STTH30ST06-Y

Automotive Turbo 2 ultrafast high voltage rectifier

Datasheet – production data

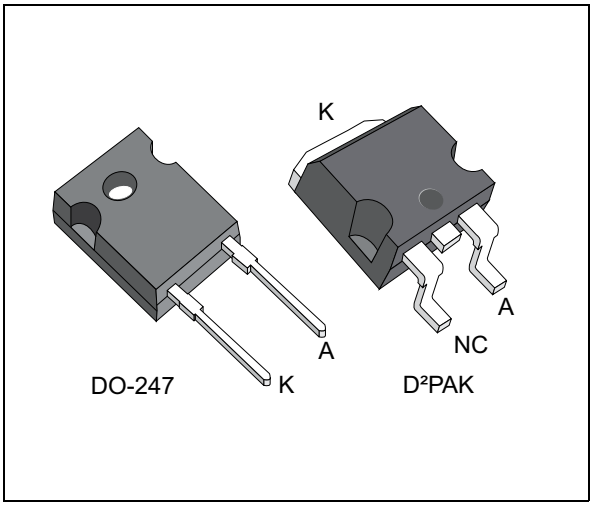


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	600 V
t_{rr} (typ)	39 ns
T_j	-40 to +175 °C
V_F (typ)	1.75 V

Features

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

Description

The STTH30ST06-Y, which uses ST Turbo 2, 600 V technology, is packaged in DO-247 and D²PAK with aluminum ribbon to ensure a high robustness. It especially suited for use in switching power supplies and automotive applications, industrial applications, as rectification and boost diode for circuits working in continuous conduction mode.

1 Characteristics

Table 2. Absolute ratings (limiting values, at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C		560	V
$I_{F(RMS)}$	Forward rms current		64	A
$I_{F(AV)}$	Average forward current, δ = 0.5	T_c = 65 °C	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	160	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		-40 to + 175	°C

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (DO-247, D²PAK)	1.25	°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	$V_R = V_{RRM}$			50	µA
		T_j = 125 °C			50	500	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A			3.6	V
		T_j = 125 °C			1.75	2.2	

1. Pulse test: tp = 5 ms, δ < 2%
2. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 1.45 \times I_{F(AV)} + 0.025\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 30 A, V_R = 400 V dI_F/dt = -100 A/µs		4	5.5	A
S_{factor}	Softness factor				0.3		
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, V_R = 30 V dI_F/dt = -50 A/µs		39	50	ns
			I_F = 0.5 A, I_{rr} = 0.25 A I_R = 1 A			30	
t_{fr}	Forward recovery time		I_F = 30 A, V_{FR} = 4 V dI_F/dt = 300 A/µs			200	
V_{FP}	Forward recovery voltage				7		V

