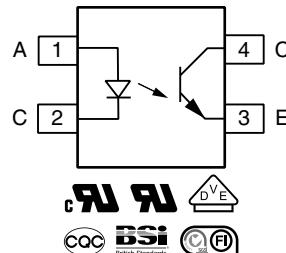
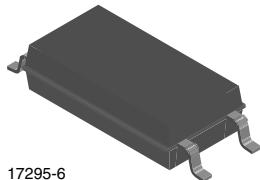


Optocoupler, Phototransistor Output, Low Input Current, 4 Pin LSOP, Long Creepage Mini-Flat Package



DESCRIPTION

The VOL617A has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 4 pin LSOP wide body package.

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

The coupling device is designed for signal transmission between two electrically separated circuits.

FEATURES

- Low profile package
- High collector emitter voltage, $V_{CEO} = 80$ V
- Isolation test voltage, 5000 V_{RMS}
- Isolation voltage $V_{IORM} = 1050$ V_{peak}
- Low coupling capacitance
- High common mode transient immunity
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
GREEN
(IEC-2008)

APPLICATIONS

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

AGENCY APPROVALS

- UL1577, file no. E76222
- cUL CSA 22.2 bulletin 5A, double protection
- DIN EN 60747-5-5 (certified at 100 °C, 110 °C certificate is pending), available with option 1
- BSI: EN 60065:2002, EN 60950-1:2006
- FIMKO EN60950-1
- CQC (pending)

ORDERING INFORMATION

<input type="checkbox"/> V	<input type="checkbox"/> O	<input type="checkbox"/> L	<input type="checkbox"/> 6	<input type="checkbox"/> 1	<input type="checkbox"/> 7	<input type="checkbox"/> A	<input type="checkbox"/> -	<input type="checkbox"/> #	<input type="checkbox"/> X	<input type="checkbox"/> 0	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> T	LSOP
PART NUMBER							CTR BIN			PACKAGE OPTION			TAPE AND REEL	
AGENCY CERTIFIED/ PACKAGE							CTR (%)							
UL, cUL, BSI, FIMKO							40 to 80			63 to 125			100 to 200	
4 pin LSOP, mini-flat, long creepage							VOL617A-1T			VOL617A-2T			160 to 320	
VDE, UL, cUL, BSI, FIMKO (option 1)							40 to 80			63 to 125			100 to 200	
4 pin LSOP, mini-flat, long creepage							VOL617A-1X001T			VOL617A-2X001T			160 to 320	
4 pin LSOP, mini-flat, long creepage							VOL617A-3X001T			VOL617A-4X001T			10.2 mm	

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25$ °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6	V
Power dissipation		P_{diss}	100	mW
Forward current		I_F	60	mA
Junction temperature		T_J	125	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	80	V
Emitter collector voltage		V_{ECO}	7	V
Collector current	$t_p/T = 0.5, t_p < 10$ ms	I_C	50	mA
		I_C	100	mA
Power dissipation		P_{diss}	150	mW
Junction temperature		T_J	125	°C
COUPLER				
Isolation test voltage between emitter and detector		V_{ISO}	5000	V_{RMS}
Total power dissipation		P_{tot}	250	mW
Storage temperature range		T_{stg}	- 55 to + 125	°C
Ambient temperature range		T_{amb}	- 55 to + 110	°C
Soldering temperature ⁽¹⁾	≤ 10 s	T_{sld}	260	°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.

⁽¹⁾ Refer to reflow profile for soldering conditions for surface mounted devices.

