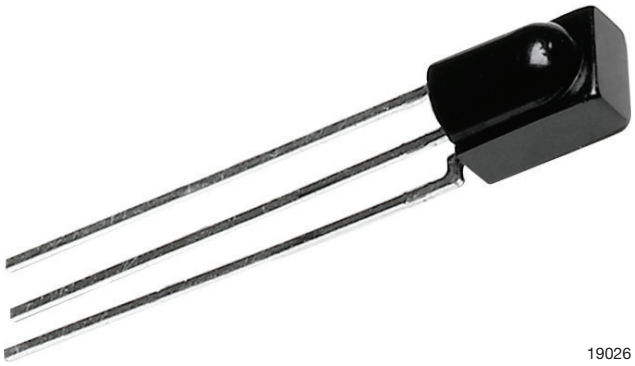
IR Receiver Modules for Remote Control Systems



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DESCRIPTION

This IR receiver series is optimized for long burst remote control systems in different environments. The customer can chose 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

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

Product Page | Marking | Packages | Holders | Bends and Cuts

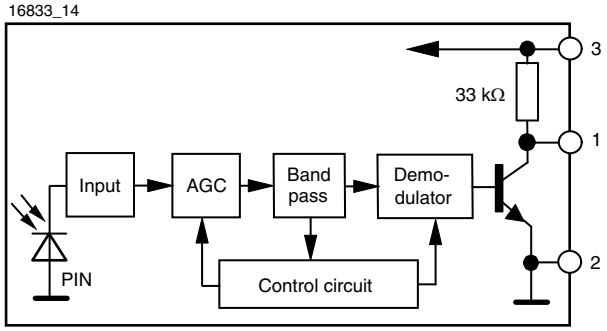
APPLICATIONS

- Infrared remote control systems

DESIGN SUPPORT TOOLS

- 3D models
- Window size calculator

BLOCK DIAGRAM



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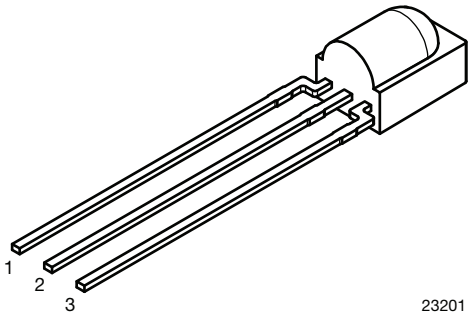
MECHANICAL DATA

Pinning for TSOP582.., TSOP584..:

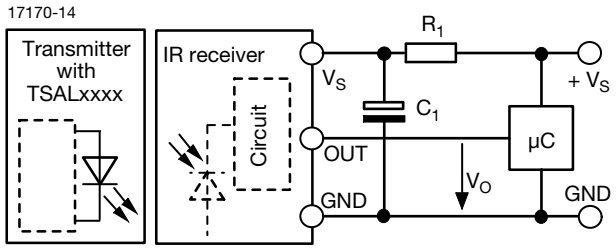
1 = OUT, 2 = GND, 3 = V_S



ORDERING CODE

TSOP58... - 1500 pieces in bags

APPLICATION CIRCUIT



R_1 and C_1 recommended in case there are strong ripple or spikes on the supply line.

PARTS TABLE			
AGC		**LEGACY, FOR LONG BURST REMOTE CONTROLS (AGC2)**	**RECOMMENDED FOR LONG BURST CODES (AGC4)**
Carrier frequency	30 kHz	TSOP58230	TSOP58430
	33 kHz	TSOP58233	TSOP58433
	36 kHz	TSOP58236	TSOP58436 (1)(2)(6)
	38 kHz	TSOP58238	TSOP58438 (3)(5)(9)(10)
	40 kHz	TSOP58240 (11)	TSOP58440
	56 kHz	TSOP58256 (7)	TSOP58456 (4)(8)
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) Panasonic (2) RC5 (3) NEC (4) RCA (5) Mitsubishi (6) RC6 (7) Cisco (8) r-step (9) Sejin 4PPM (10) Sharp (11) Sony	

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V_S	-0.3 to +6	V
Supply current		I_S	5	mA
Output voltage		V_O	-0.3 to 5.5	V
Voltage at output to supply		$V_S - V_O$	-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.

