

International
IR Rectifier

12CWQ10FN

SCHOTTKY RECTIFIER

12 Amp

$$I_{F(AV)} = 12\text{Amp}$$

$$V_R = 100\text{V}$$

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	12	A
V_{RRM}	100	V
I_{FSM} @ tp = 5 μ s sine	330	A
V_F @ 6 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.65	V
T_J range	-55 to 150	$^\circ\text{C}$

Description/ Features

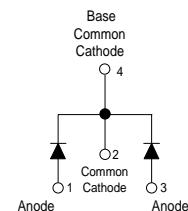
The 12CWQ10FN surface mount, center tap, Schottky rectifier series has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Popular D-PAK outline
- Center tap configuration
- Small foot print, surface mountable
- 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	12CWQ10FN
V_R Max. DC Reverse Voltage (V)	100
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	12CWQ...	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5 (Per Leg) (Per Device)	6	A	50% duty cycle @ $T_C = 135^\circ\text{C}$, rectangular wave form
	12		
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 7 (Per Leg)	330	A	5 μs Sine or 3 μs Rect. pulse
	110		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetit. Avalanche Energy (Per Leg)	6	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1$ Amps, $L = 12$ mH
I_{AR} Repetitive Avalanche Current (Per Leg)	1	A	Current decaying linearly to zero in 1 μsec Frequency limited by $T_{J,max}$. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	12CWQ...	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.80	V	@ 6A $T_J = 25^\circ\text{C}$
	0.95	V	@ 12A
	0.65	V	@ 6A $T_J = 125^\circ\text{C}$
	0.78	V	@ 12A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	1	mA	$T_J = 25^\circ\text{C}$
	4	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.47	V	$T_J = T_{J,max}$
r_t Forward Slope Resistance	20.68	m Ω	
C_T Typ. Junction Capacitance (Per Leg)	183	pF	$V_R = 5V_{DC}$, (test signal range 100Khz to 1Mhz) 25°C
L_S Typical Series Inductance (Per Leg)	5.0	nH	Measured lead to lead 5mm from package body

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

Thermal-Mechanical Specifications

Parameters	12CWQ...	Units	Conditions
T_J Max. Junction Temperature Range (*)	-55 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance (Per Leg) Junction to Case (Per Device)	3.0	$^\circ\text{C/W}$	DC operation * See Fig. 4
	1.5		
wt Approximate Weight	0.3 (0.01)	g (oz.)	
Case Style	D-Pak		Similar to TO-252AA
Marking Device	12CWQ10FN		

