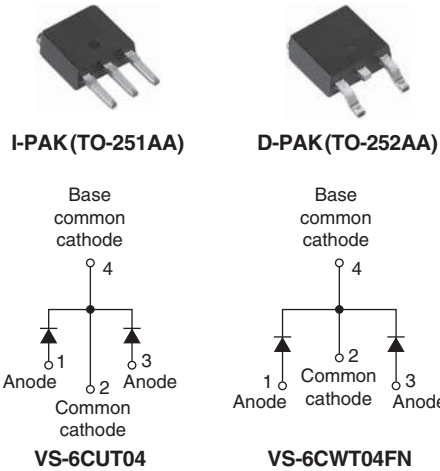


## High Performance Schottky Generation 5.0, 2 x 3 A



### 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

- Specific for PV cells pybass diode
- 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 3 A
$V_R$	45 V
$V_F$ at $I_F$	0.54 V
$I_{RM}$ max.	3 mA at 125 °C
$T_J$ max.	175 °C
Diode variation	Common cathode
$E_{AS}$	14 mJ

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_{RRM}$		45	V
$V_F$	3 Apk, $T_J = 125$ °C (typical, per leg)	0.46	V
$T_J$	Range	- 55 to 175	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VS-6CUT04 VS-6CWT04FN	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 per leg per device	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>C</sub> = 166 °C, rectangular waveform		3	A
				6	
Maximum peak one cycle non-repetitive surge current per leg	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V <sub>RRM</sub> applied	440	A
		10 ms sine or 6 ms rect. pulse		70	
Non-repetitive avalanche energy per leg	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1.3 A, L = 16 mH		14	mJ
Repetitive avalanche current per leg	I <sub>AR</sub>	Limited by frequency of operation and time pulse duration so that T <sub>J</sub> < T <sub>J</sub> max. I <sub>AS</sub> at T <sub>J</sub> max. as a function of time pulse (see fig. 8)		I <sub>AS</sub> at T <sub>J</sub> max.	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop per leg	V <sub>FM</sub> <sup>(1)</sup>	3 A	T <sub>J</sub> = 25 °C	0.535	0.600	V
		6 A		0.615	0.680	
		3 A	T <sub>J</sub> = 125 °C	0.485	0.540	
		6 A		0.570	0.640	
Reverse leakage current per leg	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	-	25	μA
		T <sub>J</sub> = 125 °C		-	3	mA
Junction capacitance per leg	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		240	-	pF
Series inductance per leg	L <sub>S</sub>	Measured lead to lead 5 mm from package body		8.0	-	nH
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		-	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 <sub>J</sub> , T <sub>Stg</sub>			- 55 to 175	°C
Maximum thermal resistance, junction to case per leg	R <sub>thJC</sub>	DC operation		4.7	°C/W
Maximum thermal resistance, junction to case per device				2.35	
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>			0.3	
Approximate weight				0.3	g
				0.01	oz.
Marking device		Case style I-PAK		6CUT04	
		Case style D-PAK		6CWT04FN	

