



STPR1020CB/CG/CT/CF

ULTRA-FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2 x 5 A
V_{RRM}	200 V
$T_j(\text{max})$	150°C
$V_F(\text{max})$	0.99 V
$\text{trr}(\text{max})$	30 ns

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- INSULATED PACKAGE: ISOWATT220AB
Insulating Voltage = 2500V_(RMS)
Capacitance = 45 pF

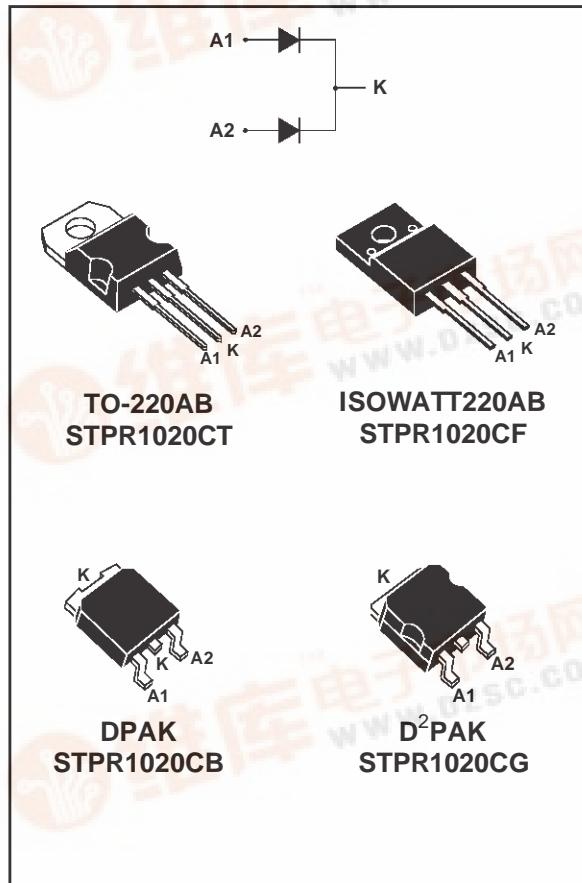
DESCRIPTION

Dual rectifier suited for switch mode and high frequency DC to DC converters.

Packaged in DPAK, D²PAK, TO-220AB or ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				200	V
$I_{F(\text{RMS})}$	RMS forward current				10	A
					6	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	D ² PAK / TO-220AB / ISOWATT220AB	$T_c=125^\circ\text{C}$	Per diode	5	A
		ISOWATT220AB	$T_c=115^\circ\text{C}$	Per device	10	
I_{FSM}	Surge non repetitive forward current				50	A
T_{stg}	Storage temperature range				- 65 to + 150	°C
T_j	Maximum operating junction temperature				150	°C



STPR1020CB / CG / CT / CF

THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / D ² PAK / DPAK	Per diode Total Coupling	4.0 2.4 0.7	°C/W
		ISOWATT220AB	Per diode Total Coupling	6.0 4.0 2.0	

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			50	μA
		$T_j = 100^\circ\text{C}$				0.6	mA
V_F **	Forward voltage drop	$T_j = 125^\circ\text{C}$	$I_F = 5 \text{ A}$		0.8	0.99	V
		$T_j = 125^\circ\text{C}$	$I_F = 10 \text{ A}$		0.95	1.20	
		$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$			1.25	

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.78 \times I_{F(AV)} + 0.042 \times I_{F(RMS)}^2$$

RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
trr	$T_j = 25^\circ\text{C}$	$I_F = 0.5 \text{ A}$	$I_{Rr} = 0.25 \text{ A}$			30	ns
tfr	$T_j = 25^\circ\text{C}$	$I_F = 1 \text{ A}$	$dI_F/dt = 50 \text{ A}/\mu\text{s}$		20		ns
V_{FP}	$T_j = 25^\circ\text{C}$	$I_F = 1 \text{ A}$	$dI_F/dt = 50 \text{ A}/\mu\text{s}$		3		V

Fig. 1: Average forward power dissipation versus average forward current (per diode).

