



## CPC1335

### Single Pole OptoMOS® Relay with Bi-directional Transient Protection

Parameters	Ratings	Units
Blocking Voltage	350	V <sub>P</sub>
Load Current	100	mA
Max On-resistance	35	Ω
LED Current to Operate	1	mA

### Transient Protection Characteristics

Peak Pulse Power	V <sub>WM</sub>
600W	40.2V

### Features

- Meets Requirements of EN50130-4 (Installation Class 3)
- 3750V<sub>rms</sub> Input/Output Isolation
- 100% Solid State
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable

### Applications

- Security
- Sensor Circuitry
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Aerospace
- Industrial Controls

### Description

The CPC1335 is a single-pole, normally open (1-Form-A) solid state relay with bi-directional transient voltage suppressor (TVS) relay protection, which is designed to meet the requirements of EN50130-4 (installation class 3).

The relay output is constructed with efficient MOSFET switches and photovoltaic die that use Clare's patented OptoMOS architecture. The input, a highly efficient GaAlAs infrared LED, controls the optically coupled output.

The CPC1335 is available in an 8-pin, space-saving surface-mount package.

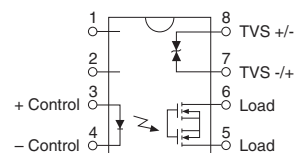
### Approvals

- UL Certified Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component: TUV Certificate B 10 05 49410 006

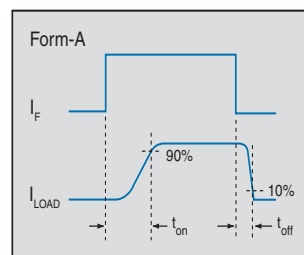
### Ordering Information

Part #	Description
CPC1335P	8-Pin Flatpack (50/Tube)
CPC1335PTR	8-Pin Flatpack (1000/Reel)

### Pin Configuration



### Switching Characteristics of Normally Open Devices



## Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
SSR Output Blocking Voltage	350	V <sub>p</sub>
TVS Working Voltage, Maximum (V <sub>WM</sub> )	40.2	V
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation <sup>1</sup>	150	mW
SSR Output Power Dissipation <sup>2</sup>	400	mW
TVS Peak Pulse Power (P <sub>pp</sub> ) (I <sub>pp</sub> =9.3A, 10/1000µs pulse)	600	W
Isolation Voltage, Input to Output	3750	V <sub>rms</sub>
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

<sup>1</sup> Derate linearly 1.33 mW / °C

<sup>2</sup> Derate linearly 6.67 mW / °C

*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

## Electrical Characteristics @ 25°C

Parameters	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current						
Continuous <sup>1</sup>	I <sub>F</sub> =2mA	I <sub>L</sub>	-	-	100	mA
Peak	t=10ms	I <sub>LPK</sub>	-	-	350	
On-resistance <sup>2</sup>	I <sub>L</sub> =100mA	R <sub>ON</sub>	-	25	35	Ω
Off-State Leakage Current	V <sub>L</sub> =350V <sub>p</sub>	I <sub>LEAK</sub>	-	-	1	µA
Switching Speeds						
Turn-On	I <sub>F</sub> =2mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	-	10	ms
Turn-Off		t <sub>off</sub>	-	-	10	
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	40	-	pF
<b>Input Characteristics</b>						
Input Control Current <sup>3</sup>	I <sub>L</sub> =100mA	I <sub>F</sub>	-	-	1	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	µA
<b>Common Characteristics</b>						
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

<sup>1</sup> Load current derates linearly from 100 mA @ 25°C to 70mA @ 85°C

<sup>2</sup> Measurement taken within 1 second of on-time

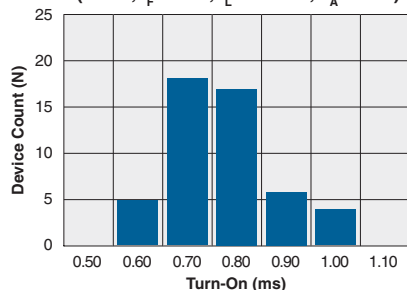
<sup>3</sup> For applications requiring high temperature operation (greater than 60°C) a minimum LED drive current of 3mA is recommended.

