



## Description

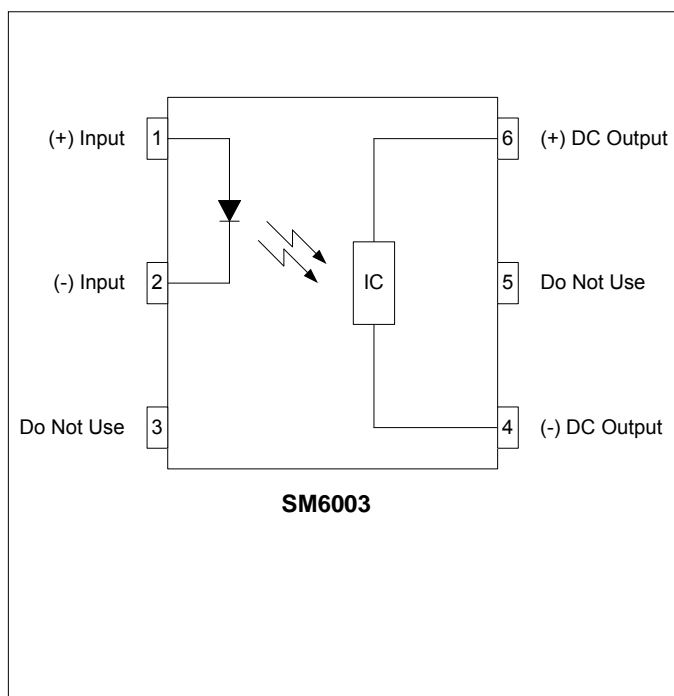
The SM6003 consists of an input drive LED optically coupled to a photodiode array output designed to drive highly capacitive loads, including the gate of a power MOSFET. The active discharge circuit of the PDA assures quick discharge of MOSFETs, providing fast turn-off times. This device can be used in a wide variety of applications for which high levels of input are required for a MOSFET output.

The SM6003 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



## Features

- Compact 6 pin DIP/SMD package
- Built in active discharge circuit for fast turn-off
- Fast Turn-On
- 6V Gate Drive Voltage
- High Input-to-Output Isolation (up to 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 .....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
SM6003	6 pin DIP, (50/Tube)
SM6003-H	5kV <sub>RMS</sub> Viso, 6 pin DIP, (50/Tube)
SM6003-S	6 pin SMD, (50/Tube)
SM6003-HS	5kV <sub>RMS</sub> , 6 pin SMD, (50/Tube)
SM6003-STR	6 pin SMD, Tape and Reel (1000/Reel)
SM6003-HSTR	5kV <sub>RMS</sub> , 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,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
<b>Input Specifications</b>						
LED Forward Voltage	$V_F$	-	2.8	3.5	V	$I_F = 10\text{mA}$
LED Reverse Voltage	$BV_R$	5	-	-	V	$I_R = 10\mu\text{A}$
Reverse Leakage Current	$I_{InRleak}$	-	-	10	$\mu\text{A}$	$V_R = 5\text{V}$
Turn-On Current	$I_F$	-	5	10	mA	$V_{OUT} = 5\text{V}$
Turn-Off Current	$I_{F(OFF)}$	-	0.5	-	mA	$V_{OUT} = 2\text{V}$
<b>Output Specifications</b>						
Open Circuit Voltage	$V_{OC}$	6	6.3	-	V	$I_F = 10\text{mA}$
Short Circuit Voltage	$I_{SC}$	15	20	-	$\mu\text{A}$	$I_F = 10\text{mA}$
<b>Isolation Specifications</b>						
Isolation Voltage (-H Option)	$V_{ISO}$	3750	-	-	$V_{RMS}$	RH $\leq$ 50%, t=1min
		5000	-	-		
Input-Output Resistance	$R_{I-O}$	-	$10^{12}$	-	$\Omega$	$V_{I-O} = 500V_{DC}$

