IXYS
INTEGRATED CIRCUITS DIVISION

CPC1333
Single-Pole Normally Closed OptoMOS® Relay

Parameters	Ratings	Units
Peak Blocking Voltage	350	V_P
Load Current	130	mA_{rms} / mA_{DC}
On-Resistance (max)	30	Ω
Isolation Voltage, Input to Output	5000	V_{rms}

Features
- 5000V_{rms} Input/Output Isolation
- 350V_P Blocking Voltage
- 100% Solid State
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 4-Pin Package
- Machine Insertable, Wave Solderable

Applications
- Telephony Switching
- 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 CPC1333G is a single-pole, normally closed (1-Form-B) Solid State Relay with an enhanced input to output isolation barrier of 5000V_{rms}.

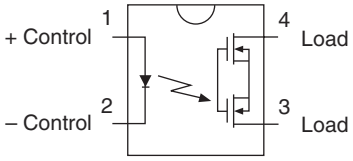
The relay output is constructed with efficient MOSFET switches that use IXYS Integrated Circuits Division's patented OptoMOS architecture. The input, a highly efficient GaAlAS infrared LED, controls the optically coupled output.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- Certified to EN 60950-1: 2006
  TUV Certificate B 09 07 49410 004

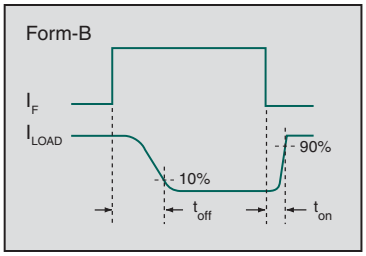
Ordering Information

Part Number	Description
CPC1333G	4-Pin DIP (100/Tube)
CPC1333GR	4-Pin Surface Mount (100/Tube)
CPC1333GRTR	4-Pin Surface Mount (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Peak Blocking Voltage	350	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}
ESD Rating, Human Body Model	8	kV
Operational Temperature	-40 to +85	ºC
Storage Temperature	-40 to +125	ºC
Maximum Soldering Temperature (10 Seconds)	260	ºC

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 3.00 mW / ºC

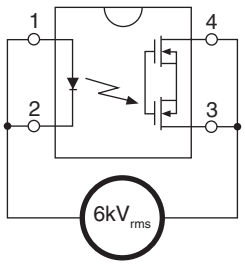
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics @ 25ºC

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous	-	I_L	-	-	130	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance [1]	I_L=130mA	R_{ON}	-	25	30	Ω
Off-State Leakage Current	I_F=2mA, V_L=350V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	2	ms
Turn-Off		t_{off}	-	-	3	
Output Capacitance	I_F=2mA, V_L=50V, f=1MHz	C_{OUT}	-	6	-	pF
Input Characteristics						
Input Control Current to Activate [2]	-	I_F	-	0.18	2	mA
Input Control Current to Deactivate	I_L=130mA	I_F	0.1	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.26	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

[1] Measurement taken within one second of on-time.
[2] For high temperature operation (> 60ºC), IXYS Integrated Circuits Division recommends a LED I_F ≥ 5mA.

CPC1333G Isolation Test Circuit

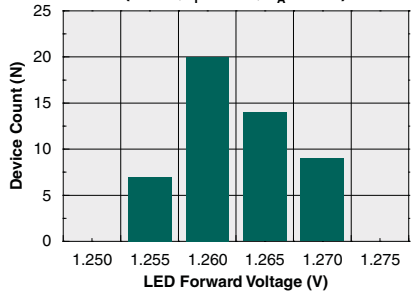


Test Conditions:

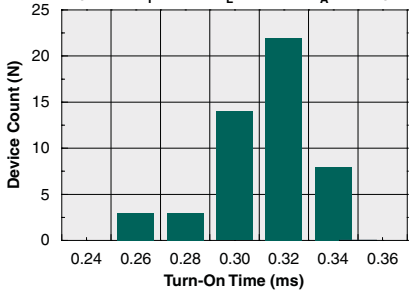
Voltage Ramp:	2V/µs
Test Time:	2 Seconds
Leakage Current Threshold:	50µA
Test Voltage:	$6kV_{rms}$

