CPC1335

Single Pole OptoMOS® Relay with Bi-directional Transient Protection

Parameters	Ratings	Units
Blocking Voltage	350	V_P
Load Current	100	mA
Max On-resistance	35	Ω
LED Current to Operate	1	mA

Transient Protection Characteristics

Peak Pulse Power	V_{WM}
600W	40.2V

Features

- 100% Solid State
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 3750V_{rms} Input/Output Isolation
- 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.

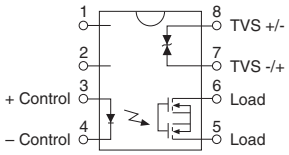
Approvals

- UL Recognized Component: File #E76270
- EN/IEC 60950 Compliant
- CSA Certified Component: Certificate # 1172007

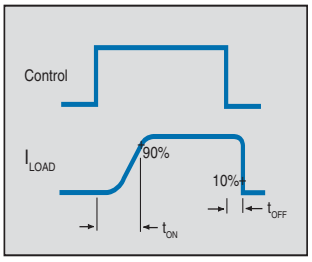
Ordering Information

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

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings

Parameter	Ratings	Units
SSR Output Blocking Voltage	350	V_P
TVS Working Voltage, Maximum (V_{WM})	40.2	V
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
SSR Output Power Dissipation [2]	400	mW
TVS Peak Pulse Power (P_{PP}) (I_{PP}=9.3A, 10/1000µs pulse)	600	W
Isolation Voltage Input to Output	3750	V_{rms}
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate Linearly 1.33 mw / °C

[2] Derate Linearly 6.67 mw / °C

Electrical absolute maximum ratings are at 25°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

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current						
Continuous [1]	I_F=2mA	I_L	-	-	100	mA
Peak	t=10ms	I_{LPK}	-	-	350	
On-resistance [2]	I_L=100mA	R_{ON}	-	25	35	Ω
Off-State Leakage Current	V_L=350V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=2mA, V_L=10V	T_{ON}	-	-	10	ms
Turn-Off		T_{OFF}	-	-	10	
Output Capacitance	50V; f=1MHz	C_{OUT}	-	40	-	pF
Input Characteristics @ 25°C						
Input Control Current [3]	I_L=100mA	I_F	-	-	1	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics @ 25°C						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

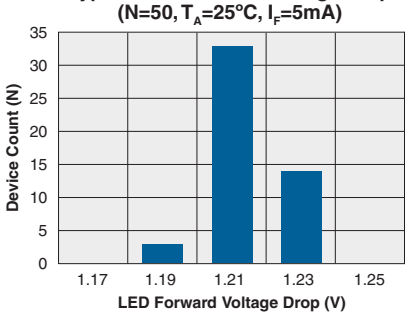
[1] Load current derates linearly from 100 mA @ 25°C to 70ma @ 85°C
[2] Measurement taken within 1 second of on time
[3] For applications requiring high temp operation (greater than 60°C) a minimum LED drive current of 3mA is recommended.

Electrical Characteristics: TVS

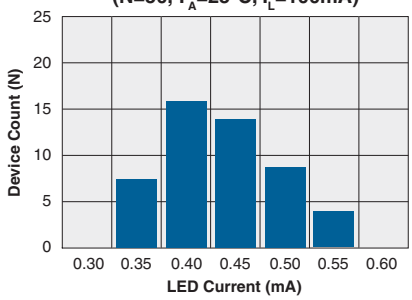
Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Clamping Voltage	I_{PP}=9.3A	V_C	-	-	66.5	V
Reverse Breakdown Voltage	I=1mA	V_{BR}	44.4	-	-	V
Reverse Leakage Current	V_{WM}=40.2V	I_L	-	-	5	µA

PERFORMANCE DATA*

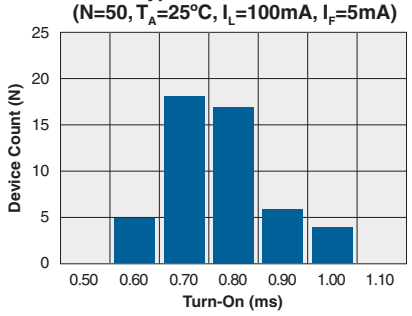
CPC1335
Typical LED Forward Voltage Drop
(N=50, T_A=25°C, I_F=5mA)



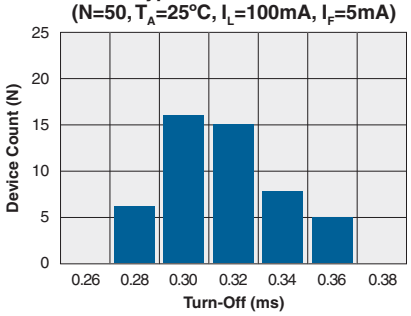
CPC1335
Typical I_F for Switch Operation
(N=50, T_A=25°C, I_L=100mA)



