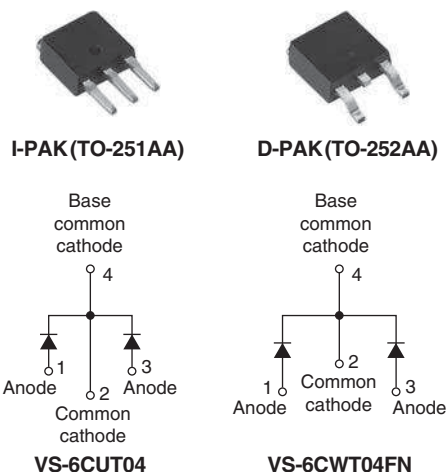


High Performance Schottky Generation 5.0, 2 x 3 A



FEATURES

- 175 °C high performance Schottky diode
- Very low forward voltage drop
- Extremely low reverse leakage
- Optimized V_F vs. I_R 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 <div>per leg per device</div>	$I_{F(AV)}$	50 % duty cycle at $T_C = 166^\circ\text{C}$, rectangular waveform		3 6	A
Maximum peak one cycle non-repetitive surge current per leg	I_{FSM}	5 μs sine or 3 μs rect. pulse 10 ms sine or 6 ms rect. pulse	Following any rated load condition and with rated V_{RRM} applied	440 70	A
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.3\text{ A}$, $L = 16\text{ mH}$		14	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	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.535	0.600	V
		6 A		0.615	0.680	
		3 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.485	0.540	
		6 A		0.570	0.640	
Reverse leakage current per leg	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	-	25	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		-	3	mA
Junction capacitance per leg	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		240	-	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	4.7	$^\circ\text{C/W}$
Maximum thermal resistance, junction to case per device			2.35	
Typical thermal resistance, case to heatsink	R_{thCS}		0.3	
Approximate weight			0.3	g
			0.01	oz.
Marking device		Case style I-PAK	6CUT04	
		Case style D-PAK	6CWT04FN	