PERFORMANCE DATA*

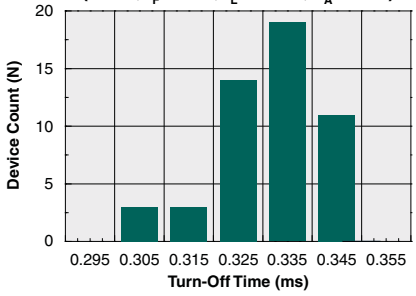
Typical LED Forward Voltage Drop
(N=50, I_F=5mA, T_A=25°C)



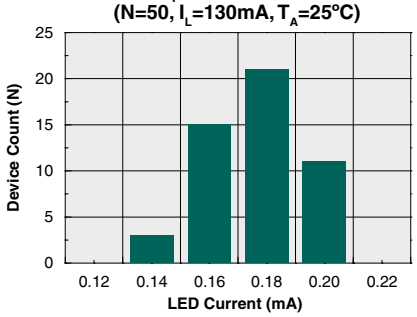
Typical Turn-On Time
(N=50, I_F=5mA, I_L=60mA, T_A=25°C)



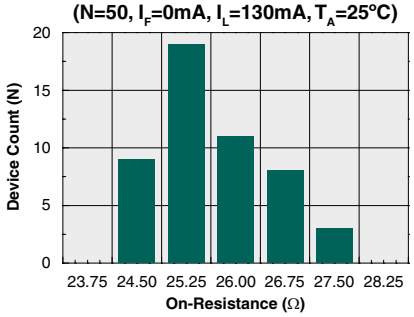
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=60mA, T_A=25°C)



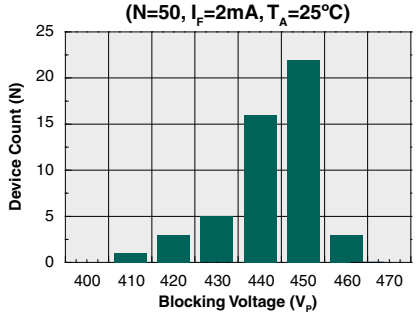
Typical I_F for Switch Operation
(N=50, I_L=130mA, T_A=25°C)



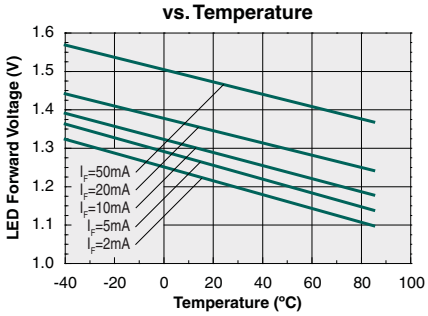
Typical On-Resistance Distribution
(N=50, I_F=0mA, I_L=130mA, T_A=25°C)



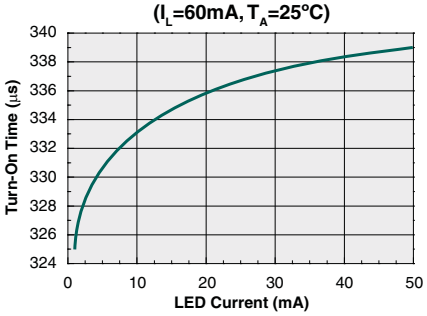
Typical Blocking Voltage Distribution
(N=50, I_F=2mA, T_A=25°C)



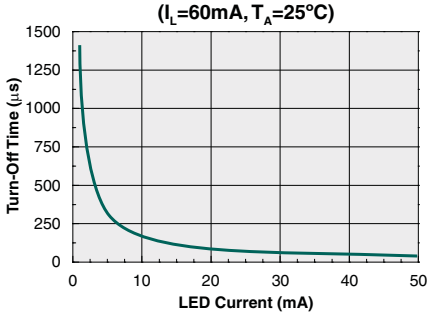
Typical LED Forward Voltage Drop
vs. Temperature



