

STTH60L04W

Ultrafast high voltage rectifier

Mian product characteristics

| I _{F(AV)} | 60 A |
|-----------------------|--------|
| V _{RRM} | 400 V |
| T _j (max) | 175° C |
| V _F (typ) | 0.83 V |
| t _{rr} (max) | 50 ns |

Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

Description

The STTH60L04W uses ST 400 V technology and is specially suited for use in switching power supplies, welding equipment, and industrial applications, as an output rectification diode.



Order codes

| Part number | Marking |
|-------------|-----------|
| STTH60L04W | STTH60L04 |

Table 1. Absolute ratings (limiting values, per diode)

| Symbol | Parar | Value | Unit | | | | |
|---------------------|--------------------------------------|---|------|--|--|--|--|
| V _{RRM} | Repetitive peak reverse voltage | Repetitive peak reverse voltage | | | | | |
| I _{F(RMS)} | RMS forward current | RMS forward current | | | | | |
| I _{F(AV)} | Average forward current | verage forward current $T_c = 90^{\circ} \text{ C } \delta = 0.5$ Per diode | | | | | |
| I _{FSM} | Surge non repetitive forward current | ge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$ | | | | | |
| T _{stg} | Storage temperature range | -55 to + 175 | ° C | | | | |
| T _j | Maximum operating junction temperatu | 175 | ° C | | | | |

Characteristics STTH60L04W

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Table 2. Thermal resistance

| Symbol | Parameter | | | Value (max). | Unit |
|----------------------|------------------|--|--|--------------|------|
| R _{th(j-c)} | Junction to case | | | 0.70 | °C/W |

Table 3. Static electrical characteristics (per diode)

| Symbol | Parameter | Test conditions | | Min. | Тур | Max. | Unit |
|-------------------------------|--|-------------------------|-----------------------|------|------|------|-------|
| I _R ⁽¹⁾ | Reverse leakage | T _j = 25° C | V - V | | | 50 | , JIA |
| IR` ′ | current | T _j = 150° C | $V_R = V_{RRM}$ | | 100 | 1000 | μA |
| V (2) | V _F ⁽²⁾ Forward voltage drop | T _j = 25° C | I _F = 60 A | | | 1.2 | V |
| VF. / | | T _j = 150° C | IF = 00 A | | 0.83 | 1.0 | V |

^{1.} Pulse test: $t_p = 5 \text{ ms}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

 $P = 0.8 \text{ x } I_{F(AV)} + 0.0033 I_{F^2(RMS)}$

Table 4. Dynamic characteristics (per diode)

| | Symbol | Parameter | Test conditions | | Min | Тур | Max | Unit |
|--------|---------------------|--------------------------|-------------------------|---|-----|-----|-----|------|
| | t _{rr} | Reverse recovery | | $I_F = 1 \text{ A} dI_F/dt = 50 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$ | | 66 | 90 | ns |
| | ۲rr | time | 1, - 25 0 | $I_F = 1 \text{ A} dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$ | | 36 | 50 | 113 |
| | I _{RM} | Reverse recovery current | T _j = 125° C | $I_F = 60 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$ | | | 15 | Α |
| \ (| S _{factor} | Softness factor | T _j = 125° C | $I_F = 60 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$ | | 0.4 | | |
| 105016 | t _{fr} | Forward recovery time | T _j = 25° C | $I_F = 60 \text{ A}$ $dI_F/dt = 200 \text{ A/µs}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}$ | | | 600 | ns |
| Oh | V _{FP} | Forward recovery voltage | T _j = 25° C | $I_F = 60 \text{ A}$ $dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}$ | | 3.2 | | V |

^{2.} Pulse test: t_p = 380 μ s, δ < 2%

STTH60L04W Characteristics

Figure 1. Conduction losses versus average forward current (per diode)

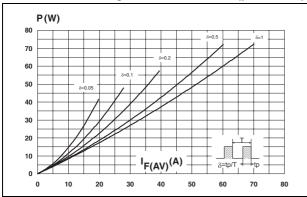


Figure 2. Forward voltage drop versus forward current (per diode)

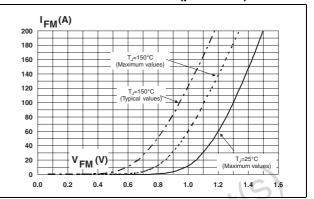


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

Zth(j-c)/Rth(j-c)

