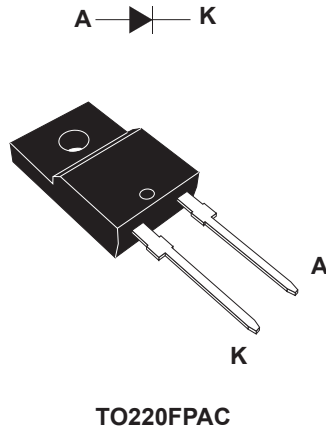


600 V, 30 A ultrafast high voltage diode



Features

- Ultrafast recovery, soft recovery
- Low power losses at high switching frequency operations
- Low leakage current
- High junction temperature
- High overcurrent capability
- ECOPACK2 compliant
- Insulated package TO-220FPAC:
 - Insulated voltage: 2000 V_{RMS}

Applications

- Boost PFC
- Clamping diode
- Air conditioning equipment

Description

The **STTH30M06** is an ultrafast recovery power rectifier especially suited for boost or clamping circuits working at high switching frequencies in heavy duty applications such as air conditioning equipment or telecom power supplies.

Designed with the latest ST's ultrafast technology, this 600 V 30 A diode in TO-220FPAC has a robust behavior against electrostatic discharge and high overcurrent capability.

Product label



Product status

STTH30M06

Product summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	600 V
$t_{rr(typ.)}$	25 ns
$T_{j(max.)}$	175 °C
$V_F(typ.)$	1.7 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(AV)}$	Average forward current	$\delta = 0.5$ square	30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	170	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		+175	°C

Table 2. Thermal resistance parameter

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	Typ.	2.45
		Max.	3.5

For more information, refer to the following application note :

- [AN5088](#): Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = 600\text{ V}$	-		60	μA
		$T_j = 125\text{ °C}$		-	70	800	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$	-	2.1		V
		$T_j = 150\text{ °C}$		-	1.3		
		$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$	-	2.6	3.8	
		$T_j = 150\text{ °C}$		-	1.7	2.3	

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

2. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

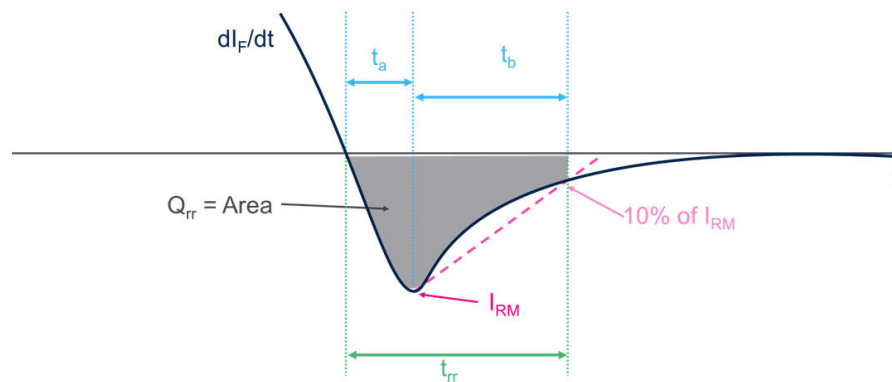
$$P = 1.08 \times I_{F(AV)} + 0.04 \times I_F^2(RMS)$$

For more information, refer to the following application notes related to the power losses :

- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses on a power diode

Table 4. Dynamic electrical characteristics

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$ $di_F/dt = -50\text{ A/}\mu\text{s}$ $V_R = 30\text{ V}$	-		50	ns
			$I_F = 1\text{ A}$ $di_F/dt = -100\text{ A/}\mu\text{s}$ $V_R = 30\text{ V}$	-	25	35	
		$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$ $di_F/dt = -200\text{ A/}\mu\text{s}$ $V_R = 400\text{ V}$	-	100		
I_{RM}	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$	-	5.2		A
Q_{rr}	Reverse recovery charge		$di_F/dt = -200\text{ A/}\mu\text{s}$ $V_R = 400\text{ V}$	-	380		nC

Figure 1.