## Electrical Characteristics: TVS

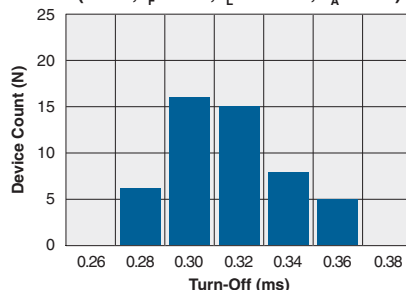
Parameters	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Clamping Voltage	I <sub>pp</sub> =9.3A	V <sub>C</sub>	-	-	66.5	V
Reverse Breakdown Voltage	I=1mA	V <sub>BR</sub>	44.4	-	-	V
Reverse Leakage Current	V <sub>WM</sub> =40.2V	I <sub>L</sub>	-	-	5	µA

# PERFORMANCE DATA\*

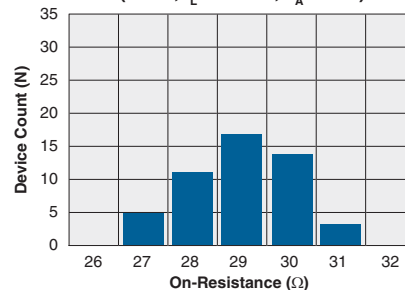
**Typical Turn-On Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=100\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



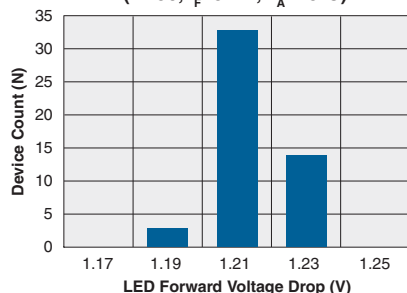
**Typical Turn-Off Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=100\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



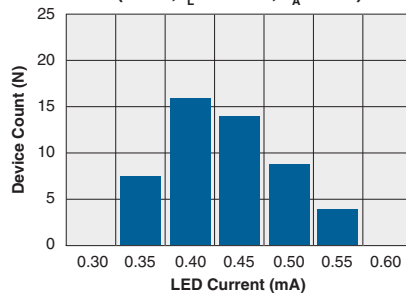
**Typical On-Resistance Distribution**  
(N=50,  $I_L=120\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



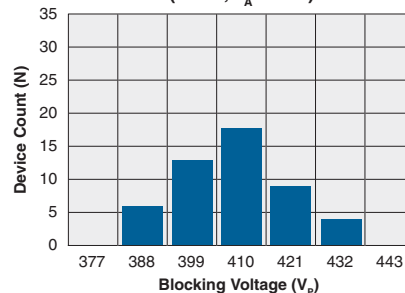
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



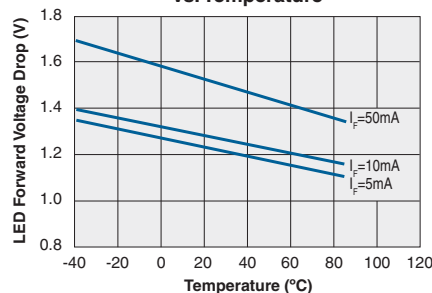
**Typical  $I_F$  for Switch Operation**  
(N=50,  $I_L=100\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



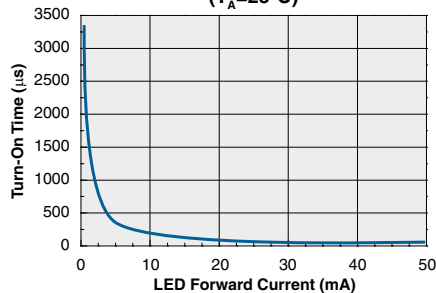
**Typical Blocking Voltage Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ )



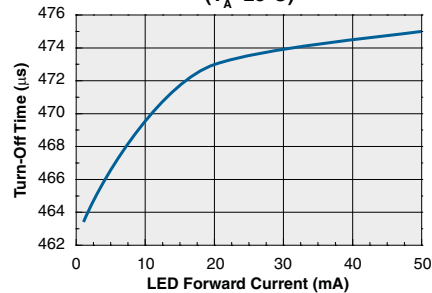
**Typical LED Forward Voltage Drop vs. Temperature**



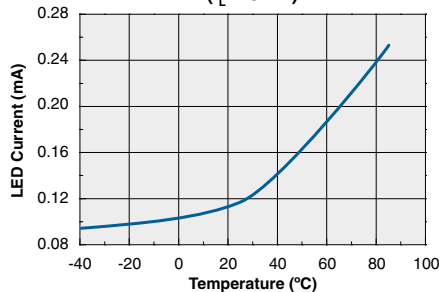
**Turn-On Time vs. LED Forward Current**  
( $T_A=25^\circ\text{C}$ )



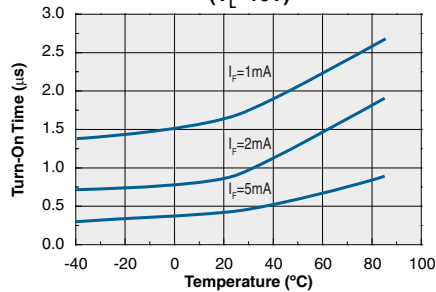
**Typical Turn-Off vs. LED Forward Current**  
( $T_A=25^\circ\text{C}$ )



