

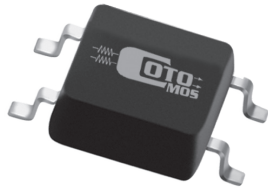
## 1 Description

The C224S series of high-current MOSFET relays feature high current switching capability to 3.5A with a low ON resistance of 0.05Ω 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® C224S Series relay is capable of handling 40V load conditions. For different requirements, please contact your Coto Applications Engineer at [www.cotorelay.com](http://www.cotorelay.com) for assistance.

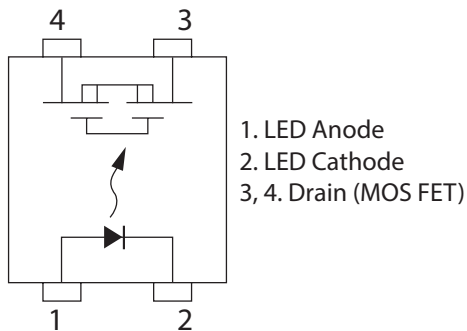
### Device Information

Part Series	Package	Body Size (mm)
C224S	SOP	4.4 x 4.3 x 2.0

### Device Package



## 4 Device Schematic



## 2 Features

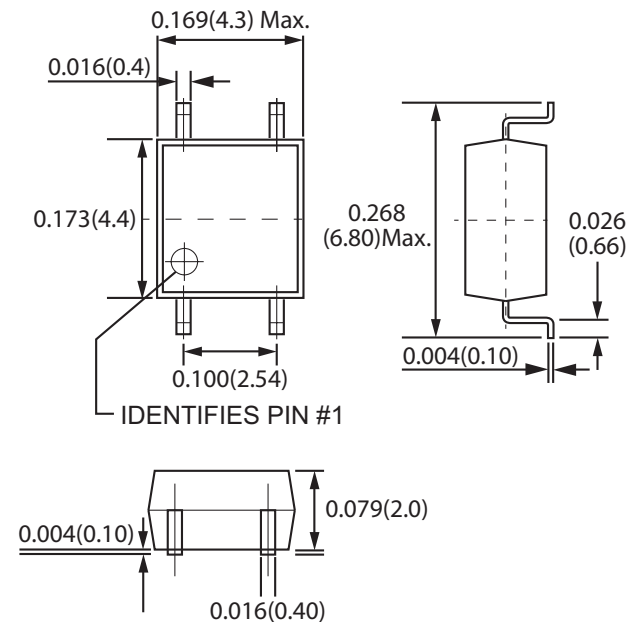
- ▶ Contact Form: 1A
- ▶ Load Voltage: 40V
- ▶ Load Current: 3.5A
- ▶ Low ON-Resistance: 0.05Ω Nominal
- ▶ Output Capacitance: 100pF Typical
- ▶ Low Off-State Leakage Current: 0.1μA Maximum
- ▶ Input/Output Isolation: 1500Vrms
- ▶ Arc-Free with no Snubbing Circuits
- ▶ High-Reliability Solid State Design
- ▶ RoHS Compliant

## 3 Applications

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

## 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	$V_L$	40	VDC
	Load Current	$I_L$	3.5	A
	Peak Load Current 300 $\mu$ s (1 pulse)	$I_{PEAK}$	5.0	A
	Output Power Dissipation	$P_{OUT}$	400	mW
Total Power Dissipation		$P_T$	600	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

