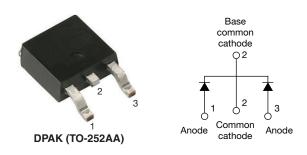
Vishay Semiconductors

FREE



Hyperfast Rectifier, 2 x 5 A FRED Pt[®]



PRIMARY CHARACTERISTICS									
I _{F(AV)}	2 x 5 A								
V _R	200 V								
V _F at I _F	0.74 V								
t _{rr} (typ.)	23 ns								
T _J max.	175 °C								
Package	DPAK (TO-252AA)								
Circuit configuration	Common cathode								

FEATURES

- Hyperfast recovery time
- 175 °C max. operating junction temperature
- Output rectification freewheeling
- Low forward voltage drop reduced Q_{rr} and soft recovery
 Low lookage ourrept
 Halogen
 Halogen
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION / APPLICATIONS

State of the art hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, hyperfast recovery time, and soft 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 PFC boost stage in the AC/DC section of SMPS 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 and snubbers.

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 _C = 160 °C	10	٨						
Non-repetitive peak surge current	I _{FSM}	$T_J = 25 \ ^{\circ}C$	80	A						
Operating junction and storage temperatures	T _J , T _{Stg}		-65 to +175	°C						

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	-	-					
Forward voltage		I _F = 5 A	-	0.90	0.98	.,				
	V _F	I _F = 10 A	-	0.98	1.15	V				
		I _F = 5 A, T _J = 150 °C - 0			0.84					
		I _F = 10 A, T _J = 150 °C	-	0.84	1.05	1				
	I _R	V _R = V _R rated	-	-	4					
Reverse leakage current per leg		$T_J = 125 \text{ °C}, V_R = V_R \text{ rated}$	-	-	40	μA				
		$T_J = 150 \text{ °C}, V_R = V_R \text{ rated}$	-	-	80					
Junction capacitance per leg	C _T	V _R = 200 V	-	17	-	pF				
Series inductance	L _S	Measured lead to lead 5 mm from package body	-	8	-	nH				

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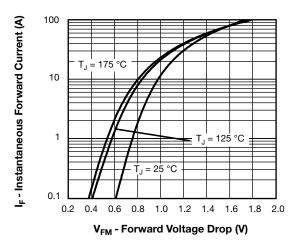


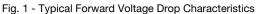
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DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25 \text{ °C}$ unless otherwise specified)											
PARAMETER	SYMBOL	TEST C	ONDITIONS	MIN.	TYP.	MAX.	UNITS				
		$I_F = 1 \text{ A}, \text{ d}I_F/\text{d}t =$	= 100 A/µs, V _R = 30 V	-	23	27					
Reverse recovery time	t _{rr}	T _J = 25 °C		-	21	-	ns				
		T _J = 125 °C		-	26	-					
Peak recovery current	I _{RRM}	T _J = 25 °C	$I_{\rm F} = 5 {\rm A}$	-	2	-	А				
		T _J = 125 °C	dl _F /dt = 200 A/µs V _B = 160 V	-	3.1	-	~				
Reverse recovery charge	0	T _J = 25 °C		-	20	-	nC				
neverse recovery charge	Q _{rr}	T _J = 125 °C		-	41	-	nc				

THERMAL - MECHANICAL SPECIFICATIONS											
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS				
Maximum junction and storage tempe	T _J , T _{Stg}		-65	-	175	°C					
Thermal registered, junction to eace	per leg	R _{thJC}		-	2.7	3.2	°C/W				
Thermal resistance, junction to case	per device			-	1.35	1.6					
Approximate weight					0.3		g				
				0.01			oz.				
Marking device			Case style DPAK (TO-252AA)	10CWH02FN							





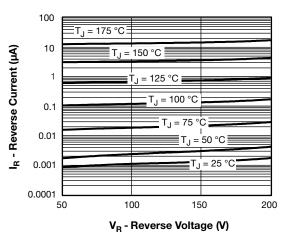


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

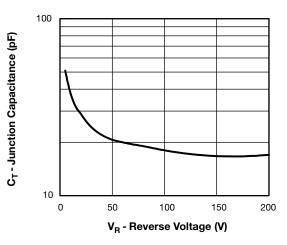


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

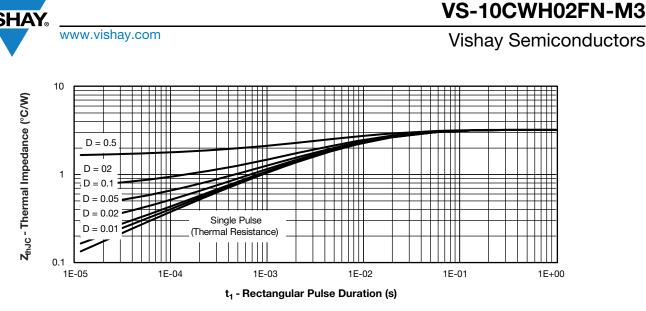


Fig. 4 - Maximum Thermal Impedance ZthJC Characteristics

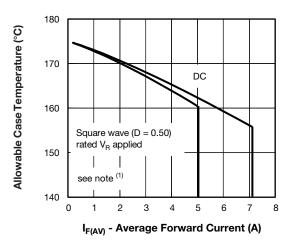


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

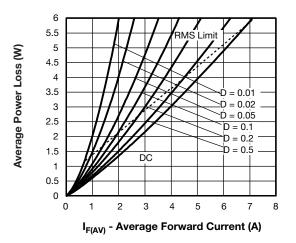


Fig. 6 - Forward Power Loss Characteristics

Note

⁽¹⁾ Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

 $Pd = forward power loss = I_{F(AV)} \times V_{FM} at (I_{F(AV)}/D)$ (see fig. 6); Pd_{REV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

