

1.Description

The STTH1R04 is specially suited for switching mode base drive and transistor circuits. Packaged in SMA and SMB, the STTH1R04 is ideal for use low voltage, high frequency inverters, free wheeling and polarity protection.

2.Features

- Negligible switching losses
- Low forward voltage drop
- High junction temperature

3.Applications

- Switching diode
- Telecom power

4.Pinning Information

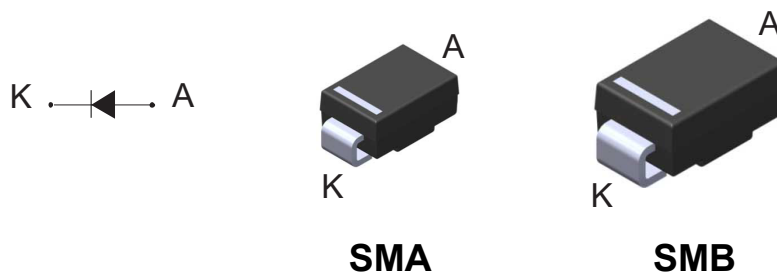


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	1A
V_{RRM}	400V
$T_{j(max)}$	175°C
$V_{F(typ)}$	0.9V
$t_{rr(typ)}$	14ns



5. Absolute Ratings (Limiting Values)

Parameter			Symbol	Value	Unit
Repetitive Peak Reverse Voltage			V _{RRM}	400	V
Average Forward Current	SMA	T _L =125°C	I _{F(AV)}	1	A
δ = 0.5, square wave	SMB	T _L =140°C		1	A
Surge Non Repetitive Forward Current	t _p =10 ms sinusoidal		I _{FSM}	30	A
Storage Temperature Range			T _{STG}	-65 to 175	°C
Operating Junction Temperature			T _J	175	°C

6. Thermal Parameters

Parameter		Symbol	Max	Units
Junction To Lead	SMA	$R_{th(j-l)}$	35	$^\circ\text{C/W}$
	SMB		25	$^\circ\text{C/W}$

7. Static Electrical Characteristics

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Reverse Leakage Current	$T_J = 25^\circ\text{C}$	$I_R^{(1)}$	$V_R = V_{RRM}$			5	μA
	$T_J = 125^\circ\text{C}$				5	50	μA
Forward Voltage Drop	$T_J = 25^\circ\text{C}$	$V_F^{(2)}$	$I_F = 1\text{A}$			1.5	V
	$T_J = 100^\circ\text{C}$				1	1.25	V
	$T_J = 150^\circ\text{C}$				0.9	1.15	V

1. Pulse test: $t_p = 5\text{ms}$, $\delta < 2\%$

2. Pulse test: $t_p = 380\mu\text{s}$, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation:

$$P = 0.9 \times I_{F(AV)} + 0.25 \times I_{F(RMS)}^2$$

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



8. Dynamic Characteristics

Parameter	Symbol	Conditions	Typ	Max	Unit
Reverse Recovery Time	t_{rr}	$I_F=1A, dI_F/dt=-50A/\mu s, V_R=30V$		30	ns
		$I_F=1A, dI_F/dt=-100A/\mu s, V_R=30V$	14	20	ns
Reverse Recovery Current	I_{RM}	$I_F=1A, dI_F/dt=-200A/\mu s, V_R=320V, T_J=125^\circ C$	2.5	3.5	A
Forward Recovery Time	t_{fr}	$I_F=1A, dI_F/dt=100A/\mu s, V_{FR}=1.1 \times V_{Fmax}$		50	ns
Forward Recovery Voltage	V_{FP}	$I_F=1A, dI_F/dt=100A/\mu s$	3.5		V



