Bulletin PD-20524 rev. H 05/06

International
IOR Rectifier

50WQ04FN

SCHOTTKY RECTIFIER 5.5 Amp

$I_{F(AV)}$ = 5.5Amp
V_R = 40V

Major Ratings and Characteristics

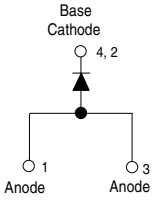
Characteristics		Values	Units
$I_{F(AV)}$	Rectangular waveform	5.5	A
V_{RRM}		40	V
I_{FSM}	@tp = 5 µs sine	340	A
V_F	@5 Apk, T_J = 125°C	0.44	V
T_J	range	-40 to 150	°C

Description/ Features

The 50WQ04FN surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Popular D-PAK outline
- Small foot print, surface moutable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability

Case Styles



D-PAK (TO-252AA)

Voltage Ratings

	Part number	50WQ04FN
V_R	Max. DC Reverse Voltage (V)	40
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	50WQ...	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	5.5	A	50% duty cycle @ T_C = 135°C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	550	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		90		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	9	mJ	T_J = 25 °C, I_{AS} = 1.5 Amps, L = 8 mH	
I_{AR}	Repetitive Avalanche Current	1.2	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	50WQ...	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop * See Fig. 1 (1)	0.51	V	@ 5A	T_J = 25 °C
		0.63	V	@ 10A	
		0.44	V	@ 5A	T_J = 125 °C
		0.59	V	@ 10A	
I_{RM}	Max. Reverse Leakage Current * See Fig. 2 (1)	3	mA	T_J = 25 °C	V_R = rated V_R
		40	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.27	V	T_J = T_J max.	
r_t	Forward Slope Resistance	26.77	mΩ		
C_T	Typical Junction Capacitance	405	pF	V_R = 5V_{DC} (test signal range 100Khz to 1Mhz) 25 °C	
L_S	Typical Series Inductance	5.0	nH	Measured lead to lead 5mm from package body	

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

Thermal-Mechanical Specifications

	Parameters	50WQ...	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-40 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case	3.0	°C/W	DC operation * See Fig. 4
wt	Approximate Weight	0.3 (0.01)	g (oz.)	
	Case Style	D-Pak		Similar to TO-252AA
	Device Marking	50WQ04FN		

