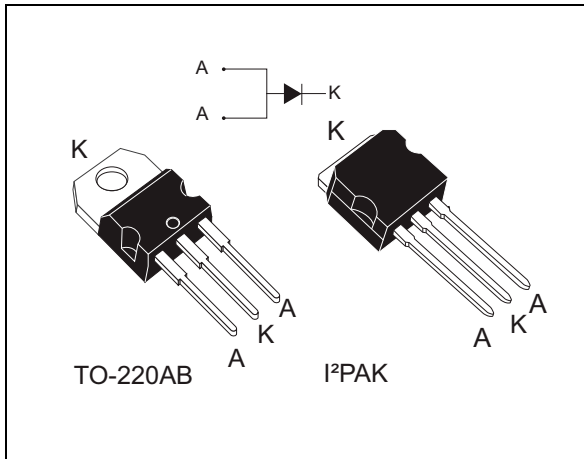


Field effect rectifier

Datasheet - production data



Description

This single rectifier is based on a proprietary technology, enabling to achieve the best in class V_F/I_R trade-off for a given silicon surface.

Packaged in TO-220AB and I²PAK, this device is intended to be used in rectification and freewheeling operations in switch-mode power supplies.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	20 A
V_{RRM}	60 V
T_j (max)	+175 °C
V_F (typ)	0.30 V

Features

- ST proprietary process
- Stable leakage current over reverse voltage
- Low forward voltage drop
- High frequency operation

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	60	V
$I_{F(RMS)}$	Forward rms current	60	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 150\text{ °C}$ 20	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal 275	A
T_{stg}	Storage temperature range	-65 to + 175	°C
$T_j^{(1)}$	Maximum operating junction temperature	175	°C

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 3. Thermal resistance

Symbol	Parameter	Value (max)	Unit
$R_{th(j-c)}$	Junction to case	1.6	°C/W

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit		
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = 45\text{ V}$			125	μA	
		$T_j = 125\text{ °C}$			10	20	mA	
		$T_j = 25\text{ °C}$	$V_R = V_{RRM}$				230	μA
		$T_j = 125\text{ °C}$			15	30	mA	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 5\text{ A}$		0.36		V	
		$T_j = 125\text{ °C}$			0.30	0.35		
		$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$		0.42	0.47		
		$T_j = 125\text{ °C}$			0.39	0.44		
		$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$		0.51	0.56		
		$T_j = 125\text{ °C}$			0.51	0.56		

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:

$$P = 0.32 \times I_{F(AV)} + 0.012 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

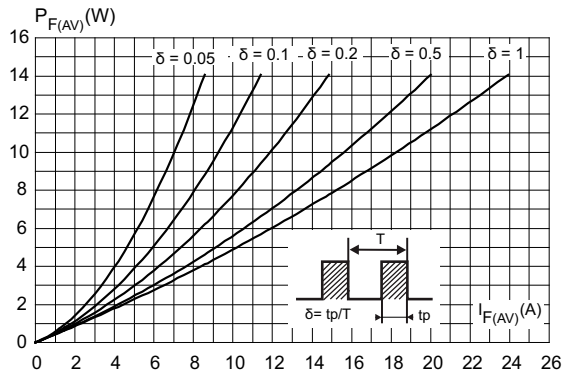


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

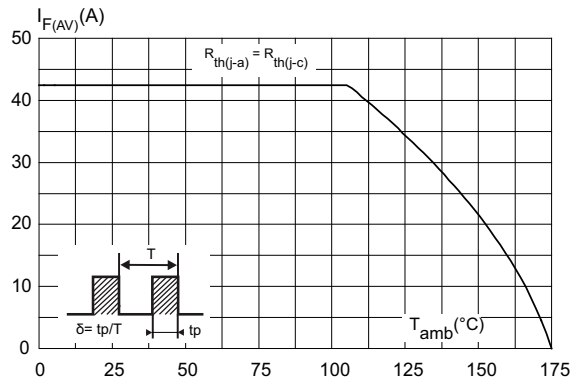


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

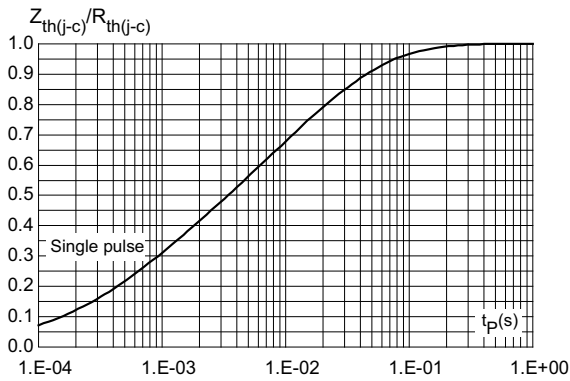


Figure 4. Reverse leakage current versus reverse voltage applied (typical values)

