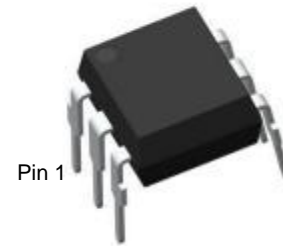




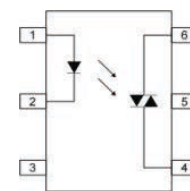
## Description

The HL3053 series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon non zero voltage crossing photo triac. They are designed for use with a discrete power triac in the interface of logic systems, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.



## Features

- 6pin Non-zero-cross optoisolators triac driver
- High input-output isolation voltage( $V_{iso} = 5,000V_{rms}$ )
- High repetitive peak off-state voltage  $V_{DRM}$ .
- Min. 600V;
- High critical rate of rise of off-state voltage(  $dv/dt$  : MIN. 1000V /s )
- Operating Temperature:  $-40^{\circ}C \sim 110^{\circ}C$
- Safety approval
- UL approved ; VDE approved ; CQC approved
- RoHS



Pin Configuration  
1 Anode  
2 Cathode  
3 No Connection  
4 Terminal  
5 No Connection  
(do not connect)  
6 Terminal

## Applications

- Solenoid/valve controls
- Static power switch
- AC motor drivers
- Temperature Control

## Maximum Ratings

| Parameter                            |  | Symbol       | Values         | Unit        |
|--------------------------------------|--|--------------|----------------|-------------|
| Input                                | Forward Current  | $I_F$        | 50             | mA          |
|                                      | Reverse Voltage  | $V_R$        | 6              | V           |
|                                      | Power Dissipation                                      | $P$          | 120            | mW          |
|                                      | Junction Temperature                                   | $T_J$        | 125            | $^{\circ}C$ |
| Output                               | Off-State Output Terminal Voltage                      | $V_{DRM}$    | 600            | V           |
|                                      | Peak Repetitive Surge Current<br>( $PW=1ms$ , 120 pps) | $I_{TSM}$    | 1              | A           |
|                                      | On-State RMS Current                                   | $I_{T(RMS)}$ | 100            | mA          |
|                                      | Junction Temperature                                   | $T_J$        | 125            | $^{\circ}C$ |
|                                      | Collector Power Dissipation                            | $P_C$        | 150            | mW          |
| Operating temperature range          |  | $T_{opr}$    | $-40 \sim 110$ | $^{\circ}C$ |
| Storage temperature range            |  | $T_{stg}$    | $-55 \sim 125$ | $^{\circ}C$ |
| Total Power consumption              |  | $P_{(W)}$    | 250            | mW          |
| Isolation Voltage <sup>(1)</sup>     |  | $V_{ISO}$    | 5000           | $V_{rms}$   |
| Soldering Temperature <sup>(2)</sup> |  | $T_{SOL}$    | 260            | $^{\circ}C$ |

Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2).For 10 seconds



**Electronic Optical Characteristics (T<sub>A</sub> = 25°C)**

| Parameter |   | Symbol           | Min. | Typ. | Max. | Unit | Conditon                         |
|-----------|---|------------------|------|------|------|------|----------------------------------|
| Input     | Forward Voltage   | V <sub>F</sub>   | -    | 1.2  | 1.6  | V    | I <sub>F</sub> =20mA             |
|           | Reverse Current   | V <sub>R</sub>   | -    | -    | 5    | μA   | V <sub>R</sub> =6V               |
| Output    | Peak Blocking Current, Either Direction <sup>(1)</sup>                  | I <sub>DRM</sub> | -    | -    | 500  | nA   | V <sub>DRM</sub> =<br>Rated VDRM |
|           | Peak On-State Voltage, Either Direction                                 | V <sub>TM</sub>  | -    | -    | 3    | V    | I <sub>TM</sub> = 100mA<br>Peak  |
|           | Critical rate of Rise of Off-State Voltage <sup>(2)</sup>               | dv/dt            | 1000 | -    | -    | V/μs | V <sub>in</sub> =240Vrms         |
| Couple    | Led Trigger Current, Current Required to Latch Output, Either Direction | I <sub>FT</sub>  | -    | -    | 5    | mA   | Main<br>Terminal<br>Voltage = 3V |
|           | Holding Current, Either Direction                                       | I <sub>H</sub>   | -    | 200  | -    | uA   | -                                |

(1) Test voltage must be applied within dv/dt rating.

(2) This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor(s) only.