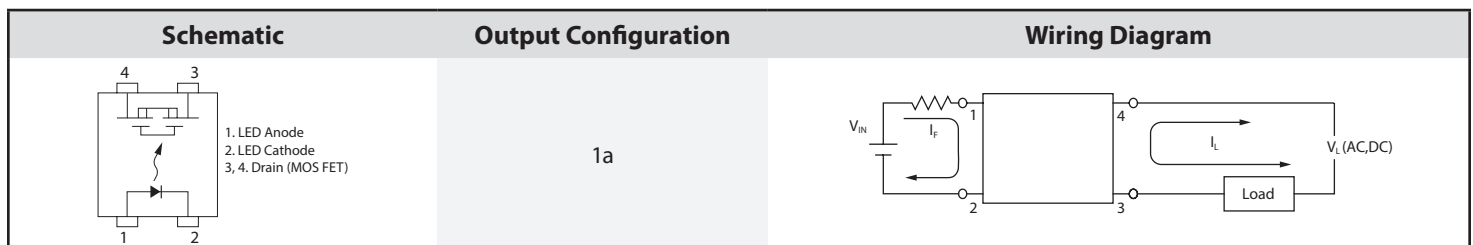
### 6.2 Electro-Optical Characteristics

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	$V_{FOFF}$		0.7			V
	Recovery LED Current	$I_{FOFF}$			0.3	0.5	mA
Output	On-Resistance	$R_{ON}$	$I_F=5mA, I_L=100mA$ Time to flow is within 1 sec		0.05	0.08	$\Omega$
	Off-State Leakage Current	$I_{LEAK}$	$V_L=Rating$			0.1	$\mu A$
	Output Capacitance	$C_{OUT}$	$V_L=0, f=1MHz$		100		pF
Trans- mission	Turn-On Time	$T_{ON}$	$I_F=5mA, I_L=100mA$		0.4	0.8	ms
	Turn-Off Time	$T_{OFF}$			0.03	0.05	ms
Coupled	I/O Insulation Resistance	$R_{I/O}$	DC500V	$10^{10}$			$\Omega$
	I/O Capacitance	$C_{I/O}$	f=1MHz		0.8	1.5	pF

#### Environmental Ratings:

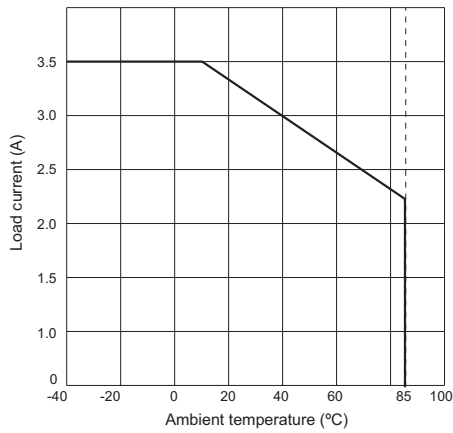
All electrical parameters measured at 25°C unless otherwise specified.

## 7 Schematic and Wiring Diagrams

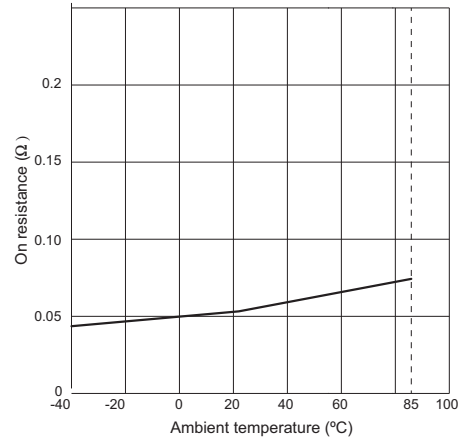


## 8 C224S Series Graphs

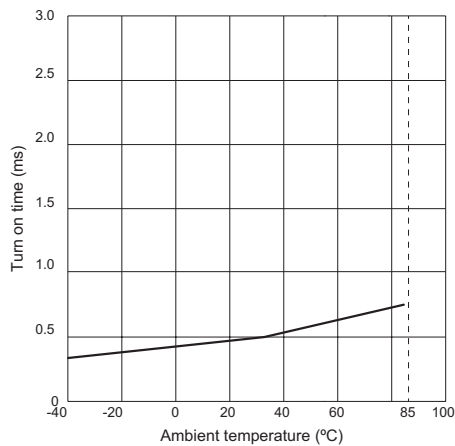
**Load Current Vs. Ambient Temperature**



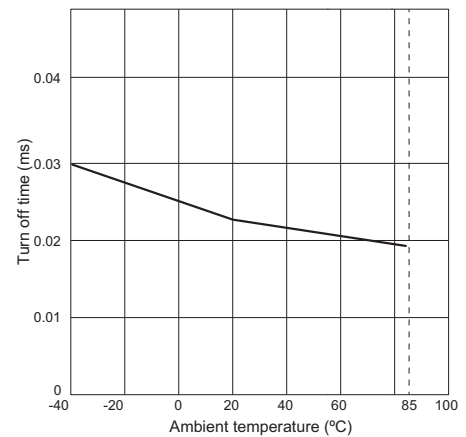
**On-Resistance Vs. Ambient Temperature**



