



Description

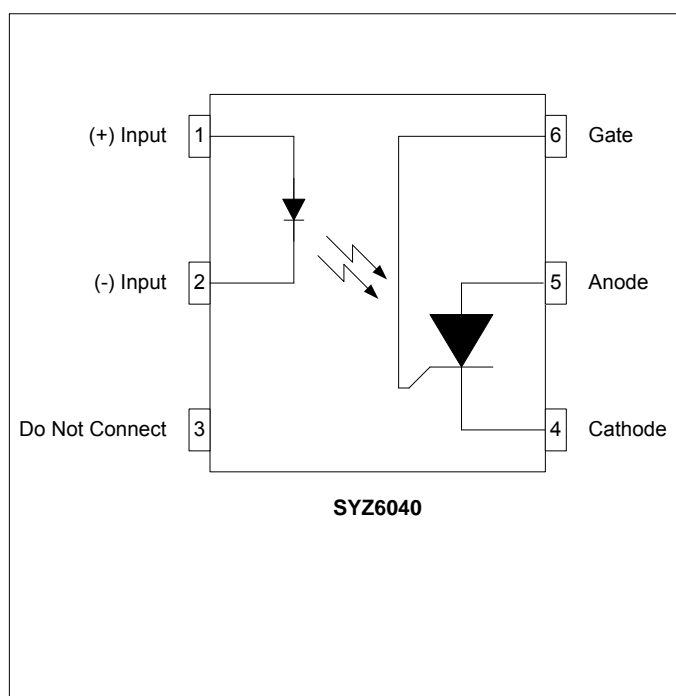
The SYZ6040 consists of a single input AlGaAs LED optically coupled to a photo-sensitive SCR. Optical coupling provides high isolation levels (up to 5kV_{RMS}) while maintaining low-level DC signal control capability. With high load voltage and low input current, the SYZ6040 is an ideal solution for driving SCRs, Triacs and Solid State Relays.

The SYZ6040 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



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: 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
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
SYZ6040	6 pin DIP, (60/Tube)
SYZ6040-H	5kV _{RMS} V _{ISO} , 6 pin DIP, (60/Tube)
SYZ6040-S	6 pin SMD, (60/Tube)
SYZ6040-HS	5kV _{RMS} , 6 pin SMD, (60/Tube)
SYZ6040-STR	6 pin SMD, Tape and Reel (1000/Reel)
SYZ6040-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, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.2	1.5	V	$I_F = 10\text{mA}$
LED Reverse Voltage	BV_R	5	-	-	V	$I_R = 10\mu\text{A}$
Reverse Leakage Current	I_{InRleak}	-	-	10	μA	$V_R = 5\mu\text{A}$
Trigger (Must Operate) Current ¹	I_{InOn}	-	2.5	5	mA	$I_O = 400\text{mA}$
Output Specifications						
Forward Blocking Voltage	V_{DM}	400	-	-	V	$R_{GK}=10\text{k}\Omega$, $T_A=100^\circ\text{C}$, $I_D=150\mu\text{A}$
Reverse Blocking Voltage	V_{RM}	400	-	-	V	$R_{GK}=10\text{k}\Omega$, $T_A=100^\circ\text{C}$, $I_R=150\mu\text{A}$
Continuous Load Current	I_{DM}	-	-	400	mA	$I_F = 5\text{mA}$
Transient Surge Current	$I_{DM}(\text{PEAK})$	-	-	10	A	$T = 16\mu\text{S}$
On-State Voltage	V_{TM}	-	1.1	1.4	V	$I_F = 5\text{mA}$, $I_{DM} = 400\text{mA}$
Forward Leakage Current	I_{DM}	-	1	10	μA	$R_{GK}=10\text{k}\Omega$, $T_A=100^\circ\text{C}$, $V_{DM}=400\text{V}$, $I_F=0$
Reverse Leakage Current	I_{RM}	-	1	10	μA	$R_{GK}=10\text{k}\Omega$, $T_A=100^\circ\text{C}$, $V_{RM}=400\text{V}$, $I_F=0$
Gate Trigger Voltage	V_{GT}	-	0.6	1	V	$V_{FX}=100\text{V}$, $R_{GK}=27\text{k}\Omega$, $R_L=10\text{k}\Omega$
Gate Trigger Current	I_{GT}	-	20	50	μA	$V_{FX}=100\text{V}$, $R_{GK}=27\text{k}\Omega$, $R_L=10\text{k}\Omega$
Critical Rate of Rise ²	dV/dt	400	-	-	V/ μS	-
Isolation Specifications						
Isolation Voltage (-H Option)	V_{ISO}	3750			V_{RMS}	$RH \leq 50\%$, $t=1\text{min}$
		5000	-	-		
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	$V_{I-O} = 500\text{V}_{DC}$

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

Note 2: This is for static dV/dt .