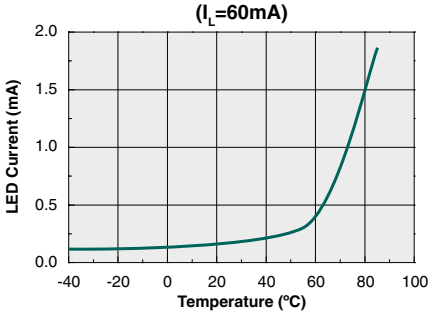
Typical Turn-On Time
vs. LED Forward Current
(I_L=60mA, T_A=25°C)



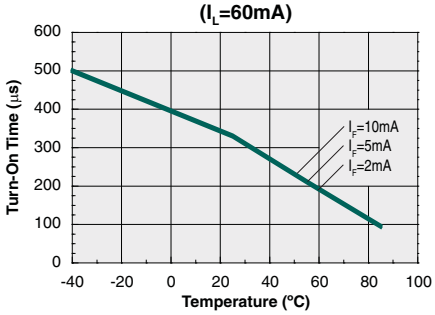
Typical Turn-Off Time
vs. LED Forward Current
(I_L=60mA, T_A=25°C)



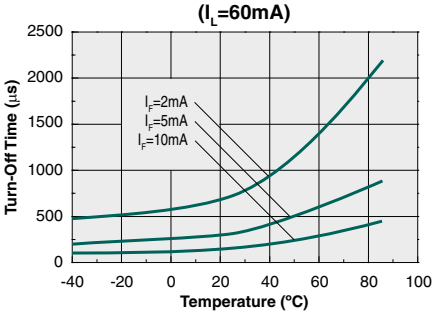
Typical I_F for Switch Operation
vs. Temperature
(I_L=60mA)



Typical Turn-On Time
vs. Temperature
(I_L=60mA)



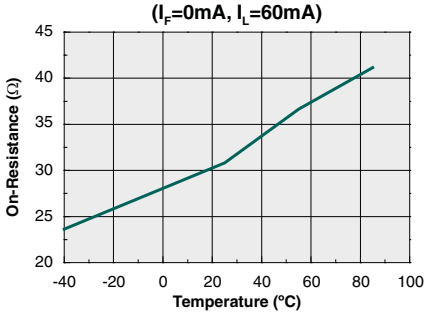
Typical Turn-Off Time
vs. Temperature
(I_L=60mA)



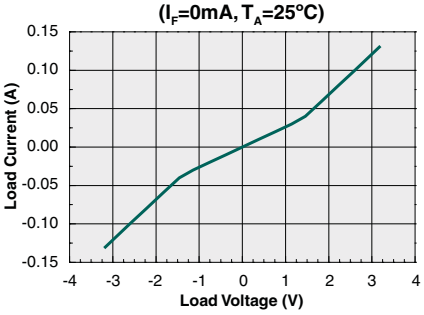
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

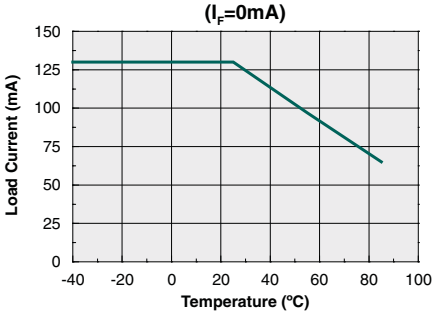
Typical On-Resistance vs. Temperature (I_F=0mA, I_L=60mA)



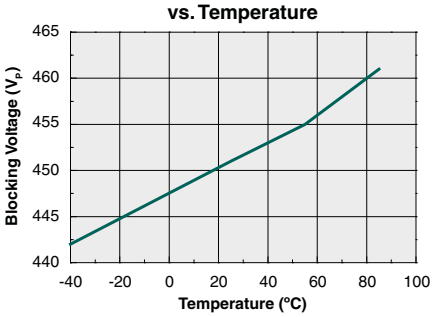
Typical Load Current vs. Load Voltage (I_F=0mA, T_A=25°C)