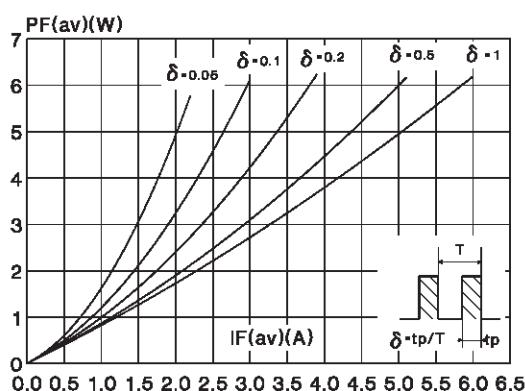
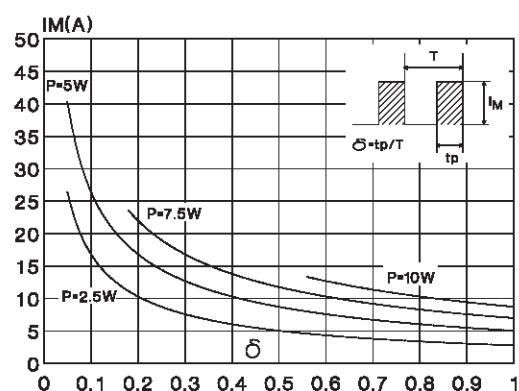


Fig. 2: Peak current versus form factor (per diode).



STPR1020CB / CG / CT / CF

Fig. 3: Average current versus ambient temperature (δ : 0.5, TO-220AB, DPAK, D²PAK).

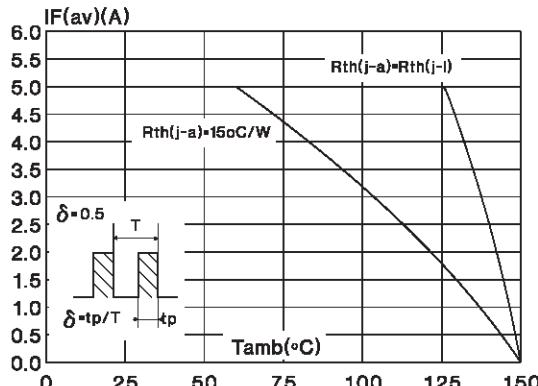


Fig. 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, DPAK and D²PAK).

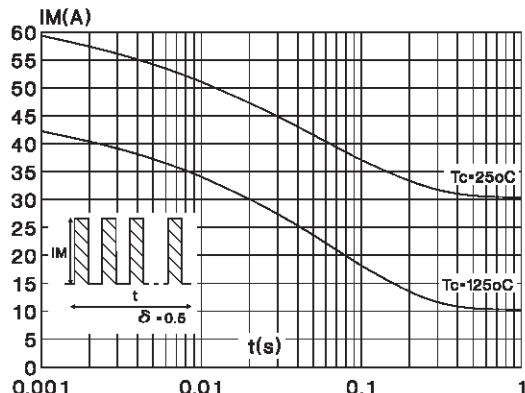


Fig. 7: Relative variation of thermal transient impedance junction to case versus pulse duration (per diode) (TO-220AB, DPAK and D²PAK).

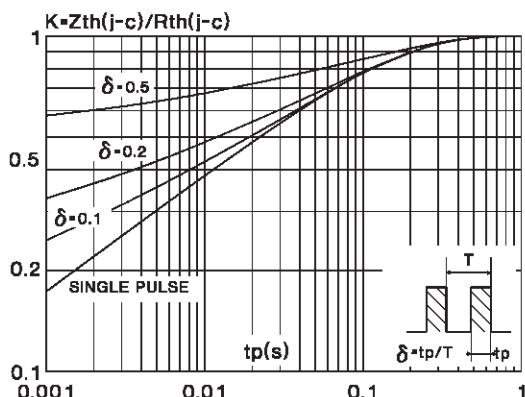


Fig. 4: Average current versus ambient temperature (δ : 0.5, ISOWATT220AB).

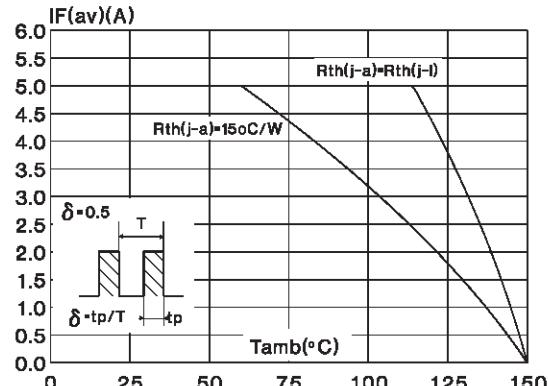


Fig. 6: Non repetitive surge peak forward current versus overload duration (maximum values, per diode).

