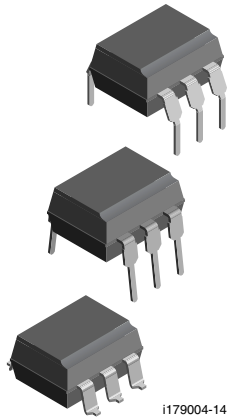
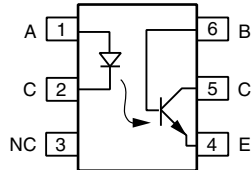


Optocoupler, Phototransistor Output, with Base Connection



i179004-14



FEATURES

- Isolation test voltage: 5000 V_{RMS}
- Long term stability
- Industry standard dual-in-line package
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

AGENCY APPROVALS

- Underwriters lab file no. E52744
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5)
- BSI IEC 60950, IEC 60065
- FIMKO
- CQC

DESCRIPTION

The CNY17 is an optically coupled pair consisting of a gallium arsenide infrared emitting diode optically coupled to a silicon NPN phototransistor.

Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

The CNY17 can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

ORDERING INFORMATION				
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">C</div> <div style="border: 1px solid black; padding: 2px;">N</div> <div style="border: 1px solid black; padding: 2px;">Y</div> <div style="border: 1px solid black; padding: 2px;">1</div> <div style="border: 1px solid black; padding: 2px;">7</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">X</div> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">#</div> <div style="border: 1px solid black; padding: 2px;">T</div> </div> <p style="text-align: center;">PART NUMBER CTR BIN PACKAGE OPTION TAPE AND REEL</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> 7.62 mm </div> <div style="text-align: center;"> 10.16 mm </div> <div style="text-align: center;"> > 8 mm </div> <div style="text-align: center;"> 8 mm typ. </div> </div>			
AGENCY CERTIFIED/PACKAGE	CTR (%)			
UL, cUL, BSI, FIMKO	40 to 80	63 to 125	100 to 200	160 to 320
DIP-6	CNY17-1	CNY17-2	CNY17-3	CNY17-4
DIP-6, 400 mil, option 6	CNY17-1X006	CNY17-2X006	CNY17-3X006	CNY17-4X006
SMD-6, option 7	CNY17-1X007T ⁽¹⁾	CNY17-2X007T ⁽¹⁾	CNY17-3X007T ⁽¹⁾	CNY17-4X007T ⁽¹⁾
SMD-6, option 9	CNY17-1X009T ⁽¹⁾	CNY17-2X009T ⁽¹⁾	CNY17-3X009T ⁽¹⁾	CNY17-4X009T ⁽¹⁾
VDE, UL, CUL, BSI, FIMKO	40 to 80	63 to 125	100 to 200	160 to 320
DIP-6	CNY17-1X001	CNY17-2X001	CNY17-3X001	CNY17-4X001
DIP-6, 400 mil, option 6	CNY17-1X016	CNY17-2X016	CNY17-3X016	CNY17-4X016
SMD-6, option 7	CNY17-1X017	CNY17-2X017T ⁽¹⁾	CNY17-3X017T ⁽¹⁾	CNY17-4X017T ⁽¹⁾
SMD-6, option 9	-	CNY17-2X019T ⁽¹⁾	-	-

Note

⁽¹⁾ Also available in tubes, do not put T on the end.



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V _R	6	V
Forward current		I _F	60	mA
Forward surge current	t _p ≤ 10 μs	I _{FSM}	2.5	A
LED power dissipation	at 25 °C	P _{diss}	70	mW
OUTPUT				
Collector emitter breakdown voltage		BV _{CEO}	70	V
Emitter base breakdown voltage		BV _{EBO}	7	V
Collector current		I _C	50	mA
	t _p /T = 0.5, t _p ≤ 10 ms	I _C	100	mA
Power dissipation		P _{diss}	150	mW
COUPLER				
Isolation test voltage between emitter and detector	t = 1 min	V _{ISO}	5000	V _{RMS}
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Isolation thickness between emitter and detector			≥ 0.4	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1			≥ 175	
Isolation resistance	V _{IO} = 500 V, T _{amb} = 25 °C	R _{IO}	≥ 10 ¹²	Ω
	V _{IO} = 500 V, T _{amb} = 100 °C	R _{IO}	≥ 10 ¹¹	Ω
Storage temperature		T _{stg}	- 55 to + 150	°C
Operating temperature		T _{amb}	- 55 to + 110	°C
Soldering temperature ⁽¹⁾	2 mm from case, ≤ 10 s	T _{sld}	260	°C
Total power dissipation		P _{diss}	220	mW

