

1.Description

The STTH4R02 uses 200V planar Pt doping technology, and it is specially suited for switching mode base drive and transistor circuits. Packaged in DPAK, SMB and SMC, this device is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection.

2.Features

- Negligible switching losses
- High junction temperature
- Very low conduction losses
- Low forward and reverse recovery times

3.Pinning Information

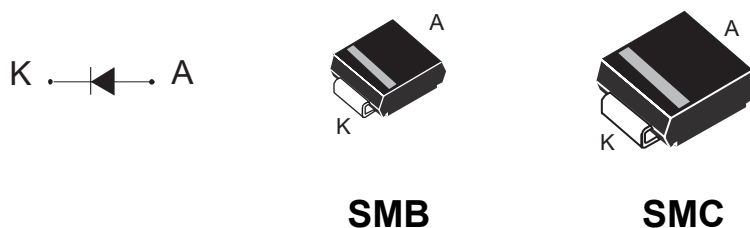


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	4A
V_{RRM}	200V
$T_{j(max)}$	175°C
$V_{F(typ)}$	0.76V
$t_{rr(typ)}$	16ns



4. Absolute Ratings (Limiting Values)

Parameter			Symbol	Value	Unit
Repetitive Peak Reverse Voltage			V _{RRM}	200	V
Forward RMS Current	SMB/SMC		I _{F(RMS)}	70	A
Average forward current, δ=0.5, square wave	SMB/SMC	T _L =95°C	I _{F(AV)}	4	A
Surge Non Repetitive Forward Current	t _p =10 ms sinusoidal		I _{FSM}	70	A
Storage Temperature Range			T _{STG}	-65 to 175	°C
Maximum Operating Junction Temperature ⁽¹⁾			T _J	175	°C

5. Thermal Parameters

Parameter		Symbol	Max	Units
Junction To Lead	SMB/SMC	$R_{th(j-l)}$	20	$^\circ\text{C/W}$

6. Static Electrical Characteristics

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Reverse Leakage Current	$T_J=25^\circ\text{C}$	$I_R^{(1)}$	$V_R=V_{RRM}$			3	μA
	$T_J=125^\circ\text{C}$				2	20	μA
Forward Voltage Drop	$T_J=25^\circ\text{C}$	$V_F^{(2)}$	$I_F=12\text{A}$		1.15	1.25	V
	$T_J=25^\circ\text{C}$		$I_F=4\text{A}$		0.95	1.05	V
	$T_J=150^\circ\text{C}$				0.76	0.83	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:

$$P=0.67 \times I_{F(AV)} + 0.04 \times I_{F(RMS)}^2$$



7.Dynamic Characteristics

Parameter		Symbol	Conditions	Typ	Max	Unit
Reverse Recovery Time	$T_J=25^{\circ}\text{C}$	t_{rr}	$I_F=1\text{A}$, $dI_F/dt=-50\text{A}/\mu\text{s}$, $V_R=30\text{V}$	24	30	ns
	$T_J=25^{\circ}\text{C}$		$I_F=1\text{A}$, $dI_F/dt=-100\text{A}/\mu\text{s}$, $V_R=30\text{V}$	16	20	ns
Reverse Recovery Current	$T_J=125^{\circ}\text{C}$	I_{RM}	$I_F=4\text{A}$, $dI_F/dt=-200\text{A}/\mu\text{s}$, $V_R=160\text{V}$	4.4	5.5	A
Forward Recovery Time	$T_J=25^{\circ}\text{C}$	t_{fr}	$I_F=4\text{A}$, $dI_F/dt=50\text{A}/\mu\text{s}$, $V_{FR}=1.1 \times V_{Fmax}$	80		ns
Forward Recovery Voltage	$T_J=25^{\circ}\text{C}$	V_{FP}	$I_F=4\text{A}$, $dI_F/dt=50\text{A}/\mu\text{s}$	1.6		V



