Ultrafast Rectifier, 2 A FRED Pt®



DO-214AA (SMB)



FEATURES

- Ultrafast recovery time, reduced Q_{rr} and soft recovery
- 175 °C maximum operating junction temperature
- Specific for output and snubber operation
- Low forward voltage drop
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified, meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

HALOGEN FREE

PRODUCT SUMMARY	
Package	DO-214AA (SMB)
$I_{F(AV)}$	2 A
V_R	200 V
V_F at I_F	0.66 V
t_{rr} typ.	24 ns
T_J max.	175 °C
Diode variation	Single die

DESCRIPTION / APPLICATIONS

State of the art ultrafast recovery rectifiers designed with optimized performance of forward voltage drop, ultrafast recovery time, and fast recovery.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in snubber, output operation, inverters or as freewheeling diodes.

Their extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current	$I_{F(AV)}$	T_L = 150 °C (1)	2	
Non-repetitive peak surge current	I_{FSM}	T_J = 25 °C	70	A
Operating junction and storage temperatures	T_J, T_{Stg}		-65 to +175	°C

Note

(1) Mounted on PCB with 6 mm x 3.5 mm lands

ELECTRICAL SPECIFICATIONS (T_J = 25 °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	I_R = 100 µA	200	-	-	V
Forward voltage	V_F	I_F = 2 A	-	0.84	0.9	
		I_F = 2 A, T_J = 150 °C	-	0.66	0.7	
Reverse leakage current	I_R	V_R = V_R rated	-	-	2	µA
		T_J = 150 °C, V_R = V_R rated	-	-	20	
Junction capacitance	C_T	V_R = 200 V	-	12	-	pF
Critical rate if rise of reverse voltage	dV/dt_τ		-	-	10 000	V/µs

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DYNAMIC RECOVERY CHARACTERISTICS (T_J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	I_F = 1.0 A, dI_F/dt = 100 A/µs, V_R = 30 V		-	24	-	ns
		I_F = 1.0 A, dI_F/dt = 50 A/µs, V_R = 30 V		-	27	-	
		I_F = 0.5 A, I_R = 1 A, I_{rr} = 0.25 A		-	-	23	
		T_J = 25 °C	I_F = 2 A dI_F/dt = 200 A/µs V_R = 100 V	-	21	-	
		T_J = 125 °C		-	26	-	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	2.7	-	A
		T_J = 125 °C		-	3.4	-	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	28	-	nC
		T_J = 125 °C		-	43	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-65	-	175	°C
Thermal resistance, junction to case	R_{thJC} (1)		-	-	17	°C/W
Thermal resistance, junction to ambient	R_{thJA} (1)		-	-	80	
Approximate Weight			0.1			g
			0.003			oz.
Marking device		Case style DO-214AA (SMB)	2H2			

