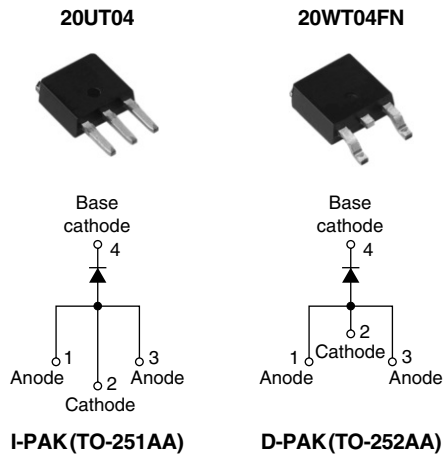


## High Performance Schottky Generation 5.0, 20 A



### FEATURES

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized  $V_F$  vs.  $I_R$  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 <sup>(1)</sup>	0.530 V

**Note**
<sup>(1)</sup> 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 $T_C = 153\text{ }^\circ\text{C}$ , rectangular waveform		20	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied <sup>(1)</sup>	900	A
		10 ms sine or 6 ms rect. pulse		220	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 7\text{ A}$ , $L = 4.4\text{ mH}$		108	mJ
Repetitive avalanche current	$I_{AR}$	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		$I_{AS}$ at $T_J\text{ max.}$	A

**Note**

(1) Measured connecting 2 anode pins

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop	$V_{FM}$ <sup>(1,2)</sup>	10 A	$T_J = 25\text{ }^\circ\text{C}$	0.505	0.540	V
		20 A		0.570	0.610	
		10 A	$T_J = 125\text{ }^\circ\text{C}$	0.415	0.450	
		20 A		0.520	0.580	
Reverse leakage current	$I_{RM}$ <sup>(1)</sup>	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	100	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}$		-	7	mA
Junction capacitance	$C_T$	$V_R = 5\text{ }V_{DC}$ (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/ $\mu\text{s}$

