CPC1317

Single-Pole OptoMOS® Relay With Bidirectional Transient Protection

Parameter	Rating	Units
Blocking Voltage	70	V_P
Load Current	150	mA
Max On-Resistance	16	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 CPC1317 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 CPC1317 is available in an 8-pin, space-saving surface-mount package.

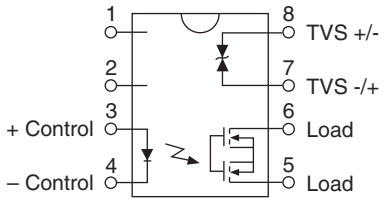
Approvals

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

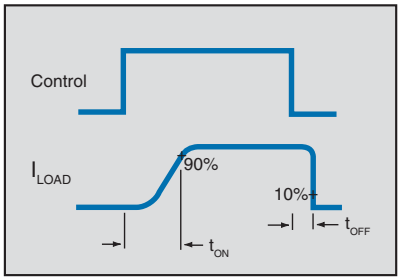
Ordering Information

Part #	Description
CPC1317P	8-Pin Flatpack (50/tube)
CPC1317PTR	8-Pin Flatpack (1000/reel)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



RoHS 2002/95/EC

Absolute Maximum Ratings

Parameter	Ratings	Units
SSR Output Blocking Voltage	70	V_P
TVS Working Voltage, Maximum	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 (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.

SSR Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current						
Continuous	-	I_L	-	-	150	mA
Peak	t=10ms	I_{LPK}	-	-	400	
On-Resistance [1]	I_L=150mA, I_F=1mA	R_{ON}	-	7	16	Ω
Off-State Leakage Current	V_L=70V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	T_{ON}	-	-	2.5	ms
Turn-Off		T_{OFF}	-	-	2.5	
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current [2]	I_L=150mA	I_F	-	-	1	mA
Input Dropout Current	-	I_F	0.1	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Common Characteristics @ 25°C						
Capacitance Input to Output	-	$C_{I/O}$	-	3	-	pF

[1] Measurement taken within 1 second of turn-on time.

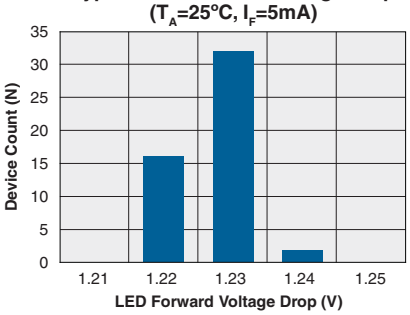
[2] For applications requiring high temperature operation (> 60ºC) a minimum LED drive current of 3mA is required.

TVS Electrical Characteristics

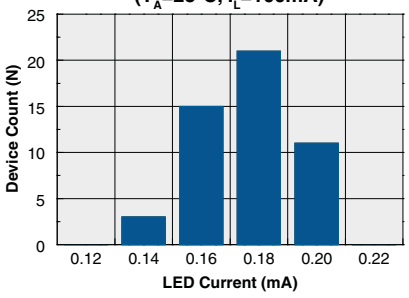
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Clamping Voltage	I_{PP}=9.3A	V_C	-	-	66.5	V
Reverse Breakdown Voltage	I=1mA	V_{BR}	44.4	-	-	V
Reverse Leakage Current	V_{WM}=40.2V	I_L	-	-	5	µA

PERFORMANCE DATA*

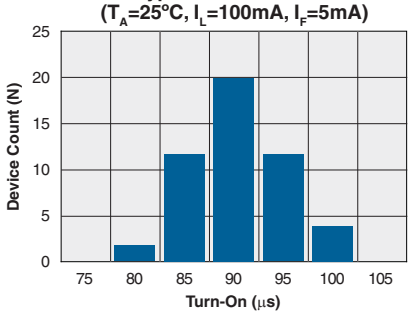
CPC1317
Typical LED Forward Voltage Drop
(T_A=25°C, I_F=5mA)



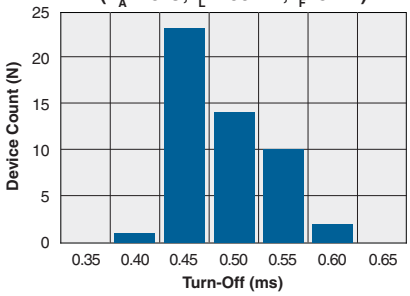
CPC1317
Typical I_F for Switch Operation
(T_A=25°C, I_L=100mA)



