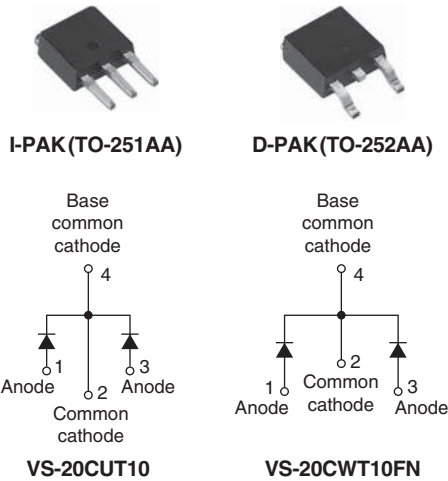




**THE DATASHEET OF
20CWT10FNTRL**



High Performance Schottky Generation 5.0, 2 x 10 A



FEATURES

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized V_F vs. I_R trade off for high efficiency
- Increased ruggedness for reverse avalanche capability
- RBSOA available
- Negligible switching losses
- Submicron trench technology
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT

APPLICATIONS

- High efficiency SMPS
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- DC/DC systems
- Increased power density systems

PRODUCT SUMMARY	
Package	D-PAK (TO-252AA), I-PAK (TO-251AA)
$I_{F(AV)}$	2 x 10 A
V_R	100 V
V_F at I_F	0.66 V
I_{RM} max.	4 mA at 125 °C
T_J max.	175 °C
Diode variation	Common cathode
E_{AS}	54 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		100	V
V_F	10 Apk, $T_J = 125$ °C (typical, per leg)	0.615	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VS-20CUT10 VS-20CWT10FN	UNITS
Maximum DC reverse voltage	V_R	$T_J = 25$ °C	100	V



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_C = 159^\circ\text{C}$, rectangular waveform		10	A
				20	
Maximum peak one cycle non-repetitive surge current per leg	I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	610	A
		10 ms sine or 6 ms rect. pulse		110	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25^\circ\text{C}$, $I_{AS} = 3\text{ A}$, $L = 12\text{ mH}$		54	mJ
Repetitive avalanche current per leg	I_{AR}	Limited by frequency of operation and time pulse duration so that $T_J < T_{J\text{ max}}$. I_{AS} at $T_{J\text{ max}}$. as a function of time pulse (see fig. 8)		I_{AS} at $T_{J\text{ max}}$.	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop per leg	$V_{FM}^{(1)}$	10 A	$T_J = 25^\circ\text{C}$	0.735	0.810	V
		20 A		0.840	0.890	
		10 A	$T_J = 125^\circ\text{C}$	0.615	0.660	
		20 A		0.730	0.770	
Reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	50	μA
		$T_J = 125^\circ\text{C}$		-	4	mA
Junction capacitance per leg	C_T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25°C		400	-	pF
Series inductance per leg	L_S	Measured lead to lead 5 mm from package body		8.0	-	nH
Maximum voltage rate of change	dV/dt	Rated V_R		-	10 000	V/ μs

Note

(1) Pulse width < 300 μs , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}			- 55 to 175	$^\circ\text{C}$
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation		2	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per device				1	
Typical thermal resistance, case to heatsink	R_{thCS}			0.3	
Approximate weight				0.3	g
				0.01	oz.
Marking device		Case style I-PAK		20CUT10	
		Case style D-PAK		20CWT10FN	

