

1 Description

The C241S series of high-current MOSFET relays feature high current switching capability to 5A with a low ON resistance of 0.02Ω Nominal and are capable of providing 1,500V of input to output isolation. Designed for Automatic Test Equipment (ATE), Industrial Controls, Measurement & Instrumentation applications, the CotoMOS® C241S Series relay is capable of handling 20V load conditions. For different requirements, please contact your Coto Applications Engineer at www.cotorelay.com for assistance.

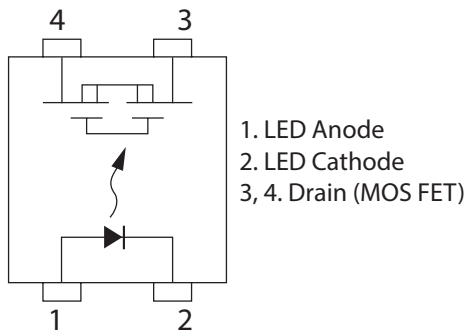
Device Information

Part Series	Package	Body Size (mm)
C241S	SOP	4.4 x 4.3 x 2.0

Device Package



4 Device Schematic



2 Features

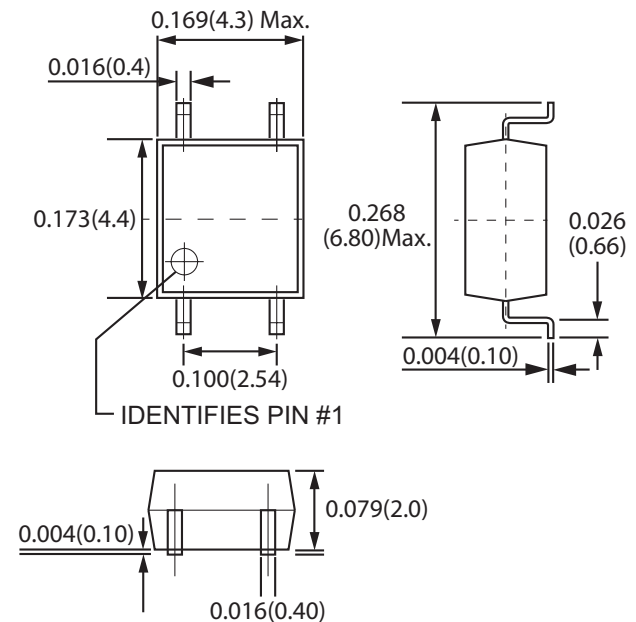
- ▶ Contact Form: 1A
- ▶ Load Voltage: 20V
- ▶ Load Current: 5A
- ▶ Low On-Resistance: 0.02Ω Nominal
- ▶ Output Capacitance: 150pF Typical
- ▶ Low Off-State Leakage Current: 1.0μA Maximum
- ▶ Input/Output Isolation: 1500Vrms
- ▶ Arc-Free with no Snubbing Circuits
- ▶ High-Reliability Solid State Design
- ▶ RoHS Compliant

3 Applications

- ▶ Automatic Test Equipment (ATE)
- ▶ Industrial Controls
- ▶ Instrumentation
- ▶ Measurement Equipment

5 Device Dimensions

Inches (mm)



6 Specifications

6.1 Absolute Maximum Ratings

Parameters		Symbol	Rating	Unit
Input	Continuous LED Current	I_F	50	mA
	Peak LED Current (f=100Hz Duty=1%)	I_{FP}	1000	mA
	LED Reverse Voltage	V_R	5	V
	Input Power Dissipation	P_{IN}	75	mW
Output	Load Voltage	V_L	20	VDC
	Load Current	I_L	5	A
	Peak Load Current 300 μ s (1 pulse)	I_{PEAK}	6.5	A
	Output Power Dissipation	P_{OUT}	400	mW
Total Power Dissipation		P_T	450	mW
I/O Breakdown Voltage (RH = 60%, 1 min)		$V_{I/O}$	1500	Vrms
Operating Temperature		T_{OPT}	-40 to +85	°C
Storage Temperature		T_{STG}	-40 to +100	°C
Pin Soldering Temperature (10 sec max)		T_{SOL}	260	°C