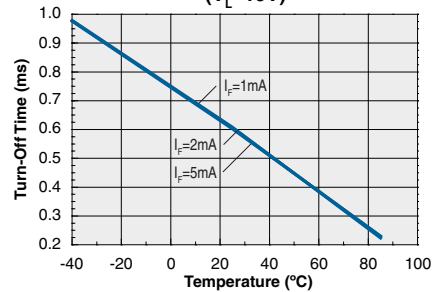
**Typical LED Current to Operate vs. Temperature**  
( $I_L=70\text{mA}$ )



**Typical Turn-On Time vs. Temperature**  
( $V_L=10\text{V}$ )

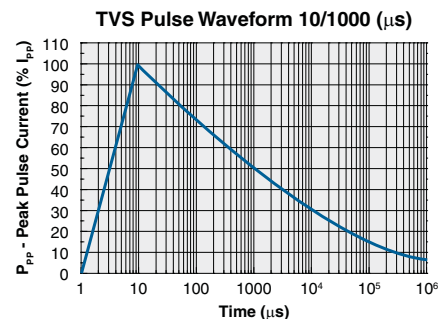
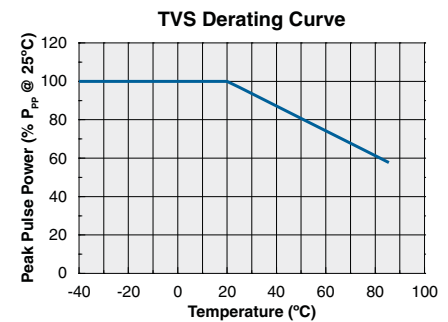
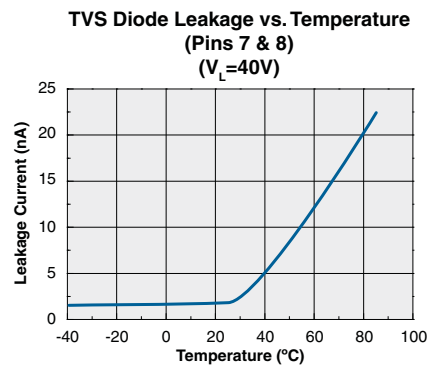
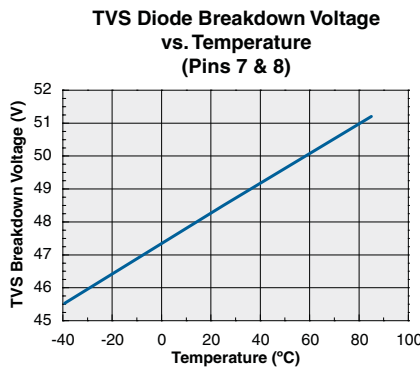
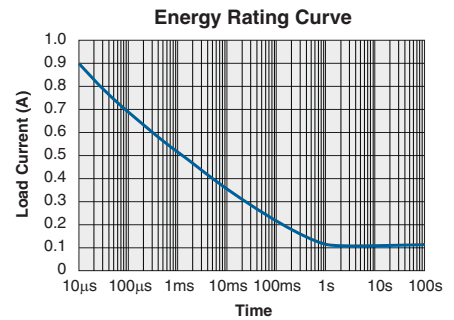
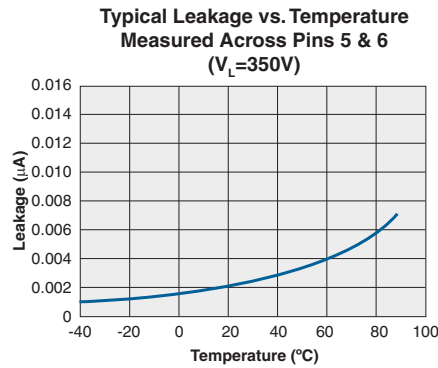
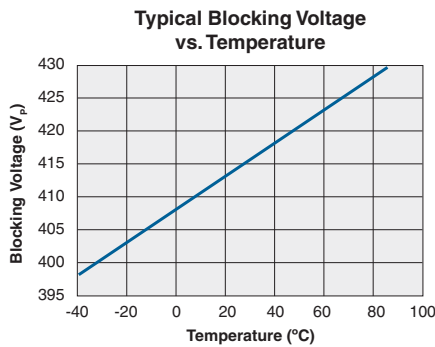
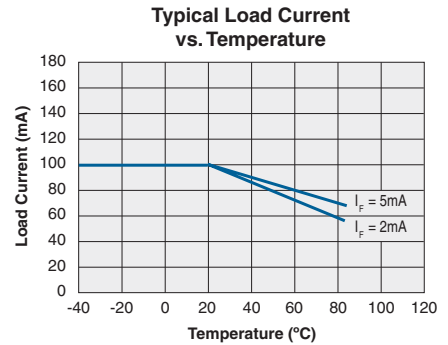
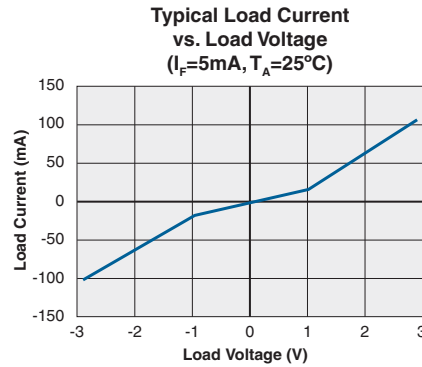
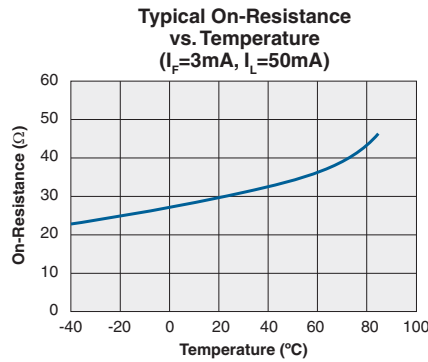


