SOLID STATE OPTRONICS



SPT601

DC Input
400V
Photo SCR / Thyristor

Description

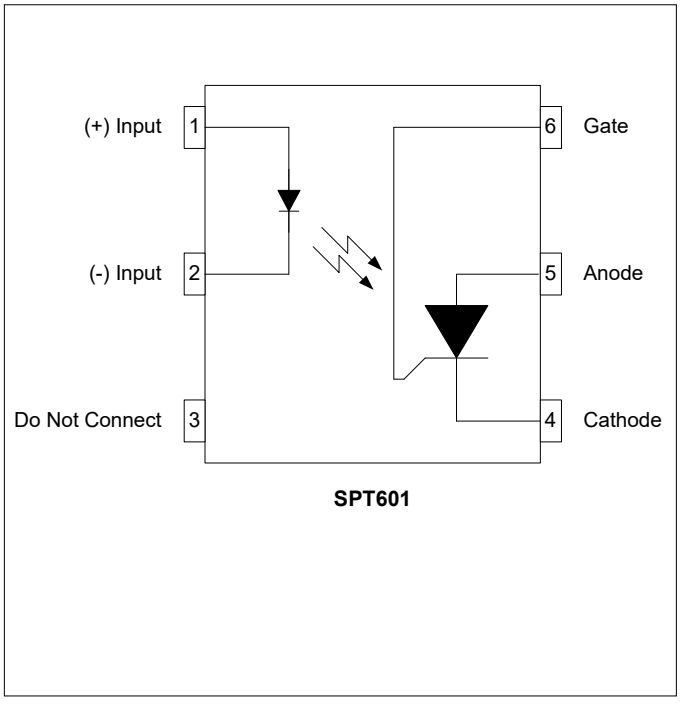
The SPT601 consists of a single input AlGaAs LED optically coupled to a photo-sensitive SCR. Optical coupling provides high isolation levels (up to $5kV_{RMS}$) while maintaining low-level DC signal control capability. With high load voltage and low input current, the SPT601 is an ideal solution for driving SCRs, Triacs and Solid State Relays.

The SPT601 comes standard in a compact 6 pin DIP package making it ideal for high-density board applications.

Applications

- Home Appliances
- Motor / Drive Controls
- Solid State Relays
- Solenoid / Valve Controls
- Temperature Controls
- Dimmer Controls

Schematic Diagram



SPT601

Features

- Low Input Control Current (5mA MAX)
- High Blocking Voltage (400V)
- 400mA Maximum Continuous Current
- High Isolation Voltage (up to $5kV_{RMS}$)
- High Transient Immunity (dV/dt = 400V/µS MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

- UL
- C-UL

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
Transient Output Current 10A
Reverse Input Control Voltage 5V
Input Power Dissipation.....40mW
Output Power Dissipation 500mW
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

Ordering Information

Part Number	Description
SPT601	6 pin DIP, (60/Tube)
SPT601-H	$5kV_{RMS}$ V_{ISO}, 6 pin DIP, (60/Tube)
SPT601-S	6 pin SMD, (60/Tube)
SPT601-HS	$5kV_{RMS}$, 6 pin SMD, (60/Tube)
SPT601-STR	6 pin SMD, Tape and Reel (1000/Reel)
SPT601-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

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SPT601 /H/S/TR
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010047

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

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.2	1.5	V	I_F = 10mA
LED Reverse Voltage	BV_R	5	-	-	V	I_R = 10µA
Reverse Leakage Current	$I_{InRleak}$	-	-	10	µA	V_R = 5µA
Trigger (Must Operate) Current[1]	I_{InOn}	-	2.5	5	mA	I_O = 400mA
Output Specifications						
Forward Blocking Voltage	V_{DM}	400	-	-	V	R_{GK}=10kΩ, T_A=100°C, I_D=150µA
Reverse Blocking Voltage	V_{RM}	400	-	-	V	R_{GK}=10kΩ, T_A=100°C, I_R=150µA
Continuous Load Current	I_{DM}	-	-	400	mA	I_F = 5mA
Transient Surge Current	$I_{DM\ (PEAK)}$	-	-	10	A	T = 16µS
On-State Voltage	V_{TM}	-	1.1	1.4	V	I_F = 5mA, I_{DM} = 400mA
Forward Leakage Current	I_{DM}	-	1	10	µA	R_{GK}=10kΩ, T_A=100°C, V_{DM}=400V, I_F=0
Reverse Leakage Current	I_{RM}	-	1	10	µA	R_{GK}=10kΩ, T_A=100°C, V_{RM}=400V, I_F=0
Gate Trigger Voltage	V_{GT}	-	0.6	1	V	V_{FX}=100V, R_{GK}=27kΩ, R_L=10kΩ
Gate Trigger Current	I_{GT}	-	20	50	µA	V_{FX}=100V, R_{GK}=27kΩ, R_L=10kΩ
Critical Rate of Rise[2]	dV/dt	400	-	-	V/µS	-
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}

