STTH5L04DEE

Turbo 2 ultrafast recovery diode

Datasheet – production data

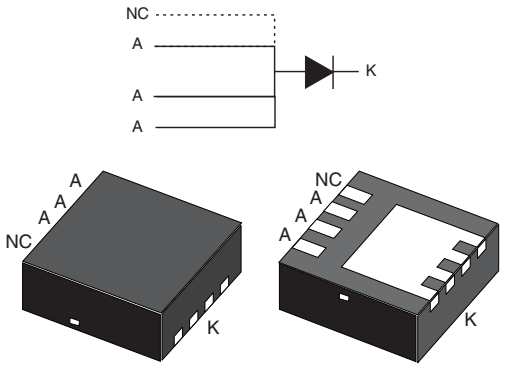
Features

- Very low switching losses
- High frequency and high pulse current operation
- Low thermal resistance
- High junction temperature
- ECOPACK®2 compliant component

Description

The STTH5L04 series uses ST's new 400 V planar Pt doping technology. The STTH5L04 is specially suited for switching mode base drive and transistor circuits.

Packaged in PowerFLAT™, this device is intended for use in low profile applications.



PowerFLAT(3.3 x 3.3)
STTH5L04DEE-TR

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	5 A
V_{RRM}	400 V
T_j (max)	150 °C
V_F (typ)	0.85 V
T_{RR} (typ)	35 ns

TM: PowerFLAT is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		400	V
$I_{F(RMS)}$	Forward rms current		15	A
$I_{F(AV)}$	Average forward current	T_c = 120 °C, δ = 0.5	5	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	60	A
T_{stg}	Storage temperature range		-65 to +150	°C
T_j	Maximum operating junction temperature		150	°C

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	4.5	°C/W
$R_{th(j-a)}$	Junction to ambient on printed circuit board (with recommended footprint dimension, copper thickness = 35 µm)	250	°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	$V_R = V_{RRM}$	-		2.5	µA
		T_j = 125 °C		-	2.5	25	µA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5A		1.05	1.25	V
		T_j = 150 °C		-	0.85	1.05	

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

To evaluate the conduction losses use the following equation:

$P = 0.85 \times I_{F(AV)} + 0.04 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 5A, V_R = 320 V, dI_F/dt = -200 A/µs	-	8	11	A
S_{factor}	Softness factor			-	0.7		
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1A, V_R = 30 V, dI_F/dt = -50 A/µs		43	60	ns
			I_F = 1A, V_R = 30 V, dI_F/dt = -100 A/µs	-	35	50	
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 5 A, V_{FR} = 1.2 V dI_F/dt = 100 A/µs			110	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C		-	2	3	V