## Characteristics Curves

Fig.1 Forward current vs.Ambient temperature

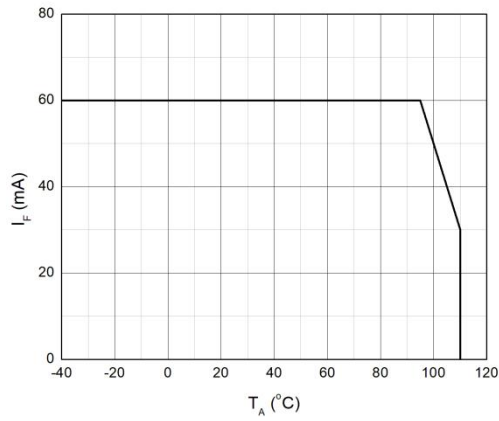


Fig.2 On-state current vs.Ambient temperature

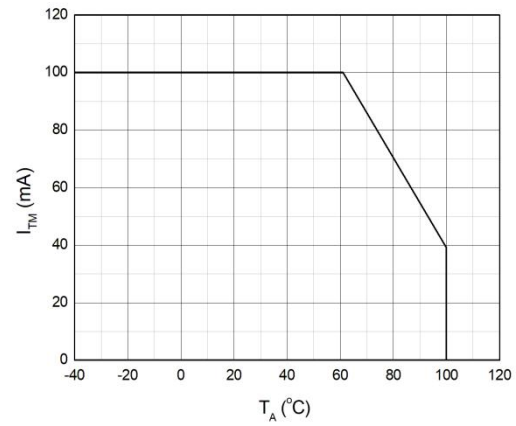


Fig.3 Forward current vs Forward Voltage

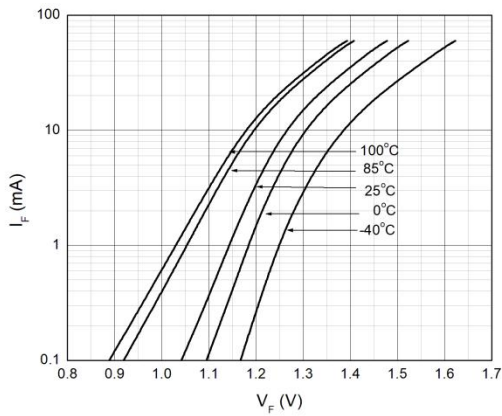


Fig.4 Holding current vs Ambient temperature

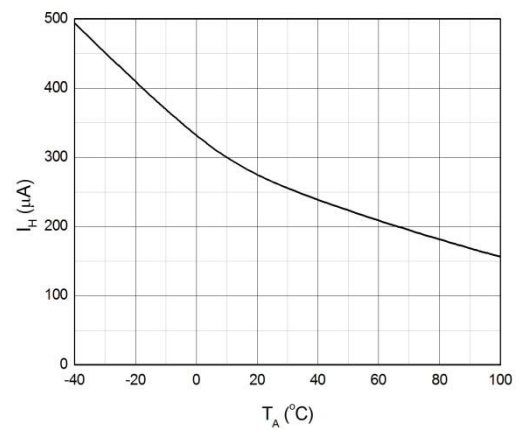
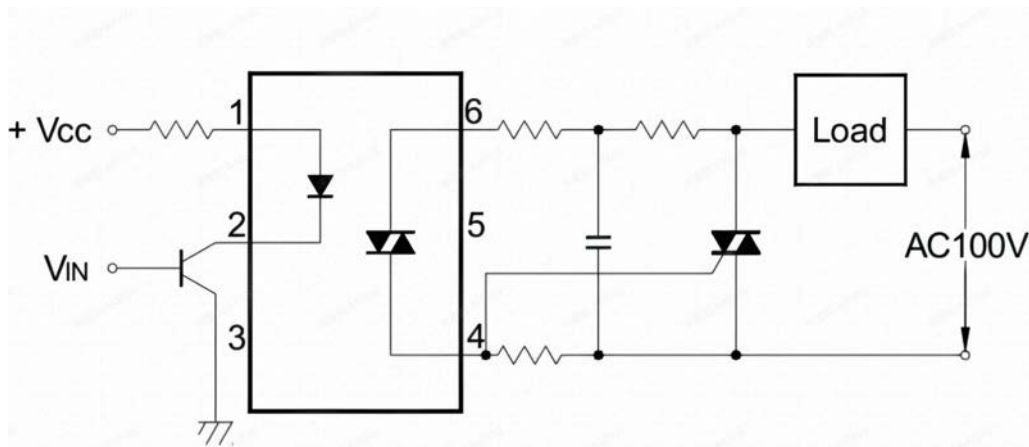


