



## Description

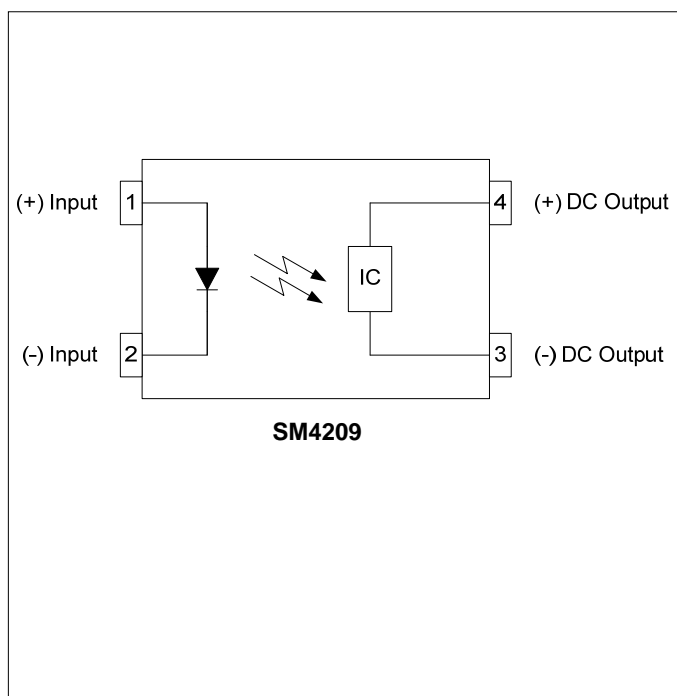
The SM4209 consists of an input drive LED optically coupled to a photodiode array output designed to drive highly capacitive loads, including the gate of a power MOSFET. The active discharge circuit of the PDA assures quick discharge of MOSFETs, providing fast turn-off times. This device can be used in a wide variety of applications for which high levels of input are required for a MOSFET output.

The SM4209 comes standard in a miniature 4 pin SOP package.

## Applications

- Isolated means to drive discrete power MOSFETs
- Lighting Controls
- Process Control Modules
- Solid State Relays
- Solenoid Controls

## Schematic Diagram



## Features

- Miniature 4 pin SOP package
- Built in active discharge circuit for fast turn-off
- Fast Turn-On
- 12V Gate Drive Voltage
- High Input-to-Output Isolation (1.5kV<sub>RMS</sub>)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

## Agency Approvals

UL / C-UL: File # E201932  
 VDE: File # 40035191 (EN 60747-5-2)

## Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature .....-55 to +125°C  
 Operating Temperature .....-40 to +85°C  
 Continuous Input Current.....50mA  
 Transient Input Current.....500mA  
 Reverse Input Control Voltage .....5V  
 Input Power Dissipation.....70mW  
 Total Power Dissipation .....170mW  
 Solder Temperature – Wave (10sec).....260°C  
 Solder Temperature – IR Reflow (10sec).....260°C

## Ordering Information

Part Number	Description
SM4209	4 pin SOP, (100/Tube)
SM4209-TR	4 pin SOP, Tape and Reel (2000/Reel)