8.1 Typical Characteristic

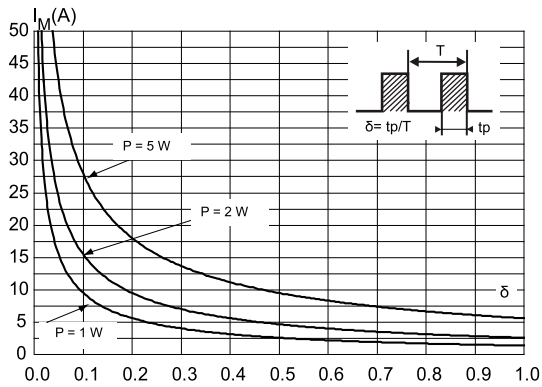


Figure 1: Peak current versus duty cycle

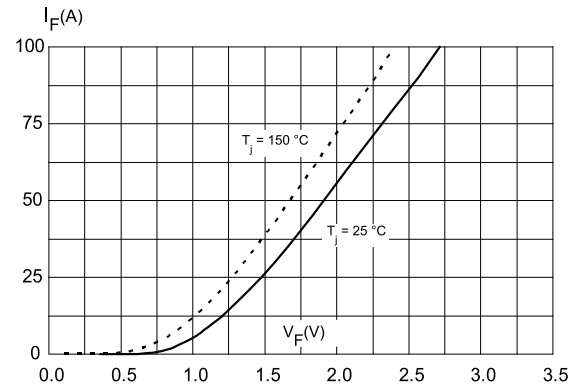


Figure 2: Forward voltage drop versus forward current (typical values)

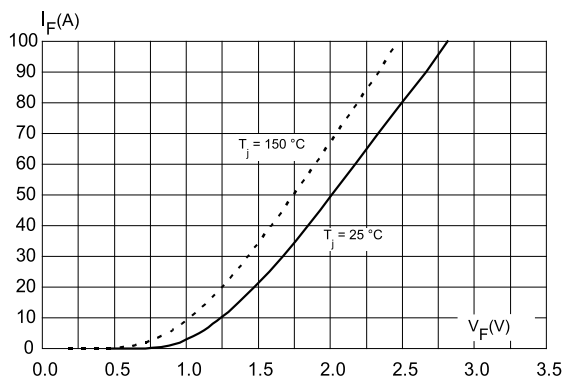


Figure 3: Forward voltage drop versus forward current (maximum values)

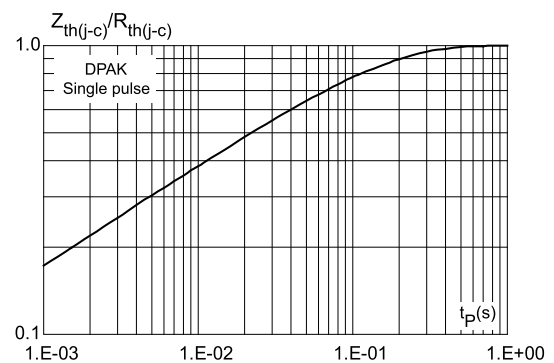


Figure 4: Relative variation of thermal impedance, junction to case, versus pulse duration

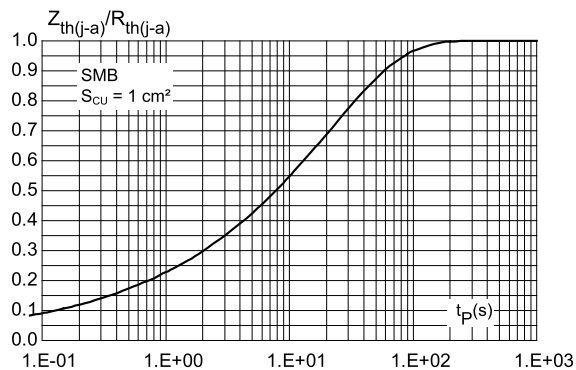


Figure 5: Relative variation of thermal impedance junction to ambient, versus pulse duration (SMB)

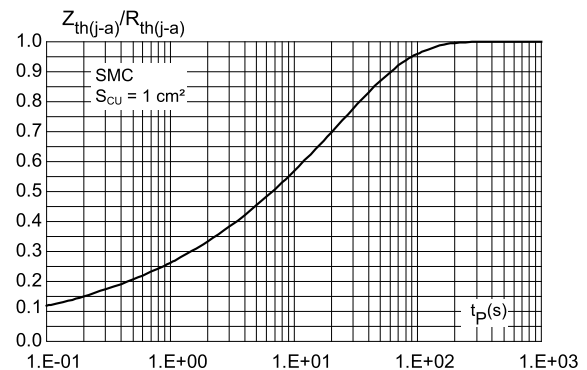


Figure 6: Relative variation of thermal impedance junction to ambient, versus pulse duration (SMC)