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ELECTRICAL AND OPTICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Supply voltage		V_S	2.0	-	5.5	V
Supply current	V_S = 3.3 V, E_v = 0	I_{SD}	0.25	0.35	0.45	mA
	E_v = 40 klx, sunlight	I_{SH}	-	0.45	-	mA
Transmission distance	E_v = 0, IR diode TSAL6200, I_F = 50 mA, test signal see Fig. 1	d	-	18	-	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	Test signal: RC5 code	$E_{e\ min.}$	-	0.2	0.4	mW/m²
	Test signal: NEC code	$E_{e\ min.}$	-	0.3	0.5	mW/m²
Maximum irradiance	Pulse width tolerance: $t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$, 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)

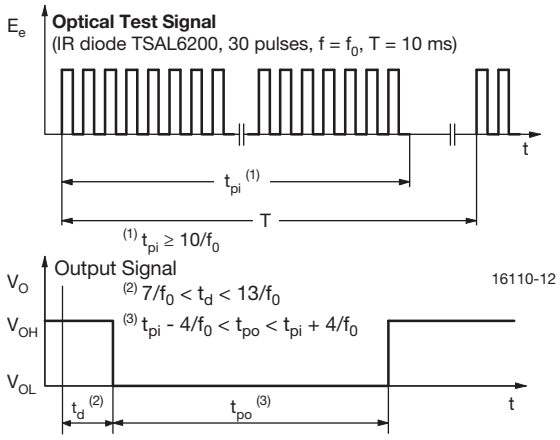

Fig. 1 - Output Active Low

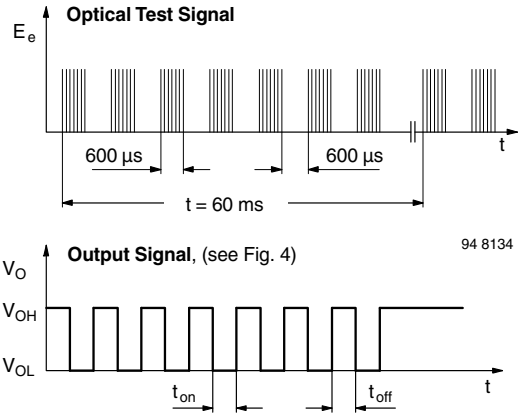

Fig. 3 - Output Function

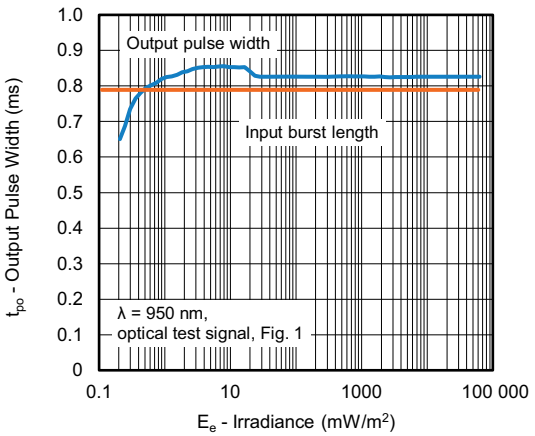

Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

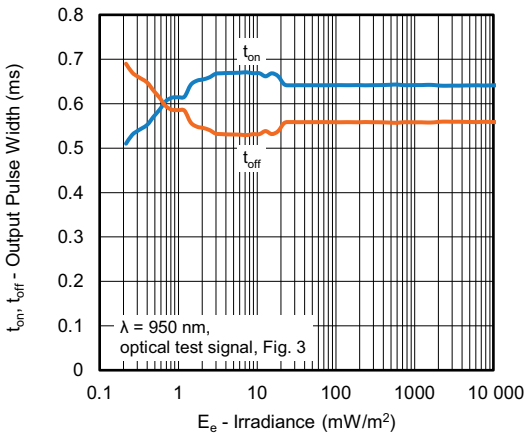

Fig. 4 - Output Pulse Diagram

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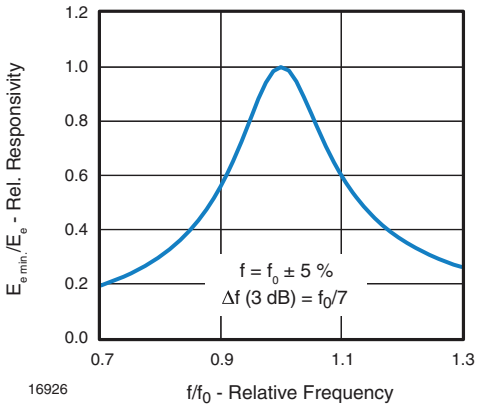

