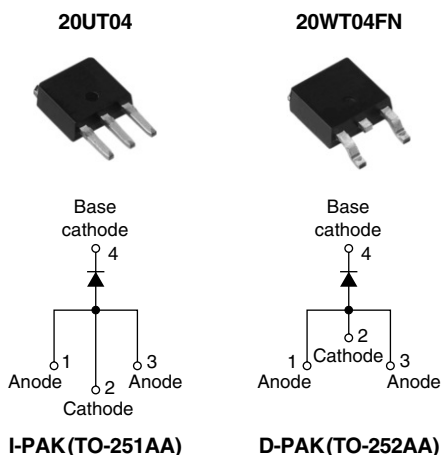


High Performance Schottky Generation 5.0, 20 A



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
- Full lead (Pb)-free and RoHS compliant devices
- Qualified for AEC Q101



RoHS
COMPLIANT

APPLICATIONS

- Specific for PV cells bypass diode
- High efficiency SMPS
- Automotive
- High frequency switching
- Output rectification
- Reverse battery protection
- Freewheeling
- Dc-to-dc systems
- Increased power density systems

PRODUCT SUMMARY

$I_{F(AV)}$	20 A
V_{RRM}	45 V
Maximum V_F at 20 A at 125 °C ⁽¹⁾	0.530 V

Note

⁽¹⁾ Measured connecting 2 anode pins

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		45	V
V_F	20 Apk, $T_J = 125$ °C (typical, measured connecting 2 anode pins)	0.480	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	20UT04 20WT04FN	UNITS
Maximum DC reverse voltage	V_R	$T_J = 25$ °C	45	V



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	I _{F(AV)}	50 % duty cycle at T _C = 153 °C, rectangular waveform		20	A
Maximum peak one cycle non-repetitive surge current	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied ⁽¹⁾	900	A
		10 ms sine or 6 ms rect. pulse		220	
Non-repetitive avalanche energy	E _{AS}	T _J = 25 °C, I _{AS} = 7 A, L = 4.4 mH		108	mJ
Repetitive avalanche current	I _{AR}	Limited by frequency of operation and time pulse duration so that T _J < T _J max. I _{AS} at T _J max. as a function of time pulse		I _{AS} at T _J max.	A

Note⁽¹⁾ Measured connecting 2 anode pins

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop	$V_{\text{FM}}^{(1, 2)}$	10 A	$T_{\text{J}} = 25\text{ }^{\circ}\text{C}$	0.505	0.540	V
		20 A		0.570	0.610	
		10 A	$T_{\text{J}} = 125\text{ }^{\circ}\text{C}$	0.415	0.450	
		20 A		0.520	0.580	
Reverse leakage current	$I_{\text{RM}}^{(1)}$	$T_{\text{J}} = 25\text{ }^{\circ}\text{C}$	$V_{\text{R}} = \text{Rated } V_{\text{R}}$	-	100	μA
		$T_{\text{J}} = 125\text{ }^{\circ}\text{C}$		-	7	mA
Junction capacitance	C_{T}	$V_{\text{R}} = 5\text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		1900	-	pF
Series inductance	L_{S}	Measured lead to lead 5 mm from package body		-	-	nH
Maximum voltage rate of change	dV/dt	Rated V_{R}		-	10 000	V/ μs

Notes⁽¹⁾ Pulse width < 300 μs , duty cycle < 2 %⁽²⁾ Only 1 anode pin connected

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	R_{thJC}	DC operation	1.2	$^{\circ}\text{C/W}$
Typical thermal resistance, case to heatsink	R_{thCS}		0.3	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style I-PAK	20UT04	
		Case style D-PAK	20WT04FN	

