

HIGH FREQUENCY SECONDARY RECTIFIER

MAJOR PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
V_{RRM}	300 V
T_j (max)	175 °C
V_F (max)	1 V
t_{rr} (max)	35 ns

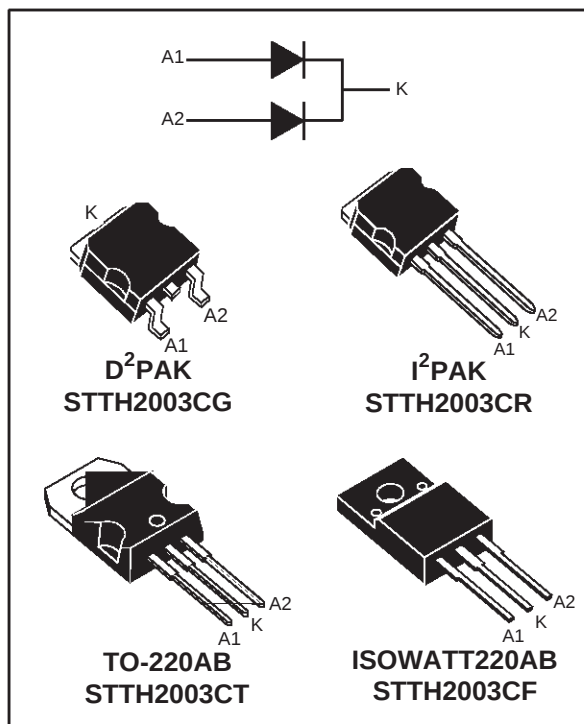
FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY

DESCRIPTION

Dual center tap Fast Recovery Epitaxial Diodes suited for Switch Mode Power Supply and high frequency DC/DC converters.

Packaged in TO-220AB, ISOWATT220AB, I²PAK or D²PAK, this device is especially intended for secondary rectification.



ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter				Value	Unit
V _{RRM}	Repetitive peak reverse voltage				300	V
I _{F(RMS)}	RMS forward current				30	A
I _{F(AV)}	Average forward current δ = 0.5	TO-220AB / D ² PAK / I ² PAK	Tc=140°C	Per diode Per device	10 20	A
		ISOWATT220AB	Tc=125°C			
I _{FSM}	Surge non repetitive forward current		tp = 10 ms sinusoidal		110	A
I _{RSM}	Non repetitive avalanche current		tp = 20 μs square		5	A
T _{stg}	Storage temperature range				-65 + 175	°C
T _j	Maximum operating junction temperature				175	°C

THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / D ² PAK / I ² PAK	Per diode	2.5	°C/W
			Total	1.3	
		ISOWATT220AB	Per diode	3.9	
			Total	3.2	
$R_{th(c)}$		TO-220AB / D ² PAK / I ² PAK	Coupling	0.1	
		ISOWATT220AB	Coupling	2.5	

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$V_R = 300\text{ V}$	$T_j = 25^\circ\text{C}$			20	μA
			$T_j = 125^\circ\text{C}$		30	300	
V_F^{**}	Forward voltage drop	$I_F = 10\text{ A}$	$T_j = 25^\circ\text{C}$			1.25	V
			$T_j = 125^\circ\text{C}$		0.85	1	

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

** $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation :

$$P = 0.75 \times I_{F(AV)} + 0.025 I_{F(RMS)}^2$$

RECOVERY CHARACTERISTICS

Symbol	Tests conditions			Min.	Typ.	Max.	Unit
trr	I _F = 0.5 A	I _{rr} = 0.25 A	I _R = 1 A	T _j = 25°C		25	ns
	I _F = 1 A	dI _F /dt = - 50 A/μs	V _R = 30 V			35	
tfr	I _F = 10 A dI _F /dt = 100 A/μs			T _j = 25°C		230	ns
V _{FP}	V _{FR} = 1.1 x V _F max.					3.5	
S _{factor}	V _{CC} = 200V I _F = 10 A			T _j = 125°C	0.3		-
I _{RM}	dI _F /dt = 200 A/μs					8	A

