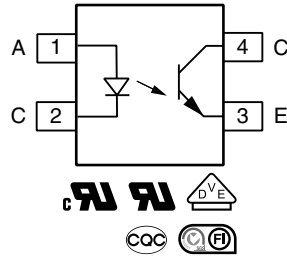


# Optocoupler, Phototransistor Output, Low Input Current, SSOP-4, Half Pitch, Mini-Flat Package



22628-1


**FEATURES**

- High CTR with low input current
- Low profile package (half pitch)
- High collector emitter voltage,  $V_{CEO} = 80\text{ V}$
- Isolation test voltage,  $3750\text{ V}_{RMS}$
- Low coupling capacitance
- High common mode transient immunity
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**DESCRIPTION**

The VOS618A series has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 4-pin 50 mil lead pitch mini-flat package.

It features a high current transfer ratio at low input current, low coupling capacitance, and high isolation voltage.

The coupling devices are designed for signal transmission between two electrically separated circuits.

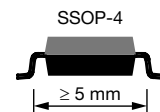
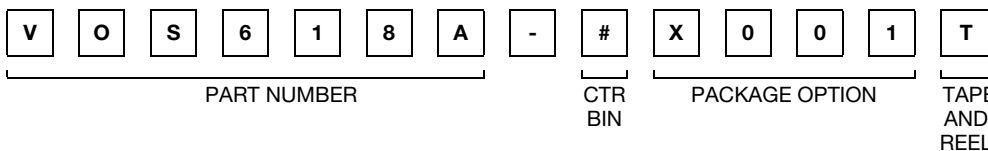
**APPLICATIONS**

- Telecom
- Industrial controls
- Battery powered equipment
- Office machines
- Programmable controllers

**AGENCY APPROVALS**

(All parts are certified under base model VOS618A)

- UL1577, file no. E52744
- cUL
- DIN EN 60747-5-5 (VDE 0884-5) (*pending*), available with option 1
- FIMKO EN 60065, EN 60950-1 (*pending*)
- CQC GB4943.1-2011, GB8898-2011 (*pending*)

**ORDERING INFORMATION**


AGENCY CERTIFIED/PACKAGE	CTR (%)				
	1 mA				
UL, cUL, FIMKO, CQC	50 to 600	63 to 125	100 to 200	80 to 160	130 to 260
SSOP-4, 50 mil pitch	VOS618AT	VOS618A-2T	VOS618A-3T	VOS618A-7T	VOS618A-8T
UL, cUL, FIMKO, CQC, VDE (option 1)	50 to 600	63 to 125	100 to 200	80 to 160	130 to 260
SSOP-4, 50 mil pitch	VOS618A-X001T	VOS618A-2X001T	VOS618A-3X001T	VOS618A-7X001T	VOS618A-8X001T

**Note**

- Additional options may be possible, please contact sales office.

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Reverse voltage		$V_R$	6	V
Power dissipation		$P_{diss}$	70	mW
Forward current		$I_F$	50	mA
<b>OUTPUT</b>				
Collector emitter voltage		$V_{CEO}$	80	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	50	mA
	$t_p/T = 0.5, t_p < 10\text{ ms}$	$I_C$	100	mA
Power dissipation		$P_{diss}$	150	mW
<b>COUPLER</b>				
Isolation test voltage between emitter and detector	$t = 1\text{ min}$	$V_{ISO}$	3750	$V_{RMS}$
Total power dissipation		$P_{tot}$	170	mW
Storage temperature range		$T_{stg}$	- 55 to + 150	$^{\circ}\text{C}$
Ambient temperature range		$T_{amb}$	- 55 to + 110	$^{\circ}\text{C}$
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>	$t = 10\text{ s}$	$T_{sld}$	260	$^{\circ}\text{C}$

**Notes**

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

<sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices.

