

Single Channel Transmissive Sensor



19601



21848

DESCRIPTION

The VT141P is a compact transmissive sensor that includes an infrared emitter and a phototransistor detector, located face-to-face in a surface mount package. VT141P is especially designed to meet high operating temperature requirements and is released for operating temperature ranges from -25 °C to +85 °C.

FEATURES

- Package type: surface-mount
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 5.5 x 4 x 4
- Gap (in mm): 3
- Aperture (in mm): 0.3
- Typical output current under test: $I_C = 1.5 \text{ mA}$
- Emitter wavelength: 950 nm
- Moisture sensitivity level (MSL): 1
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Accurate position sensor for encoder
- Detection of motion speed

PRODUCT SUMMARY				
PART NUMBER	GAP WIDTH (mm)	APERTURE WIDTH (mm)	TYPICAL OUTPUT CURRENT UNDER TEST ⁽¹⁾ (mA)	DAYLIGHT BLOCKING FILTER INTEGRATED
VT141P	3	0.3	1.5	No

Note

- Conditions like in table basic characteristics / coupler

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
VT141P	Tape and reel	MOQ: 2000 pcs, 2000 pcs/reel	Drypack, MSL 1

Note

- MOQ: minimum order quantity



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Total power dissipation	T _{amb} ≤ 85 °C	P _{tot}	37.5	mW
Junction temperature		T _j	105	°C
Ambient temperature range		T _{amb}	-25 to +85	°C
Storage temperature range		T _{stg}	-25 to +105	°C
Soldering temperature	In accordance with Fig. 16	T _{sd}	260	°C
INPUT (EMITTER)				
Reverse voltage		V _R	5	V
Forward current	T _{amb} ≤ 85 °C	I _F	25	mA
Forward surge current	t _p ≤ 10 μs	I _{FSM}	200	mA
Power dissipation	T _{amb} ≤ 85 °C	P _V	37.5	mW
OUTPUT (DETECTOR)				
Collector emitter voltage		V _{CEO}	5	V
Emitter collector voltage		V _{ECO}	7	V
Collector current		I _C	20	mA
Collector dark current	T _{amb} = 85 °C, V _{CE} = 5 V	I _{CEO}	3.3	μA