9.1 Typical Characteristic

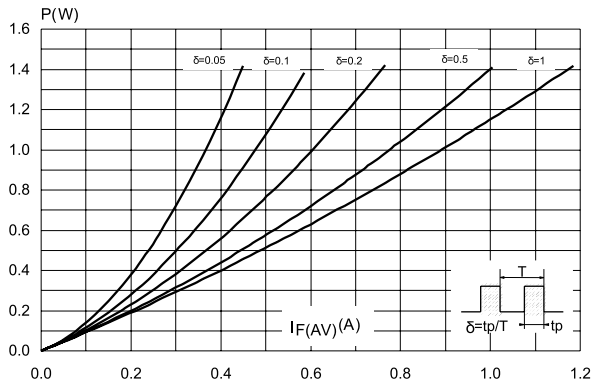


Figure 1: Average forward power dissipation versus average forward current

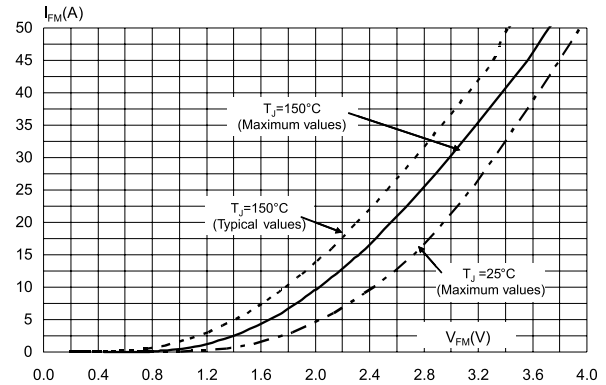


Figure 2: Forward voltage drop versus forward current

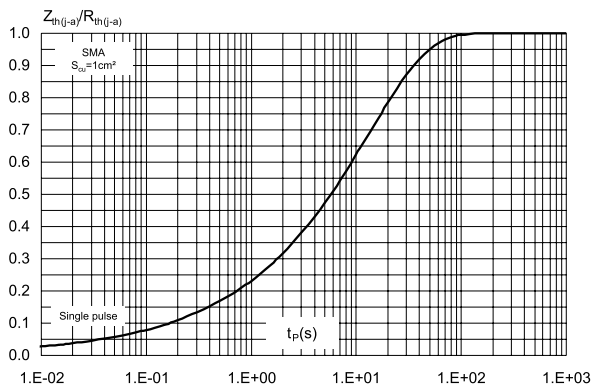


Figure 3: Relative variation of thermal impedance junction to lead versus pulse duration (SMA)

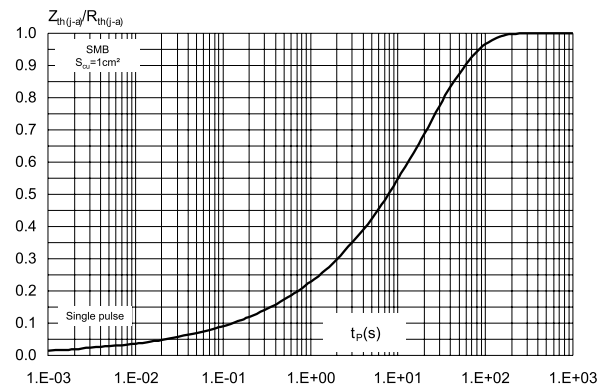


Figure 4: Relative variation of thermal impedance junction to lead versus pulse duration (SMB)

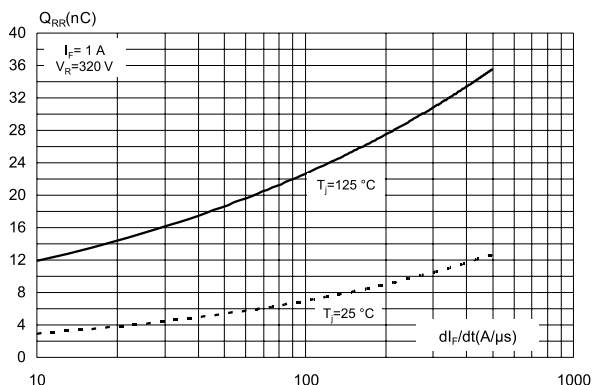


Figure 5: Reverse recovery charges versus dI_F/dt (typical values)