**NOTES:** Suffixes listed above are not included in marking on device for part number identification

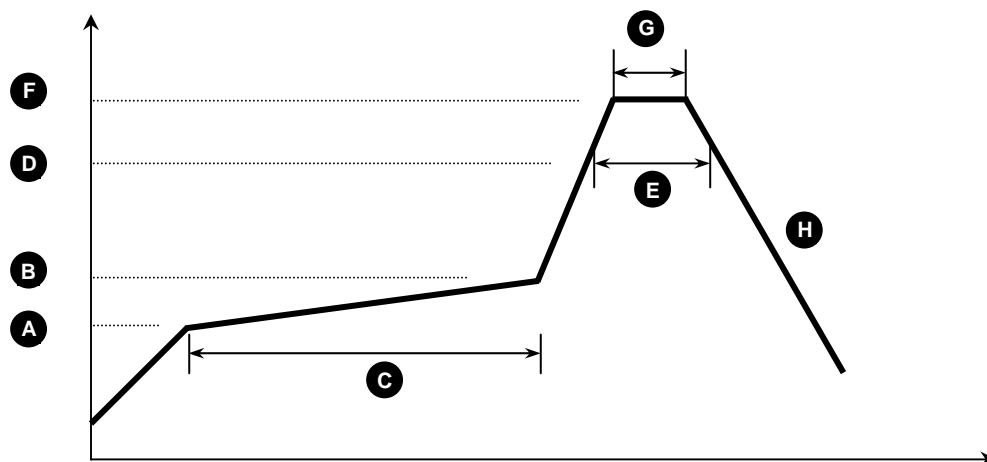
**Electrical Characteristics,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
<b>Input Specifications</b>						
LED Forward Voltage	$V_F$	-	1.4	1.8	V	$I_F = 10\text{mA}$
LED Reverse Voltage	$BV_R$	5	-	-	V	$I_R = 10\mu\text{A}$
Reverse Leakage Current	$I_{\text{InRleak}}$	-	-	10	$\mu\text{A}$	$V_R = 5\text{V}$
Turn-On Current	$I_F$	-	5	10	mA	$V_{\text{OUT}} = 5\text{V}$
Turn-Off Current	$I_{F(\text{OFF})}$	-	0.5	-	mA	$V_{\text{OUT}} = 2\text{V}$
<b>Output Specifications</b>						
Open Circuit Voltage	$V_{\text{OC}}$	12	14	-	V	$I_F = 10\text{mA}$
Short Circuit Voltage	$I_{\text{SC}}$	10	15	-	$\mu\text{A}$	$I_F = 10\text{mA}$
<b>Isolation Specifications</b>						
Isolation Voltage	$V_{\text{ISO}}$	1500	-	-	$V_{\text{RMS}}$	$\text{RH} \leq 50\%, t=1\text{min}$
Input-Output Resistance	$R_{\text{I-O}}$	-	$10^{12}$	-	$\Omega$	$V_{\text{I-O}} = 500V_{\text{DC}}$

## SM4209 Solder Reflow Temperature Profile Recommendations

### (1) Infrared Reflow:

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250°C:



Process Step	Description	Parameter
A	Preheat Start Temperature (°C)	150°C
B	Preheat Finish Temperature (°C)	180°C
C	Preheat Time (s)	90 - 120s
D	Melting Temperature (°C)	230°C
E	Time above Melting Temperature (s)	30s
F	Peak Temperature, at Terminal (°C)	260°C
G	Dwell Time at Peak Temperature (s)	10s
H	Cool-down (°C/s)	<6°C/s

