International Rectifier

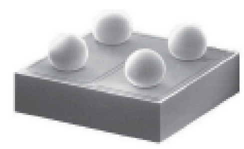
IR1H40CSPTRPbF

FlipkyTM

1 Amp
40 Volt

Features

- Ultra Low V_F per Footprint Area
- Low Leakage
- Low Thermal Resistance
- One-fifth Footprint of SMA
- Super Low Profile (<.7mm)
- Available Tested on Tape & Reel
- Lead-Free ("PbF" suffix)



FlipkyTM

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	1.0	A
V_{RRM}	40	V
I_{FSM} @ tp = 5 μs sine	250	A
V_F @1.0Apk, T_J=125°C	0.42	V
T_J range	-55 to 150	°C

Description

True chip-scale packaging is available from International Rectifier. The IR1H40CSPTRPbF surface-mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

The FlipkyTM package, is one-fifth the footprint of a comparable SMA package and has a profile of less then .7mm. Combined with the low thermal resistance of the die level device, this makes the FlipkyTM the best device for application where printed circuit board space is at a premium and in extremely thin application environments such as battery packs, cell phones and PCMCIA cards.

Voltage Ratings

	Part number	IR1H40CSPTRPbF
V_R	Max. DC Reverse Voltage (V)	40
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	Value	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current	1.0	A	50% duty cycle @ T_{PCB} = 117 °C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	250	A	5μs Sine or 3μs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current @ 25°C	21		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	10	mJ	T_J = 25 °C, I_{AS} = 2.0A, L = 5.0mH	
I_{AR}	Repetitive Avalanche Current	2.0	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. Va = 1.5 x Vr typical	

Electrical Specifications

	Parameters	Typ.	Max.	Units	Conditions	
V_{FM}	Max. Forward Voltage (1)	0.48	0.52	V	@ 1A	T_J = 25 °C
	Drop	0.54	0.59		@ 2A	
	* See Fig. 1	0.38	0.42		@ 1A	T_J = 125 °C
		0.48	0.52		@ 2A	
I_{RM}	Max. Reverse Leakage (1)	3	15	μA	T_J = 25 °C	V_R = rated V_R
	Current	0.5	1			V_R = 20V
	* See Fig. 2	0.2	0.5			V_R = 10V
		0.15	0.3			V_R = 5V
		2.5	4	mA	T_J = 125 °C	V_R = rated V_R
		0.9	2			V_R = 20V
		0.6	1.5			V_R = 10V
		0.5	1			V_R = 5V
C_T	Max. Junction Capacitance	-	160	pF	V_R = $5V_{DC}$ (test signal range 100kHz to 1MHz) 25°C	
dv/dt	Max. Volatge Rate of Charge	-	10000	V/ μs	(Rated V_R)	

(1) Pulse Width < 300μs, Duty Cycle < 2%

Thermal-Mechanical Specifications

	Parameters	Value	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-55 to 150	°C	
R_{thJL}	Typ. Thermal Resistance Junction to PCB (**)	40	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient	62	°C/W	

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j\text{-}a)}$ thermal runaway condition for a diode on its own heatsink

