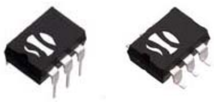
SOLID STATE
OPTRONICS



SM6009

Optically Coupled
MOSFET Driver
w/Discharge Circuit

Description

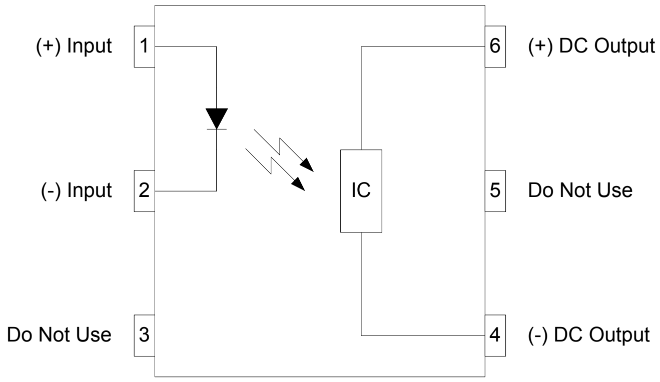
The SM6009 consists of an input drive LED optically coupled to a photodiode array output designed to drive highly capacitive loads, including the gate of a power MOSFET. The active discharge circuit of the PDA assures quick discharge of MOSFETs, providing fast turn-off times. This device can be used in a wide variety of applications for which high levels of input are required for a MOSFET output.

The SM6009 comes standard in a miniature 6 pin DIP package making it ideal for high-density board applications.

Applications

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

Schematic Diagram



SM6009

Features

- Compact 6 pin DIP/SMD package
- Built in active discharge circuit for fast turn-off
- Fast Turn-On
- 12V Gate Drive Voltage
- High Input-to-Output Isolation (up to 5kV$_{RMS}$)
- 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	400mA
Reverse Input Control Voltage	5V
Input Power Dissipation	40mW
Output Power Dissipation	400mW
Solder Temperature – Wave (10sec)	260°C
Solder Temperature – IR Reflow (10sec)	260°C

Ordering Information

Part Number	Description
SM6009	6 pin DIP, (50/Tube)
SM6009-H	5kV$_{RMS}$ Viso, 6 pin DIP, (50/Tube)
SM6009-S	6 pin SMD, (50/Tube)
SM6009-HS	5kV$_{RMS}$, 6 pin SMD, (50/Tube)
SM6009-STR	6 pin SMD, Tape and Reel (1000/Reel)
SM6009-HSTR	5kV$_{RMS}$, 6 pin SMD, Tape and Reel (1000/Reel)

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

Electrical Characteristics, T_A = 25°C (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.4	1.8	V	I_F = 10mA
LED Reverse Voltage	BV_R	5	-	-	V	I_R = 10µA
Reverse Leakage Current	$I_{InRleak}$	-	-	10	µA	V_R = 5V
Turn-On Current	I_F	-	5	10	mA	V_{OUT} = 5V
Turn-Off Current	$I_{F(OFF)}$	-	0.5	-	mA	V_{OUT} = 2V
Output Specifications						
Open Circuit Voltage	V_{OC}	12	14	-	V	I_F = 10mA
Short Circuit Voltage	I_{SC}	10	15	-	µA	I_F = 10mA
Isolation Specifications						
Isolation Voltage	V_{ISO}	3750	-	-	V_{RMS}	RH ≤ 50%, t=1min
(-H Option)		5000	-	-		
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	V_{I-O} = 500V_{DC}

SM6009 Solder 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 250ºC:

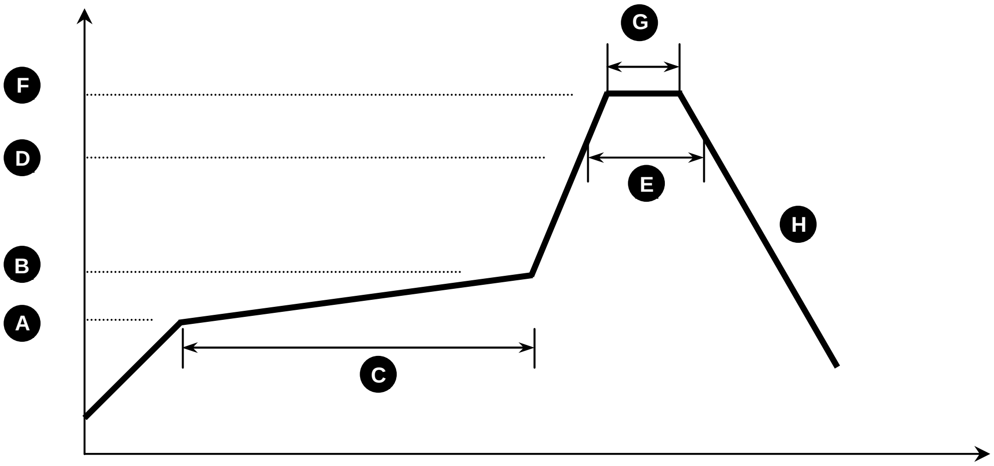


Figure 1

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

(2) *Wave Solder*:

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

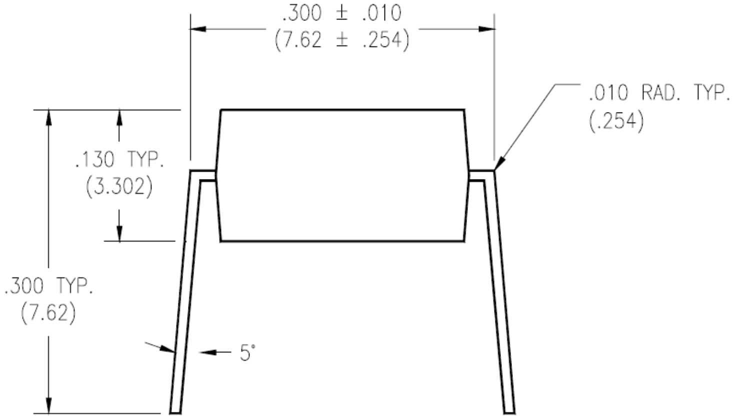
(3) *Hand Solder*:

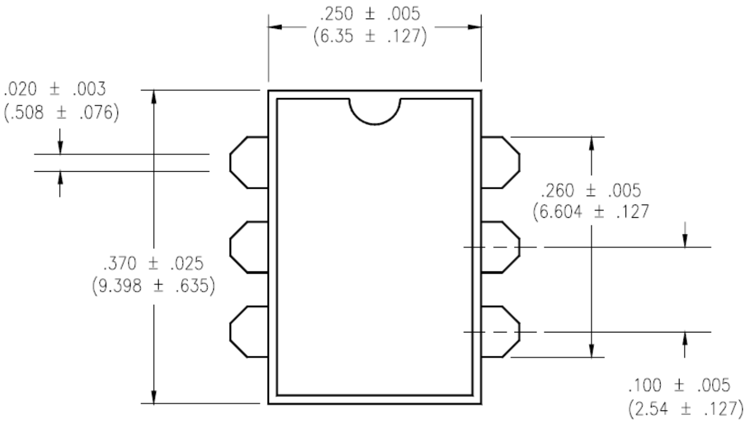
Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

