International
IOR Rectifier

30WQ04FN

SCHOTTKY RECTIFIER

3.5 Amp

D-Pak (TO-252AA)

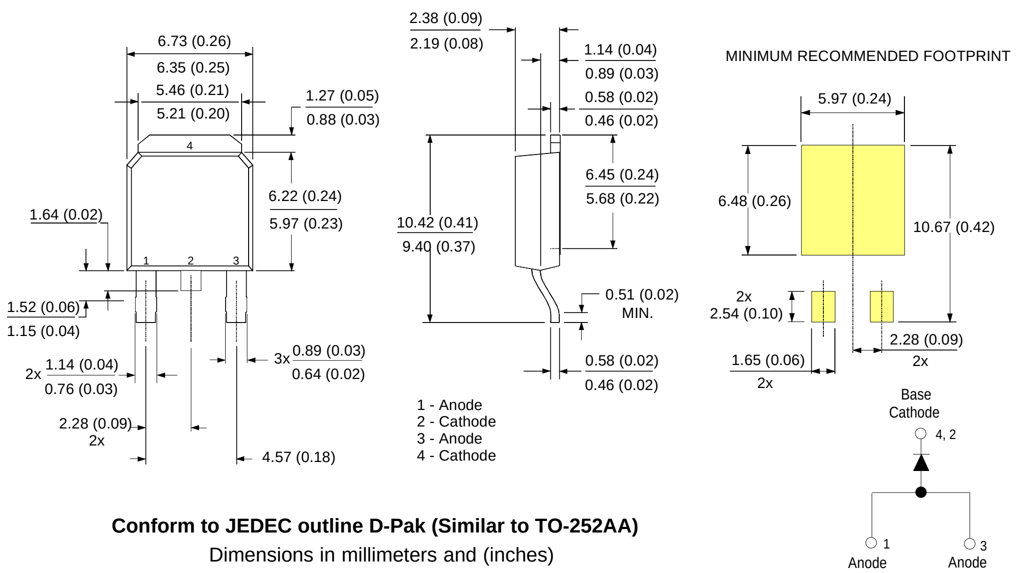
Major Ratings and Characteristics

Characteristics	30WQ04FN	Units
$I_{F(AV)}$ Rectangular waveform	3.5	A
V_{RRM}	40	V
I_{FSM} @ tp = 5 μs sine	500	A
V_F @ 3 Apk, T_J = 125°C	0.49	V
T_J	- 40 to 150	°C

Description/ Features

The 30WQ04FN 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 mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



Conform to JEDEC outline D-Pak (Similar to TO-252AA)

Dimensions in millimeters and (inches)

Voltage Ratings

Part number	30WQ04FN
V_R Max. DC Reverse Voltage (V)	40
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	30WQ...	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	3.5	A	50% duty cycle @ T_C = 135°C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7	500	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		80		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	8.0	mJ	T_J = 25 °C, I_{AS} = 1 Amp, L = 16 mH	
I_{AR}	Repetitive Avalanche Current	1.0	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	30WQ...	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop * See Fig. 1 (1)	0.53	V	@ 3A	T_J = 25 °C
		0.67	V	@ 6A	
		0.49	V	@ 3A	T_J = 125 °C
		0.62	V	@ 6A	
I_{RM}	Max. Reverse Leakage Current * See Fig. 2 (1)	2	mA	T_J = 25 °C	V_R = rated V_R
		24	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.34	V	T_J = T_J max.	
r_t	Forward Slope Resistance	37.33	mΩ		
C_T	Typical Junction Capacitance	189	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	
dv/dt	Max. Voltage Rate of Change	10000	V/µs	(Rated V_R)	

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

Thermal-Mechanical Specifications

	Parameters	30WQ...	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	4.7	°C/W	DC operation * See Fig. 4
wt	Approximate Weight	0.3 (0.01)	g (oz.)	
	Case Style	D - PAK		Similar to TO-252AA