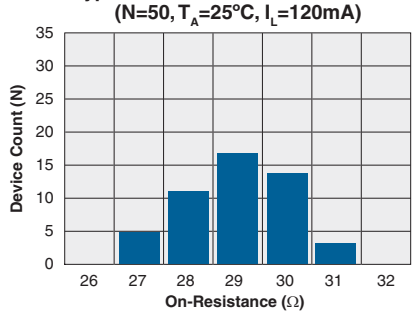
CPC1335
Typical Turn-On Time
(N=50, T_A=25°C, I_L=100mA, I_F=5mA)



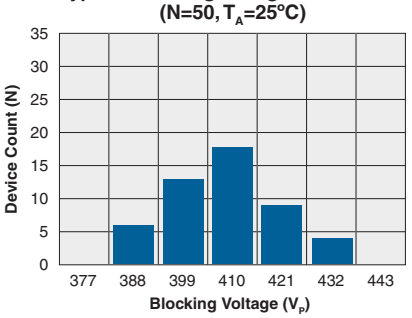
CPC1335
Typical Turn-Off Time
(N=50, T_A=25°C, I_L=100mA, I_F=5mA)



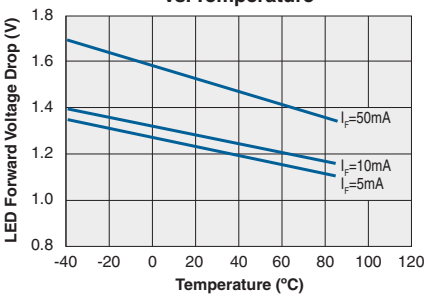
CPC1335
Typical On-Resistance Distribution
(N=50, T_A=25°C, I_L=120mA)



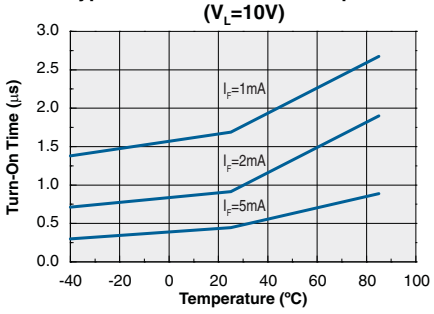
CPC1335
Typical Blocking Voltage Distribution
(N=50, T_A=25°C)



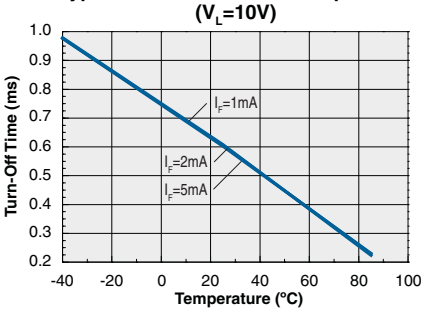
CPC1335
Typical LED Forward Voltage Drop
vs. Temperature



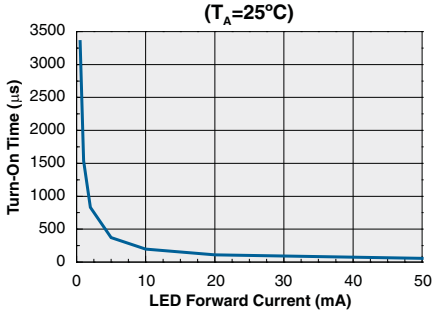
CPC1335
Typical Turn-On Time vs. Temperature
(V_L=10V)



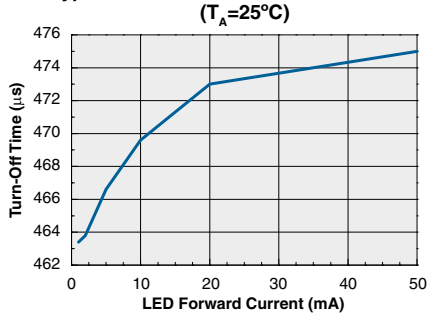
CPC1335
Typical Turn-Off Time vs. Temperature
(V_L=10V)



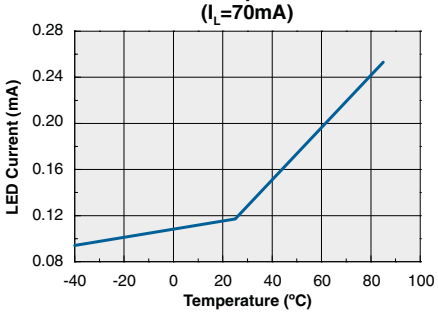
CPC1335
Turn-On Time vs. LED Forward Current
(T_A=25°C)



CPC1335
Typical Turn-Off vs. LED Forward Current
(T_A=25°C)