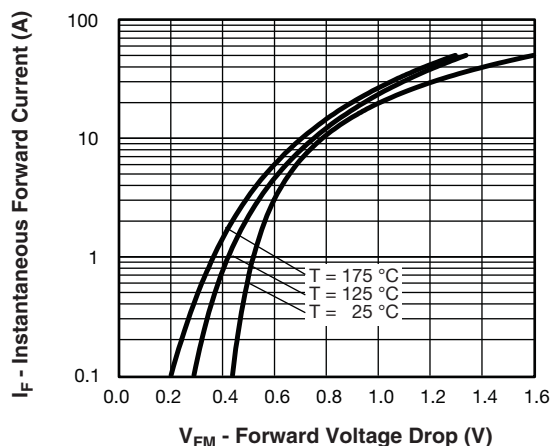


Fig. 1 - Maximum Forward Voltage Drop Characteristics

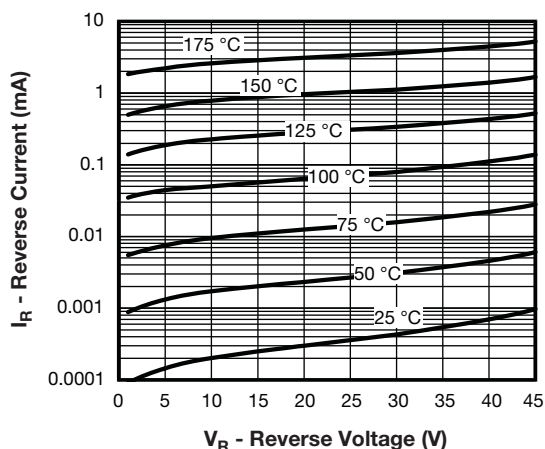


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

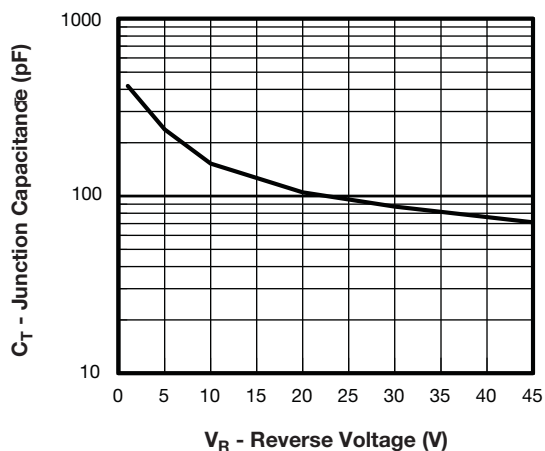
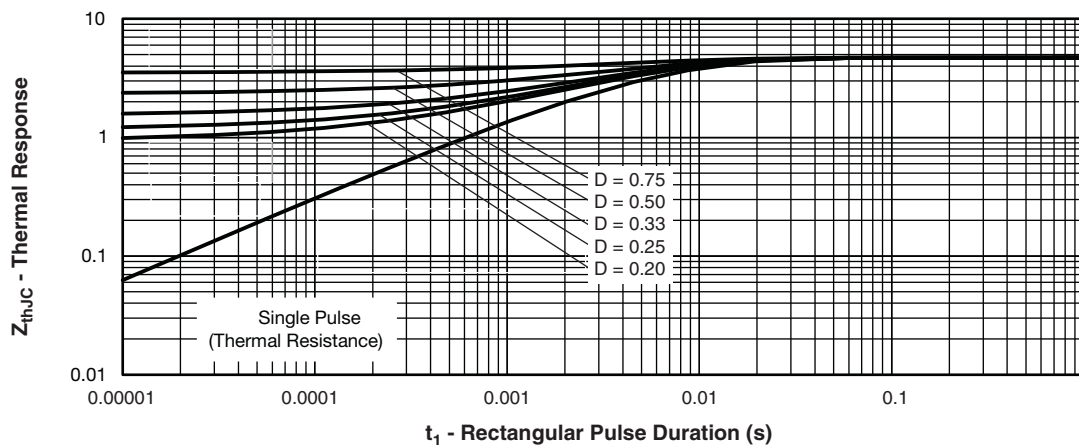


