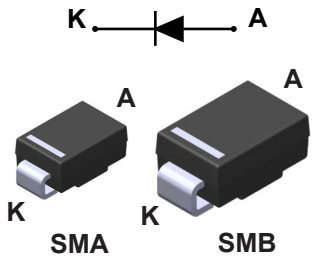
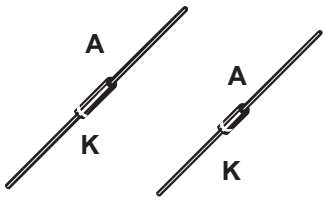
STTH1R02

Datasheet

200 V - 1.5 A ultrafast recovery diode





DO-15 DO-41

Features

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

Applications

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

Description

The STTH1R02 uses ST's new 200 V planar Pt doping technology, and it is specially suited for switching mode base drive and transistor circuits.

Packaged in SMA, SMB, DO-41 and DO-15, the STTH1R02 is ideal for use low voltage, high frequency inverters, free wheeling and polarity protection

Product status
STTH1R02

Product summary	
Symbol	**Value**
$I_{F(AV)}$	1.5 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, SMB	T_L = 150 °C	1.5	A
		DO-41, DO-15	T_L = 135 °C		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	60	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
$R_{th(j-l)}$	Junction to lead	Lead length = 10 mm on infinite heatsink	DO-15, DO-41	45	

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 = 1.5 A	-	0.89	1.00	V
		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:

$P = 0.68 \times I_{F(AV)} + 0.08 \times I_F{}^2{}_{(RMS)}$

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 stated)

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 = 1.5 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 =1.5 A, dI_F/dt = 100 A/µs, V_{FR} = 1.1 $V_{F(max.)}$	-	50		ns
V_{FP}	Forward recovery voltage	I_F =1.5 A, dI_F/dt = 100 A/µs	-	2.1		V

1.1 Characteristics (curves)

Figure 1. Peak current versus duty cycle

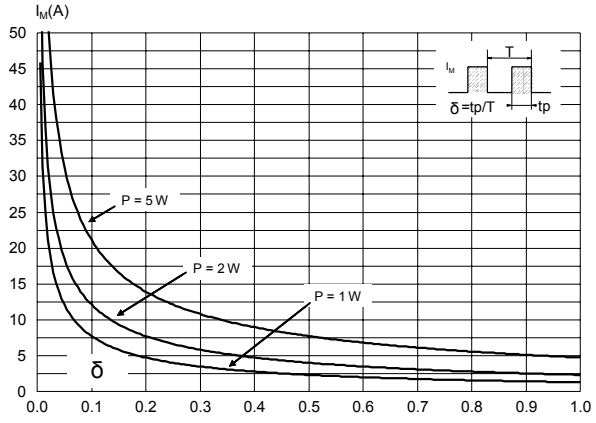


Figure 2. Forward voltage drop versus forward current (typical values)

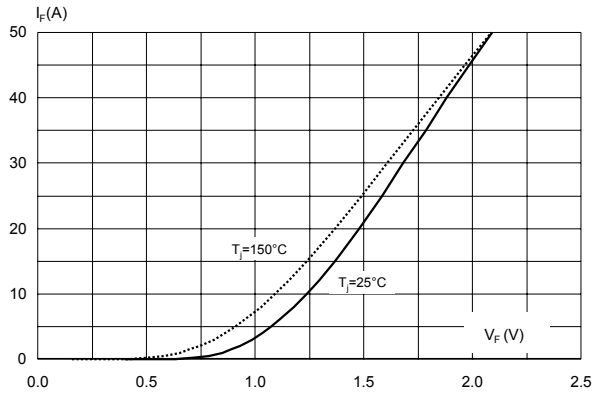


Figure 3. Forward voltage drop versus forward current (maximum values)