For more information, refer to the following application notes related to the power losses:

- [AN5028](#): Calculation of turn-off power losses generated by an ultrafast diode

1.1 Characteristics (curves)

Figure 2. Average forward power dissipation versus average forward current

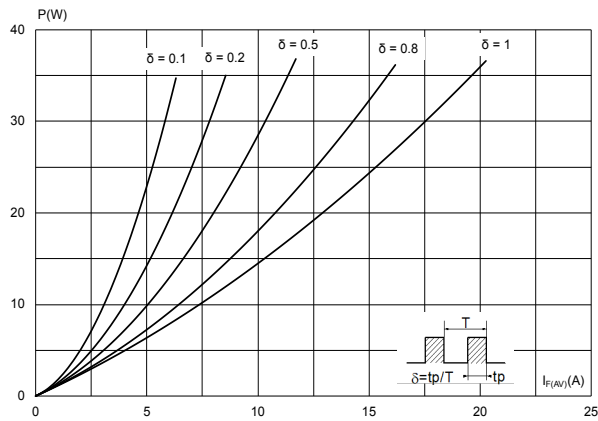


Figure 3. Forward voltage drop versus forward current (typical values)

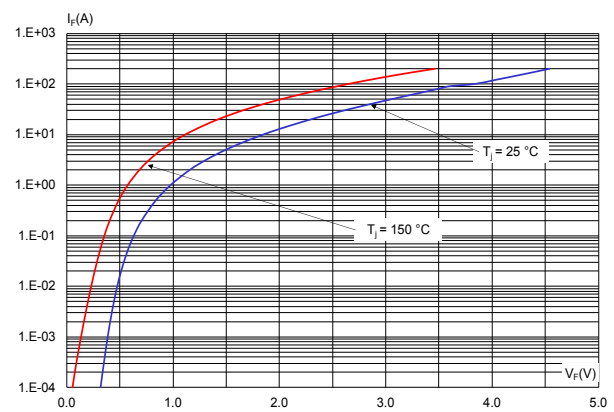


Figure 4. Forward voltage drop versus forward current (maximum values)

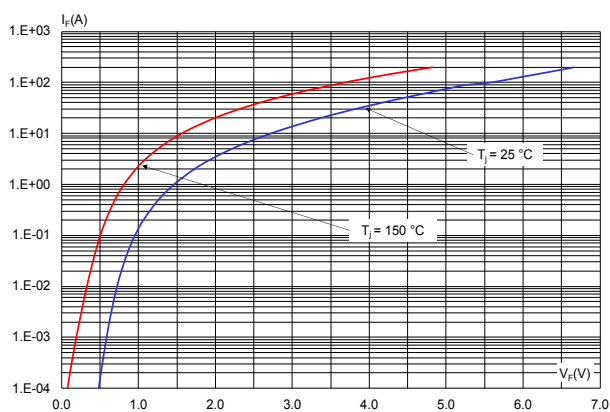


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

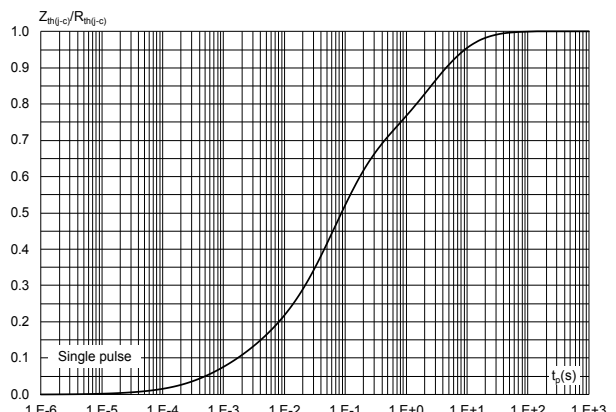


Figure 6. Peak reverse recovery current versus di_F/dt (typical values)