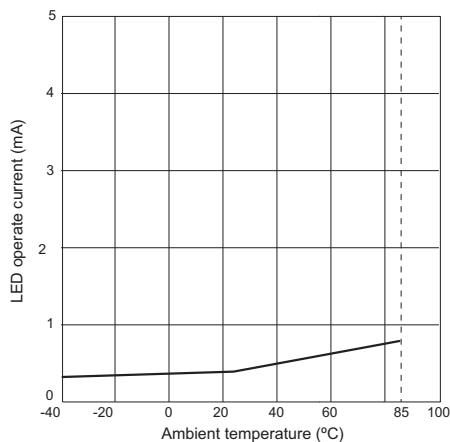
**Turn-On Time Vs. Ambient Temperature**



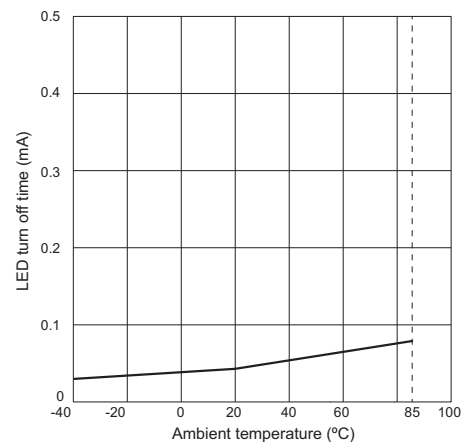
**Turn-Off Time Vs. Ambient Temperature**



**LED Operate Current Vs. Ambient Temperature**

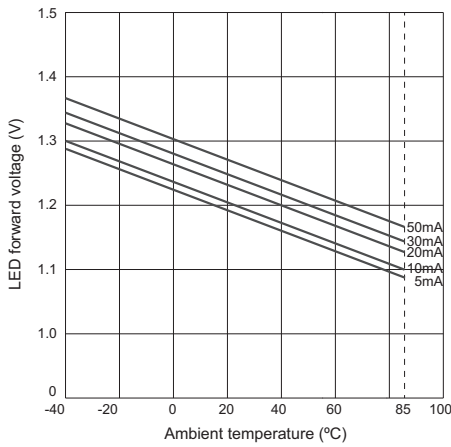


**LED Turn-Off Current Vs. Ambient Temperature**

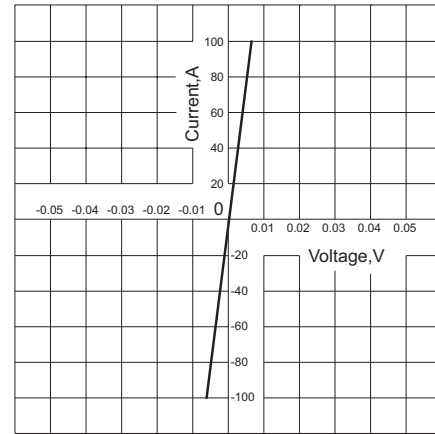


## 8 C224S Series Graphs

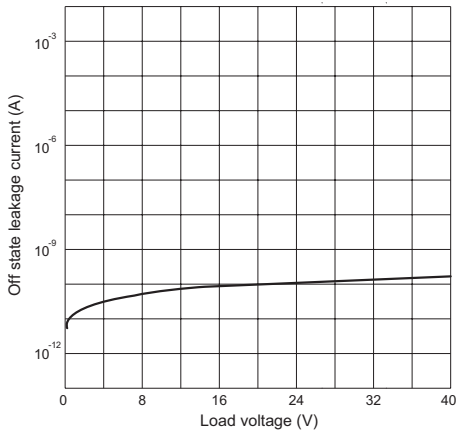
**LED Forward Voltage Vs. Ambient Temperature**