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

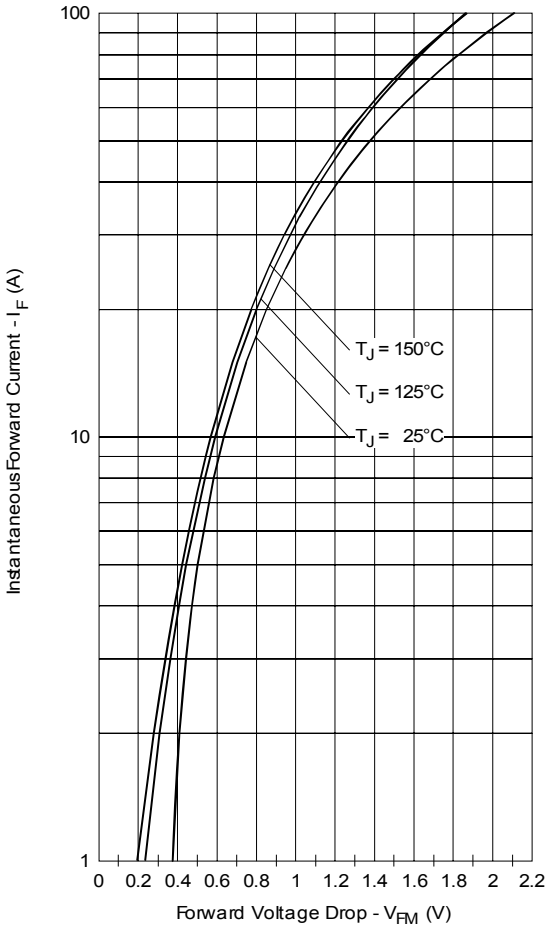


Fig. 1 - Maximum Forward Voltage Drop Characteristics

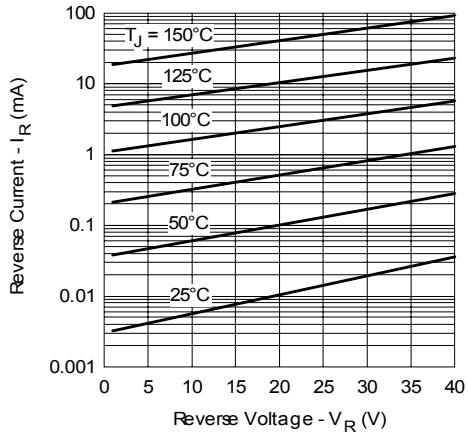


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

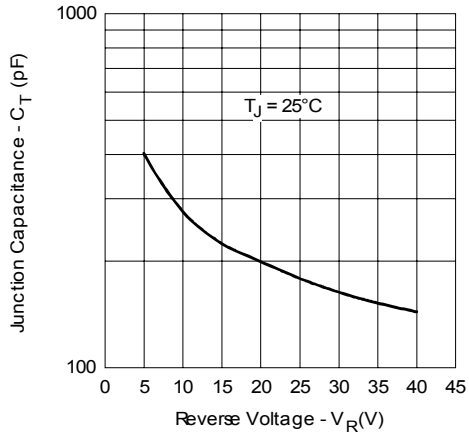


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

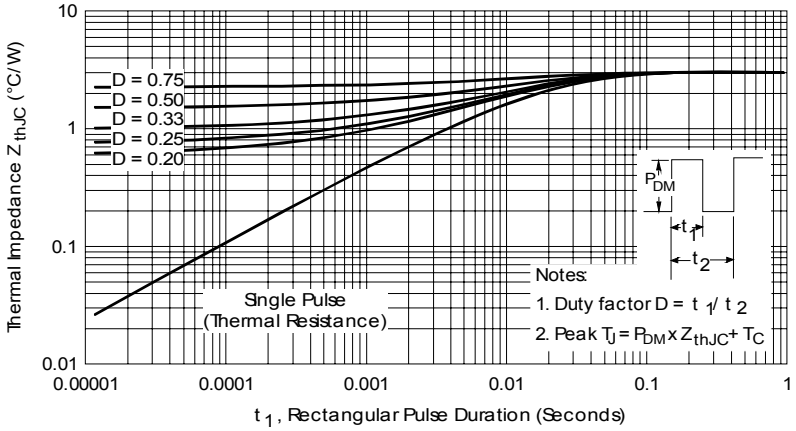


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

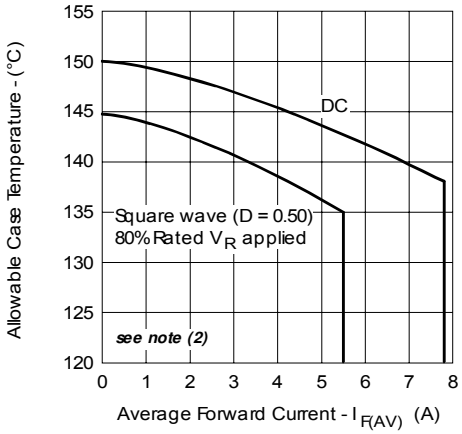


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

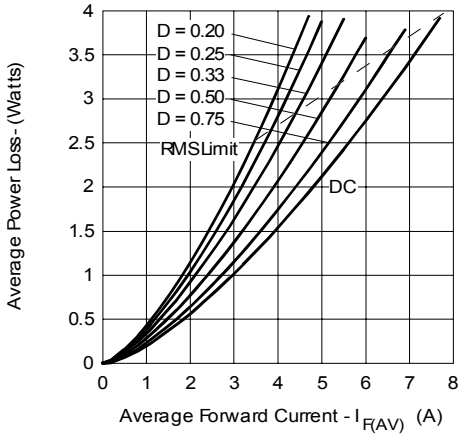


Fig. 6 - Forward Power Loss Characteristics

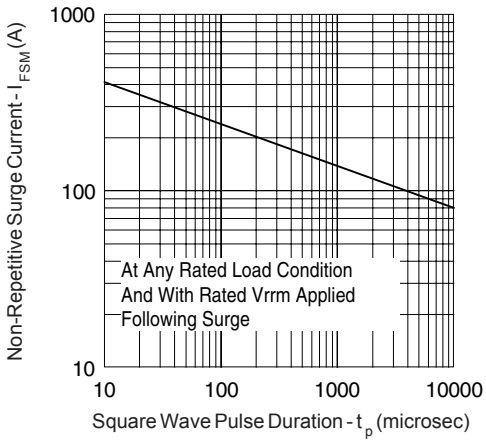
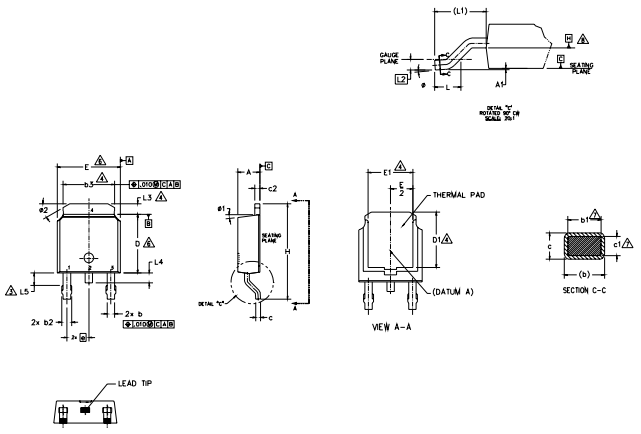


Fig. 7 - Maximum Non-Repetitive Surge Current

(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 = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = 80% rated V_R

Outline Table



NOTES:
1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2.- DIMENSION ARE SHOWN IN INCHES [MILLIMETERS].