Fig. 5 - Frequency Dependence of Responsivity

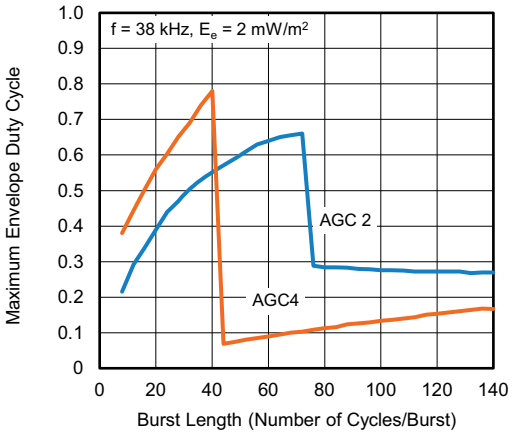

Fig. 8 - Max. Envelope Duty Cycle vs. Burst Length

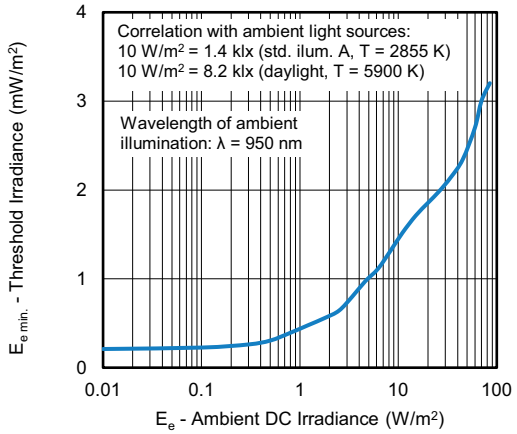

Fig. 6 - Sensitivity in Bright Ambient

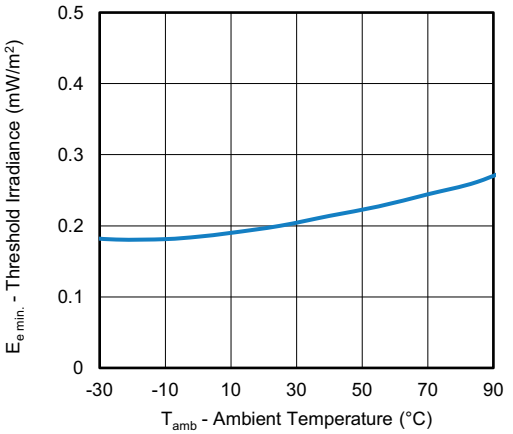

Fig. 9 - Sensitivity vs. Ambient Temperature

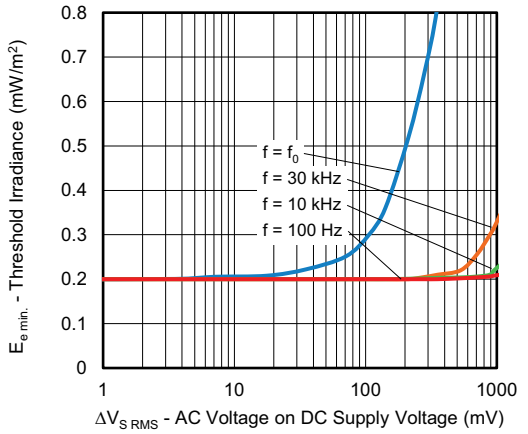

Fig. 7 - Sensitivity vs. Supply Voltage Disturbances

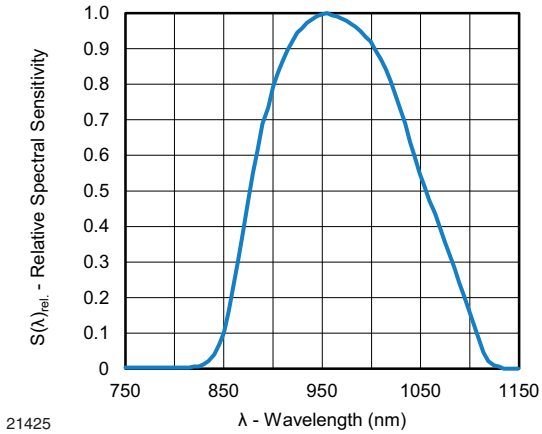

Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

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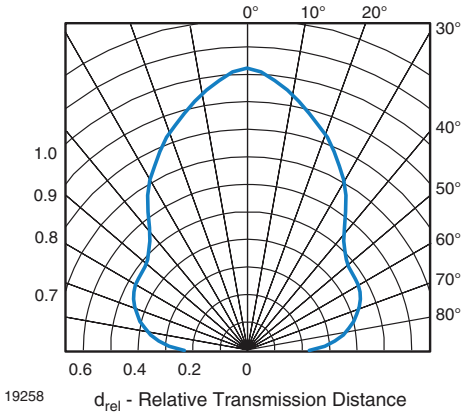