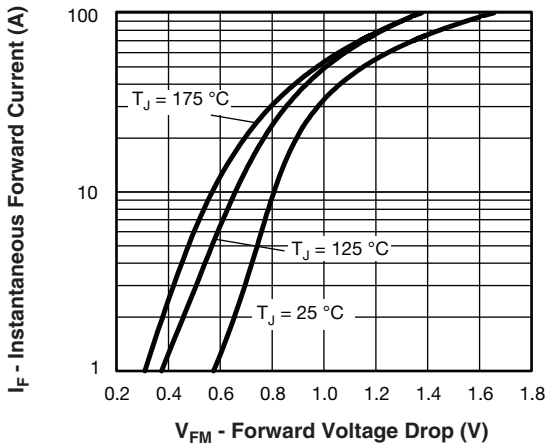


Fig. 1 - Maximum Forward Voltage Drop Characteristics

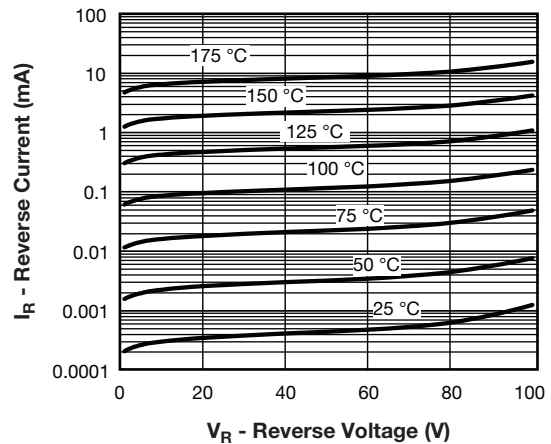


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

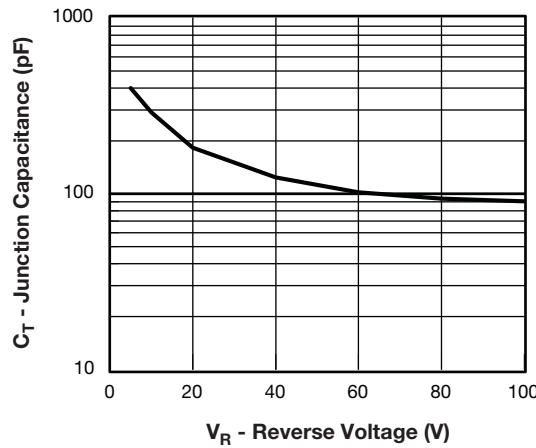


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

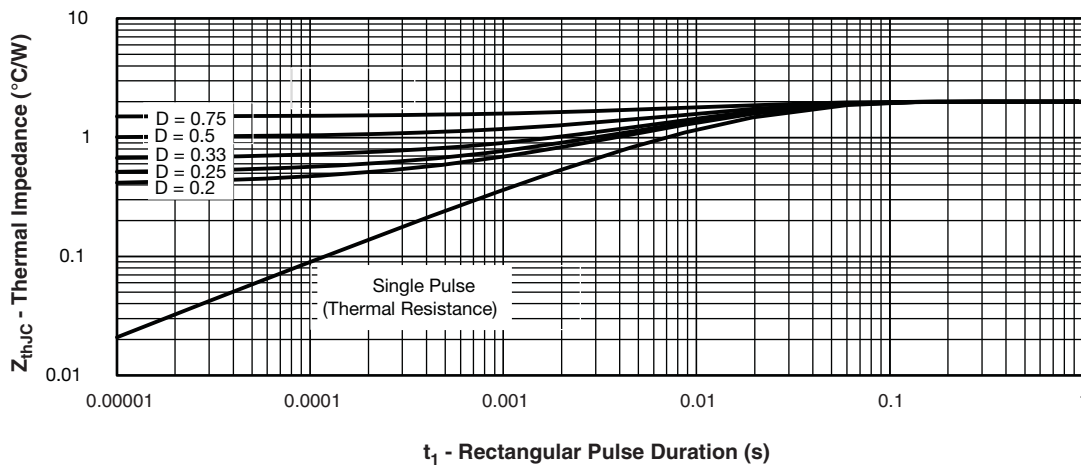


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