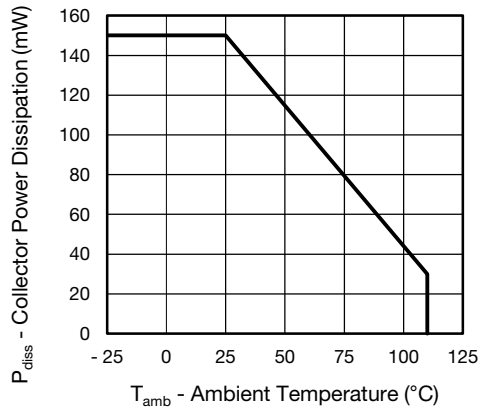


Fig. 1 - Power Dissipation vs. Ambient Temperature

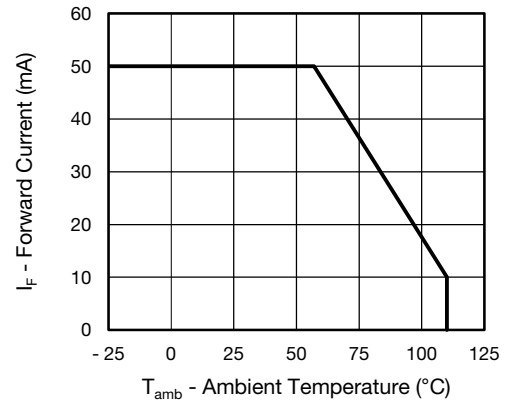


Fig. 2 - Forward Current vs. Ambient Temperature

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>						
Forward voltage	$I_F = 50\text{ mA}$	$V_F$		1.1	1.5	V
Reverse current	$V_R = 6\text{ V}$	$I_R$		0.01	10	$\mu\text{A}$
Capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}$	$C_O$		8		pF
<b>OUTPUT</b>						
Collector emitter leakage current	$V_{CE} = 10\text{ V}$	$I_{CEO}$		0.7	100	nA
Collector emitter breakdown voltage	$I_C = 100\text{ }\mu\text{A}$	$BV_{CEO}$	80			V
Emitter collector breakdown voltage	$I_E = 10\text{ }\mu\text{A}$	$BV_{ECO}$	7			V
Collector emitter capacitance	$V_{CE} = 5\text{ V}, f = 1\text{ MHz}$	$C_{CE}$		6		pF
<b>COUPLER</b>						
Collector emitter saturation voltage	$I_F = 1\text{ mA}, I_C = 0.25\text{ mA}$	$V_{CEsat}$		0.12	0.4	V
Cut-off frequency	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 100\text{ }\Omega$	$f_{ctr}$		119		kHz

**Note**

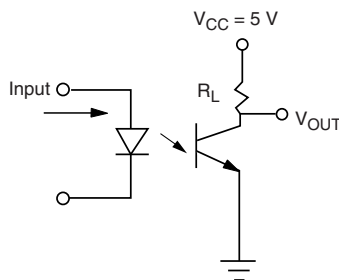
- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

**CURRENT TRANSFER RATIO** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 1\text{ mA}, V_{CE} = 5\text{ V}$	VOS618A	CTR	50		600	%
		VOS618A-2	CTR	63		125	%
		VOS618A-3	CTR	100		200	%
		VOS618A-7	CTR	80		160	%
		VOS618A-8	CTR	130		260	%

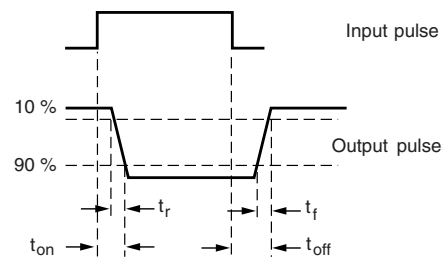
**SWITCHING CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>NON-SATURATED</b>						
Turn on time	$V_{CC} = 5\text{ V}, I_C = 2\text{ mA}, R_L = 100\text{ }\Omega$	$t_{on}$		5		$\mu\text{s}$
Rise time		$t_r$		5		$\mu\text{s}$
Turn off time		$t_{off}$		8		$\mu\text{s}$
Fall time		$t_f$		7		$\mu\text{s}$
<b>SATURATED</b>						
Rise and fall time	$I_F = 1.6\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1.9\text{ k}\Omega$	$t_r$		10		$\mu\text{s}$
Fall time		$t_f$		11		$\mu\text{s}$
Turn on time		$t_{on}$		14		$\mu\text{s}$
Turn off time		$t_{off}$		12		$\mu\text{s}$