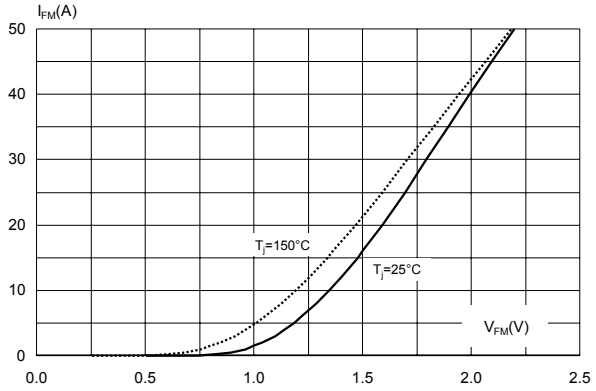


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SMA)

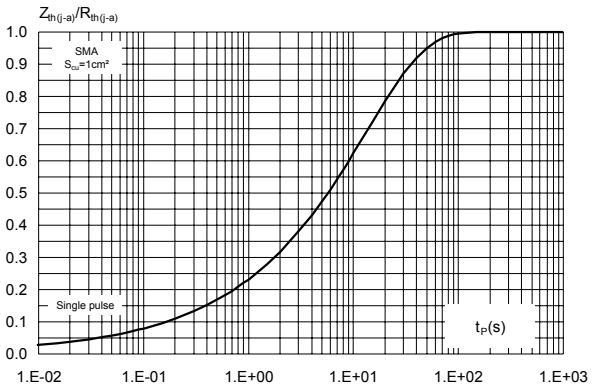


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB)

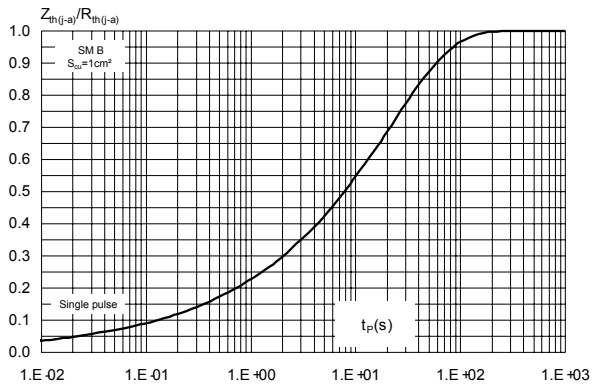


Figure 6. Relative variation of thermal impedance junction to lead versus pulse duration (DO-41)

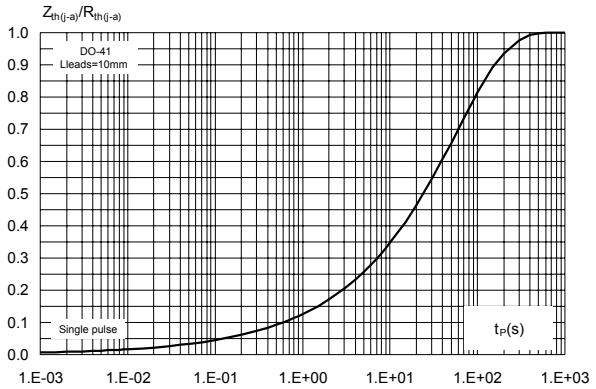


Figure 7. Relative variation of thermal impedance junction to lead versus pulse duration (DO-15)