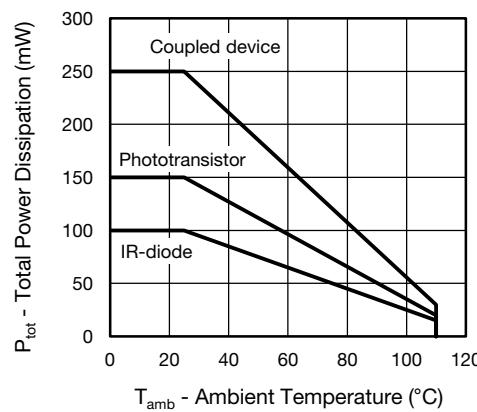


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	$I_F = 5$ mA	V_F		1.16	1.5	V
Capacitance	$V_R = 0$ V, $f = 1$ MHz	C_O		45		pF
OUTPUT						
Collector emitter leakage current	$V_{CE} = 10$ V, $I_F = 0$ A	I_{CEO}		10	200	nA
Collector emitter capacitance	$V_{CE} = 5$ V, $f = 1$ MHz	C_{CE}		7		pF
COUPLER						
Collector emitter saturation voltage	$I_C = 1.0$ mA, $I_F = 5$ mA	V_{CEsat}		0.25	0.4	V
Coupling capacitance	$f = 1$ MHz	C_C		0.25		pF

Note

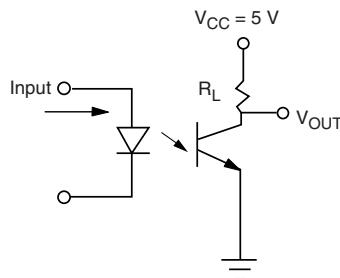
- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

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

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	VOL617A-1	CTR	40		80	%
		VOL617A-2	CTR	63		125	%
		VOL617A-3	CTR	100		200	%
		VOL617A-4	CTR	160		320	%

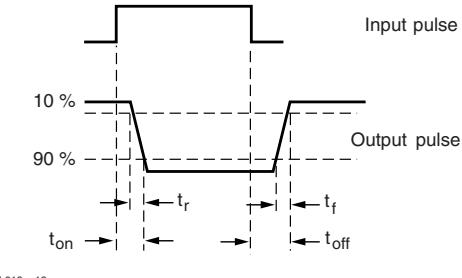
SWITCHING CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn on time	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	t_{on}		6		μs
Rise time	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	t_r		3.5		μs
Turn off time	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	t_{off}		5.5		μs
Fall time	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	t_f		5		μs



isfh618a_10

Fig. 2 - Test Circuit



isfh618a_12

Fig. 3 - Test Circuit and Waveforms

SAFETY AND INSULATION RATED PARAMETERS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Partial discharge test voltage - routine test	$100\%, t_{test} = 1 \text{ s}$	V_{pd}	2			kV
Partial discharge test voltage - lot test (sample test)	$t_{Tr} = 60 \text{ s}, t_{test} = 10 \text{ s},$ (see figure 4)	V_{IOTM}	8			kV
		V_{pd}	1.68			kV
Insulation voltage		V_{IORM}			1050	V_{peak}
Insulation resistance	$V_{IO} = 500 \text{ V}, T_{amb} = 25^{\circ}\text{C}$	R_{IO}	10^{12}			Ω
	$V_{IO} = 500 \text{ V}, T_{amb} = 100^{\circ}\text{C}$	R_{IO}	10^{11}			Ω
	$V_{IO} = 500 \text{ V}, T_{amb} = 150^{\circ}\text{C}$ (construction test only)	R_{IO}	10^9			Ω
Safety rating - maximum input current		I_{si}			130	mA
Safety rating - maximum power dissipation		P_{SO}			265	mW
Rated impulse voltage		V_{IOTM}			8	kV
Safety rating - maximum ambient temperature		T_{si}			150	$^{\circ}\text{C}$
Clearance distance			8			mm
Creepage distance			8			mm
Insulation distance (internal)			0.4			mm

Note

- According to DIN EN 60747-5-5 (VDE 0884), § 7.4.3.8.2, (see figure 4). This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits.