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

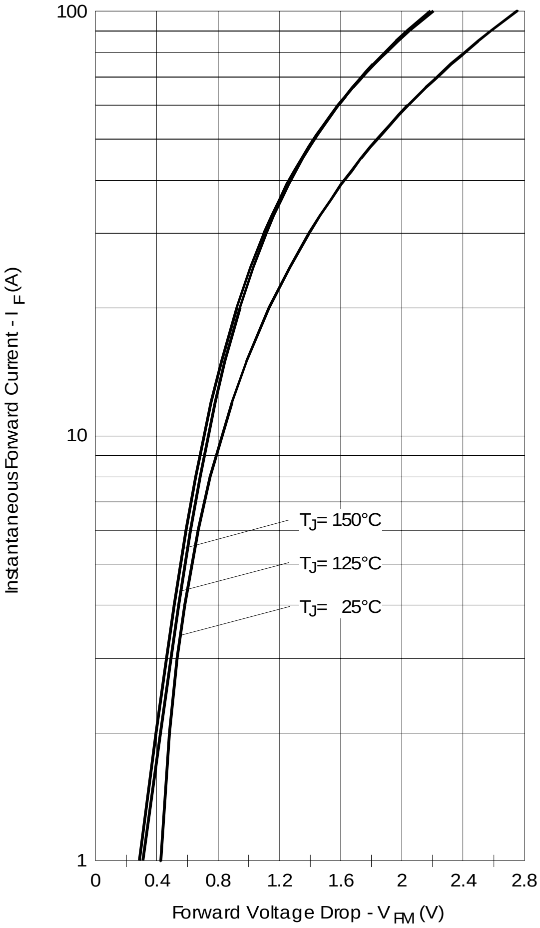


Fig. 1 - Maximum Forward Voltage Drop Characteristics

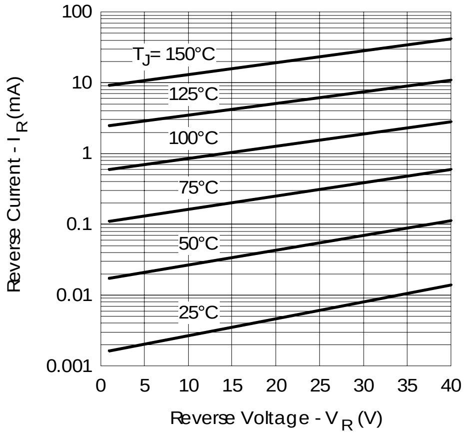


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

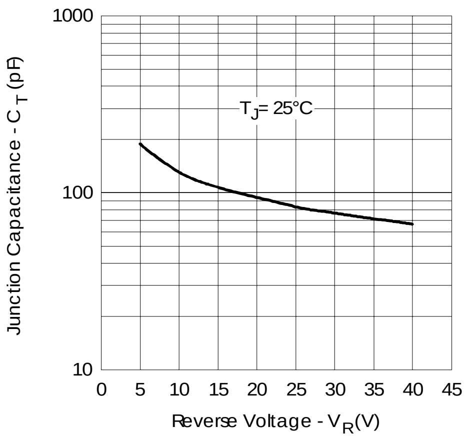


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