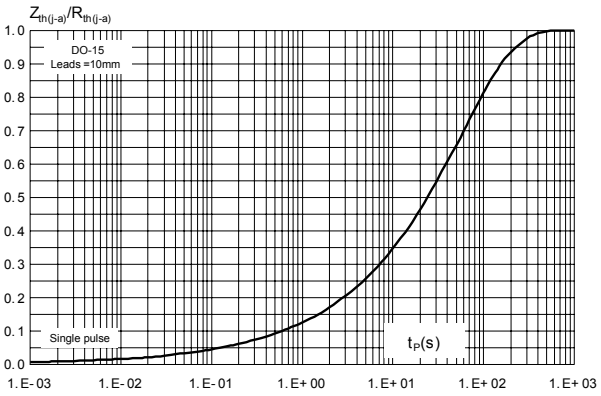


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

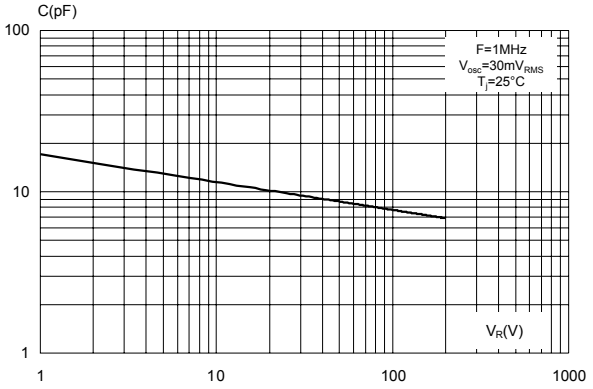


Figure 9. Reverse recovery charges versus dI_F/dt (typical values)

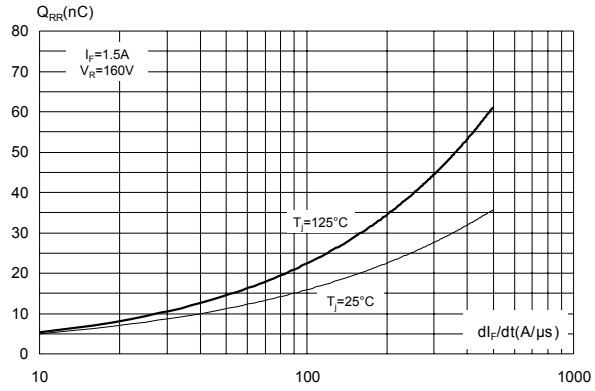


Figure 10. Reverse recovery time versus dI_F/dt (typical values)

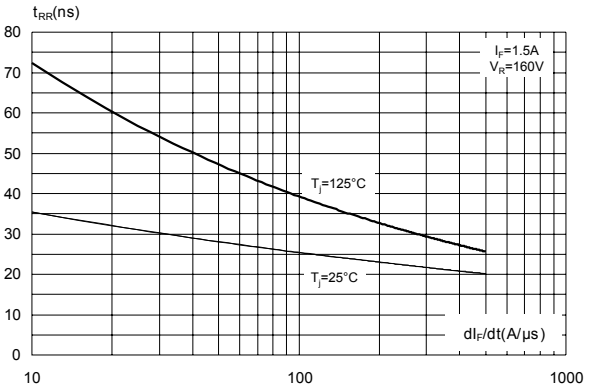


Figure 11. Peak reverse recovery current versus dI_F/dt (typical values)