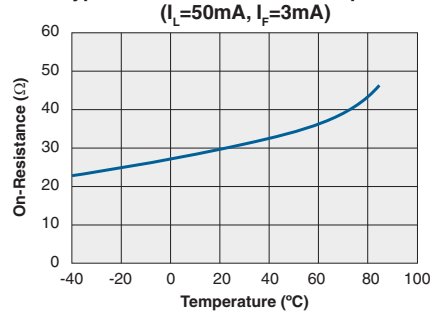
CPC1335
Typical LED Current to Operate
vs. Temperature
(I_L=70mA)



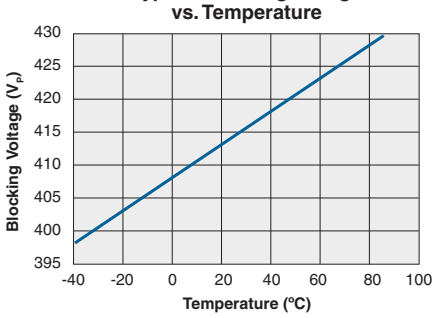
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

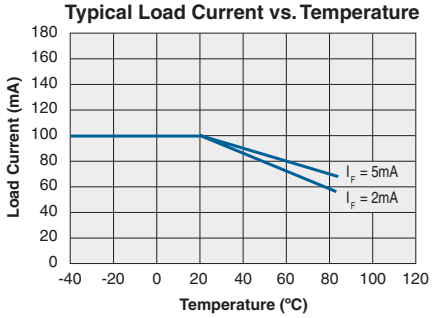
CPC1335
Typical On-Resistance vs. Temperature
(I_L=50mA, I_F=3mA)



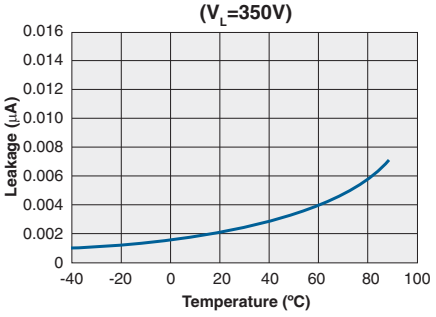
CPC1335
Typical Blocking Voltage vs. Temperature



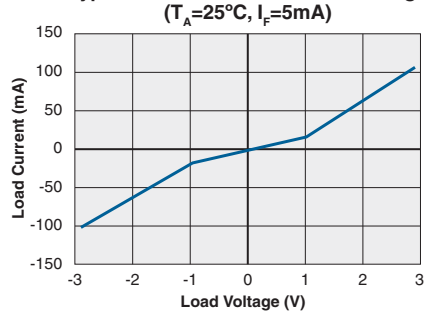
CPC1335
Typical Load Current vs. Temperature



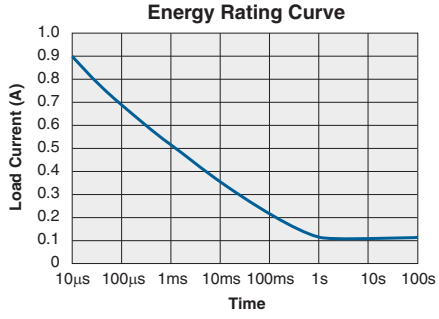
CPC1335
Typical Leakage vs. Temperature
Measured Across Pins 5 & 6
(V_L=350V)



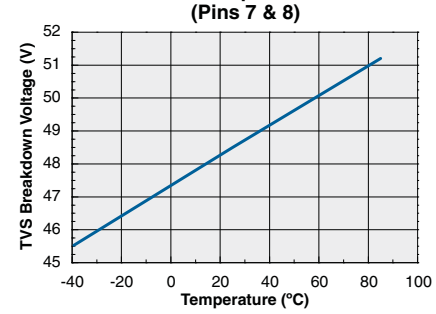
CPC1335
Typical Load Current vs. Load Voltage
(T_A=25°C, I_F=5mA)



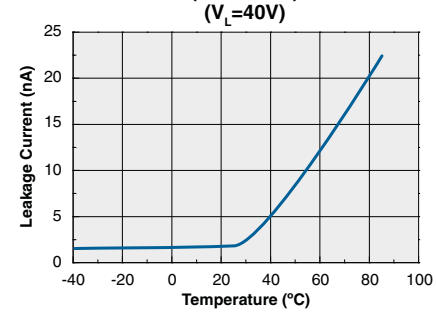
CPC1335
Energy Rating Curve



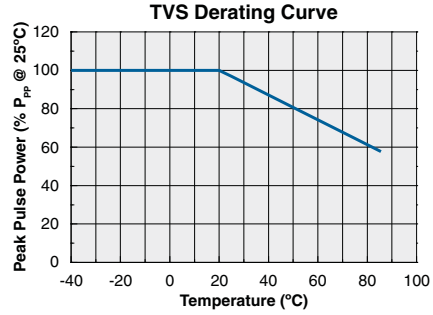
CPC1335
TVS Diode Breakdown Voltage vs. Temperature
(Pins 7 & 8)