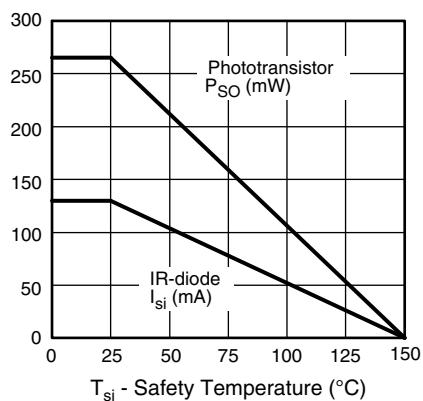


Fig. 4 - Derating Diagram

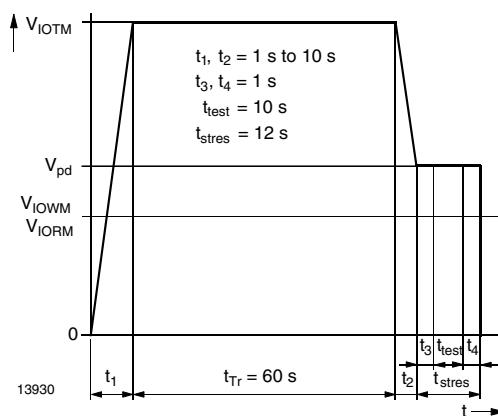


Fig. 5 - Test Pulse Diagram for Sample Test according to DIN EN 60747-5-5

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

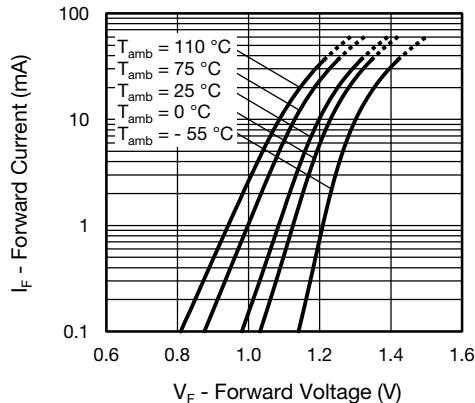


Fig. 6 - Forward Current vs. Forward Voltage

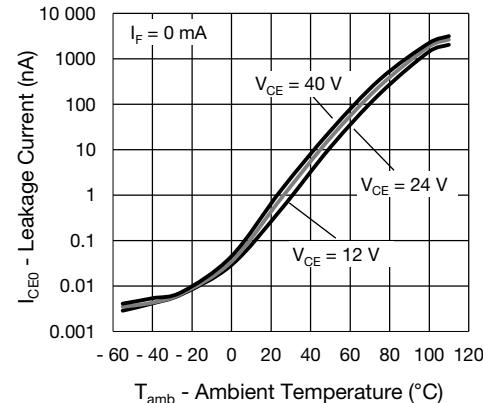


Fig. 8 - Collector Emitter Current vs. Ambient Temperature

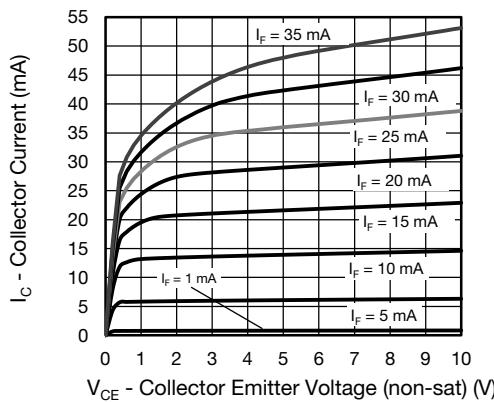


Fig. 7 - Collector Current vs. Collector Emitter Voltage (non-saturated)