Note 1: Resistive load. For inductive loads, higher drive current is recommended

Note 2: This is for static dV/dt.

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SPT601 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 1: *Maximum Load Current vs. Temperature*

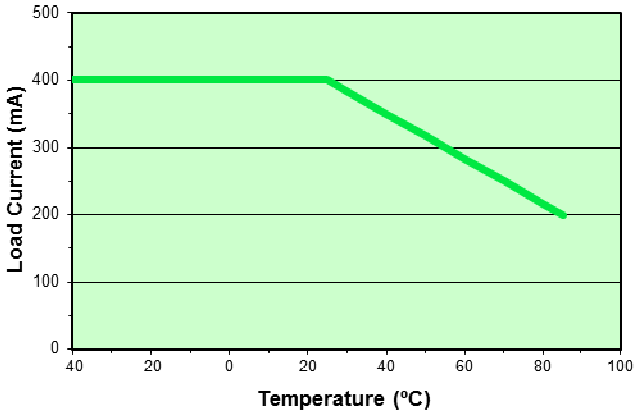
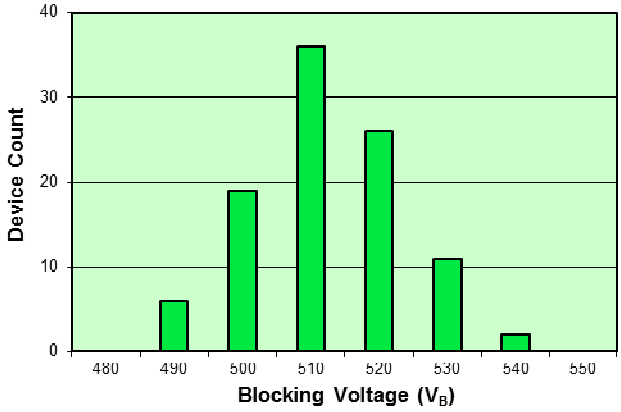


Figure 2: *Typical Blocking Voltage Distribution* (N = 100, Ta = 25ºC)



SPT601 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:

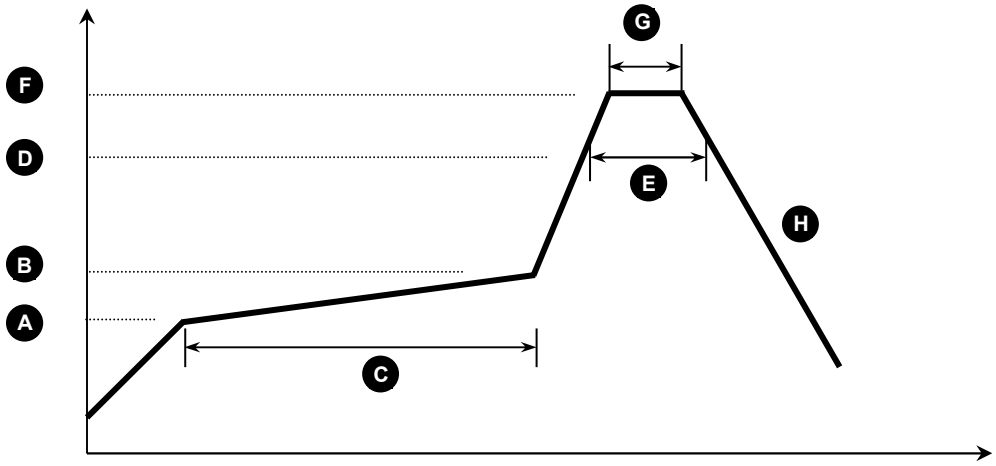


Figure 1

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*:

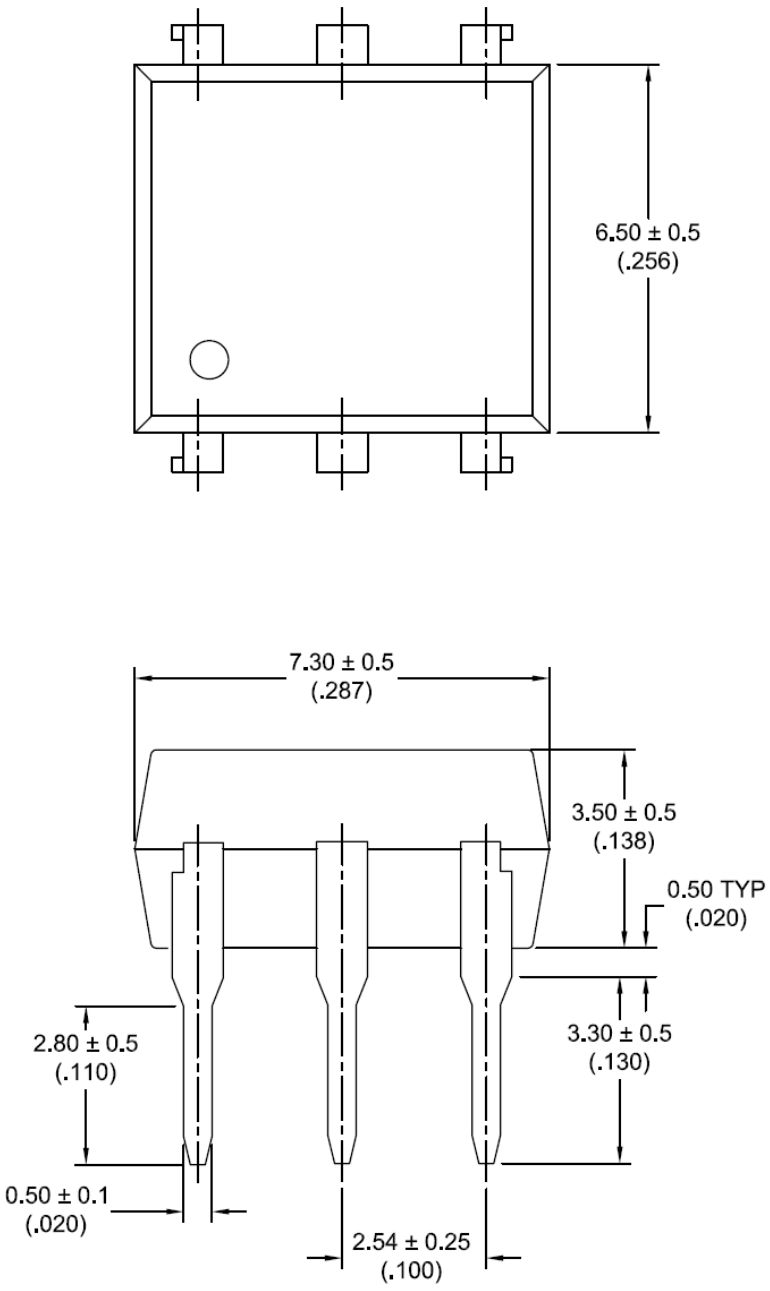
Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

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SPT601 Package Dimensions

6 PIN DIP Package

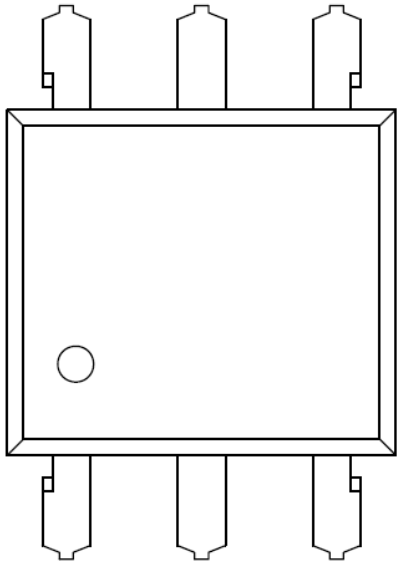
Note: *All dimensions in millimeters with inches [“] in parenthesis ()*