**SM6003 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 250°C:

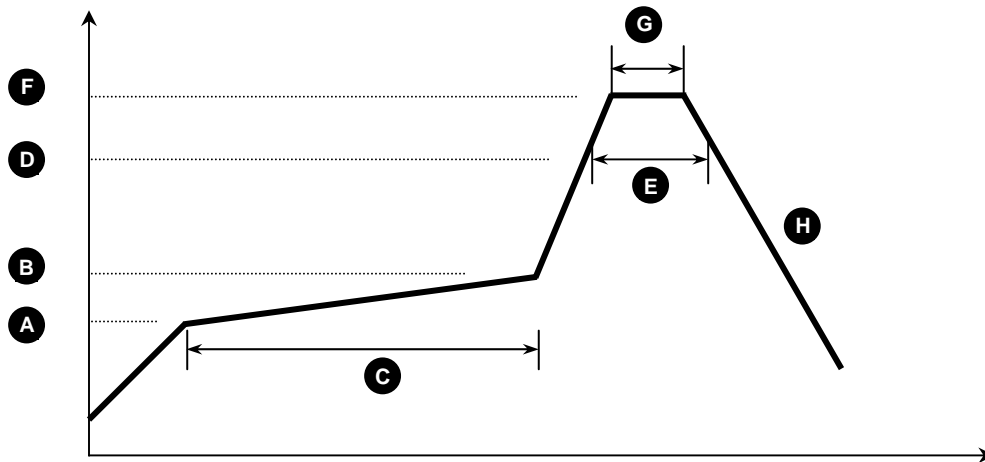


Figure 1

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

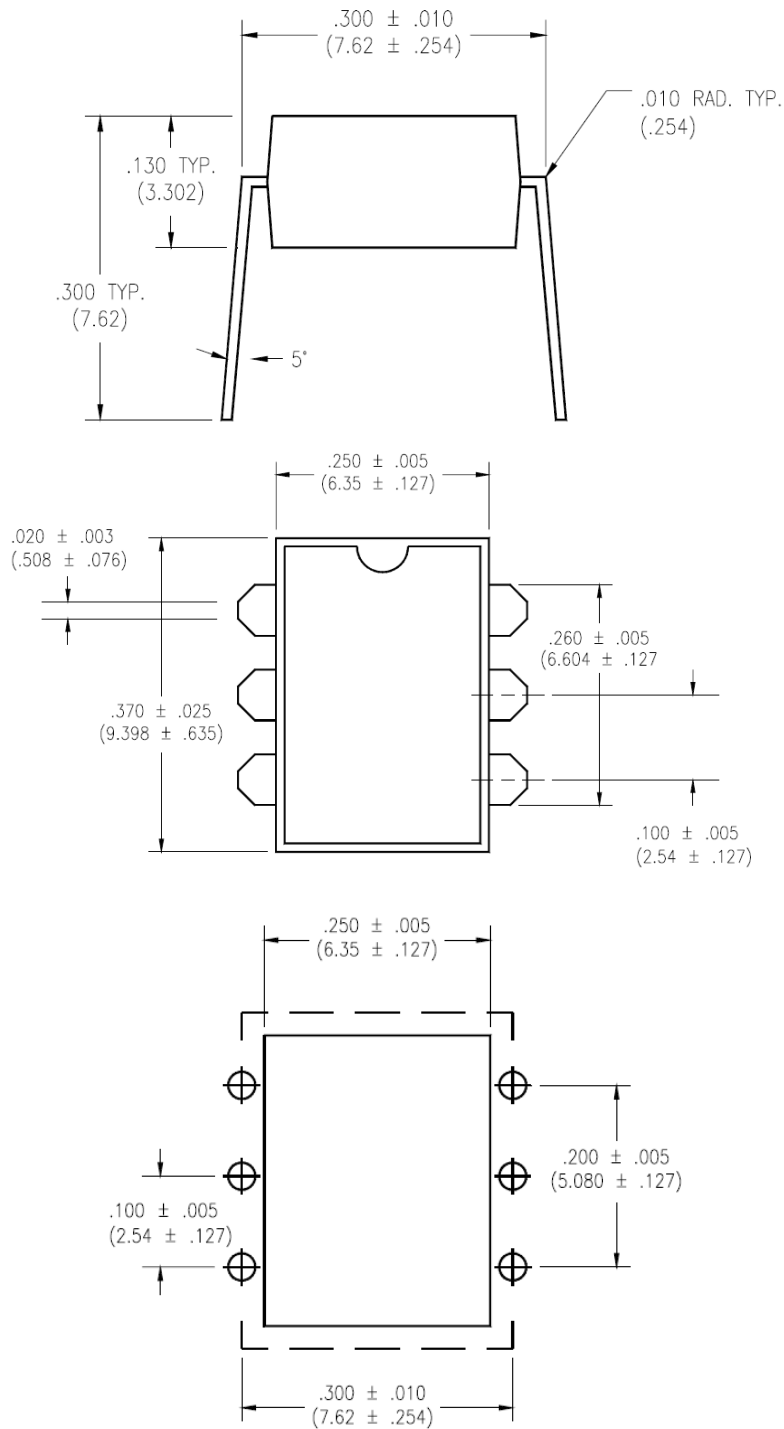
**(3) Hand Solder:**

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