Figure 1. Average forward power dissipation versus average forward current

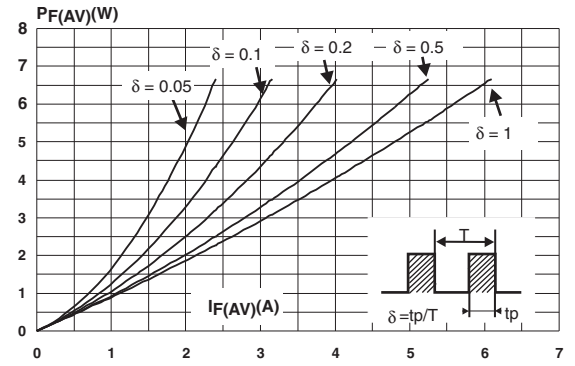


Figure 2. Forward voltage drop versus forward current

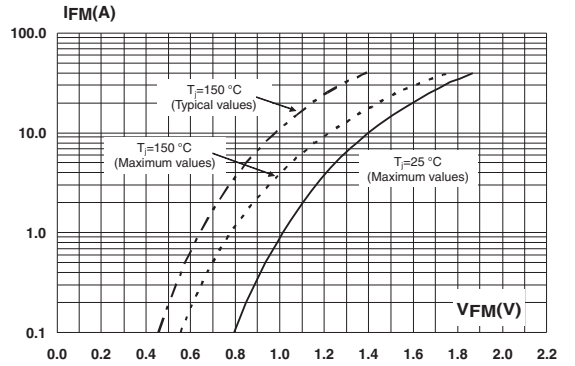


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

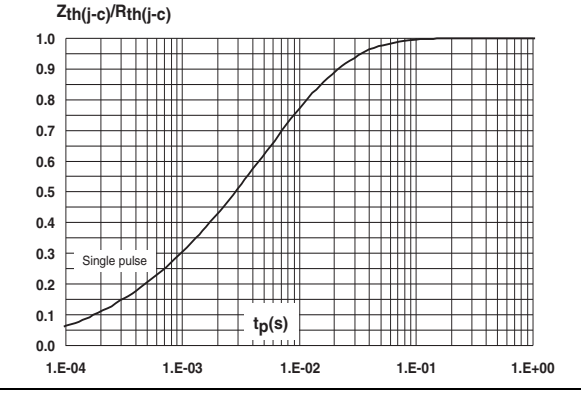


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

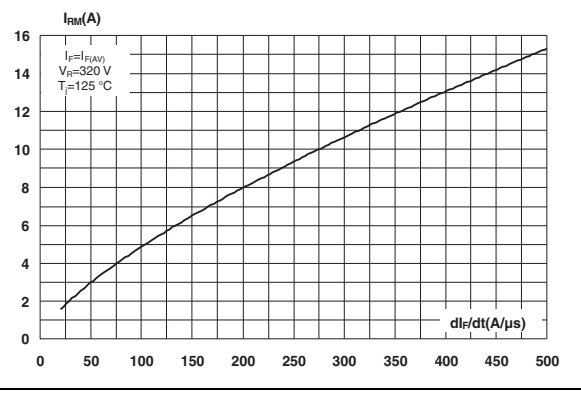


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

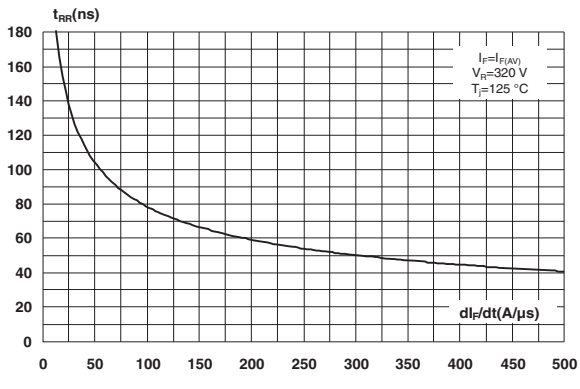


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

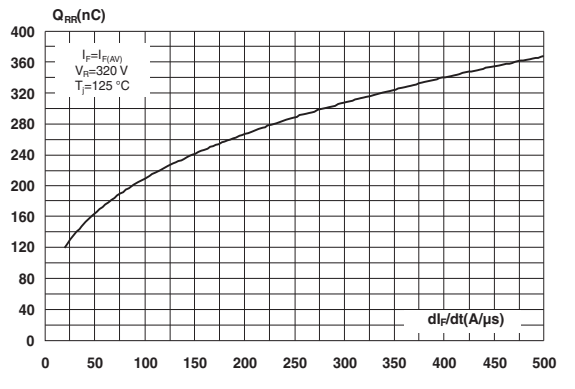