3 LEAD DIMENSION UNCONTROLLED IN L5.
4 DIMENSION D1, E1, L3 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.13 AND 0.25] FROM THE LEAD TIP.
6 DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
7 DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.
8 DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	.086	.094	
A1	–	0.13	–	.005	
b	0.64	0.89	.025	.035	
b1	0.65	0.79	.025	.031	7
b2	0.76	1.14	.030	.045	
b3	4.95	5.46	.195	.215	4
c	0.46	0.61	.018	.024	
c1	0.41	0.56	.016	.022	7
c2	0.46	0.89	.018	.035	
D	5.97	6.22	.235	.245	6
D1	5.21	–	.205	–	4
E	6.35	6.73	.250	.265	6
E1	4.32	–	.170	–	4
e	2.29 BSC		.090 BSC		
H	9.40	10.41	.370	.410	
L	1.40	1.78	.055	.070	
L1	2.74 BSC		.108 REF.		
L2	0.51 BSC		.020 BSC		
L3	0.89	1.27	.035	.050	4
L4	–	1.02	–	.040	
L5	1.14	1.52	.045	.060	3
ø	0°	10°	0°	10°	
ø1	0°	15°	0°	15°	
ø2	25°	35°	25°	35°	

LEAD ASSIGNMENTS

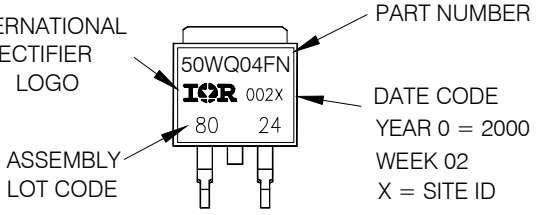
HEXFET
1.- GATE
2.- DRAIN
3.- SOURCE
4.- DRAIN