Figure 1. Average forward power dissipation versus average forward current

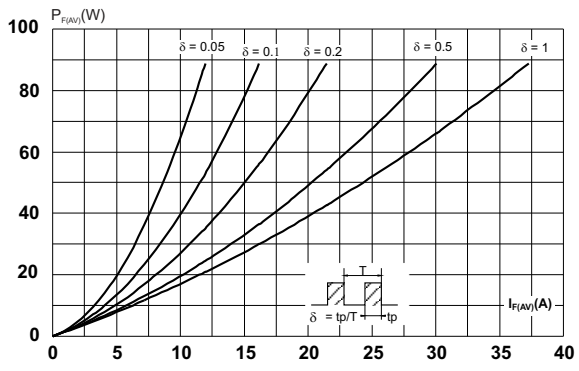


Figure 2. Forward voltage drop versus forward current

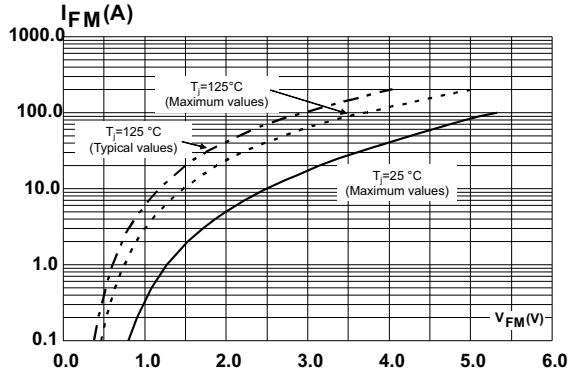


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

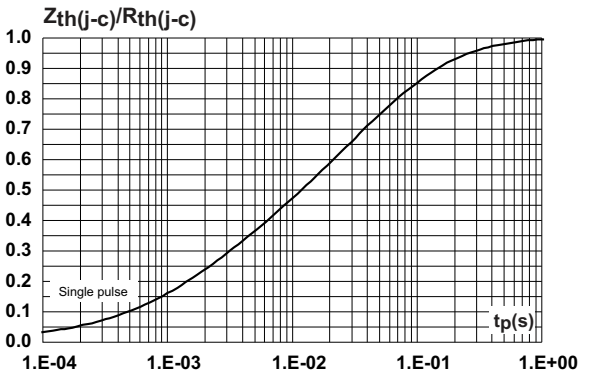


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

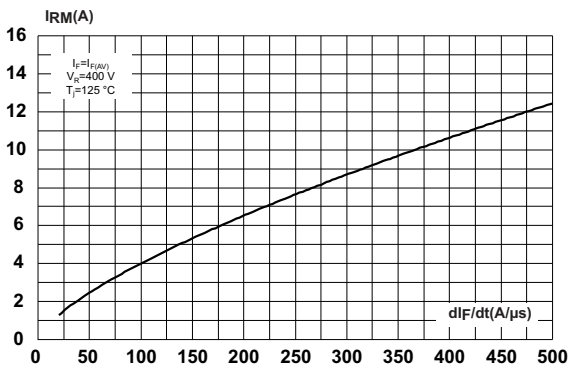


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

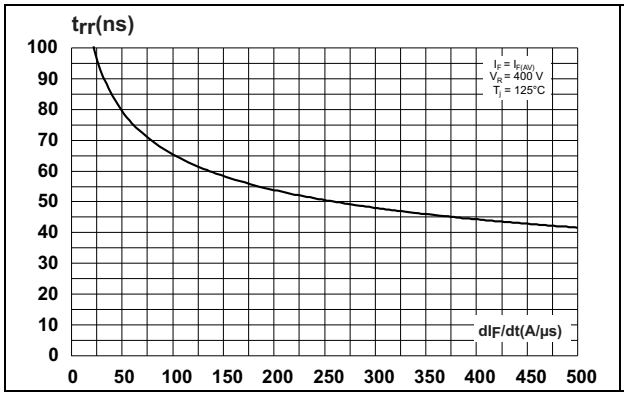