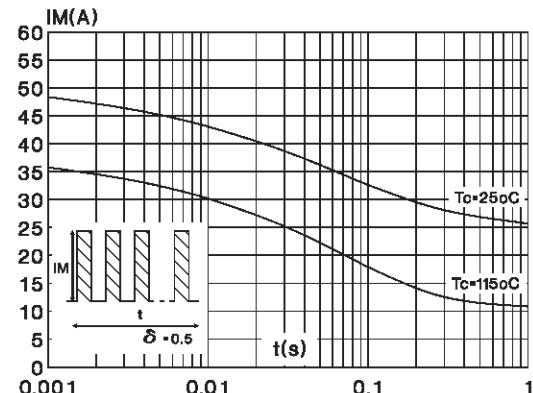
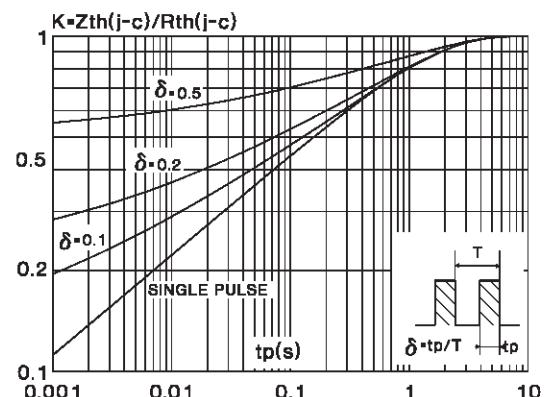


Fig. 8: Relative variation of thermal transient impedance junction to case versus pulse duration (per diode) (ISOWATT220AB).



STPR1020CB / CG / CT / CF

Fig. 9: Forward voltage drop versus forward current.

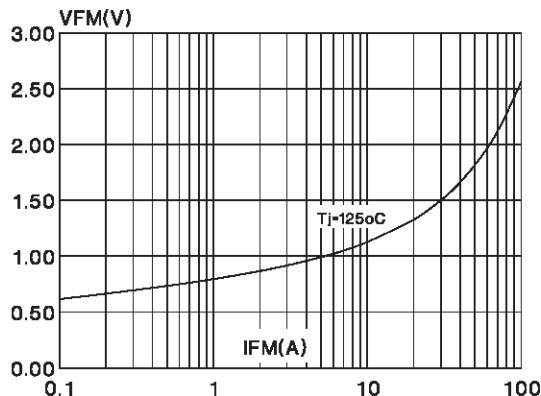


Fig. 11: Recovery charges versus dI/dt (per diode).

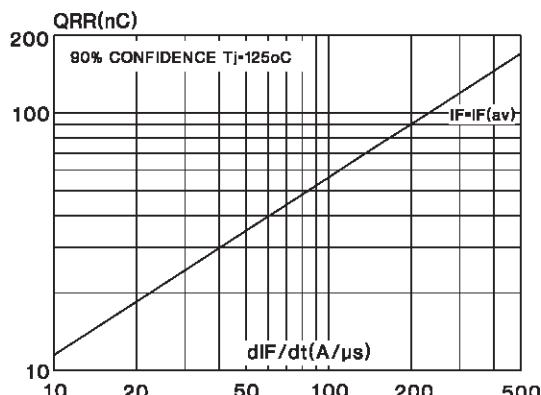


Fig. 13: Dynamic parameters versus junction temperature (per diode).

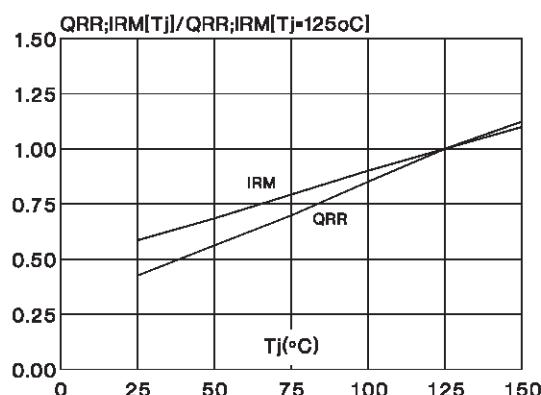


Fig. 10: Junction capacitance versus reverse voltage applied (typical values, per diode).