8.2 Typical Characteristic

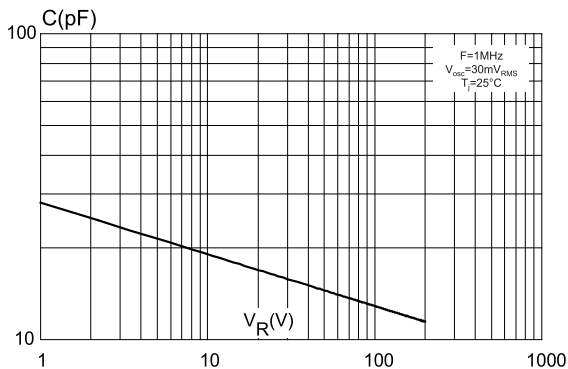


Figure 7: Junction capacitance versus reverse applied voltage (typical values)

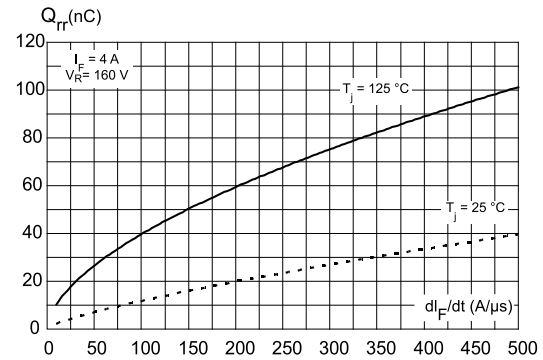


Figure 8: Reverse recovery charges versus dI_F/dt (typical values)

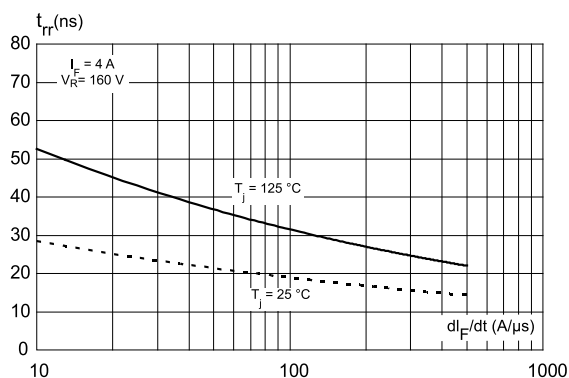


Figure 9: Reverse recovery time versus dI_F/dt (typical values)

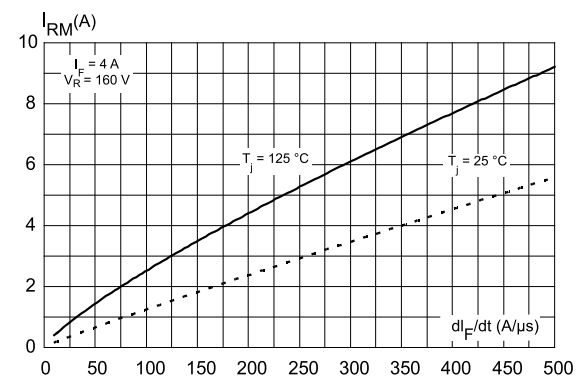


Figure 10: Peak reverse recovery current versus dI_F/dt (typical values)

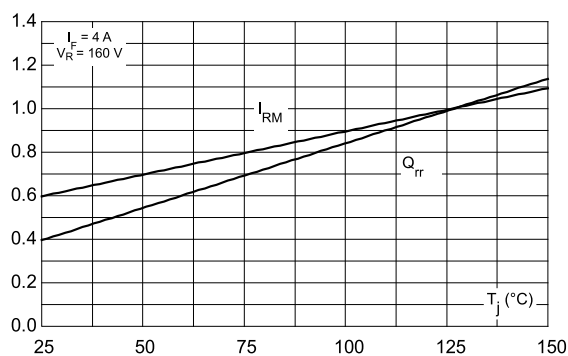


Figure 11: Dynamic parameters versus junction temperature (reference: $T_J=125^\circ\text{C}$)

