



# STTH8R03G/D

## 300V HYPERFAST RECTIFIER

### MAJOR PRODUCT CHARACTERISTICS

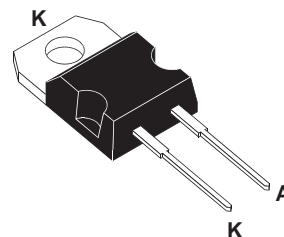
$I_{F(AV)}$	8 A
$V_{RRM}$	300 V
$I_{RM}(typ.)$	4A
$T_j(max)$	175 °C
$V_F(max)$	1.3 V
$t_{rr}(max)$	30 ns

### FEATURES AND BENEFITS

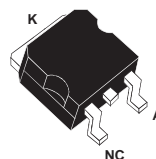
- Designed for high frequency applications.
- Hyperfast recovery competes with GaAs devices.
- Allows size decrease of snubbers and heatsinks.

### DESCRIPTION

The TURBOSWITCH "R" is an ultra high performance diode.  
This TURBOSWITCH family, which drastically cuts losses in associated MOSFET when run at high  $dI_F/dt$ , is suited for HF OFF-Line SMPS and DC/DC converters.



TO-220AC  
STTH8R03D



D²PAK  
STTH8R03G

### ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	RMS forward current		20	A
$I_{F(AV)}$	Average forward current	$T_c = 140^{\circ}C \quad \delta = 0.5$	8	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms sinusoidal}$	80	A
$T_{stg}$	Storage temperature range		- 65 + 175	°C
$T_j$	Maximum operating junction temperature		+ 175	°C

## STTH8R03G/D

### THERMAL AND POWER DATA

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^*$	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^\circ\text{C}$			10	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		15	100	
$V_F^{**}$	Forward voltage drop	$I_F = 8\text{ A}$	$T_j = 25^\circ\text{C}$			1.8	V
			$T_j = 125^\circ\text{C}$		1.05	1.3	

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 :

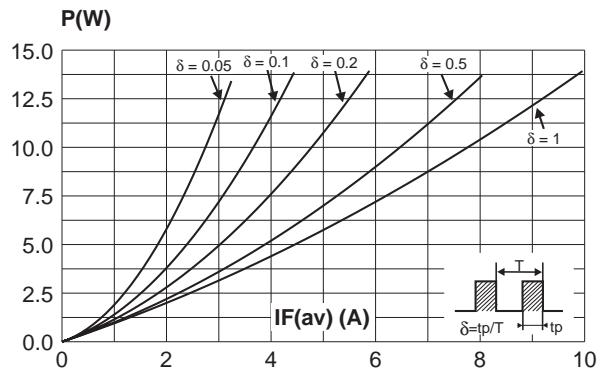
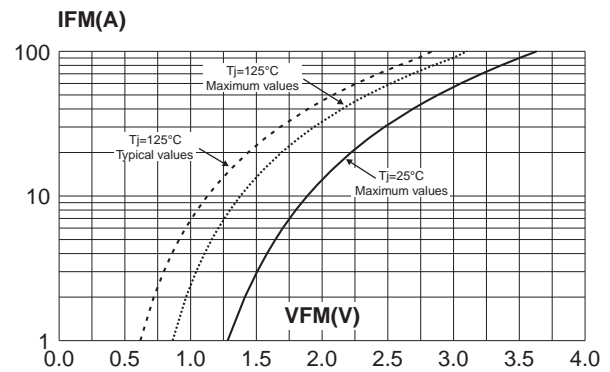
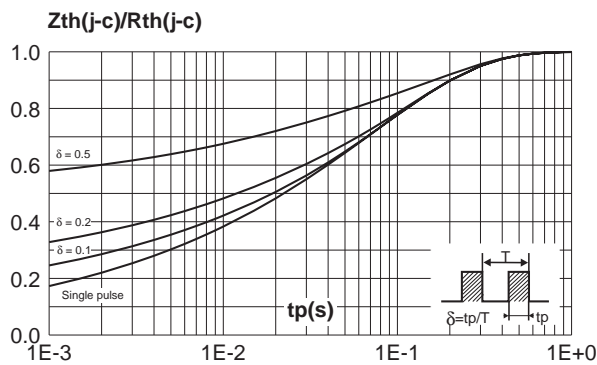
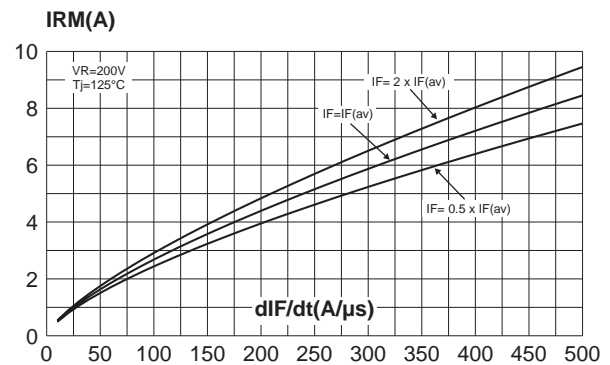
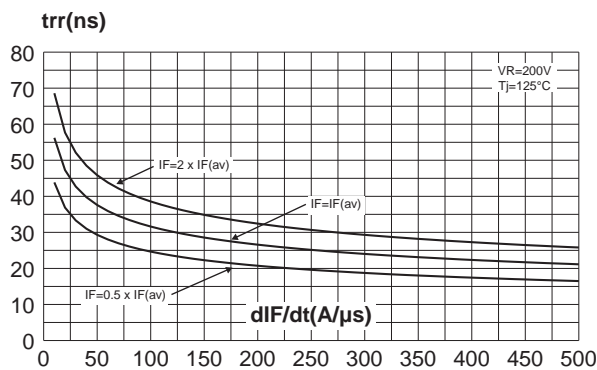
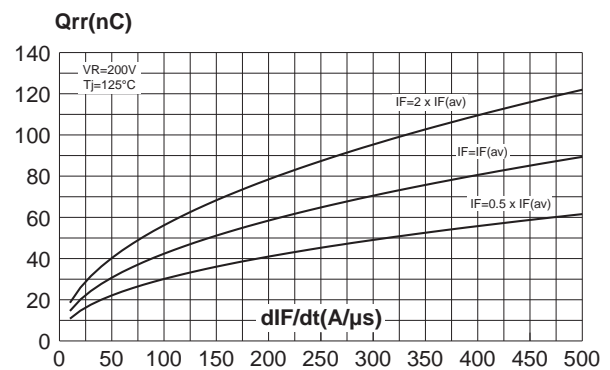
$$P = 0.9 \times I_{F(AV)} + 0.05 I_{F(RMS)}^2$$

