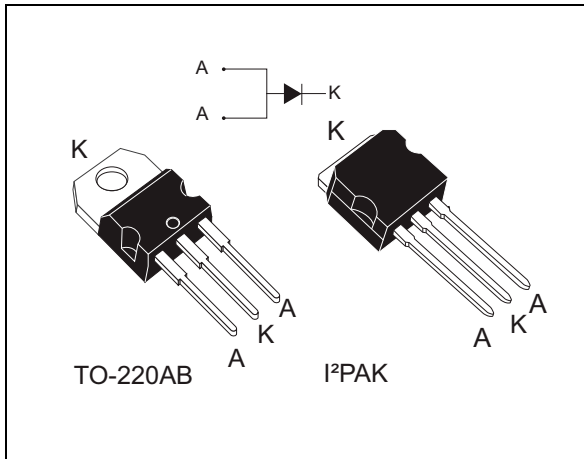


## Field effect rectifier

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 I<sup>2</sup>PAK, 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	$\mu\text{A}$	
		$T_j = 125\text{ °C}$			10	20	mA	
		$T_j = 25\text{ °C}$	$V_R = V_{RRM}$				230	$\mu\text{A}$
		$T_j = 125\text{ °C}$			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		

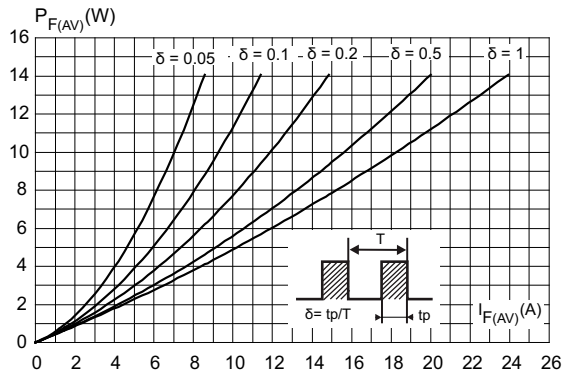
1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

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

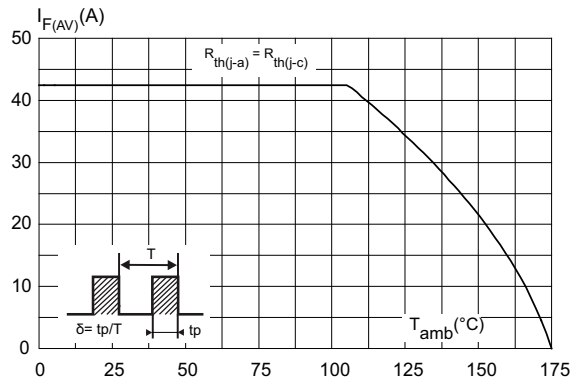
To evaluate the conduction losses use the following equation:

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

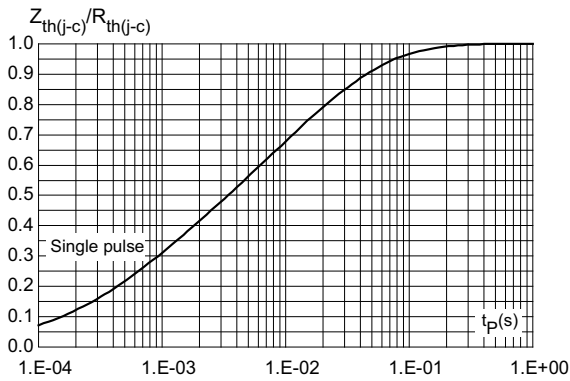
**Figure 1. Average forward power dissipation versus average forward current**



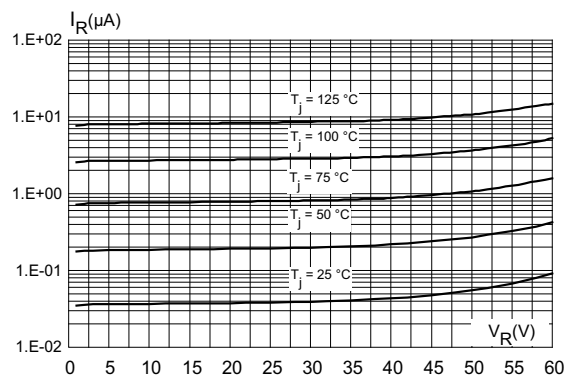
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