isfh618a\_10

Fig. 3 - Test Circuit



isfh618a\_12

Fig. 4 - Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS				
PARAMETER		SYMBOL	VALUE	UNIT
<b>MAXIMUM SAFETY RATINGS</b>				
Output safety power		$P_{SO}$	300	mW
Input safety current		$I_{si}$	200	mA
Safety temperature		$T_S$	150	°C
Comparative tracking index		CTI	175	
<b>INSULATION RATED PARAMETERS</b>				
Maximum withstanding isolation voltage		$V_{ISO}$	3750	$V_{RMS}$
Maximum transient isolation voltage		$V_{IOTM}$	6000	$V_{peak}$
Maximum repetitive peak isolation voltage		$V_{IORM}$	565	$V_{peak}$
Insulation resistance		$T_{amb} = 25\text{ °C}, V_{DC} = 500\text{ V}$	$R_{IO}$	$10^{12}$
Insulation resistance		$T_{amb} = 100\text{ °C}, V_{DC} = 500\text{ V}$	$R_{IO}$	$10^{11}$
Climatic classification (according to IEC 68 part 1)			55/110/21	
Environment (pollution degree in accordance to DIN VDE 0109)			2	
Creepage distance			$\geq 5$	mm
Clearance distance			$\geq 5$	mm
Insulation thickness			DTI	$\geq 0.4$

**Note**

- As per IEC 60747-5-5, §7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

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


Fig. 5 - Forward Voltage vs. Forward Current

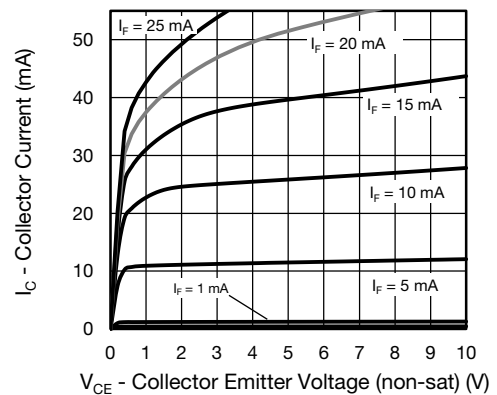


Fig. 6 - Collector Current vs. Collector Emitter Voltage (non-saturated)



Fig. 7 - Collector Emitter Current vs. Ambient Temperature

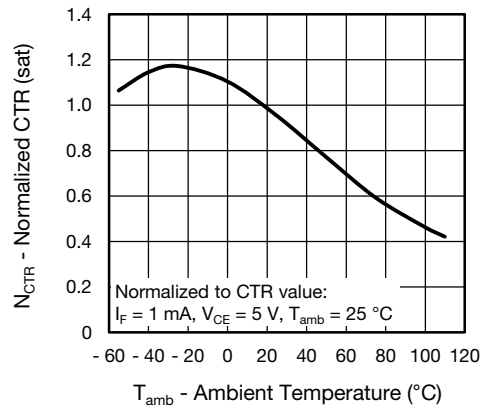


Fig. 10 - Normalized Current Transfer Ratio vs. Ambient Temperature (saturated)

