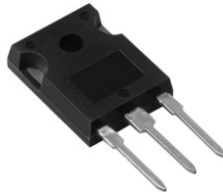
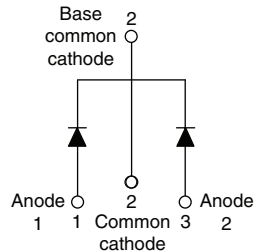


## High Performance Schottky Generation 5.0, 2 x 20 A



TO-247AC



### 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
- Designed and qualified for industrial level


**RoHS  
COMPLIANT**

### APPLICATIONS

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

### PRODUCT SUMMARY

$I_{F(AV)}$	2 x 20 A
$V_R$	100 V
$V_F$ at 20 A at 125 °C	0.61 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_{RRM}$		100	V
$V_F$	20 Apk, $T_J = 125$ °C (typical, per leg)	0.585	
$T_J$	Range	- 55 to 175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	40CPT100	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 $T_C = 156$ °C, rectangular waveform	20	A
			40	
Maximum peak one cycle non-repetitive surge current per leg	$I_{FSM}$	5 $\mu$ s sine or 3 $\mu$ s rect. pulse	2100	
		10 ms sine or 6 ms rect. pulse	300	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 6$ A, $L = 5.6$ mH	101	mJ
Repetitive avalanche current per leg	$I_{AR}$	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 See fig. 8	$I_{AS}$ at $T_J$ max.	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop per leg	$V_{FM}^{(1)}$	20 A	$T_J = 25\text{ }^\circ\text{C}$	0.666	0.78	V
		40 A		0.798	0.86	
		20 A	$T_J = 125\text{ }^\circ\text{C}$	0.585	0.61	
		40 A		0.695	0.72	
Reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	2.1	135	$\mu\text{A}$
		$T_J = 125\text{ }^\circ\text{C}$		3.1	10	mA
Junction capacitance per leg	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C		1100	-	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/ $\mu\text{s}$

**Note**(1) Pulse width < 300  $\mu\text{s}$ , 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	1.25	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per device			0.63	
Typical thermal resistance, case to heatsink	$R_{thCS}$		0.24	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AC	40CPT100	