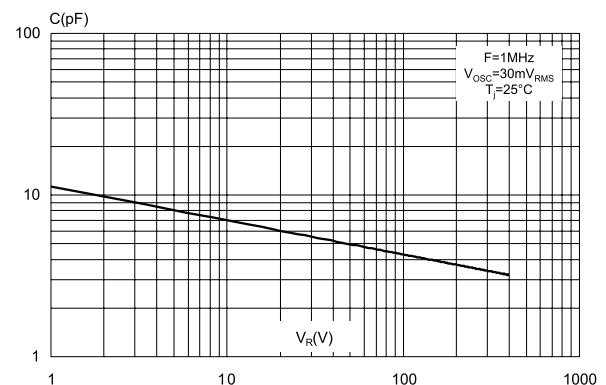


Figure 6: Junction capacitance versus reverse voltage applied (typical values)



9.2 Typical Characteristic

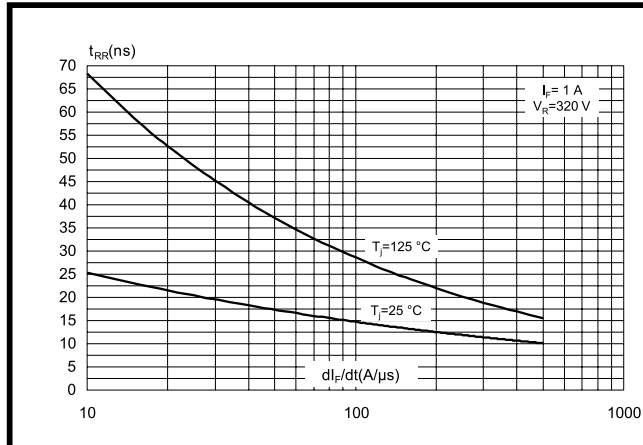


Figure 7: Reverse recovery time versus dI_F/dt (typical values)

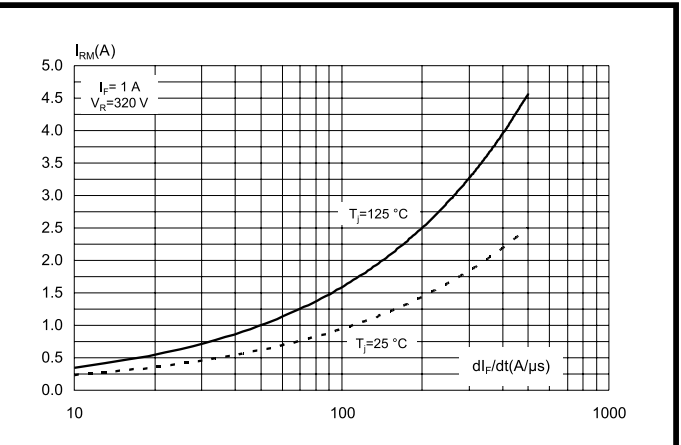


Figure 8: Peak reverse recovery current versus dI_F/dt (typical values)