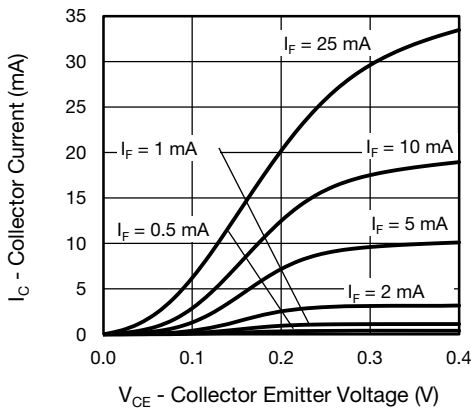


Fig. 8 - Collector Current vs. Collector Emitter Voltage (saturated)

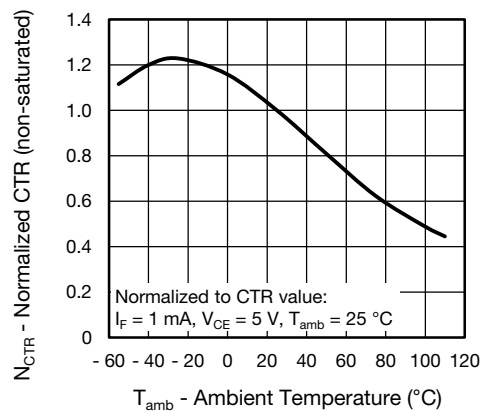


Fig. 11 - Normalized Current Transfer Ratio vs. Ambient Temperature (non-saturated)

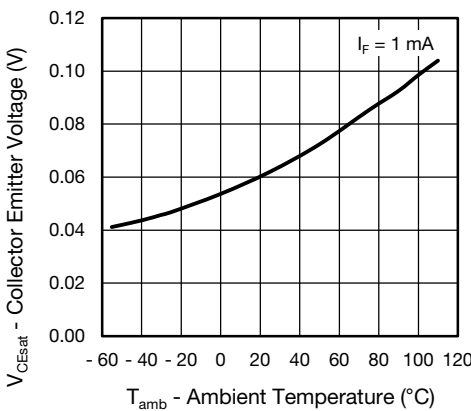


Fig. 9 - Collector Emitter Voltage vs. Ambient Temperature (saturated)

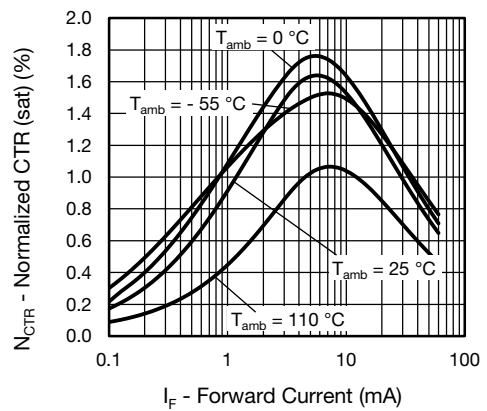


Fig. 12 - Current Transfer Ratio vs. Forward Current (saturated) normalized to 1 mA at 25 °C

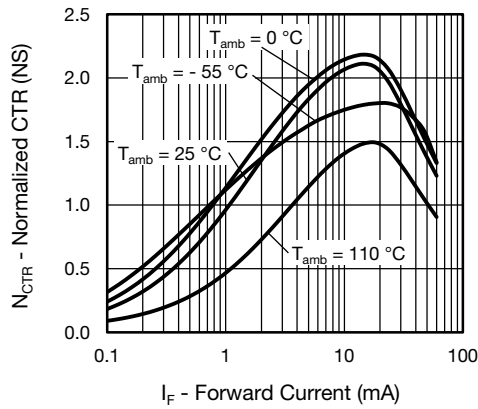


Fig. 13 - Current Transfer Ratio vs. Forward Current (non-saturated) normalized to 1 mA at 25 °C