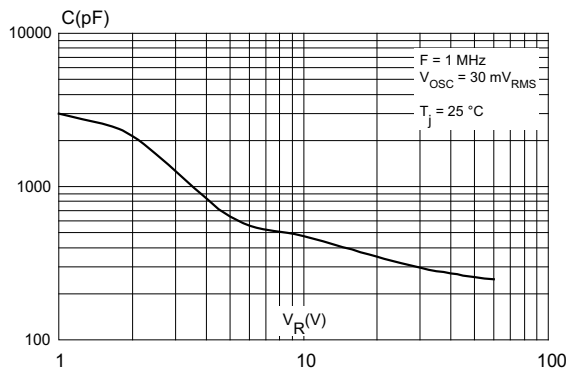
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



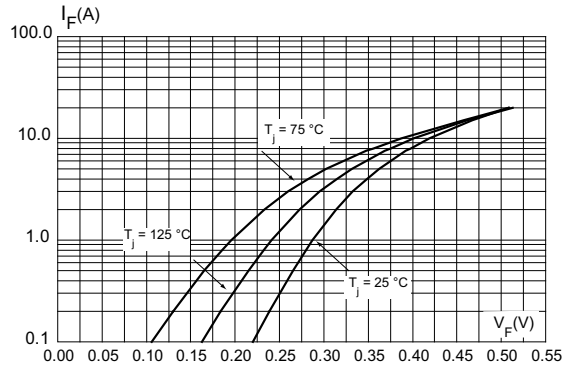
**Figure 4. Reverse leakage current versus reverse voltage applied (typical values)**



**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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 TO-220AB package information