ABSOLUTE MAXIMUM RATINGS

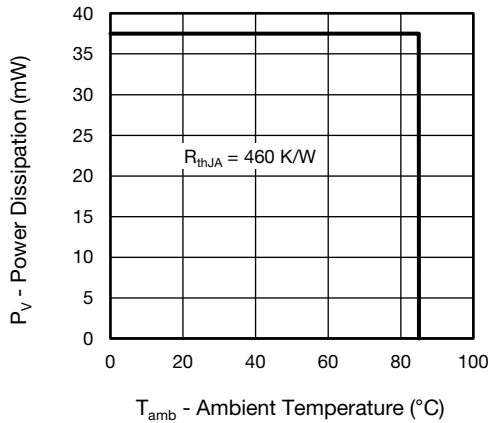


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

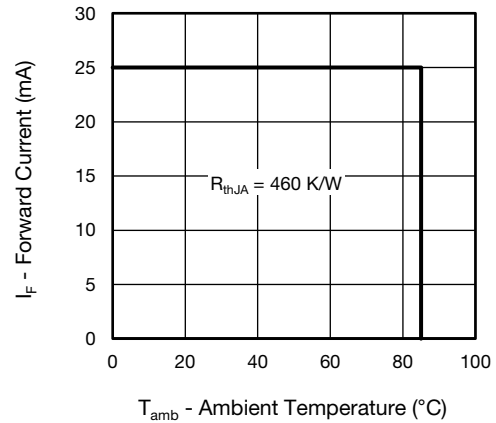


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER						
Collector current	$V_{CE} = 5\text{ V}$, $I_F = 15\text{ mA}$	I_C	0.7	1.5	-	mA
Collector emitter saturation voltage	$I_F = 15\text{ mA}$, $I_C = 0.2\text{ mA}$	V_{CEsat}	-	-	0.4	V
INPUT (EMITTER)						
Forward voltage	$I_F = 15\text{ mA}$	V_F	1	1.2	1.4	V
Reverse current	$V_R = 5\text{ V}$	I_R	-	-	10	μA
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$	C_j	-	25	-	pF
OUTPUT (DETECTOR)						
Collector emitter voltage I_C	$I_C = 1\text{ mA}$	V_{CEO}	20	-	-	V
Emitter collector voltage	$I_E = 100\text{ }\mu\text{A}$	V_{ECO}	7	-	-	V
Collector dark current	$V_{CE} = 25\text{ V}$, $I_F = 0\text{ A}$, $E = 0\text{ lx}$	I_{CEO}	-	1	100	nA
SWITCHING CHARACTERISTICS						
Rise time	$I_C = 0.7\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_L = 100\text{ }\Omega$ (see Fig. 3)	t_r	-	14	150	μs
Fall time	$I_C = 0.7\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_L = 100\text{ }\Omega$ (see Fig. 3)	t_f	-	21	150	μs

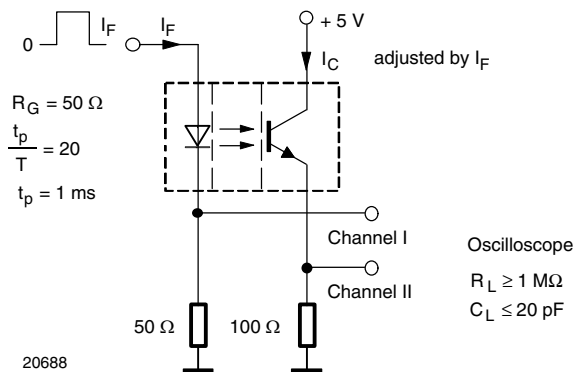
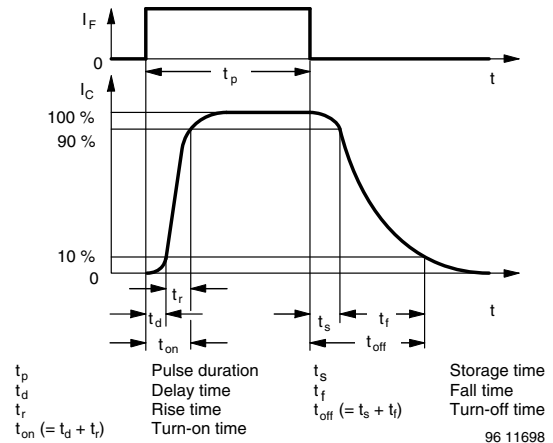

 Fig. 3 - Test Circuit for t_r and t_f


Fig. 4 - Switching Times

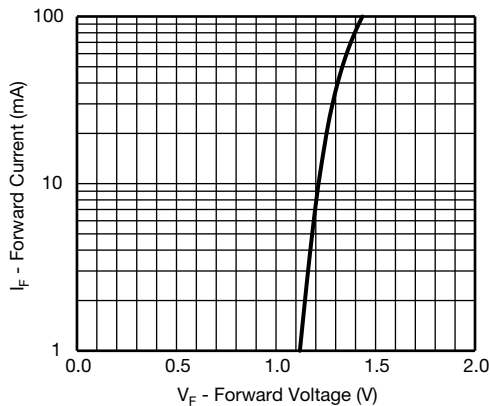
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 5 - Forward Current vs. Forward Voltage