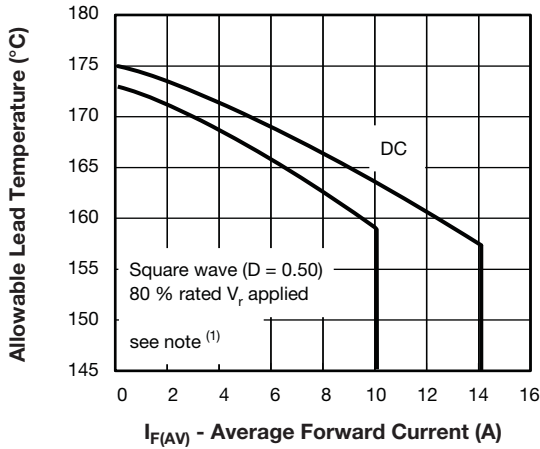


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

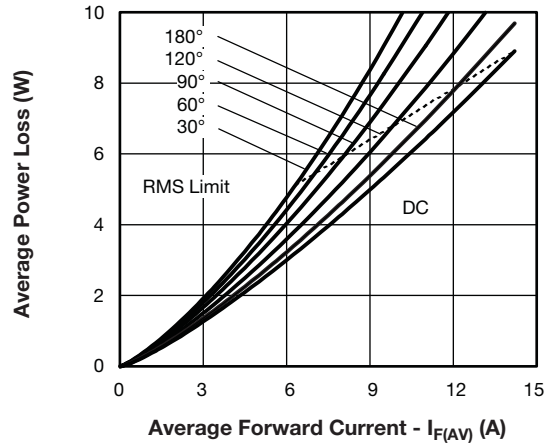


Fig. 6 - Forward Power Loss Characteristics

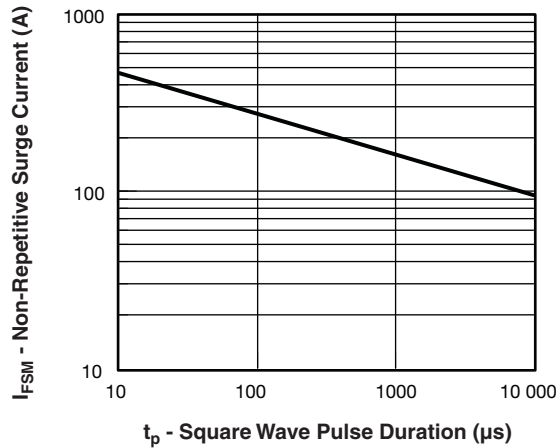


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
- P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
- $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