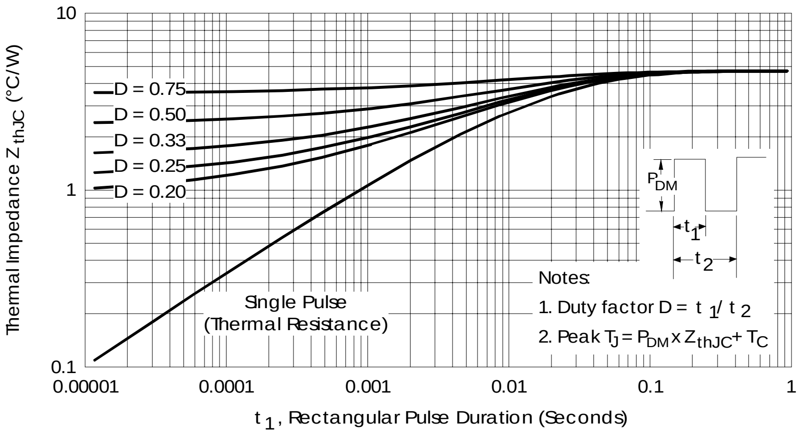


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

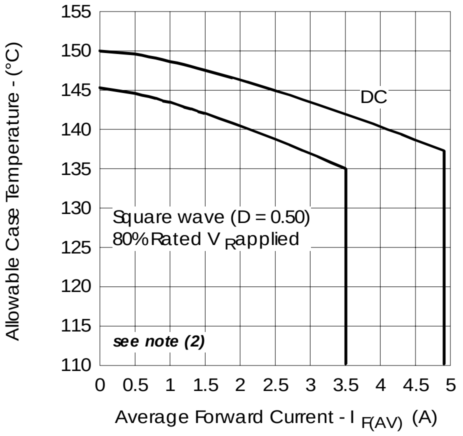


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

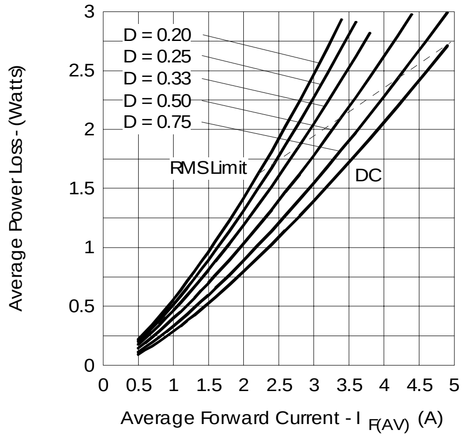


Fig. 6 - Forward Power Loss Characteristics

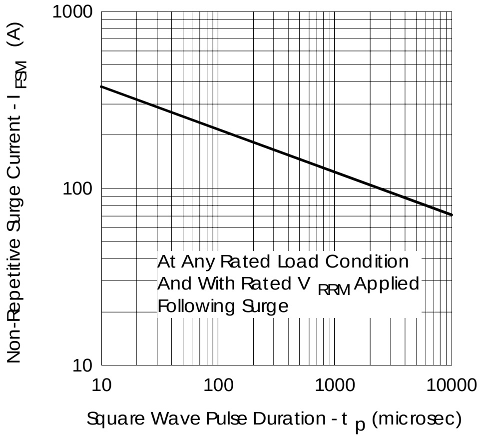
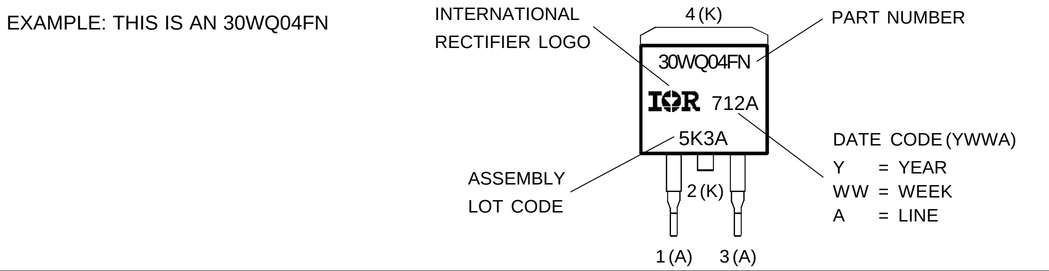