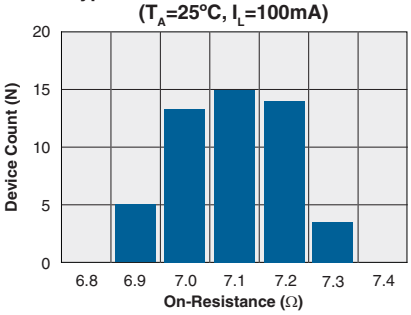
CPC1317
Typical Turn-On Time
(T_A=25°C, I_L=100mA, I_F=5mA)



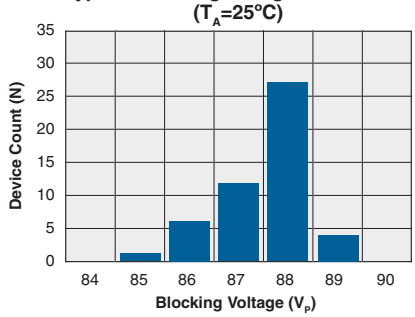
CPC1317
Typical Turn-Off Time
(T_A=25°C, I_L=100mA, I_F=5mA)



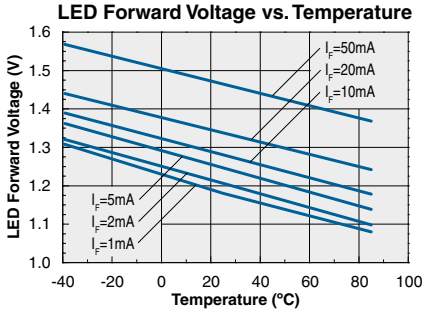
CPC1317
Typical On-Resistance Distribution
(T_A=25°C, I_L=100mA)



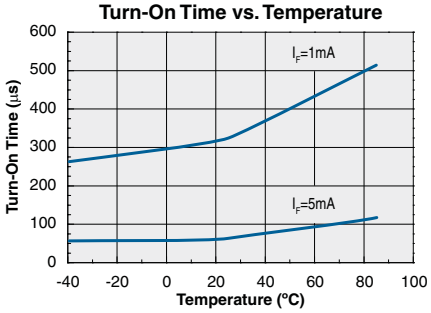
CPC1317
Typical Blocking Voltage Distribution
(T_A=25°C)



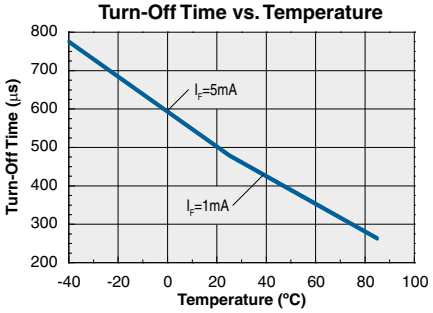
CPC1317
LED Forward Voltage vs. Temperature



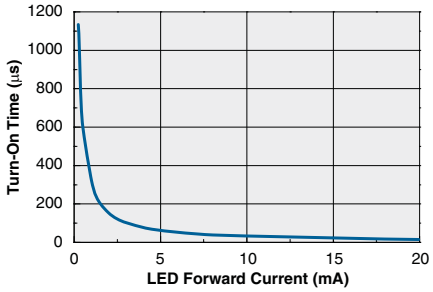
CPC1317
Turn-On Time vs. Temperature



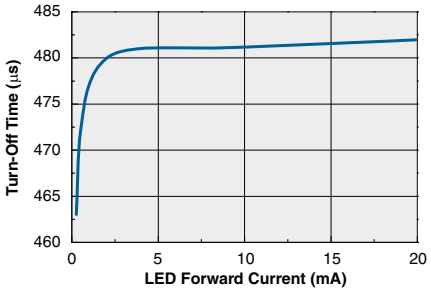
CPC1317
Turn-Off Time vs. Temperature



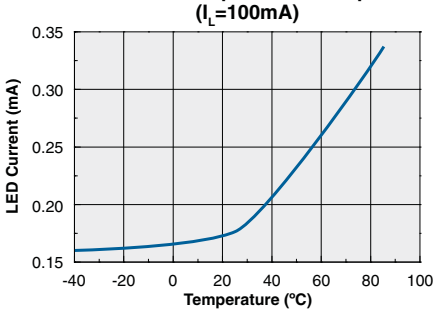
CPC1317
Typical Turn-On Time
vs. LED Forward Current