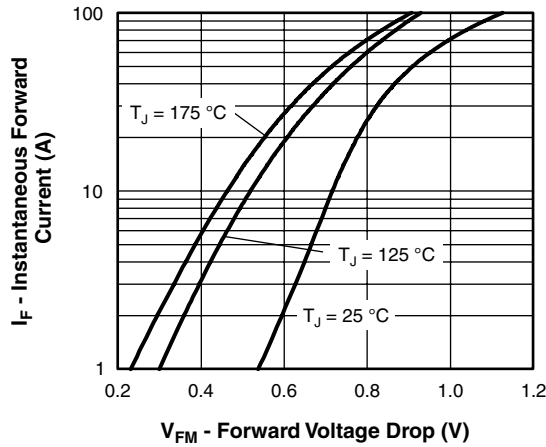


Fig. 1 - Maximum Forward Voltage Drop Characteristics

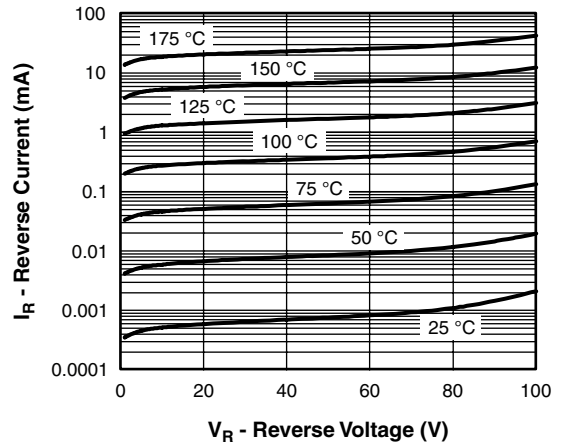


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

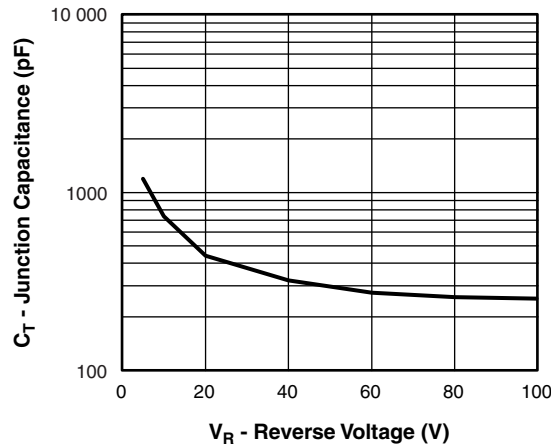


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

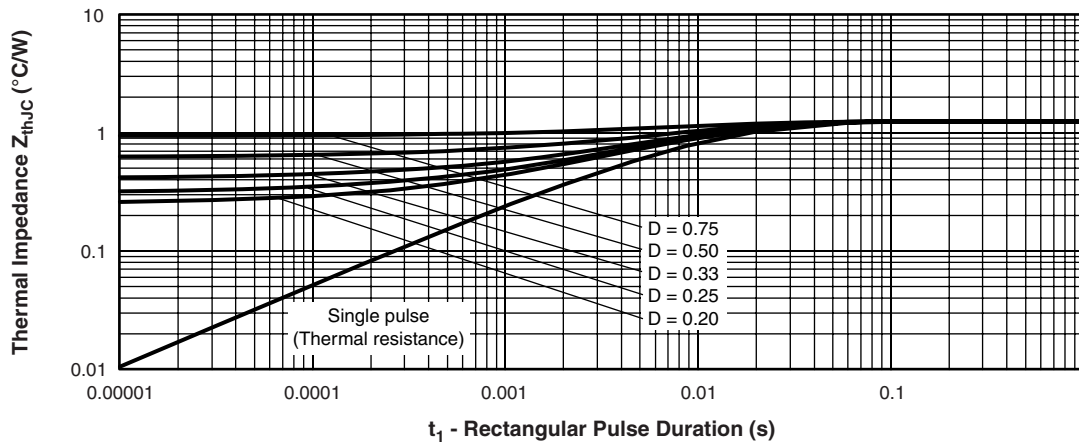


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

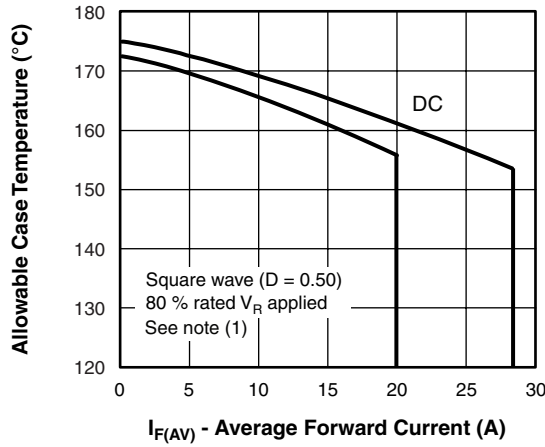


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

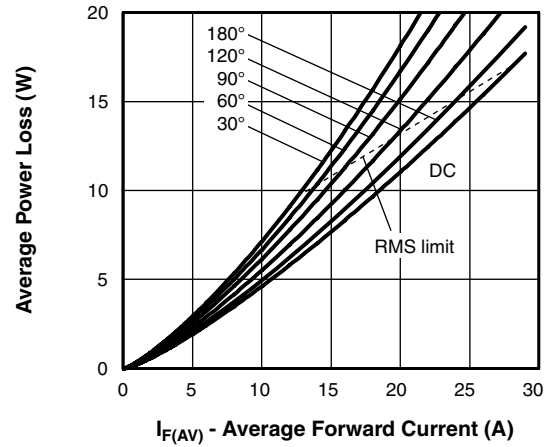


Fig. 6 - Forward Power Loss Characteristics

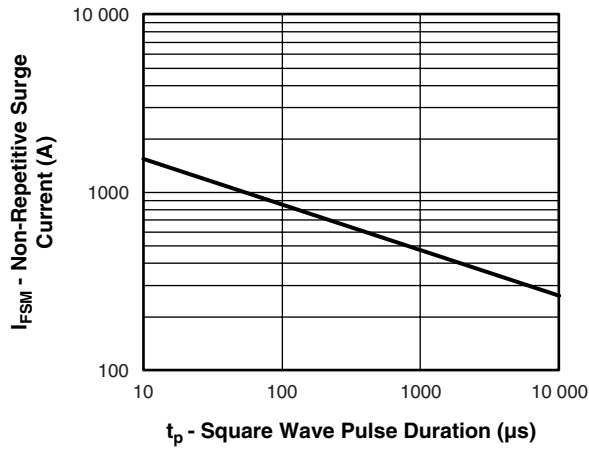


Fig. 7 - Maximum Non-Repetitive Surge Current

**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  $V_R$

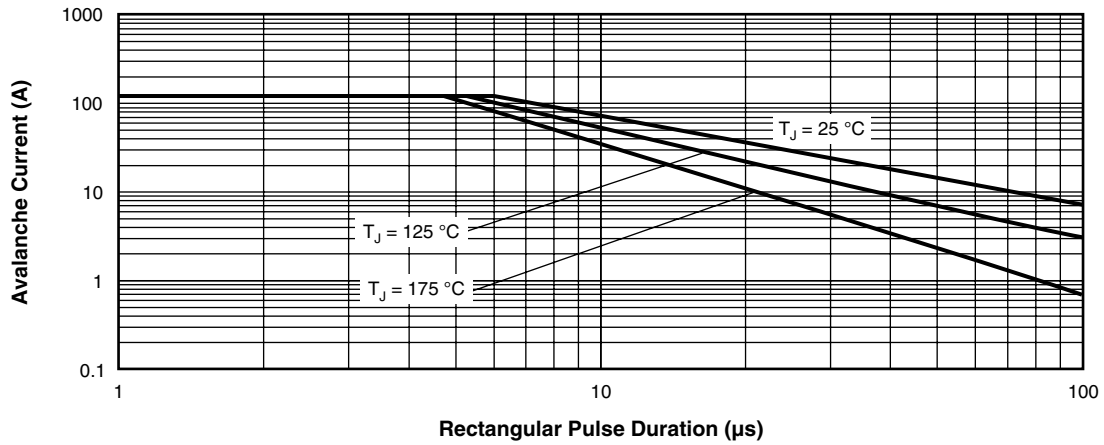


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

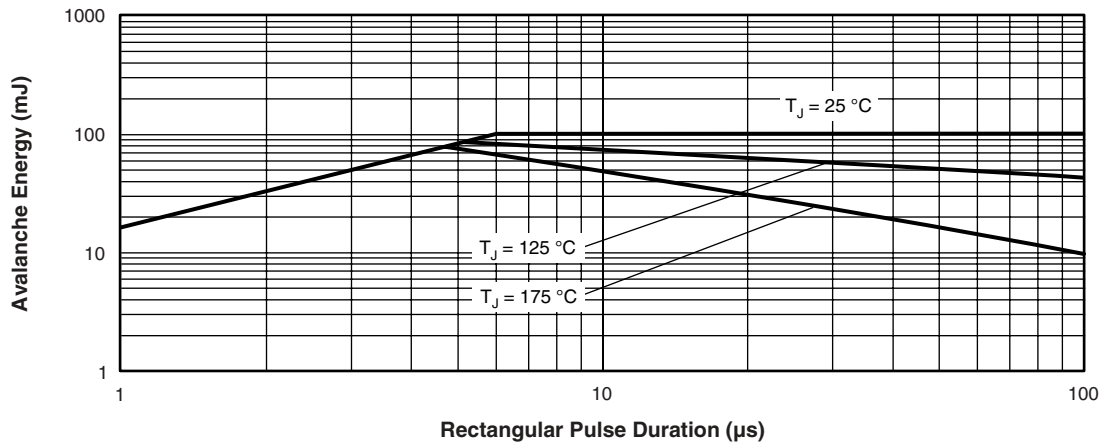


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

# 40CPT100-F



Vishay High Power Products High Performance Schottky  
Generation 5.0, 2 x 20 A

## ORDERING INFORMATION TABLE

Device code	<b>40</b>	<b>C</b>	<b>P</b>	<b>T</b>	<b>100</b>	<b>-</b>	<b>F</b>
	①	②	③	④	⑤		⑥

- 1** - Current rating (40 A)
- 2** - Circuit configuration:  
C = Common cathode
- 3** - Package:  
P = TO-247
- 4** - T = Trench
- 5** - Voltage code (100 = 100 A)
