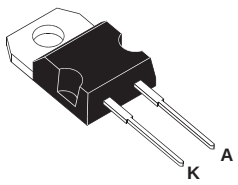
STPR520D/F/FP

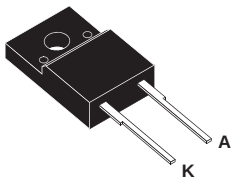
ULTRA-FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

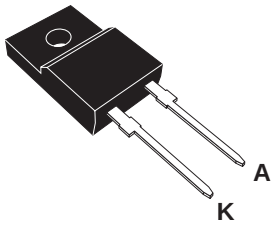
$I_{F(AV)}$	5 A
V_{RRM}	200 V
Tj (max)	150°C
V_F (max)	0.99 V
trr (max)	30 ns



TO-220AC
STPR520D



ISOWATT220AC
STPR520F



TO-220FPAC
STPR520FP

FEATURES

- Suited for SMPS
- Very low forward losses
- Negligible switching losses
- High surge current capability
- Insulated packages:
  ISOWATT220AC / TO-220FPAC
  Insulation voltage = 2000V DC
  Capacitance = 12pF

DESCRIPTION

Low cost single chip rectifier suited for Switch Mode Power Supplies and high frequency DC to DC converters.

Packaged in TO-220AC, ISOWATT220AC and TO-220FPAC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	RMS forward current			10	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC	Tc = 125°C	5	A
		ISOWATT220AC TO-220FPAC	Tc = 115°C		
I_{FSM}	Surge non repetitive forward current		Tp = 10 ms Sinusoidal	50	A
T_{stg}	Storage temperature range			- 65 to + 150	°C
Tj	Maximum operating junction temperature			+ 150	

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC	4	°C/W
		ISOWATT220AC / TO-220FPAC	6	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	Tj = 25°C	$V_R = V_{RRM}$			50	µA
		Tj = 100°C				0.5	mA
V_F **	Forward voltage drop	Tj = 125°C	I_F = 5 A			0.99	V
		Tj = 125°C	I_F = 10 A			1.20	
		Tj = 25°C	I_F = 10 A			1.25	

Pulse test : * tp = 5 ms, δ < 2 %
** tp = 380 µs, δ < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.042 \times I_{F}{}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			30	ns
tfr	T_j = 25°C	I_F = 1A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		
V_{FP}	T_j = 25°C	I_F = 1A tr = 10 ns		3		V

Fig. 1: Average forward power dissipation versus average forward current.

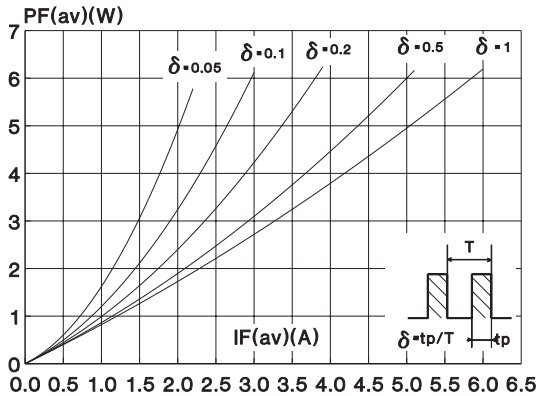


Fig. 2: Peak current versus form factor.

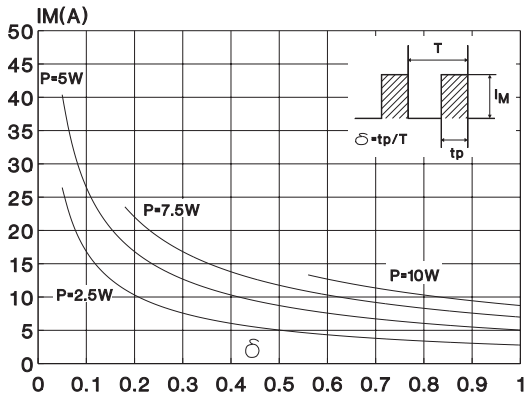


Fig. 3: Average current versus ambient temperature.