(*) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

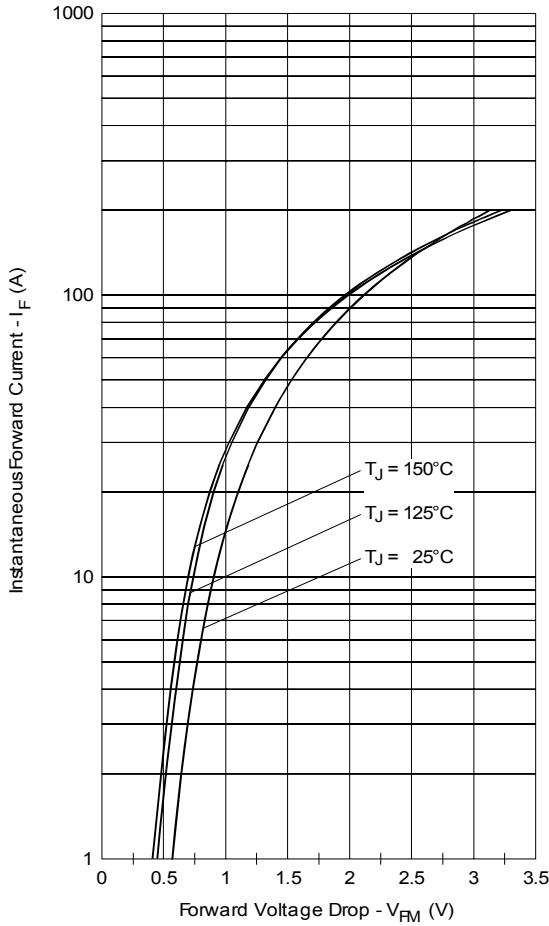


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

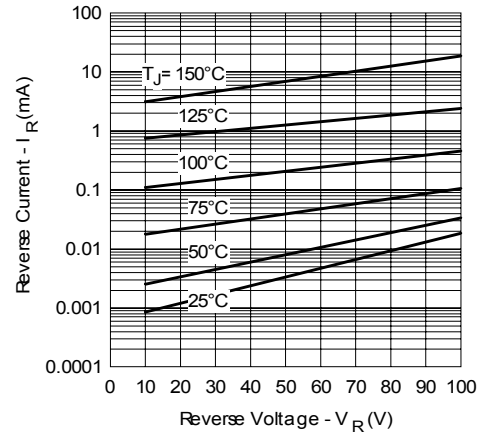


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

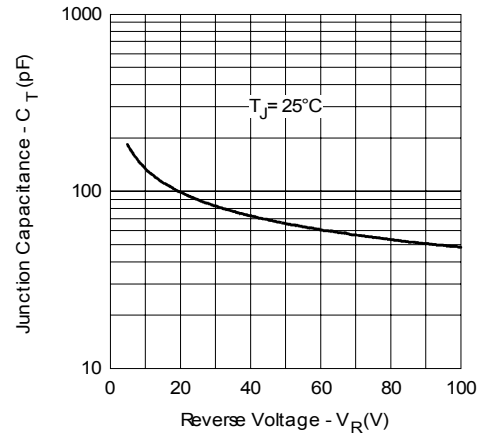


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

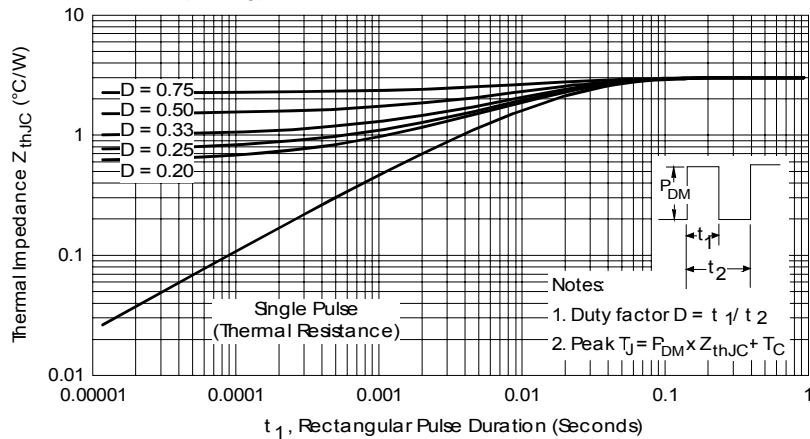


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

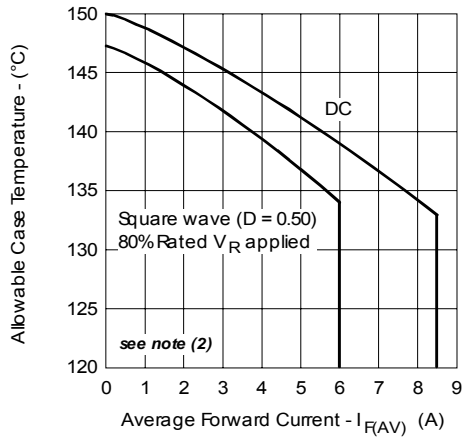


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

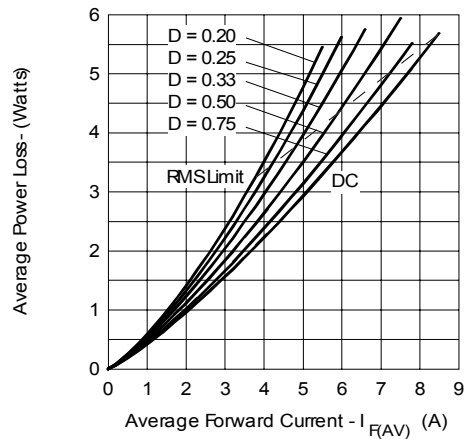


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

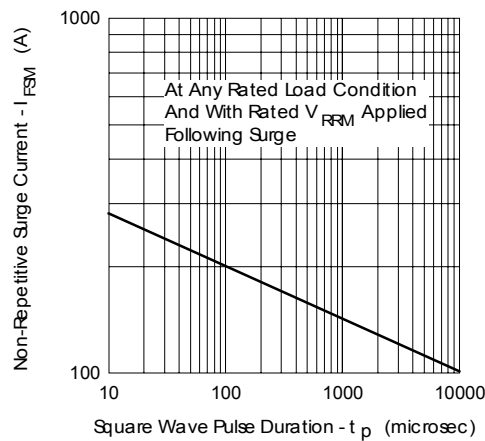


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(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- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]
 3- LEAD DIMENSION UNCONTROLLED IN L.S.
 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 .008 [0.15] 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 A.
 9- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

S W B L	DIMENSIONS				N D S
	MILLIMETERS		INCHES		
A	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.30	.086	.091	
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	4.90	0.46	.190	.010	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	4.52	-	.170	-	4
e	2.29 BSC	.090 BSC			
H	8.40	10.41	.330	.410	
L	1.40	1.78	.055	.070	
L1	2.74 BSC	.108 REF.			
L2	0.61 BSC	.020 BSC			4
L3	0.89	1.27	.035	.050	
L4	-	1.02	-	.040	3
L5	1.14	1.52	.045	.060	
#	0°	10°	0°	10°	
#1	0°	15°	0°	15°	
#2	25°	30°	25°	30°	

