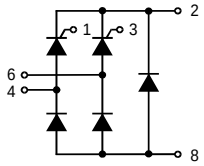
# S1PHB36

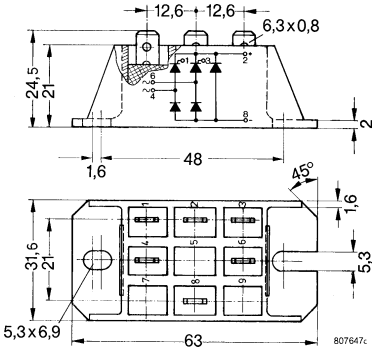
## Single Phase Half Controlled Bridge With Free Wheeling Diode






| Type | $V_{RSM}$ $V_{DSM}$ V | $V_{RRM}$ $V_{DRM}$ V |
|---|---|---|
| **S1PHB36-08** | 900 | 800 |
| **S1PHB36-12** | 1300 | 1200 |
| **S1PHB36-14** | 1500 | 1400 |
| **S1PHB36-16** | 1700 | 1600 |
| **S1PHB36-18** | 1900 | 1800 |

**Dimensions in mm (1mm=0.0394")**




| Symbol | Test Conditions | | Maximum Ratings | Unit |
|---|---|---|---|---|
| $I_{dAV}$<br>$I_{dAVM}$<br>$I_{FRMS}$, $I_{TRMS}$ | $T_K$=85°C, module<br>module<br>per leg | | 36<br>40<br>28 | A |
| $I_{TSM}$, $I_{FSM}$ | $T_{VJ}$=45°C<br>$V_R$=0 | t=10ms (50Hz), sine<br>t=8.3ms (60Hz), sine | 320<br>350 | A |
| | $T_{VJ}$=$T_{VJM}$<br>$V_R$=0 | t=10ms(50Hz), sine<br>t=8.3ms(60Hz), sine | 280<br>310 | |
| $I^2t$ | $T_{VJ}$=45°C<br>$V_R$=0 | t=10ms (50Hz), sine<br>t=8.3ms (60Hz), sine | 500<br>520 | $A^2s$ |
| | $T_{VJ}$=$T_{VJM}$<br>$V_R$=0 | t=10ms(50Hz), sine<br>t=8.3ms(60Hz), sine | 390<br>400 | |
| $(di/dt)_{cr}$ | $T_{VJ}$=125°C<br>f=50Hz, $t_p$=200us<br>$V_D$=2/3$V_{DRM}$<br>$I_G$=0.3A<br>$di_G/dt$=0.3A/us | repetitive, $I_T$=50A<br><br><br>non repetitive, $I_T$=1/2$I_{dAV}$ | 150<br><br><br>500 | A/us |
| $(dv/dt)_{cr}$ | $T_{VJ}$=$T_{VJM}$;<br>$R_{GK}$=∞; method 1 (linear | $V_{DR}$=2/3$V_{DRM}$<br>voltage rise) | 1000 | V/us |
| $P_{GM}$ | $T_{VJ}$=$T_{VJM}$<br>$I_T$=$I_{TAVM}$ | $t_p$=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 | °C |
| $V_{ISOL}$ | 50/60Hz, RMS<br>$I_{ISOL}$≤1mA | t=1min<br>t=1s | 3000<br>3600 | V~ |
| $M_d$ | Mounting torque (M5)<br>(10-32 UNF) | | 2-2.5<br>18-22 | Nm<br>lb.in. |
| **Weight** | | | 50 | g |