High Performance
Schottky Generation 5.0, 20 A

Vishay High Power Products

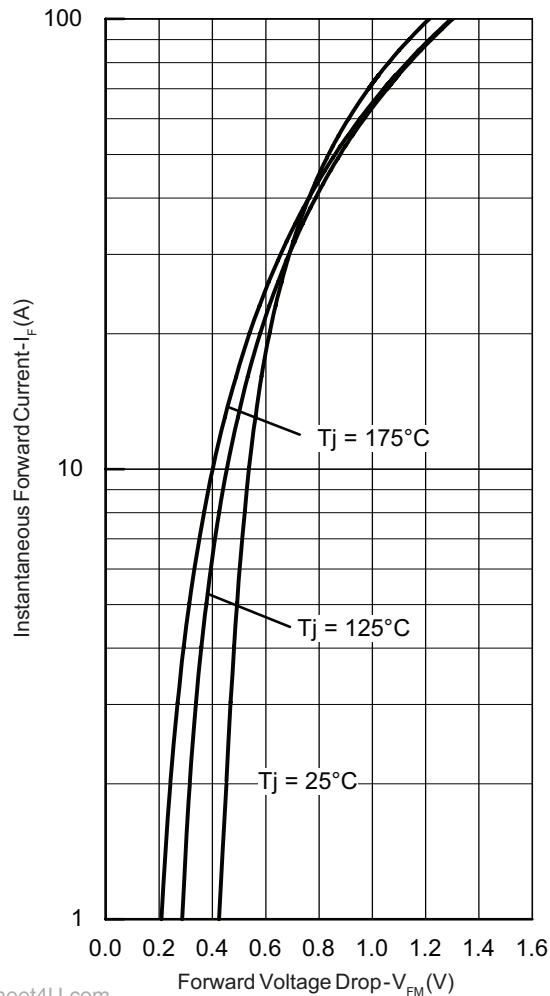


Fig. 1 - Maximum Forward Voltage Drop Characteristics

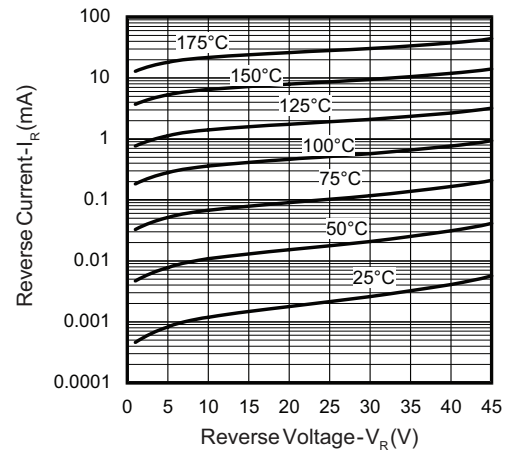


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

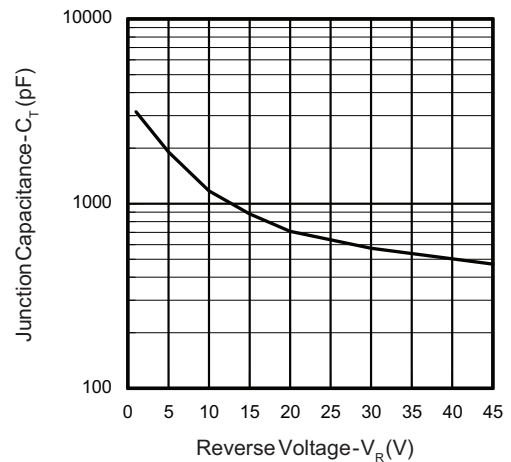


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

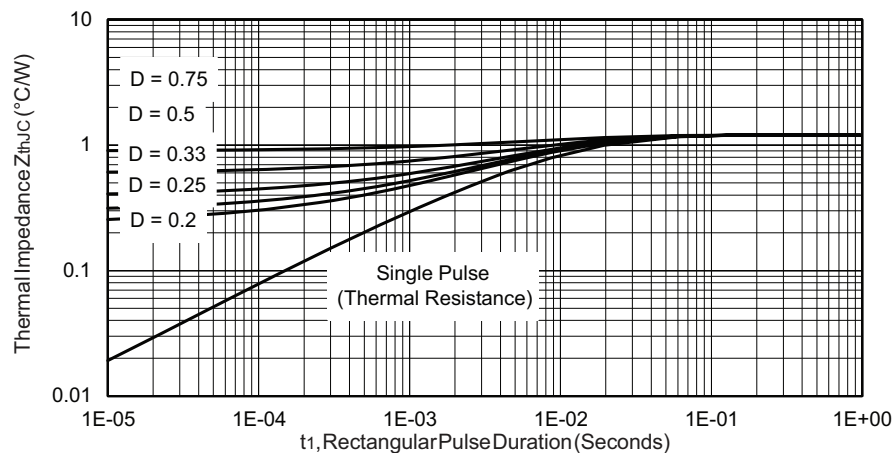


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

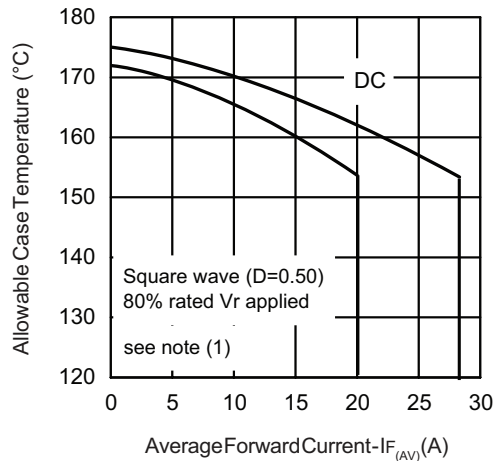


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

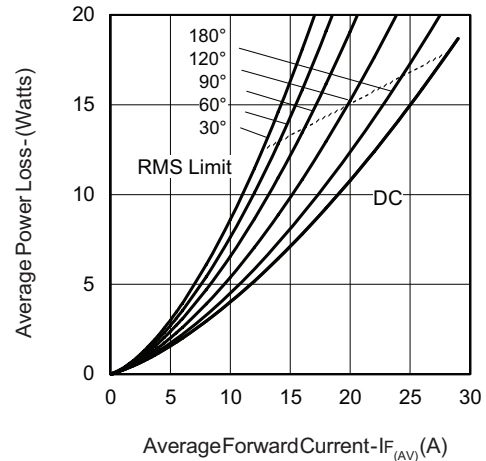


Fig. 6 - Forward Power Loss Characteristics

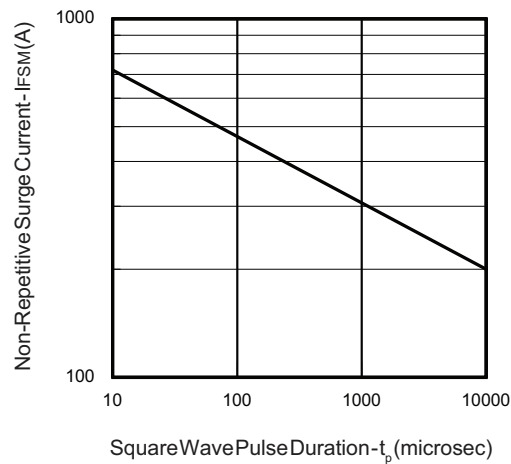


Fig. 7 - Maximum Non-Repetitive Surge Current

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

High Performance Vishay High Power Products
Schottky Generation 5.0, 20 A