### RECOVERY CHARACTERISTICS

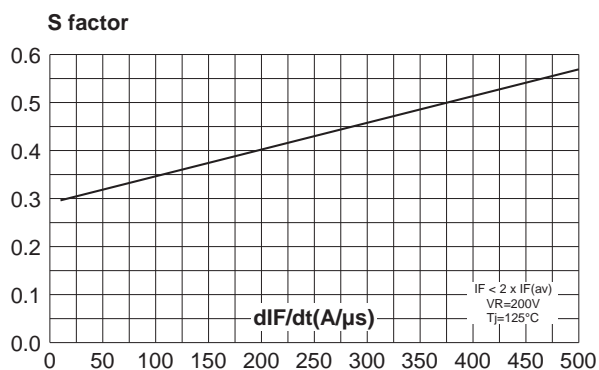
Symbol	Tests conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	$I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$ $I_R = 1\text{ A}$	$T_j = 25^\circ\text{C}$		13		ns
	$I_F = 1\text{ A}$ $dI_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$				30	
$I_{RM}$	$V_R = 200\text{ V}$ $I_F = 8\text{ A}$ $dI_F/dt = -200\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$		4	5.5	A
S factor				0.4		

### TURN-ON SWITCHING CHARACTERISTICS

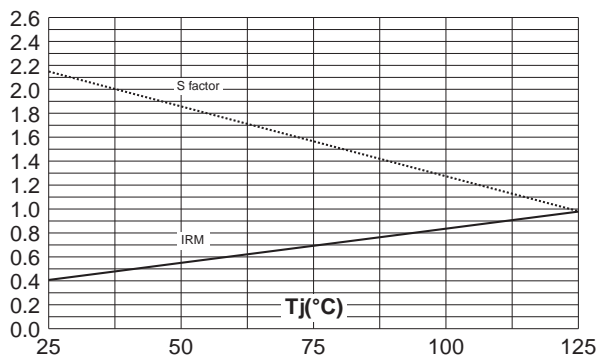
Symbol	Tests conditions	Min.	Typ.	Max.	Unit
$t_{fr}$	$T_j = 25^\circ\text{C}$ $I_F = 8\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ measured at $1.1 \times V_{Fmax}$			200	ns
$V_{FP}$	$T_j = 25^\circ\text{C}$ $I_F = 8\text{ A}$ $dI_F/dt = 100\text{ A}/\mu\text{s}$			3.5	V

**Fig. 1:** Conduction losses versus average current**Fig. 2:** Forward voltage drop versus forward current**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration**Fig. 4:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence).**Fig. 5:** Reverse recovery time versus  $dI_F/dt$  (90% confidence).**Fig. 6:** Reverse recovery charges versus  $dI_F/dt$  (90% confidence).

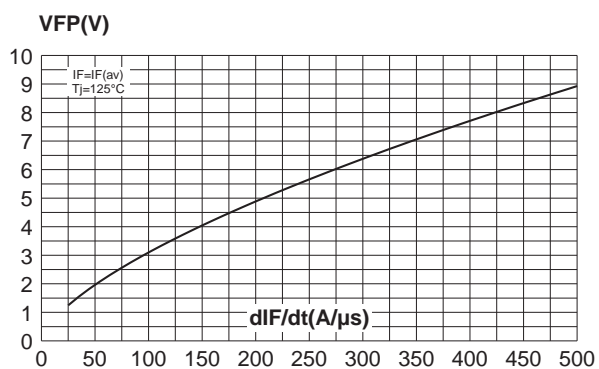
**Fig. 7:** Softness factor ( $t_b/t_a$ ) versus  $dI_F/dt$  (typical values).



