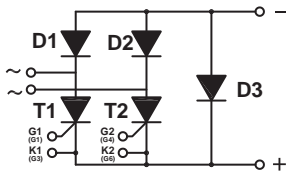
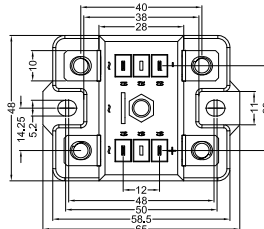
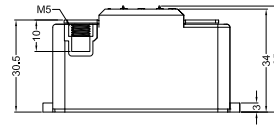


# S1PHB41GKXXB

## Single Phase Half Controlled Bridge Modules With Free Wheeling Diode



Dimensions in mm (1mm=0.0394")



| Type                | $V_{RSM}$<br>$V_{DSM}$<br>V | $V_{RRM}$<br>$V_{DRM}$<br>V |
|---------------------|-----------------------------|-----------------------------|
| <b>S1PHB41GK08B</b> | 900                         | 800                         |
| <b>S1PHB41GK12B</b> | 1300                        | 1200                        |
| <b>S1PHB41GK14B</b> | 1500                        | 1400                        |
| <b>S1PHB41GK16B</b> | 1700                        | 1600                        |
| <b>S1PHB41GK18B</b> | 1900                        | 1800                        |

| Symbol  | Test Conditions  | Maximum Ratings                 | Unit        |
|---|--|---------------------------------|-------------|
| $I_{dAV}$<br>$I_{dAVM}$<br>$I_{FRMS}, I_{TRMS}$ | $T_K=85^{\circ}C$ , module<br>module<br>per leg  | 40<br>40<br>31                  | A           |
| $I_{TSM}, I_{FSM}$                              | $T_{VJ}=45^{\circ}C$<br>$V_R=0$<br>$t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine<br>$T_{VJ}=T_{VJM}$<br>$V_R=0$<br>$t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine | 430<br>460<br>380<br>430        | A           |
| $I^2t$  | $T_{VJ}=45^{\circ}C$<br>$V_R=0$<br>$t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine<br>$T_{VJ}=T_{VJM}$<br>$V_R=0$<br>$t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine | 1200<br>1440<br>960<br>1150     | $A^2s$      |
| $(di/dt)_{cr}$                                  | $T_{VJ}=125^{\circ}C$<br>$f=50Hz, t_p=200us$<br>$V_D=2/3V_{DRM}$<br>$I_G=0.3A$<br>$di_G/dt=0.3A/us$<br>repetitive, $I_T=40A$<br>non repetitive, $I_T=1/2I_{dAV}$     | 150<br>500                      | A/us        |
| $(dv/dt)_{cr}$                                  | $T_{VJ}=T_{VJM}$ ;<br>$R_{GK}=\infty$ ; method 1 (linear voltage rise)<br>$V_{DR}=2/3V_{DRM}$  | 1000                            | V/us        |
| $P_{GM}$  | $T_{VJ}=T_{VJM}$<br>$I_T=I_{TAVM}$<br>$t_p=30us$<br>$t_p=500us$  | 10<br>5                         | W           |
| $P_{GAVM}$                                      |  | 0.5                             | W           |
| $V_{RGM}$                                       |  | 10                              | V           |
| $T_{VJ}$<br>$T_{VJM}$<br>$T_{stg}$              |  | -40...+125<br>125<br>-40...+125 | $^{\circ}C$ |
| $V_{ISOL}$                                      | 50/60Hz, RMS<br>$I_{ISOL} \leq 1mA$<br>$t=1min$<br>$t=1s$  | 2500<br>3000                    | V~          |
| $M_d$   | Mounting torque (M5)<br>Terminal connection torque (M5)  | $5 \pm 15\%$<br>$5 \pm 15\%$    | Nm<br>Nm    |
| Weight  | typical  | 165                             | g           |