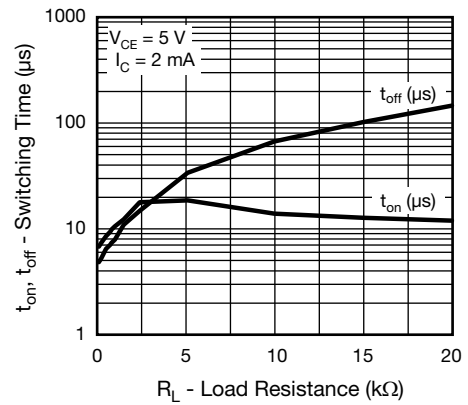


Fig. 16 - Switching Time vs. Load Resistance

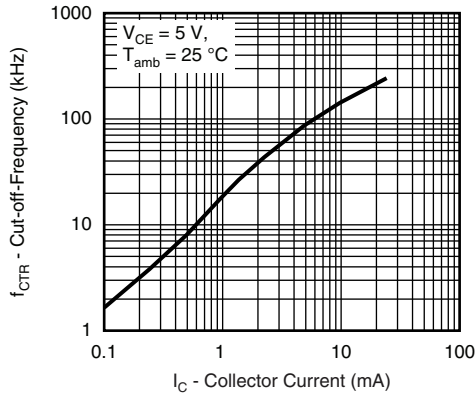


Fig. 14 - Cut-off Frequency (- 3 dB) vs. Collector Current

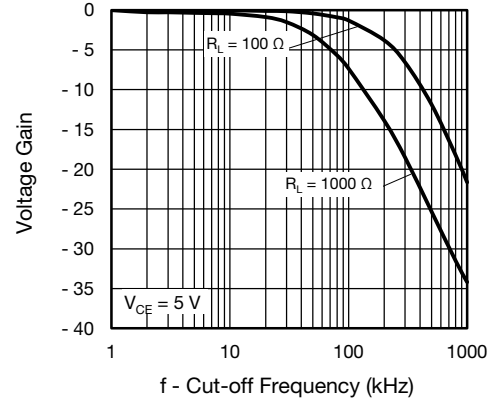


Fig. 17 - Voltage Gain vs. Cut-off Frequency

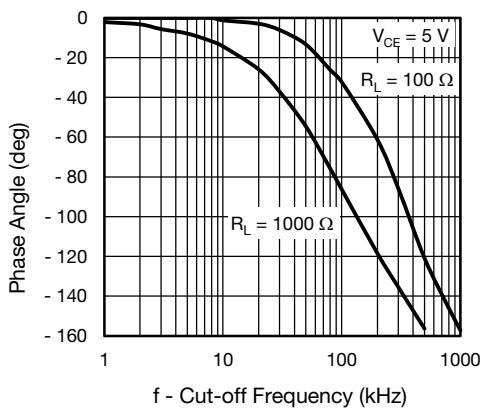
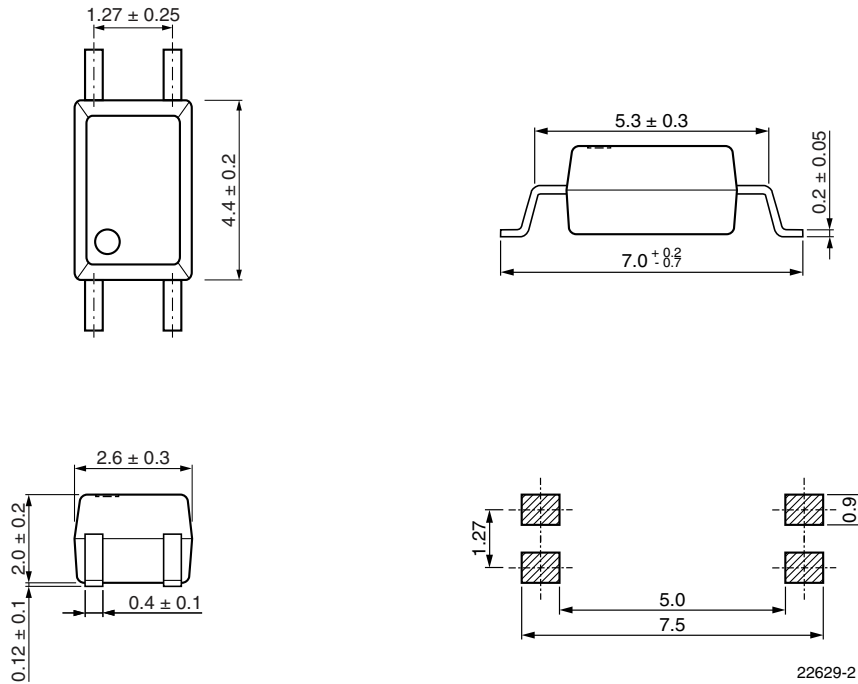