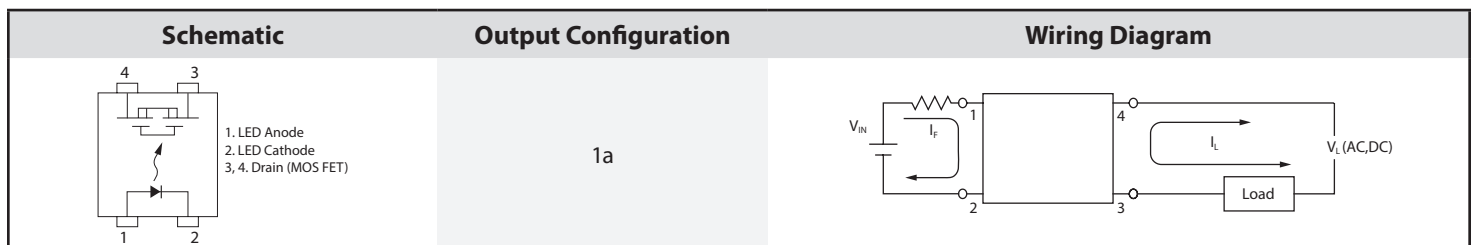
6.2 Electro-Optical Characteristics

Parameters		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	LED Forward Voltage	V_F	$I_F=10mA$		1.2	1.4	V
	Operation LED Current	I_{FON}			0.5	2.0	mA
	Recovery LED Voltage	V_{FOFF}		0.5			V
	Recovery LED Current	I_{FOFF}			0.35	0.5	mA
Output	On-Resistance	R_{ON}	$I_F=5mA, I_L=100mA$ Time to flow is within 1 sec		0.02	0.05	Ω
	Off-State Leakage Current	I_{LEAK}	$V_L=Rating$			1.0	μA
	Output Capacitance	C_{OUT}	$V_L=0, f=1MHz$		500		pF
Trans-mission	Turn-On Time	T_{ON}	$I_F=5mA, I_L=100mA$		0.5	1.5	ms
	Turn-Off Time	T_{OFF}			0.03	0.1	ms
Coupled	I/O Insulation Resistance	$R_{I/O}$	DC500V	10^9			Ω
	I/O Capacitance	$C_{I/O}$	f=1MHz		0.8	1.5	pF

Environmental Ratings:

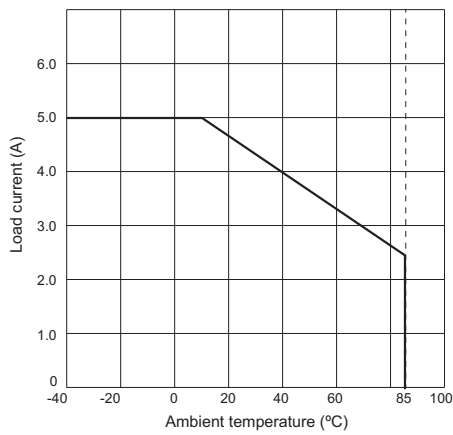
All electrical parameters measured at 25°C unless otherwise specified.