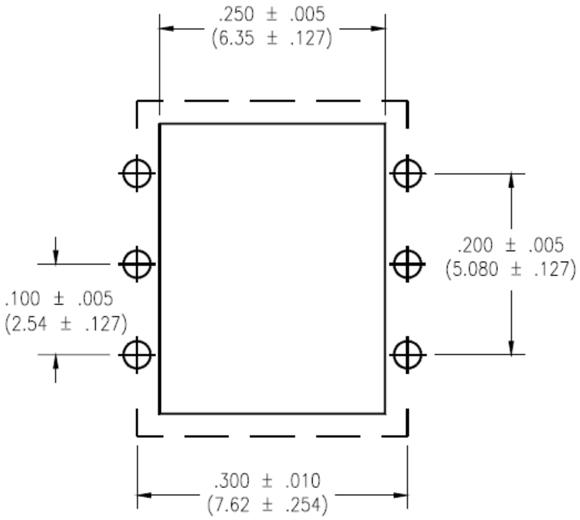
SM6009 Package Dimensions

6 PIN DIP Package

Note: *All dimensions in inches [“] with millimeters in parenthesis ()*



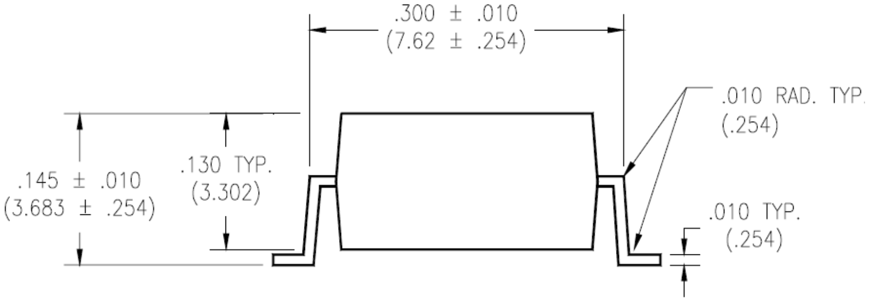


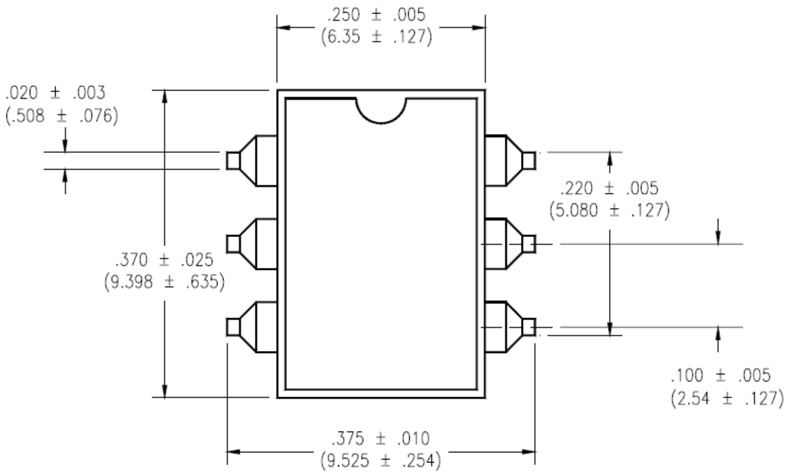


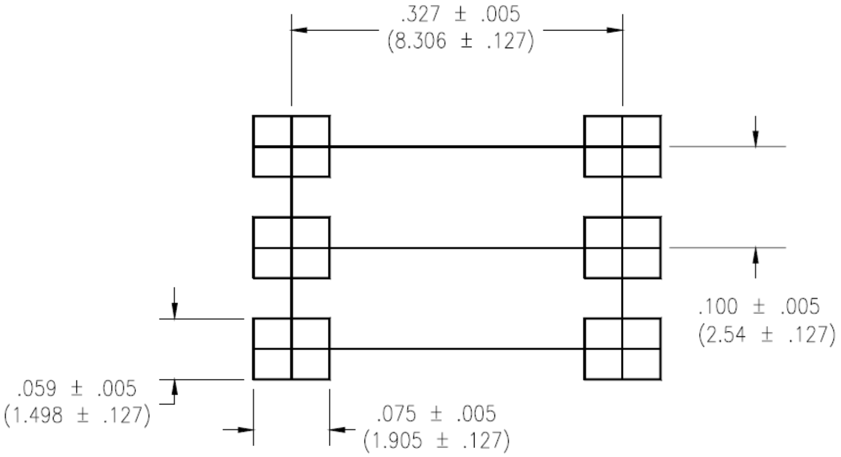
SM6009 Package Dimensions

6 PIN SMD Surface Mount Package (-S)

Note: *All dimensions in inches [“] with millimeters in parenthesis ()*



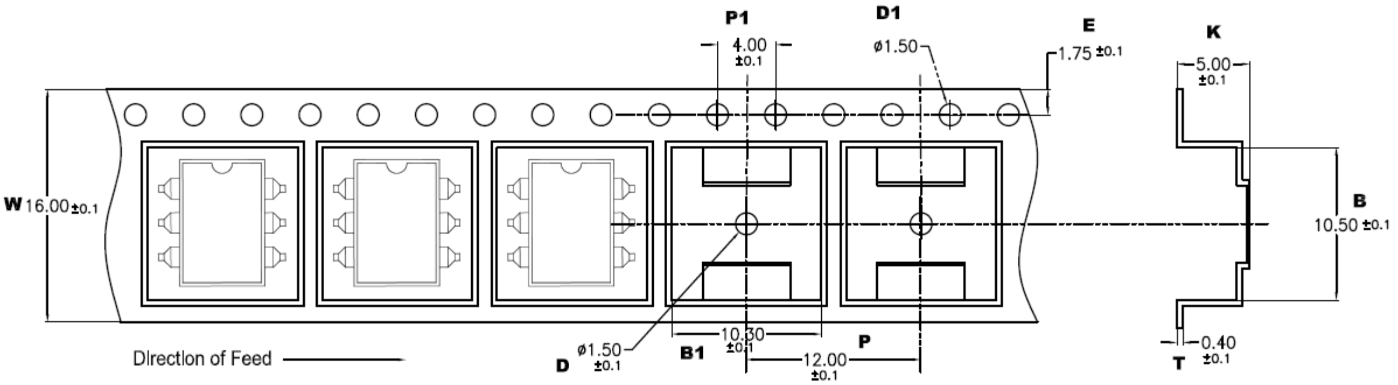




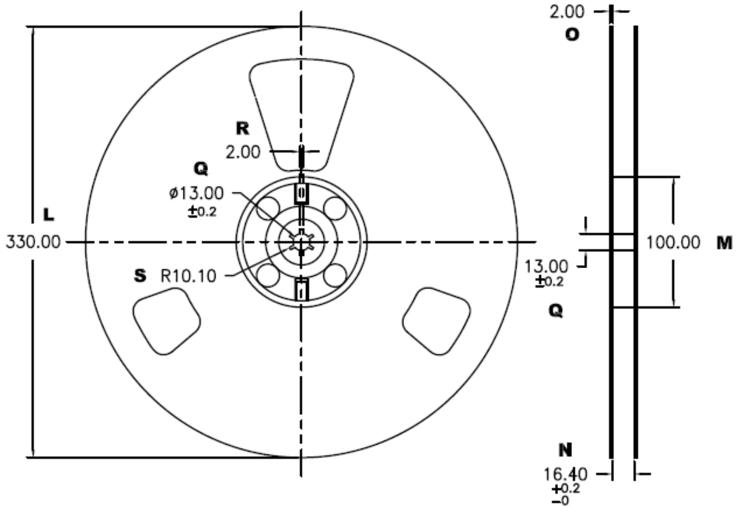
SM6009 Package Dimensions

6 PIN SMD Tape & Reel (-STR)