CPC1317
Typical Turn-Off Time
vs. LED Forward Current



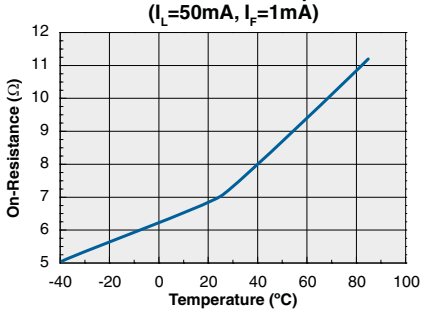
CPC1317
LED Current to Operate vs. Temperature
(I_L=100mA)



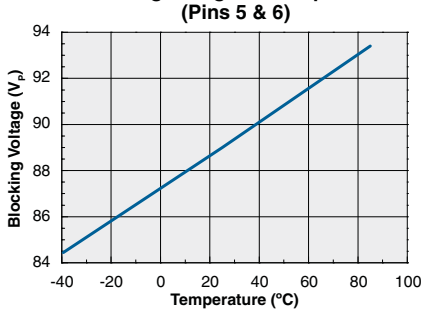
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

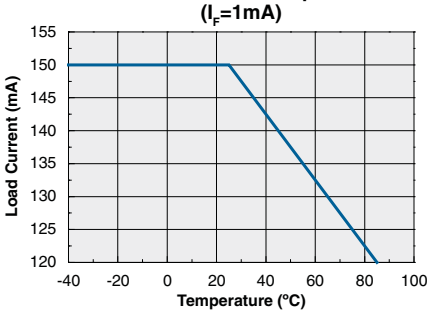
CPC1317
On-Resistance vs. Temperature
(I_L=50mA, I_F=1mA)



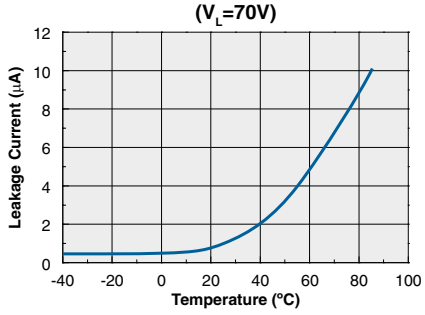
CPC1317
Blocking Voltage vs. Temperature
(Pins 5 & 6)



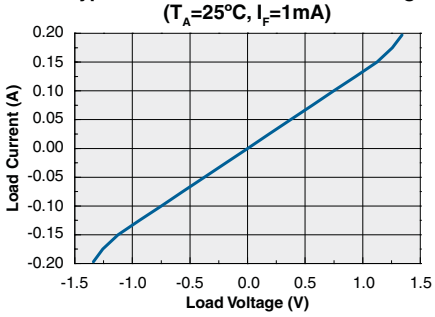
CPC1317
Load Current vs. Temperature
(I_F=1mA)



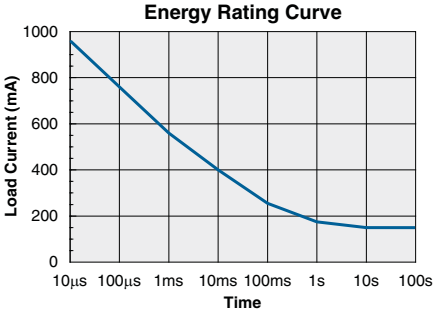
CPC1317
Leakage Current vs. Temperature
Measured Between Pins 5 & 6
(V_L=70V)



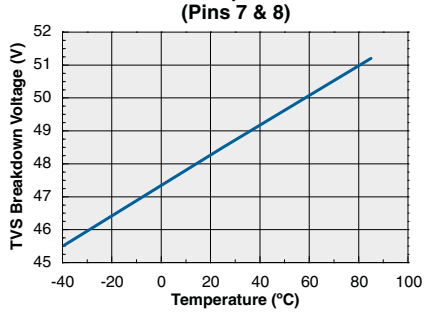
CPC1317
Typical Load Current vs. Load Voltage
(T_A=25°C, I_F=1mA)