(**) Mounted 1 inch square PCB

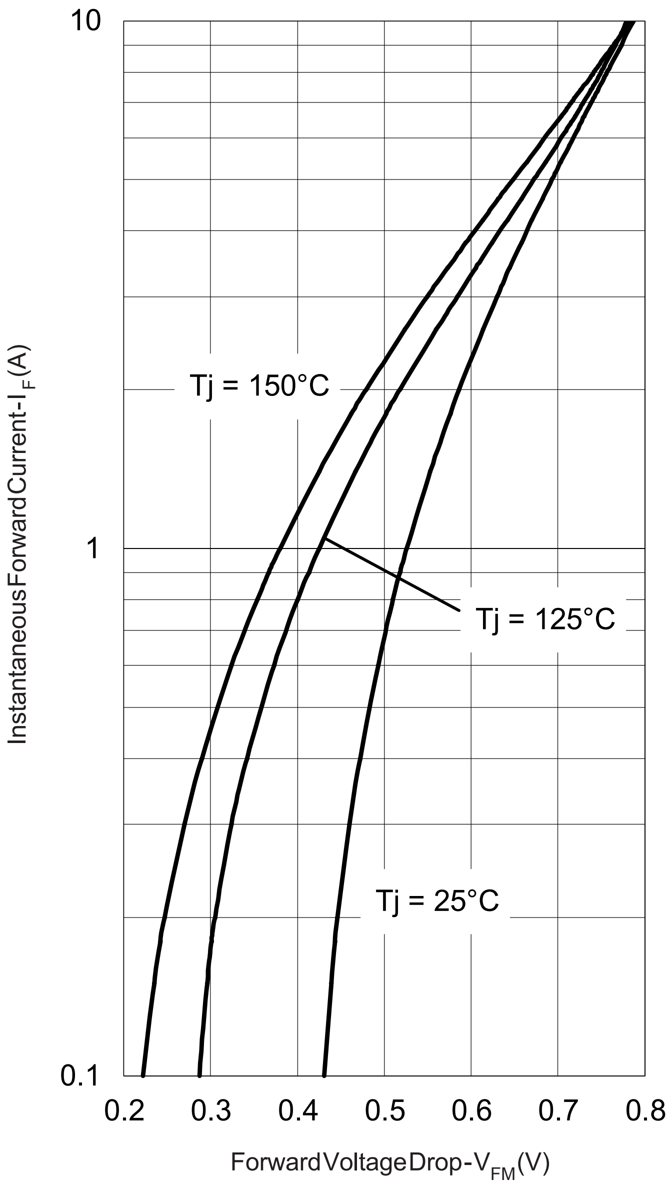


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

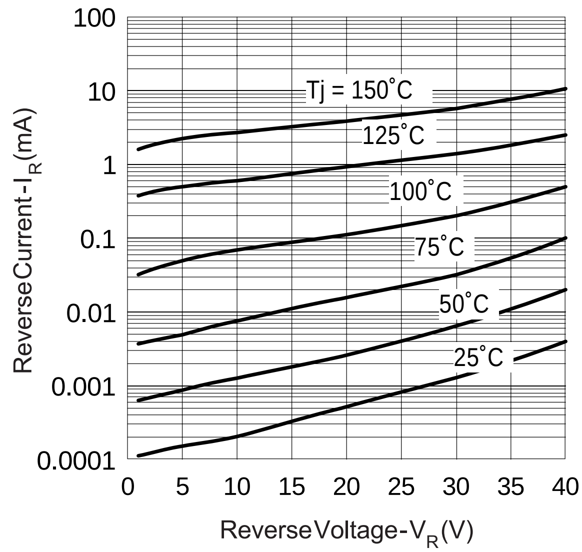


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

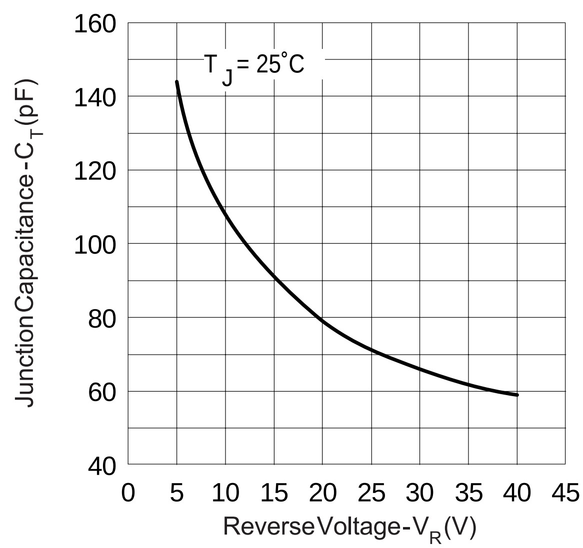


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

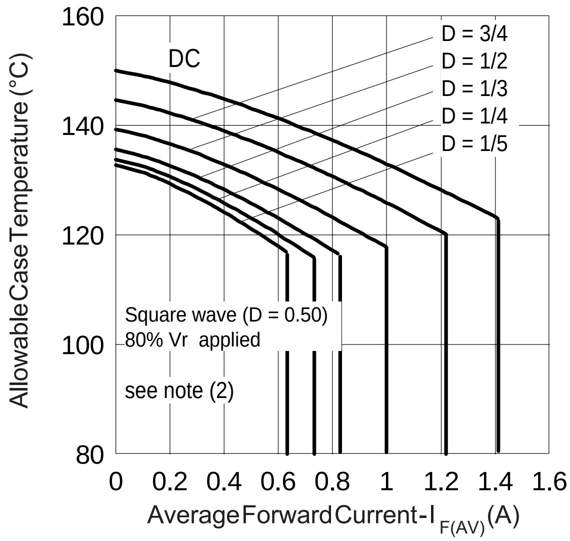


Fig. 4 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

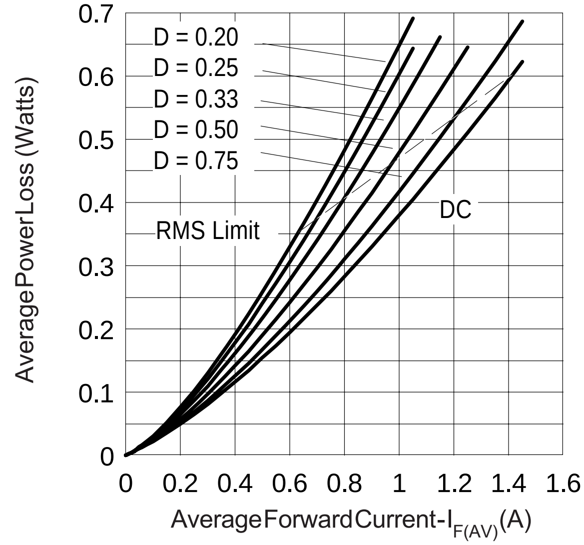


Fig. 5 - Forward Power Loss Characteristics (Per Leg)

