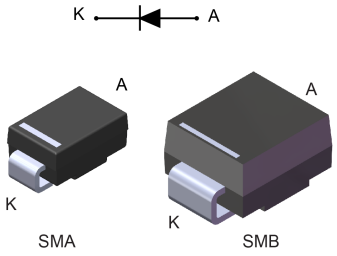
STTH2R02

Datasheet

200 V - 2 A ultrafast recovery diode



Features

- Very low conduction losses
- Negligible switching losses
- Low forward voltage drop
- High junction temperature
- ECOPACK®2 compliant

Applications

- Switching diode
- LED Lighting
- Auxiliary power supply
- Flyback diode

Description

The STTH2R02 uses ST's patented 200 V planar Pt doping technology, and it is specially suited for switching mode base drive and transistor circuits.

Packaged in SMA, SMB, the STTH2R02 is optimized for use low voltage, high frequency inverters, free wheeling and polarity protection

Product status
STTH2R02

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 A
V_{RRM}	200 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.7 V
trr(typ.)	15 ns

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	SMA	T_L = 90 °C	2	A
		SMB	T_L = 90 °C		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	75	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature			+175	°C

Table 2. Thermal resistance parameter

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA / SMB	30	°C/W

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		3	µA
		T_j = 125 °C		-	2	20	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 6 A	-		1.20	V
		T_j = 25 °C	I_F = 2 A	-	0.89	1.00	
		T_j = 100 °C		-	0.76	0.85	
		T_j = 150 °C		-	0.70	0.80	

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:

$P = 0.68 \times I_{F(AV)} + 0.06 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

Table 4. Dynamic characteristics (T_j = 25 °C unless otherwise specified)

Symbol	Parameters	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V	-	23	30	ns
		I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V	-	15	20	
I_{RM}	Reverse recovery current	I_F = 2 A, dI_F/dt = -200 A/µs, V_R = 160 V, T_j = 125 °C	-	3	4	A
t_{fr}	Forward recovery time	I_F = 2 A, dI_F/dt = 100 A/µs, V_{FR} = 1.1 $V_{F(max.)}$	-	40		ns
V_{FP}	Forward recovery voltage	I_F = 2 A, dI_F/dt = 100 A/µs	-	2.0		V

1.1 Characteristics (curves)

Figure 1. Peak current versus duty cycle

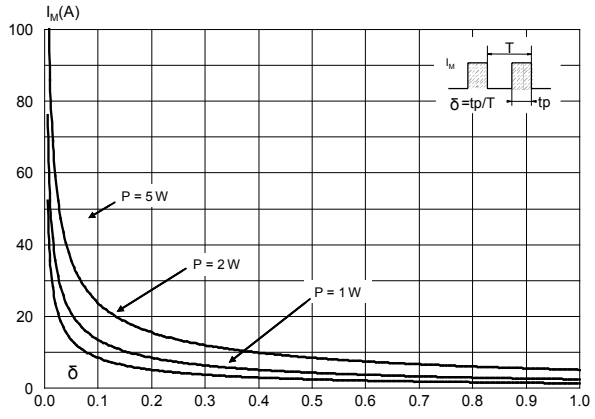


Figure 2. Forward voltage drop versus forward current (typical values)

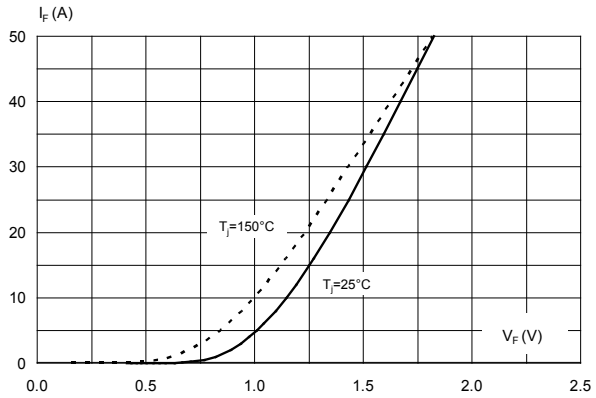


Figure 3. Forward voltage drop versus forward current (maximum values)

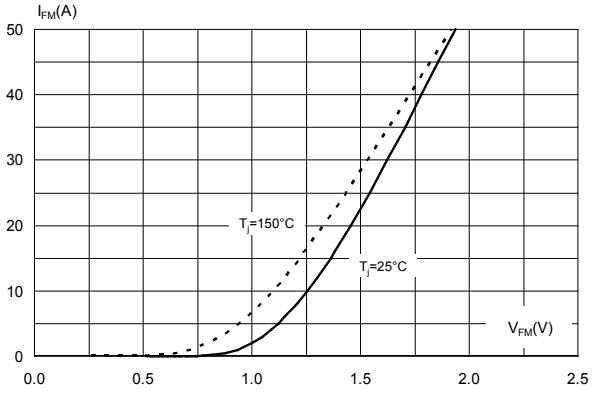


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SMA)