Fig. 11 - Horizontal Directivity

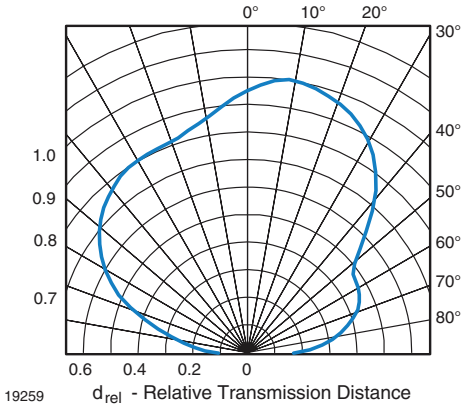

Fig. 12 - Vertical Directivity

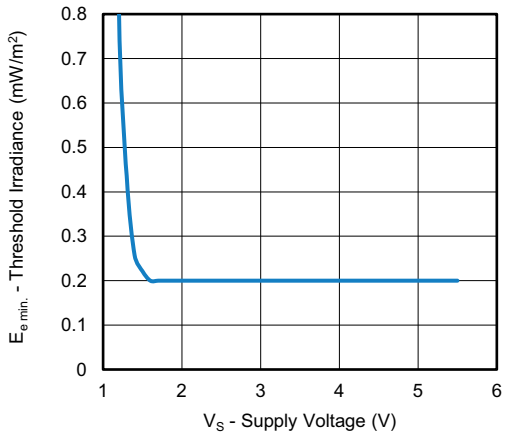

Fig. 13 - Sensitivity vs. Supply Voltage

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SUITABLE DATA FORMAT

These products 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 (e.g. 38 kHz) and fulfill the conditions in the table below.

When a data signal is applied to the IR receiver 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
- Modulated IR signals from common fluorescent lamps (example of noise pattern is shown in Fig. 14 or Fig. 15)
- 2.4 GHz and 5 GHz Wi-Fi

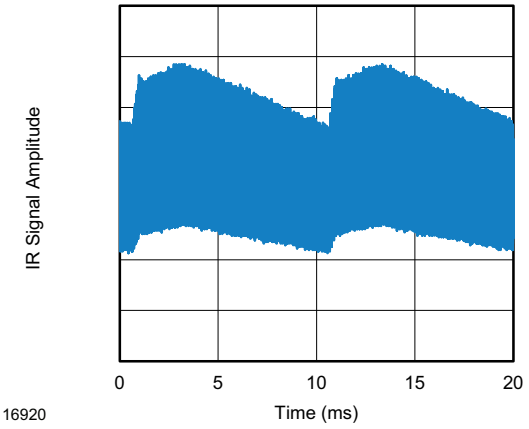

Fig. 14 - IR Disturbance from Fluorescent Lamp With Low Modulation

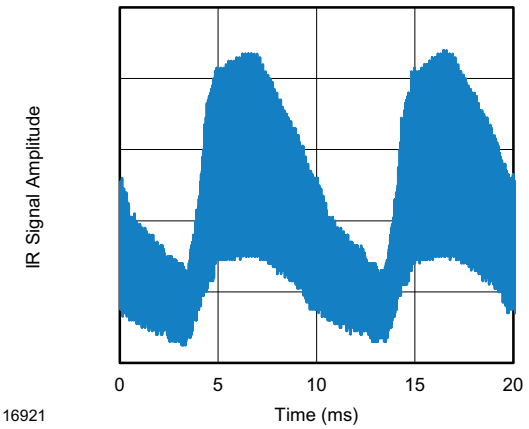

Fig. 15 - IR Disturbance from Fluorescent Lamp With High Modulation

	TSOP582..	TSOP584..
Minimum burst length	10 cycles/burst	10 cycles/burst
After each burst of length A gap time is required of	10 to 72 cycles ≥ 10 cycles	10 to 40 cycles ≥ 10 cycles
For bursts greater than a minimum gap time in the data stream is needed of	72 cycles > 3 x burst length	40 cycles > 10 x burst length
Maximum number of continuous short bursts/second	950	1500
RC5 code	Yes	Preferred
RC6 code	Yes	Preferred
NEC code	Yes	Preferred
r-step code	Yes	Preferred
Sony code	Preferred	No
RCA 56 kHz code	Yes	Preferred
Suppression of interference from fluorescent lamps	Mild disturbance patterns are suppressed (example: signal pattern of Fig. 14)	Complex disturbance patterns are suppressed (example: signal pattern of Fig. 14 and Fig. 15)

Note

- For data formats with short bursts please see the datasheet of TSOP581.., TSOP583..