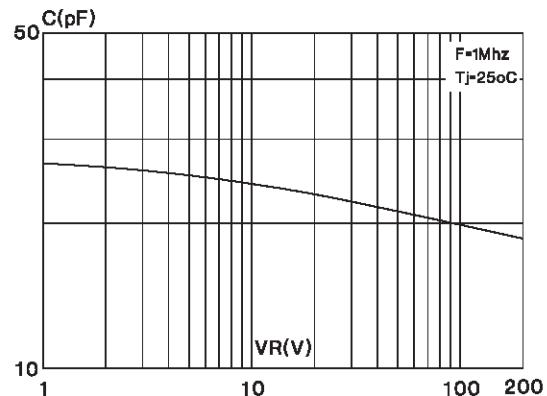
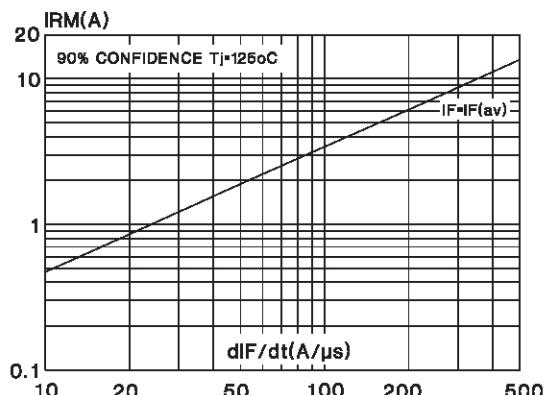
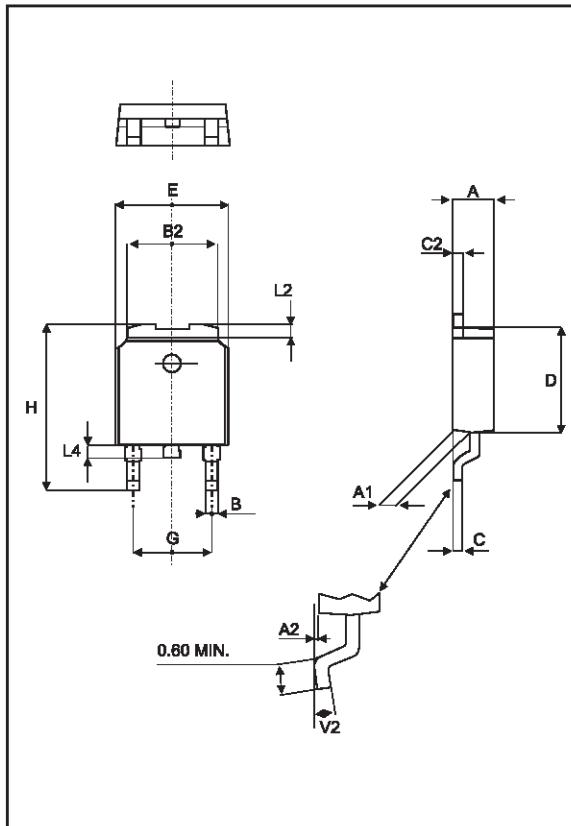


Fig. 12: Peak reverse current versus dI/dt (per diode).



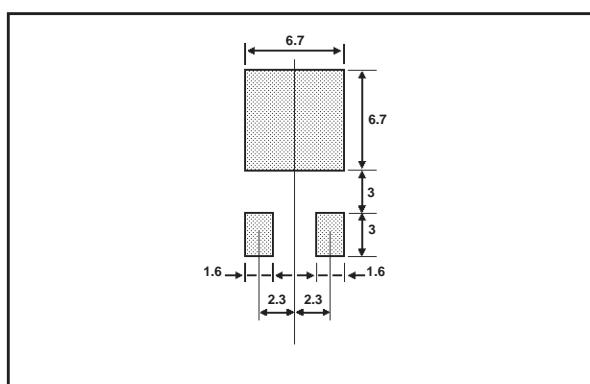
PACKAGE MECHANICAL DATA
DPAK



The diagram shows a 3D perspective view of the DPAK package. It includes a top-down view at the top left, a side view on the right, and a detailed view of the lead pitch area at the bottom right. Labels indicate various dimensions: A, A1, A2, B, B2, C, C2, D, E, G, H, L1, L2, L4, V1, and V2. A note "0.80 MIN." is present near the lead pitch area.