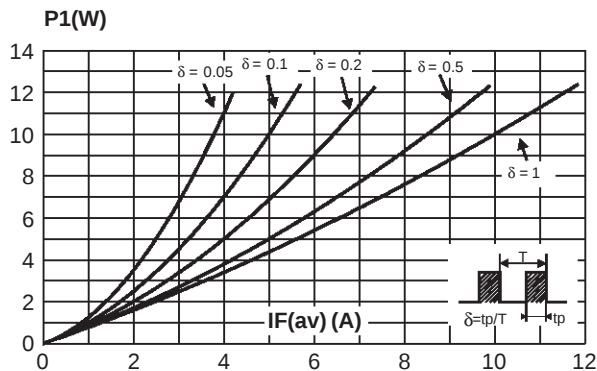
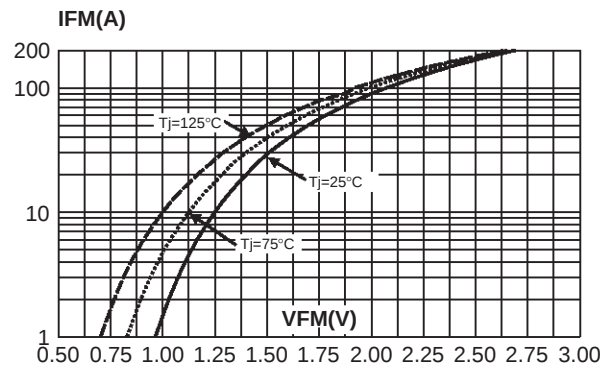
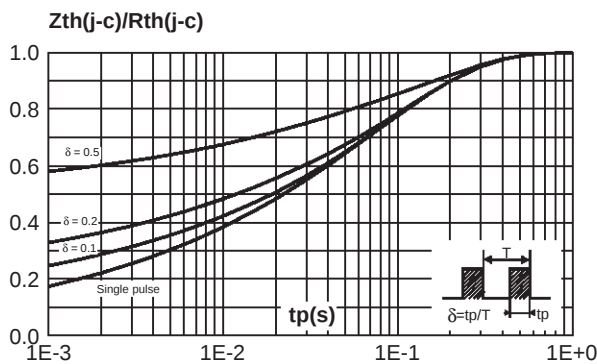
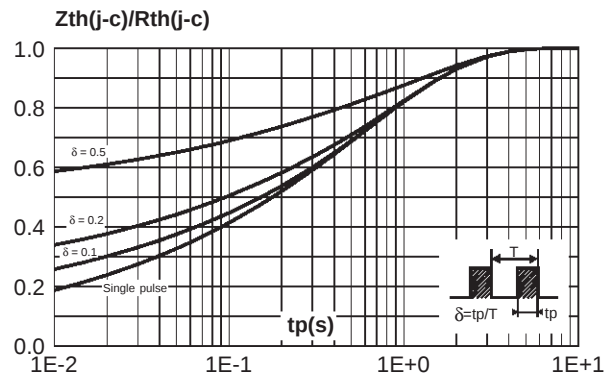
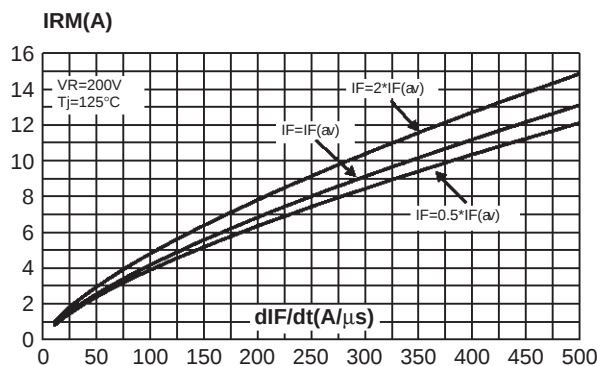
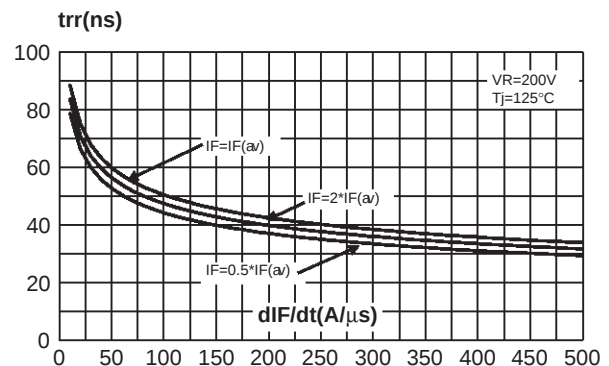
Fig. 1: Conduction losses versus average current (per diode).**Fig. 2:** Forward voltage drop versus forward current (maximum values, per diode).**Fig. 3-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB / D²PAK / I²PAK).**Fig. 3-2:** Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB).**Fig. 4:** Peak reverse recovery current versus dI_F/dt (90% confidence, per diode).**Fig. 5:** Reverse recovery time versus dI_F/dt (90% confidence, per diode).