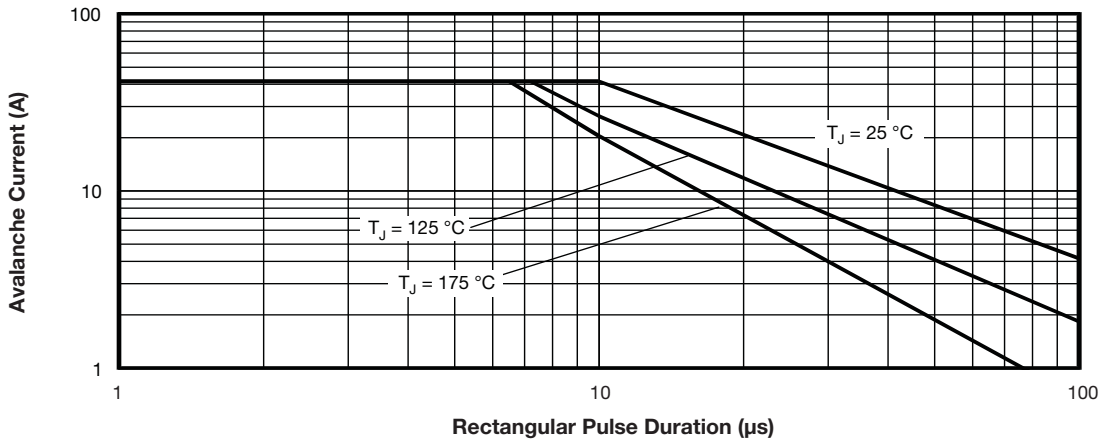


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

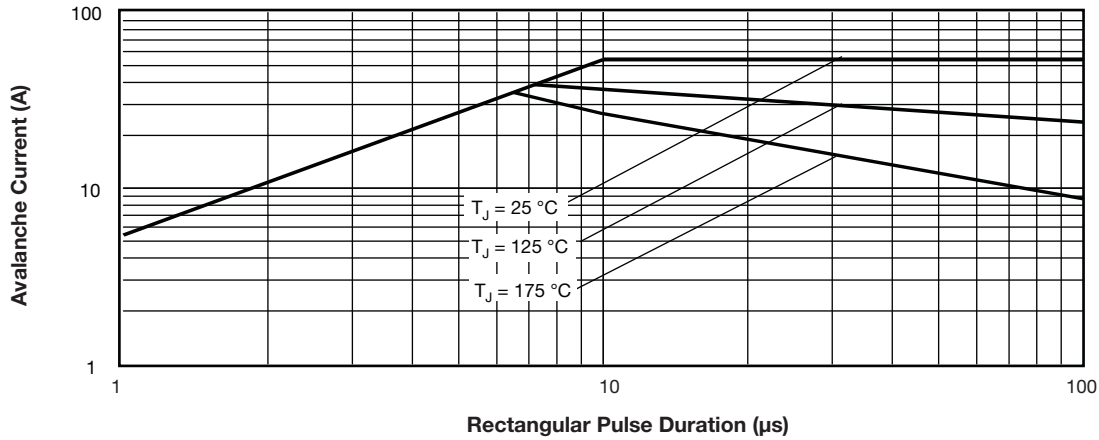


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

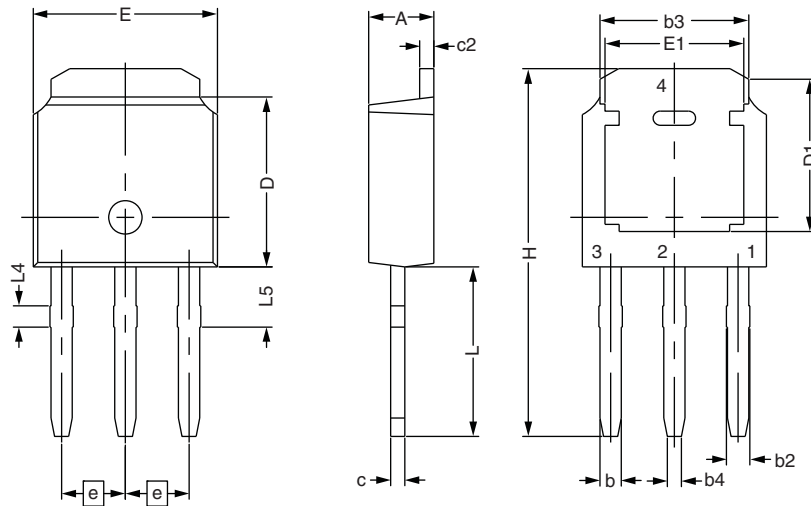
ORDERING INFORMATION TABLE

Device code	VS-	20	C	U	T	10	FN	TRL
	①	②	③	④	⑤	⑥	⑦	⑧
	1	-	Vishay Semiconductors product					
	2	-	Current rating (20 A)					
	3	-	Circuit configuration: C = Common cathode					
	4	-	Package: • U = I-PAK • W = D-PAK					
	5	-	T = Trench					
	6	-	Voltage rating (10 = 100 V)					
	7	-	TO-252AA (D-PAK)					
	8	-	D-PAK, I-PAK: None = Tube (75 pieces) D-PAK only: • TR = Tape and reel • TRL = Tape and reel (left oriented) • TRR = Tape and reel (right oriented)					

LINKS TO RELATED DOCUMENTS		
Dimensions	I-PAK (TO-251AA)	www.vishay.com/doc?95024
	D-PAK (TO-252AA)	www.vishay.com/doc?95448
Part marking information	I-PAK (TO-251AA)	www.vishay.com/doc?95025
	D-PAK (TO-252AA)	www.vishay.com/doc?95059
Packaging information		www.vishay.com/doc?95033
SPIICE model		www.vishay.com/doc?95041

I-PAK - S

DIMENSIONS FOR I-PAK - S in millimeters



SYMBOL	DIMENSIONAL REQUIREMENTS		
	MIN.	NOM.	MAX.
E	6.40	6.60	6.70
L	3.98	4.13	4.28
L4	0.66	0.76	0.86
L5	1.96	2.16	2.36
D	6.00	6.10	6.20
H	11.05	11.25	11.45
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
b4	0.41	0.51	0.61
e	2.286 BSC		
A	2.20	2.30	2.38
c	0.40	0.50	0.60
c2	0.40	0.50	0.60
D1	5.30	-	-
E1	4.40	-	-



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