**Typical Turn-Off Time vs. Temperature**  
( $V_L=10\text{V}$ )



\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***



\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. Clare classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
CPC1335P	MSL 1

### ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

### Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
CPC1335P	260°C for 30 seconds

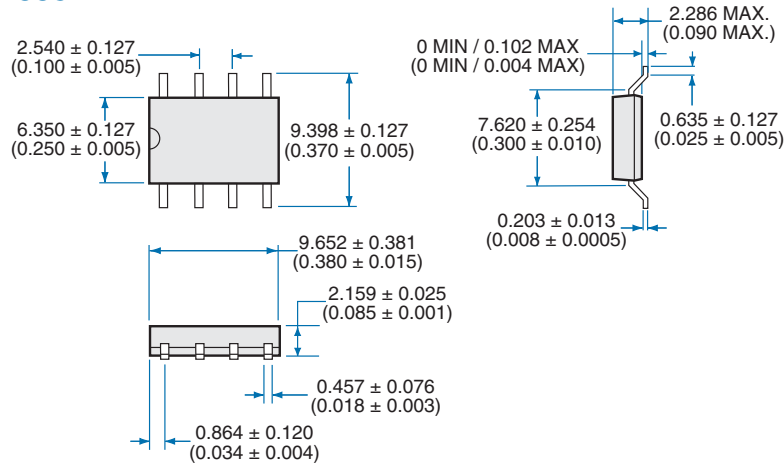
### Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

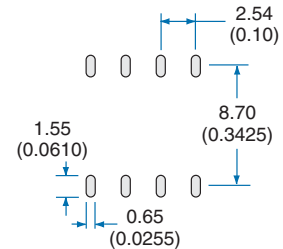


### MECHANICAL DIMENSIONS

#### CPC1335P

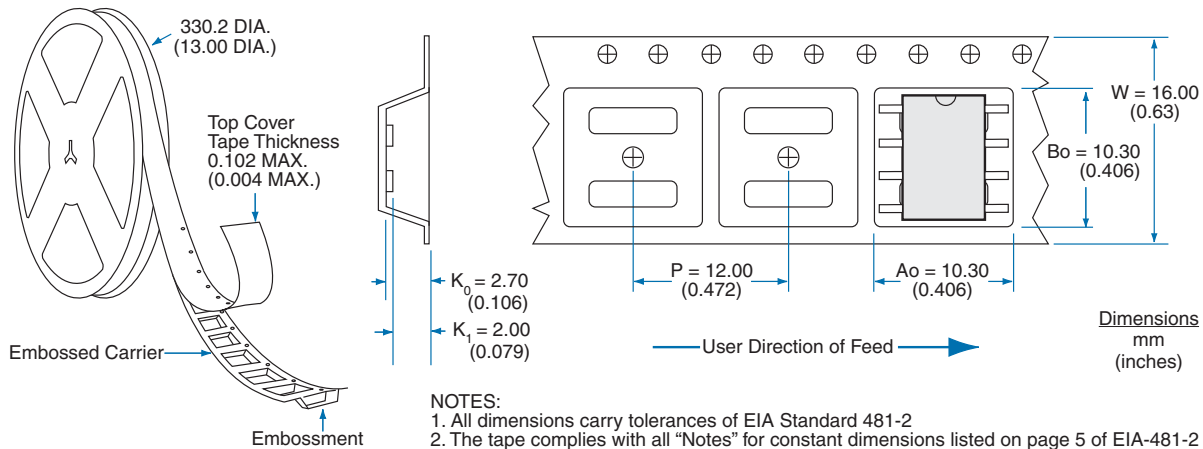


#### PCB Land Pattern



Dimensions  
mm  
(inches)

#### CPC1335P Tape & Reel



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