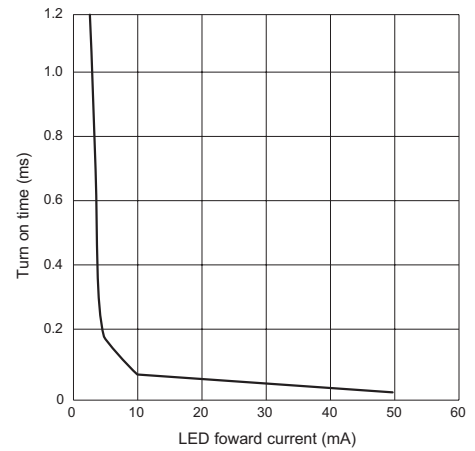
**Voltage Vs. Current Characteristics of Output at MOS Portion**



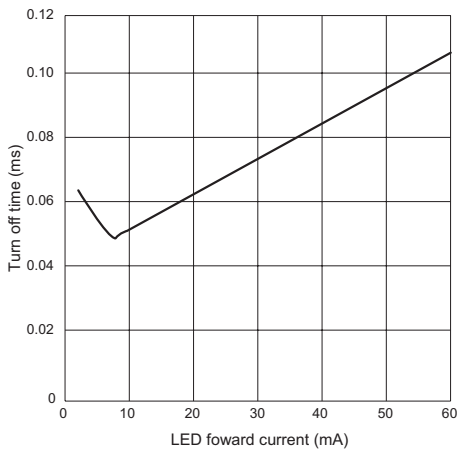
**Off-State Leakage Current Vs. Load Voltage Characteristics**



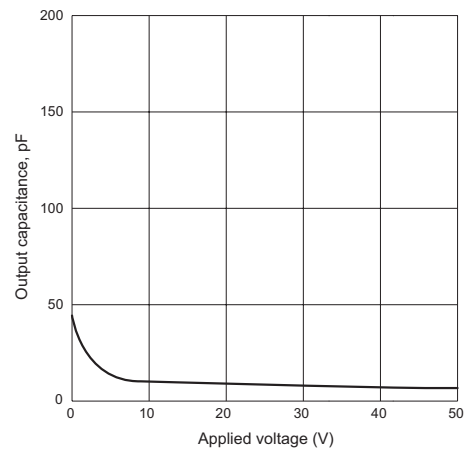
**LED Forward Current Vs. Turn on Time Characteristics**



**LED Forward Current Vs. Turn-Off Time Characteristics**



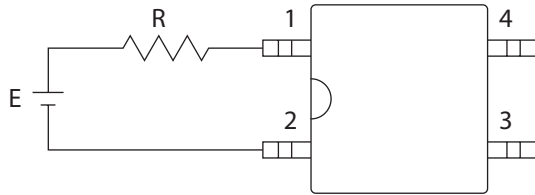
**Applied Voltage Vs. Output Capacitance Characteristics**



