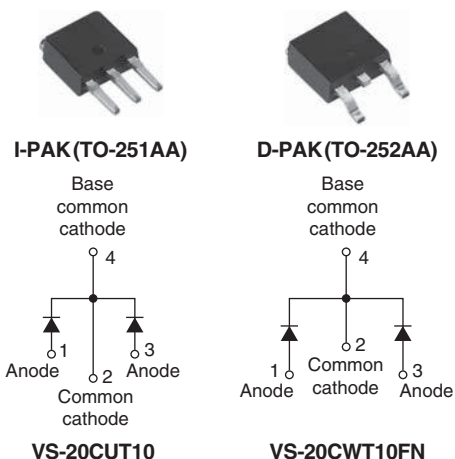


High Performance Schottky Generation 5.0, 2 x 10 A



FEATURES

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized V_F vs. I_F 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 per leg per device	$I_{F(AV)}$	50 % duty cycle at $T_C = 159\text{ }^{\circ}\text{C}$, 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}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_{AS} = 3\text{ A}$, $L = 12\text{ mH}$		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	$T_J = 25\text{ }^{\circ}\text{C}$	0.735	0.810	V
		20 A		0.840	0.890	
		10 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.615	0.660	
		20 A		0.730	0.770	
Reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	-	50	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		-	4	mA
Junction capacitance per leg	C_T	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		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	