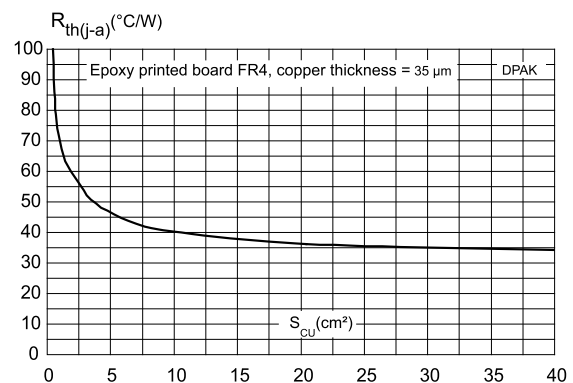
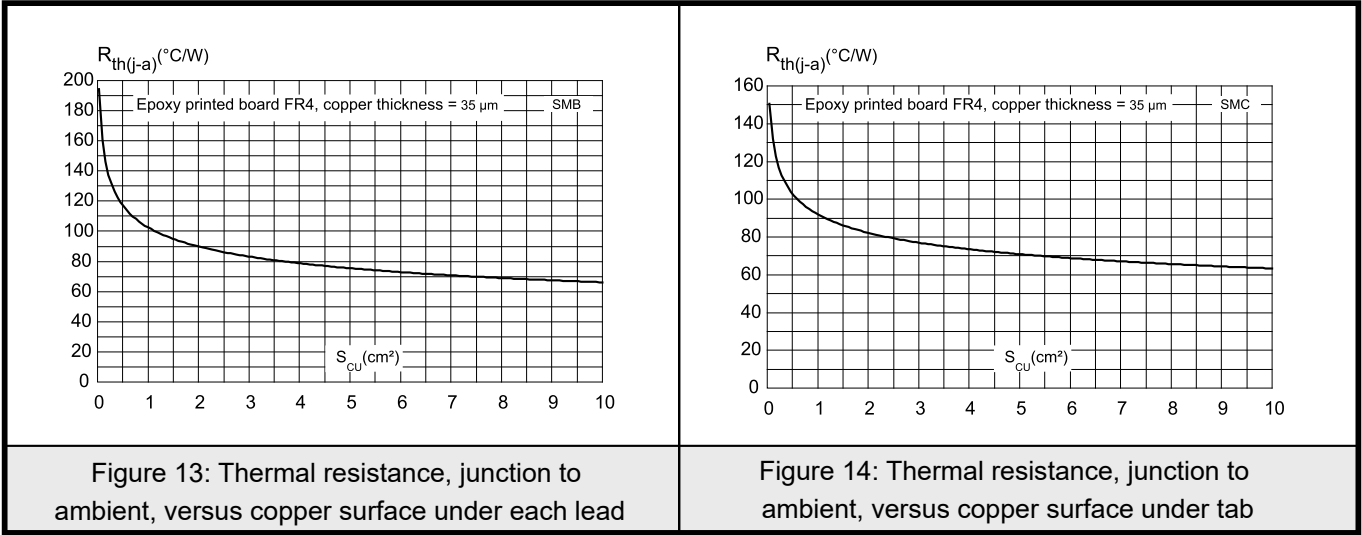


Figure 12: Thermal resistance, junction to ambient, versus copper surface under each lead