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 (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

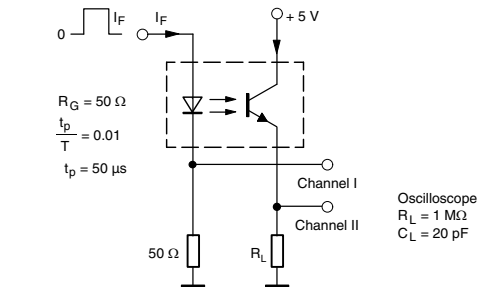
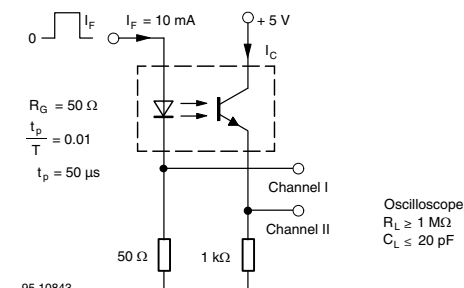
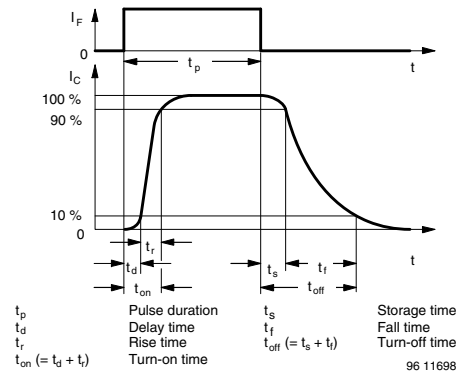
ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I _F = 60 mA		V _F		1.39	1.65	V
Breakdown voltage	I _R = 10 μA		V _{BR}	6			V
Reverse current	V _R = 6 V		I _R		0.01	10	μA
Capacitance	V _R = 0 V, f = 1 MHz		C _O		25		pF
Thermal resistance			R _{th}		750		K/W
OUTPUT							
Collector emitter capacitance	V _{CE} = 5 V, f = 1 MHz		C _{CCE}		5.2		pF
Collector base capacitance	V _{CE} = 5 V, f = 1 MHz		C _{CCB}		6.5		pF
Emitter base capacitance	V _{CE} = 5 V, f = 1 MHz		C _{CEB}		7.5		pF
Thermal resistance			R _{th}		500		K/W
COUPLER							
Collector emitter, saturation voltage	V _F = 10 mA, I _C = 2.5 mA		V _{CEsat}		0.25	0.4	V
Coupling capacitance			C _C		0.6		pF
Collector emitter, leakage current	V _{CE} = 10 V	CNY17-1	I _{CEO}	2	50		nA
		CNY17-2	I _{CEO}	2	50		nA
		CNY17-3	I _{CEO}	5	100		nA
		CNY17-4	I _{CEO}	5	100		nA

Note

- Minimum and maximum values were tested requirements. Typical values are characteristics of the device and are the result of engineering evaluations. 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	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$	CNY17-1	CTR	40		80	%
		CNY17-2	CTR	63		125	%
		CNY17-3	CTR	100		200	%
		CNY17-4	CTR	160		320	%
	$V_{CE} = 5\text{ V}, I_F = 1\text{ mA}$	CNY17-1	CTR	13	30		%
		CNY17-2	CTR	22	45		%
		CNY17-3	CTR	34	70		%
		CNY17-4	CTR	56	90		%

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
LINEAR OPERATION (without saturation)							
Turn-on time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\text{ }\Omega$		t_{on}		3		μs
Rise time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\text{ }\Omega$		t_r		2		μs
Turn-off time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\text{ }\Omega$		t_{off}		2.3		μs
Fall time	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\text{ }\Omega$		t_f		2		μs
Cut-off frequency	$I_F = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 75\text{ }\Omega$		f_{CO}		110		kHz
SWITCHING OPERATION (with saturation)							
Turn-on time	$I_F = 20\text{ mA}$	CNY17-1	t_{on}		3		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_{on}		4.2		μs
		CNY17-3	t_{on}		4.2		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_{on}		6		μs
Rise time	$I_F = 20\text{ mA}$	CNY17-1	t_r		2		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_r		3		μs
		CNY17-3	t_r		3		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_r		4.6		μs
Turn-off time	$I_F = 20\text{ mA}$	CNY17-1	t_{off}		18		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_{off}		23		μs
		CNY17-3	t_{off}		23		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_{off}		25		μs
Fall time	$I_F = 20\text{ mA}$	CNY17-1	t_f		11		μs
	$I_F = 10\text{ mA}$	CNY17-2	t_f		14		μs
		CNY17-3	t_f		14		μs
	$I_F = 5\text{ mA}$	CNY17-4	t_f		15		μs