**SM6003 Package Dimensions**

6 PIN DIP Package

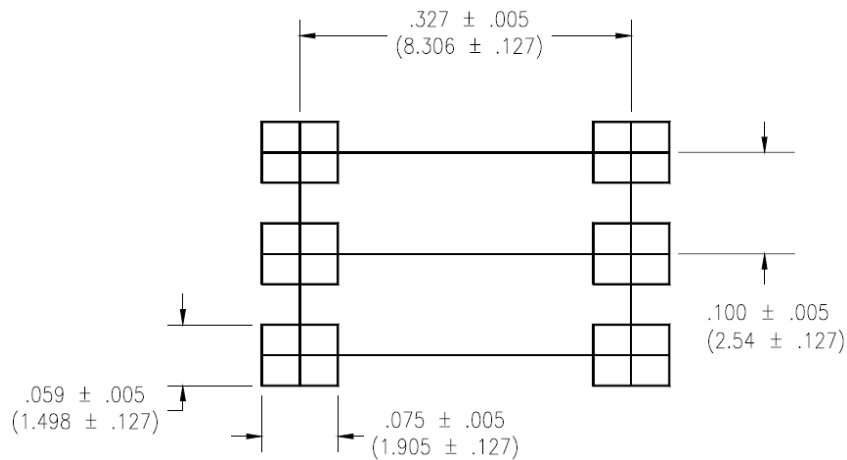
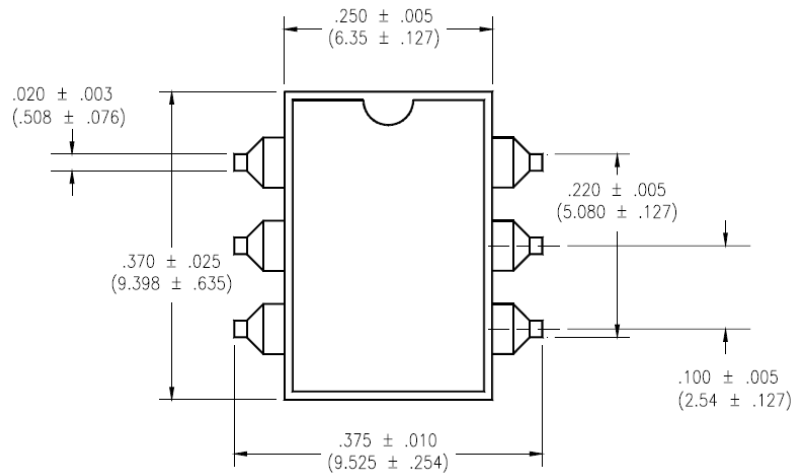
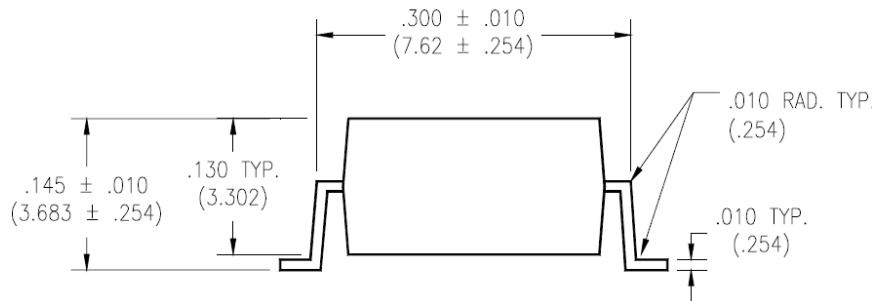
**Note:** All dimensions in inches ["] with millimeters in parenthesis ( )