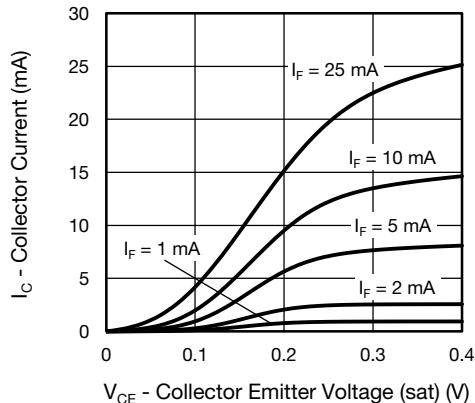


Fig. 9 - Collector Current vs. Collector Emitter Voltage (saturated)

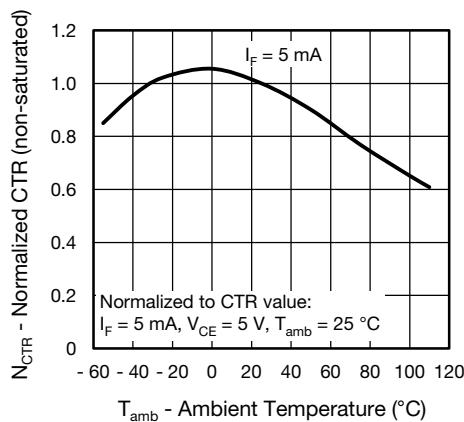


Fig. 10 - Normalized Current Transfer Ratio (non-sat) vs. Ambient Temperature

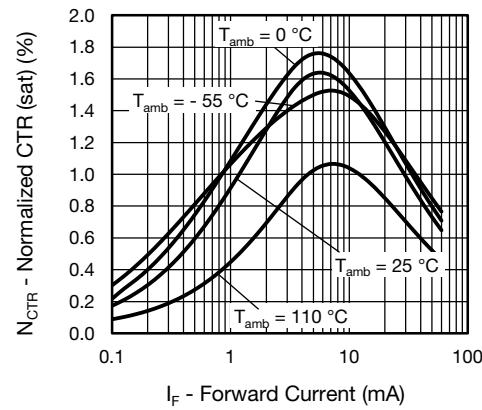


Fig. 13 - Normalized Current Transfer Ratio (sat) vs. Forward Current

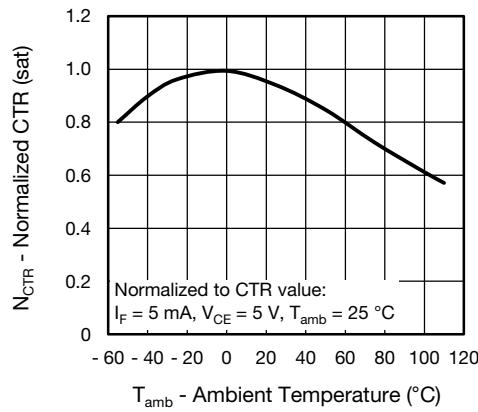


Fig. 11 - Normalized Current Transfer Ratio (sat) vs. Ambient Temperature

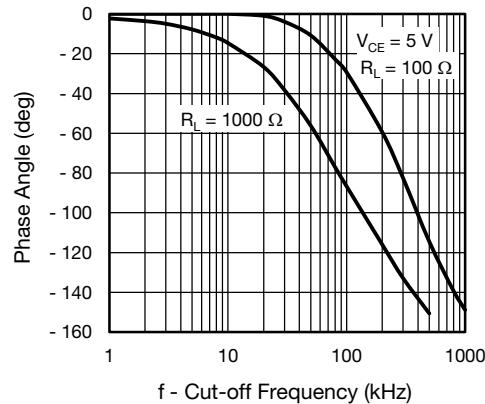