**Notes**(1) Pulse width < 300  $\mu\text{s}$ , 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	

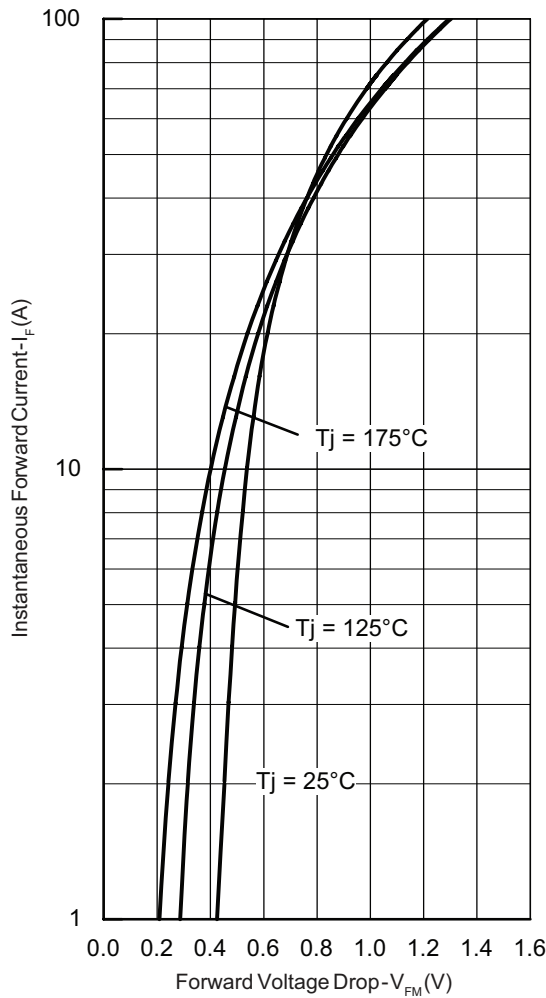


Fig. 1 - Maximum Forward Voltage Drop Characteristics

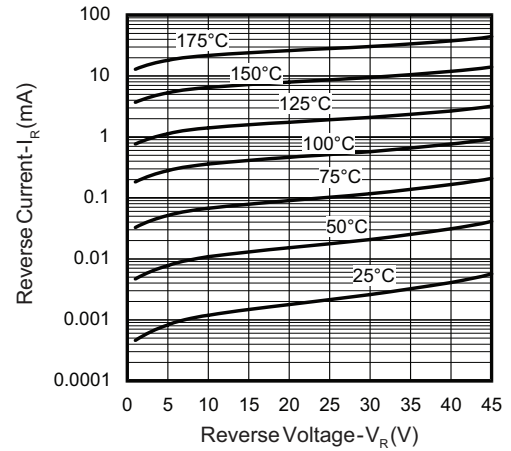


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

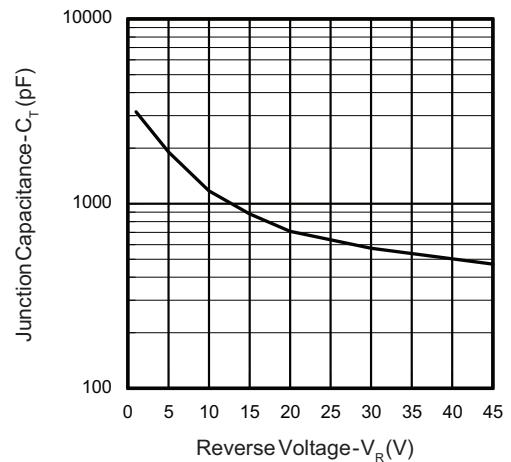


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

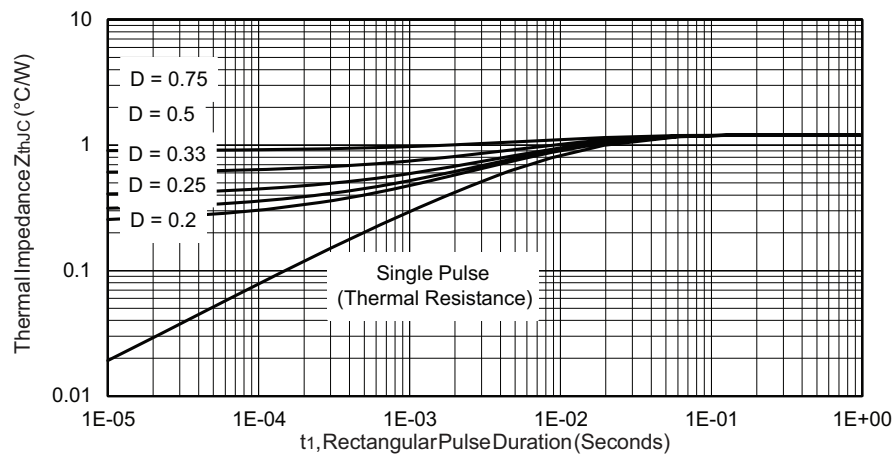


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

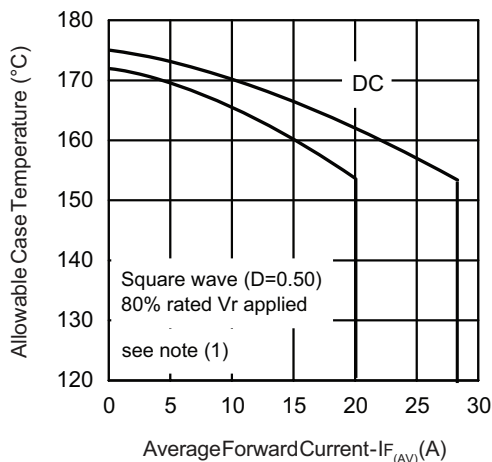


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

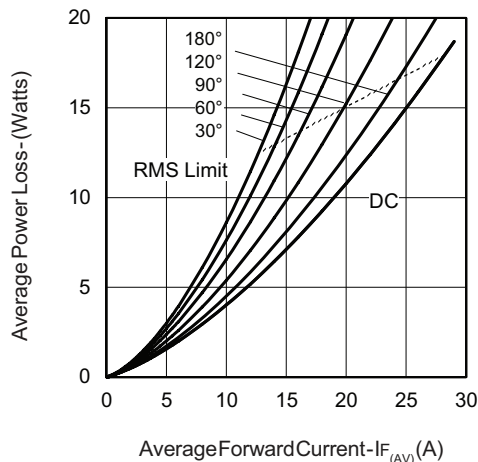


Fig. 6 - Forward Power Loss Characteristics

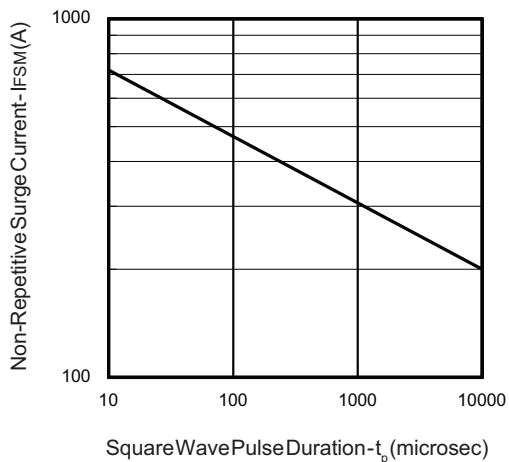


Fig. 7 - Maximum Non-Repetitive Surge Current