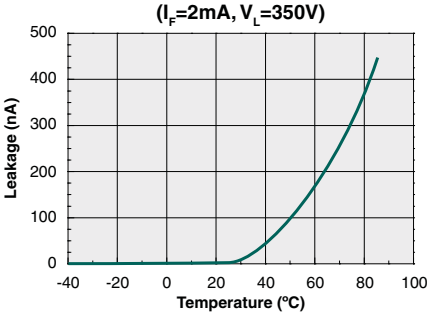
Maximum Load Current vs. Temperature (I_F=0mA)



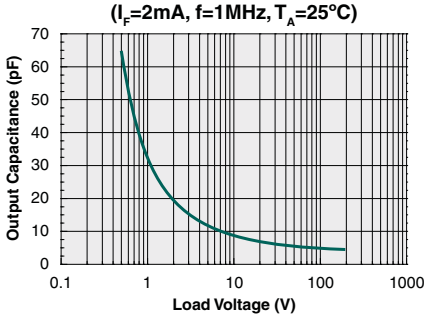
Typical Blocking Voltage vs. Temperature



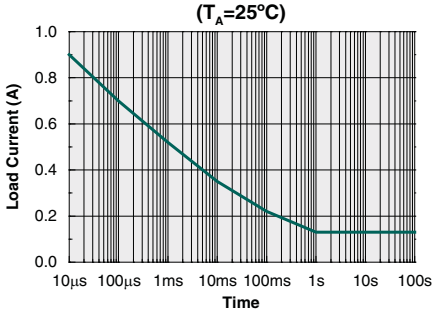
Typical Leakage vs. Temperature Measured Between Pins 3 & 4 (I_F=2mA, V_L=350V)



Output Capacitance vs. Load Voltage (I_F=2mA, f=1MHz, T_A=25°C)



Energy Rating Curve (T_A=25°C)



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Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division 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
CPC1333G / CPC1333GR	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.

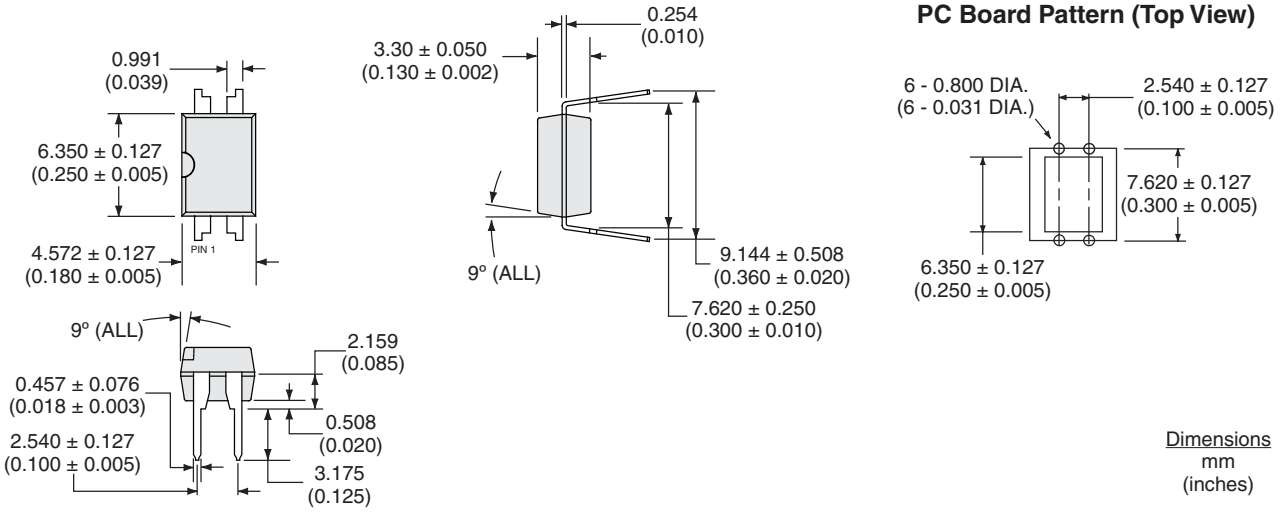
Device	Maximum Temperature x Time
CPC1333G / CPC1333GR	250°C for 30 seconds

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division 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.