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

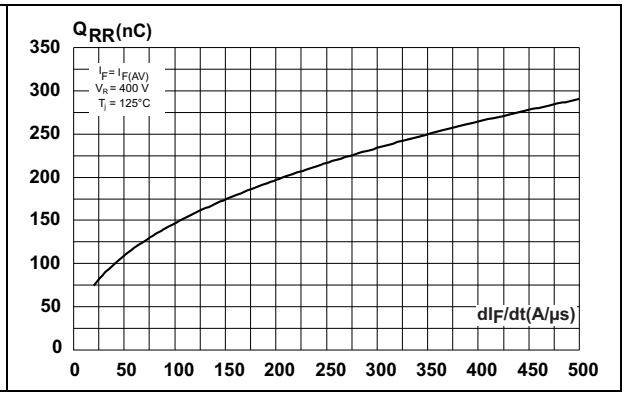


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

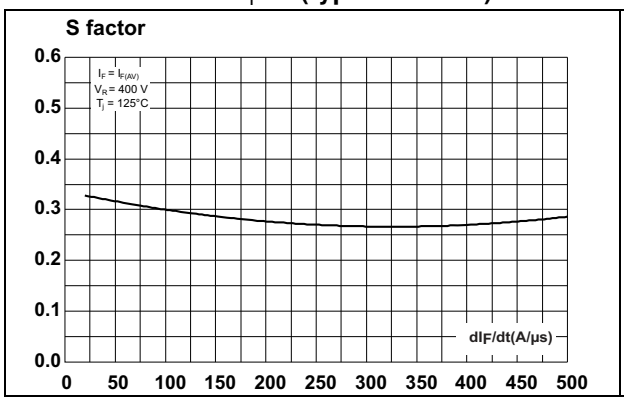


Figure 8. Relative variation of dynamic parameters versus junction temperature

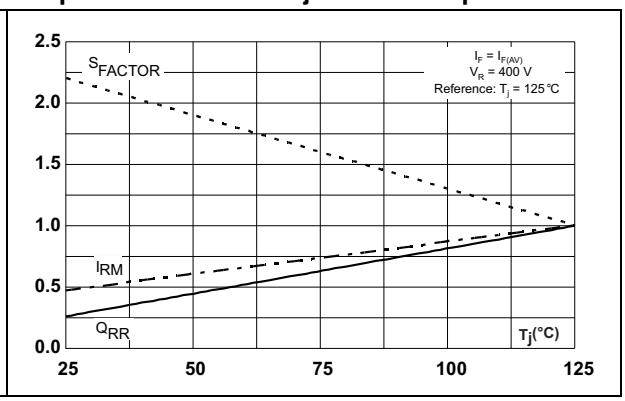


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

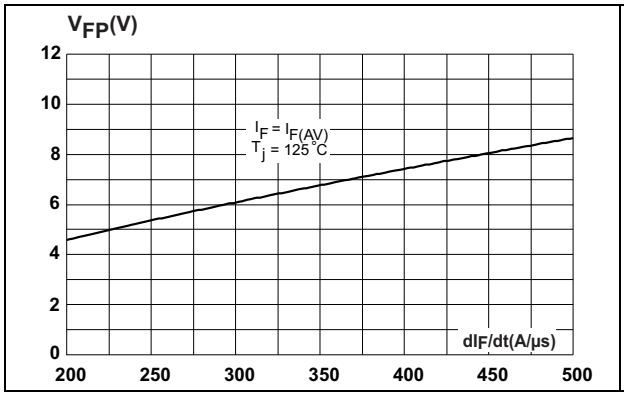


Figure 10. Forward recovery time versus dI_F/dt (typical values)