**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  $V_R$

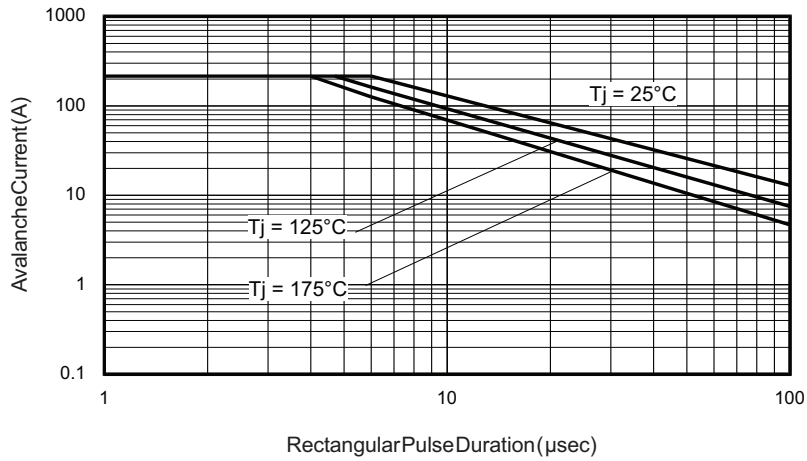


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

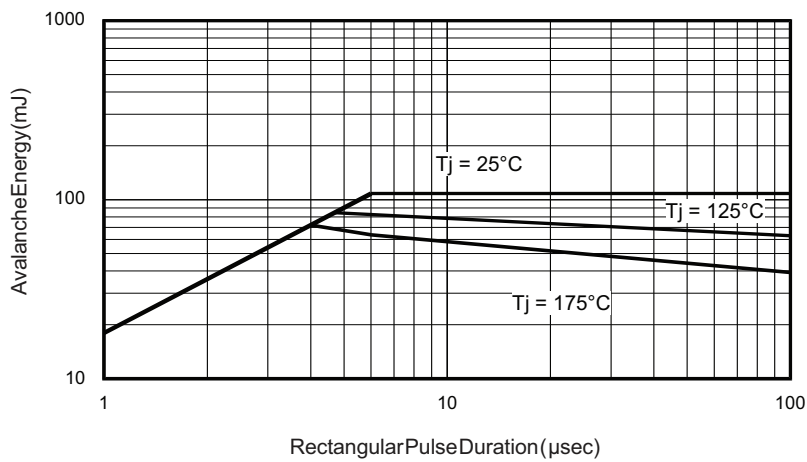
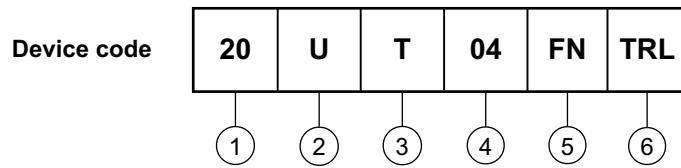


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

## ORDERING INFORMATION TABLE



- 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	<a href="http://www.vishay.com/doc?95024">http://www.vishay.com/doc?95024</a>
Part marking information	<a href="http://www.vishay.com/doc?95025">http://www.vishay.com/doc?95025</a>
Packaging information	<a href="http://www.vishay.com/doc?95033">http://www.vishay.com/doc?95033</a>
SPIICE model	<a href="http://www.vishay.com/doc?95027">http://www.vishay.com/doc?95027</a>



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