### (2) Wave Solder:

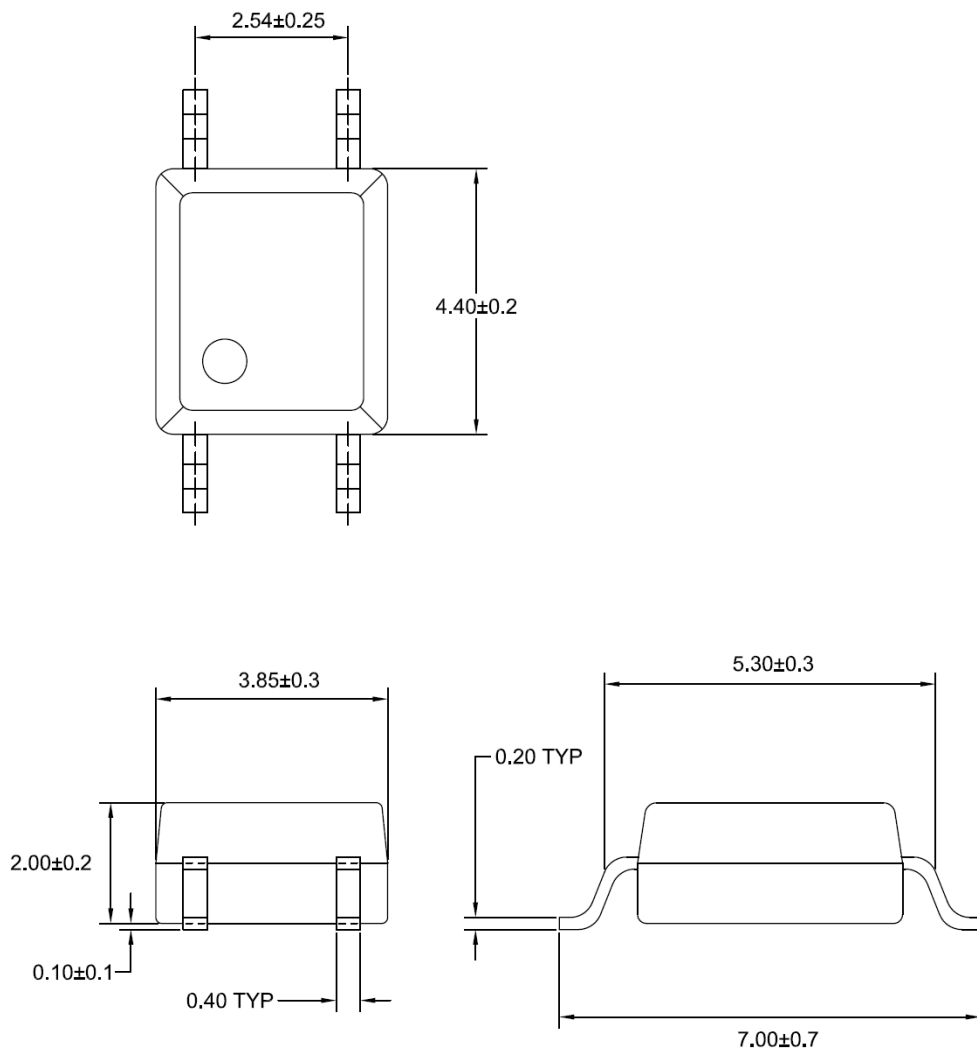
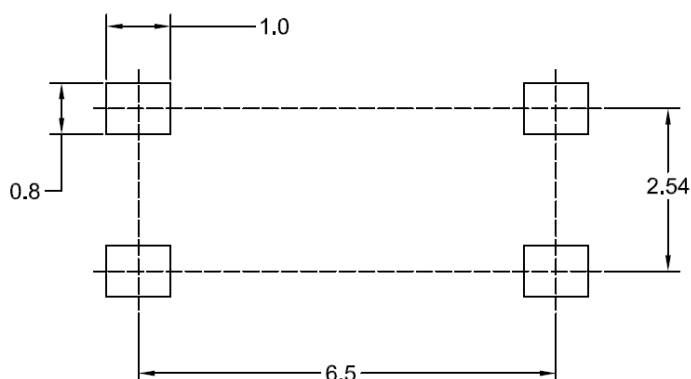
Maximum Temperature: 260°C (at terminal)  
 Maximum Time: 10s  
 Pre-heating: 100 - 150°C (30 - 90s)  
 Single Occurrence

