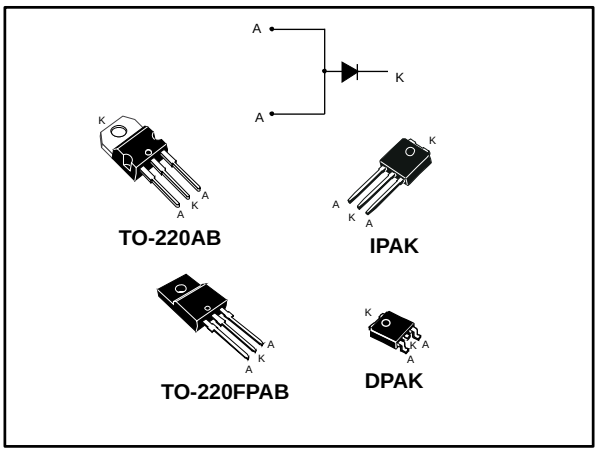
FERD20H100S

100 V field-effect rectifier diode

Datasheet - production data



Features

- ST advanced rectifier process
- Stable leakage current over reverse voltage
- Reduced leakage current
- Low forward voltage drop
- High frequency operation
- Insulated package TO-220FPAB :
  - Insulated voltage : 2000 V_{RMS} sine

Description

The device is based on a proprietary technology that achieves the best in class V_F/I_R trade-off for a given silicon surface. This 100 V rectifier has been optimized for use in confined applications where both efficiency and thermal performance are key. With a lower dependency of leakage current (I_R) and forward voltage (V_F) in function of temperature, the thermal runaway risk is reduced. It is highly recommended to be used in adapters and chargers.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	20 A
V_{RRM}	100 V
V_F (max.)	0.415 V
I_R (max.)	140 µA
T_j (max.)	175 °C

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	Forward rms current			40	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	TO-220AB, DPAK, IPAK	T_C = 155 °C	20	A
		TO-220FPAB	T_C = 110 °C		A
I_{FSM}	Surge non repetitive forward current	TO-220AB, TO-220FPAB	t_p = 10 ms sinusoidal	250	A
		DPAK, IPAK		150	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature			+175	°C

Notes:

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

Table 3: Thermal resistance parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, DPAK, IPAK	1	°C/W
		TO-220FPAB	3.8	

Table 4: Static electrical characteristics, anode terminals short circuited

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		140	µA
		T_j = 125 °C		-	8	16	mA
		T_j = 125 °C	V_R = 70 V	-	4	7	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 2 A	-	0.370	0.415	V
		T_j = 125 °C		-	0.315	0.365	
		T_j = 25 °C	I_F = 5 A	-	0.455	0.515	
		T_j = 125 °C		-	0.450	0.510	
		T_j = 25 °C	I_F = 10 A	-	0.580	0.655	
		T_j = 125 °C		-	0.550	0.605	
		T_j = 125 °C	I_F = 20 A	-	0.640	0.705	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.415 \times I_{F(AV)} + 0.019\ I_F^2{}_{(RMS)}$

1.1 Characteristics (curves)

Figure 1: Average forward current versus ambient temperature (δ = 0.5)

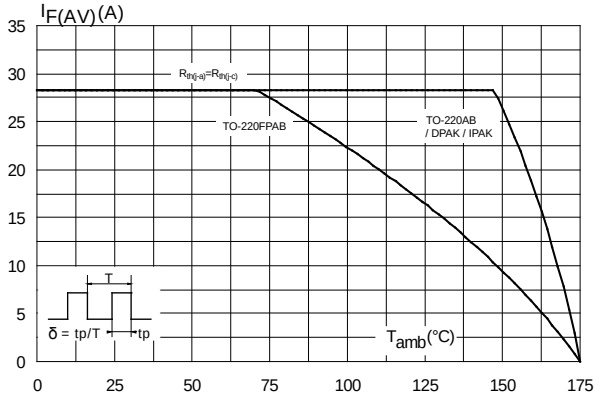


Figure 2: Relative variation of thermal impedance junction to case versus pulse duration