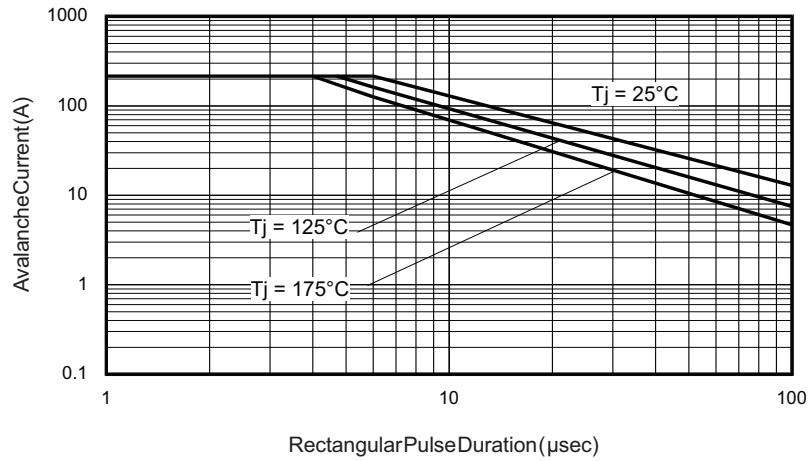


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

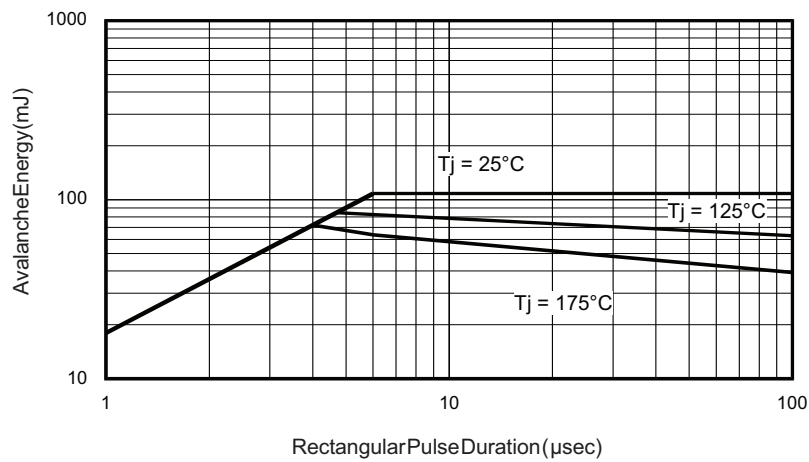


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

20UT04, 20WT04FN

Vishay High Power Products High Performance
Schottky Generation 5.0, 20 A

ORDERING INFORMATION TABLE

Device code	20	U	T	04	FN	TRL
	1	2	3	4	5	6
	1	-	-	-	-	-
	2	-	-	-	-	-
	3	-	-	-	-	-
	4	-	-	-	-	-
	5	-	-	-	-	-
	6	-	-	-	-	-

- 1 - Current rating (20 A)
 - 2 - Package:
 - U = I-PAK
 - W = D-PAK
 - 3 - T = Trench
 - 4 - Voltage code (45 V)
 - 5 - TO-252AA (D-PAK)
 - 6 - 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	http://www.vishay.com/doc?95024
Part marking information	http://www.vishay.com/doc?95025
Packaging information	http://www.vishay.com/doc?95033
SPICE model	http://www.vishay.com/doc?95027



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