1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			300	V
$I_{F(RMS)}$	Forward rms current			60	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_c = 135 °C	Per diode	30	A
			Per device	60	
I_{FSM}	Surge non repetitive forward current	t_P = 10 ms sinusoidal		300	A
I_{RSM}	Non repetitive peak reverse current	t_P = 100 µs square		4	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature			+175	°C

Table 3: Thermal parameters

Symbol	Parameter		Maximum	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1	°C/W
		Total	0.55	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)(per\ diode)} + P_{(diode2)} \times R_{th(c)}$

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 = 300 V	-		60	µA
		T_j = 125 °C		-	60	600	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A	-		1.25	V
		T_j = 125 °C		-	0.85	1	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2 %

(2)Pulse test: t_p = 380 µs, δ < 2 %

To evaluate the maximum conduction losses, use the following equation:

$P = 0.75 \times I_{F(AV)} + 0.008 \times I_{F}^{2}{}_{(RMS)}$

Table 5: Dynamic characteristics

Symbol	Parameters	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	-		40	ns
			I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V	-		55	
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 30 A; dI_F/dt = 200 A/µs, V_{FR} = 1.1 x V_F max.	-		350	ns
V_{FP}	Forward recovery voltage			-		5	V
S_{factor}	Softness factor	T_j = 125 °C	V_{CC} = 200 V, I_F = 30 A, dI_F/dt = 200 A/µs	-	0.3		-
I_{RM}	Reverse recovery current			-		11	A

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current (per diode)

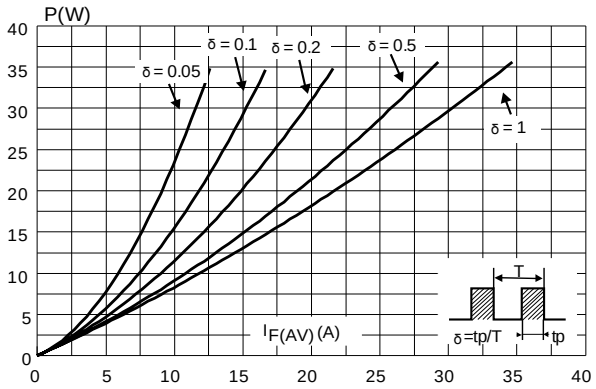


Figure 2: Forward voltage drop versus forward current (maximum values, per diode)

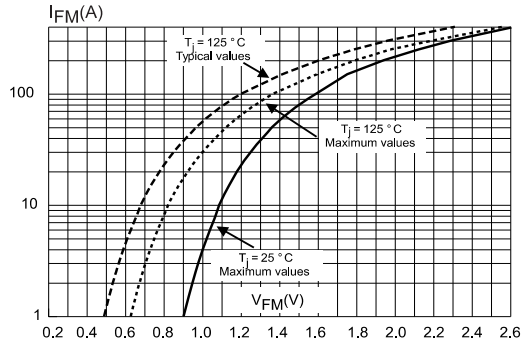


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (TO-247)

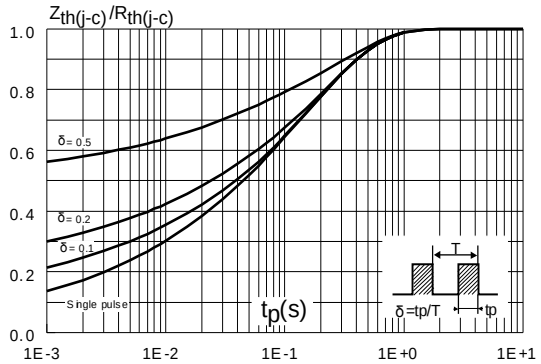


Figure 4: Peak reverse recovery current versus dI_F/dt (90% confidence, per diode)

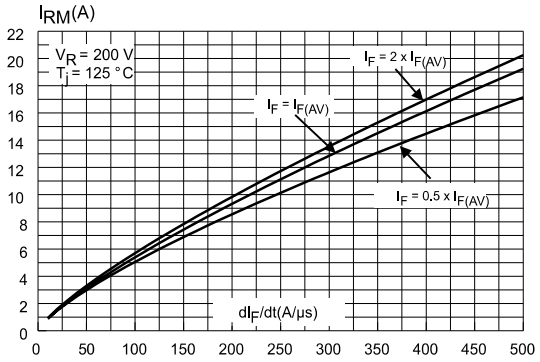


Figure 5: Reverse recovery time versus dI_F/dt (90% confidence, per diode)