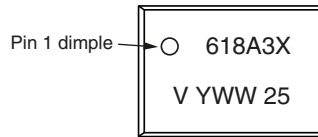
Fig. 15 -  $F_{CTR}$  vs. Phase Angle

**PACKAGE DIMENSIONS** in millimeters



22629-2

**PACKAGE MARKING** (example of VOS618A-3X001T)



**Notes**

- Only option 1 is reflected in the package marking, it is indicated by the characters "X".
- Tape and reel suffix (T) is not part of the package marking.

**TAPE AND REEL DIMENSIONS** in millimeters

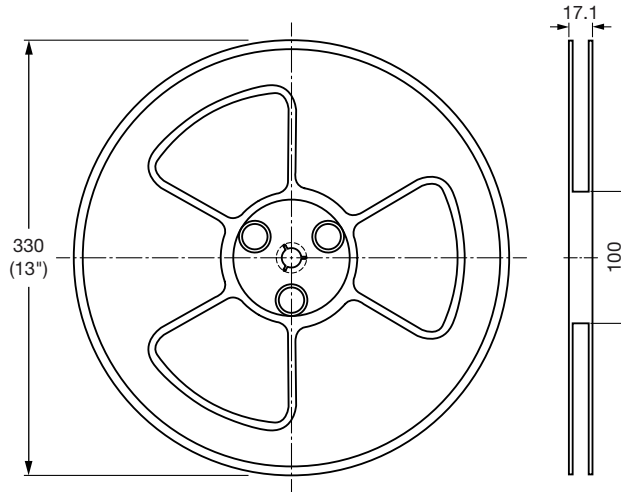


Fig. 18 - Reel Dimensions (3000 units per reel)

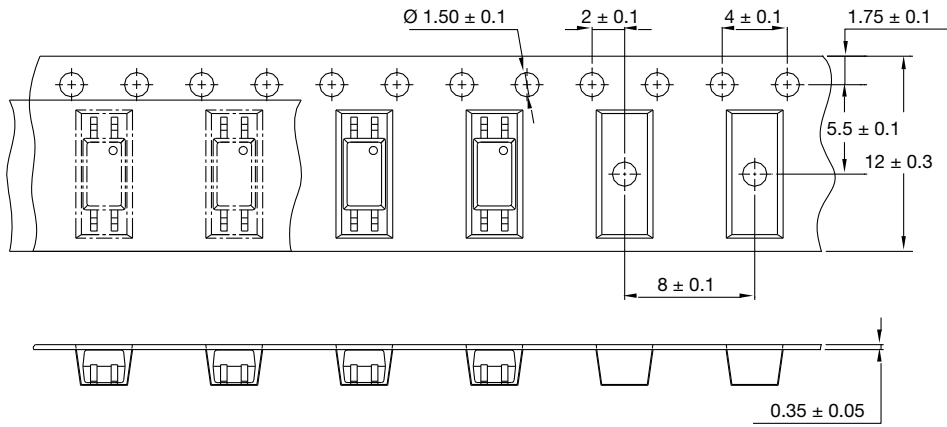


Fig. 19 - Tape Dimensions