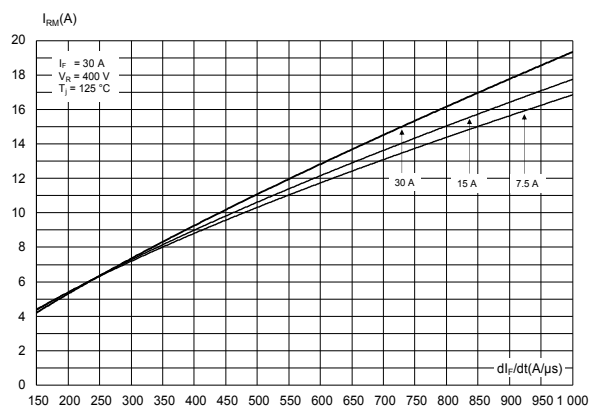


Figure 7. Reverse recovery time versus di_F/dt (typical values)

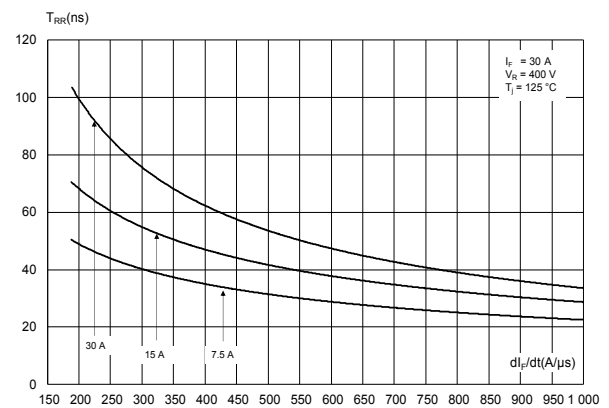
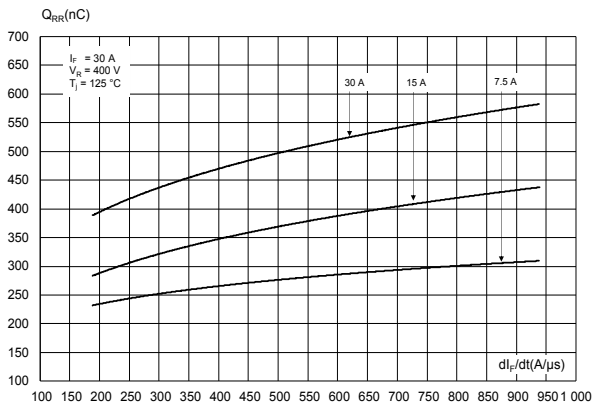
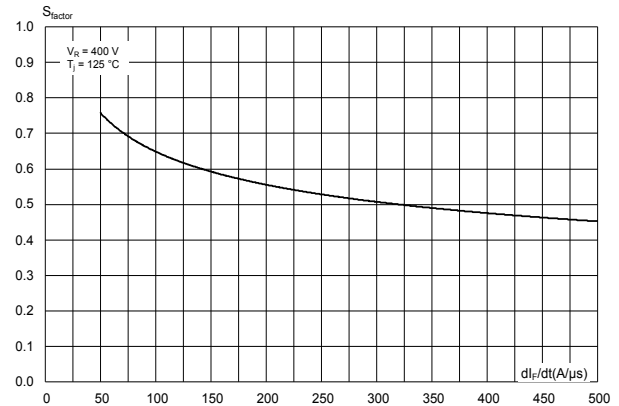
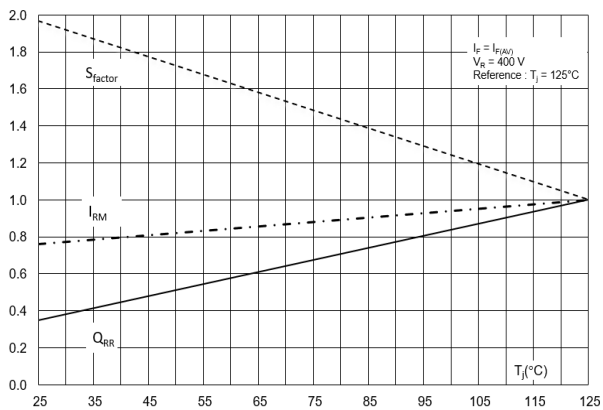
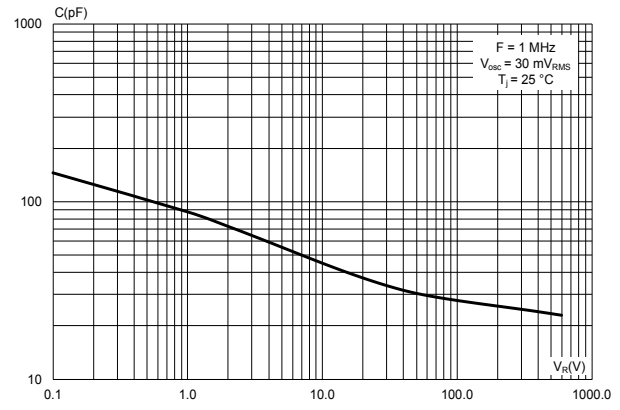
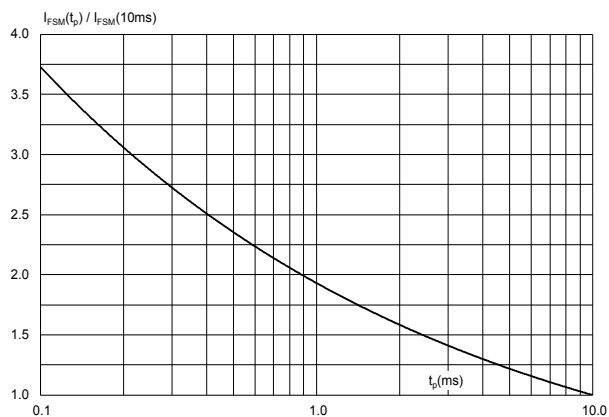
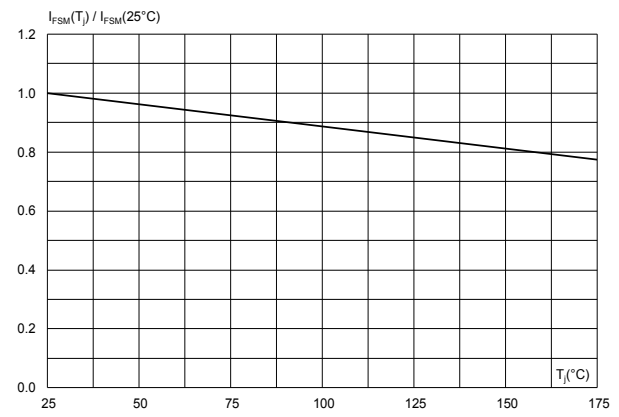


Figure 8. Reverse recovery charges versus di_F/dt (typical values)

Figure 9. Reverse recovery softness factor versus di_F/dt (typical values)

Figure 10. Relative variations of dynamic parameters versus junction temperature

Figure 11. Junction capacitance versus reverse voltage applied (typical values)

Figure 12. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

Figure 13. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)