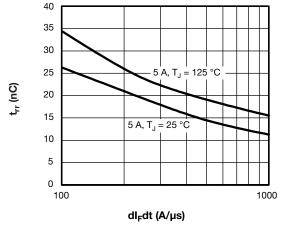


Fig. 7 - Typical Reverse Recovery Time vs. dl_F/dt

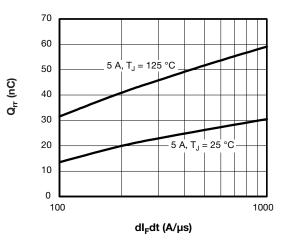


Fig. 8 - Typical Stored Charge vs. dl_F/dt

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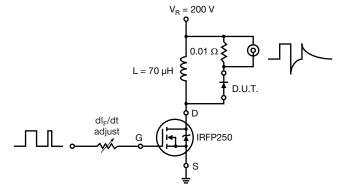


Fig. 9 - Reverse Recovery Parameter Test Circuit

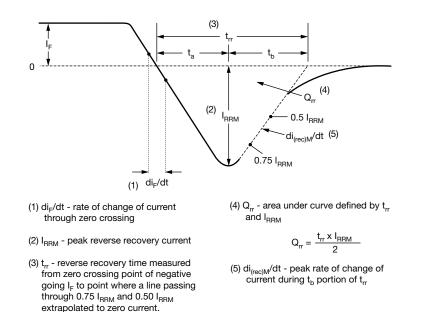


Fig. 10 - Reverse Recovery Waveform and Definitions

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Device code	VS-	10	С	w	н	02	FN	TRL	-M3
	1	2	3	4	5	6	7	8	9
	1	- Visl	hay Sen	nicondu	ctors pro	oduct			
	2	- Cur	rent rati	ng (10 =	= 10 A)				
	3	- Circ	cuit conf	iguratio	n:				
		C = common cathode							
	4	- Pac	kage id	entifier:					
		W =	D-PAK	C					
	5	- H=	hyperfa	ast recov	/ery				
	6	- Vol	tage rati	ing (02 =	= 200 V))			
	7	- FN	= TO-2	52AA					
	8	- • N	one = tı	ıbe					
		• T	R = tape	e and re	el				
		• T	RL = tap	be and r	eel (left	orienteo	d)		
		• TI	RR = ta	pe and r	eel (righ	nt orient	ed)		
	9	- Env	vironmer	ntal digit	:				
		-M3	3 = halog	gen-free	, RoHS-	-complia	ant and	termina	tions le

ORDERING INFORMATION (Example)									
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION							
VS-10CWH02FN-M3	75	Antistatic plastic tube							
VS-10CWH02FNTR-M3	2000	13" diameter reel							
VS-10CWH02FNTRL-M3	3000	13" diameter reel							
VS-10CWH02FNTRR-M3	3000	13" diameter reel							

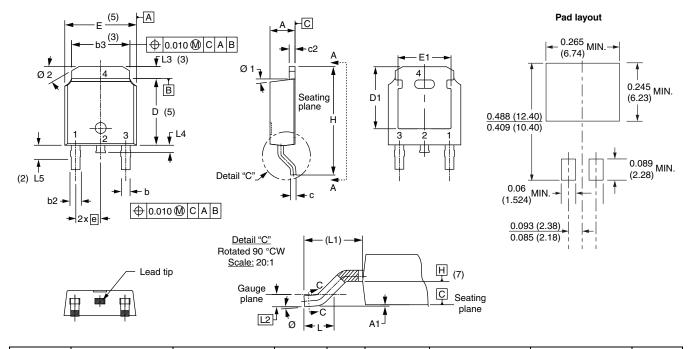
LINKS TO RELATED DOCUMENTS									
Dimensions	www.vishay.com/doc?95627								
Part marking information	www.vishay.com/doc?95176								
Packaging information	www.vishay.com/doc?95033								
SPICE model	www.vishay.com/doc?95376								





D-PAK (TO-252AA) "M"

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INC	INCHES		NOTES		MILLIN	IETERS	INC	HES	NOTES
STWIDOL	MIN.	MAX.	MIN.	MAX.	NOTES		SYMBOL	MIN.	MAX.	MIN.	MAX.	NOTES
А	2.18	2.39	0.086	0.094			е	2.29	BSC	0.090	BSC	
A1	-	0.13	-	0.005			Н	9.40	10.41	0.370	0.410	
b	0.64	0.89	0.025	0.035			L	1.40	1.78	0.055	0.070	
b2	0.76	1.14	0.030	0.045			L1	2.74	BSC	0.108	REF.	
b3	4.95	5.46	0.195	0.215	3		L2	0.51 BSC		0.020 BSC		
С	0.46	0.61	0.018	0.024			L3	0.89	1.27	0.035	0.050	3
c2	0.46	0.89	0.018	0.035			L4	-	1.02	-	0.040	
D	5.97	6.22	0.235	0.245	5		L5	1.14	1.52	0.045	0.060	2
D1	5.21	-	0.205	-	3		Ø	0°	10°	0°	10°	
E	6.35	6.73	0.250	0.265	5		Ø1	0°	15°	0°	15°	
E1	4.32	-	0.170	-	3		Ø2	25°	35°	25°	35°	

Notes

⁽¹⁾ Dimensioning and tolerancing as per ASME Y14.5M-1994

⁽²⁾ Lead dimension uncontrolled in L5

⁽³⁾ Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad

(4) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip

(5) Dimension D, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body

⁽⁶⁾ Dimension b1 and c1 applied to base metal only

⁽⁷⁾ Datum A and B to be determined at datum plane H

⁽⁸⁾ Outline conforms to JEDEC[®] outline TO-252AA

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Revision: 01-Jan-2025