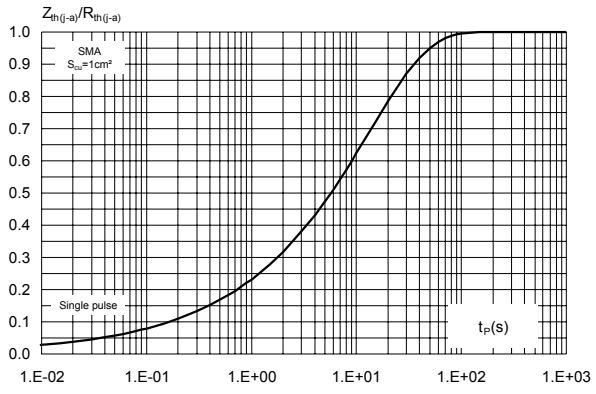


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB)

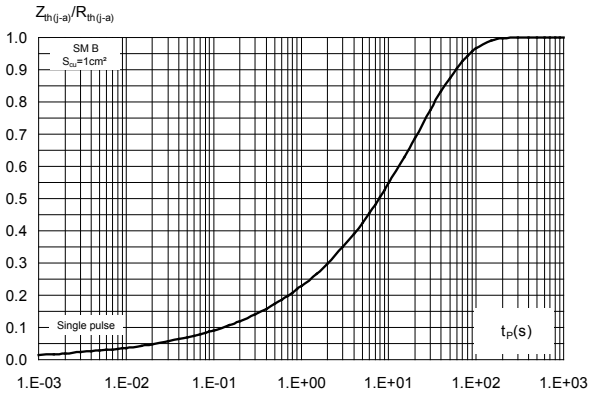


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

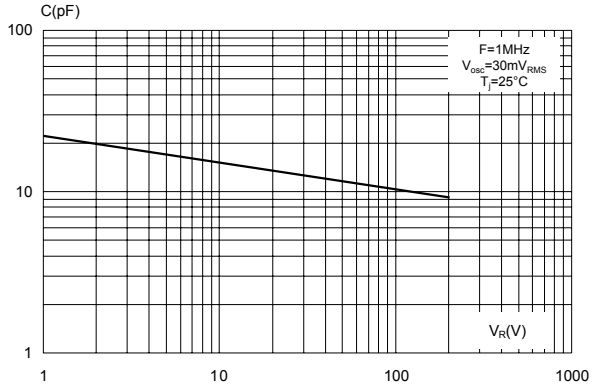


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

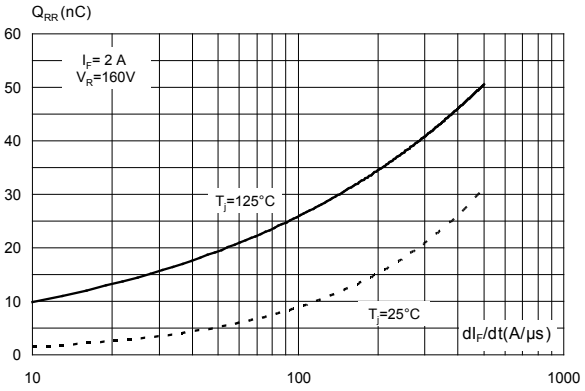


Figure 8. Reverse recovery time versus dI_F/dt (typical values)

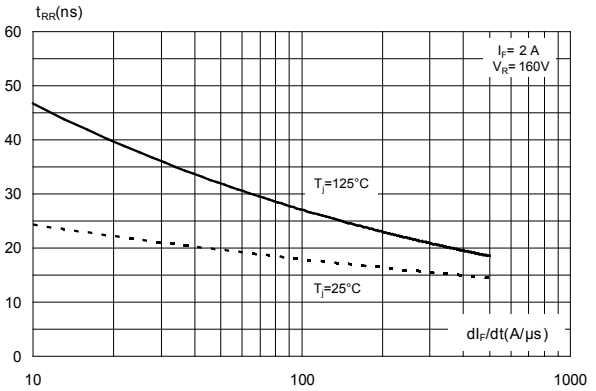


Figure 9. Peak reverse recovery current versus dI_F/dt (typical values)