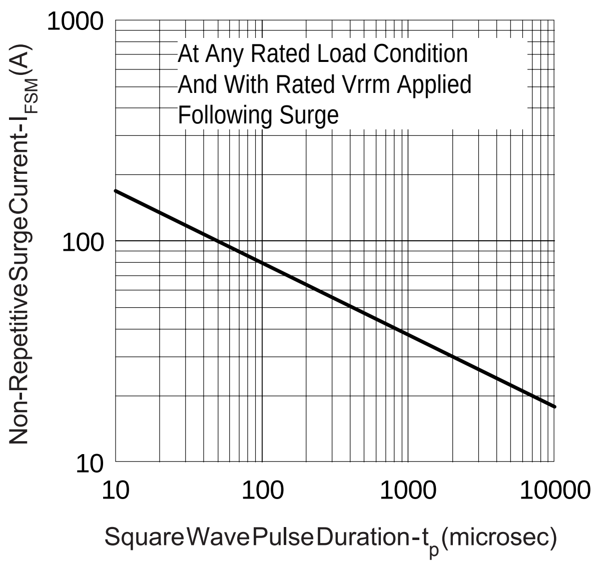


Fig. 6 - Max. Non-Repetitive Surge Current (Per Leg)

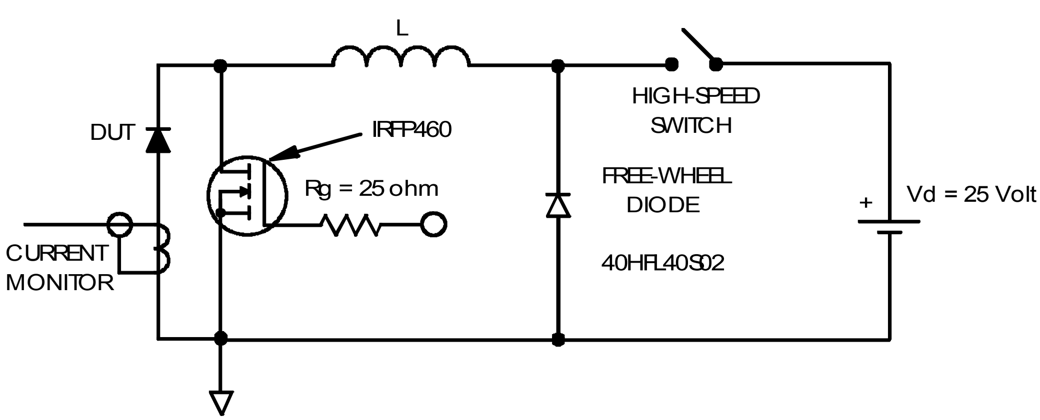


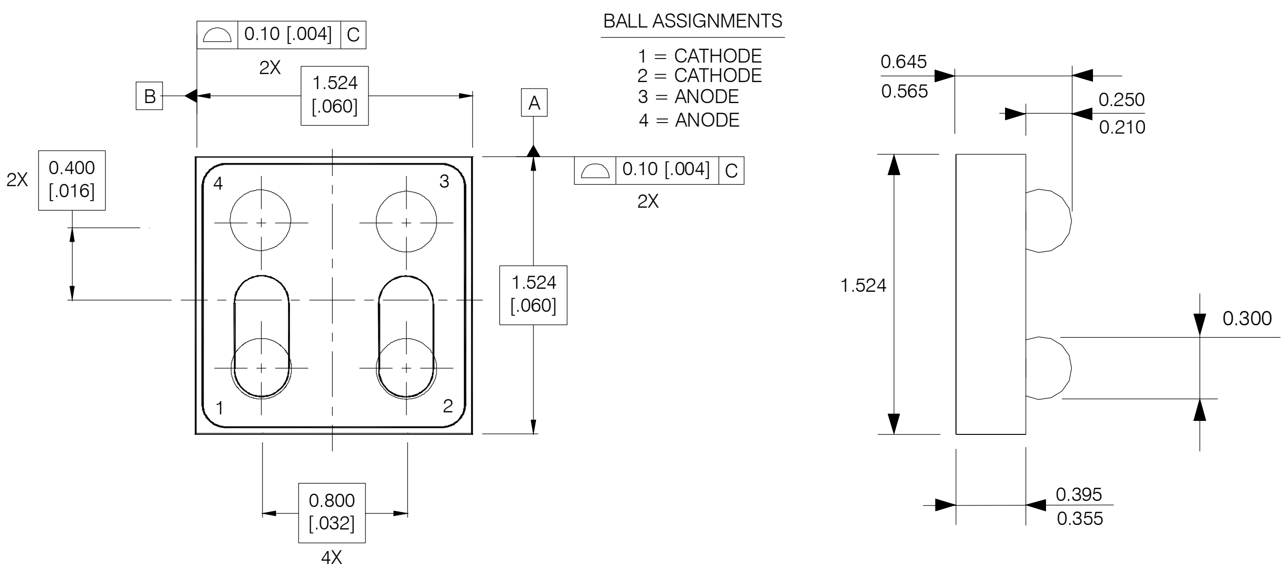
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;