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

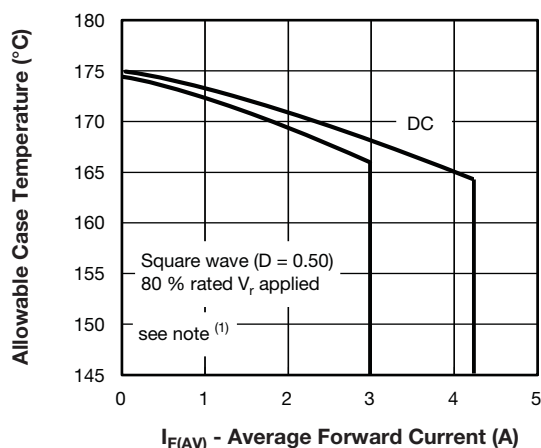


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

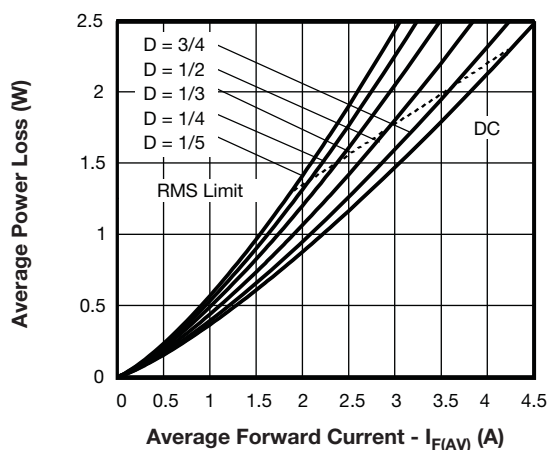


Fig. 6 - Forward Power Loss Characteristics

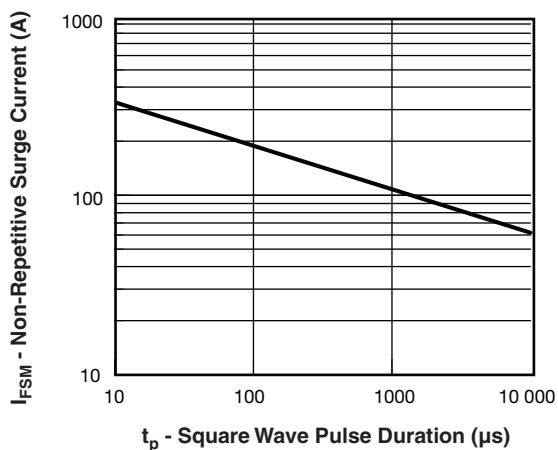


Fig. 7 - Maximum Non-Repetitive Surge Current

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

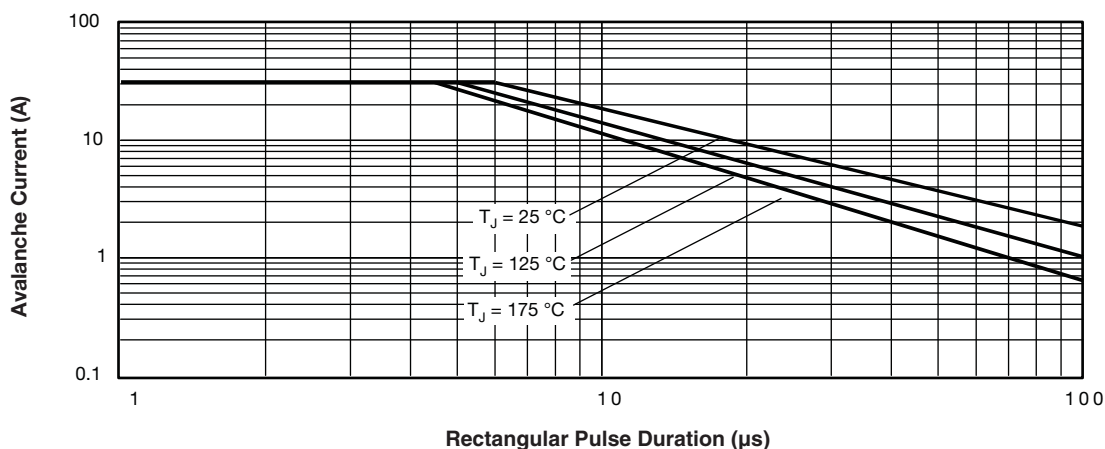


Fig. 8 - Reverse Bias Safe Operating Area (Avalanche Current vs. Rectangular Pulse Duration)

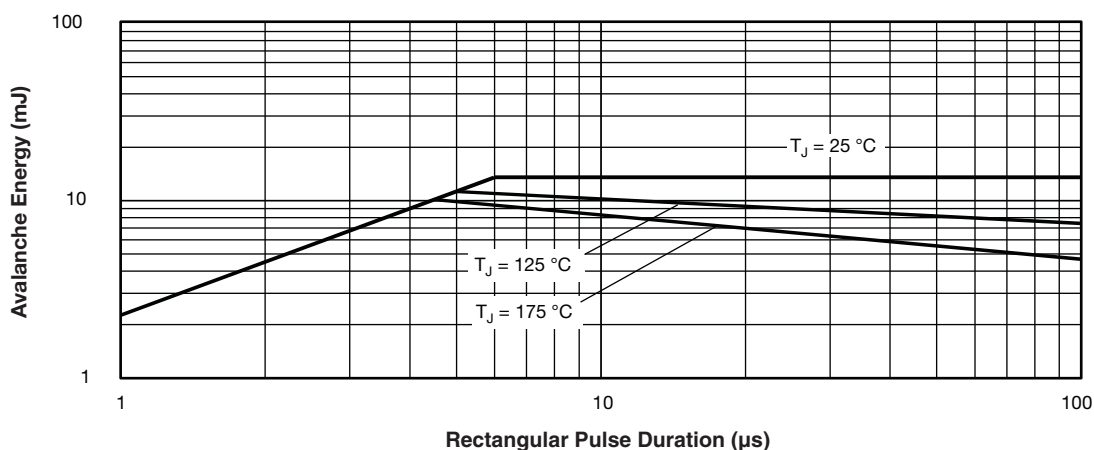


Fig. 9 - Reverse Bias Safe Operating Area (Avalanche Energy vs. Rectangular Pulse Duration)

**ORDERING INFORMATION TABLE**

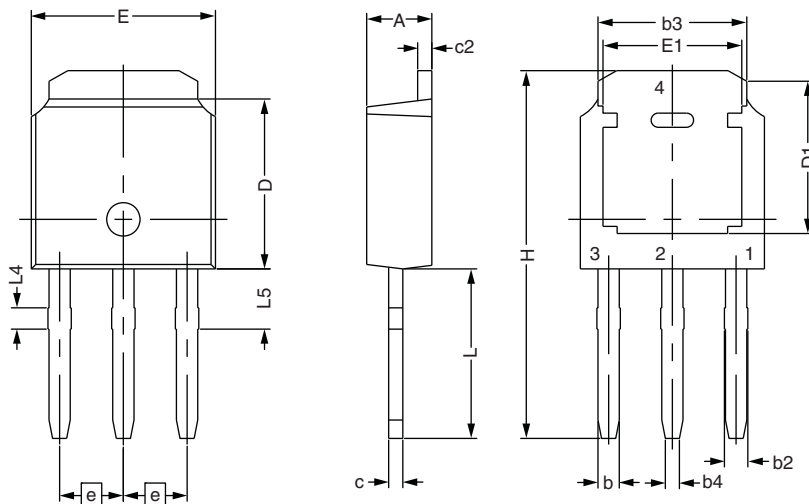
Device code	VS-	6	C	U	T	04	FN	TRL
	①	②	③	④	⑤	⑥	⑦	⑧

- | | |
|----------|--|
| 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)	www.vishay.com/doc?95024
	D-PAK (TO-252AA)	www.vishay.com/doc?95448
Part marking information	I-PAK (TO-251AA)	www.vishay.com/doc?95025
	D-PAK (TO-252AA)	www.vishay.com/doc?95059
Packaging information		www.vishay.com/doc?95033
SPIICE model		www.vishay.com/doc?95038

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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