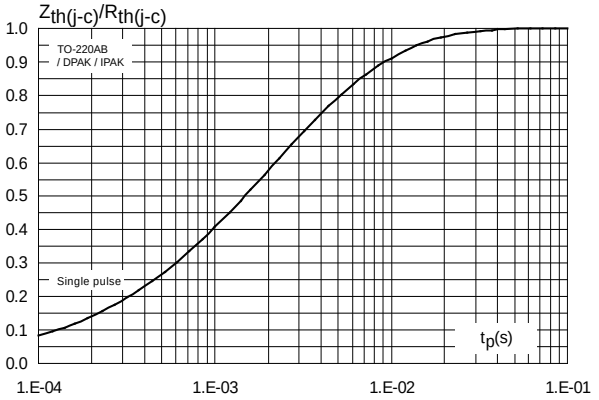


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

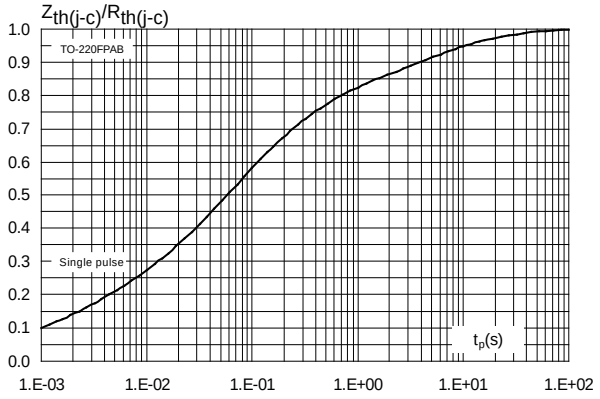


Figure 4: Reverse leakage current versus reverse voltage applied (typical values)

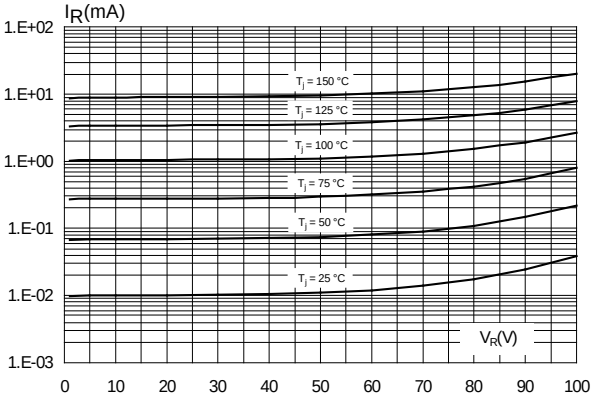


Figure 5: Junction capacitance versus reverse voltage applied (typical values)

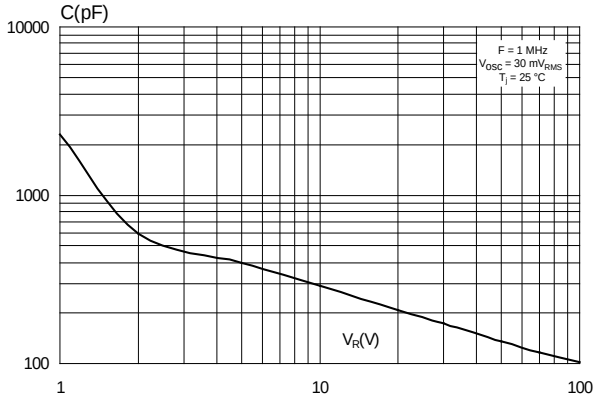
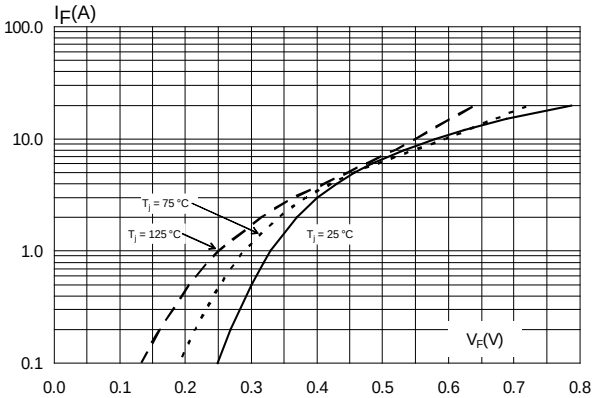


Figure 6: Forward voltage drop versus forward current (typical values)



3 Ordering information

Table 9: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
FERD20H100STS	FD20H100STS	TO-220AB	1.38 g	50	Tube
FERD20H100SFP	FD20H100SFP	TO-220FPAB	1.7 g	50	Tube
FERD20H100SB-TR	FD20 H100S	DPAK	0.35 g	75	Tape and reel
FERD20H100SH	FD20 H100S	IPAK	0.32 g	2500	Tube