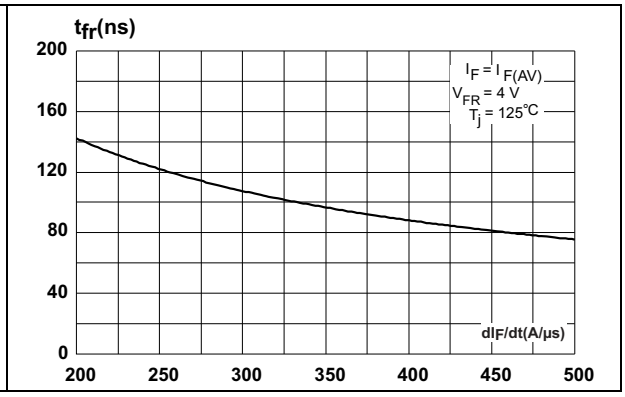


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

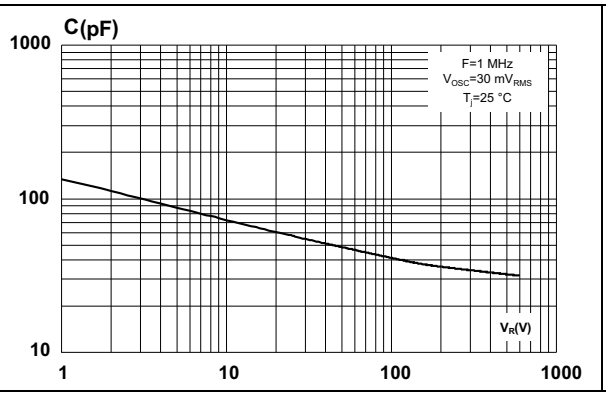
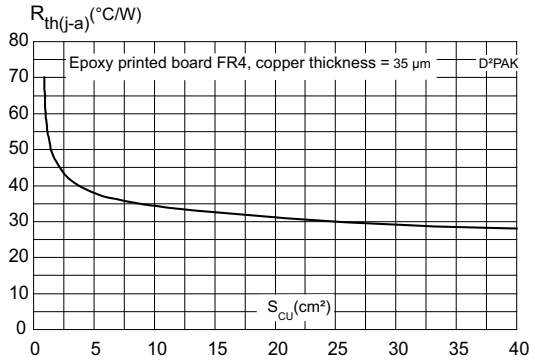


Figure 12. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m (1.0 N·m maximum)

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.