# S1PHB41GKXXB

## Single Phase Half Controlled Bridge Modules With Free Wheeling Diode

| Symbol     | Test Conditions  | Characteristic Values | Unit      |
|------------|--|-----------------------|-----------|
| $I_R, I_D$ | $T_{VJ}=T_{VJM}; V_R=V_{RRM}; V_D=V_{DRM}$   | 4                     | mA        |
| $V_T$      | $I_T=62A; T_{VJ}=25^{\circ}C$  | 1.64                  | V         |
| $V_{To}$   | For power-loss calculations only   | 0.88                  | V         |
| $r_T$      |  | 13                    | $m\Omega$ |
| $V_{GT}$   | $V_D=6V; T_{VJ}=25^{\circ}C$<br>$T_{VJ}=-40^{\circ}C$  | 1.5<br>1.6            | V         |
| $I_{GT}$   | $V_D=6V; T_{VJ}=25^{\circ}C$<br>$T_{VJ}=-40^{\circ}C$  | 100<br>200            | mA        |
| $V_{GD}$   | $T_{VJ}=T_{VJM}; V_D=2/3V_{DRM}$   | 0.2                   | V         |
| $I_{GD}$   |  | 5                     | mA        |
| $I_L$      | $t_p=10\mu s; I_G=0.45A; T_{VJ}=25^{\circ}C$<br>$di_G/dt=0.45A/\mu s$                                    | 450                   | mA        |
| $I_H$      | $T_{VJ}=25^{\circ}C; V_D=6V; R_{GK}=\infty$  | 200                   | mA        |
| $t_{gd}$   | $T_{VJ}=25^{\circ}C; V_D=1/2V_{DRM}$<br>$I_G=0.45A; di_G/dt=0.45A/\mu s$                                 | 2                     | $\mu s$   |
| $t_q$      | $T_{VJ}=T_{VJM}; I_T=20A; t_p=200\mu s; V_R=100V$<br>$V_D=2/3V_{DRM}; dv/dt=15V/\mu s; di/dt=-10A/\mu s$ | typ.<br>250           | $\mu s$   |
| $R_{thJC}$ | per thyristor/Diode; DC<br>per module  | 0.98<br>0.196         | K/W       |
| $R_{thJK}$ | per thyristor/Diode; DC<br>per module  | 1.20<br>0.24          | K/W       |
| $d_s$      | Creeping distance on surface   | 16.1                  | mm        |
| $d_A$      | Creepage distance in air   | 7.1                   | mm        |
| $a$        | Maximum allowable acceleration   | 50                    | $m/s^2$   |