Fig. 6: Softness factor (t_b/t_a) versus dI_F/dt (typical values, per diode).

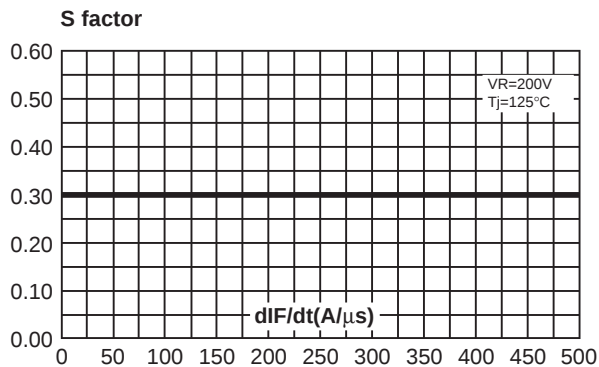


Fig. 8: Transient peak forward voltage versus dI_F/dt (90% confidence, per diode) (TO-220AB).

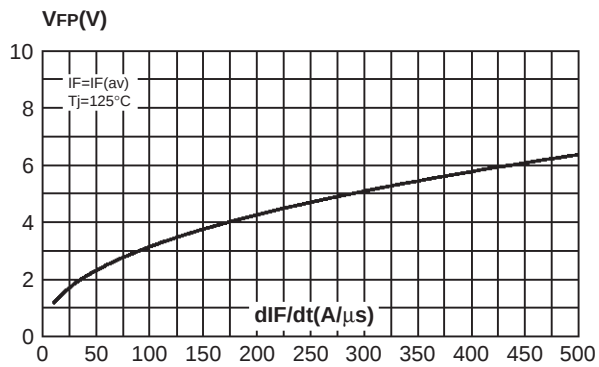


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 μ m) (D²PAK).

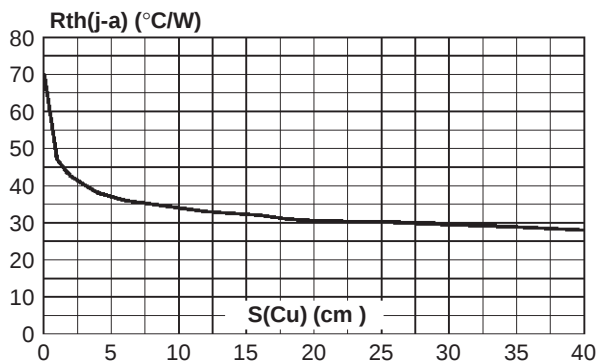


Fig. 7: Relative variation of dynamic parameters versus junction temperature (reference: $T_j = 125^\circ C$).