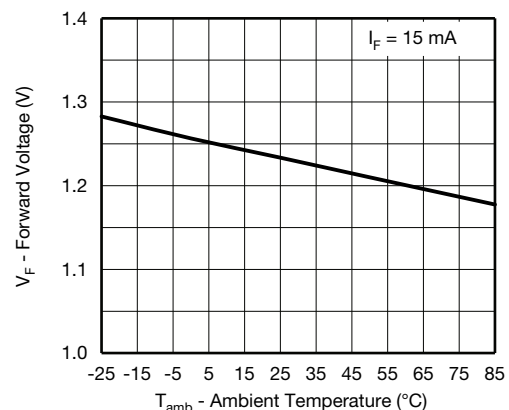


Fig. 6 - Forward Voltage vs. Ambient Temperature

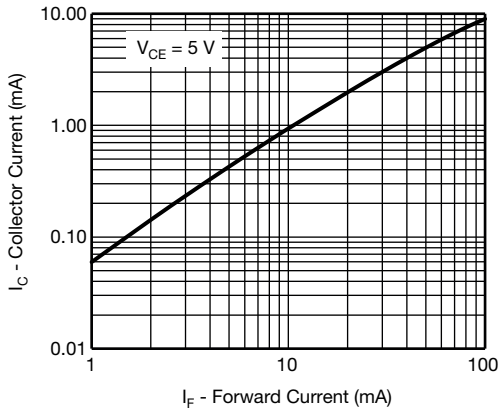


Fig. 7 - Collector Current vs. Forward Current

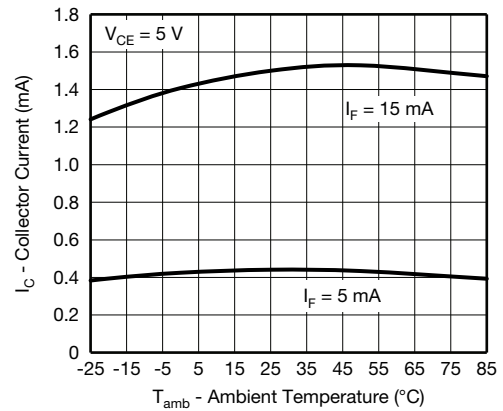


Fig. 10 - Collector Current vs. Ambient Temperature

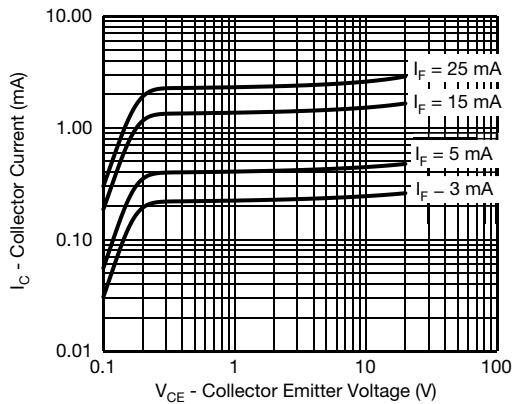


Fig. 8 - Collector Current vs. Collector Emitter Voltage

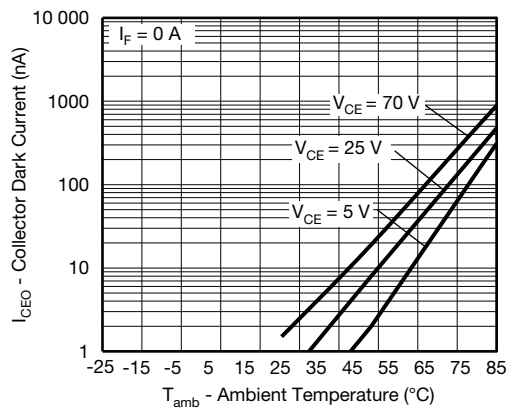


Fig. 11 - Collector Dark Current vs. Ambient Temperature

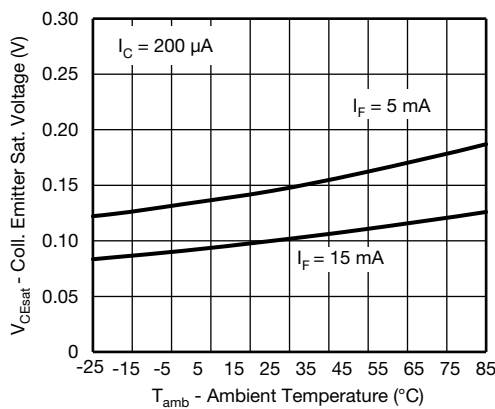


Fig. 9 - Collector Emitter Saturation Voltage vs. Ambient Temperature