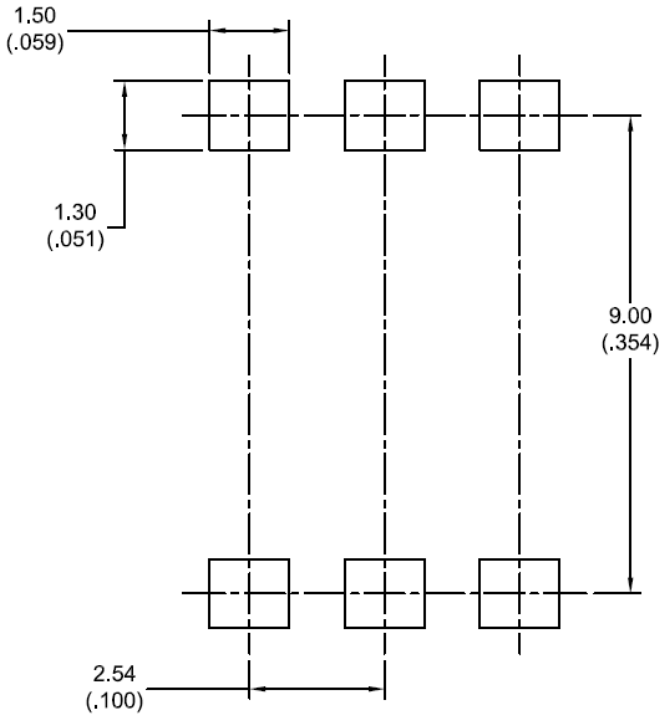


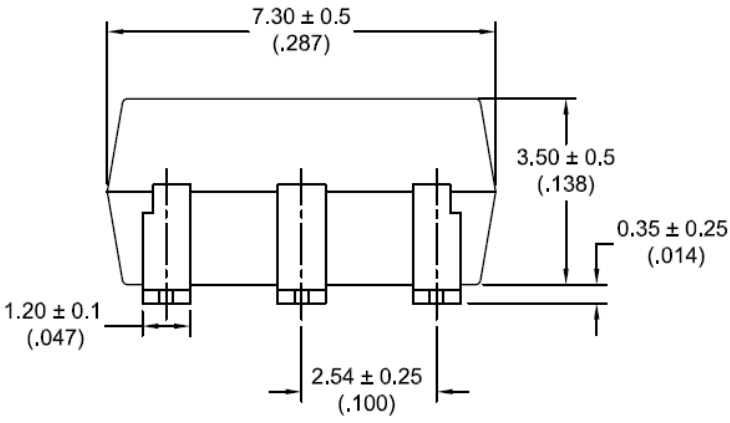
SPT601 Package Dimensions

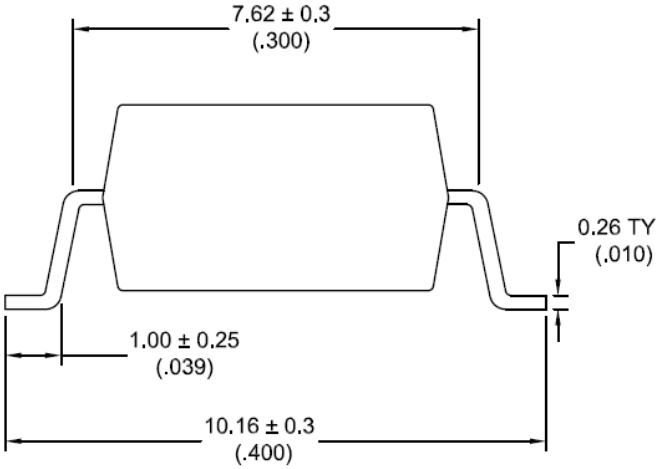
6 PIN SMD Surface Mount Package (-S)