IGBT & CoPAK
1.- GATE
2.- COLLECTOR
3.- EMITTER
4.- COLLECTOR

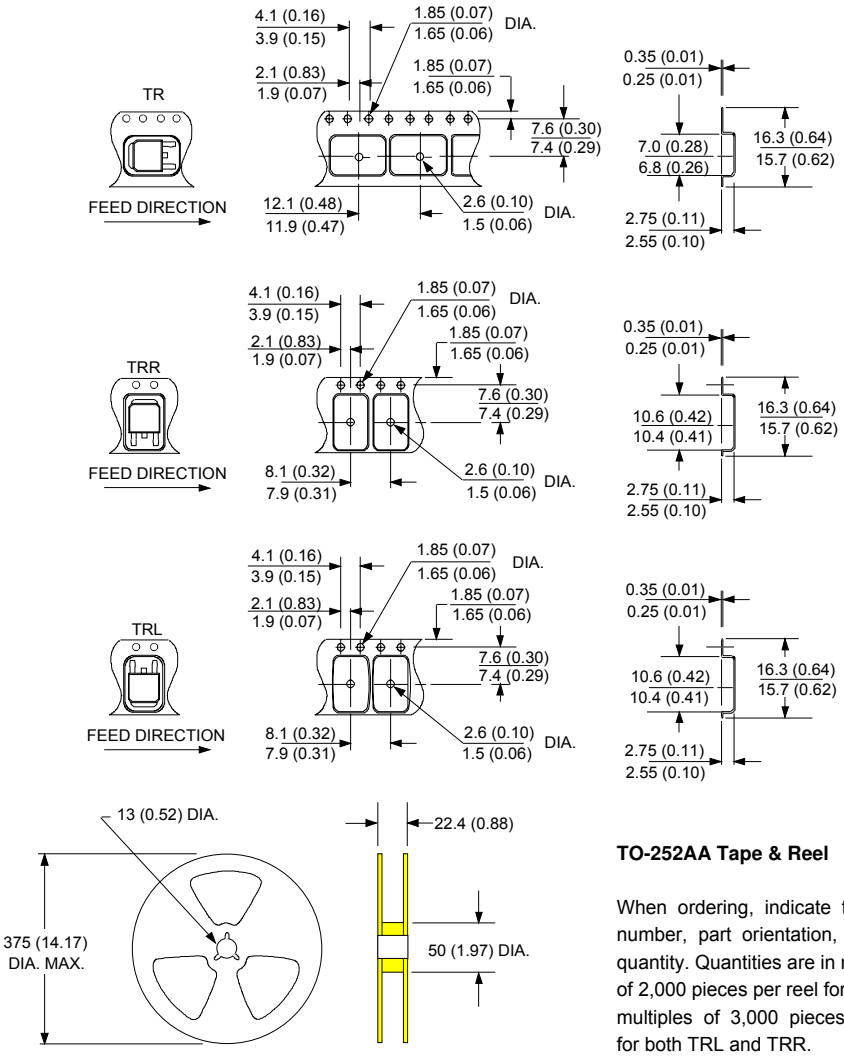
Modified JEDEC outline TO-252AA
Dimensions in millimeters and (inches)

Part Marking Information

EXAMPLE: THIS IS A 50WQ04FN
LOT CODE 8024
ASSEMBLED ON WW 02, 2000



Tape & Reel Information

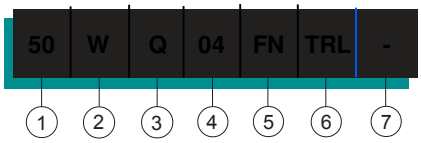


TO-252AA Tape & Reel

When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 2,000 pieces per reel for TR and multiples of 3,000 pieces per reel for both TRL and TRR.

Ordering Information Table

Device Code



1	-	Current Rating (5.5A)
2	-	Package Identifier
4		W = D-Pak
3	-	Schottky "Q" Series
4	-	Voltage Rating (04 = 40V)
5	-	FN = TO-252AA
6	-	• none = Tube (50 pieces) • TR = Tape & Reel • TRL = Tape & Reel (Left Oriented) • TRR = Tape & Reel (Right Oriented)
7	-	• none = Standard Production • PbF = Lead-Free

Data and specifications subject to change without notice.
This product has been designed and qualified for AEC Q101 Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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05/06

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