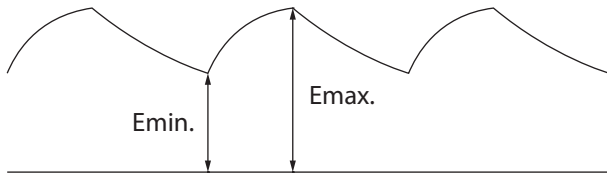
## 9 Using Methods

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

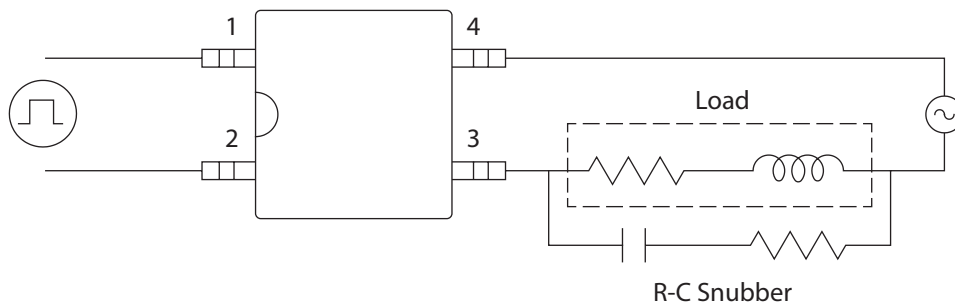
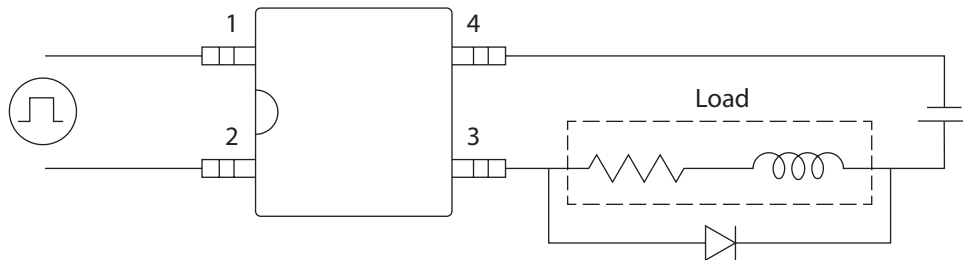
1. LED forward current must be more than 5mA, at E min.
2. LED forward current must be less than 50mA, at E max.



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



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

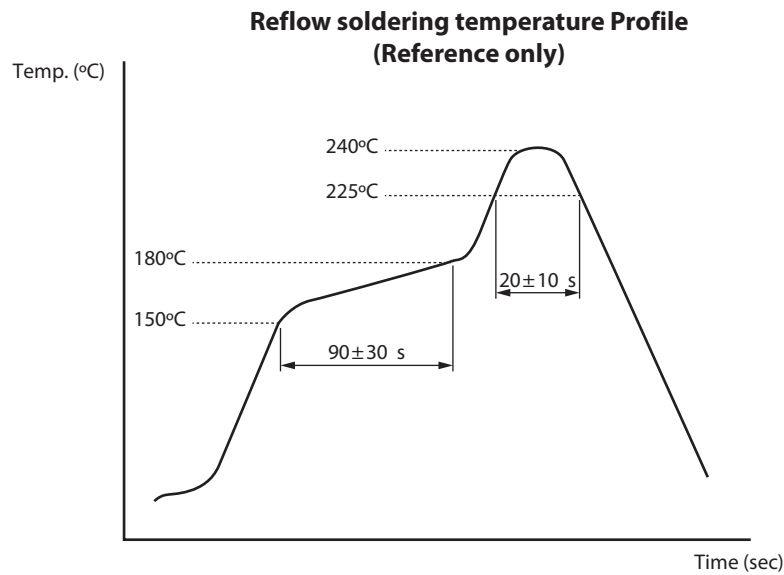


## 10 Recommended Soldering Conditions

### 10.1 Infrared Reflow Soldering

- ▶ Peak reflow soldering: 240°C or below (package surface temperature)
- ▶ Time of peak reflow temperature: 20-30 seconds
- ▶ Time of temperature higher than 240°C: 30-60 seconds
- ▶ Time to preheat temperature from 180~190°C: 90-120 seconds
- ▶ Number of reflows: One
- ▶ 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