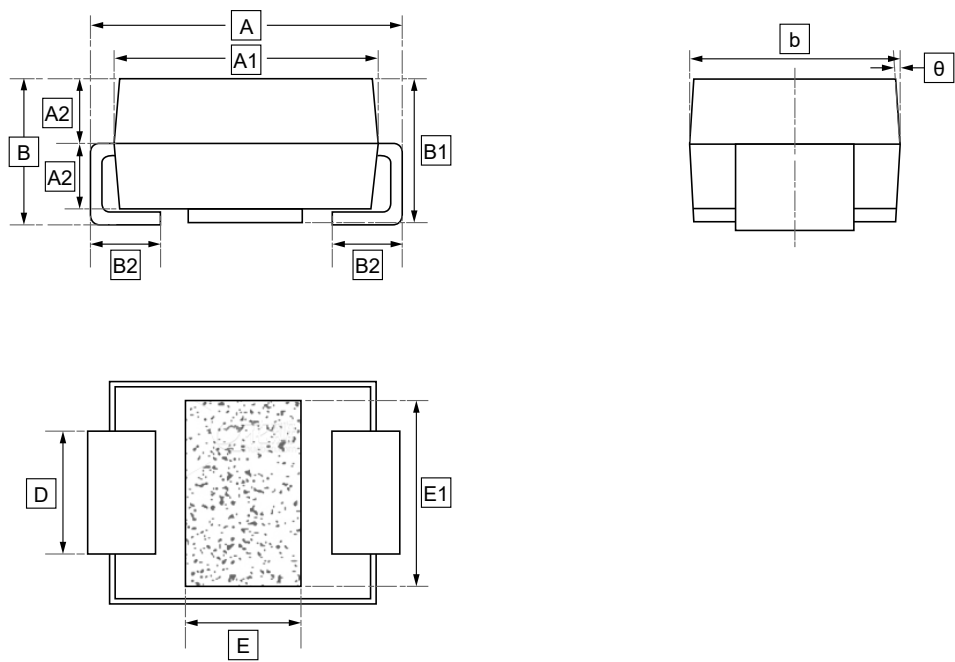


8.3 Typical Characteristic





9.1 SMB Package Outline Dimensions

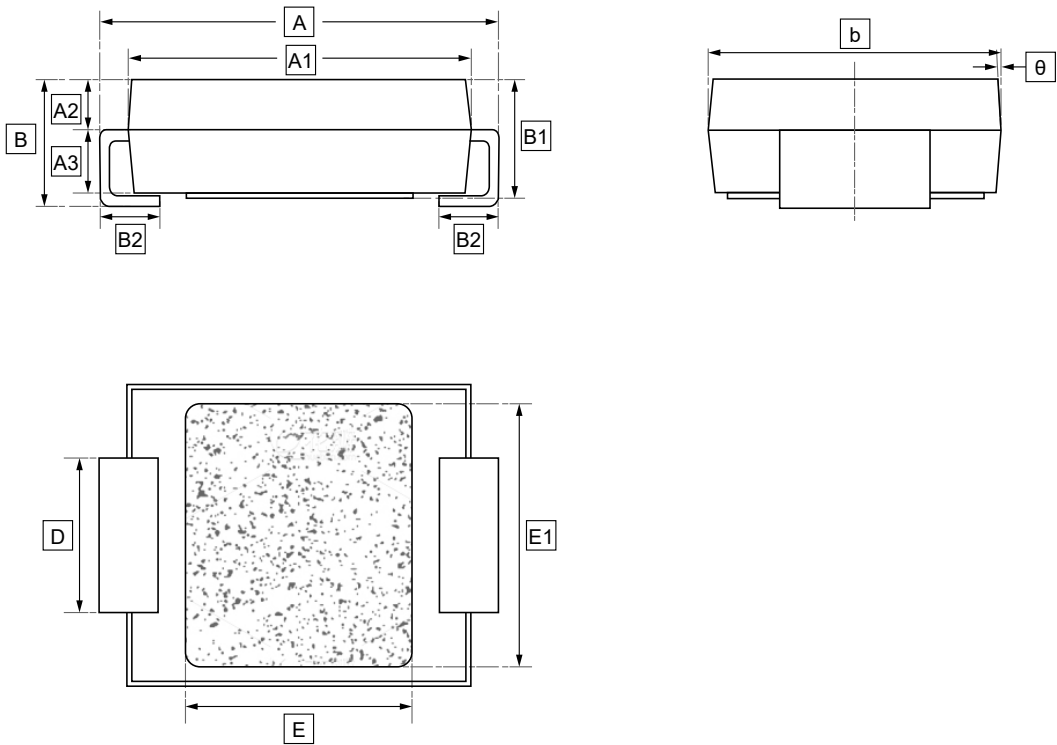


DIMENSIONS (mm are the original dimensions)

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	



9.2 SMC Package Outline Dimensions

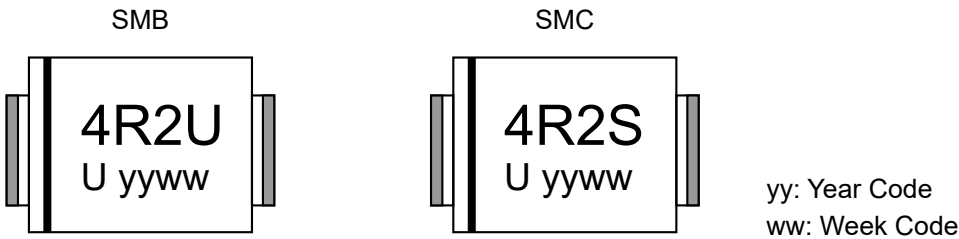


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	B2	b	D	E	E1	θ
Min	7.9	6.8	0.97	1.17	2.35	2.25	1.0	5.8	2.98	4.4	5.0	5°
Max	8.1	6.9	1.03	1.23	2.55	2.35	1.4	5.9	3.02	4.6	5.2	



10.Ordering Information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW STTH4R02U	4R2U	SMB	2500	Tape and reel
UMW STTH4R02S	4R2S	SMC	2500	Tape and reel



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