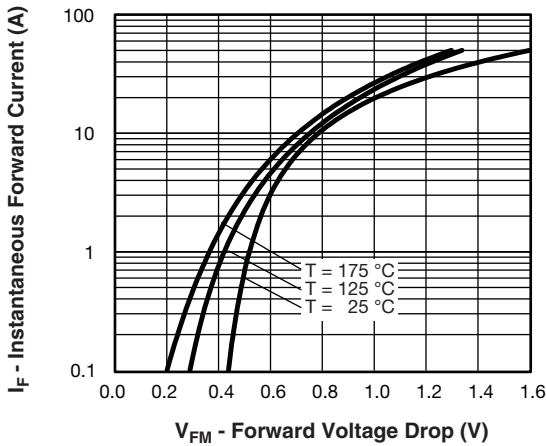


Fig. 1 - Maximum Forward Voltage Drop Characteristics

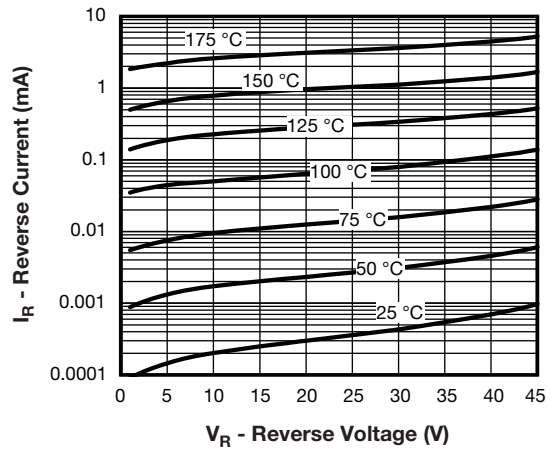


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

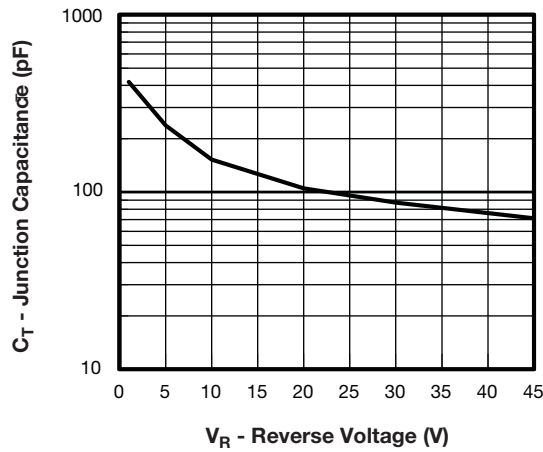


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

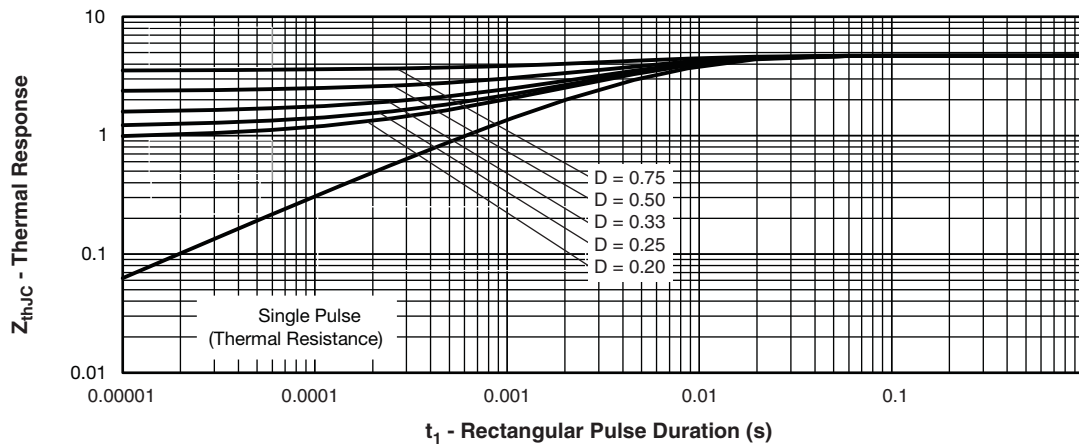


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

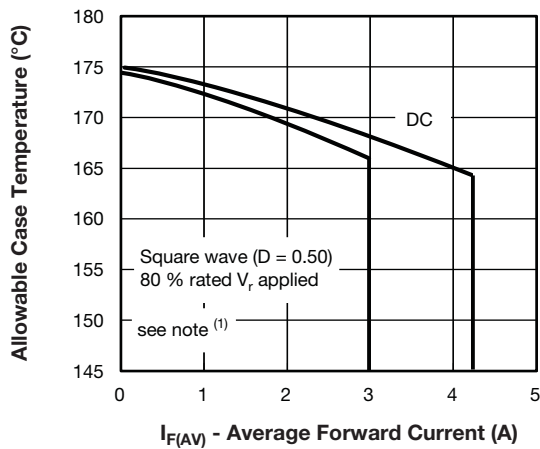


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

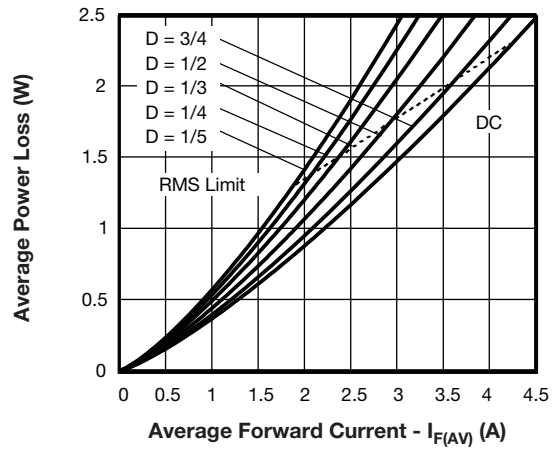


Fig. 6 - Forward Power Loss Characteristics

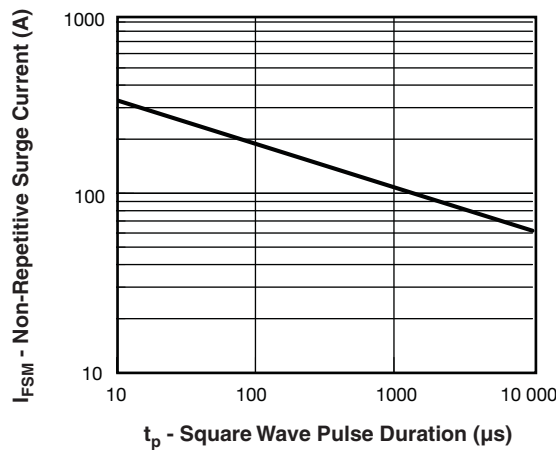


Fig. 7 - Maximum Non-Repetitive Surge Current

