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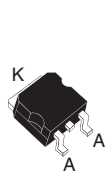
# STTH30L06-Y

## Automotive Turbo 2 ultrafast high voltage rectifier

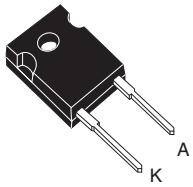
**Datasheet – production data**

## Features

- AEC-Q101 qualified
- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- ECOPACK®2 compliant component (DO-247)




**D²PAK**
**STTH30L06GY**




**DO-247**
**STTH30L06WY**

## Description

The STTH30L06 uses ST Turbo 2 600 V technology and is especially suited for use in rectification and discontinuous mode PFC boost diode for automotive applications.

**Table 1. Device summary**

| | |
|---|---|
| $I_{F(AV)}$ | 30 A |
| $V_{RRM}$ | 600 V |
| $T_j$ | 175 °C |
| $V_F$ (typ) | 1.10 V |
| $t_{rr}$ (max) | 65 ns |

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 600 | V |
| $I_{F(RMS)}$ | Forward rms voltage | | 50 | A |
| $I_{F(AV)}$ | Average forward current | $T_c$ = 125 °C $\delta$ = 0.5 | 30 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 300 | A |
| $T_{stg}$ | Storage temperature range | | -65 to +175 | °C |
| $T_j$ | Operating junction temperature range | | -40 to +175 | °C |

**Table 3. Thermal resistance**

| Symbol | Parameter | Value (max) | Unit |
|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | 1.1 | °C/W |

**Table 4. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | | 25 | µA |
| | | $T_j$ = 150 °C | | | 80 | 800 | |
| $V_F$ (2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 30 A | | | 1.55 | V |
| | | $T_j$ = 150 °C | | | 1.0 | 1.25 | |

1. Pulse test: $t_p$ = 5 ms, $\delta$ < 2%
2. Pulse test: $t_p$ = 380 µs, $\delta$ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.95 \times I_{F(AV)} + 0.010\ I_F{}^2{}_{(RMS)}$

**Table 5. Dynamic Characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse recovery time | $T_j$ = 25 °C | $I_F$ = 0.5 A, $I_{rr}$ = 0.25 A, $I_R$ =1 A | | | 65 | ns |
| | | | $I_F$ = 1 A, $dI_F/dt$ = 50 A/µs, $V_R$ =30 V | | 65 | 90 | |
| $I_{RM}$ | Reverse recovery current | $T_j$ = 125 °C | $I_F$ = 30 A, $V_R$ = 400 V, $dI_F/dt$ = 100 A/µs | | 11.5 | 16 | A |
| $t_{fr}$ | Forward recovery time | $T_j$ = 25 °C | $I_F$ = 30 A, $dI_F/dt$ = 100 A/µs, $V_{FR} = 1.1 \times V_{Fmax}$ | | | 500 | ns |
| $V_{FP}$ | Forward recovery voltage | $T_j$ = 25 °C | $I_F$ = 30 A, $dI_F/dt$ = 100 A/µs, $V_{FR} = 1.1 \times V_{Fmax}$ | | 2.5 | | V |