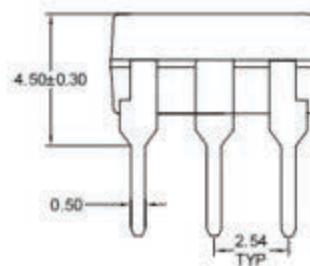
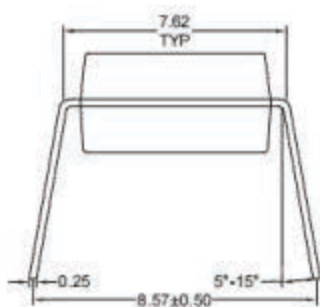
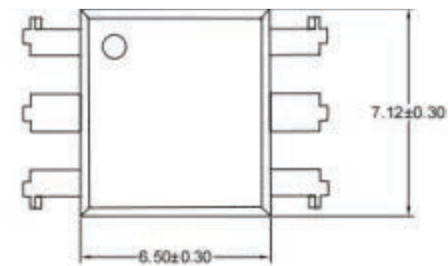


Fig.9 Basic Driver Circuit



## Outline Dimension

DIP-6 Normal Type:



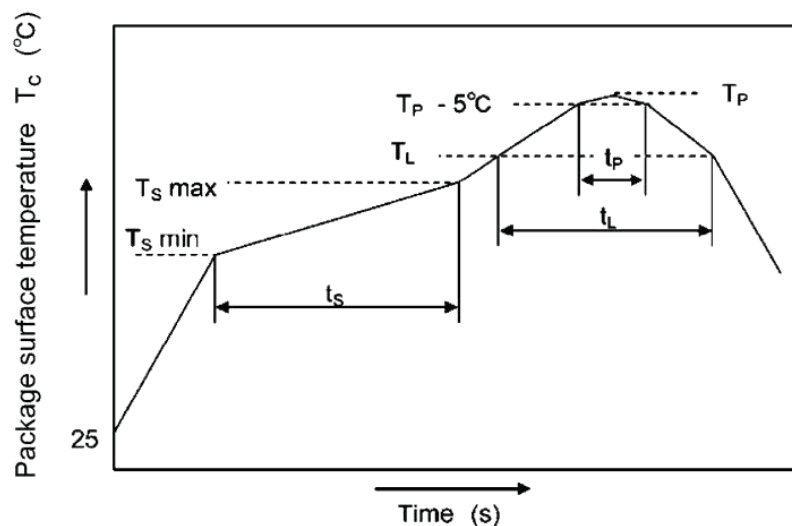


## Temperature Profile Of Soldering

### 1. IR Reflow soldering

**(JEDEC-STD-020D compliant)**

| Profile item              | Conditon      |
|---------------------------|---------------|
| Preheat                   |               |
| -Temperature Min (TSmin)  | 150°C         |
| -Temperature Max (TSmax)  | 200°C         |
| -Time (min to max) (ts)   | 90±30 sec     |
| Soldering zone            |               |
| -Temperature (TL)         | 217°C         |
| -Time (tL)                | 60-150 sec    |
| Peak Temperature (TP)     | 260°C         |
| -Time (TP-5°C to TP) (ts) | 30 sec        |
| Ramp-up rate              | 3°C / sec max |
| Ramp-down rate            | 3~6°C/ sec    |



#### Notes:

One time soldering reflow is recommended within the condition of temperature and time profile shown below.  
Do not solder more than three times.



## 2. Wave soldering (JEDEC22A111 compliant)

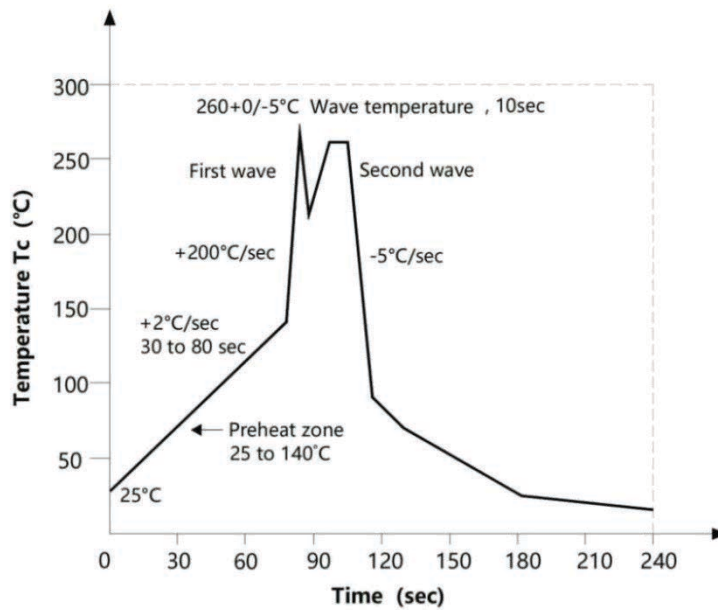
One time soldering is recommended within the condition.

Temperature:  $260 \pm 0/-5^{\circ}\text{C}$ .

Time: 10 sec.

Preheat temperature: 25 to  $140^{\circ}\text{C}$ .

Preheat time: 30 to 80 sec.



## 3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature:  $380 \pm 0/-5^{\circ}\text{C}$

Time: 3 sec max.



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