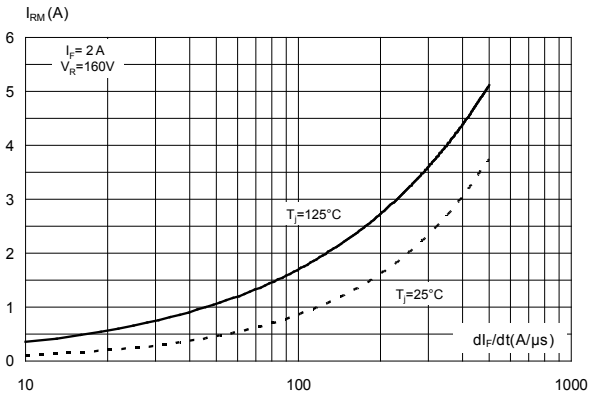


Figure 10. Relative variations of dynamic parameters versus junction temperature

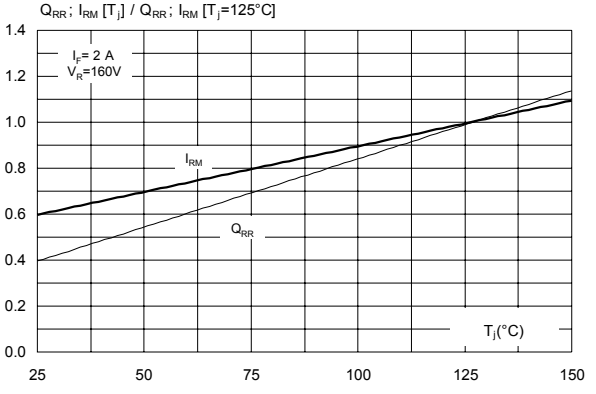


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

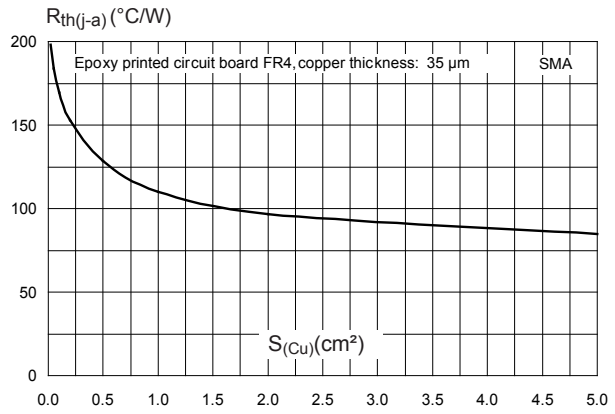
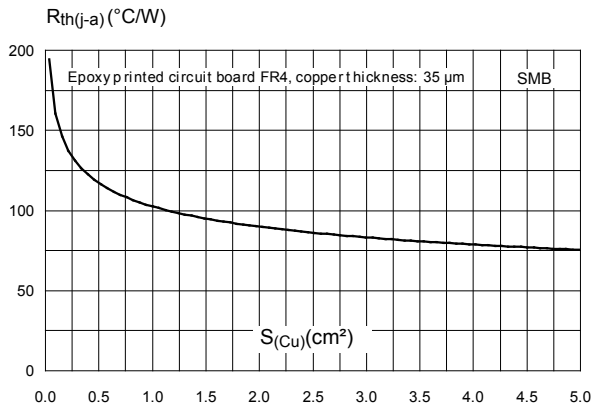


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



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.

2.1 SMA package information

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

Figure 13. SMA package outline

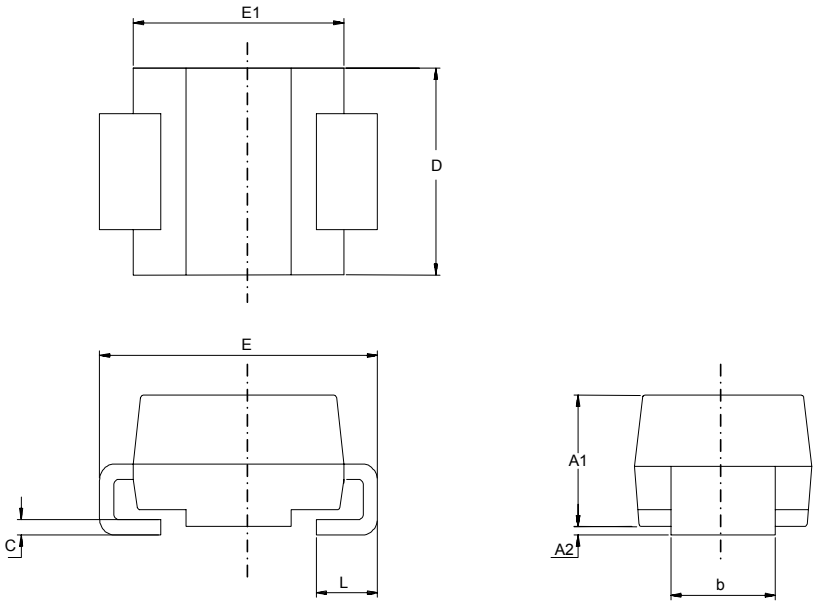
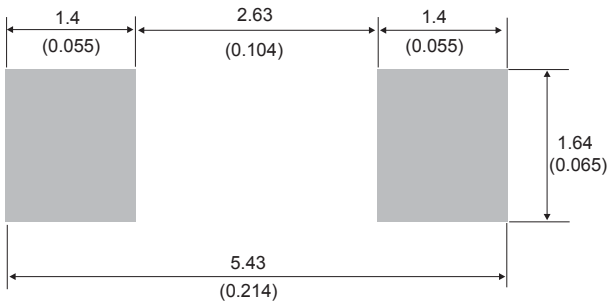