Fig. 14 - f_{CTR} vs. Phase Angle

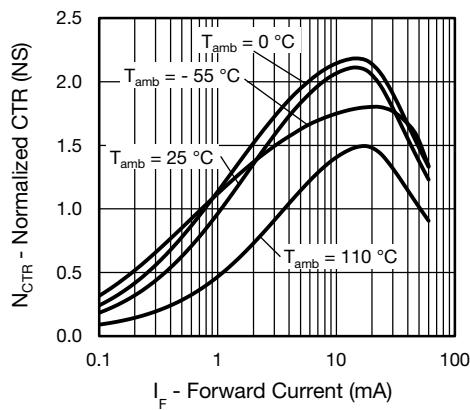


Fig. 12 - Normalized Current Transfer Ratio (non-sat) vs. Forward Current

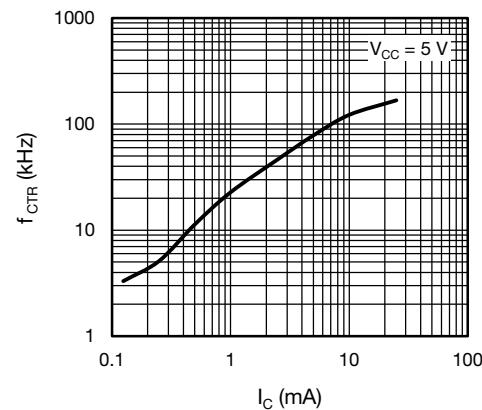


Fig. 15 - f_{CTR} vs. Collector Current

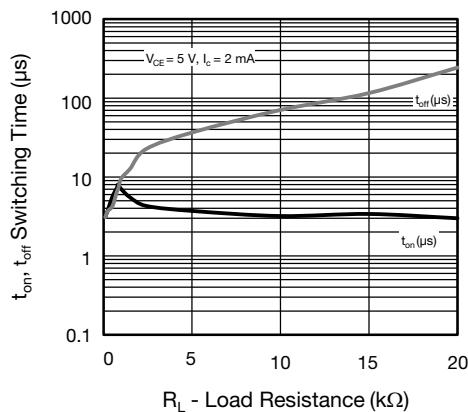


Fig. 16 - Switching Time vs. Load Resistance

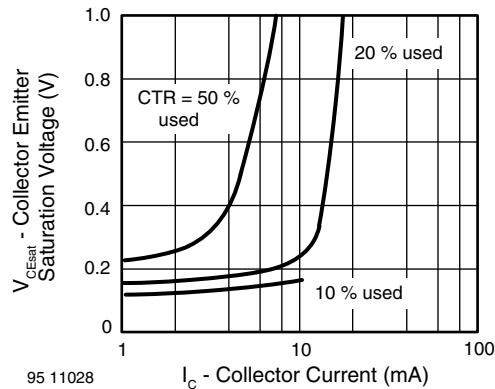


Fig. 17 - Collector Emitter Saturation Voltage vs. Collector Current

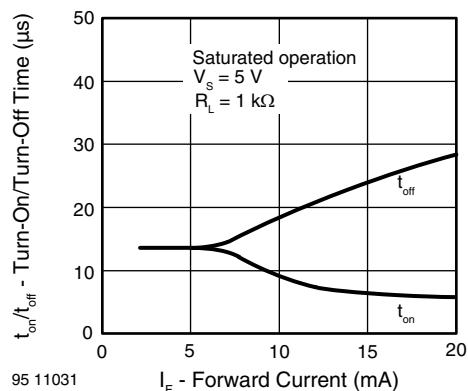
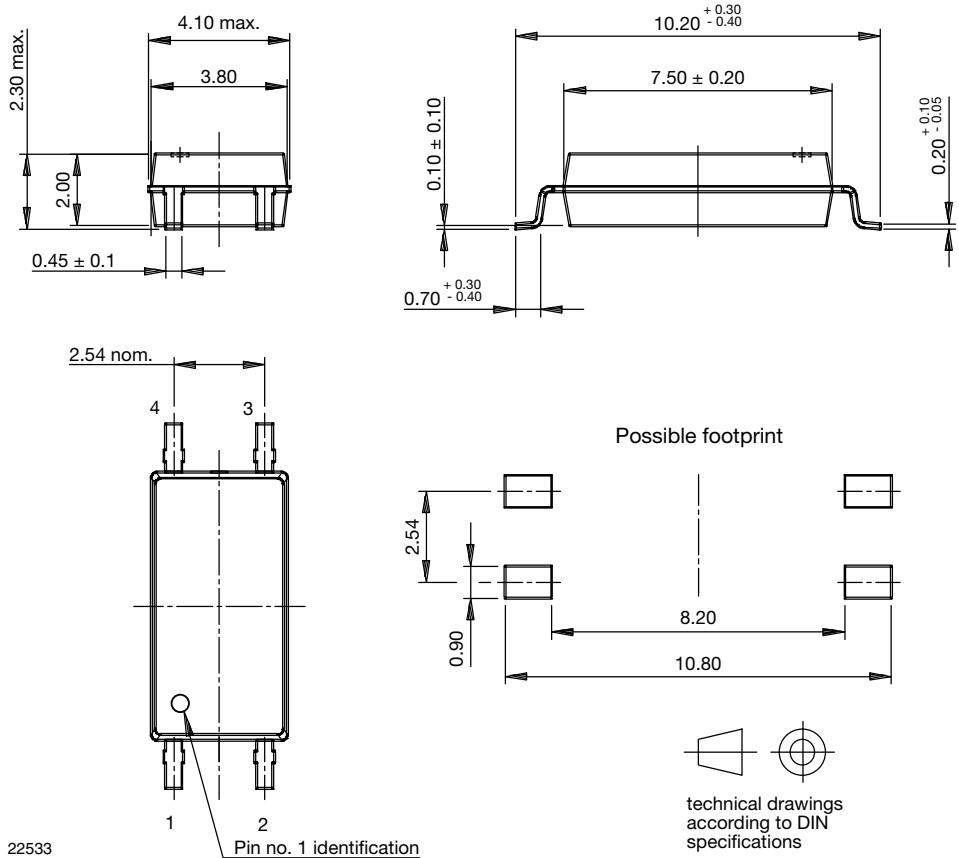