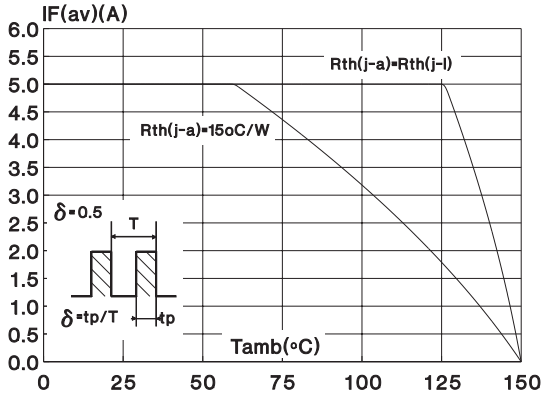


Fig. 4: Average current versus ambient temperature.

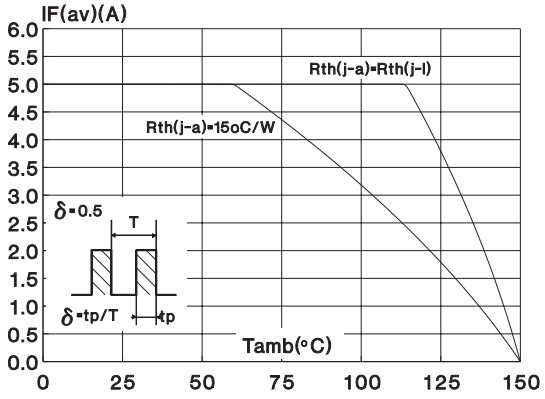


Fig. 5: Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC).

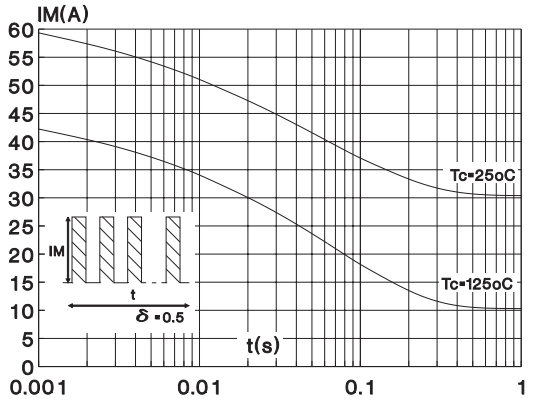


Fig. 6: Non repetitive surge peak forward current versus overload duration (maximum values) (ISOWATT220AC, TO-220FPAC).

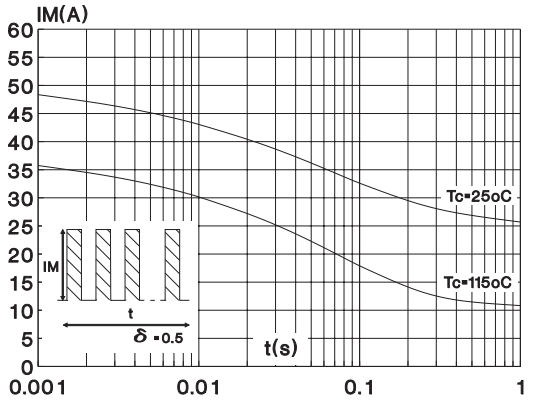


Fig. 7: Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC).

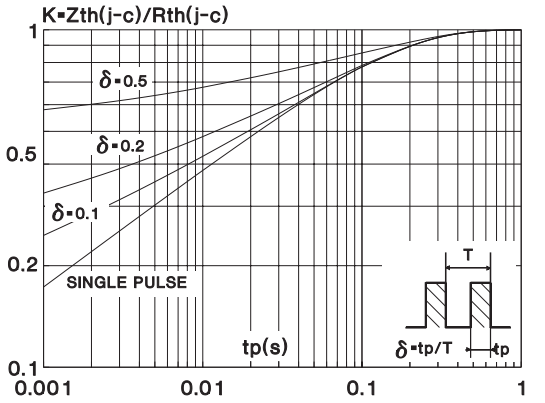


Fig. 8: Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC, TO-220FPAC).

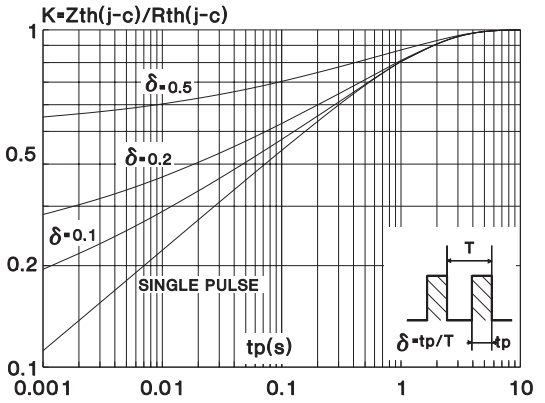


Fig. 9: Forward voltage drop versus forward current.

