CPC1393
Single Pole OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	600	V_P
Load Current	90	mA
Max On-resistance	50	Ω

Features
- 5000V_{rms} Input/Output Isolation
- 600V_P Blocking Voltage
- 100% Solid State
- Small 4-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable

Applications
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

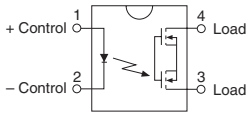
Description
The CPC1393G is a single-pole normally-open (1-Form-A) Solid State Relay with an enhanced input to output isolation barrier of 5000V_{rms}. Clare's patented OptoMOS architecture makes available the optically coupled technology necessary to activate the output's efficient MOSFET switches. Control of the isolated output is accomplished by means of the highly effective GaAlAs infrared LED at the input.

Approvals
- UL - File # E76270
- EN60950 - Pending

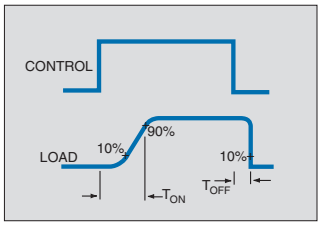
Ordering Information

Part Number	Description
CPC1393G	4-Pin DIP (100/Tube)
CPC1393GV	4-Pin DIP V-Bend (100/Tube)
CPC1393GR	4-Pin Surface Mount (100/Tube)
CPC1393GRTR	4-Pin Surface Mount (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings

Parameter	Ratings	Units
Peak Blocking Voltage	600	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	100	mW
Total Package Dissipation [2]	550	mW
Isolation Voltage, Input to Output	5000	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate Linearly 1.33 mW/°C

[2] Derate Linearly 3.00 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.

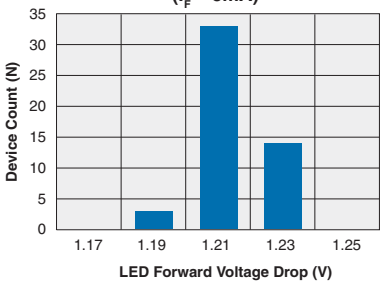
Electrical Characteristics

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current						
Continuous	-	I_L	-	-	90	mA
Peak	t≤10ms	I_{LPK}	-	-	350	
On-resistance [1]	I_L=90mA	R_{ON}	-	35	50	Ω
Off-State Leakage Current	V_L=600V	I_{LEAK}	-	-	1	µA
Switching Speeds	I_F=5mA, V_L=10V					
Turn-On		T_{ON}	-	-	5	ms
Turn-Off		T_{OFF}	-	-	5	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	50	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=90mA	I_F	-	0.55	2	mA
Input Dropout Current	-	I_F	0.2	-	-	
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

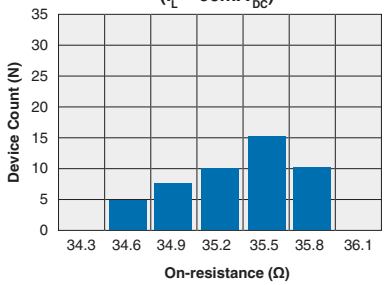
[1] Within 1 second of time.

PERFORMANCE DATA*

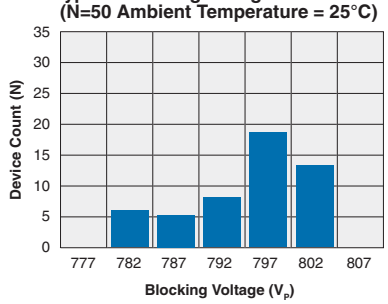
CPC1393
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C)
(I_F = 5mA)



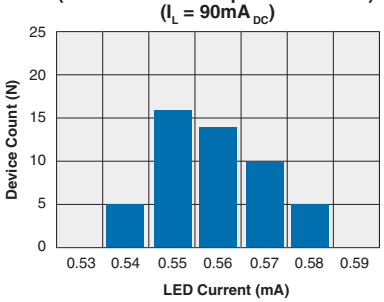
CPC1393
Typical On-resistance Distribution
(N=50 Ambient Temperature = 25°C)
(I_L = 90mA$_{DC}$)