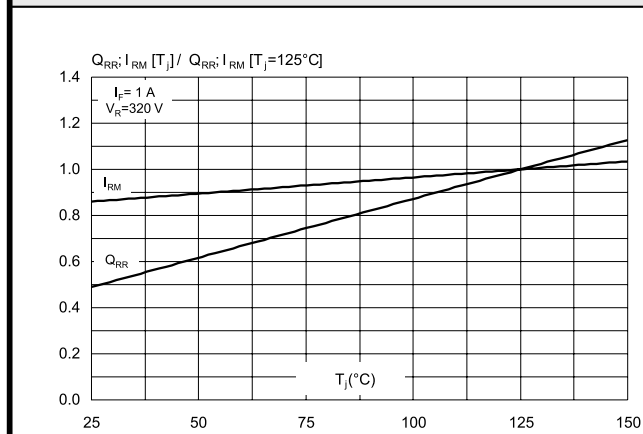


Figure 9: Relative variations of dynamic parameters versus junction temperature

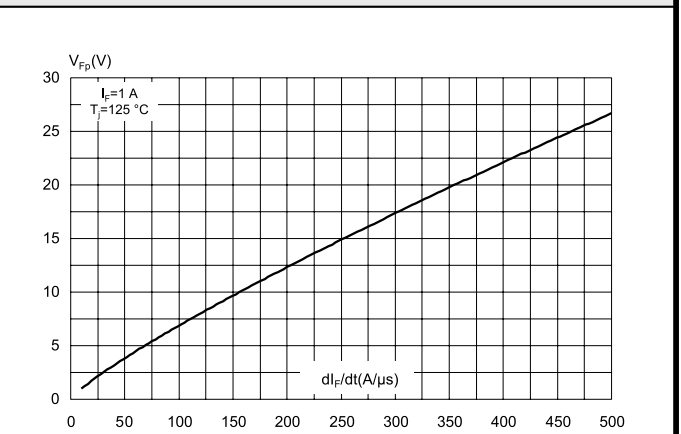


Figure 10: Transient peak forward voltage versus dI_F/dt (typical values)

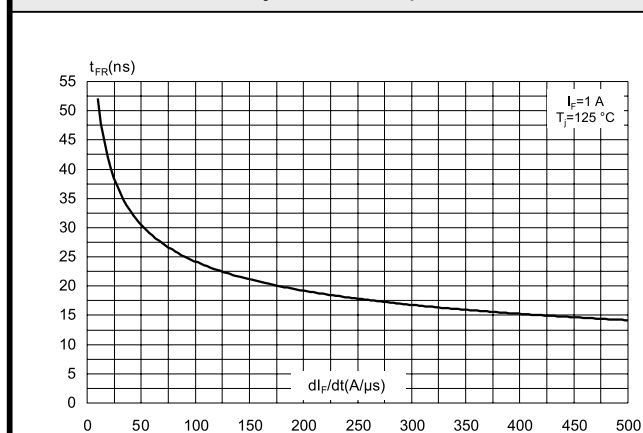


Figure 11: Forward recovery time versus dI_F/dt (typical values)