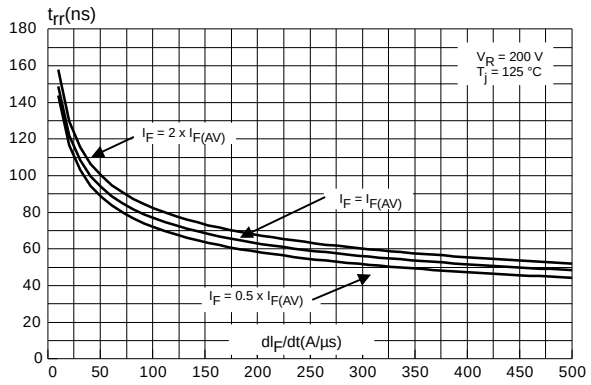


Figure 6: Softness factor (tb/ta) versus dI_F/dt (typical values, per diode)

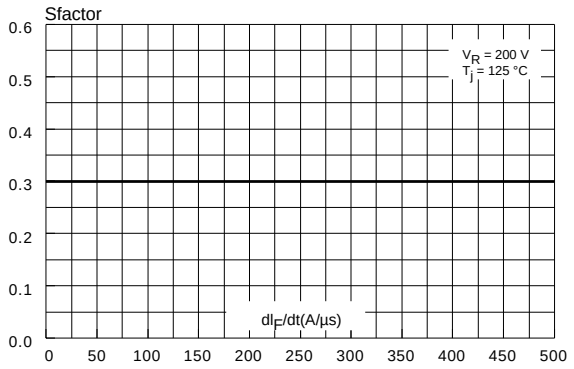


Figure 7: Relative variation of dynamic parameters versus junction temperature (T_j = 125 °C)

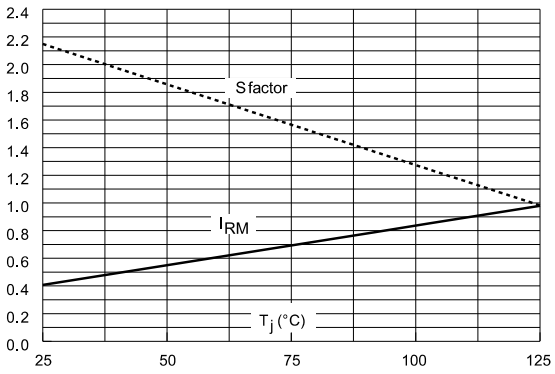


Figure 8: Transient peak forward voltage versus dI_F/dt (90% confidence, per diode)

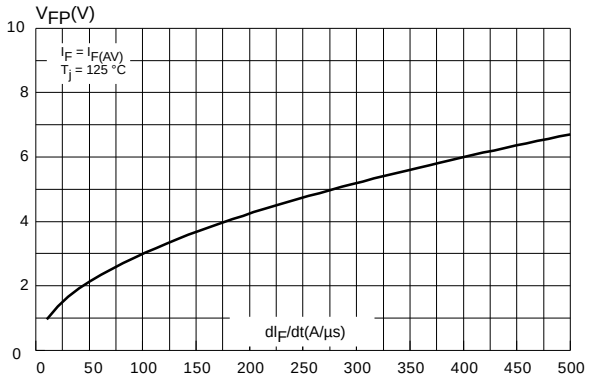
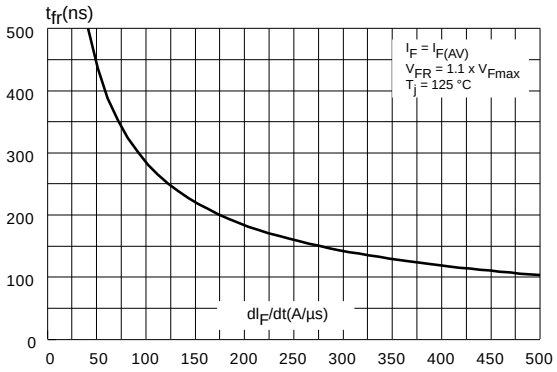


Figure 9: Forward recovery time versus dI_F/dt (90% confidence, per diode)



2 Package information

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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque values: 0.55 N·m
- Maximum torque value: 1.0 N·m