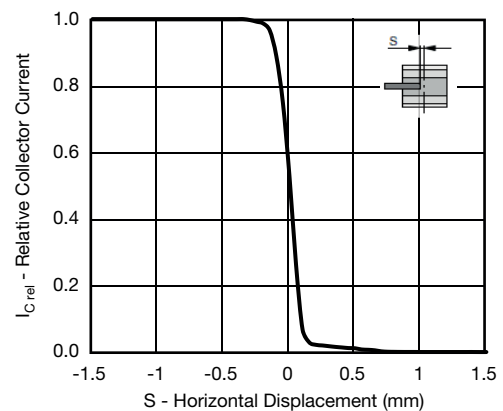


Fig. 12 - Relative Collector Current vs. Horizontal Displacement

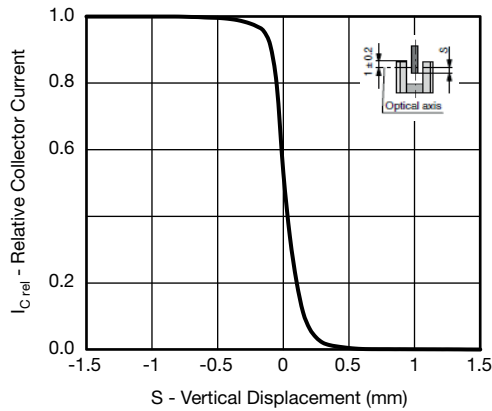
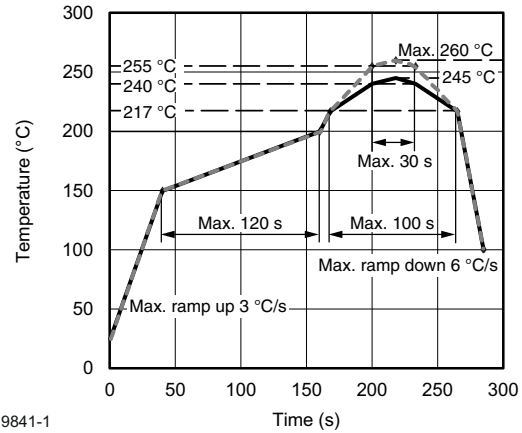


Fig. 13 - Relative Collector Current vs. Vertical Displacement

REFLOW SOLDER PROFILE



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Fig. 16 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

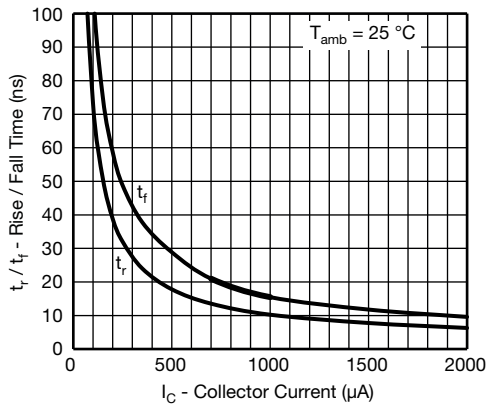


Fig. 14 - Rise / Fall Time vs. Collector Current

FLOOR LIFE

No time limit.

Moisture sensitivity level (MSL) 1, according to JEDEC®, J-STD-020.