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

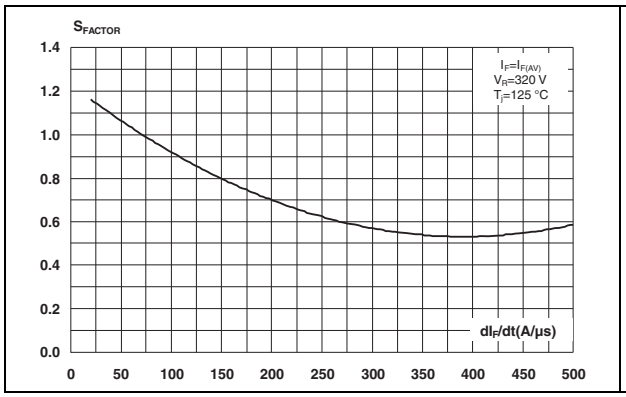


Figure 8. Relative variation of dynamic parameters versus junction temperature

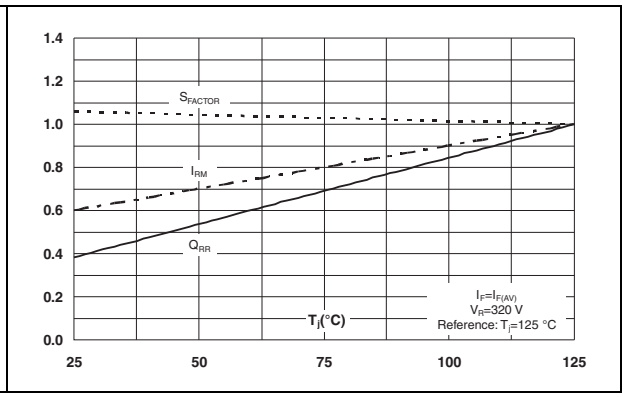


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

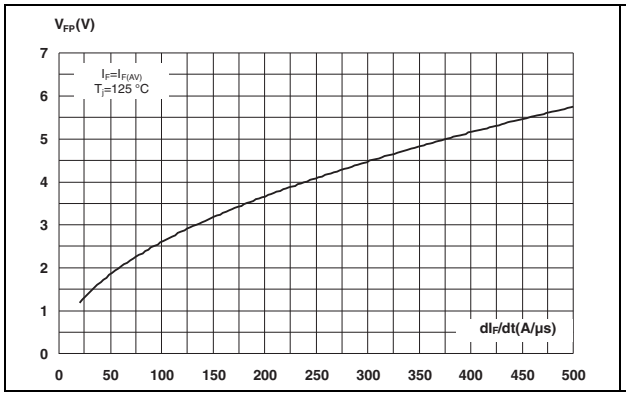


Figure 10. Forward recovery time versus dI_F/dt (typical values)

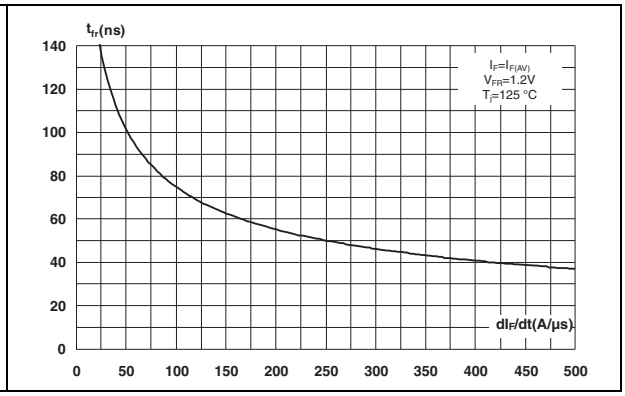


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

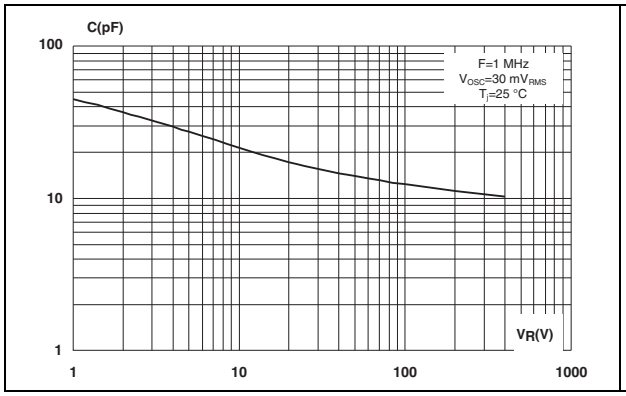
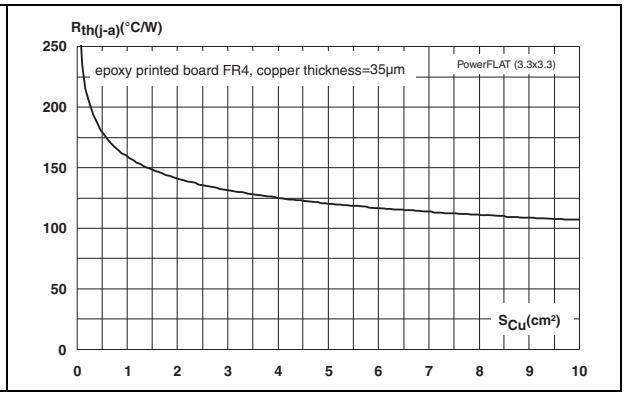