Fig. 18 - Turn-On/Turn-Off Time vs. Forward Current

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example of VOL617A-3X001T)



Notes

- Only option 1 is reflected in the package marking with the characters "X1".
- Tape and reel suffix (T) is not part of the package marking.

TAPE AND REEL DIMENSIONS in millimeters

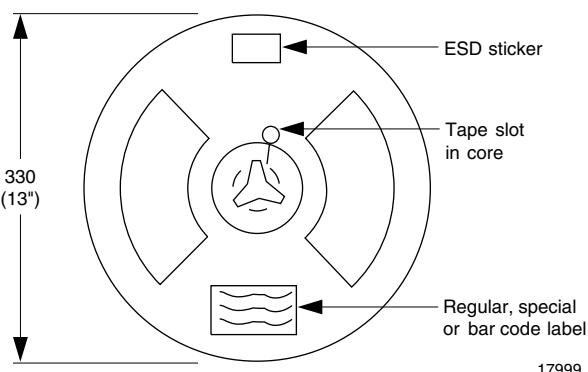


Fig. 19 - Reel Dimensions (3000 units per reel)

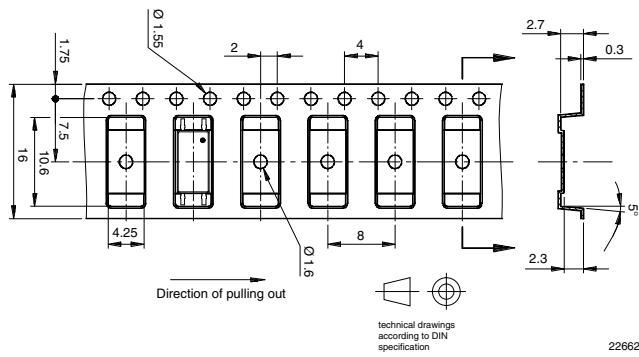


Fig. 20 - Tape Dimensions

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