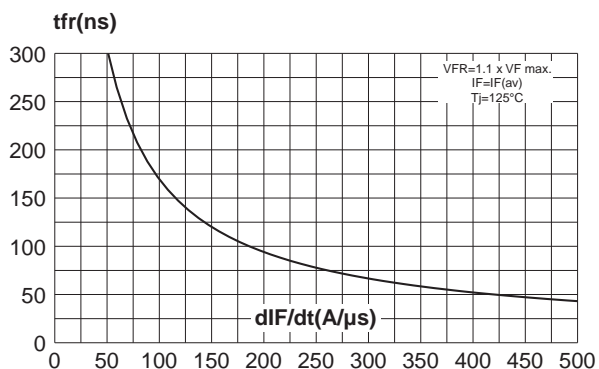
**Fig. 8:** Relative variation of dynamic parameters versus junction temperature (Reference:  $T_J = 125^\circ C$ ).



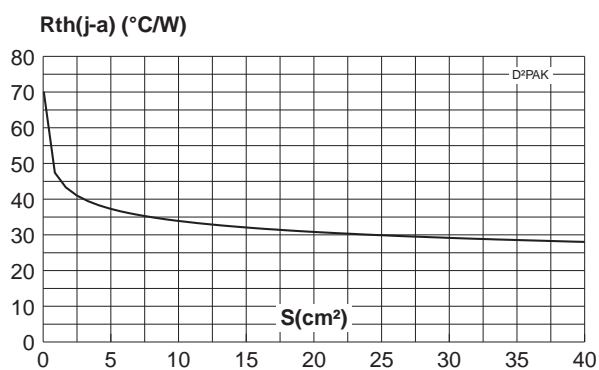
**Fig. 9:** Transient peak forward voltage versus  $dI_F/dt$  (90% confidence).



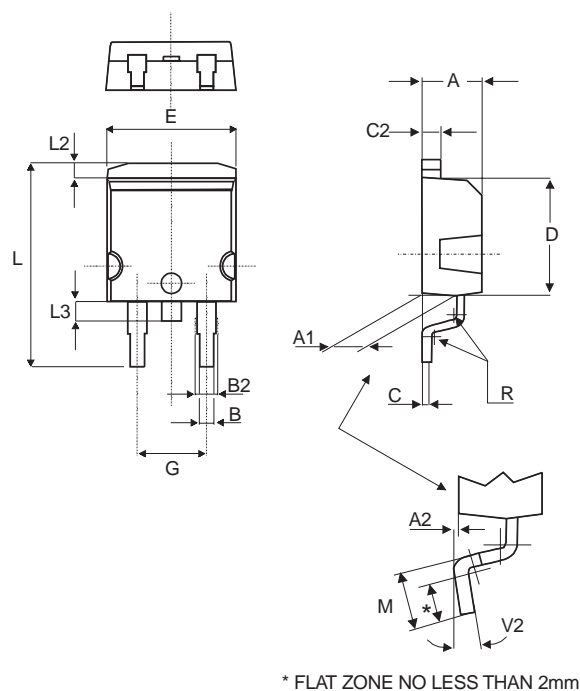
**Fig. 10:** Forward recovery time versus  $dI_F/dt$  (90% confidence).



**Fig. 11:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm)(D<sup>2</sup>PAK)

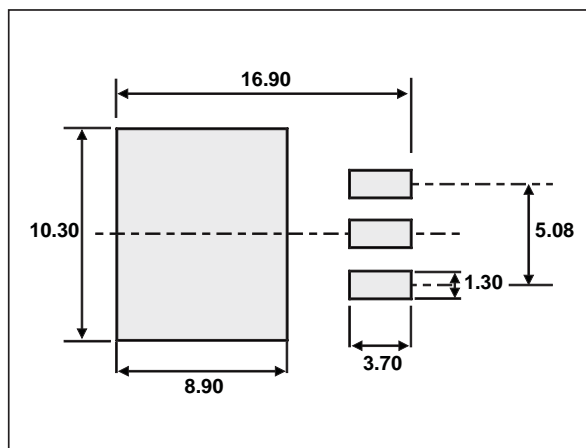


## PACKAGE MECHANICAL DATA

D<sup>2</sup>PAK

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
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

## FOOTPRINT



## PACKAGE MECHANICAL DATA

TO-220AC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam. I	3.75	3.85	0.147	0.151

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH8R03D	STTH8R03D	TO-220AC	1.86g	50	Tube
STTH8R03G	STTH8R03G	D <sup>2</sup> PAK	1.48g	50	Tube
STTH8R03G-TR	STTH8R03G	D <sup>2</sup> PAK	1.48g	1000	Tape & Reel

- Cooling method: by conduction (C)
- Recommended torque value (TO-220AC): 0.55 N.m.
- Maximum torque value (TO-220AC): 0.7 N.m.
- Epoxy meets UL 94,V0

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