LEAD ASSIGNMENTS
 1- GATE
 2- DRAIN
 3- SOURCE
 4- DRAIN

HEFEET
 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 12CWQ10FN
 LOT CODE 8024
 ASSEMBLED ON WW 02, 2000

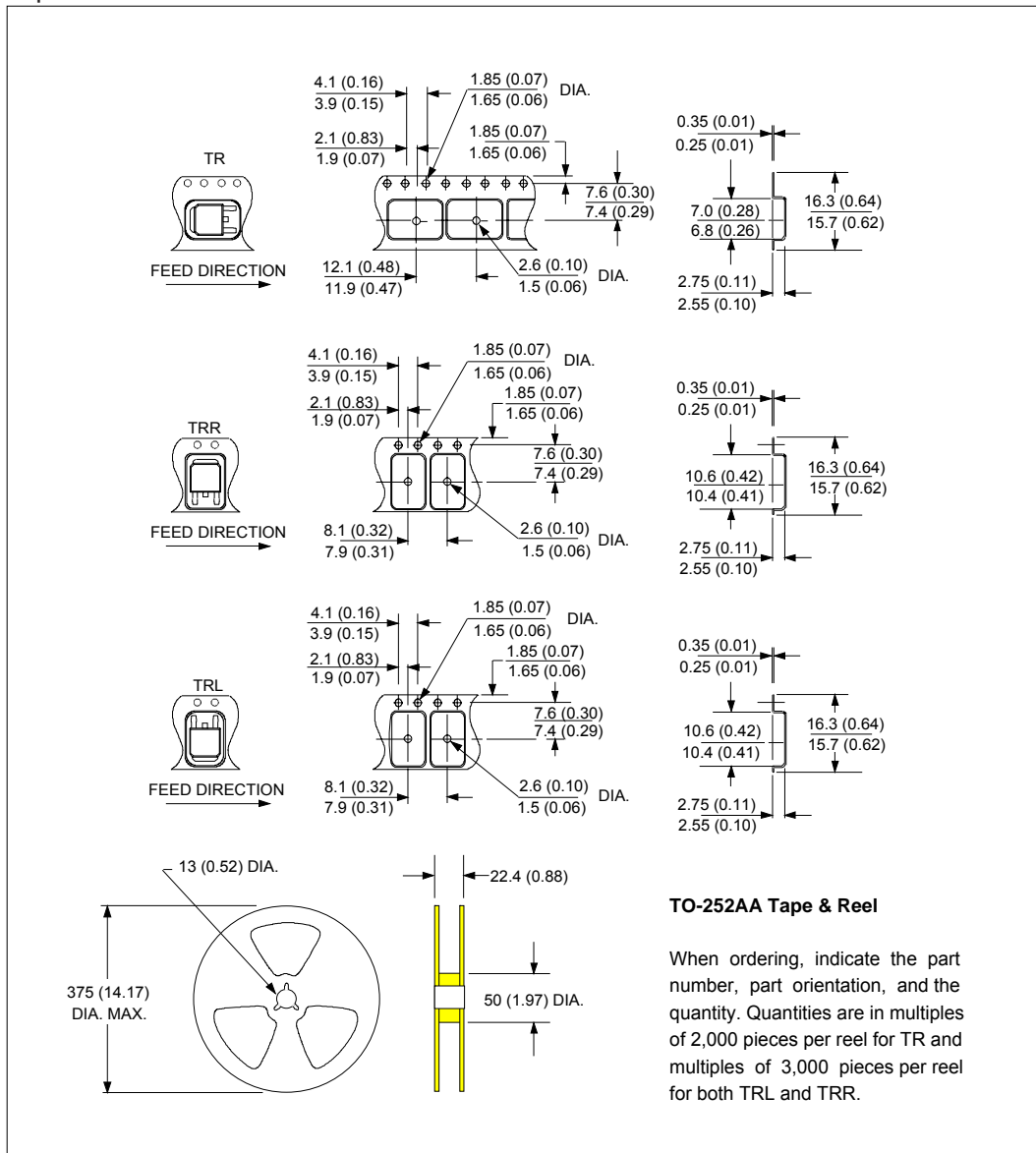
INTERNATIONAL
 RECTIFIER
 LOGO

ASSEMBLY
 LOT CODE

PART NUMBER

DATE CODE
 YEAR 0 = 2000
 WEEK 02
 X = SITE ID

Tape & Reel Information



Ordering Information Table

Device Code	
12	C
W	Q
10	FN
TRL	-
(1)	(2)
(3)	(4)
(5)	(6)
(7)	(8)
1	- Current Rating (12A)
2	- Center Tap Configuration
3	- Package Identifier W = D-Pak
4	- Schottky "Q" Series
5	- Voltage Rating (10 = 100V)
6	- FN = TO-252AA
7	- <ul style="list-style-type: none"> • none = Tube (50 pieces) • TR = Tape & Reel • TRL = Tape & Reel (Left Oriented) • TRR = Tape & Reel (Right Oriented)
8	- <ul style="list-style-type: none"> • 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.