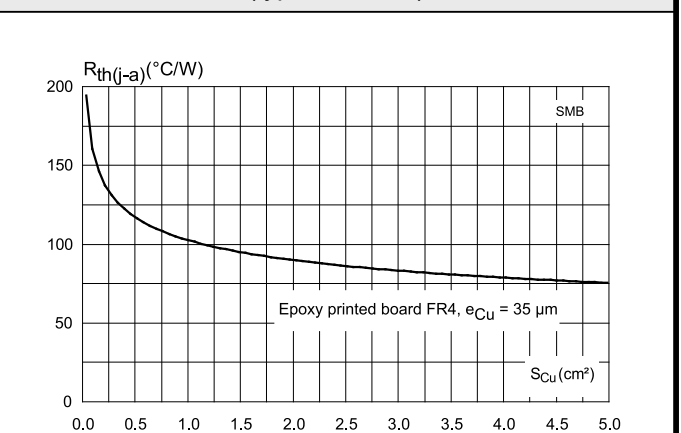
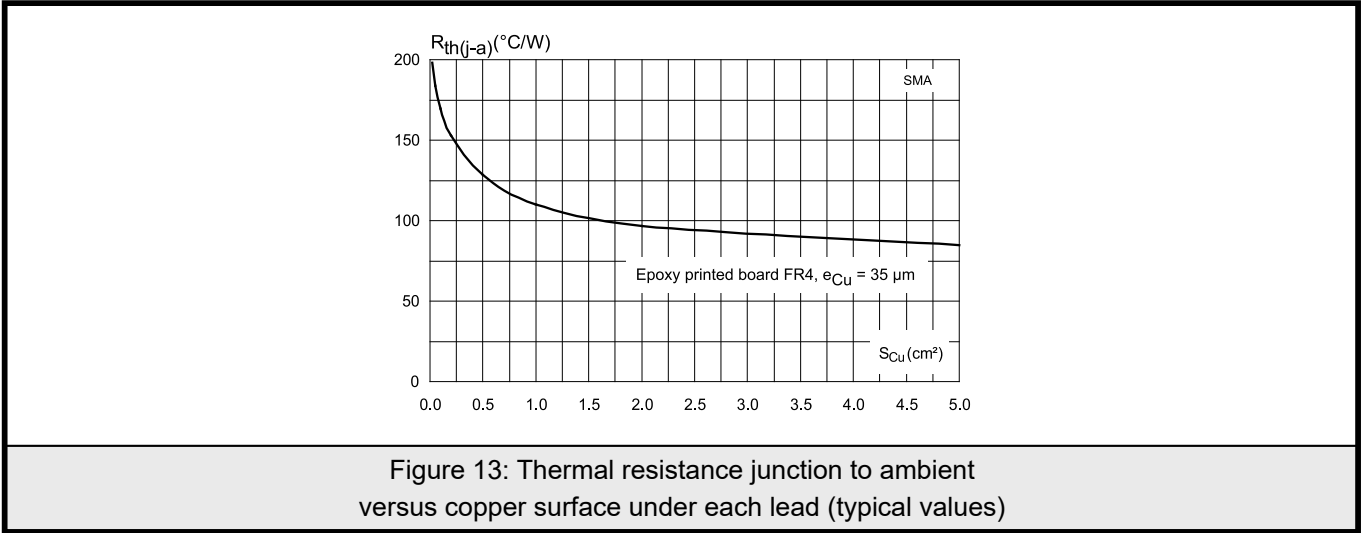


Figure 12: Thermal resistance junction to ambient versus copper surface under each lead (typical values)