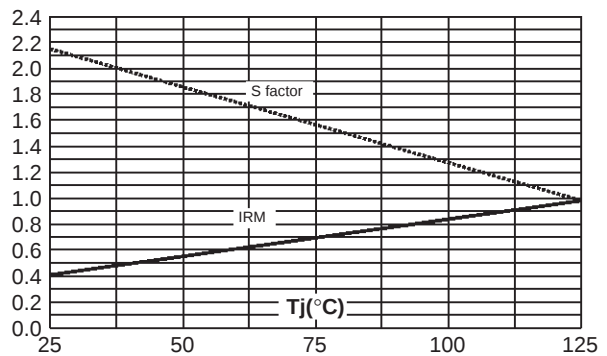
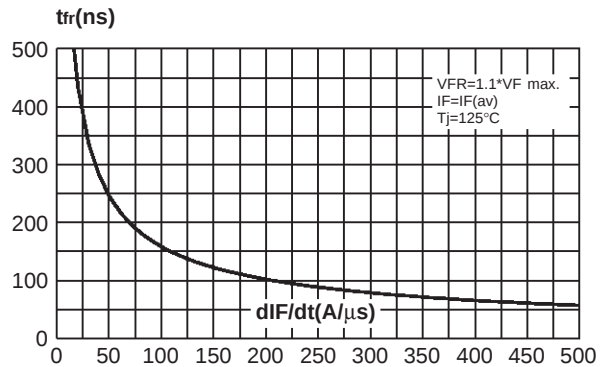
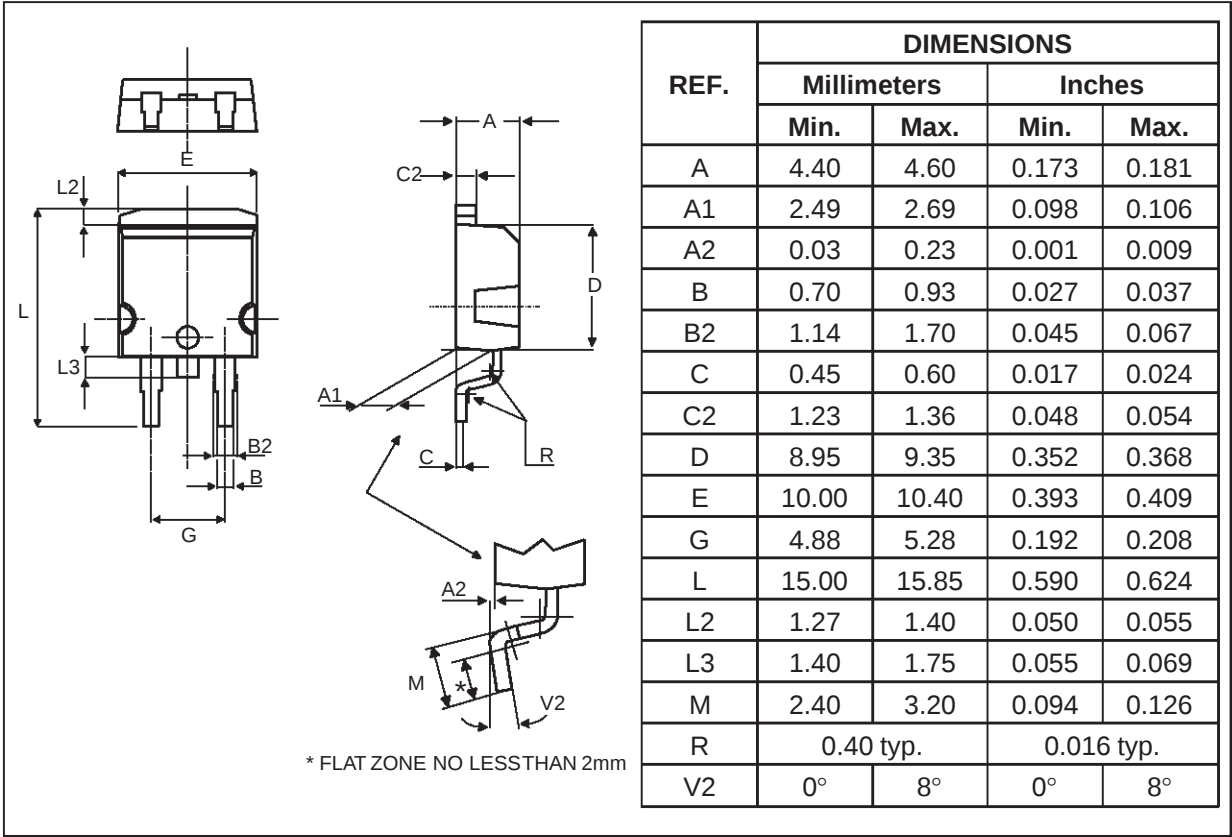