**Figure 1. Conduction losses versus average forward current**

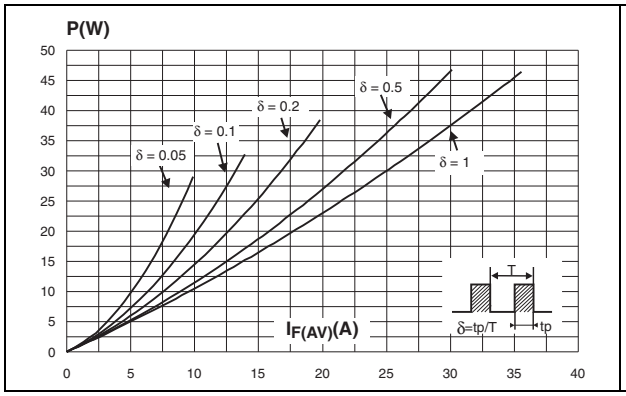



**Figure 2. Forward voltage drop versus forward current**

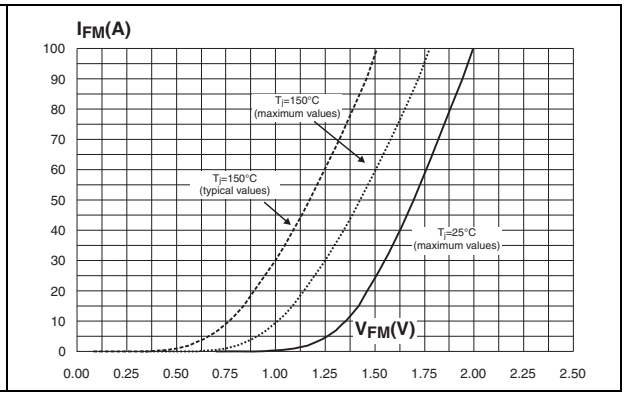



**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**

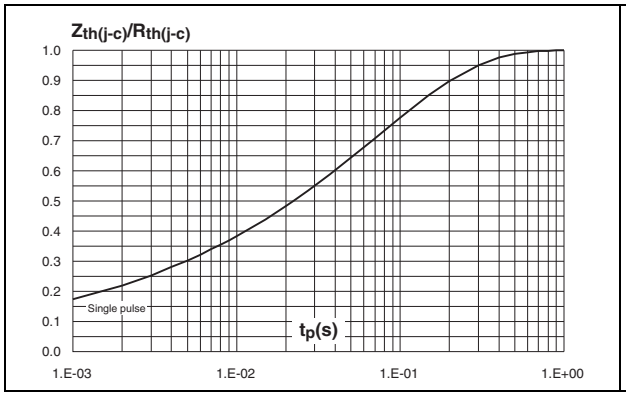



**Figure 4. Peak reverse recovery current versus $dI_F/dt$ (typical values)**

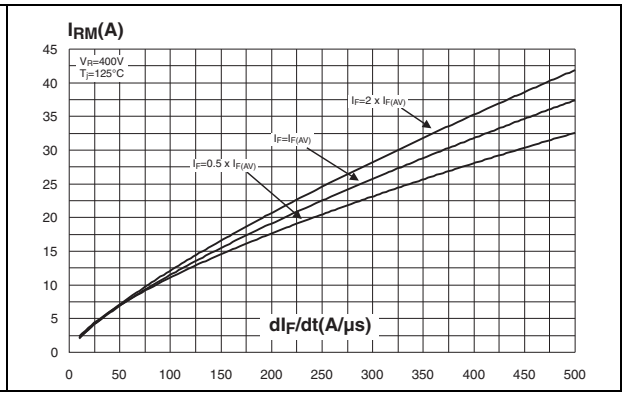



**Figure 5. Reverse recovery time versus $dI_F/dt$ (typical values)**

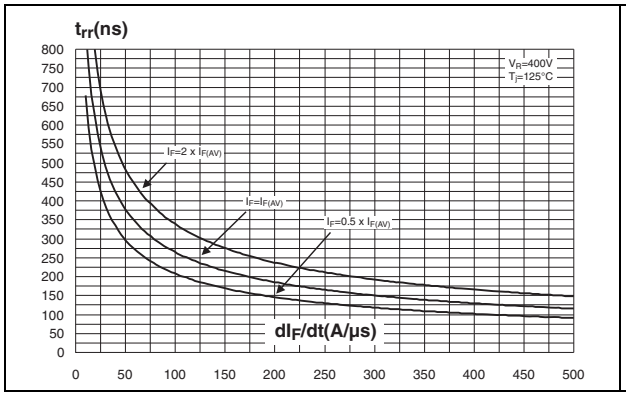



**Figure 6. Reverse recovery charges versus $dI_F/dt$ (typical values)**

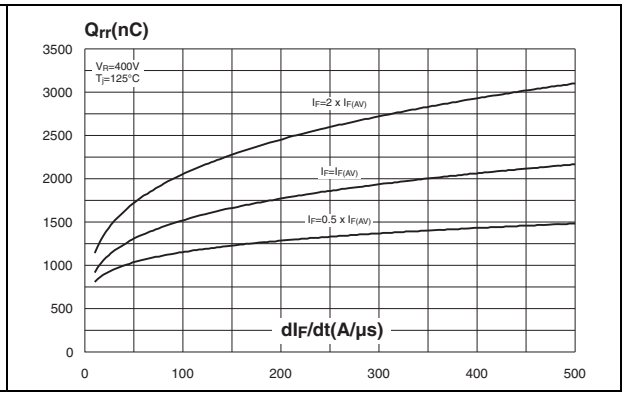