2.1 TO-247 package information

Figure 10: TO-247 package outline

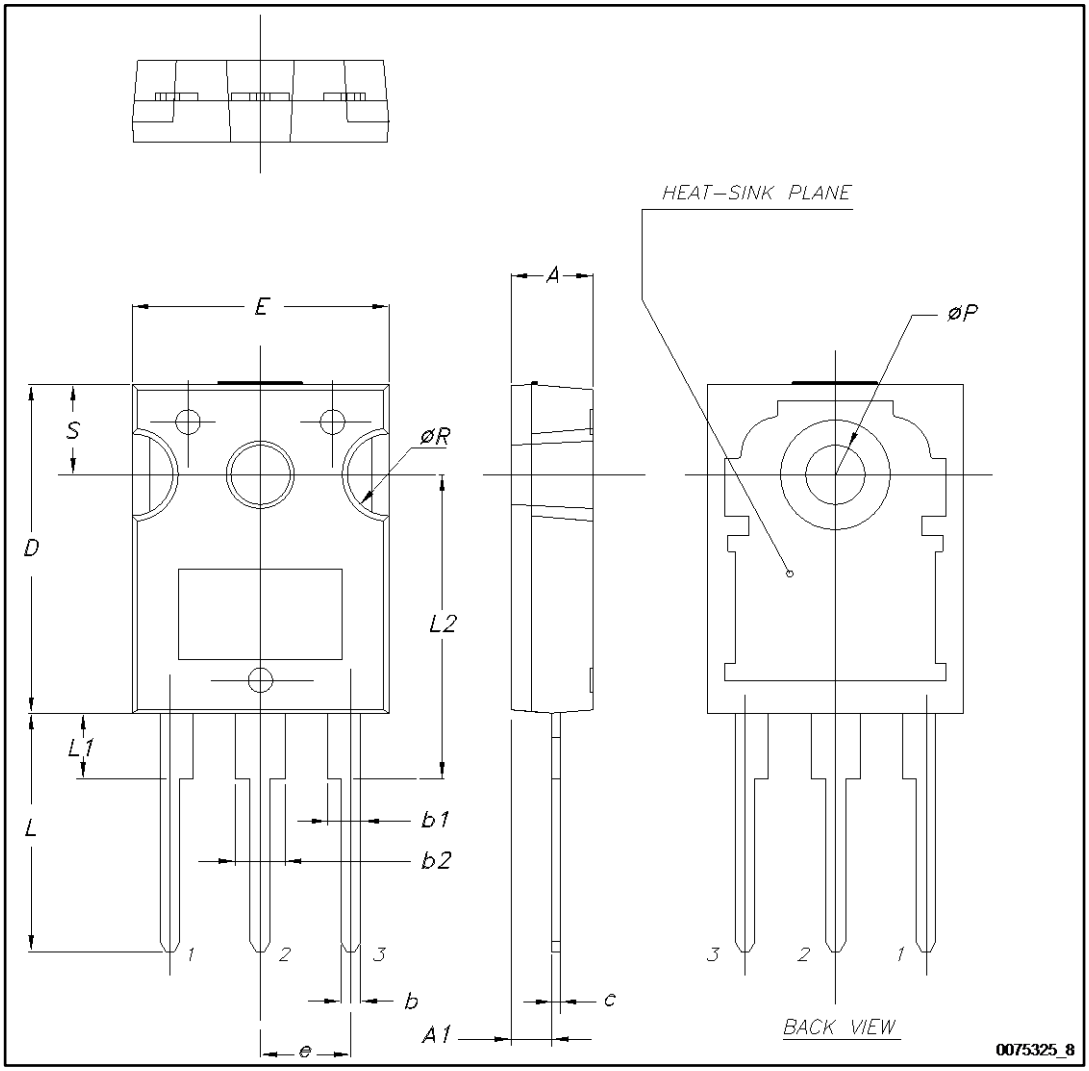


Table 6: TO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D(1)	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
ØP(2)	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

Notes:

(1)Dimension D plus gate protusion does not exceed 20.5 mm

(2)Resin thickness around the mounting hole is not less than 0.9 mm.

3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH6003CW	STTH6003CW	TO-247	4.36 g	30	Tube

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
Oct-1999	5C	Previous revision.
18-Jun-2014	6	Removed ISOTOP package. Updated *Section 2: Package information.*
21-Nov-2016	7	Updated *Table 7: "Ordering information"*. Minor text changes.

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