# S1PHB41GKXX

## Single Phase Half Controlled Bridge Modules With Free Wheeling Diode

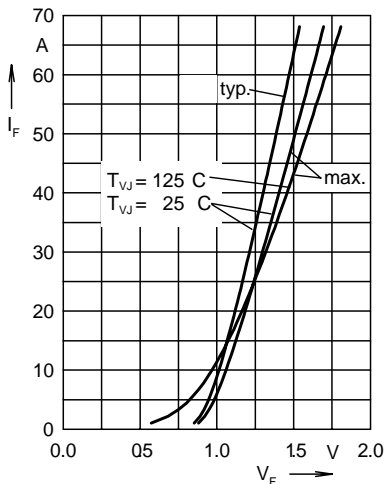


Fig. 3 Forward current versus voltage drop per diode

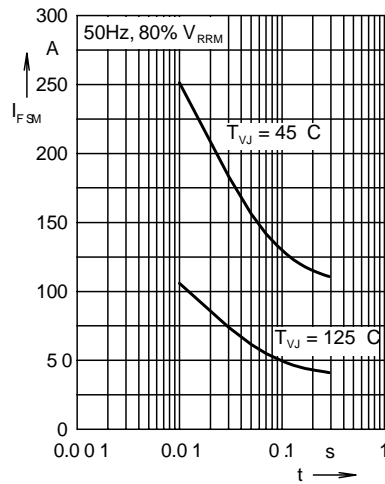


Fig. 4 Surge overload current

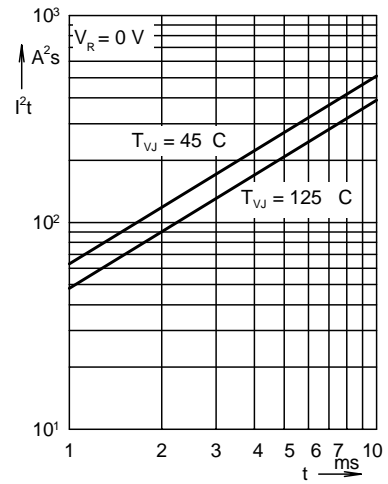


Fig. 5  $i^2t$  versus time per diode

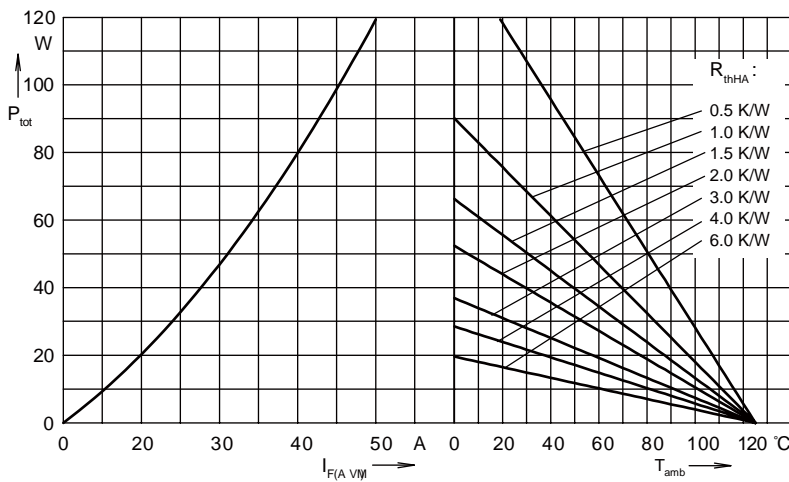


Fig. 6 Power dissipation versus direct output current and ambient temperature

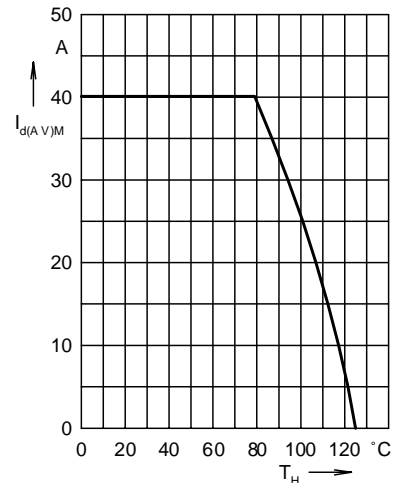


Fig. 7 Max. forward current versus heatsink temperature

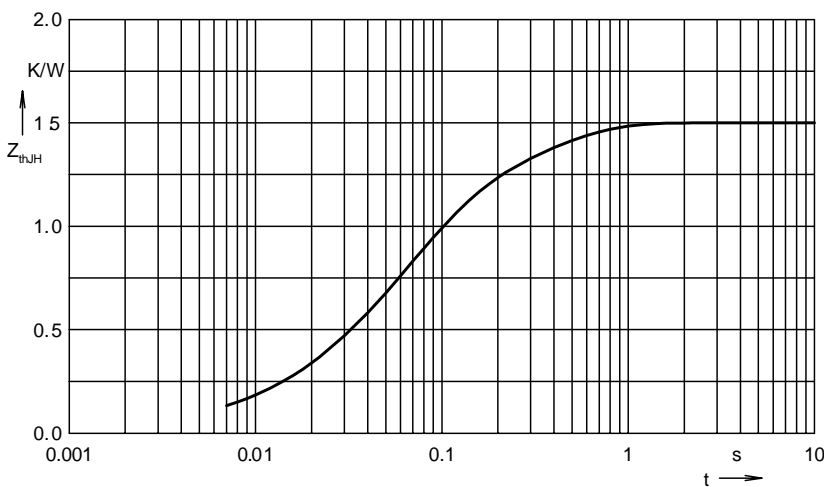


Fig. 8 Transient thermal impedance junction to heatsink

Constants for  $Z_{thJH}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.005           | 0.008     |
| 2 | 0.2             | 0.05      |
| 3 | 0.875           | 0.06      |
| 4 | 0.47            | 0.25      |