Note: *All dimensions in millimeters*

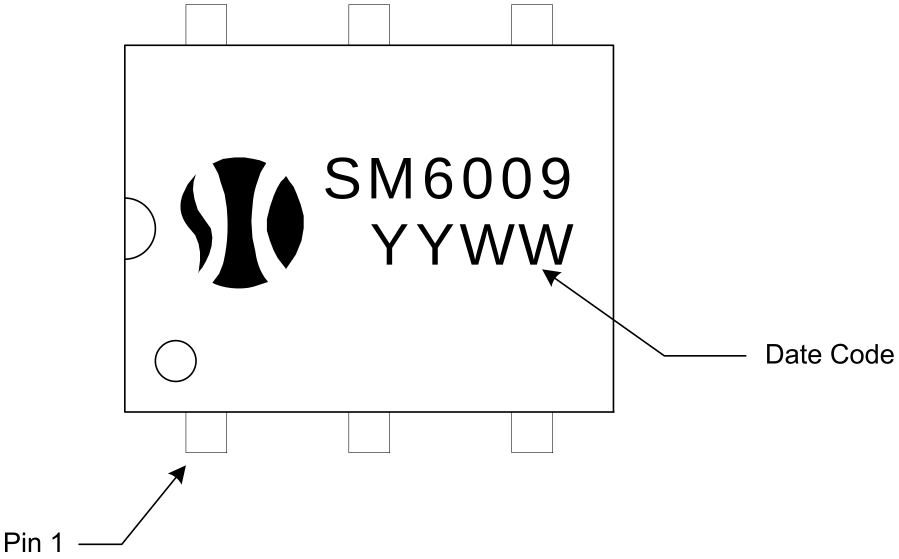


W	B	B1	P	P1	K	E	T	D	D1
16.00 ±0.1	10.50 ±0.1	10.30 ±0.1	12.00 ±0.1	4.00 ±0.1	5.00 ±0.1	1.75 ±0.1	0.40 ±0.1	1.50 ±0.1	1.50 ±0.1



L	M	N	O	Q	R	S
330.00	100.00	16.40 +0.2	2.00 ±0.1	13.00 ±0.2	2.00	10.00

SM6009 Package Marking



SM6009 Package Weights

Device	Single Unit	Full Tube (50pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
SM6009(-H)	0.45	48	490	-
SM6009-(H)S	0.44	46	470	-
SM6009-(H)STR	0.44	-	-	884

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

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