Table 5. SMA package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.074	0.097
A2	0.05	0.20	0.001	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.005	0.016
D	2.25	2.90	0.088	0.115
E	4.80	5.35	0.188	0.211
E1	3.95	4.60	0.155	0.182
L	0.75	1.50	0.029	0.060

Figure 14. **SMA recommended footprint in mm (inches)**



2.2 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 15. SMB package outline

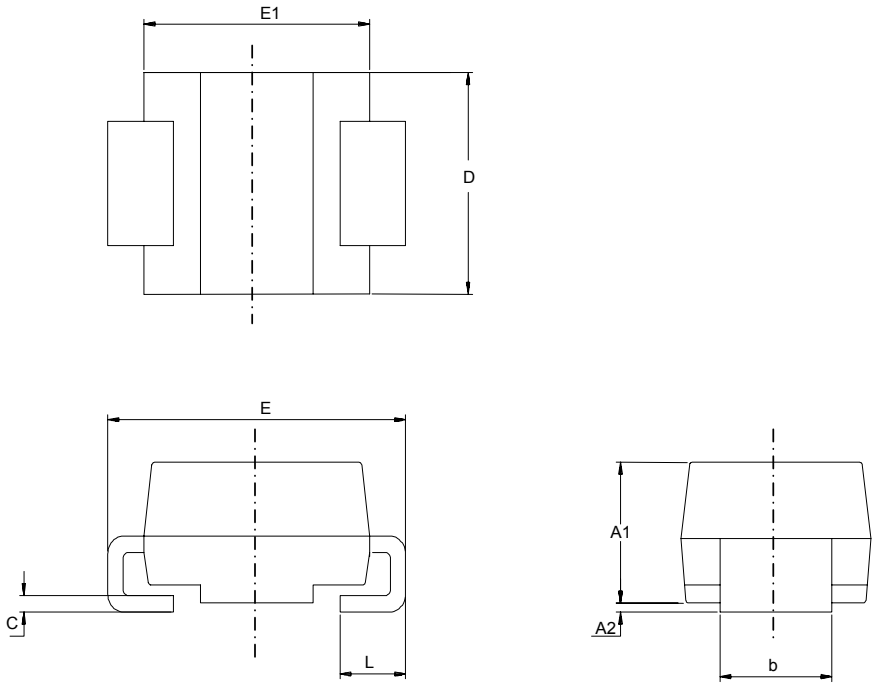
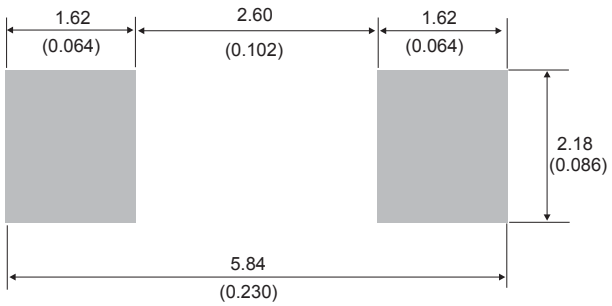


Table 6. SMB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.074	0.097
A2	0.05	0.20	0.001	0.008
b	1.95	2.20	0.076	0.087
c	0.15	0.40	0.005	0.016
D	3.30	3.95	0.129	0.156
E	5.10	5.60	0.200	0.221
E1	4.05	4.60	0.159	0.182
L	0.75	1.50	0.029	0.060

Figure 16. SMB recommended footprint



3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH2R02A	R2A	SMA	0.068 g	5000	Tape and reel
STTH2R02U	R2U	SMB	0.107 g	2500	Tape and reel

Revision history

Table 8. **Document revision history**

Date	Revision	Changes
03-May-2006	1	First issue.
13-Oct-2006	2	Maximum T_j set to 175° C for all packages in Table 1.
11-Dec-2018	3	Removed DO-15 package information.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

STMicroelectronics:
STTH2R02A STTH2R02U