 95 10804-3
Fig. 1 - Test Circuit, Non-Saturated Operation

 95 10843
Fig. 2 - Test Circuit, Saturated Operation

Fig. 3 - Switching Times

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

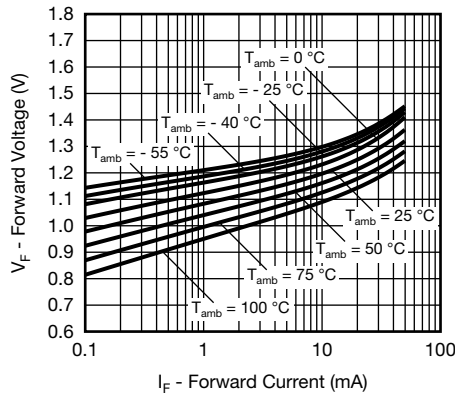


Fig. 4 - Forward Voltage vs. Forward Current

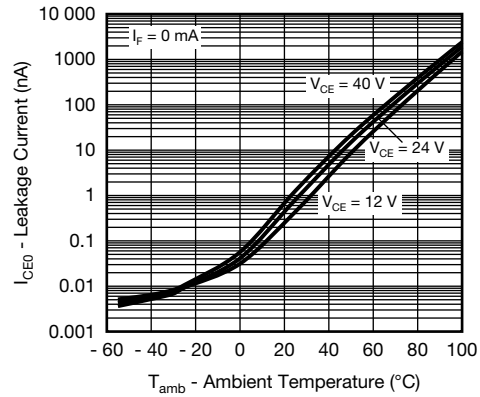


Fig. 7 - Leakage Current vs. Ambient Temperature

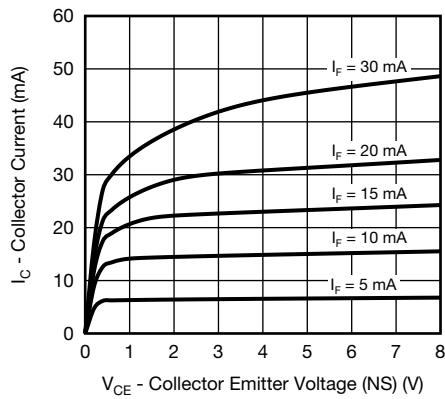


Fig. 5 - Collector Current vs. Collector Emitter Voltage (NS)

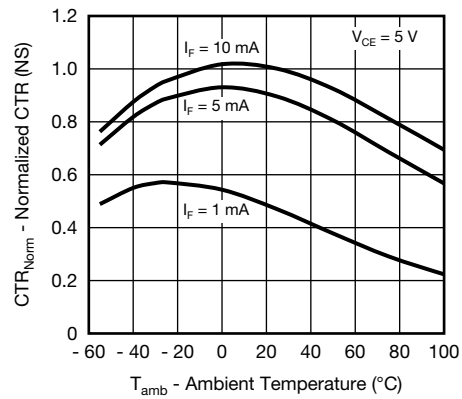


Fig. 8 - Normalized CTR (NS) vs. Ambient Temperature

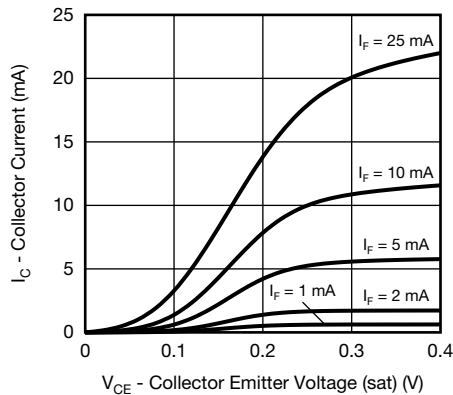


Fig. 6 - Collector Current vs. Collector Emitter Voltage (sat)