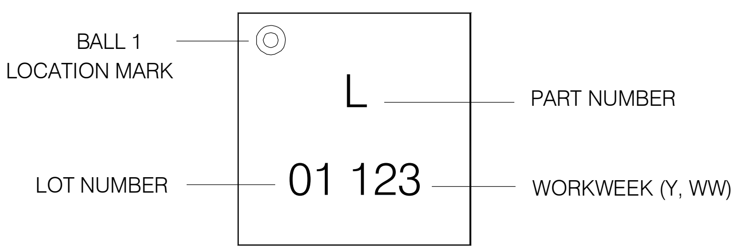
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM}$ @ $(I_{F(AV)} / D)$ (see Fig. 6);

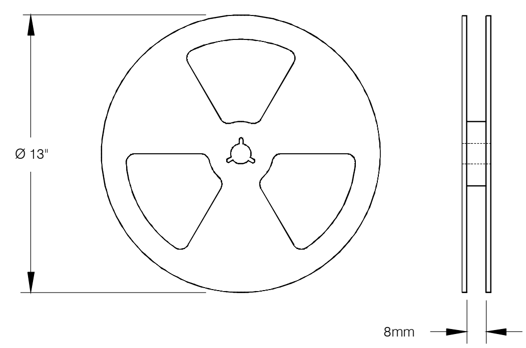
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; I_R @ 80% V_R applied

FlipKY ™ Outline Dimension and Tape and Reel

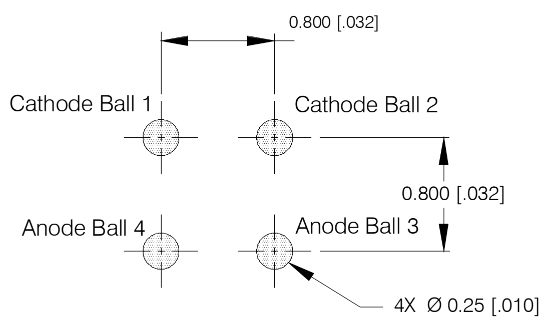


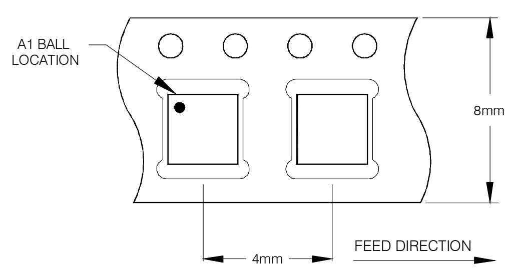
NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].





RECOMMENDED FOOTPRINT





NOTES:
1. TAPE AND REEL OUTLINE CONFORMS TO EIA-481 & EIA-541.

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IR1H40CSP
**********************************************
*      This model has been developed by      *
*     Wizard SPICE MODEL GENERATOR (1999)    *
*    (International Rectifier Corporation)   *
*       Contain Proprietary Information      *
**********************************************
* SPICE Model Diode is composed by a         *
* simple diode plus paralled VCG2T           *
**********************************************
.SUBCKT ir1h40csp ANO CAT
D1 ANO 1 DMOD (0.01614)
*Define diode model
.MODEL  DMOD  D(IS=1.89451920631734E-05A,N=1.28115932154793,BV=48V,
+  IBV=3.51582918628388E-02A,RS=  0.000316344,CJO=1.496133161627E-08,
+  VJ=2.48275231672173,XTI=2,  EG=0.909092986033443)
**********************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL  TRES  RES(R=1,TC1=141.418786575201)
GP1  ANO  CAT  VALUE={-ABS(I(VX))*(EXP((((-4.18234E-03/
141.4188)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-1))+1)*0.1008349*ABS(V(ANO,CAT)))-
1)}
**********************************************
.ENDS ir1h40csp
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Data and specifications subject to change without notice.
This product has been designed and qualified for Consumer Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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05/06

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