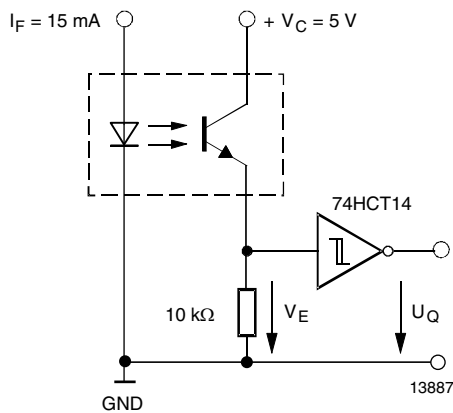
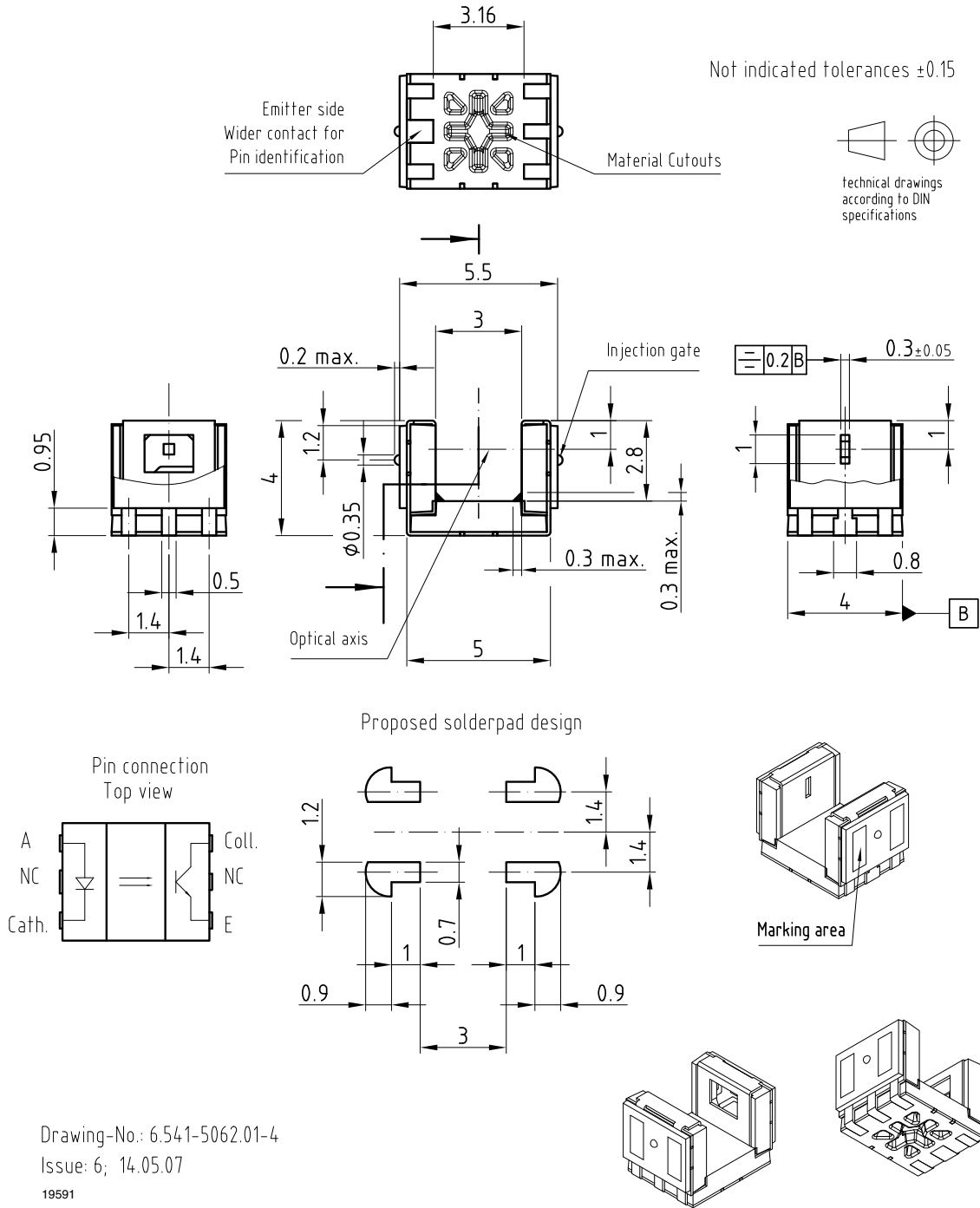