7 Schematic and Wiring Diagrams

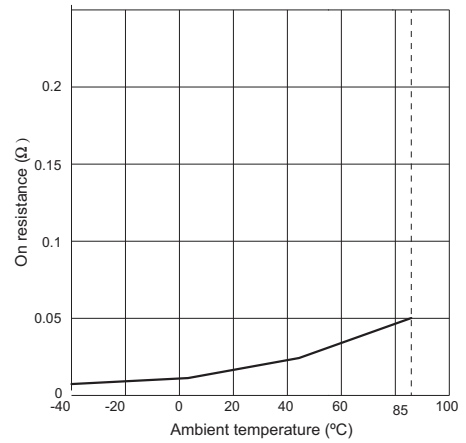


8 C241S Series Graphs

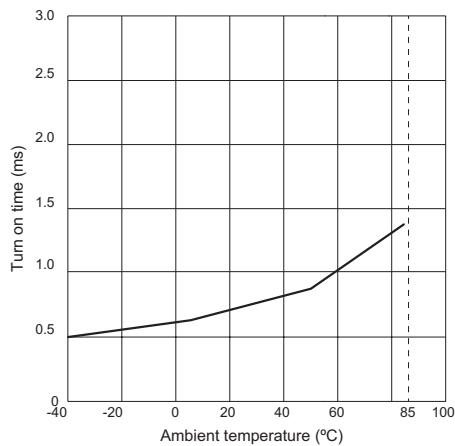
Load Current Vs. Ambient Temperature



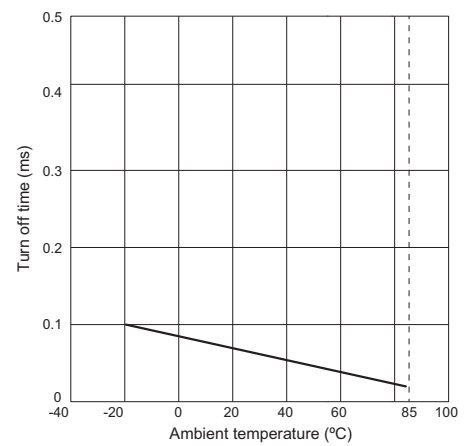
On-Resistance Vs. Ambient Temperature



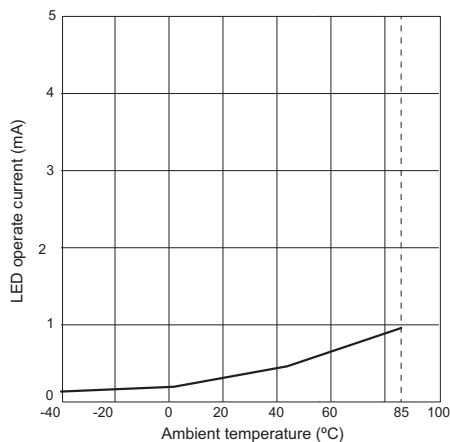
Turn-On Time Vs. Ambient Temperature



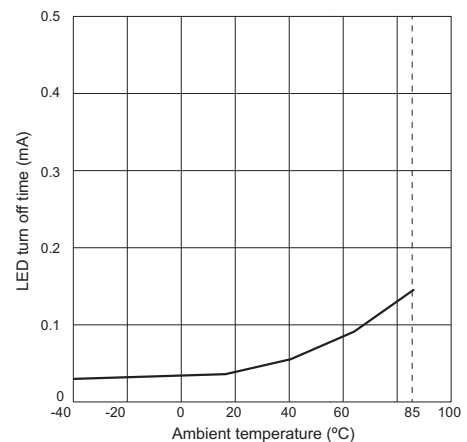
Turn-Off Time Vs. Ambient Temperature



LED Operate Current Vs. Ambient Temperature

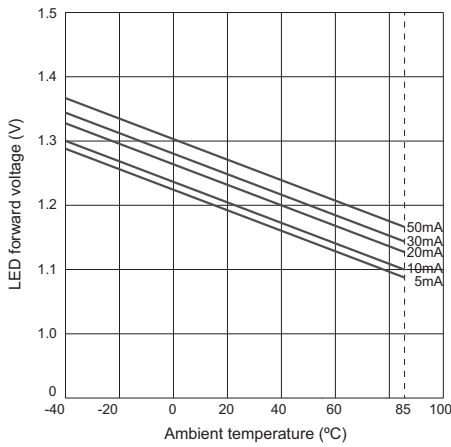


LED Turn-Off Current Vs. Ambient Temperature

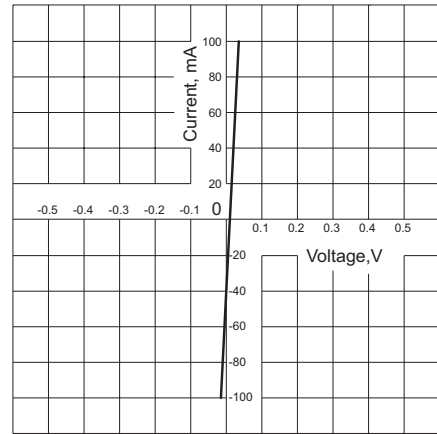


8 C241S Series Graphs

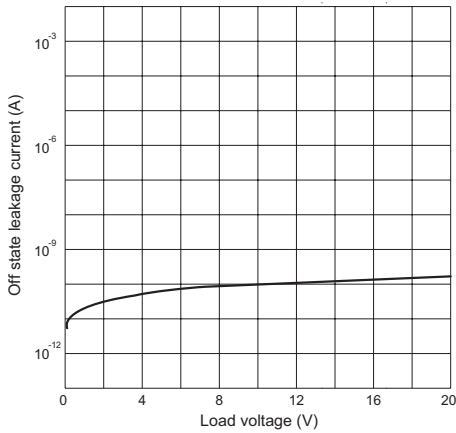
LED Forward Voltage Vs. Ambient Temperature