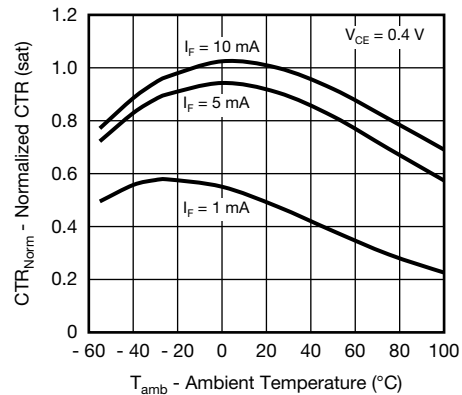


Fig. 9 - Normalized CTR (sat) vs. Ambient Temperature

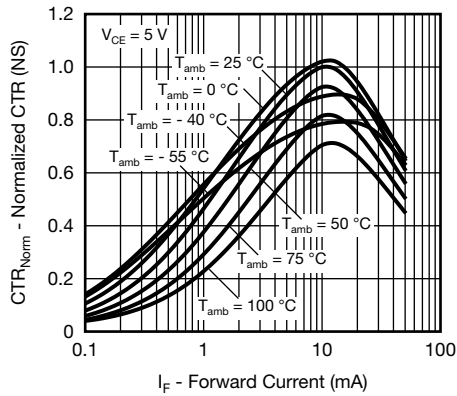


Fig. 10 - Normalized CTR (NS) vs. Forward Current

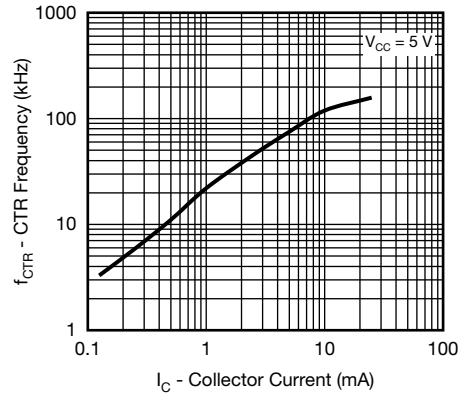


Fig. 13 - CTR Frequency vs. Collector Current

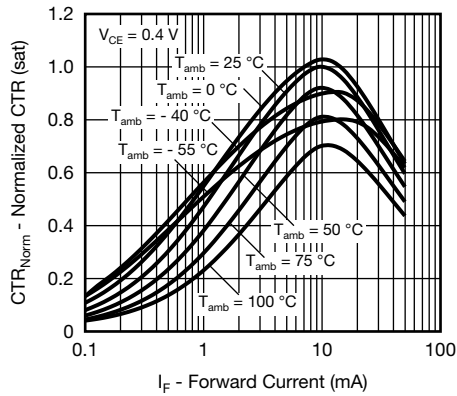


Fig. 11 - Normalized CTR (sat) vs. Forward Current

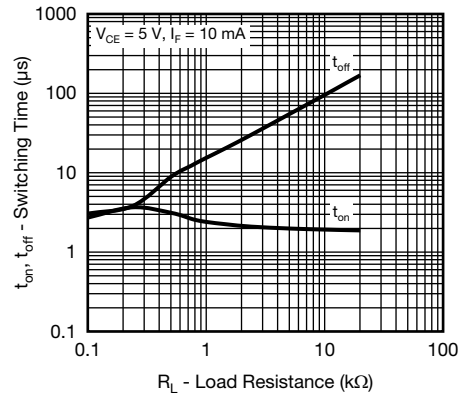


Fig. 14 - Switching Time vs. Load Resistance

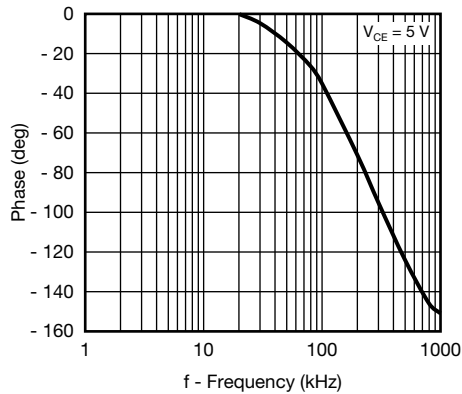
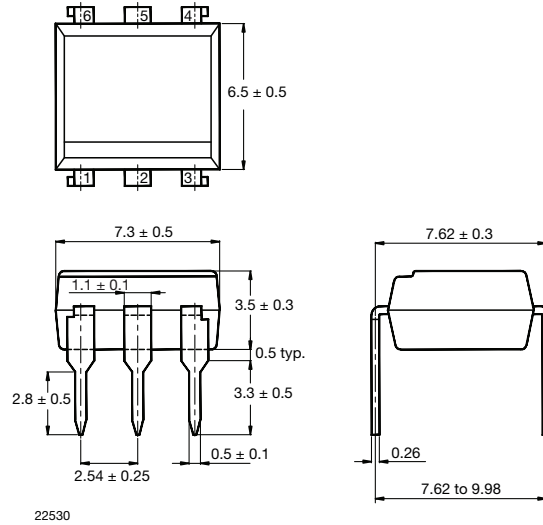
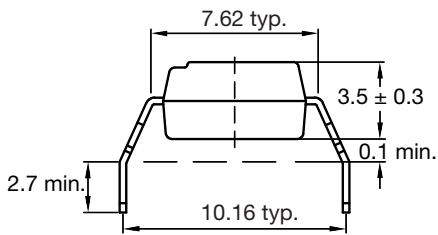