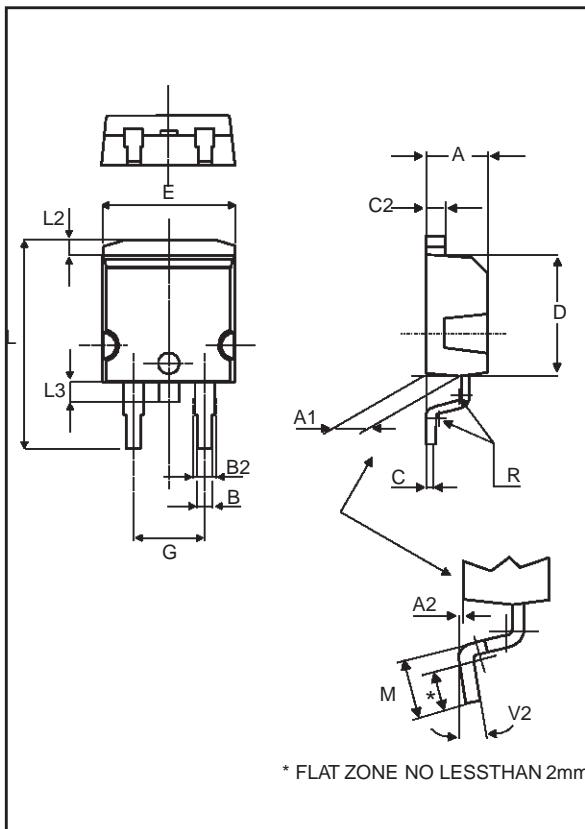
REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max	Min.	Typ.	Max.
A	2.20			2.40	0.086	
A1	0.90			1.10	0.035	
A2	0.03			0.23	0.001	
B	0.64			0.90	0.025	
B2	5.20			5.40	0.204	
C	0.45			0.60	0.017	
C2	0.48			0.60	0.018	
D	6.00			6.20	0.236	
E	6.40			6.60	0.251	
G	4.40			4.60	0.173	
H	9.35			10.10	0.368	
L2		0.80			0.031	
L4	0.60			1.00	0.023	
V2	0°			8°	0°	
						8°

FOOT PRINT (in millimeters)
DPAK



STPR1020CB / CG / CT / CF

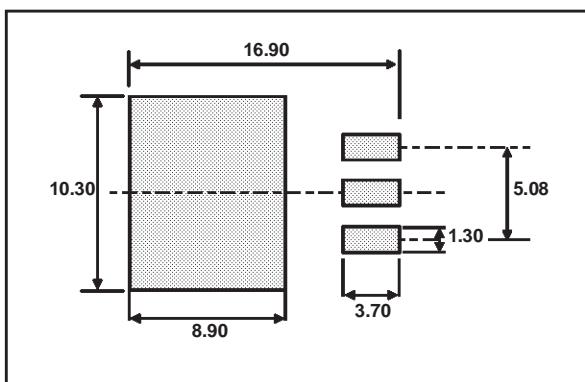
PACKAGE MECHANICAL DATA D²PAK



* FLAT ZONE NO LESS THAN 2mm

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°

FOOT PRINT (in millimeters) D²PAK



PACKAGE MECHANICAL DATA

TO-220AB (JEDEC outline)

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
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	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.	3.75	3.85	0.147	0.151

STPR1020CB / CG / CT / CF

PACKAGE MECHANICAL DATA ISOWATT220AB (JEDEC outline)

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	2.50		2.70	0.098		0.106
D	2.50		2.75	0.098		0.108
E	0.40		0.70	0.016		0.028
F	0.75		1.00	0.030		0.039
F1	1.15		1.70	0.045		0.067
F2	1.15		1.70	0.045		0.067
G	4.95		5.20	0.195		0.205
G1	2.40		2.70	0.094		0.106
H	10.00		10.40	0.394		0.409
L2		16.00			0.630	
L3	28.60		30.60	1.125		1.205
L4	9.80		10.60	0.386		0.417
L6	15.90		16.40	0.626		0.646
L7	9.00		9.30	0.354		0.366
Diam	3.00		3.20	0.118		0.126

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPR1020CB	STPR1020CB	DPAK	0.3g	75	Tube
STPR1020CB-TR	STPR1020CB	DPAK	0.3g	2500	Tape & reel
STPR1020CT	STPR1020CT	TO-220AB	2.23g	50	Tube
STPR1020CF	STPR1020CF	ISOWATT220AB	2.2g	50	Tube
STPR1020CG	STPR1020CG	D ² PAK	1.48g	50	Tube

- Cooling method : by conduction (C)
- Recommended torque value (ISOWATT220AB): 0.55 N.m.
- Maximum torque value (ISOWATT220AB): 0.70 N.m.
- Recommended torque value (TO-220AB): 0.8 N.m
- Maximum torque value (TO-220AB): 1.0 N.m.
- Epoxy meets UL94,V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco -
The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>