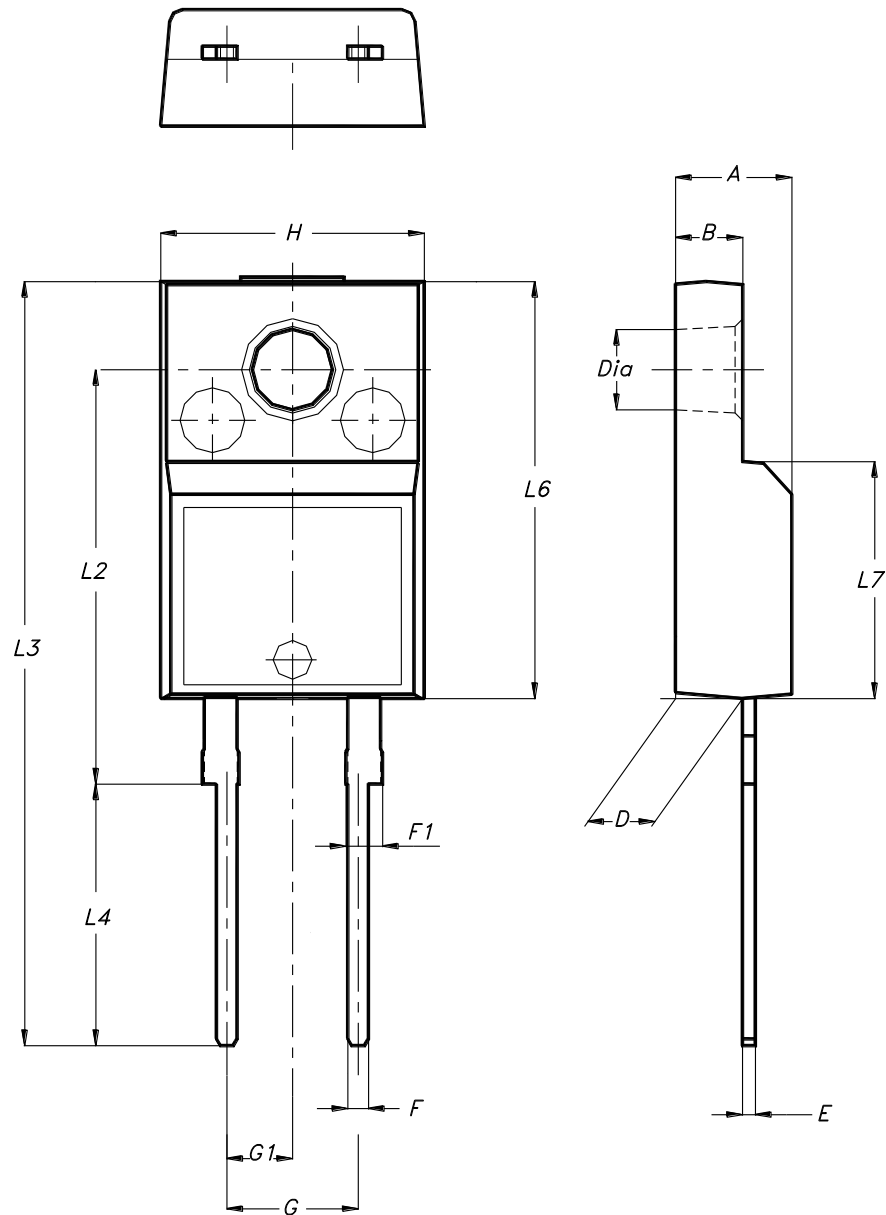
2 Package information

To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

2.1 TO-220FPAC package information

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

Figure 14. TO-220FPAC package outline



7147406_7

Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. TO-220FPAC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	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	0.45	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	2.70	0.094	0.106
H	10	10.40	0.393	0.409
L2	16 typ.		0.63 typ.	
L3	28.6	30.60	1.126	1.205
L4	9.8	10.60	0.386	0.417
L6	15.9	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

Note: For package and tape orientation, reel and inner box dimensions and tape outline you can check [TN1173](#).

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH30M06FP	TH30M06FP	TO-220FPAC	1.9 g	50	Tube

Revision history

Table 7. Document revision history

Date	Revision	Changes
17-Dec-2025	1	Initial release.

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