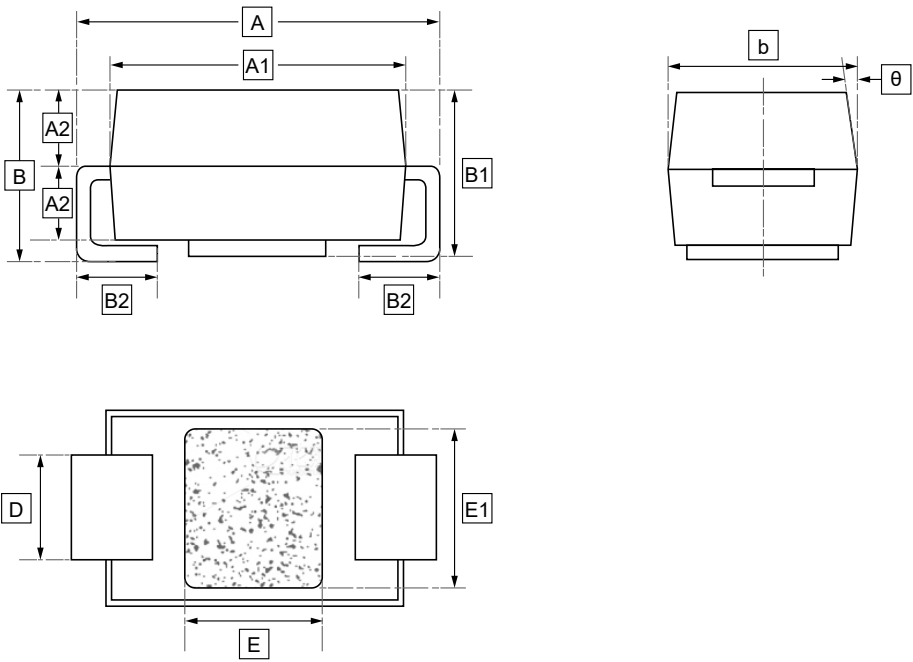


9.3 Typical Characteristic





10.1 SMA Package Outline Dimensions

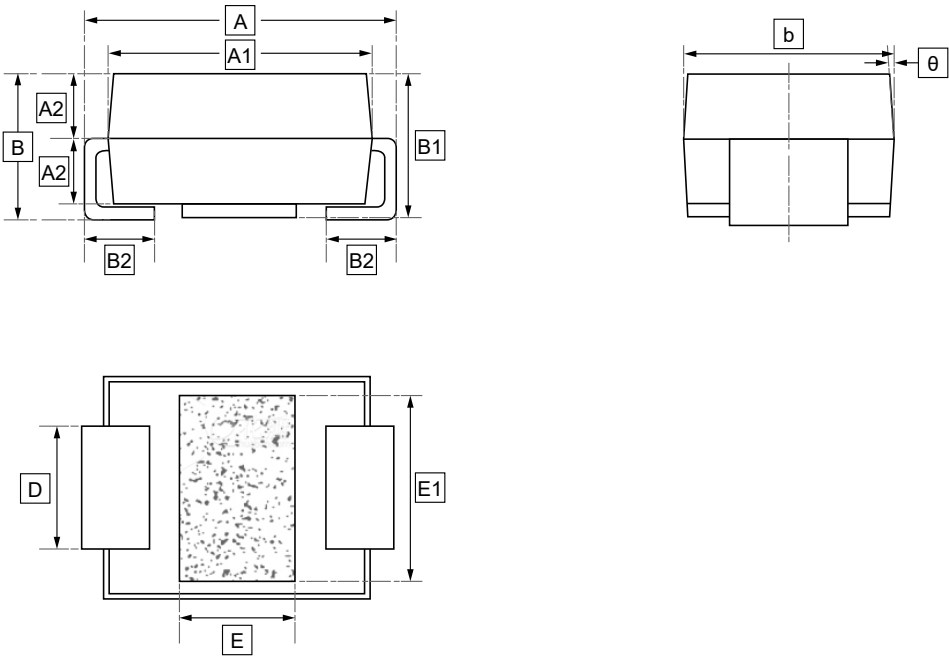


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	B1	B2	b	D	E	E1	θ
Min	4.9	4.05	0.97	2.18	2.15	1.0	2.55	1.38	1.8	2.0	5°
Max	5.1	4.15	1.03	2.38	2.25	1.4	2.65	1.42	2.0	2.2	



10.2 SMB Package Outline Dimensions



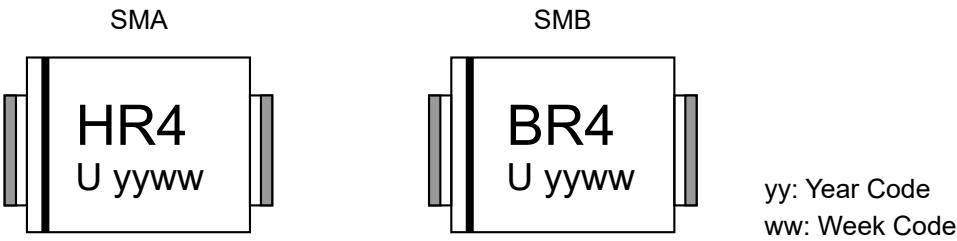
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	B1	B2	b	D	E	E1	θ
Min	5.1	4.4	1.02	2.25	2.25	1.0	3.55	1.98	1.8	2.9	5°
Max	5.3	4.5	1.08	2.45	2.35	1.4	3.65	2.02	2.0	3.1	



UMW STTH1R04

11.Ordering Information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW STTH1R04A	HR4	SMA	5000	Tape and reel
UMW STTH1R04U	BR4	SMB	2500	Tape and reel



12.Disclaimer

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