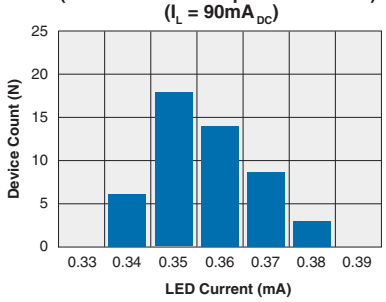
CPC1393
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



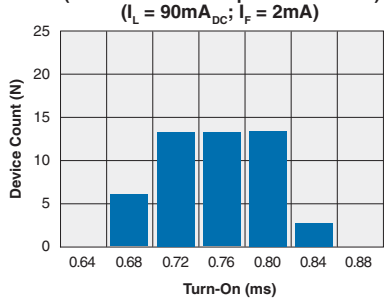
CPC1393
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(I_L = 90mA$_{DC}$)



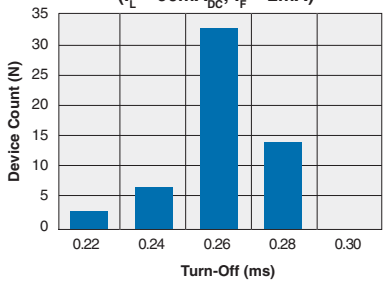
CPC1393
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(I_L = 90mA$_{DC}$)



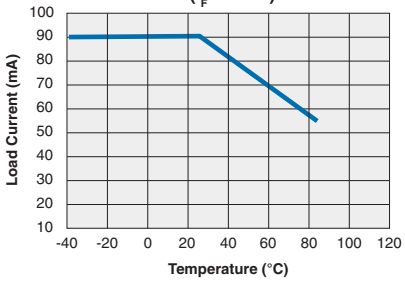
CPC1393
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(I_L = 90mA$_{DC}$; I_F = 2mA)



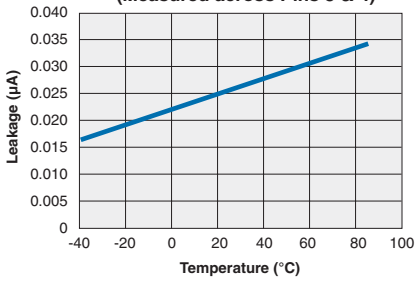
CPC1393
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(I_L = 90mA$_{DC}$; I_F = 2mA)



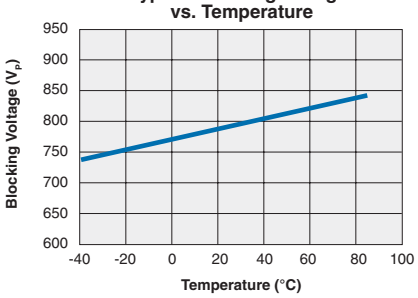
CPC1393
Typical Load Current vs. Temperature
(I_F = 2mA)



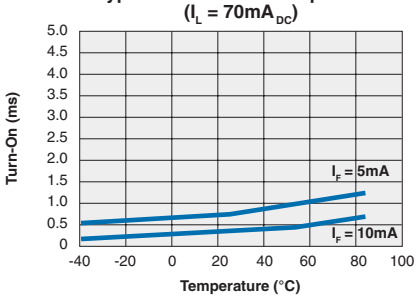
CPC1393
Typical Leakage vs. Temperature
(Measured across Pins 3 & 4)



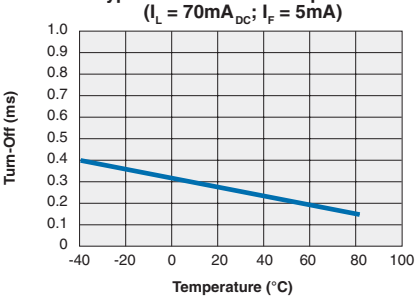
CPC1393
Typical Blocking Voltage
vs. Temperature



CPC1393
Typical Turn-On vs. Temperature
(I_L = 70mA$_{DC}$)



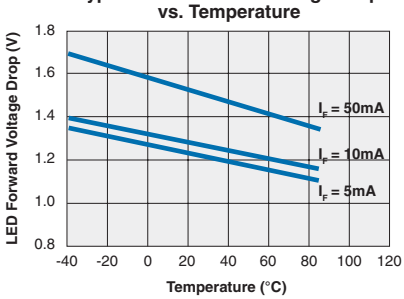
CPC1393
Typical Turn-Off vs. Temperature
(I_L = 70mA$_{DC}$; I_F = 5mA)