**SM6003 Package Dimensions**

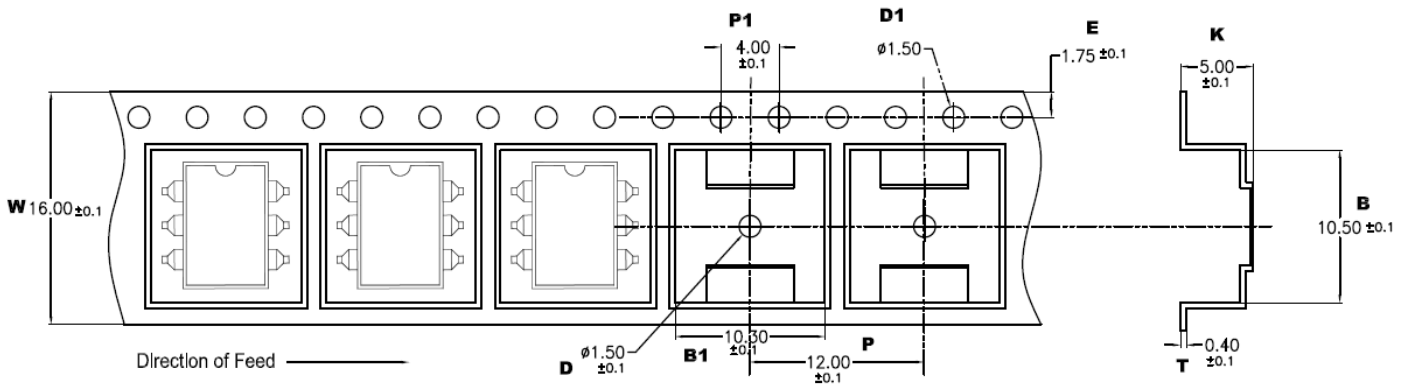
6 PIN SMD Surface Mount Package (-S)

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

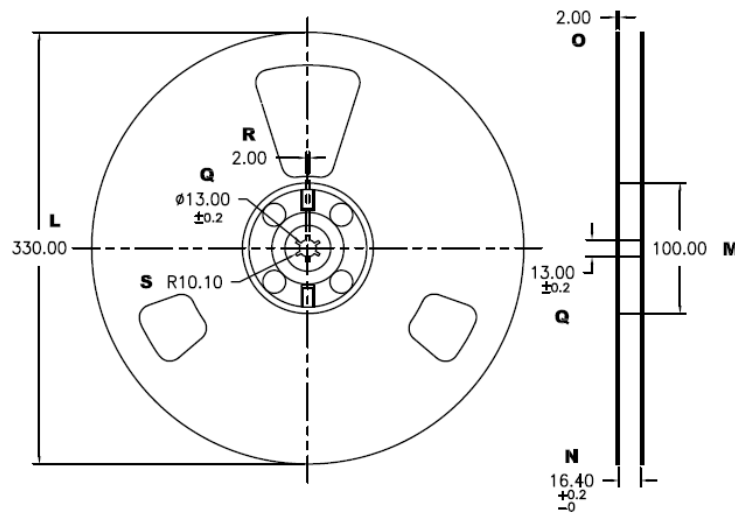


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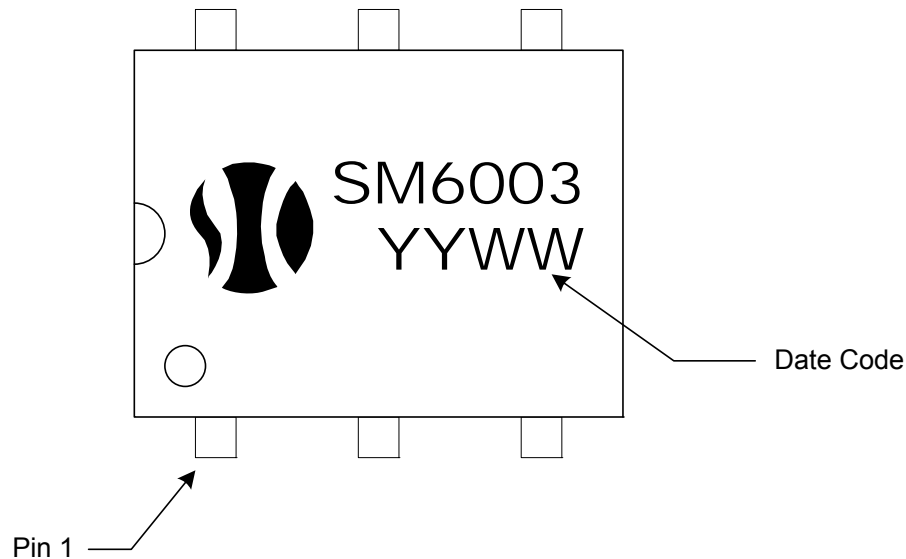
6 PIN SMD Tape &amp; Reel (-STR)

**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

**SM6003 Package Marking**

**SM6003 Package Weights**

Device	Single Unit	Full Tube (50pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
SM6003(-H)	0.45	48	490	-
SM6003(-H)S	0.44	46	470	-
SM6003(-H)STR	0.44	-	-	884

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

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