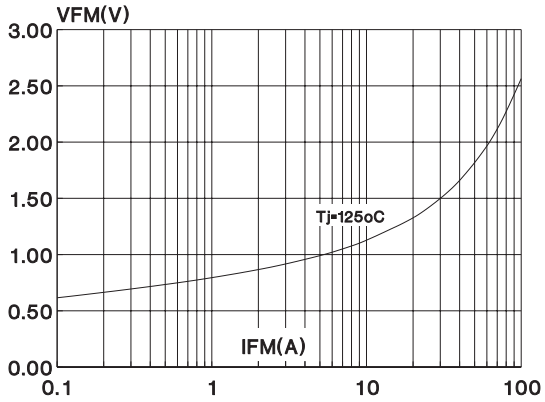


Fig. 10: Junction capacitance versus reverse voltage applied (typical values).

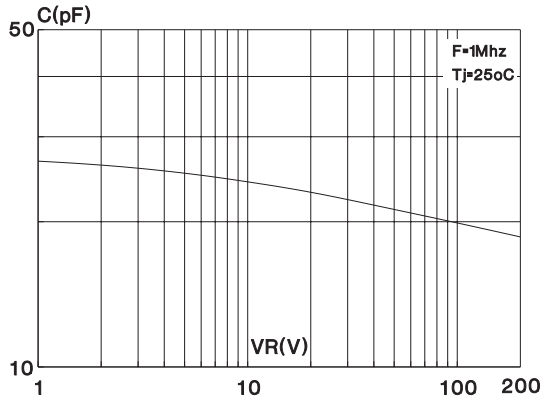


Fig. 11: Recovery charge versus dI_F/dt.

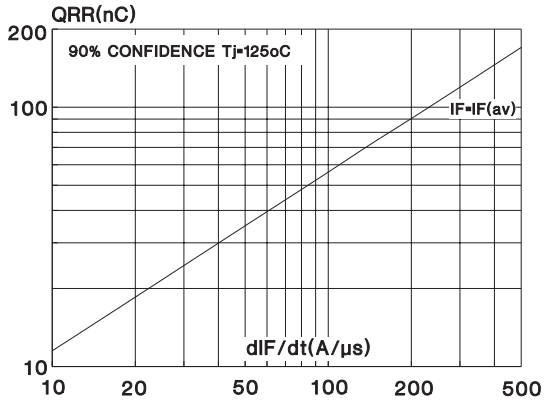


Fig. 12: Peak reverse current versus dI_F/dt.

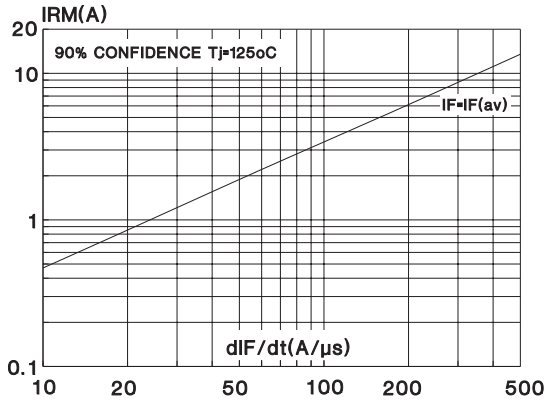
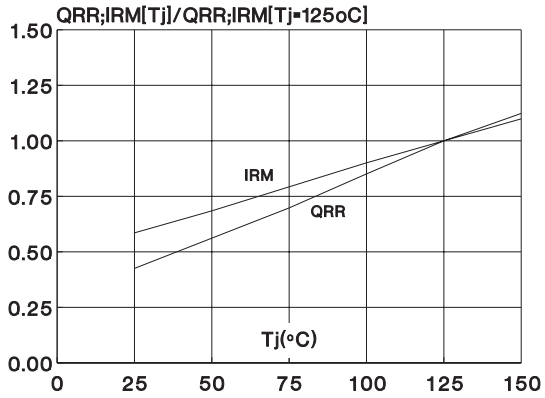
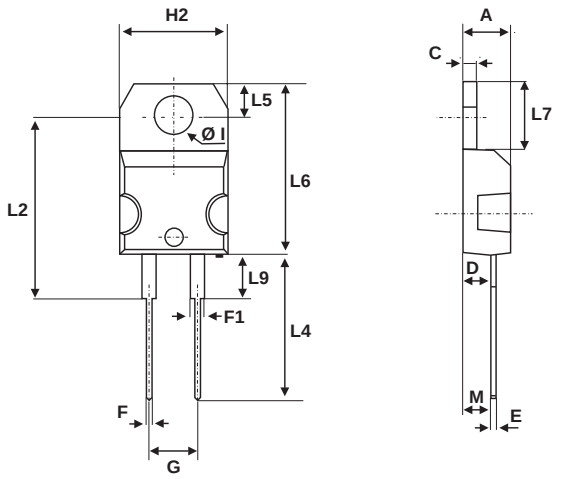