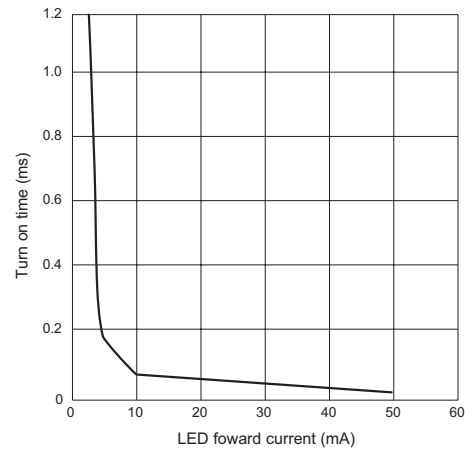
Voltage Vs. Current Characteristics of Output at MOS Portion



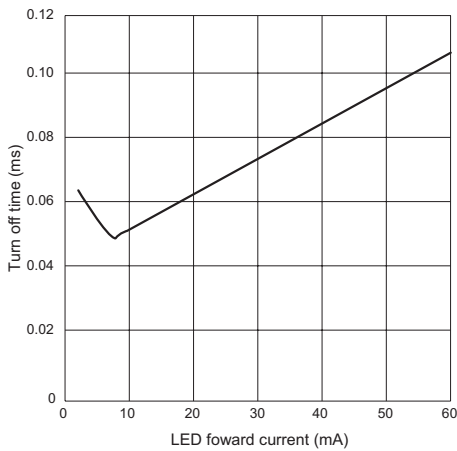
Off-State Leakage Current Vs. Load Voltage Characteristics



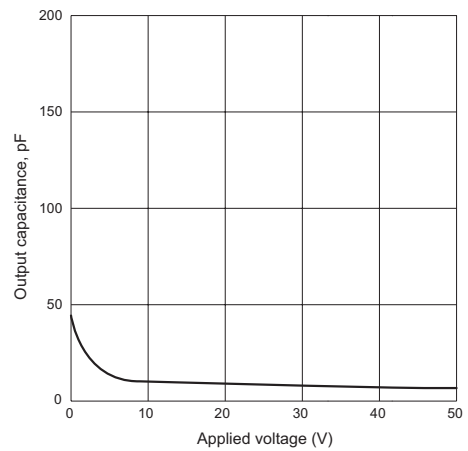
LED Forward Current Vs. Turn on Time Characteristics



LED Forward Current Vs. Turn-Off Time Characteristics



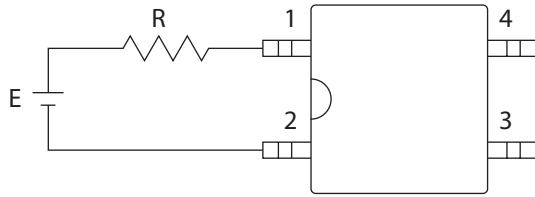
Applied Voltage Vs. Output Capacitance Characteristics



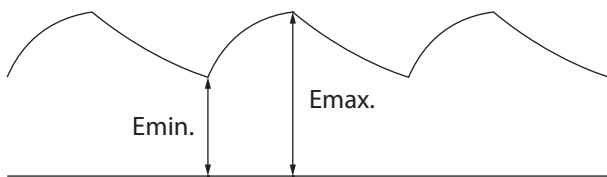
9 Using Methods

Examples of resistance value to control LED forward current ($I_f=5\text{mA}$)

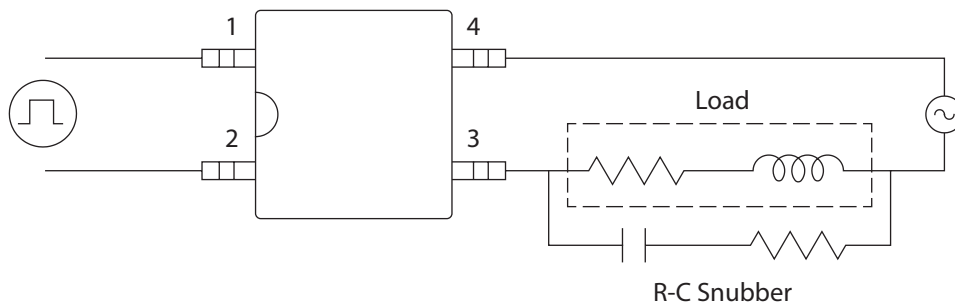
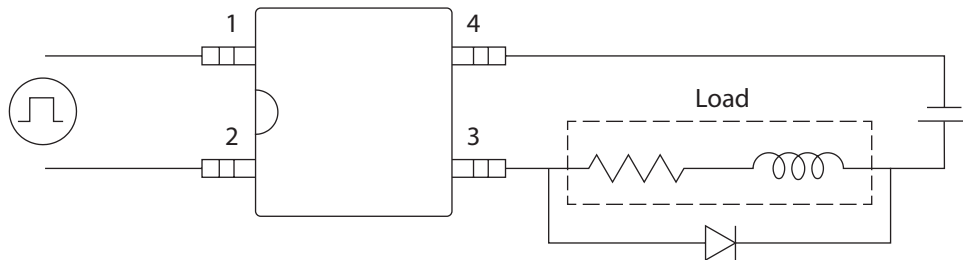
1. LED forward current must be more than 5mA, at E min.
2. LED forward current must be less than 50mA, at E max.