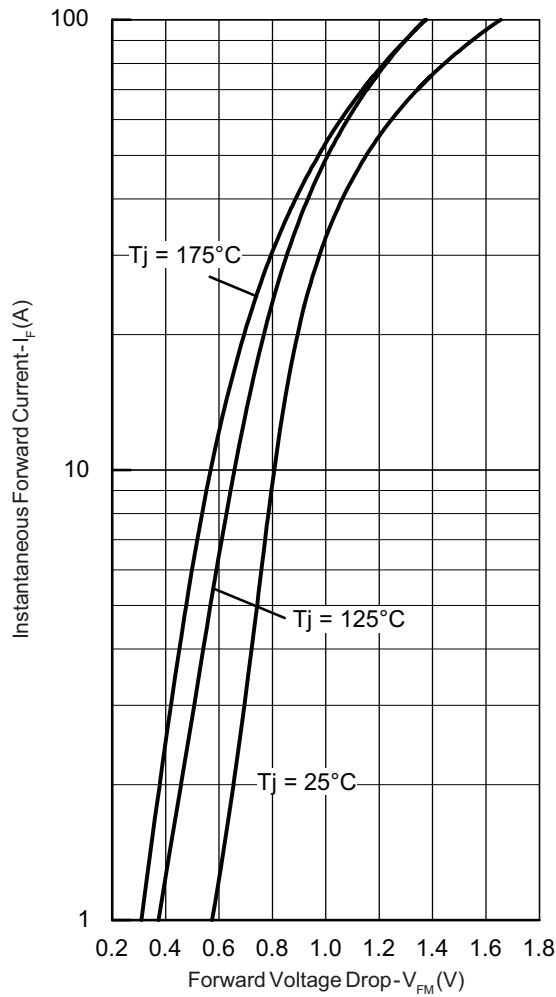


Fig. 1 - Maximum Forward Voltage Drop Characteristics

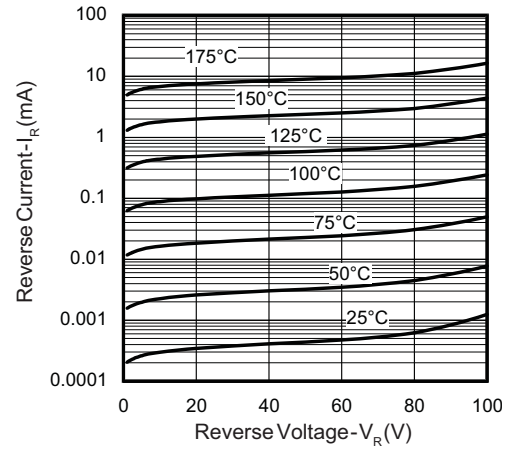


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

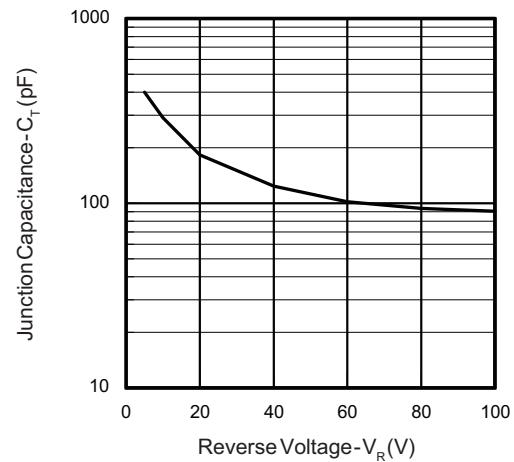


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

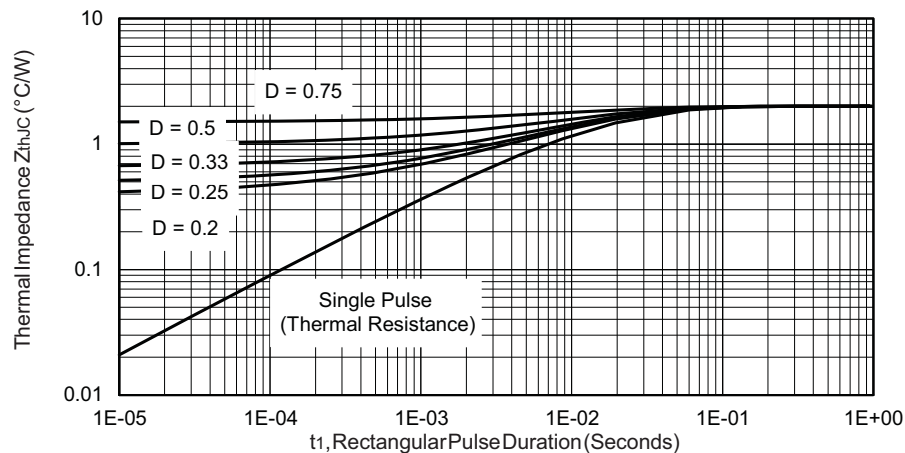


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

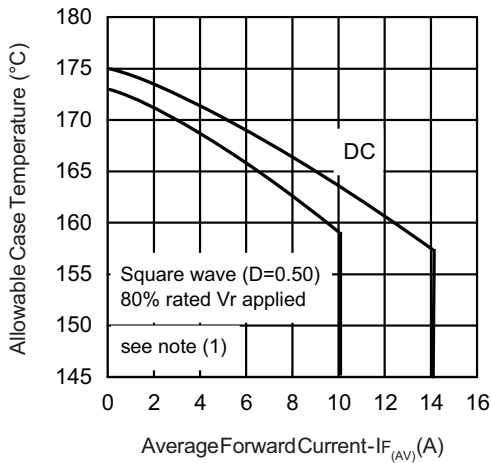


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

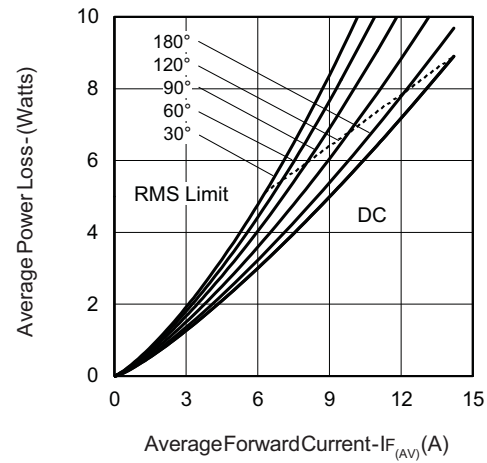


Fig. 6 - Forward Power Loss Characteristics

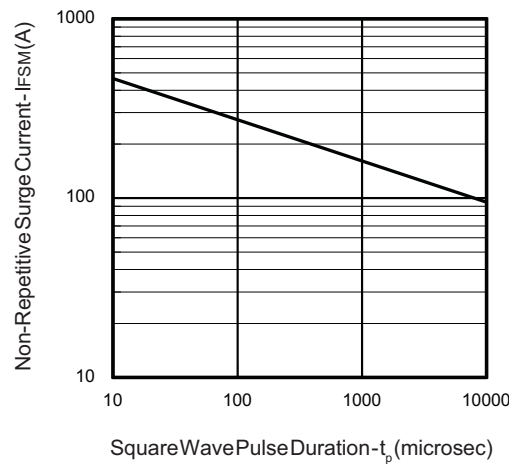


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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