Note

(1) Units mounted on PCB 6 mm x 3.5 mm land areas

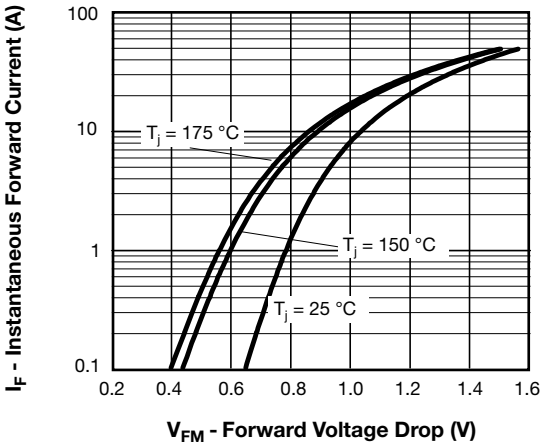


Fig. 1 - Typical Forward Voltage Drop Characteristics

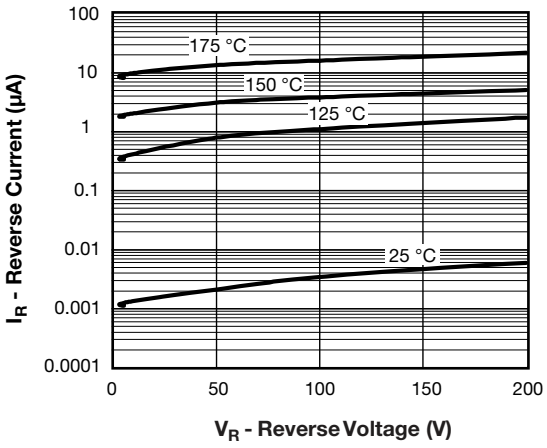


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

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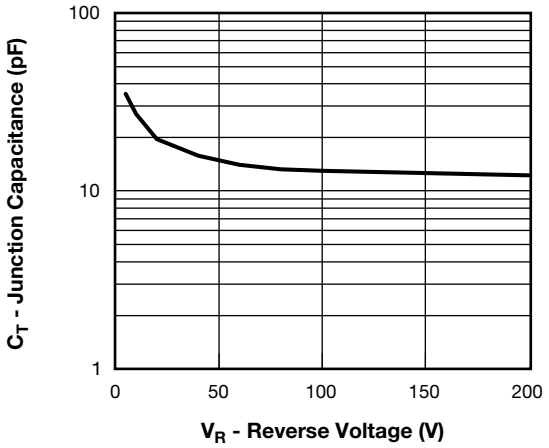