**Figure 7. Reverse recovery softness factor versus $dI_F/dt$ (typical values)**

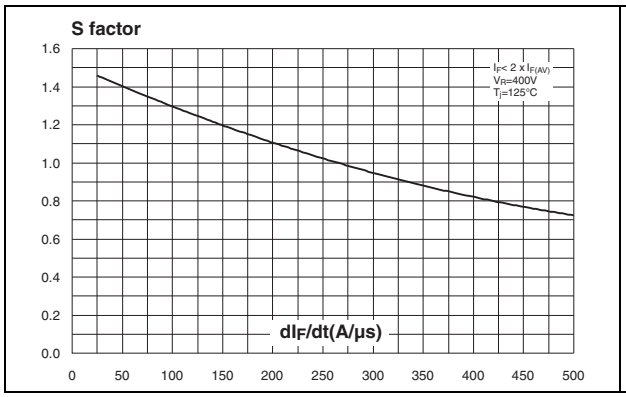



**Figure 8. Relative variations of dynamic parameters versus junction temperature**

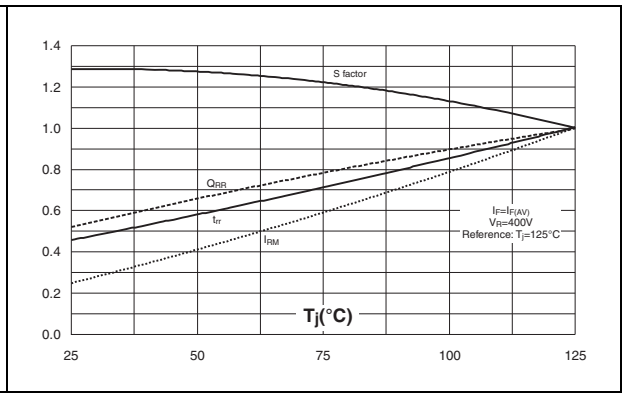



**Figure 9. Transient peak forward voltage versus $dI_F/dt$ (typical values)**

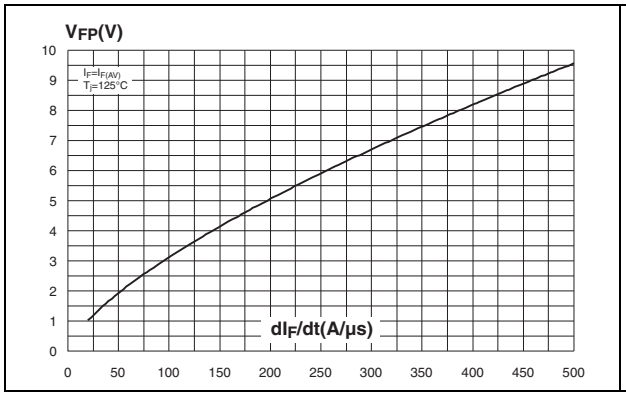



**Figure 10. Forward recovery time versus $dI_F/dt$ (typical values)**

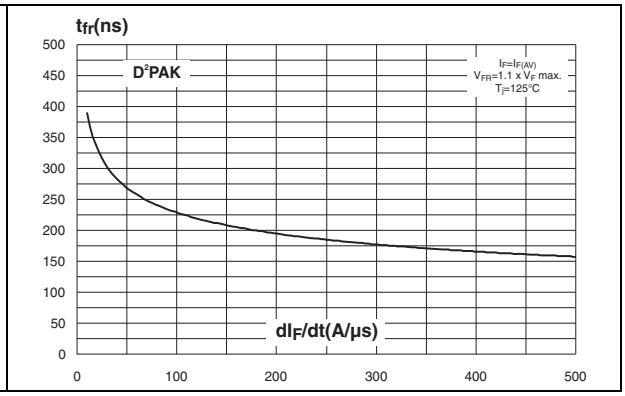



**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**

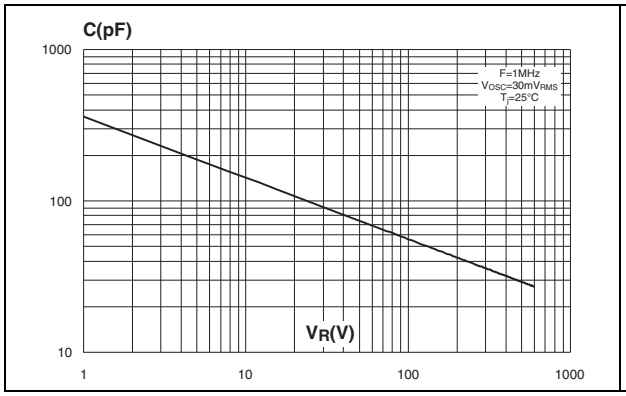
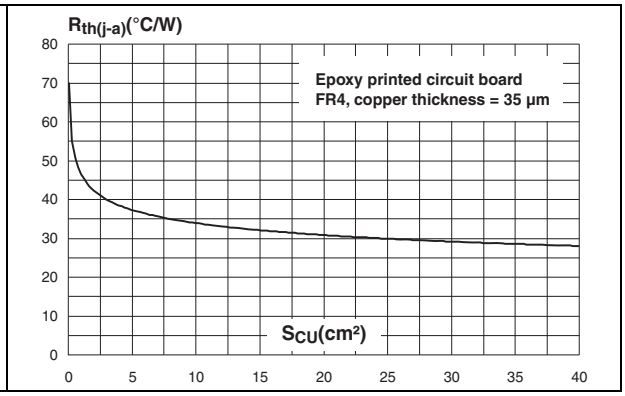