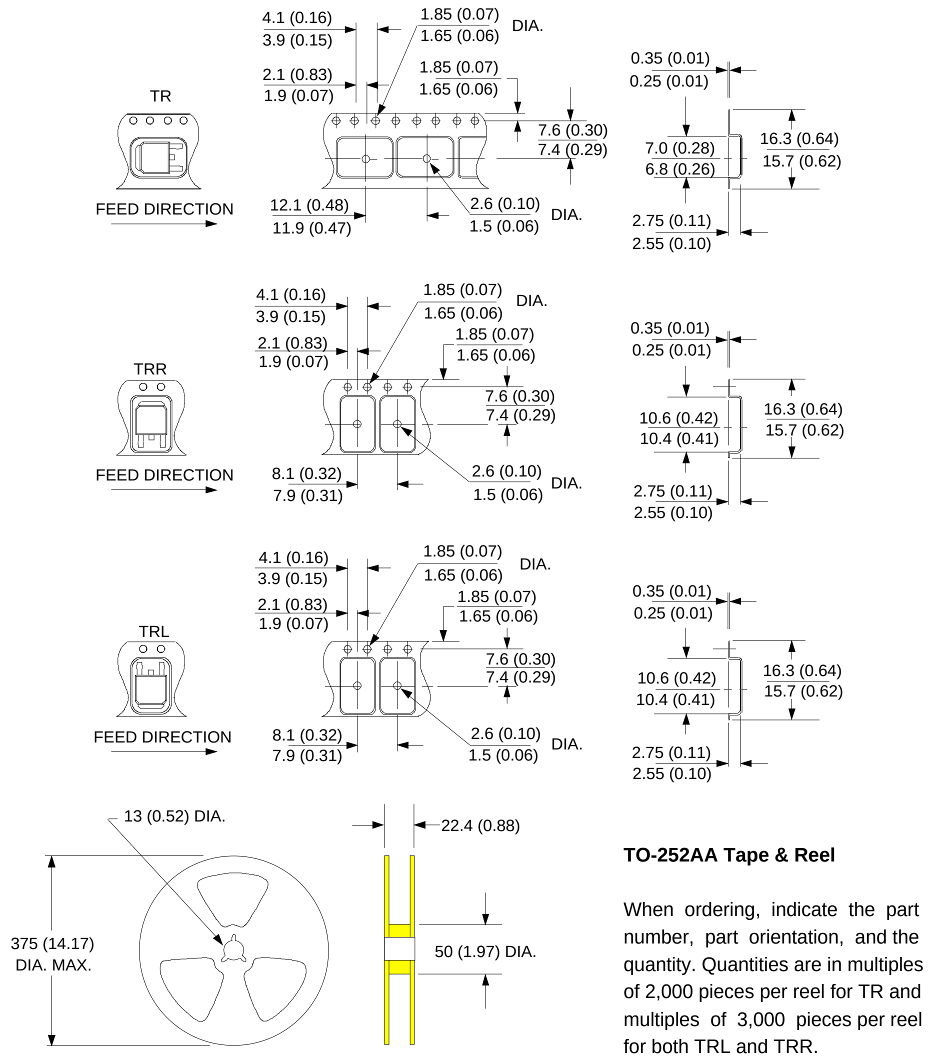
Fig. 7 - Maximum Non-Repetitive Surge Current

(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

Marking Information



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.

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30WQ04FN
*********************************************
*     This model has been developed by     *
*    Wizard SPICE MODEL GENERATOR (1999)   *
*  (International Rectifier Corporation)   *
*   contains Proprietary Information       *
*********************************************
* SPICE Model Diode is composed by a       *
* simple diode plus paralled VCG2T         *
*********************************************
.SUBCKT 30WQ04FN ANO CAT
D1 ANO 1 DMOD (0.01614)
*Define diode model
.MODEL DMOD D(IS=1.1021044955238E-04A,N=1.03763733127871,BV=53V,
+ IBV=0.225832353615935A,RS= 0.000439008,CJO=6.29671162330771E-08,
+ VJ=0.169606385579256,XTI=2, EG=0.72244495735053)
*********************************************
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=96.5402599365199)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((-3.005809E-03/96.54026)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-
1))+1)*6.266778E-02*ABS(V(ANO,CAT)))-1)}
*********************************************
.ENDS 30WQ04FN


Thermal Model Subcircuit
.SUBCKT 30WQ04FN  5 1

CTHERM1     5     4     8.75E-04
CTHERM2     4     3     5.09E+01
CTHERM3     3     2     3.62E+02
CTHERM4     2     1     2.35E+03

RTHERM1     5     4     1.00E-07
RTHERM2     4     3     2.07E+00
RTHERM1     3     2     1.92E+00
RTHERM1     2     1     7.07E-01


.ENDS 30WQ04FN
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International IOR Rectifier

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