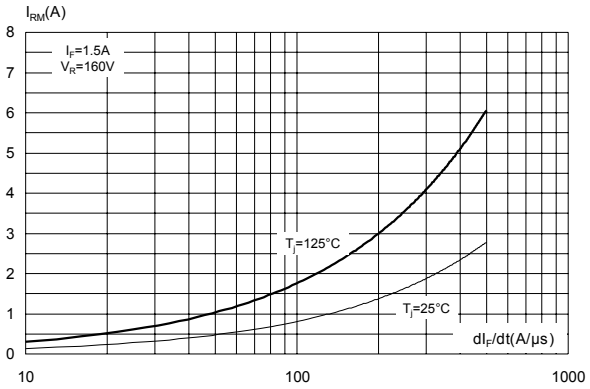


Figure 12. Relative variations of dynamic parameters versus junction temperature

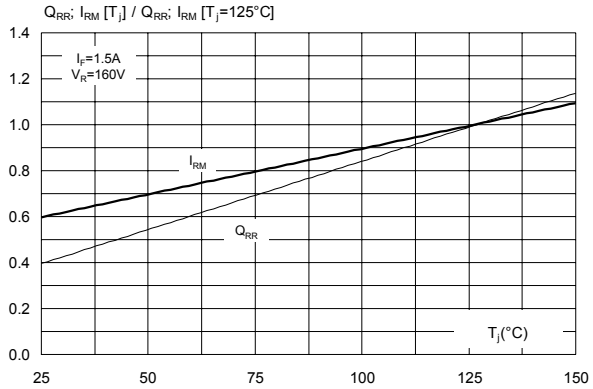


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

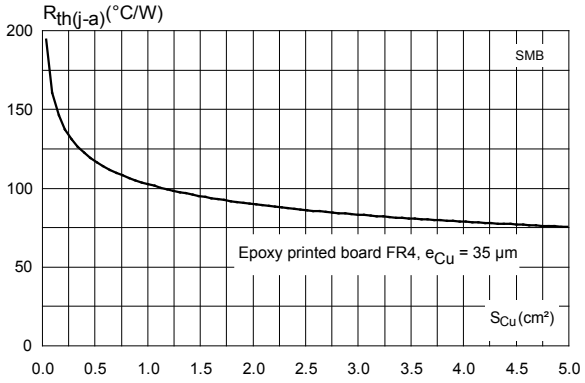


Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (typical values)

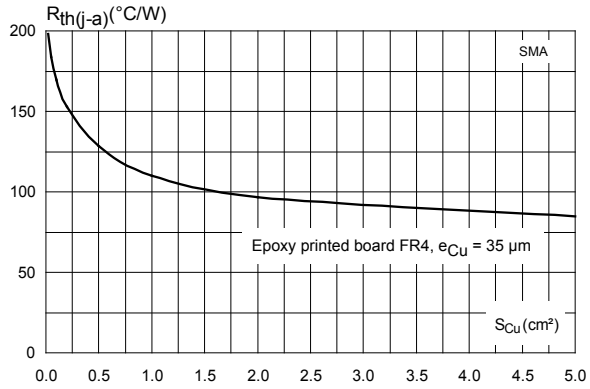


Figure 15. Thermal resistance junction to ambient versus lead length (DO-41)

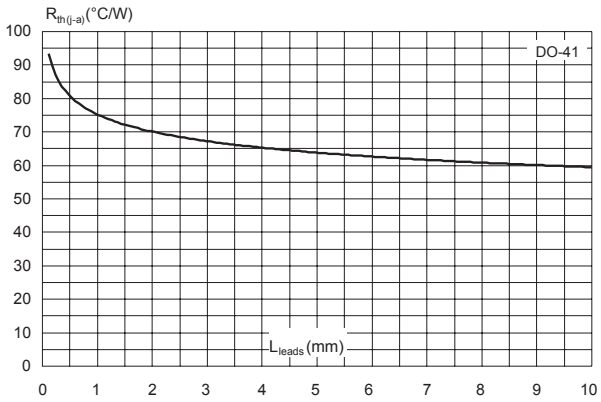
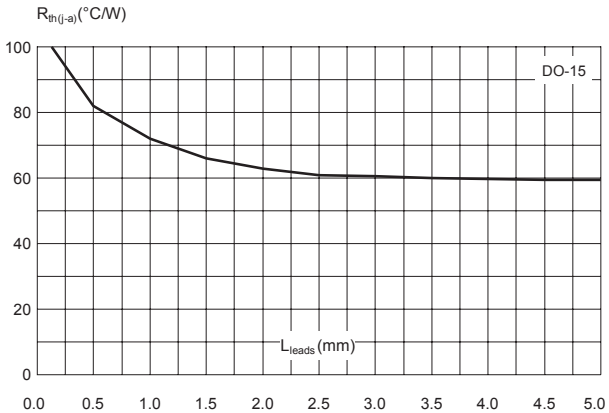


Figure 16. Thermal resistance junction to ambient versus lead length (DO-15)



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 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 17. SMB package outline