Fig. 13: Dynamic parameters versus junction temperature.

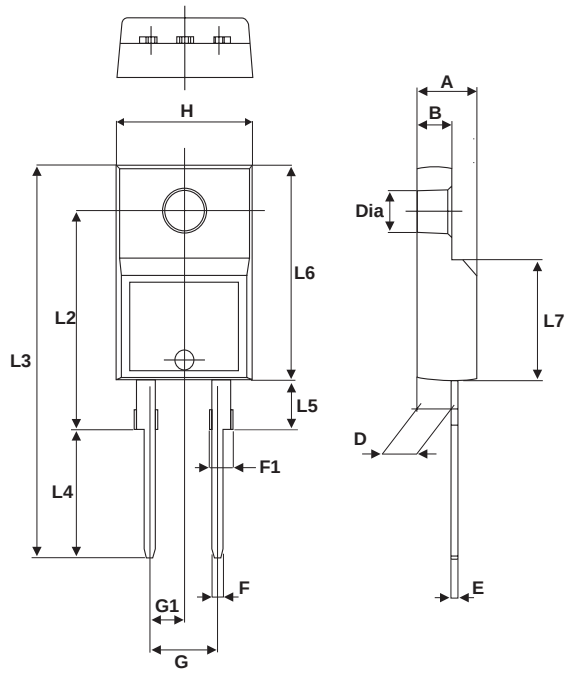


PACKAGE MECHANICAL DATA
TO-220AC



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

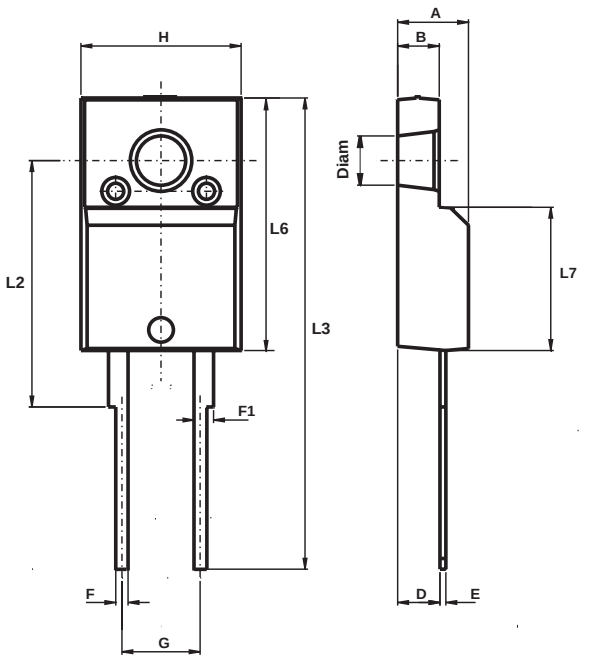
PACKAGE MECHANICAL DATA
TO-220FPAC



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA

ISOWATT220AC



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.40	2.75	0.094	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
G	4.95	5.20	0.195	0.205
H	10.00	10.40	0.394	0.409
L2	16.00 Typ.		0.630 Typ.	
L3	28.60	30.60	1.125	1.205
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

Type	Marking	Package	Weight	Base Qty	Delivery mode
STPR520D	STPR520D	TO-220AC	2.3 g	50	Tube
STPR520F	STPR520F	ISOWATT220AC	2 g	50	Tube
STPR520FP	STPR520FP	TO-220FPAC	1.8 g	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value (ISOWATT220AC, TO-220FPAC): 0.55 nm
- Maximum torque value (ISOWATT220AC, TO-220FPAC): 0.7 Nm
- Recommended torque value (TO-220AC): 0.8 Nm
- Maximum torque value (TO-220AC): 1.0 Nm
- Epoxy meets UL94, V0