Figure 13. D²PAK dimension definitions

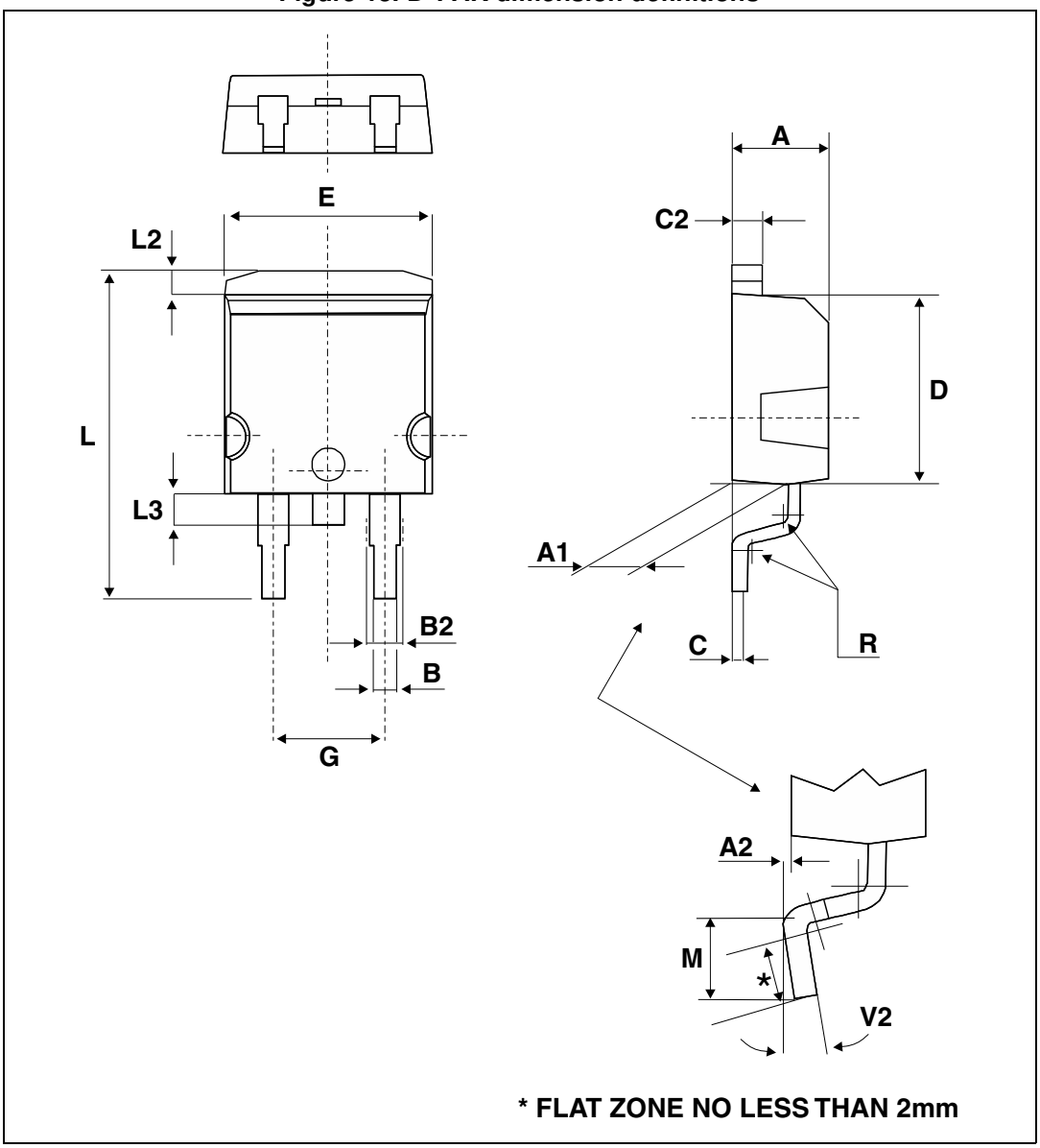


Table 6. D^2PAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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	16	5.28	0.192	0.63	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 14. Footprint (dimensions in mm)