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## Single Phase Half Controlled Bridge With Free Wheeling Diode

| Symbol | Test Conditions | Characteristic Values | Unit |
|---|---|---|---|
| $I_R$, $I_D$ | $T_{VJ}=T_{VJM}$; $V_R=V_{RRM}$; $V_D=V_{DRM}$<br>$T_{VJ}=25^oC$ | 5<br>0.3 | mA |
| $V_T$, $V_F$ | $I_T$, $I_F$=45A; $T_{VJ}=25^oC$ | 1.45 | V |
| $V_{TO}$ | For power-loss calculations only ($T_{VJ}=125^oC$) | 0.85 | V |
| $r_T$ | | 13 | mΩ |
| $V_{GT}$ | $V_D$=6V; $T_{VJ}=25^oC$<br>$T_{VJ}=-40^oC$ | 1.0<br>1.2 | V |
| $I_{GT}$ | $V_D$=6V; $T_{VJ}=25^oC$<br>$T_{VJ}=-40^oC$<br>$T_{VJ}=125^oC$ | 65<br>80<br>50 | mA |
| $V_{GD}$ | $T_{VJ}=T_{VJM}$; $V_D=2/3V_{DRM}$ | 0.2 | V |
| $I_{GD}$ | $T_{VJ}=T_{VJM}$; $V_D=2/3V_{DRM}$ | 5 | mA |
| $I_L$ | $t_G$=30us; $I_G$=0.3A; $T_{VJ}=25^oC$<br>$di_G/dt$=0.3A/us $T_{VJ}=-40^oC$<br>$T_{VJ}=125^oC$ | 150<br>200<br>100 | mA |
| $I_H$ | $T_{VJ}=25^oC$; $V_D$=6V; $R_{GK}=\infty$ | 100 | mA |
| $t_{gd}$ | $T_{VJ}=25^oC$; $V_D=1/2V_{DRM}$<br>$I_G$=0.3A; $di_G/dt$=0.3A/us | 2 | us |
| $t_q$ | $T_{VJ}=125^oC$; $I_T$=15A; $t_p$=300us; $V_R$=100V typ. | 150 | us |
| $Q_r$ | $V_D=2/3V_{DRM}$; dv/dt=20V/us; di/dt=-10A/us | 75 | uC |
| $R_{thJC}$ | per thyristor(diode); DC current<br>per module | 1.15<br>0.29 | K/W |
| $R_{thJK}$ | per thyristor(diode); DC current<br>per module | 1.55<br>0.39 | K/W |
| $d_S$ | Creeping distance on surface | 12.6 | mm |
| $d_A$ | Creepage distance in air | 6.3 | mm |
| a | Maximum allowable acceleration | 50 | $m/s^2$ |

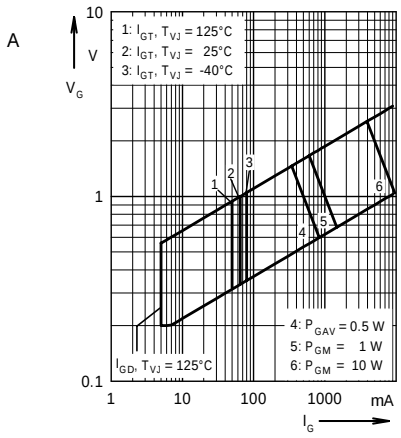



Fig. 1 Gate trigger range

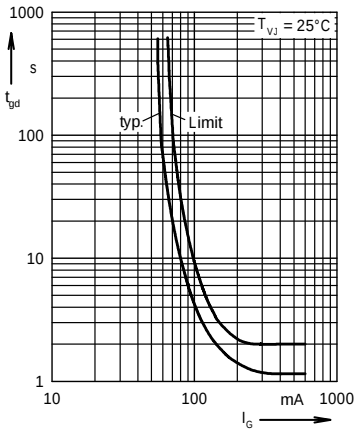



Fig. 2 Gate controlled delay time $t_{gd}$

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## Single Phase Half Controlled Bridge With Free Wheeling Diode