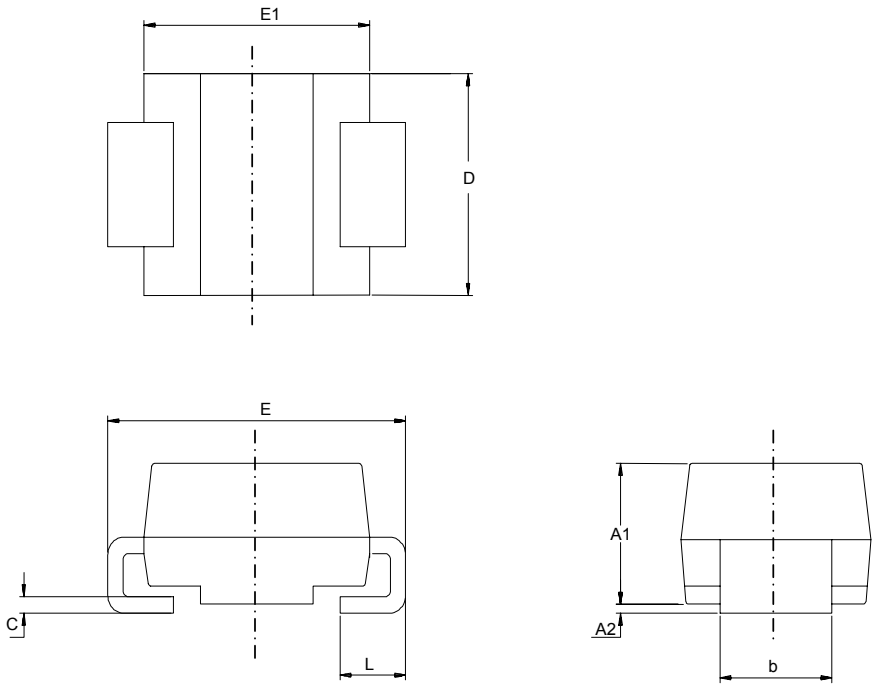
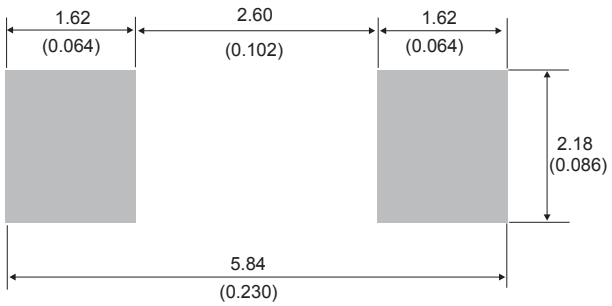


Table 5. **SMB package mechanical data**

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 18. **SMB recommended footprint**



2.2 SMA package information

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

Figure 19. SMA package outline

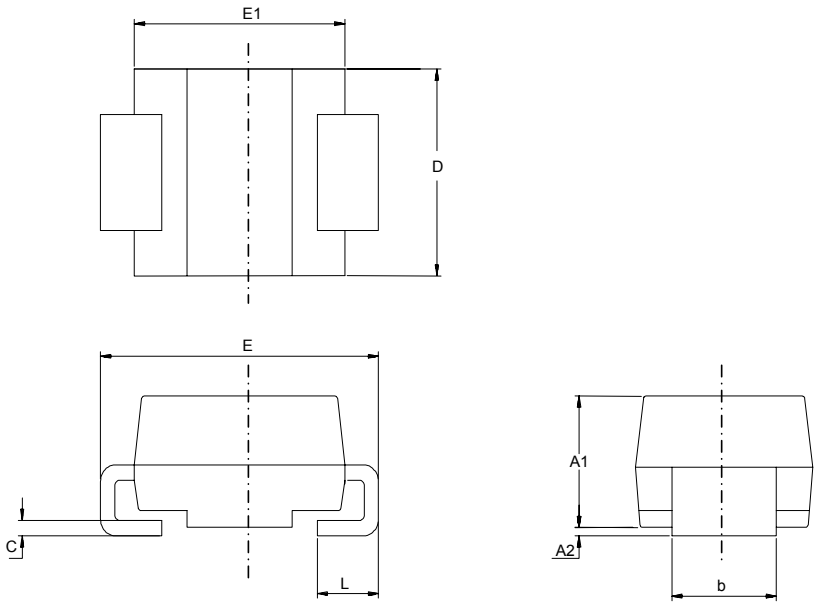
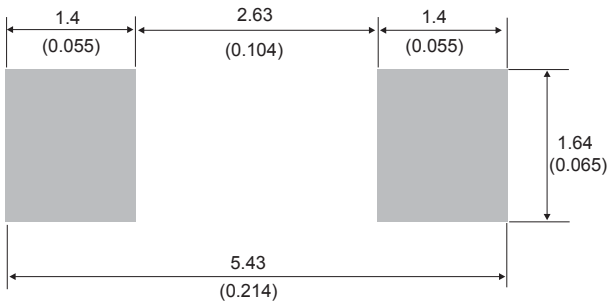