SYZ6040 Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Figure 1: Maximum Load Current vs. Temperature

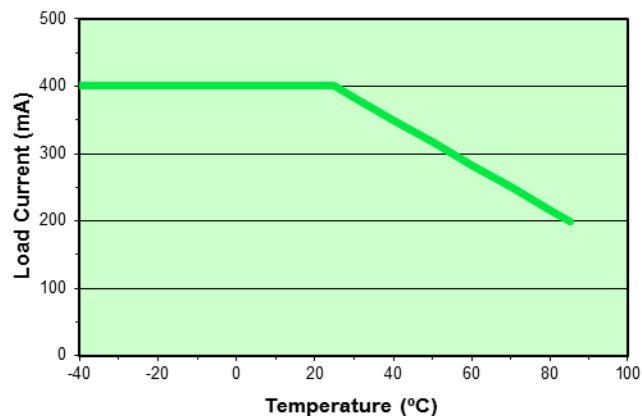
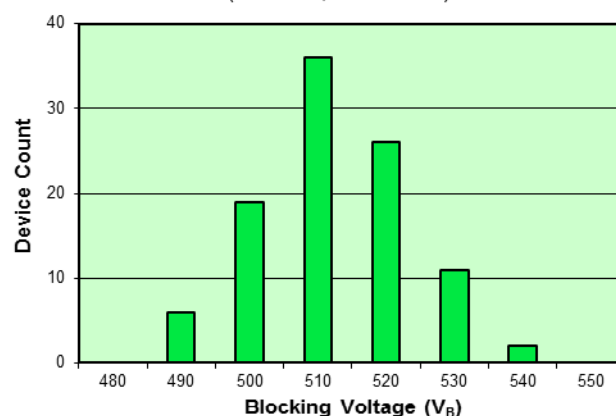


Figure 2: Typical Blocking Voltage Distribution (N = 100, $T_A = 25^\circ\text{C}$)



SYZ6040 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:

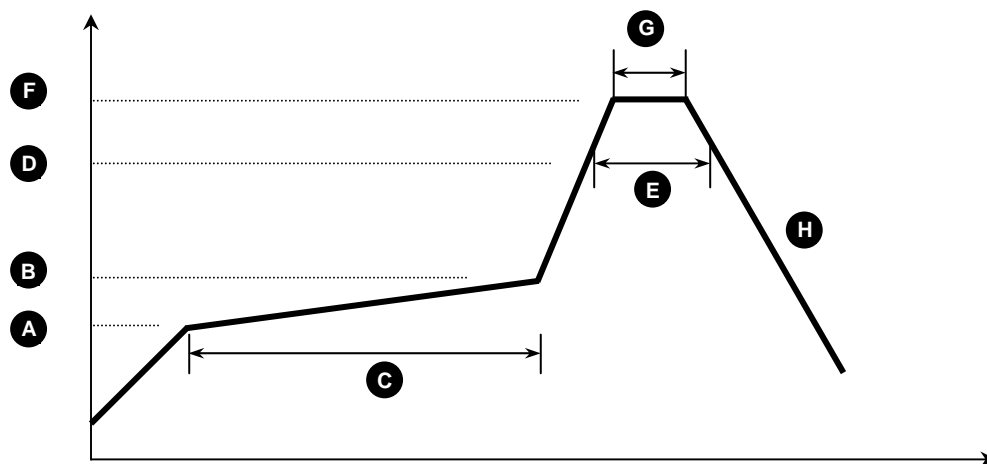


Figure 1

Process Step	Description	Parameter
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:

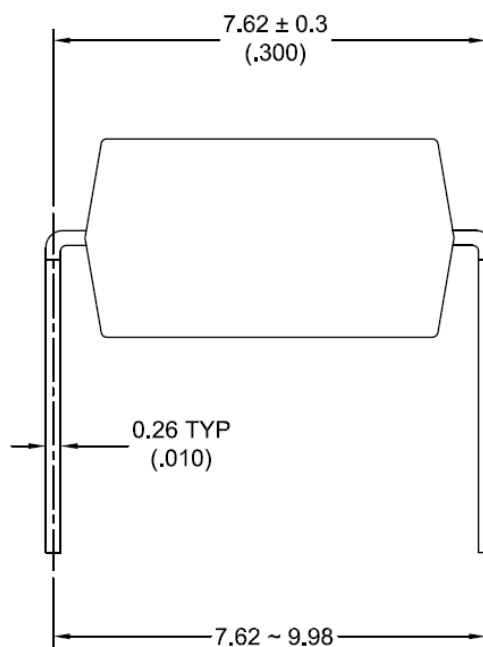
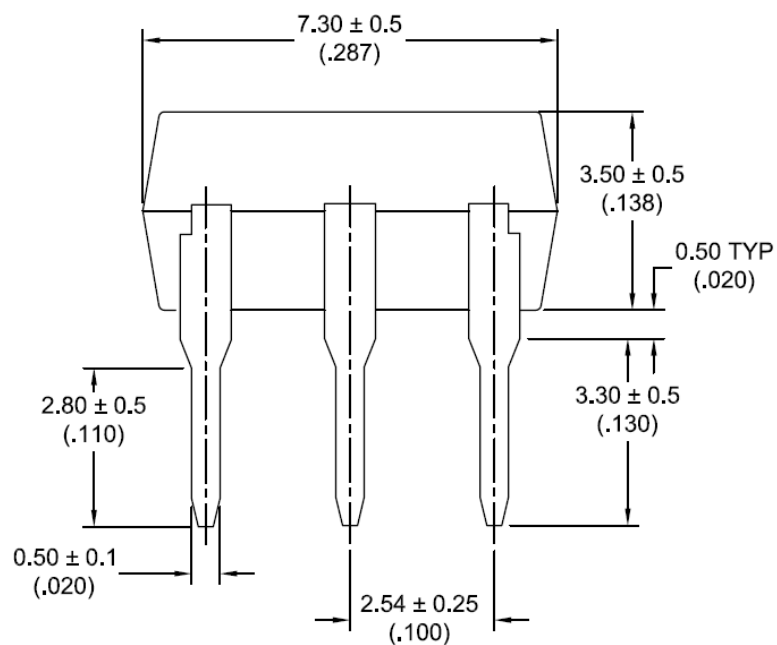
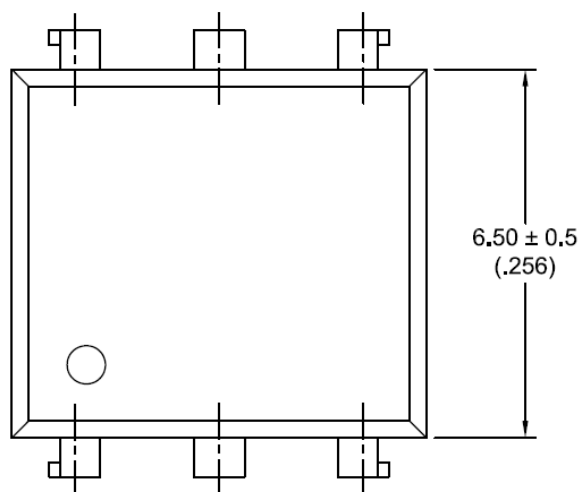
Maximum Temperature: 260°C (at terminal)
Maximum Time: 10s
Pre-heating: 100 - 150°C (30 - 90s)
Single Occurrence

(3) Hand Solder:

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

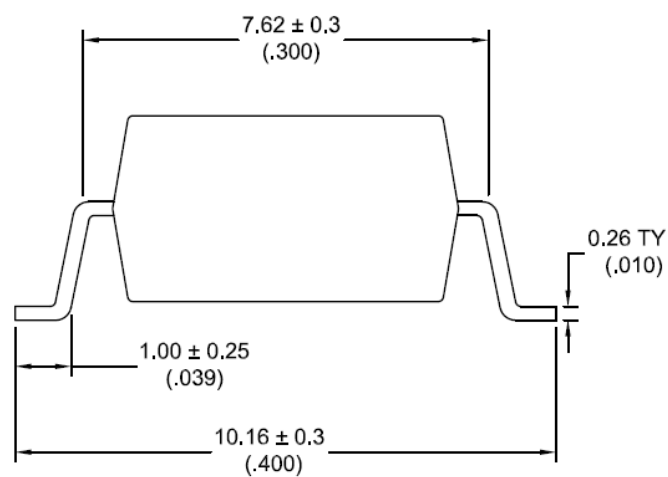
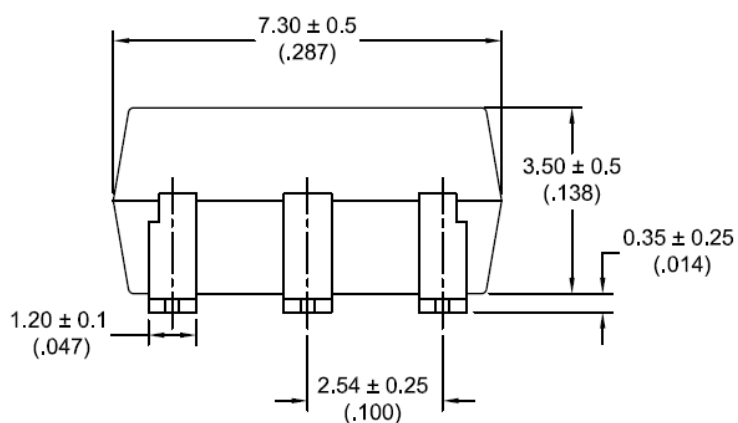
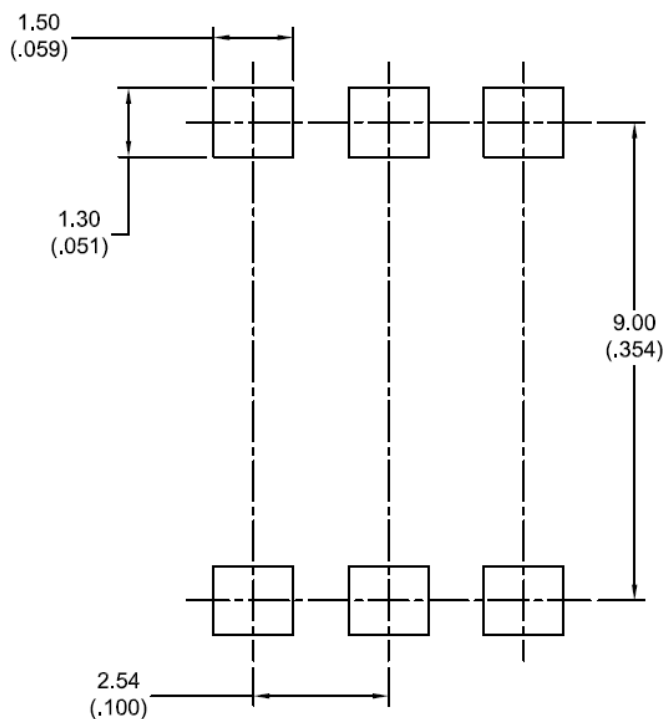
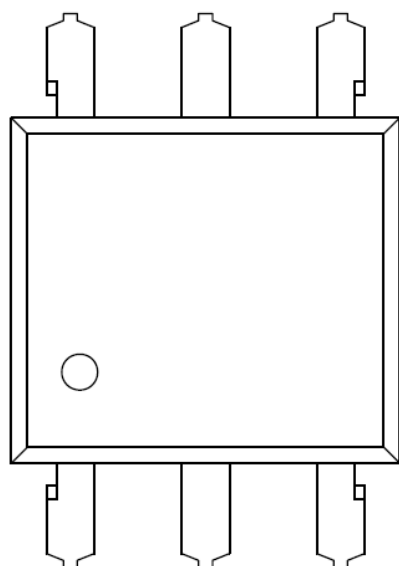
SYZ6040 Package Dimensions