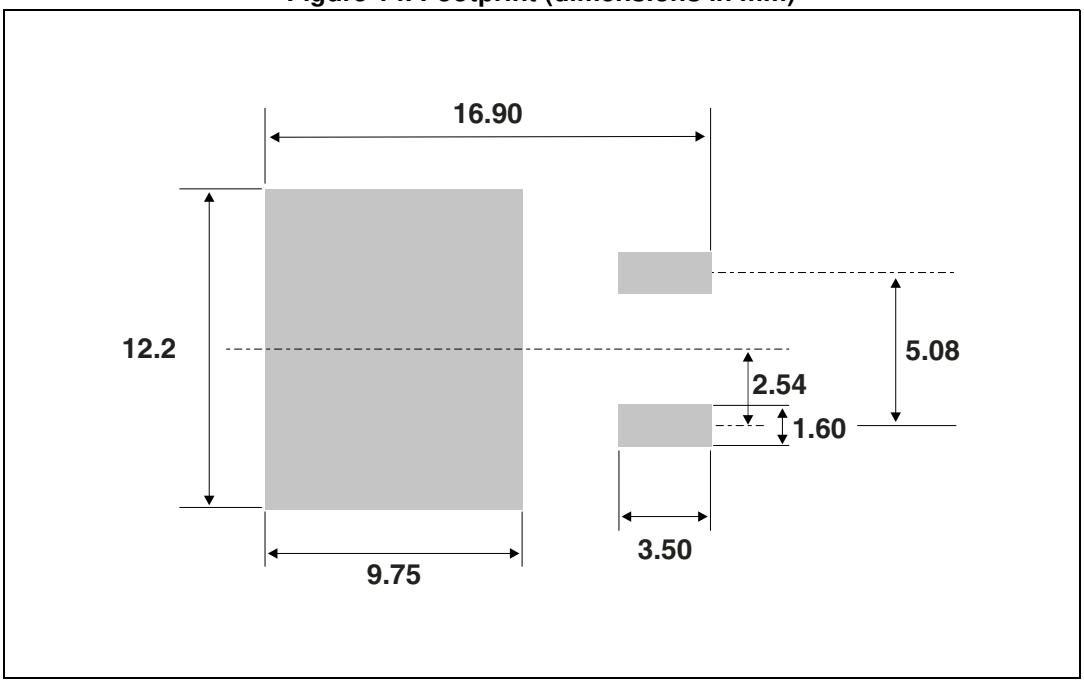


Figure 15. DO-247 dimension definitions

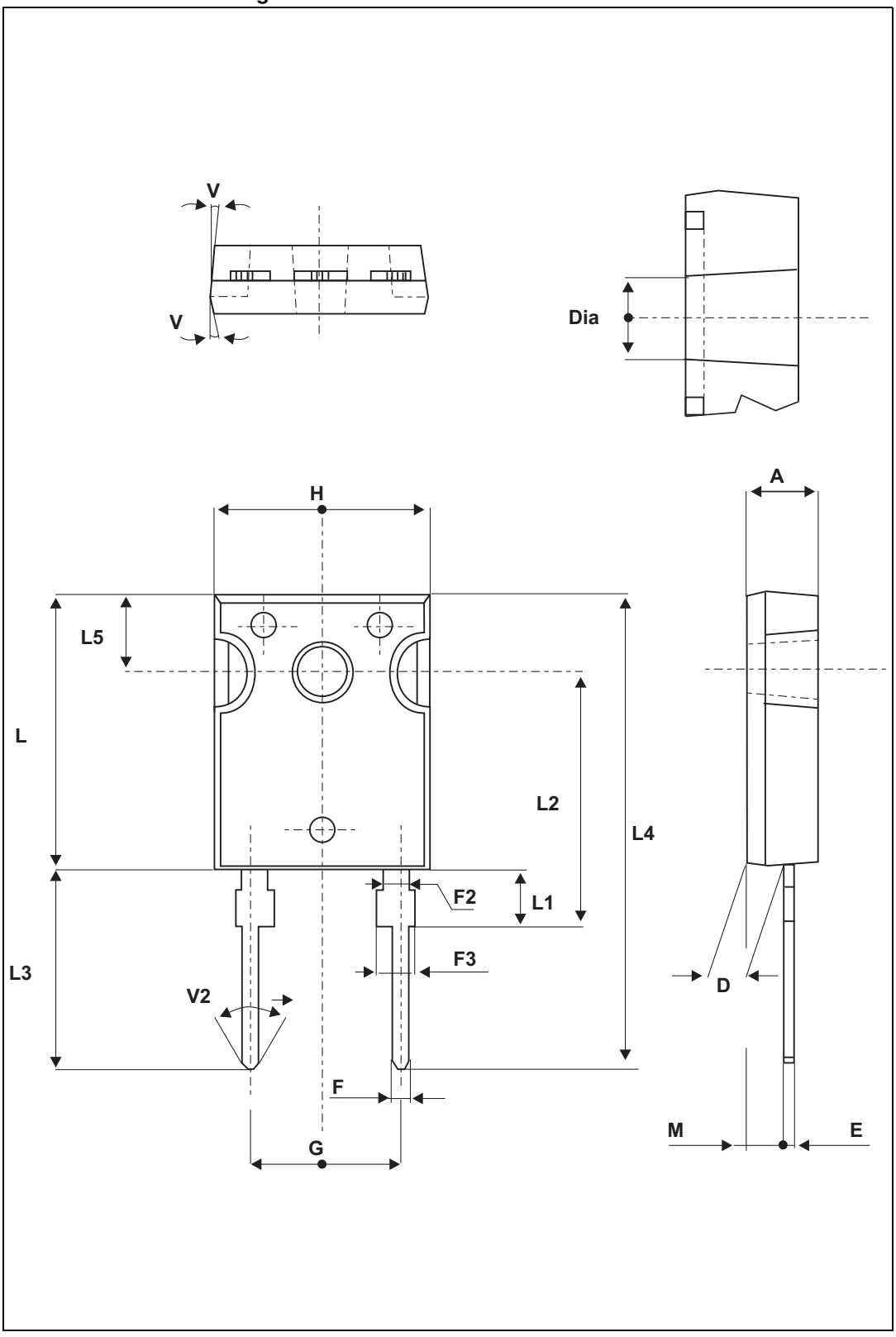


Table 7. DO-247 dimension values

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

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30ST06WY	STTH30ST06WY	DO-247	4.40 g	30	Tube
STTH30ST06GY-TR	STTH30ST06GY	D²PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
14-Jan-2015	1	First issue.