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94,V0
- Lead-free package

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. PowerFLAT (3.3 x 3.3) dimensions (definitions)

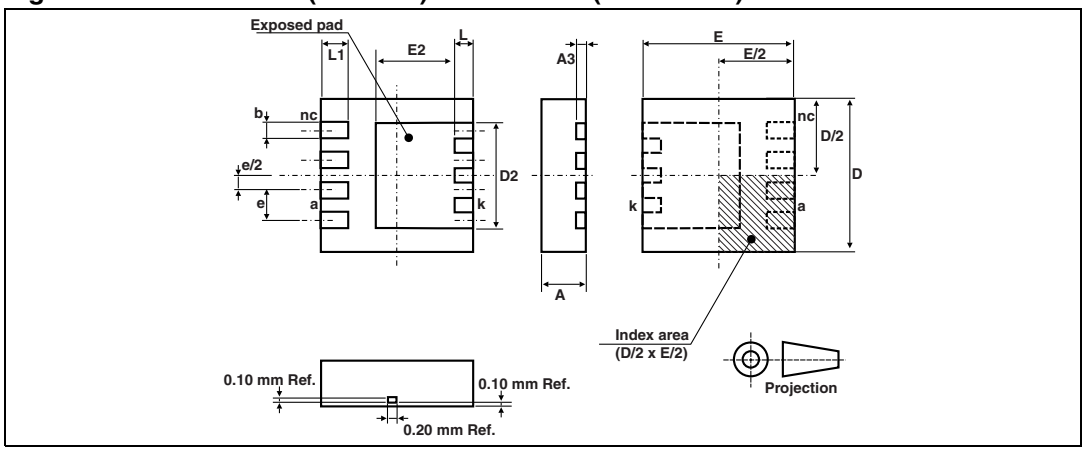
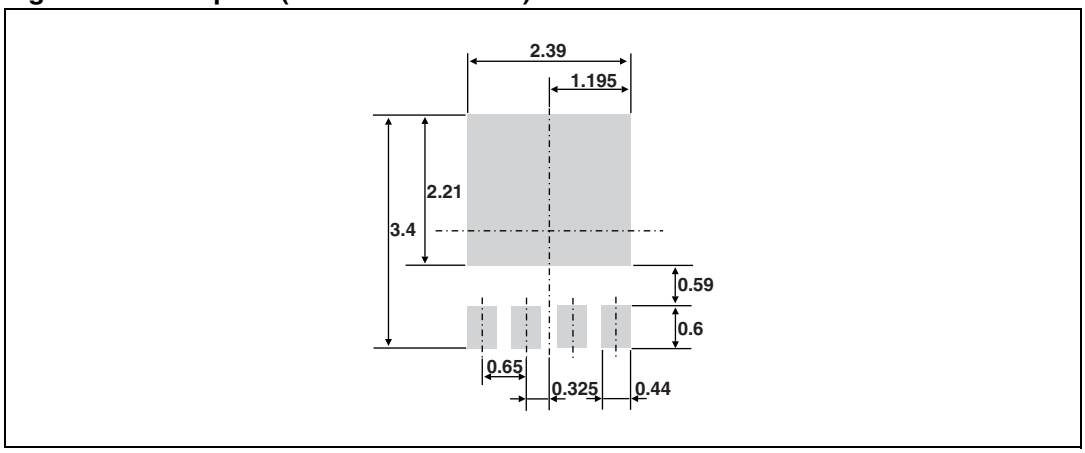


Table 6. PowerFLAT (3.3 x 3.3) dimensions (values)

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.95		1.0	0.037		0.039
A3		0.2			0.008	
b	0.29	0.34	0.39	0.011	0.013	0.015
D	3.20	3.30	3.40	0.126	0.130	0.134
D2	2.24	2.29	2.34	0.088	0.090	0.092
E	3.20	3.30	3.40	0.126	0.130	0.134
E2	1.66	1.71	1.76	0.065	0.067	0.069
e		0.65			0.026	
L		0.40			0.016	
L1	0.45	0.50	0.55	0.018	0.20	0.22

Figure 14. Footprint (dimensions in mm)



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH5L04DEE-TR	TH5L04	PowerFLAT (3.3 x 3.3)	34 mg	3000	Tape and reel 13” reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
11-Sep-2012	1	First issue.

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