENSIONS in millimeters





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