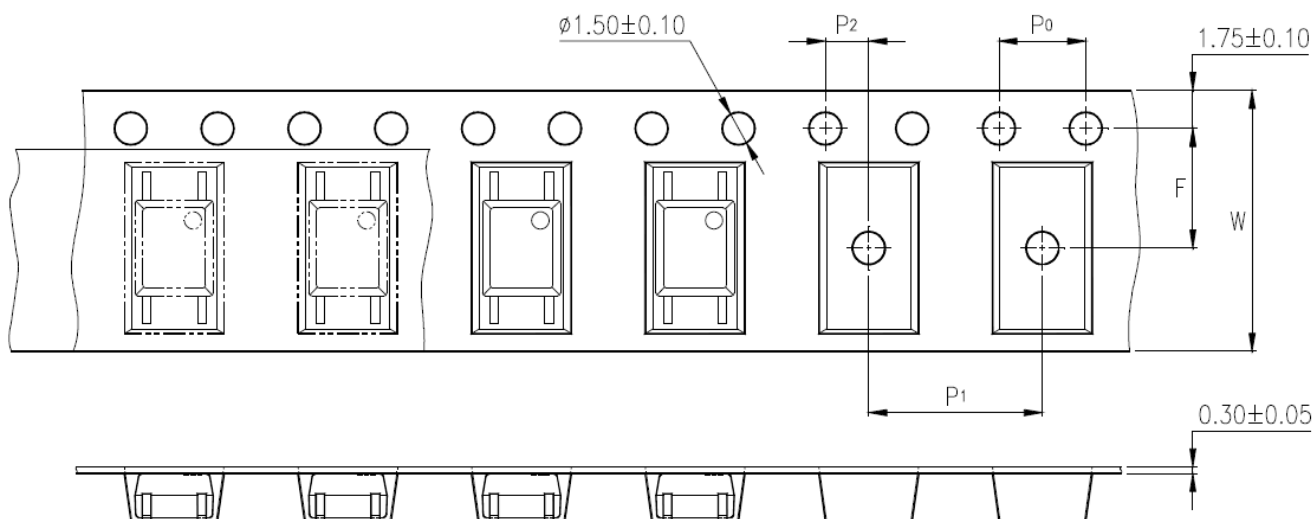
### (3) Hand Solder:

Maximum Temperature: 350°C (at tip of soldering iron)  
 Maximum Time: 3s  
 Single Occurrence

**SM4209 Package Dimensions**
*4 PIN SOP Package*

**Note:** All dimensions in millimeters [mm]


*4 PIN SOP Footprint*


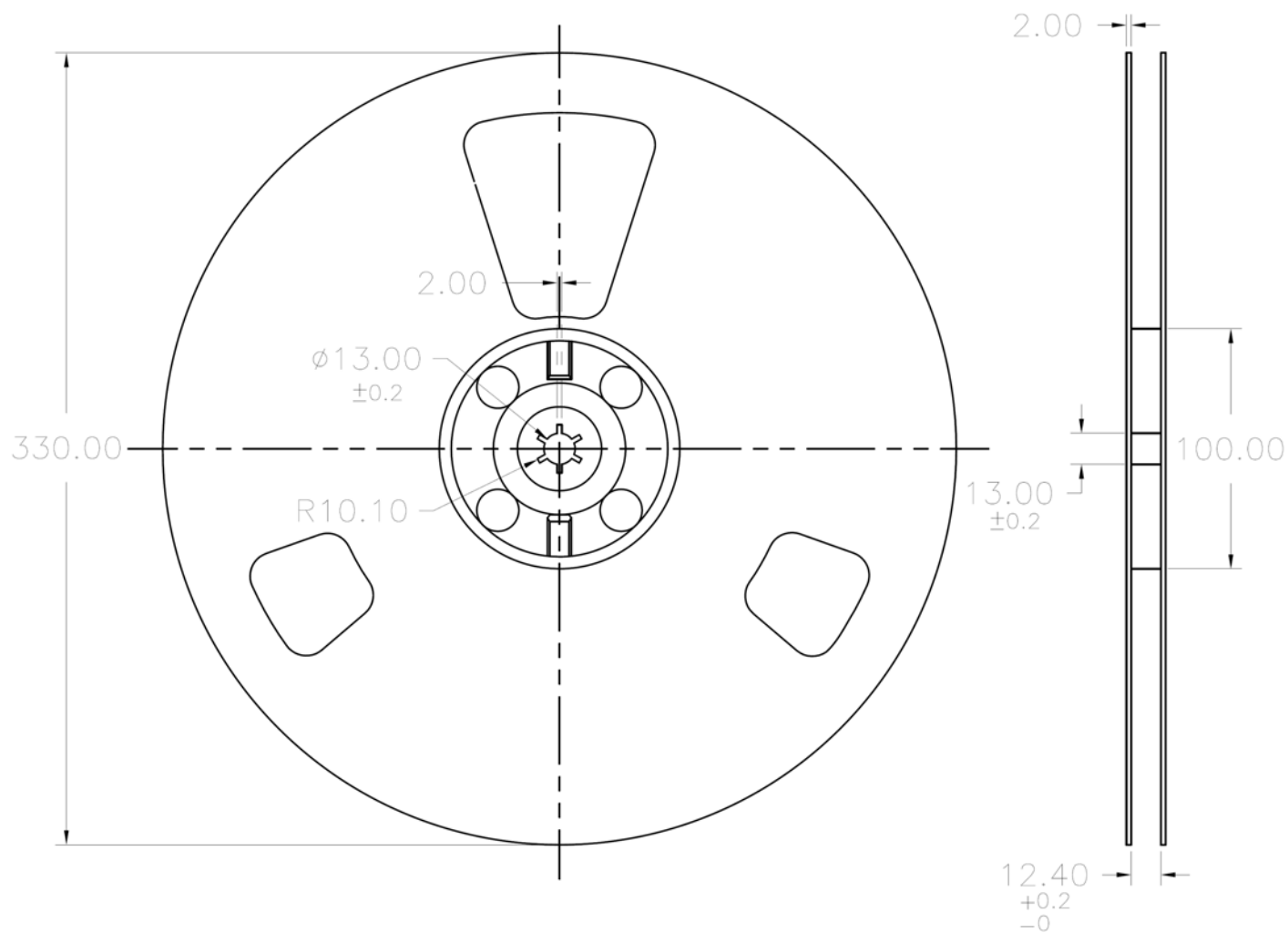
**SM4209 Packaging Specifications**
*Tape & Reel Specifications (T&R)*
**Note:** All dimensions in millimeters [mm]