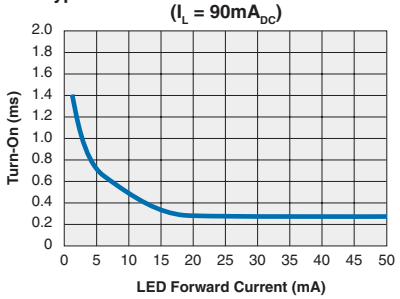
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

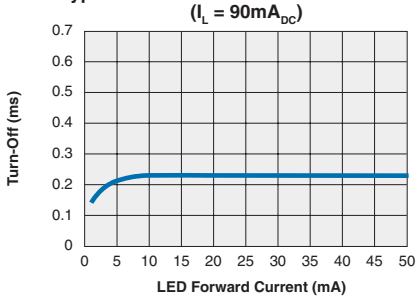
CPC1393
Typical LED Forward Voltage Drop vs. Temperature



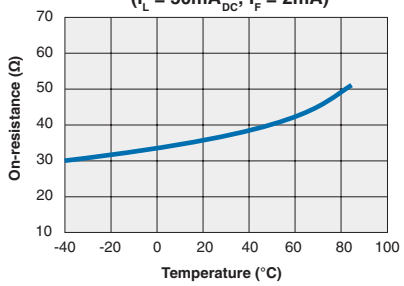
CPC1393
Typical Turn-On vs. LED Forward Current (I_L = 90mA$_{DC}$)



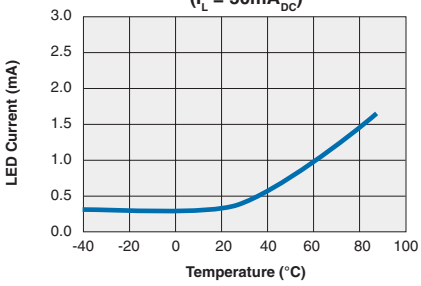
CPC1393
Typical Turn-Off vs. LED Forward Current (I_L = 90mA$_{DC}$)



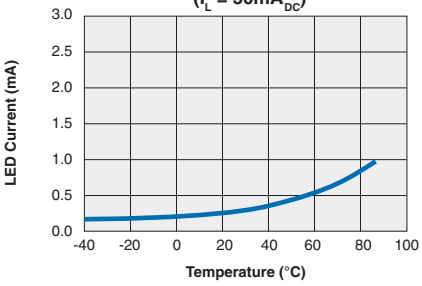
CPC1393
Typical On-resistance vs. Temperature (I_L = 50mA$_{DC}$; I_F = 2mA)



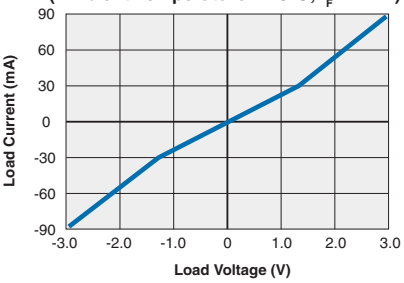
CPC1393
Typical I_F for Switch Operation vs. Temperature (I_L = 50mA$_{DC}$)



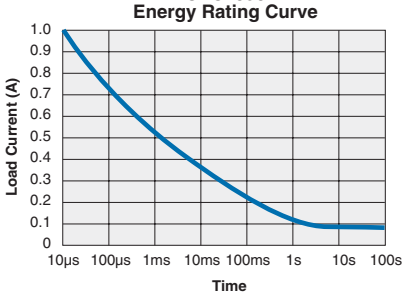
CPC1393
Typical I_F for Switch Dropout vs. Temperature (I_L = 50mA$_{DC}$)



CPC1393
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C; I_F = 2mA)



CPC1393
Energy Rating Curve



*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.