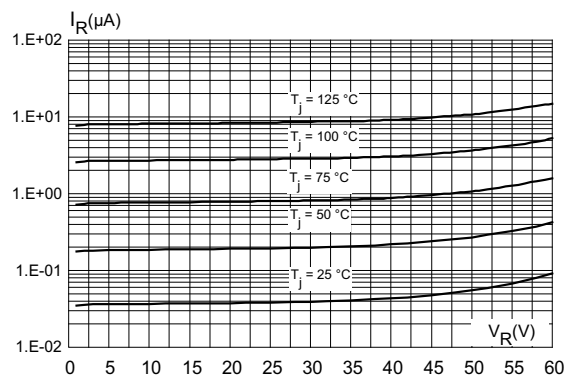


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

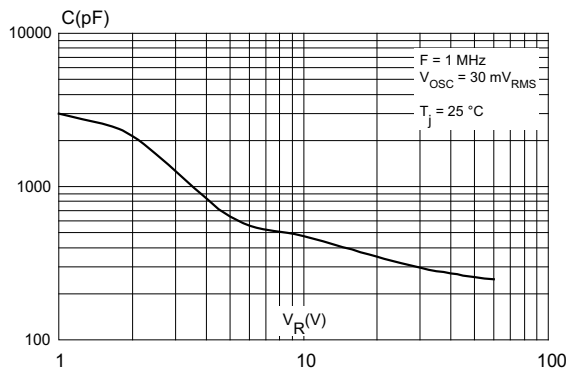
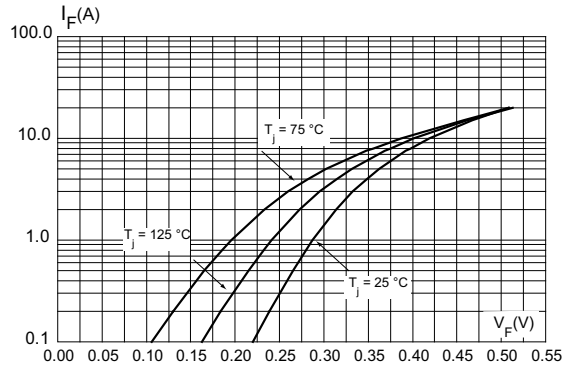


Figure 6. Forward voltage drop versus forward current (typical values)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N.m

In order 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-220AB package information