E	R
3.3V	Approx. 333 Ω
5V	Approx. 640 Ω
12V	Approx. 1.9K Ω
15V	Approx. 2.5K Ω
24V	Approx. 4.1K Ω



Regulate the spike voltage generated on the inductive load as follows:

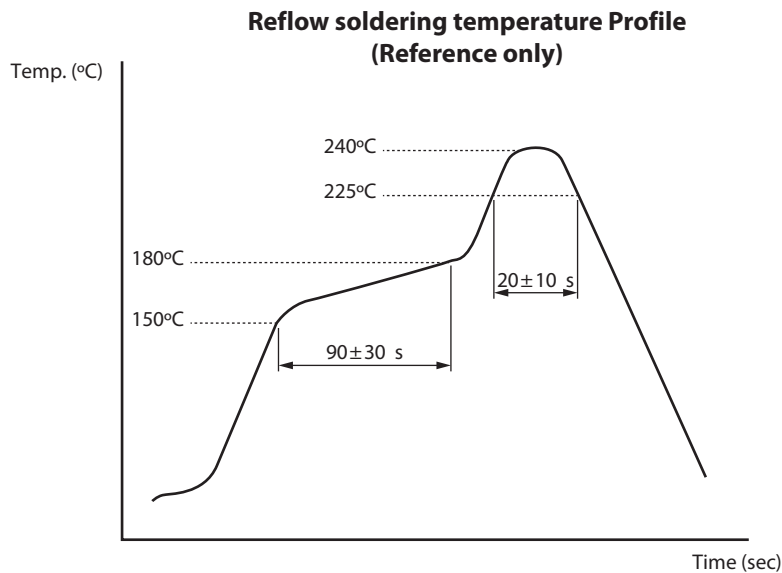


10 Recommended Soldering Conditions

10.1 Infrared Reflow Soldering

- ▶ Peak reflow soldering: 240°C or below (package surface temperature)
- ▶ Time of peak reflow temperature: 10 seconds
- ▶ Time of temperature higher than 230°C: 30-60 seconds
- ▶ Time to preheat temperature from 180~190°C: 60-120 seconds
- ▶ Number of reflows: Two
- ▶ Flux: Rosin flux containing small amount of chlorine
(The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