**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  $V_R$

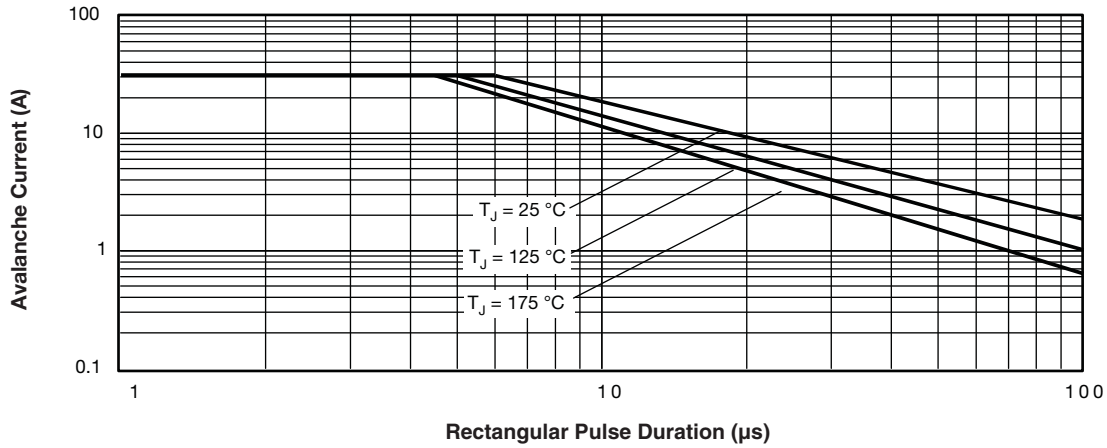


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

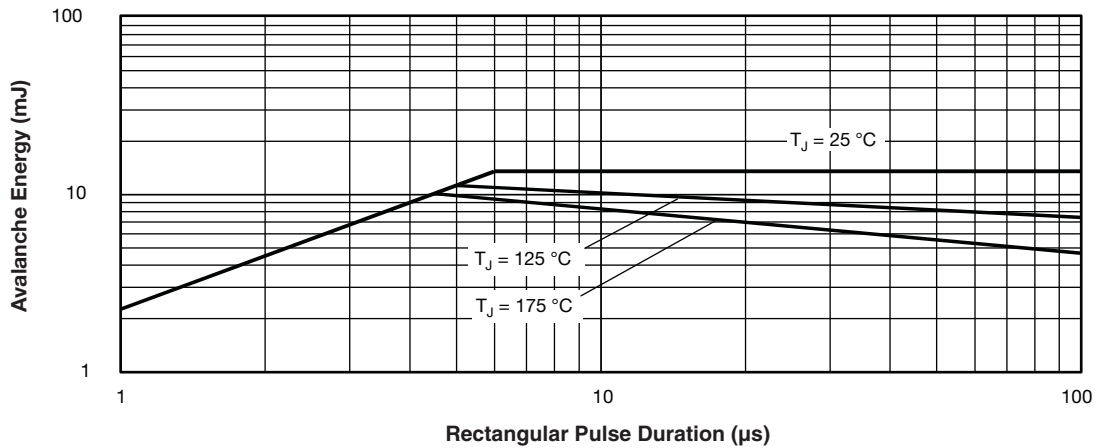
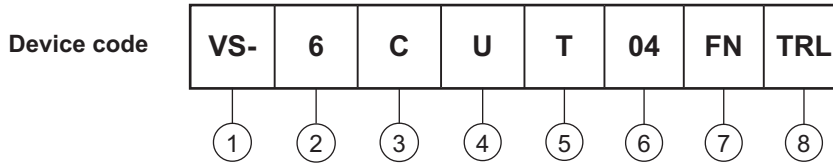


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)



## ORDERING INFORMATION TABLE

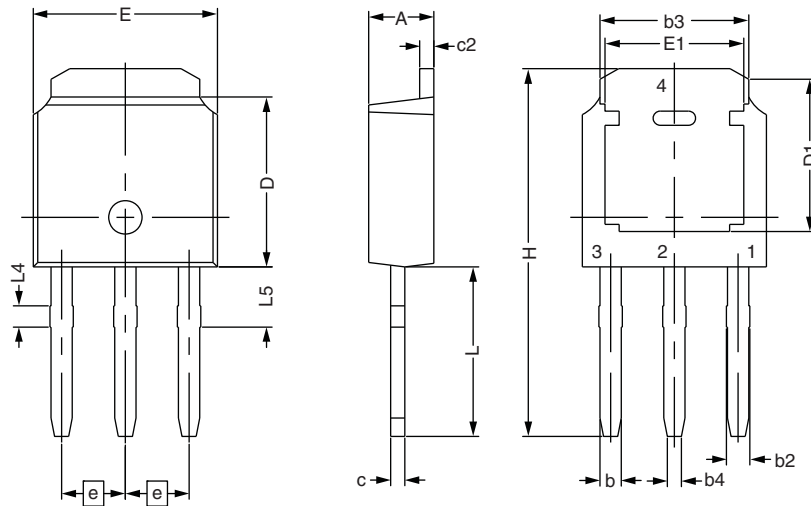


- 1** - Vishay Semiconductors product
- 2** - Current rating (6 A)
- 3** - Circuit configuration:  
C = Common cathode
- 4** - Package:  
• U = I-PAK  
• W = D-PAK
- 5** - T = Trench
- 6** - Voltage rating (04 = 45 V)
- 7** - TO-252AA (D-PAK)
- 8** - D-PAK, I-PAK:  
None = Tube (75 pieces)  
D-PAK only:  
• 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)	<a href="http://www.vishay.com/doc?95024">www.vishay.com/doc?95024</a>
	D-PAK (TO-252AA)	<a href="http://www.vishay.com/doc?95448">www.vishay.com/doc?95448</a>
Part marking information	I-PAK (TO-251AA)	<a href="http://www.vishay.com/doc?95025">www.vishay.com/doc?95025</a>
	D-PAK (TO-252AA)	<a href="http://www.vishay.com/doc?95059">www.vishay.com/doc?95059</a>
Packaging information		<a href="http://www.vishay.com/doc?95033">www.vishay.com/doc?95033</a>
SPIICE model		<a href="http://www.vishay.com/doc?95038">www.vishay.com/doc?95038</a>

## 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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