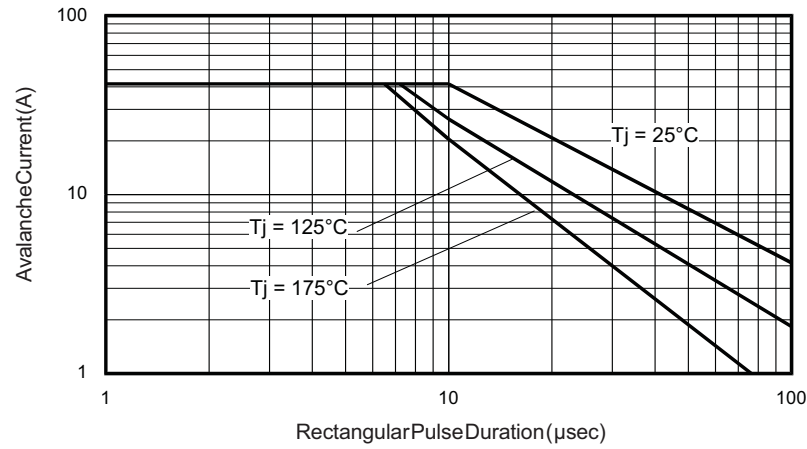


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

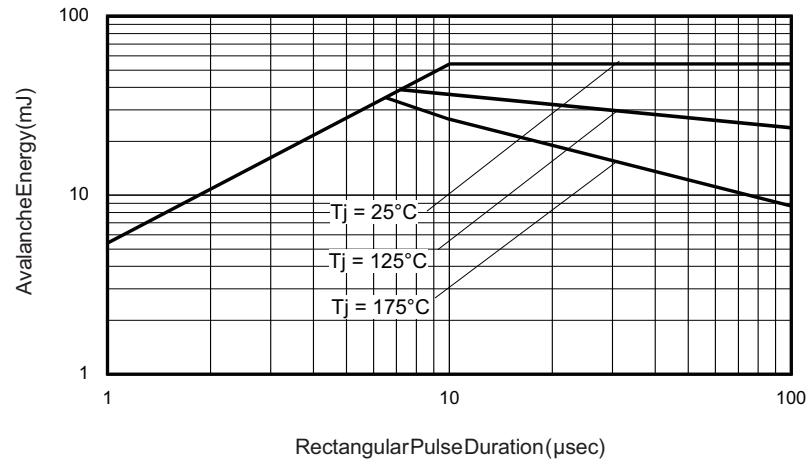


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

VS-20CUT10, VS-20CWT10FN

Vishay Semiconductors

High Performance Schottky
Generation 5.0, 2 x 10 A



ORDERING INFORMATION TABLE

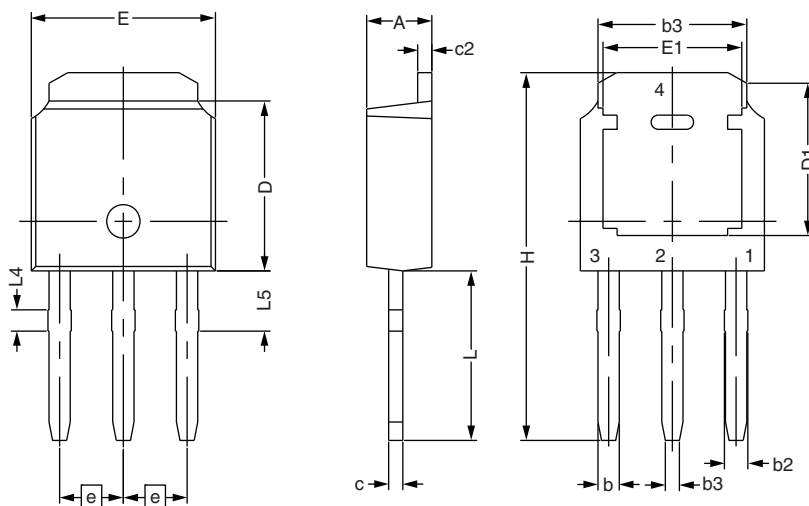
Device code	VS-	20	C	U	T	10	FN	TRL
	1	2	3	4	5	6	7	8