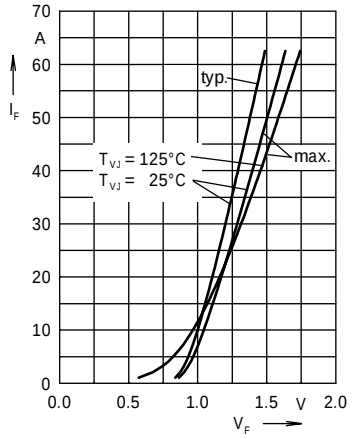



Fig. 3 Forward current versus voltage drop per diode

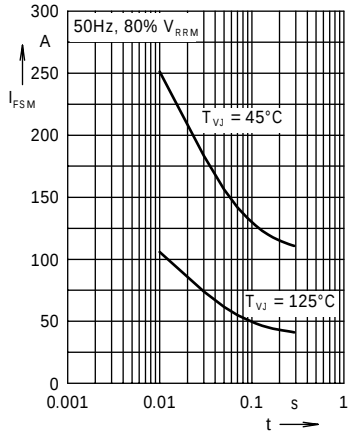



Fig. 4 Surge overload current

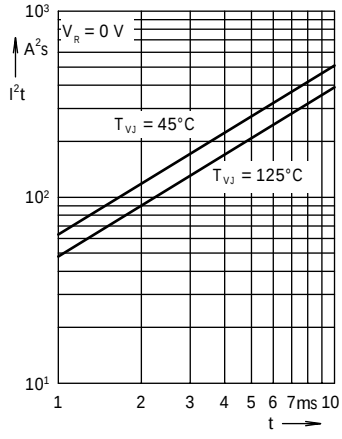



Fig. 5 $I^2t$ versus time per diode

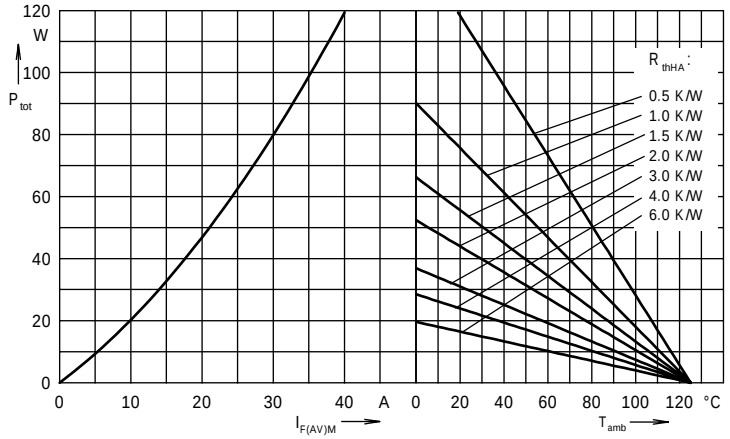



Fig. 6 Power dissipation versus direct output current and ambient temperature

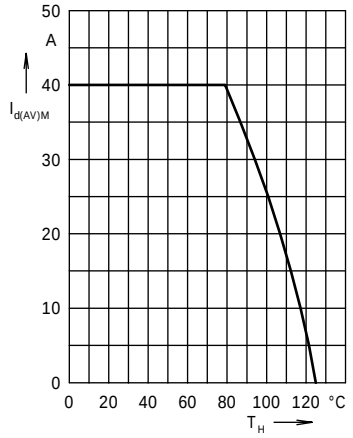



Fig. 7 Max. forward current versus heatsink temperature

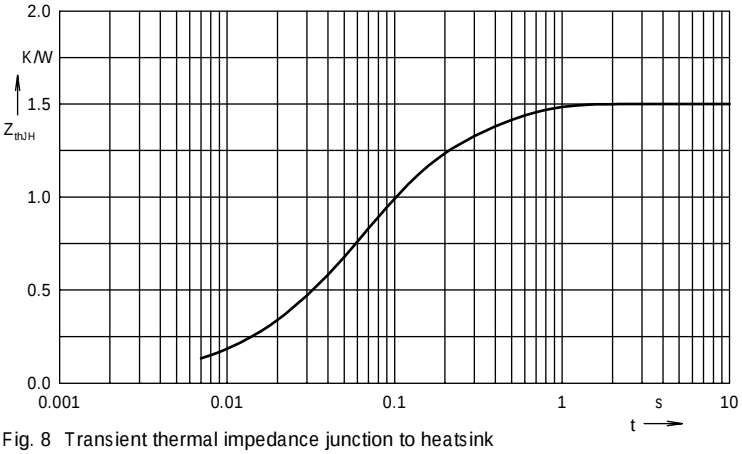



Fig. 8 Transient thermal impedance junction to heatsink

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 |