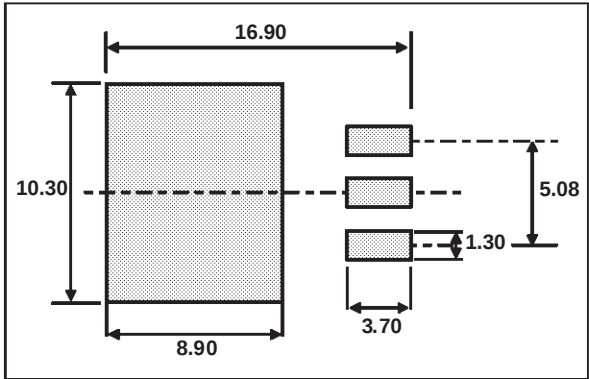
Fig. 9: Forward recovery time versus dI_F/dt (90% confidence, per diode).



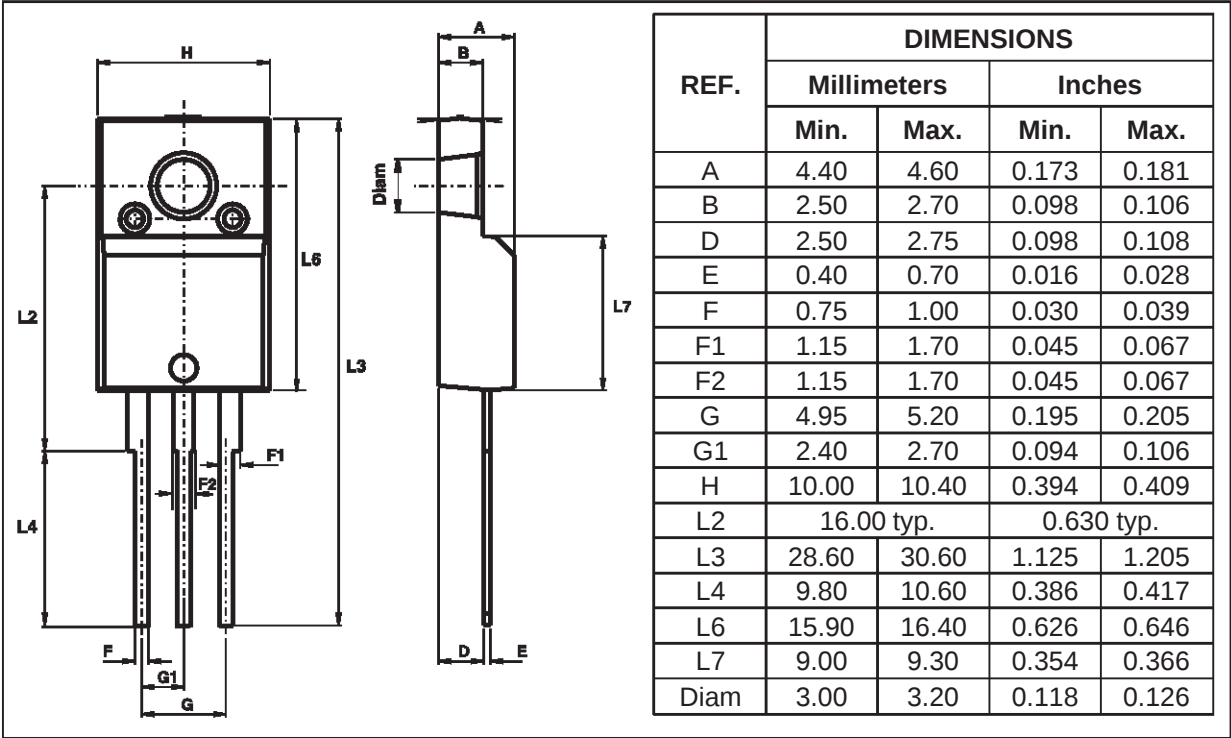
PACKAGE MECHANICAL DATA
D²PAK



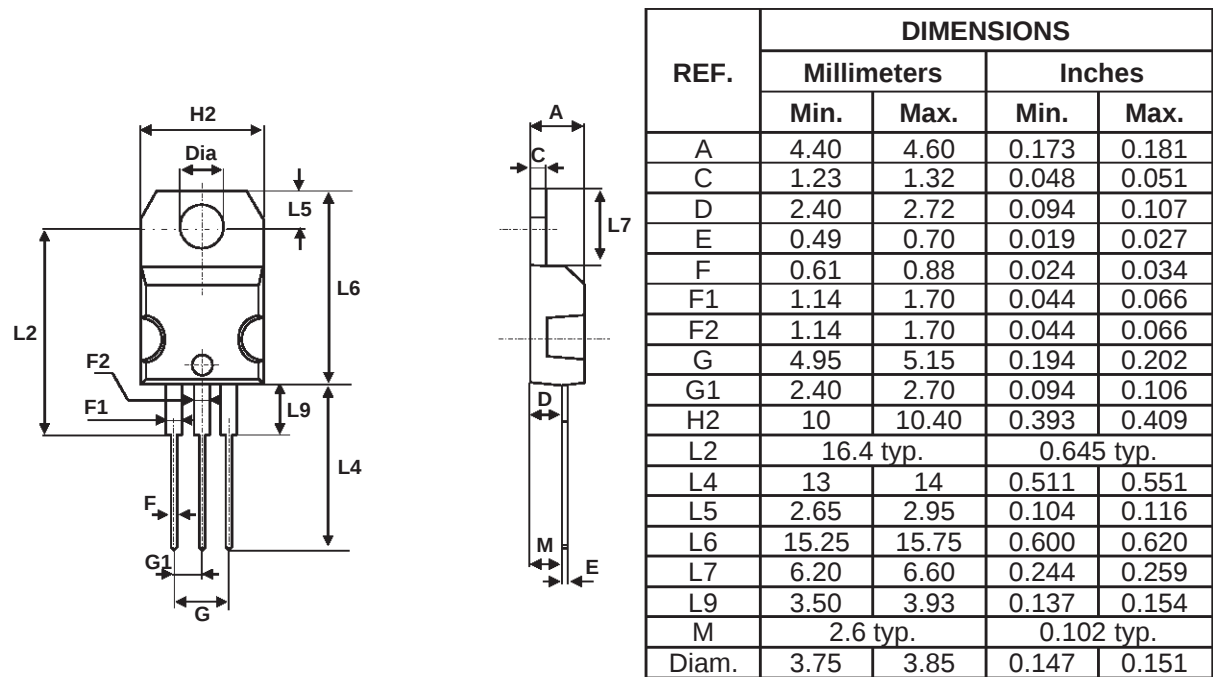
FOOT PRINT DIMENSIONS (in millimeters)
D²PAK



PACKAGE MECHANICAL DATA
ISOWATT220AB



PACKAGE MECHANICAL DATA
TO-220AB



PACKAGE MECHANICAL DATA

I²PAK

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH2003CT	STTH2003CT	TO-220AB	2.2 g	50	Tube
STTH2003CG	STTH2003CG	D ² PAK	1.48 g	50	Tube
STTH2003CG-TR	STTH2003CG	D2PAK	1.48 g	500	Tape & reel
STTH2003CF	STTH2003CF	ISOWATT220AB	2.08 g	50	Tube
STTH2003CR	STTH2003CR	I ² PAK	1.49 g	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N.m.
- Maximum torque value: 0.70 N.m.
- Epoxy meets UL 94,V0

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