Fig. 12 - CTR Frequency vs. Phase Angle

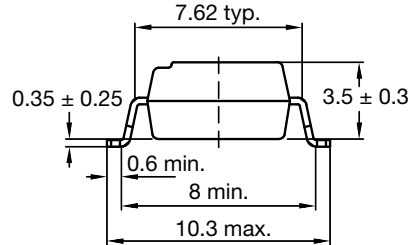
PACKAGE DIMENSIONS in millimeters



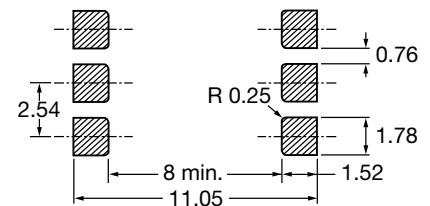
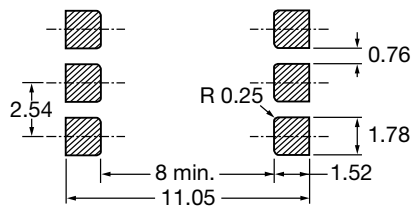
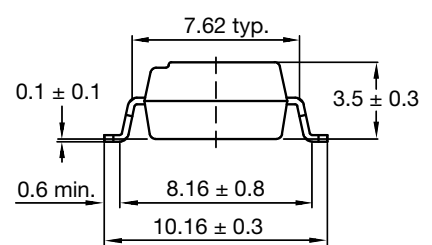
Option 6



Option 7

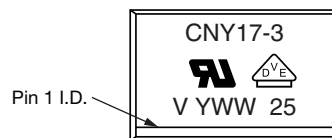


Option 9



20802-34

PACKAGE MARKING



Notes

- VDE logo is only marked on option 1 parts. Option information is not marked on the part.
- Tape and reel suffix (T) is not part of the package marking.



TUBE AND TAPE INFORMATION

DEVICES PER TUBE			
TYPE	UNITS/TUBE	TUBES/BOX	UNITS/BOX
DIP-6	50	40	2000

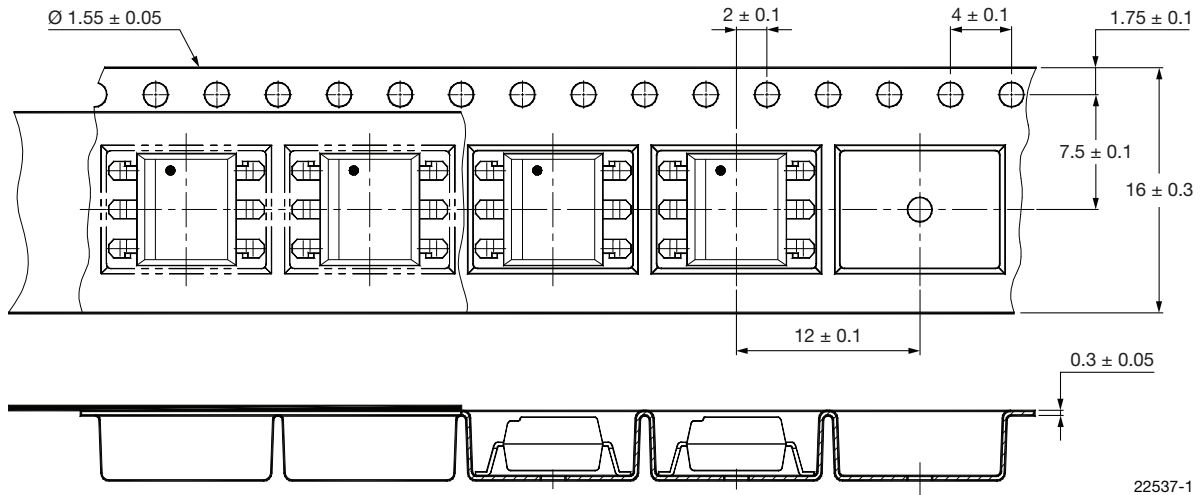


Fig. 15 - Tape and Reel Drawing, 1000 Units per Reel



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