Figure 7. TO-220AB package outline

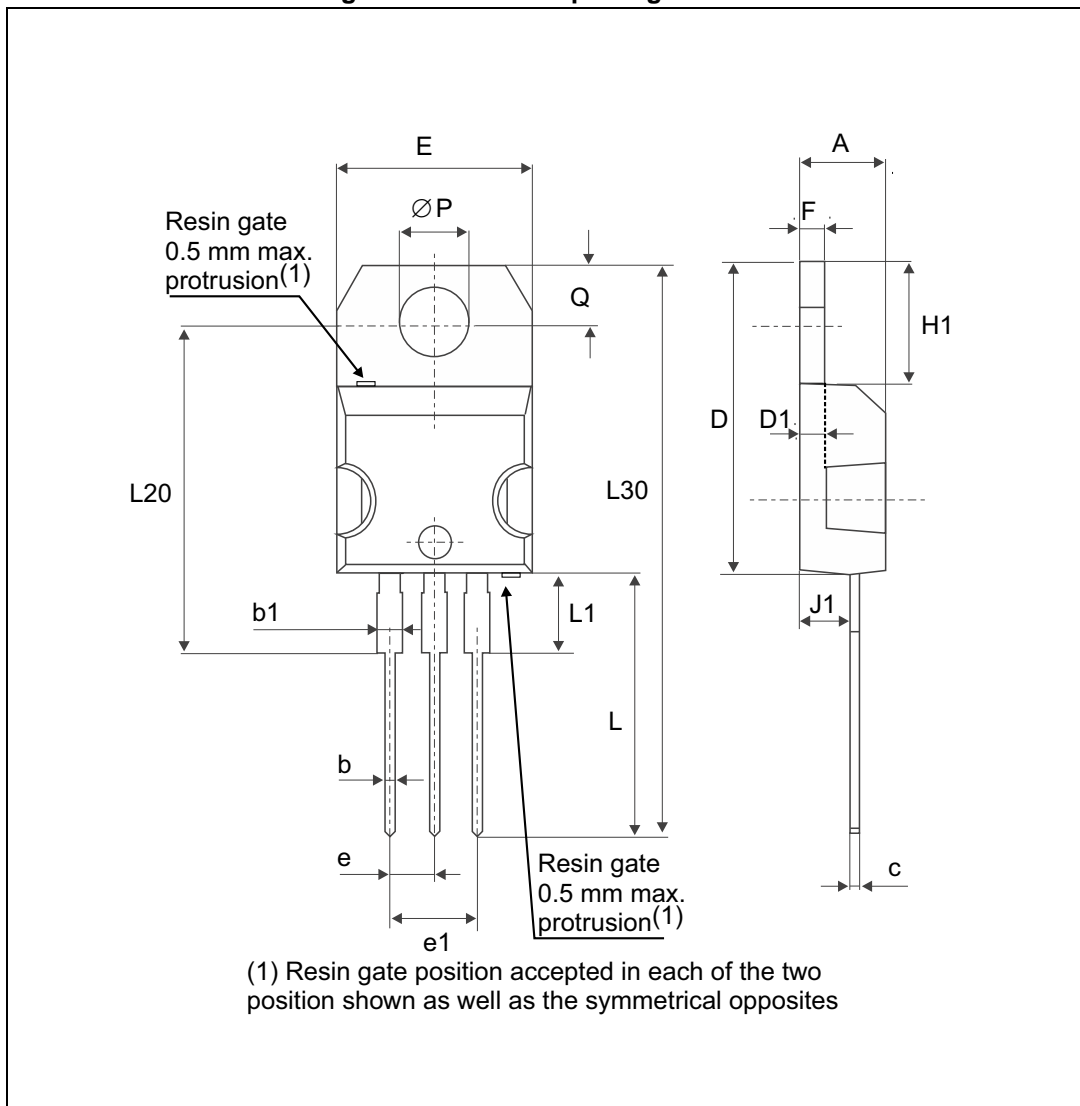


Table 5. TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
ØP	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116

2.2 I²PAK package information

Figure 8. I²PAK package outline

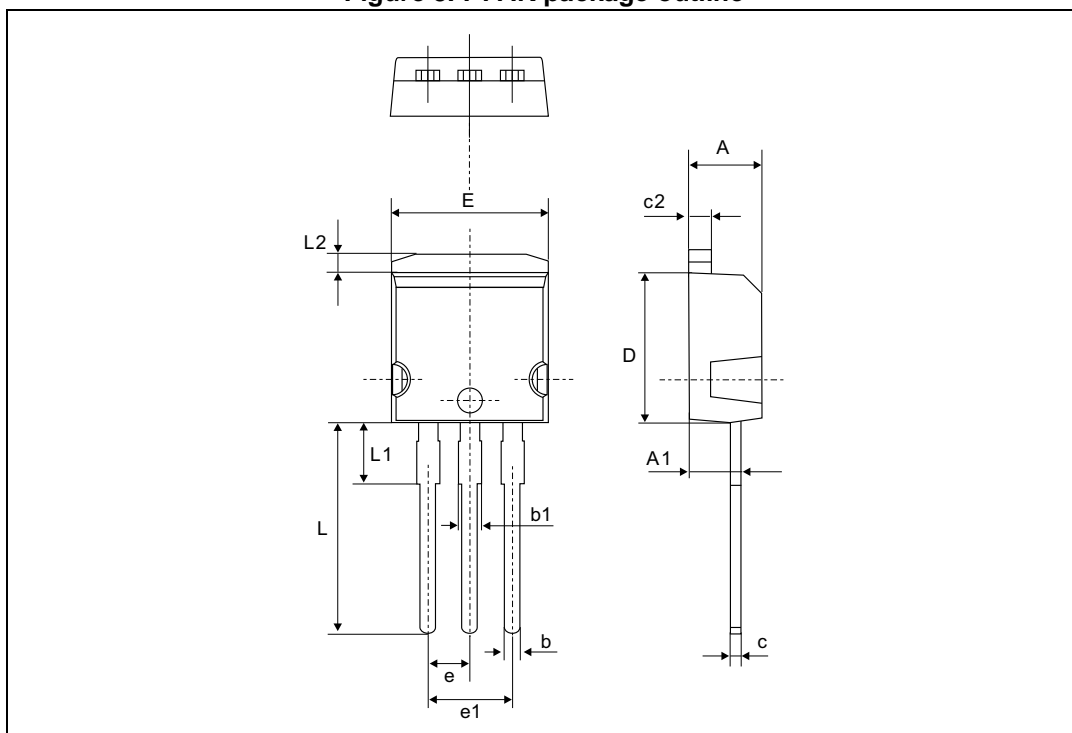


Table 6. I²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10	10.40	0.394	0.409
L	13	14	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
FERD20M60ST	FERD20M60ST	TO-220AB	1.9 g	50	Tube
FERD20M60SR	FERD20M60SR	I ² PAK	1.4 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
20-Nov-2014	1	Initial release.
17-Jun-2015	2	Added I ² PAK package information.

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