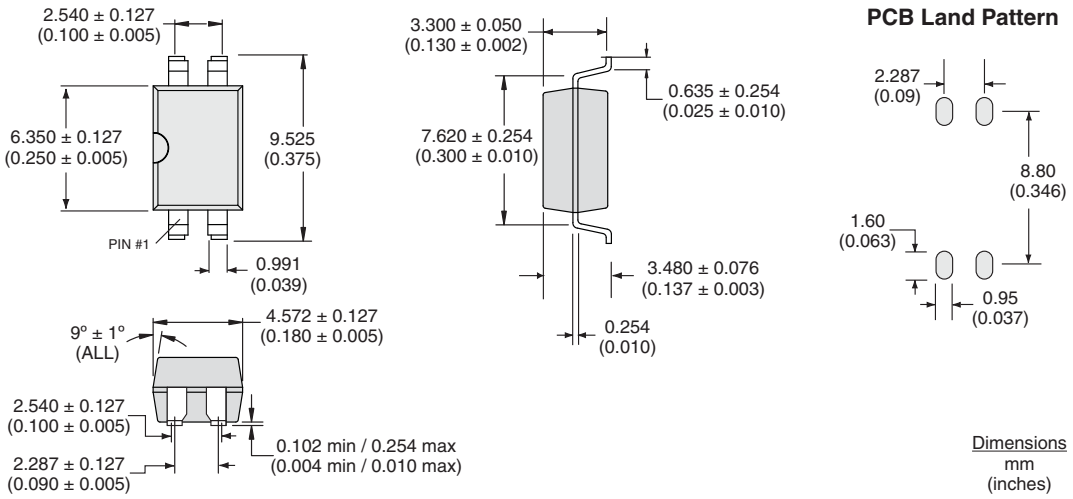
Mechanical Dimensions

CPC1333G



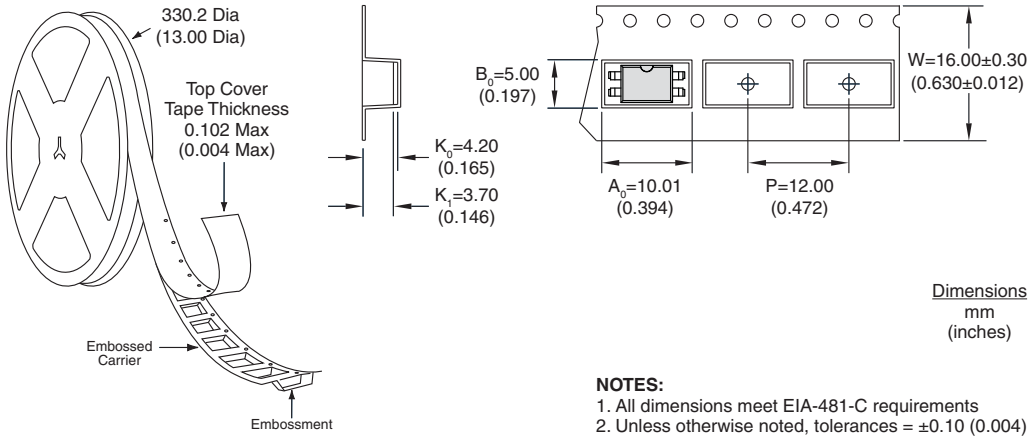
Dimensions
mm
(inches)

CPC1333GR



Dimensions
mm
(inches)

CPC1333GRTR Tape & Reel



Dimensions
mm
(inches)

NOTES:
1. All dimensions meet EIA-481-C requirements
2. Unless otherwise noted, tolerances = ±0.10 (0.004)

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

Specification: DS-CPC1333-R02

12/16/2012