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

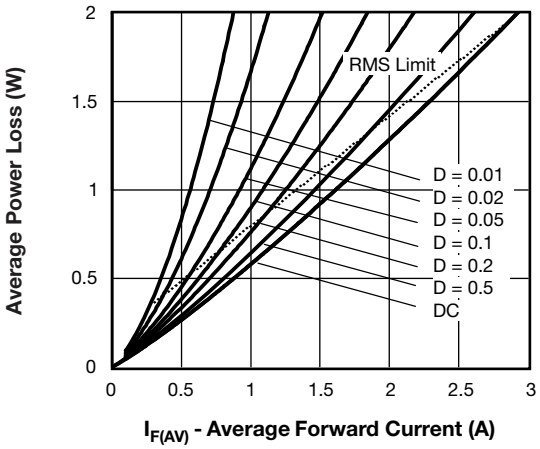


Fig. 5 - Forward Power Loss Characteristics

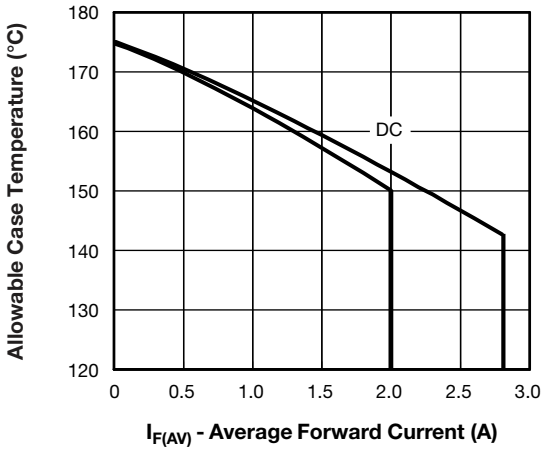


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

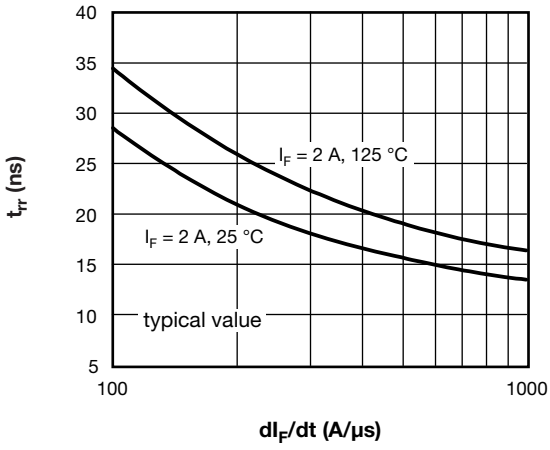


Fig. 6 - Typical Reverse Recovery vs. dI_F/dt

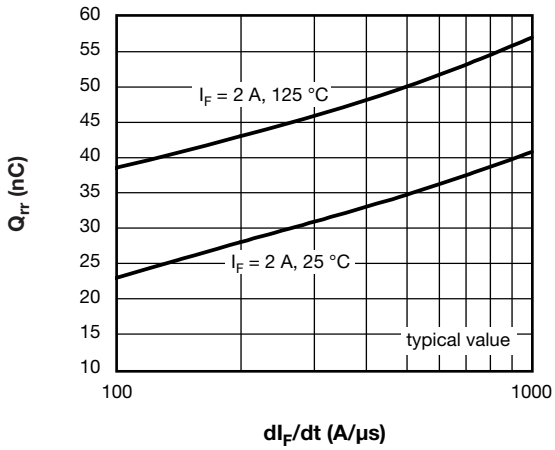
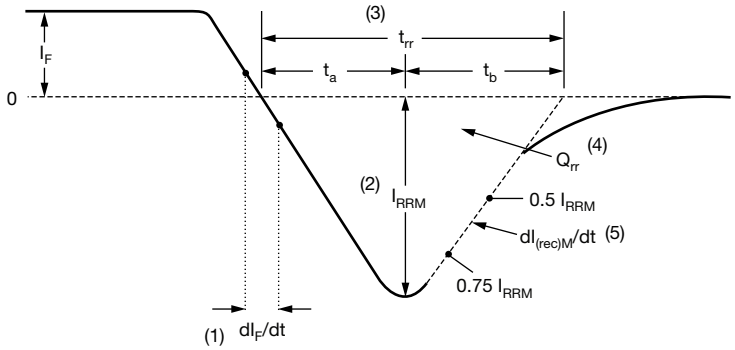


Fig. 7 - Typical Stored Charge vs. dI_F/dt

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(1) dI_F/dt - rate of change of current through zero crossing

(2) I_{RRM} - peak reverse recovery current

(3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through 0.75 I_{RRM} and 0.50 I_{RRM} extrapolated to zero current.

(4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}

$$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$

(5) $dI_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 8 - Reverse Recovery Waveform and Definitions

ORDERING INFORMATION (Example)			
PREFERRED P/N	**PACKAGE CODE**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-2EGH02HM3/5BT	5BT	3200	13"diameter plastic tape and reel
VS-2EGH02HM3_A/I	I	3200	13"diameter plastic tape and reel

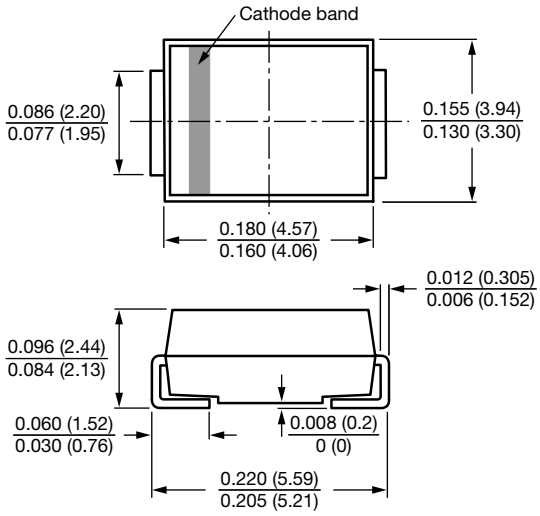
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95401
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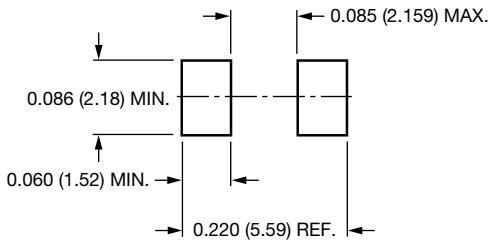
SMB

DIMENSIONS in inches (millimeters)

DO-214AA (SMB)



Mounting Pad Layout



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