Figure 7. TO-220AB package outline

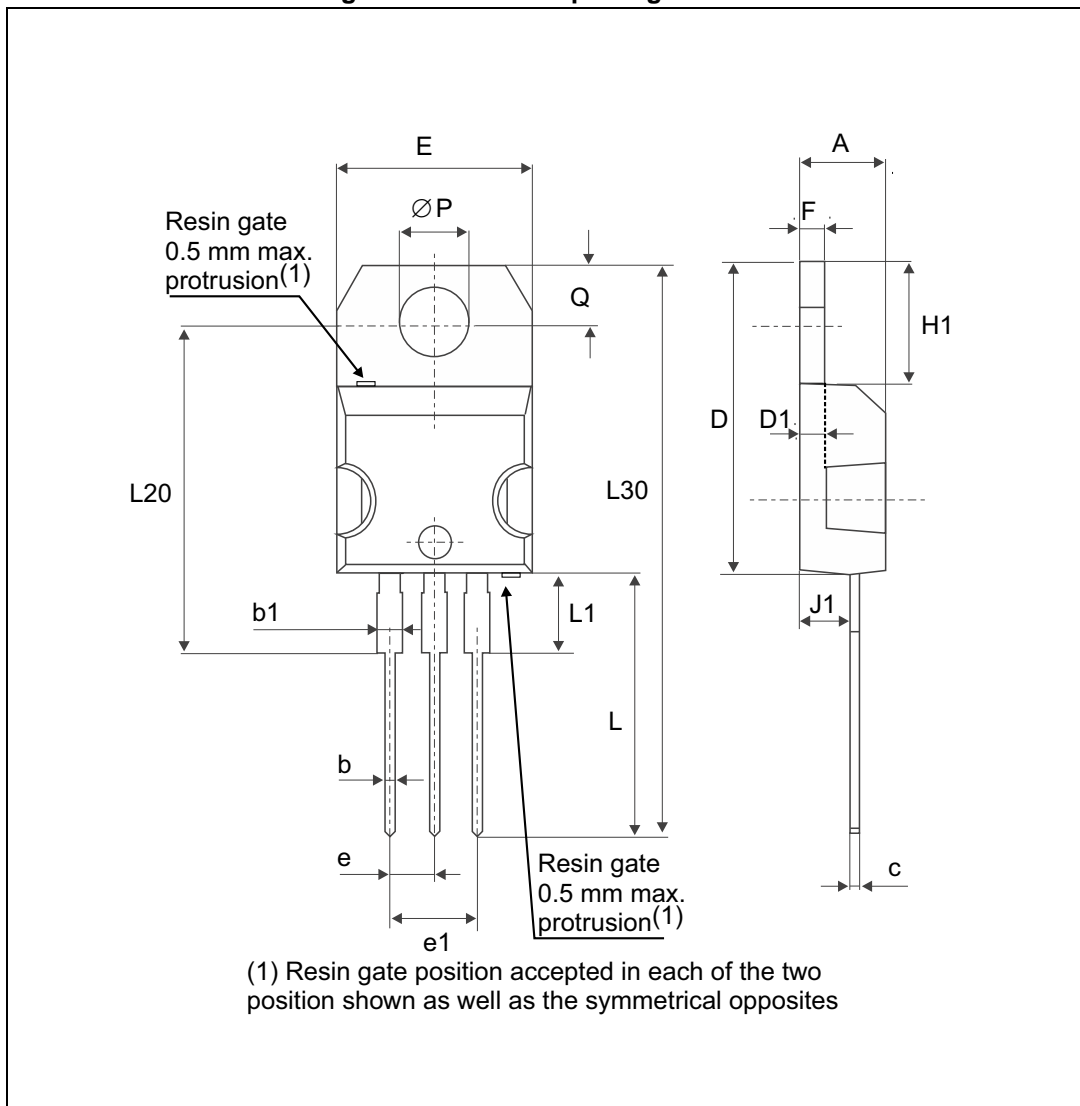


Table 5. TO-220AB package mechanical data

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 I<sup>2</sup>PAK package information

Figure 8. I<sup>2</sup>PAK package outline

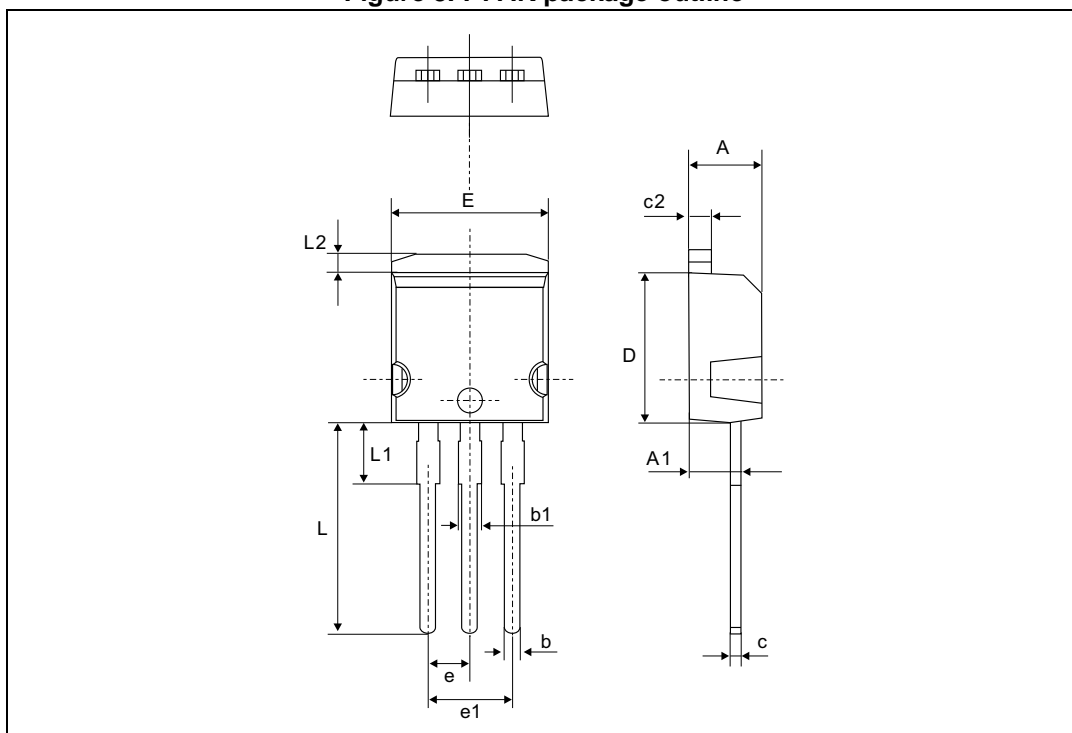


Table 6. I<sup>2</sup>PAK package mechanical data

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 <sup>2</sup> 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 <sup>2</sup> PAK package information.

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