6 PIN DIP Package

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


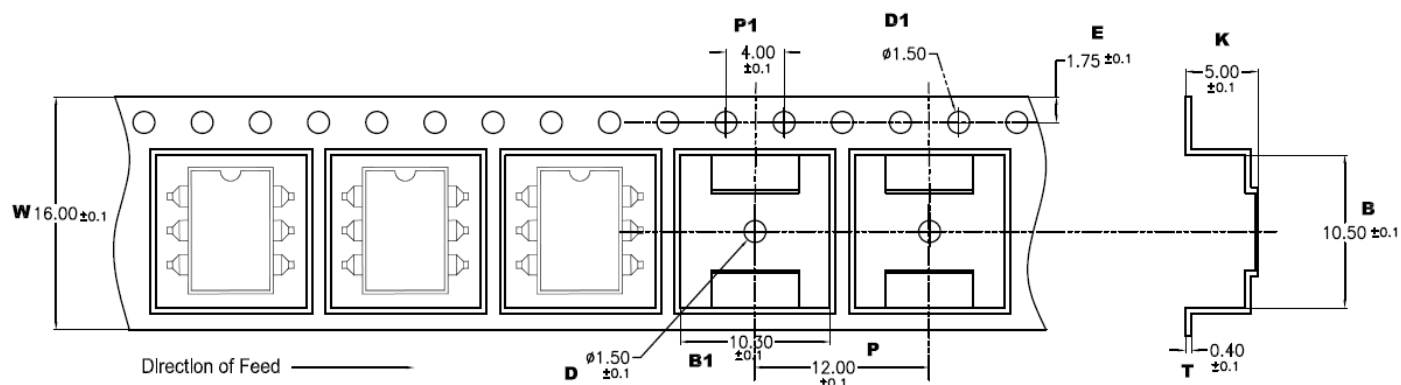
SYZ6040 Package Dimensions

6 PIN SMD Surface Mount Package (-S)

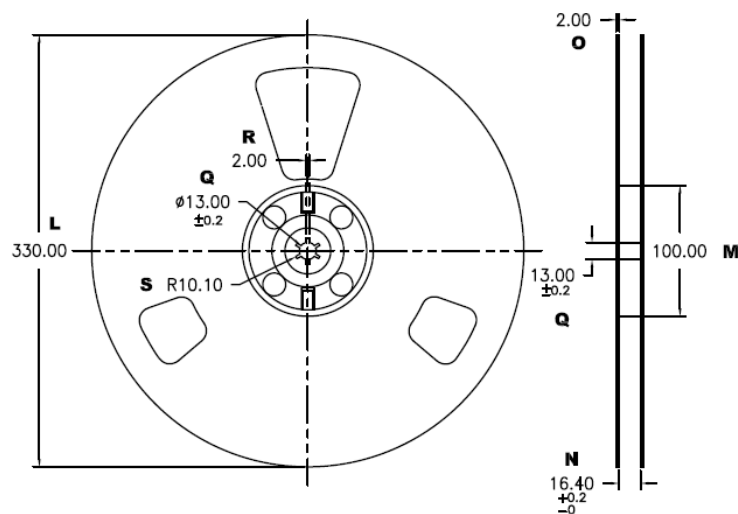
Note: All dimensions in millimeters with inches ["] in parenthesis ()


SYZ6040 Package Dimensions

6 PIN SMD Tape & Reel (-STR)

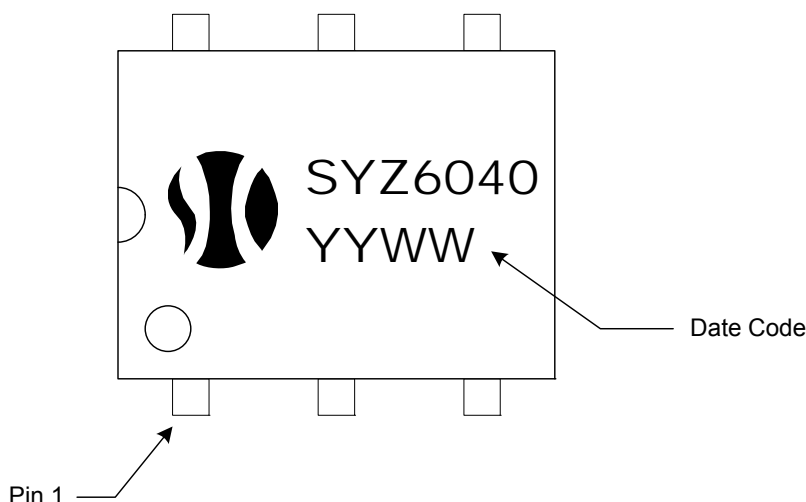
Note: All dimensions in millimeters


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

SYZ6040 Package Marking



SYZ6040 Package Weights

Device	Single Unit	Full Tube (60pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
SYZ6040-(H)	0.41	43	450	-
SYZ6040-(H)S	0.40	42	440	-
SYZ6040-(H)STR	0.40	-	-	880

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

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