Table 6. SMA package mechanical data

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 20. **SMA recommended footprint in mm (inches)**



2.3 DO-41 package information

- Epoxy meets UL 94, V0

Figure 21. **DO-41 package outline**

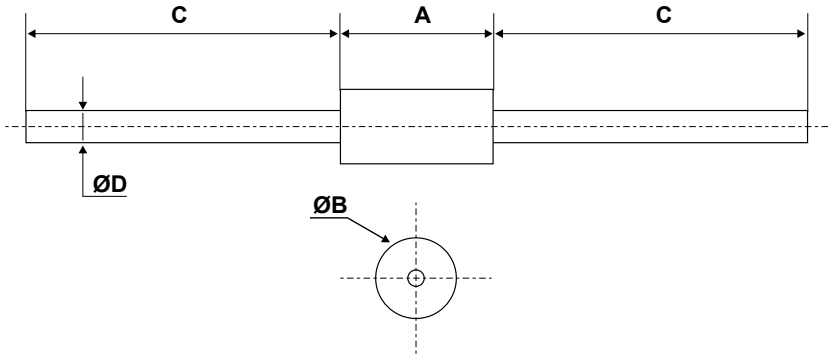


Table 7. **DO-41 package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.07	-	5.20	0.160	-	0.205
B	2.04	-	2.71	0.080	-	0.107
C	25.40	-		1.000	-	
D	0.71	-	0.86	0.028	-	0.0034

2.4 DO-15 package information

- Epoxy meets UL 94, V0

Figure 22. **DO-15 package outline**

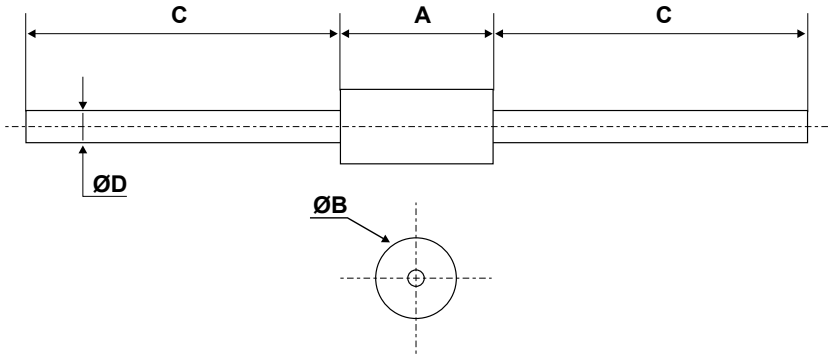


Table 8. **DO-15 package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.05	-	6.75	0.238	-	0.266
B	2.95	-	3.53	0.116	-	0.139
C	26.00	-	31.00	1.024	-	1.220
D	0.71	-	0.88	0.028	-	0.0035

3 Ordering information

Table 9. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1R02A	R1A	SMA	0.068 g	5000	Tape and reel
STTH1R02U	1R2S	SMB	0.107 g	2500	Tape and reel
STTH1R02	STTH1R02	DO-41	0.34 g	2000	Ammopack
STTH1R02RL	STTH1R02	DO-41	0.34 g	5000	Tape and reel
STTH1R02Q	STTH1R02Q	DO-15	0.40 g	1000	Ammopack
STTH1R02QRL	STTH1R02Q	DO-15	0.40 g	6000	Tape and reel

Revision history

Table 10. **Document revision history**

Date	Revision	Changes
03-May-2006	1	First issue.
13-Oct-2006	2	Added DO-15 and SMB packages.
08-Mar-2007	3	Replaced Figure 8. Replaced ecu with copper thickness.
05-Dec-2018	4	Updated Section Applications. Minor text changes.

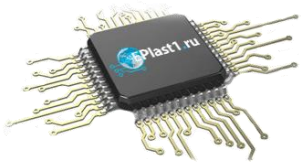
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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