10.2 Recommended Temperature Profile of Infrared Reflow

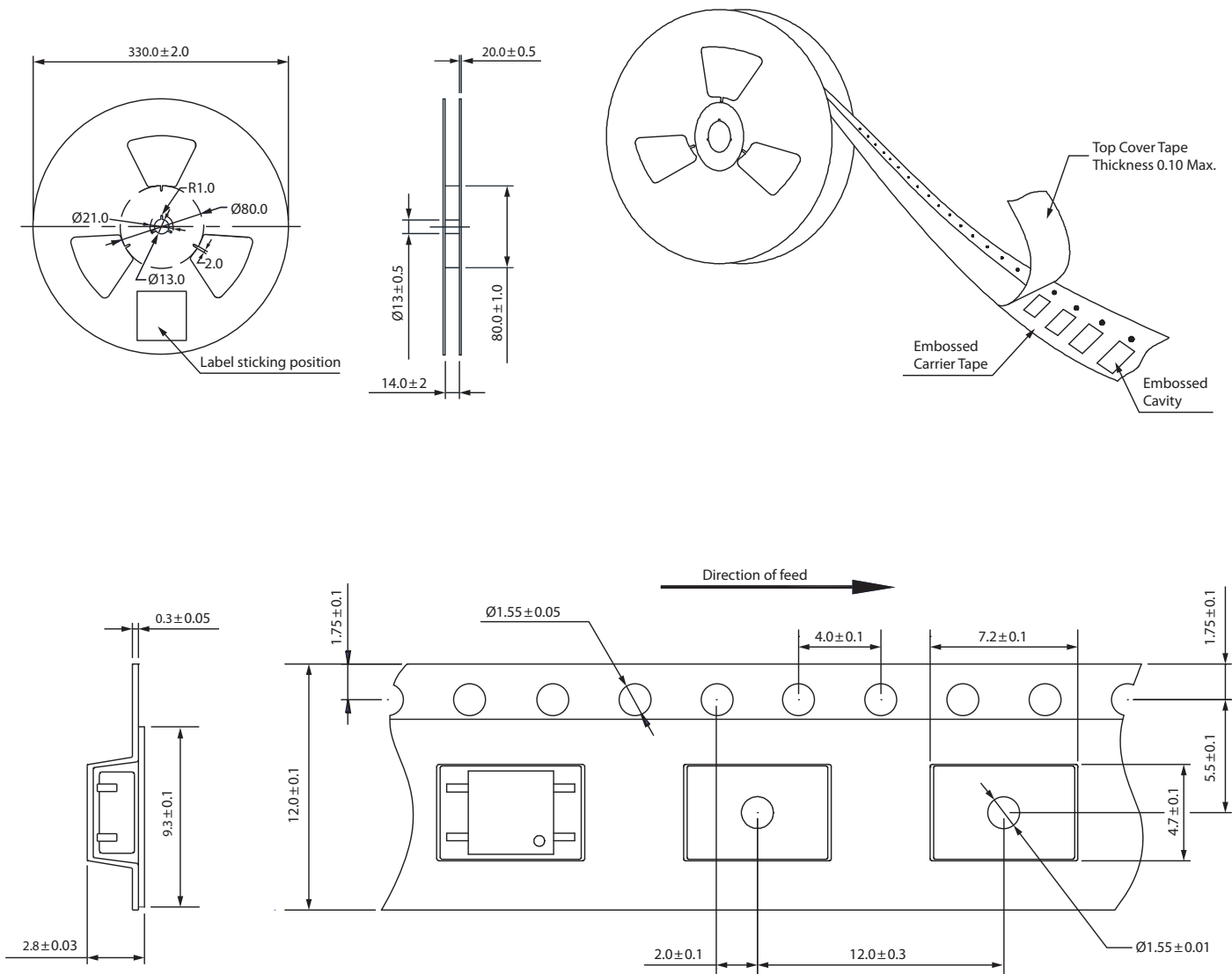


10.3 Cautions

- ▶ Fluxes: Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- ▶ Avoid shorting between portion of frame and leads.

11 CotoMOS Relay Packaging Information

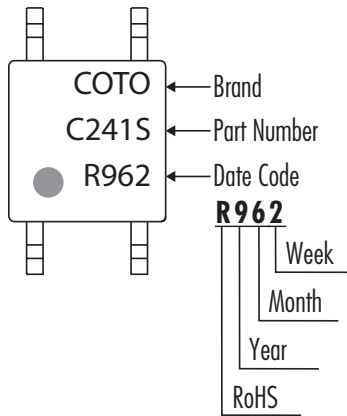
11.1 4-pin SOP Carrier Tape & Reel Units: mm



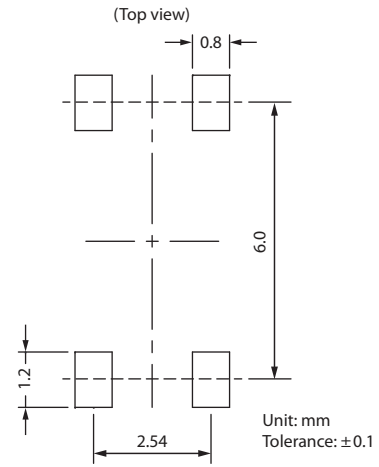
Notes

1. There is a leader of 230mm minimum which consists of carrier and/or cover tape followed by a minimum of 160mm of carrier tape sealed with cover tape.
2. There is a minimum of 160 mm of empty component pockets sealed with cover tape.
3. Device pockets are in accordance with EIA standard EIA-481-A and specifications provided above.
4. Packaging: 2000pcs per reel, 2 reels per box, 5 boxes per carton.

11.2 Device Marking



11.3 Recommended Mounting Pad



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