0.9 Single pulse

0.8

0.7

0.6

0.5

0.4

0.3

0.2

0.1

0.0

1.E-04

1.E-03

1.E-02

1.E-01

1.E+00

Figure 4. Peak reverse recovery current versus dl_F/dt (typical values, per diode)

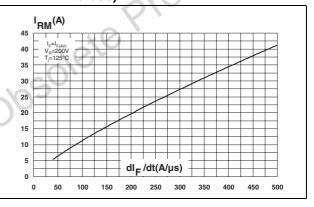


Figure 5. Reverse recovery time versus dl₋/dt (typical values, per diode)

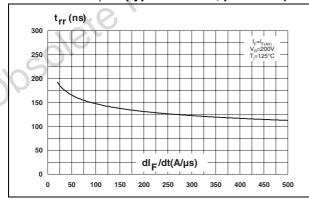
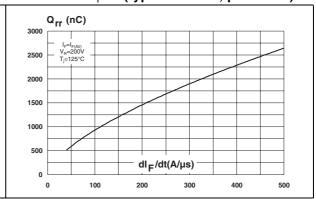


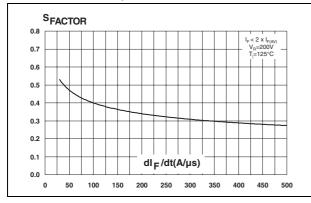
Figure 6. Reverse recovery charges versus dl_F/dt (typical values, per diode)



Characteristics STTH60L04W

Figure 7. Reverse recovery softness factor versus dl_F/dt (typical values, per diode)

Figure 8. Relative variations of dynamic parameters versus junction temperature



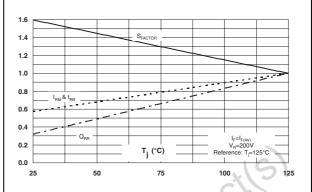
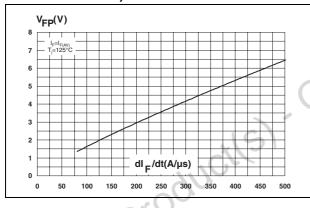


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values, per diode)

Figure 10. Forward recovery time versus dl_F/dt (typical values, per diode)



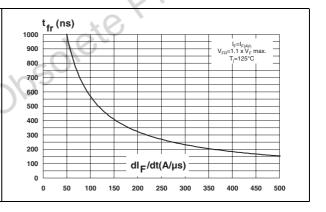
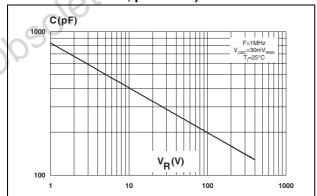


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



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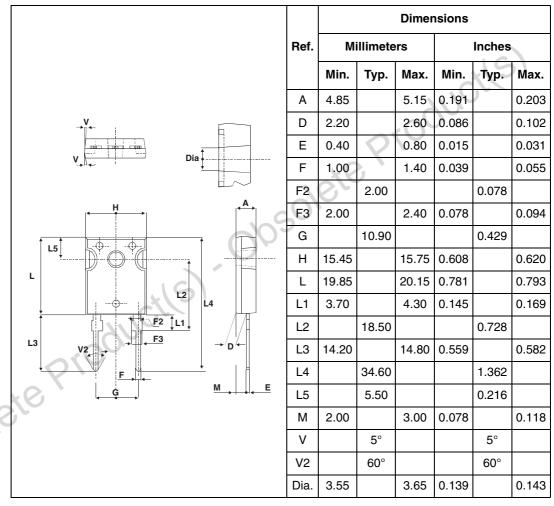
STTH60L04W Package information

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)
 Recommended torque value: 0.8 Nm
 Maximum torque value: 1.0 Nm

Table 5. DO-247 Dimensions



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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Ordering information STTH60L04W

3 Ordering information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|------------|---------|--------|----------|---------------|
| STTH60L04W | STTH60L04W | DO-247 | 4.4 g | 30 | Tube |

4 Revision history

| | Date | Revision | Description of Changes |
|--------|-------------|----------|------------------------|
| | 26-Oct-2006 | 1 | First issue |
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