Specification	Symbol	Dimensions, mm ( inches )
Tape Width	W	$12 \pm 0.3$ ( 0.47 )
Sprocket Hole Pitch	P0	$4 \pm 0.1$ ( 0.15 )
Compartment Location	F P2	$5.5 \pm 0.1$ ( 0.217 ) $2 \pm 0.1$ ( 0.079 )
Compartment Pitch	P1	$8 \pm 0.1$ ( 0.315 )

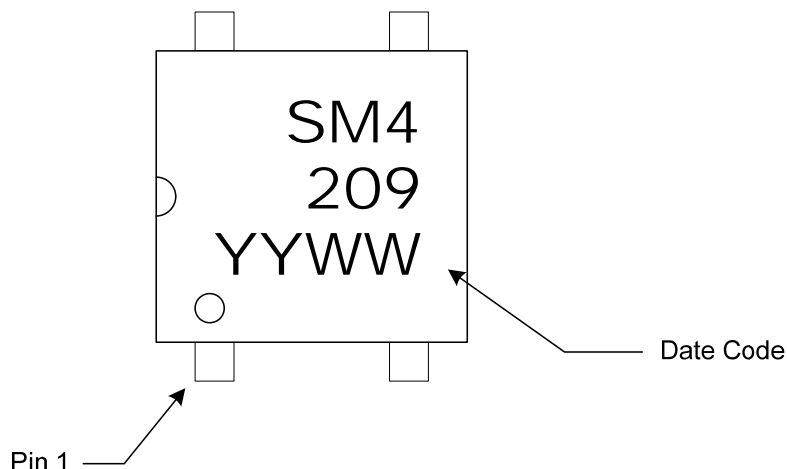
**SM4209 Packaging Specifications**

*Tape & Reel Specifications (T&R)*

**Note:** All dimensions in millimeters [mm]



## SM4209 Package Marking



## SM4209 Package Weights

Device	Single Unit	Full Tube (100pcs)	Full Pouch (10 tubes)	Full Reel (2000pcs)
SM4209	0.10	23	240	-
SM4209-TR	0.10	-	-	500

**Note:** All weights above are in GRAMS, and include packaging materials where applicable

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