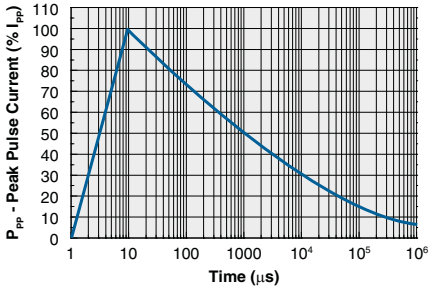
CPC1335
TVS Diode Leakage vs. Temperature
(Pins 7 & 8)
(V_L=40V)



CPC1335
TVS Derating Curve



CPC1335
TVS Pulse Waveform 10/1000 (µs)



*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

Soldering

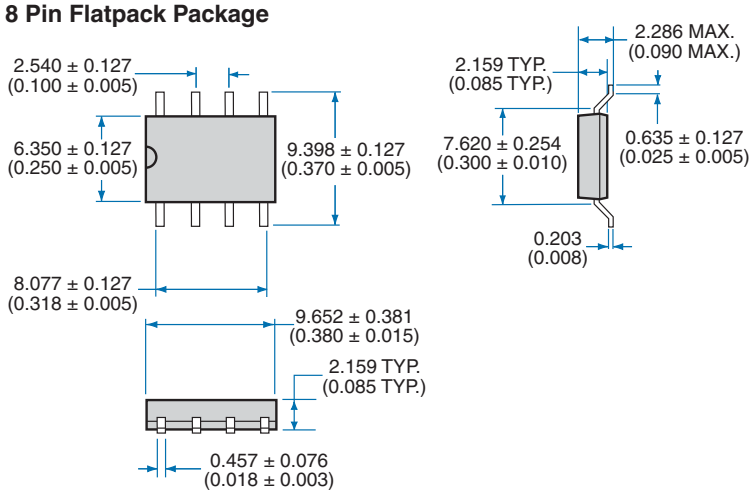
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

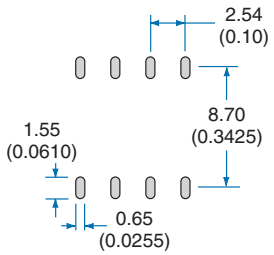
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

8 Pin Flatpack Package

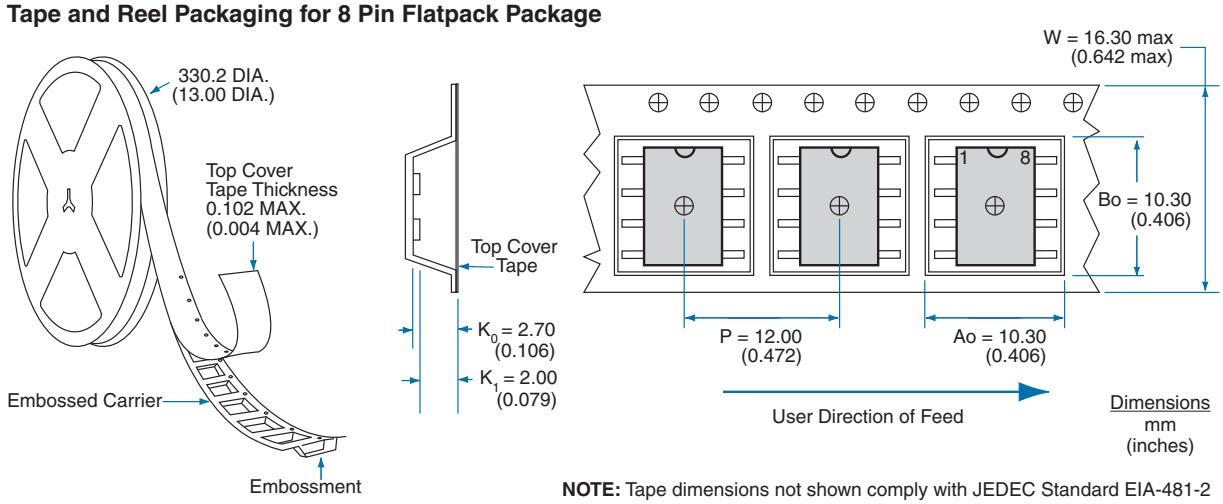


Recommended PCB Land Pattern



Dimensions
mm
(inches)

Tape and Reel Packaging for 8 Pin Flatpack Package



Dimensions
mm
(inches)

NOTE: Tape dimensions not shown comply with JEDEC Standard EIA-481-2

For additional information please visit our website at: www.clare.com

Specification: DS-CPC1335-R05

3/9/09