

Vishay High Power Products

FlipKY®, 0.5 A



FlipKY®

PRODUCT SUMMARY			
I _{F(AV)}	0.5 A		
V _R	30 V		

FEATURES

- Ultralow V_F to footprint area
- Very low profile (< 0.6 mm)
- · Low thermal resistance
- · Supplied tested and on tape and reel
- · Designed for consumer level

APPLICATIONS

- · Reverse polarity protection
- · Current steering
- Freewheeling
- Flyback
- Oring

DESCRIPTION

FlipKY® product family utilizes wafer level chip scale packaging to deliver Schottky diodes with the lowest V_F to PCB footprint area in the industry. The three pad 0.9 mm x 1.2 mm devices can deliver up to 0.5 A and occupy only 1.08 mm² of board space. The anode and cathode connections are made through solder bump pads on one side of the silicon rather than through protruding leads enabling designers to strategically place the diodes on the PCB. This design not only minimizes board space but also reduces thermal resistance and inductance, which can improve overall circuit efficiency.

Typical applications include hand-held, portable equipment such as cell phones, MP3 players, PDAs, and portable hard disk drives where space savings and performance are crucial.

MAJOR RATINGS AND CHARACTERISTICS					
SYMBOL	CHARACTERISTICS	VALUES	UNITS		
I _{F(AV)}	Rectangular waveform	0.5	Α		
V _{RRM}		30	V		
I _{FSM}	$t_p = 5 \mu s \text{ sine}$	190	Α		
V _F	0.5 Apk, T _J = 125 °C	0.33	V		
T _J	Range	- 55 to 150	°C		

VOLTAGE RATINGS				
PARAMETER	SYMBOL	FCSP0530ETR	UNITS	
Maximum DC reverse voltage	V_{R}	30	V	
Maximum working peak reverse voltage	V_{RWM}	30	V	

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ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	I _{F(AV)}	50 % duty cycle at T _{PCB} = 133 °C, rectangular waveform		0.5	
Maximum peak one cycle non-repetitive surge current	leau	5 μs sine or 3 μs rect. pulse Following any rated load condition and with	190	Α	
non-repetitive surge current I_{FSM} at $T_J = 25$ °C	10 ms sine or 6 ms rect. pulse	rated V _{RRM} applied	10		
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 2.0 \text{A}, L = 5.0 \text{mH}$		5	mJ
Repetitive avalanche current	I _{AR}	Current decaying linearly to zero in 1 μ s Frequency limited by T _J maximum V _A = 1.5 x V _R typical		0.5	Α

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
		0.5 A	T _J = 25 °C	0.40	0.44	V
Maximum forward voltage drop	V _{FM} ⁽¹⁾	1 A		0.45	0.49	
See fig. 1	VFM (1)	0.5 A	T _J = 125 °C	0.29	0.33	
		1 A		0.36	0.39	
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	10	50	μΑ
See fig. 2		T _J = 125 °C		5	15	mA
Maximum junction capacitance	C _T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C		-	90	pF
Maximum voltage rate of charge	dV/dt	Rated V _R		-	10 000	V/µs

Note

 $^{^{(1)}\,}$ Pulse width < 300 $\mu s,$ duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T _J ⁽¹⁾ , T _{Stg}		- 55 to 150	°C
Typical thermal resistance, junction to PCB	R _{thJL} (2)	DC operation	35	°C/W
Typical thermal resistance, junction to ambient	R _{thJA} (2)		150	C/VV

Notes

- (1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink
- (2) Mounted on dual sided 0.58" square FR4 PCB with 0.2 square inches of 1 oz. top copper area



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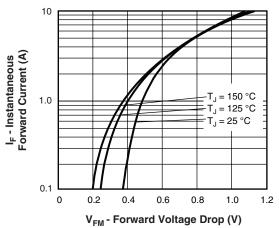


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

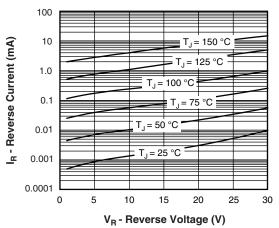


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

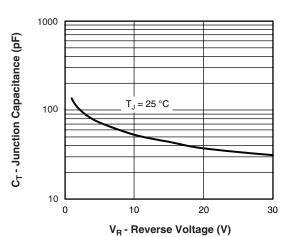
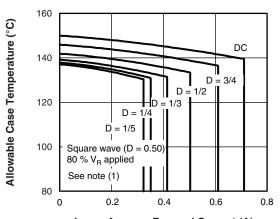
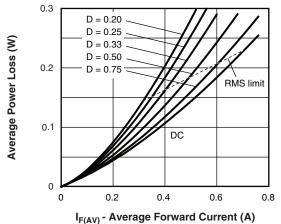


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)



I_{F(AV)} - Average Forward Current (A)

Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)



r(AV)

Fig. 5 - Forward Power Loss Characteristics (Per Leg)

Note

 $^{(1)}$ Formula used: $T_C = T_J$ - (Pd + Pd_{REV}) x R_{thJC} ; Pd = Forward power loss = $I_{F(AV)}$ x V_{FM} at ($I_{F(AV)}/D$) (see fig. 6); Pd_{REV} = Inverse power loss = V_{R1} x I_R (1 - D); I_R at 80 % V_R applied



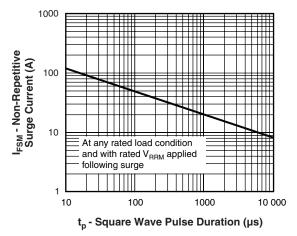


Fig. 6 - Maximum Non-Repetitive Surge Current (Per Leg)

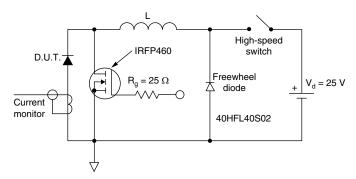


Fig. 7 - Unclamped Inductive Test Circuit

LINKS TO RELATED DOCUMENTS			
Dimensions http://www.vishay.com/doc?95049			
Part marking information http://www.vishay.com/doc?95060			
Packaging information http://www.vishay.com/doc?95062			



Vishay

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