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







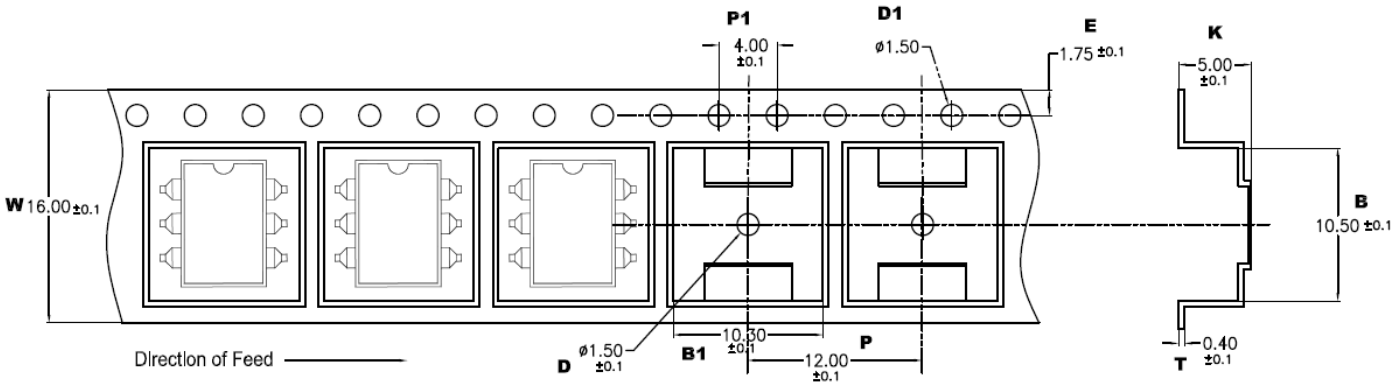


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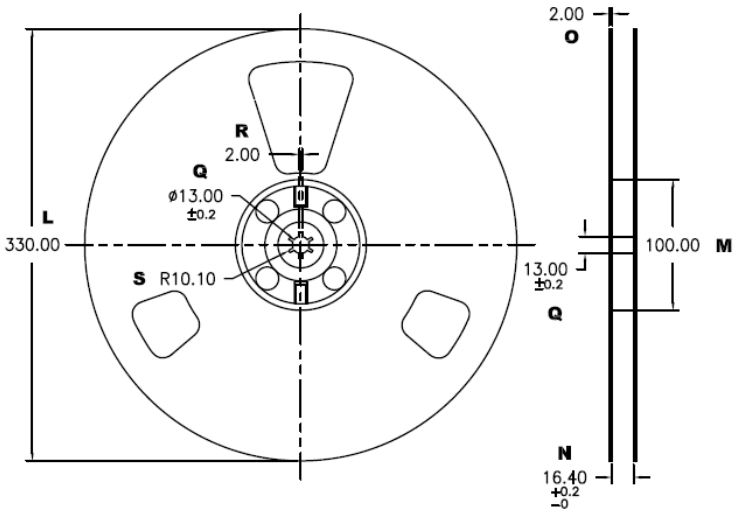
SPT601 Package Dimensions

6 PIN SMD Tape & Reel (-STR)

Note: *All dimensions in millimeters*

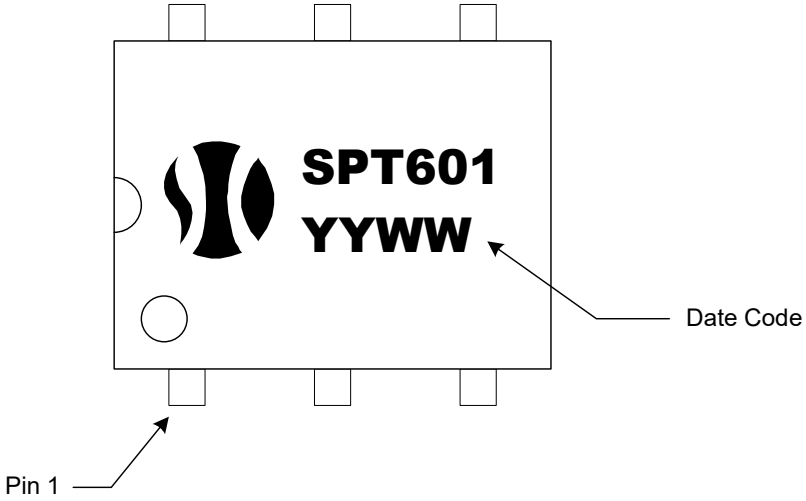


W	B	B1	P	P1	K	E	T	D	D1
16.00 ±0.1	10.50 ±0.1	10.30 ±0.1	12.00 ±0.1	4.00 ±0.1	5.00 ±0.1	1.75 ±0.1	0.40 ±0.1	1.50 ±0.1	1.50 ±0.1



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

SPT601 Package Marking



SPT601 Package Weights

Device	Single Unit	Full Tube (60pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
SPT601-(H)	0.41	43	450	-
SPT601-(H)S	0.40	42	440	-
SPT601-(H)STR	0.40	-	-	880

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

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