- 6** - F = RoHS compliant and totally lead (Pb)-free

Tube standard pack quantity: 25 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95223">www.vishay.com/doc?95223</a>
Part marking information	<a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a>



**DIMENSIONS** in millimeters and inches



**Lead assignments**

- Diodes**  
 1. - Anode/open  
 2. - Cathode  
 3. - Anode

SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209		D2	0.51	1.30	0.020	0.051	
A1	2.21	2.59	0.087	0.102		E	15.29	15.87	0.602	0.625	3
A2	1.50	2.49	0.059	0.098		E1	13.72	-	0.540	-	
b	0.99	1.40	0.039	0.055		e	5.46 BSC		0.215 BSC		
b1	0.99	1.35	0.039	0.053		FK	2.54		0.010		
b2	1.65	2.39	0.065	0.094		L	14.20	16.10	0.559	0.634	
b3	1.65	2.37	0.065	0.094		L1	3.71	4.29	0.146	0.169	
b4	2.59	3.43	0.102	0.135		N	7.62 BSC		0.3		
b5	2.59	3.38	0.102	0.133		ΦP	3.56	3.66	0.14	0.144	
c	0.38	0.86	0.015	0.034		ΦP1	-	6.98	-	0.275	
c1	0.38	0.76	0.015	0.030		Q	5.31	5.69	0.209	0.224	
D	19.71	20.70	0.776	0.815	3	R	4.52	5.49	1.78	0.216	
D1	13.08	-	0.515	-	4	S	5.51 BSC		0.217 BSC		

**Notes**

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) 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
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c



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