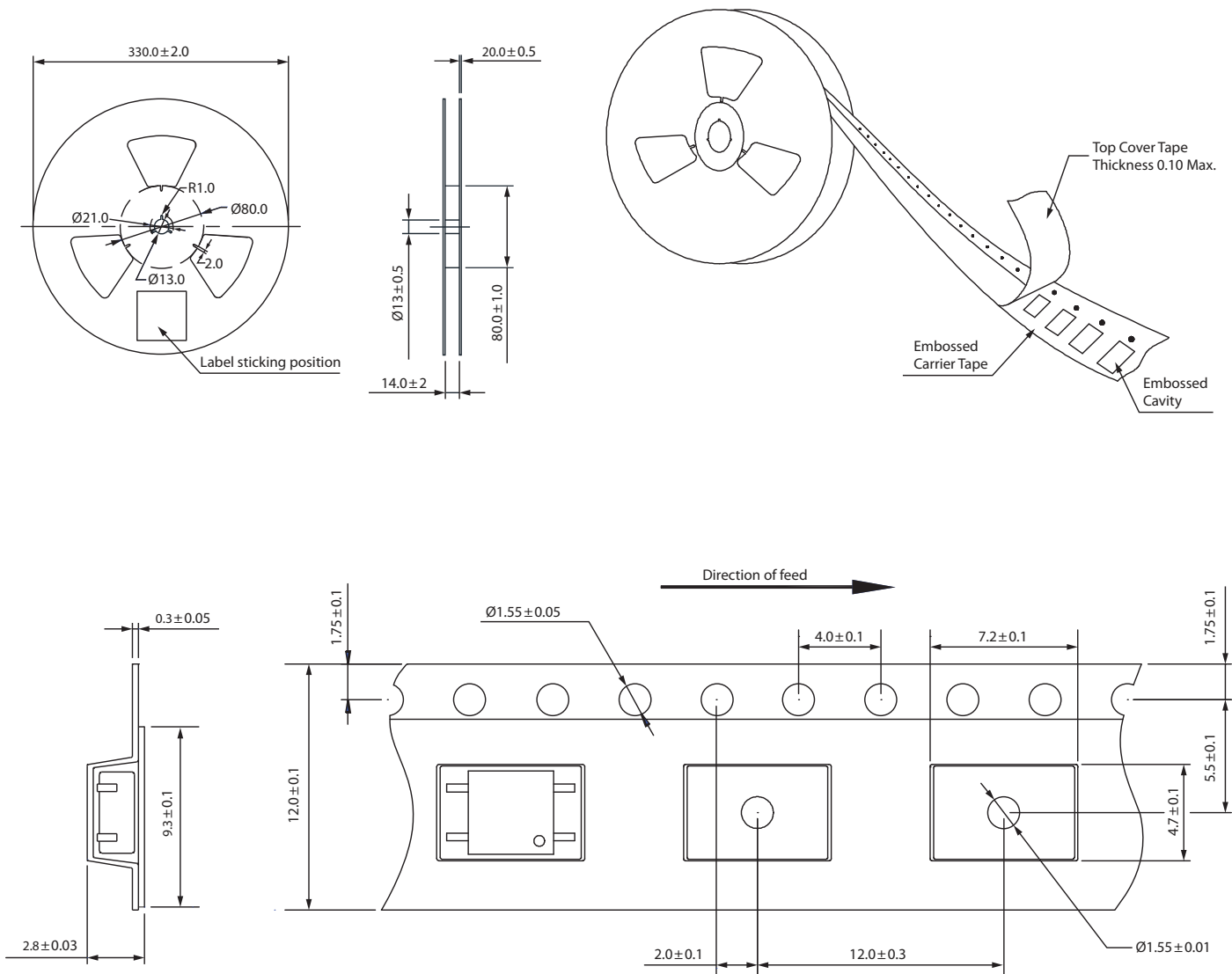


### 10.3 Cautions

- ▶ 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

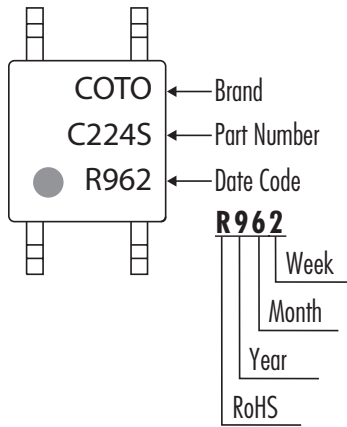
### 11.1 4-pin SOP Carrier Tape & Reel Units: mm



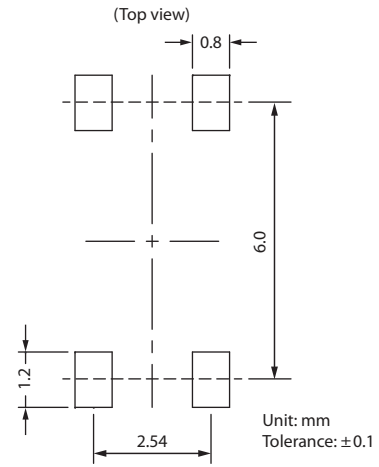
#### Notes

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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