- 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	www.vishay.com/doc?95024
Part marking information	www.vishay.com/doc?95025
Packaging information	www.vishay.com/doc?95033
SPICE model	www.vishay.com/doc?95041

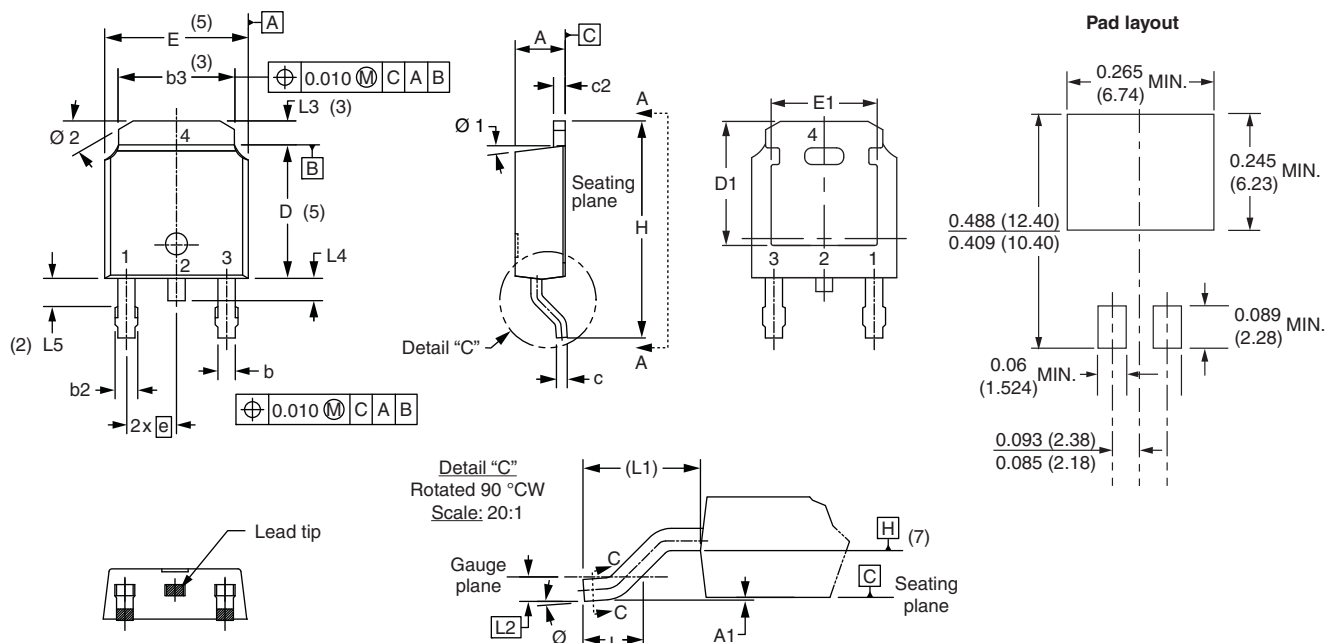
I-PAK - S, D-PAK

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	-	-

DIMENSIONS FOR D-PAK in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094	
A1	-	0.13	-	0.005	
b	0.64	0.89	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	3
c	0.46	0.61	0.018	0.024	
c2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	5
D1	5.21	-	0.205	-	3
E	6.35	6.73	0.250	0.265	5
E1	4.32	-	0.170	-	3

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
e	2.29 BSC		0.090 BSC		
H	9.40	10.41	0.370	0.410	
L	1.40	1.78	0.055	0.070	
L1	2.74 BSC		0.108 REF.		
L2	0.51 BSC		0.020 BSC		
L3	0.89	1.27	0.035	0.050	3
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	2
Ø	0°	10°	0°	10°	
Ø1	0°	15°	0°	15°	
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 0.010") 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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