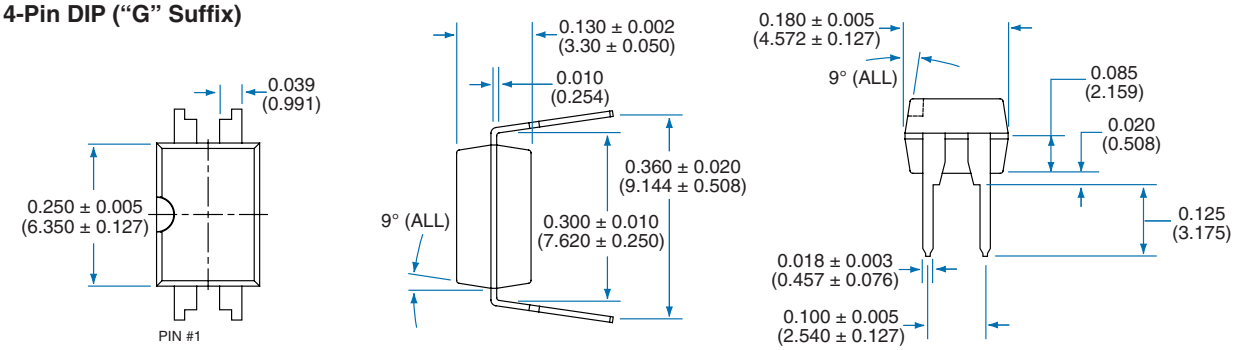
Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

Washing

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

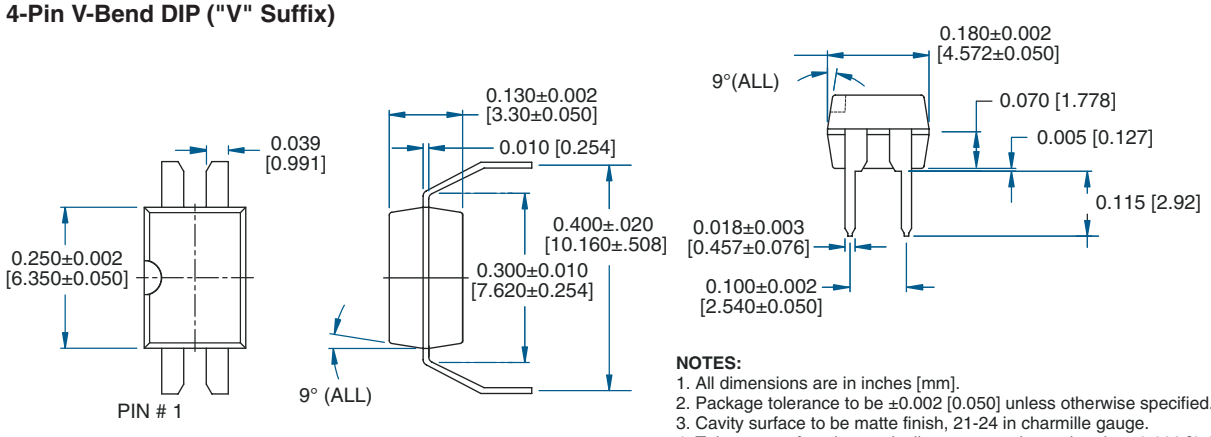
MECHANICAL DIMENSIONS

4-Pin DIP ("G" Suffix)