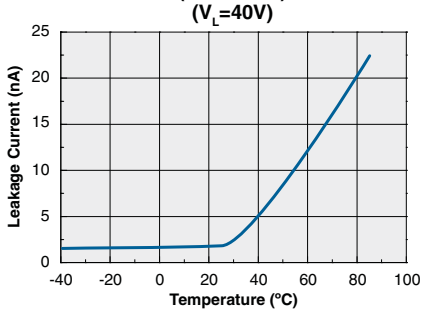
CPC1317
Energy Rating Curve



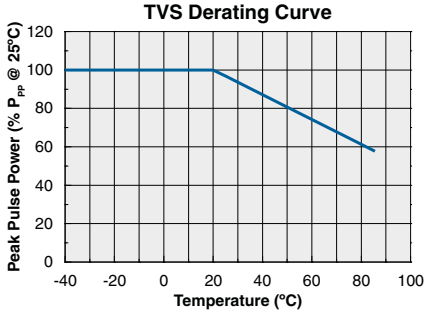
CPC1317
TVS Diode Breakdown Voltage
vs. Temperature
(Pins 7 & 8)



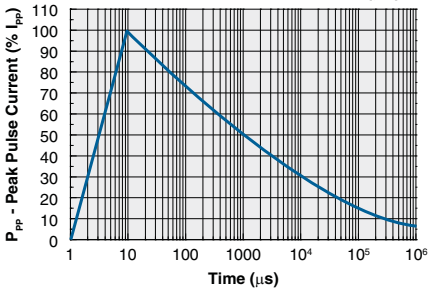
CPC1317
TVS Diode Leakage vs. Temperature
(Pins 7 & 8)
(V_L=40V)



CPC1317
TVS Derating Curve



CPC1317
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

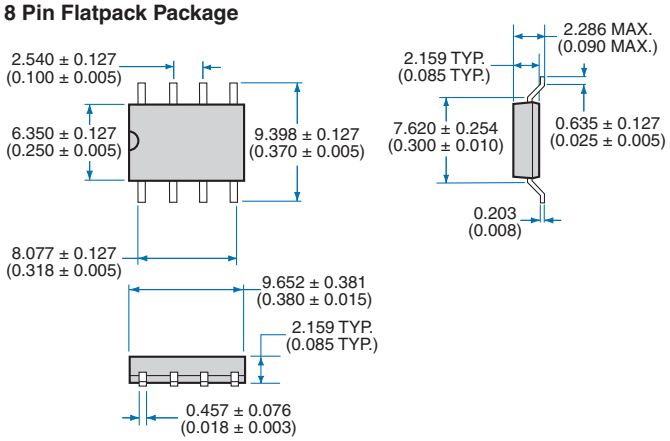
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

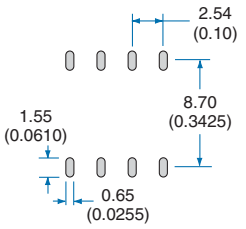
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

8 Pin Flatpack Package

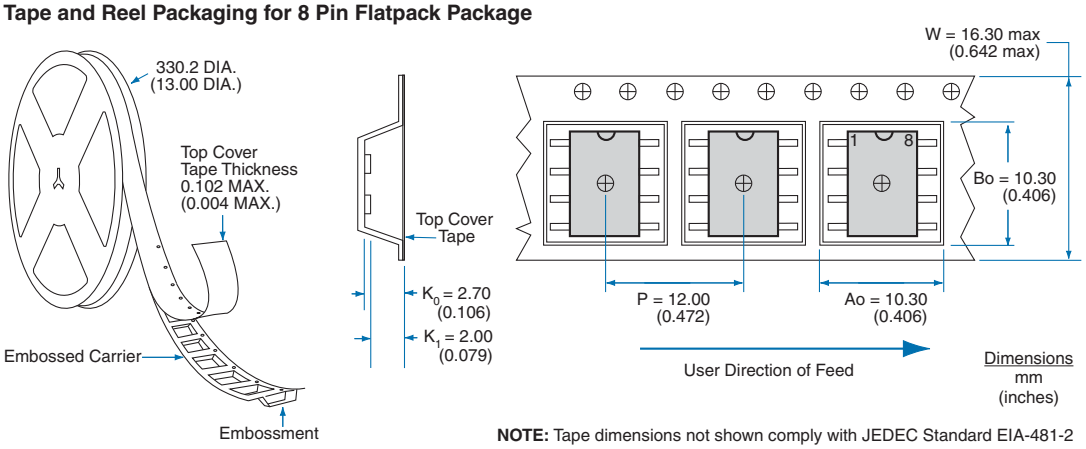


Recommended PCB Land Pattern



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-CPC1317-R03

3/9/09