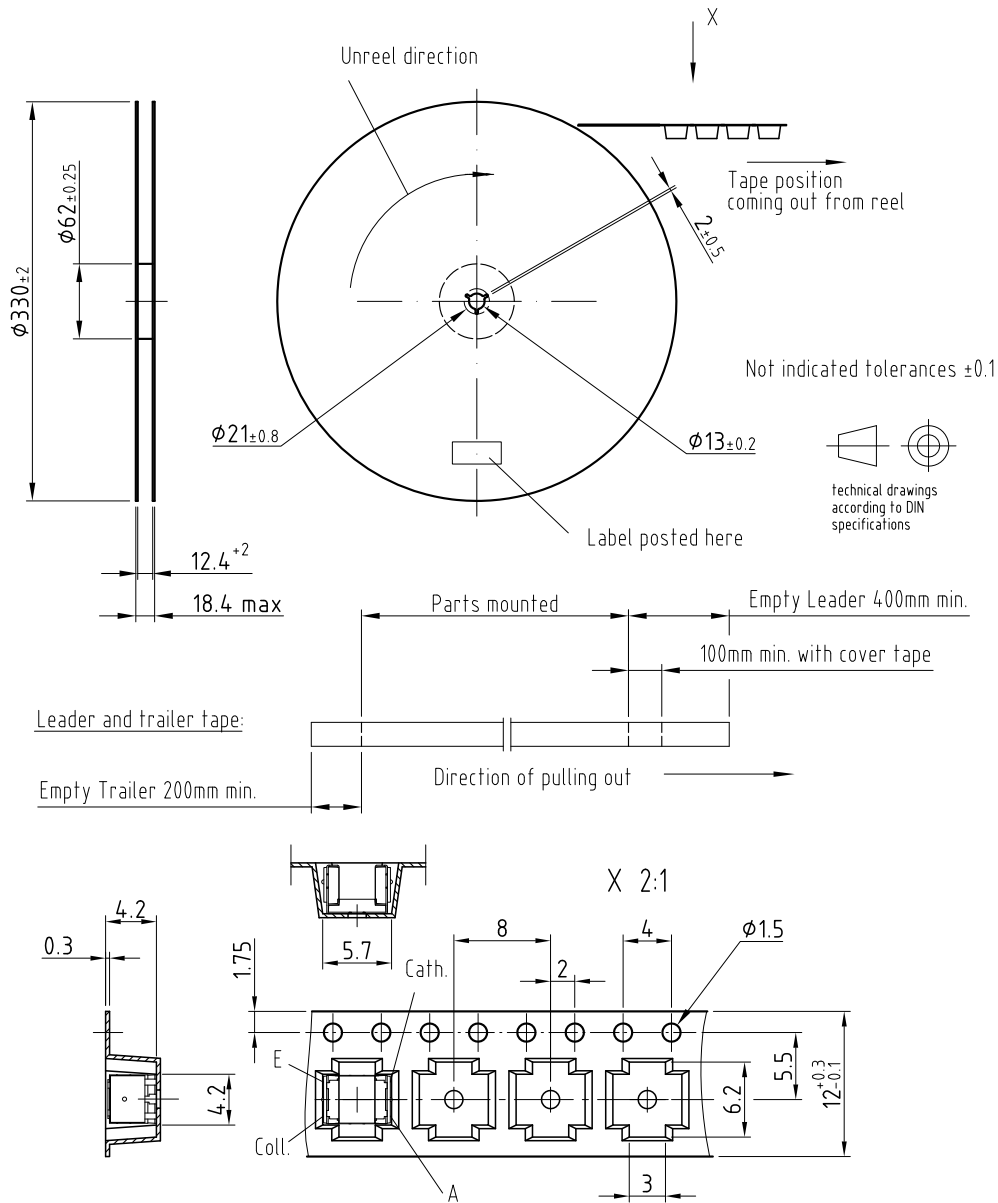
Fig. 15 - Application example

PACKAGE DIMENSIONS in millimeters



PACKAGE DIMENSIONS in millimeters

Volume/reel = 2000 pcs



Drawing-No.: 9.800-5092.02-4

Issue: 1; 14.05.07

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