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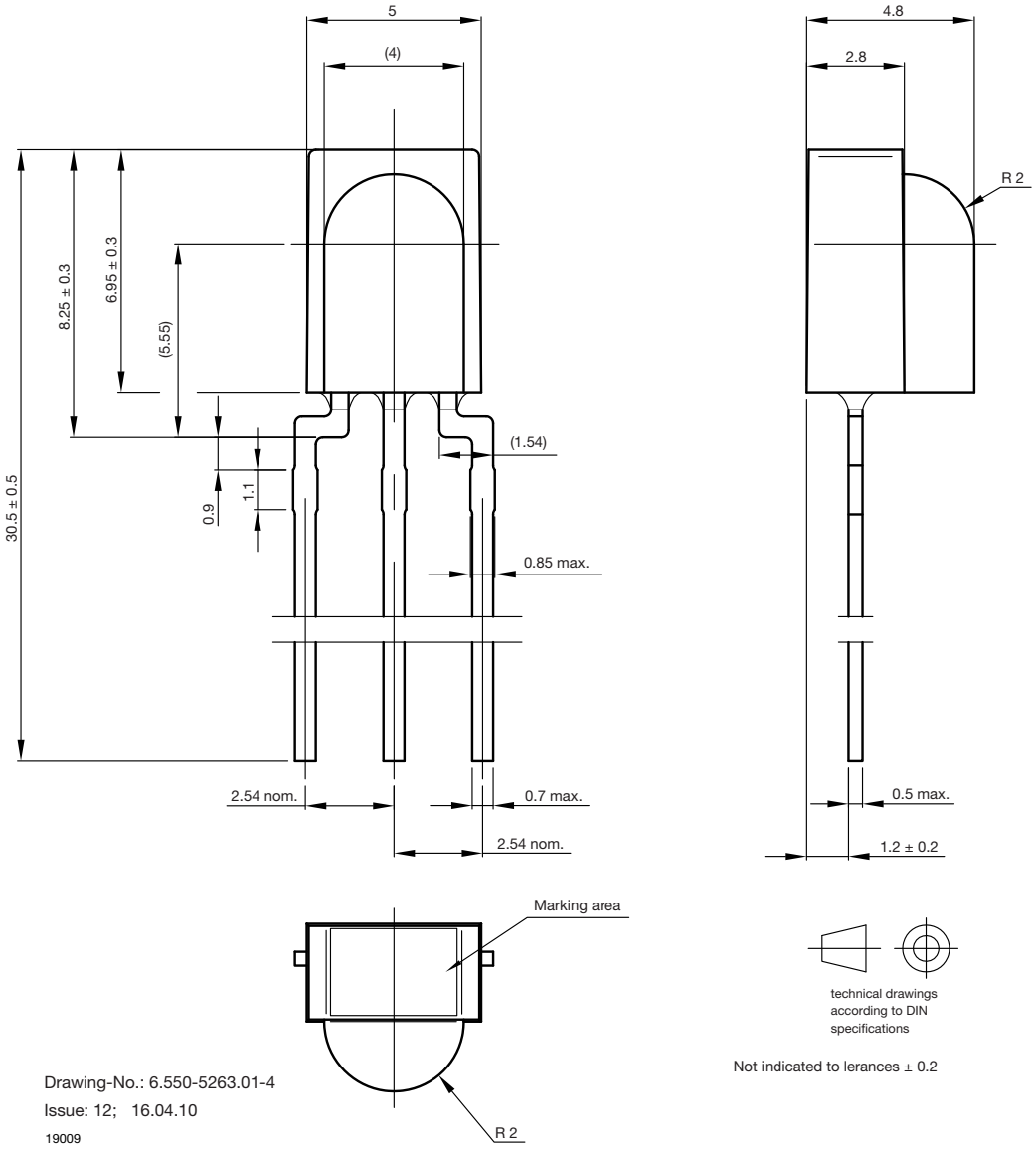
PACKAGE DIMENSIONS in millimeters



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