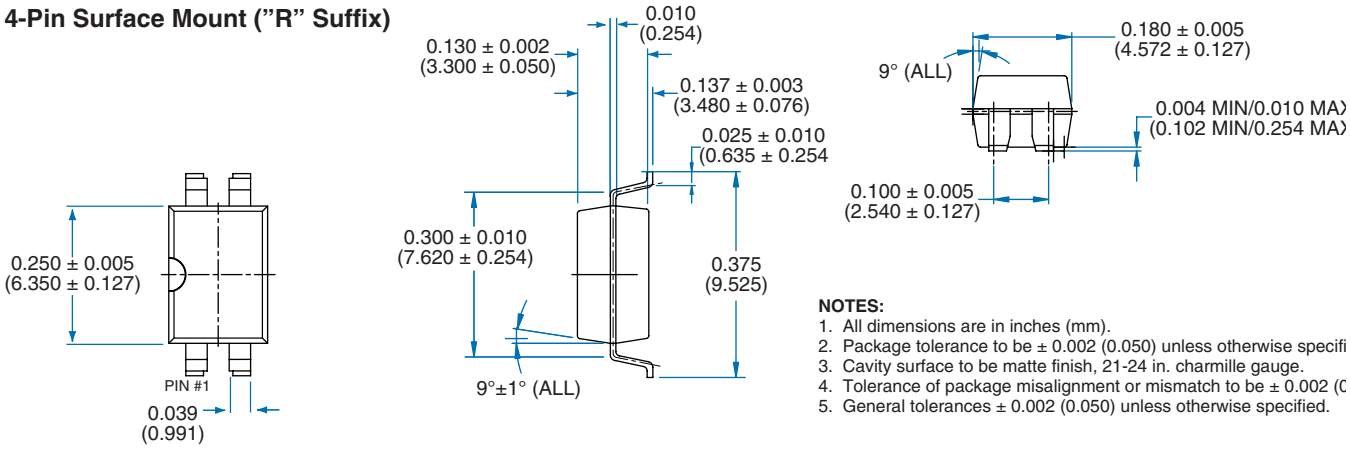
NOTES:
1. All dimensions are in inches (mm).
2. Package tolerance to be ±0.002 (0.05) unless otherwise specified.
3. Cavity surface to be matte finish, 21 - 24 inches charmille gauge.
4. Tolerance of package misalignment or mismatch to be ±0.002 (0.05).
5. General tolerances ± 0.002 (0.05) unless otherwise specified.

4-Pin V-Bend DIP ("V" Suffix)



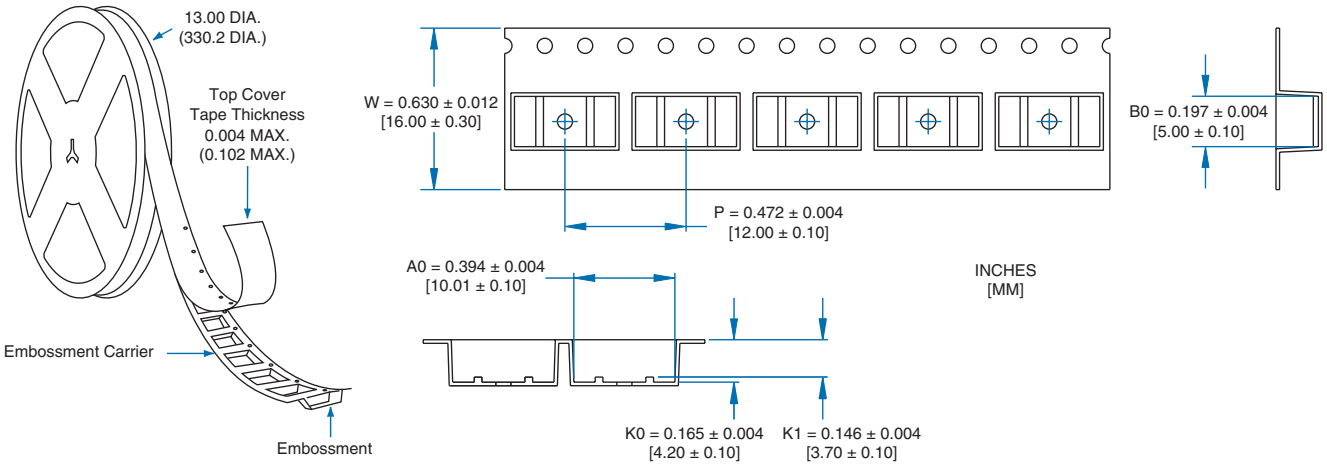
NOTES:
1. All dimensions are in inches [mm].
2. Package tolerance to be ±0.002 [0.050] unless otherwise specified.
3. Cavity surface to be matte finish, 21-24 in charmille gauge.
4. Tolerances of package misalignment or mismatch to be ±0.002 [0.050].
5. General tolerances ±0.002 [0.050] unless otherwise specified.

4-Pin Surface Mount ("R" Suffix)



NOTES:
1. All dimensions are in inches (mm).
2. Package tolerance to be ± 0.002 (0.050) unless otherwise specifi
3. Cavity surface to be matte finish, 21-24 in. charmille gauge.
4. Tolerance of package misalignment or mismatch to be ± 0.002 (0
5. General tolerances ± 0.002 (0.050) unless otherwise specified.

Tape and Reel Packaging for Surface Mount Package



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

Specification: DS-CPC1393-R01

10/17/06