**Figure 12. Thermal resistance junction to ambient versus copper surface under tab**

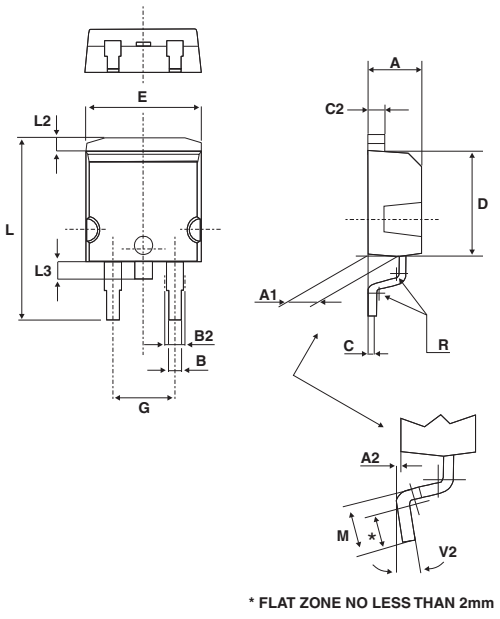


# 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

**Table 6. D²PAK dimensions**




| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.49 | 2.69 | 0.098 | 0.106 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.70 | 0.93 | 0.027 | 0.037 |
| B2 | 1.14 | 1.70 | 0.045 | 0.067 |
| C | 0.45 | 0.60 | 0.017 | 0.024 |
| C2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| G | 4.88 | 5.28 | 0.192 | 0.208 |
| L | 15.00 | 15.85 | 0.590 | 0.624 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |
| L3 | 1.40 | 1.75 | 0.055 | 0.069 |
| M | 2.40 | 3.20 | 0.094 | 0.126 |
| R | 0.40 typ. | | 0.016 typ. | |
| V2 | 0° | 8° | 0° | 8° |

**Figure 13. D²PAK footprint (dimensions in mm)**

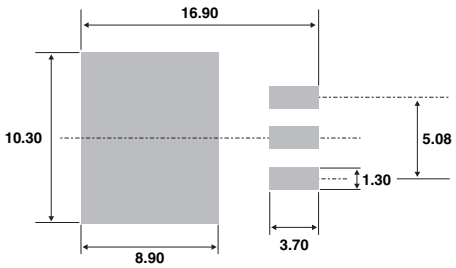
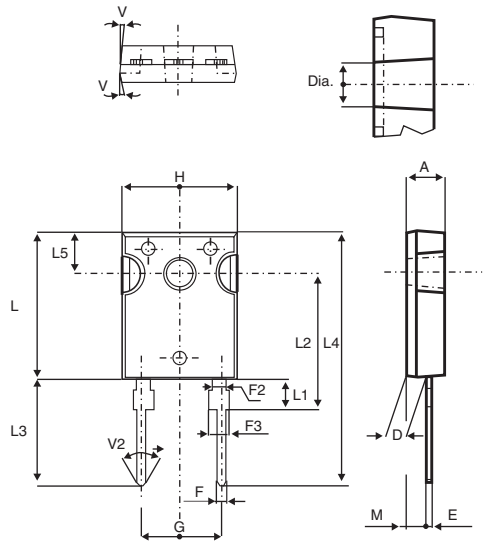


**Table 7. DO-247 dimensions**




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.85 | | 5.15 | 0.191 | | 0.203 |
| D | 2.20 | | 2.60 | 0.086 | | 0.102 |
| E | 0.40 | | 0.80 | 0.015 | | 0.031 |
| F | 1.00 | | 1.40 | 0.039 | | 0.055 |
| F2 | | 2.00 | | | 0.078 | |
| F3 | 2.00 | | 2.40 | 0.078 | | 0.094 |
| G | | 10.90 | | | 0.429 | |
| H | 15.45 | | 15.75 | 0.608 | | 0.620 |
| L | 19.85 | | 20.15 | 0.781 | | 0.793 |
| L1 | 3.70 | | 4.30 | 0.145 | | 0.169 |
| L2 | | 18.50 | | | 0.728 | |
| L3 | 14.20 | | 14.80 | 0.559 | | 0.582 |
| L4 | | 34.60 | | | 1.362 | |
| L5 | | 5.50 | | | 0.216 | |
| M | 2.00 | | 3.00 | 0.078 | | 0.118 |
| V | | 5° | | | 5° | |
| V2 | | 60° | | | 60° | |
| Dia. | 3.55 | | 3.65 | 0.139 | | 0.143 |

# 3 Ordering information

**Table 8. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STTH30L06GY-TR | STTH30L06GY | $D^2PAK$ | 1.48 g | 1000 | Tape and reel |
| STTH30L06WY | STTH30L06WY | DO-247 | 4.40 g | 30 | Tube |

# 4 Revision history

**Table 9. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 24-Oct-2012 | 1 | First issue. |