

International  
**IR** Rectifier

# 6CWQ10FN

## SCHOTTKY RECTIFIER

## 7 Amp

$$I_{F(AV)} = 7\text{Amp}$$

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

### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	7	A
$V_{RRM}$	100	V
$I_{FSM}$ @ tp = 5 $\mu$ s sine	440	A
$V_F$ @ 3 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.63	V
$T_J$ range	-40 to 150	$^\circ\text{C}$

### Description/ Features

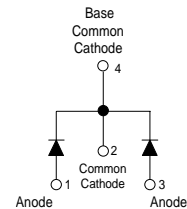
The 6CWQ10FN surface mount, center tap, Schottky rectifier series has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery 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	6CWQ10FN
$V_R$ Max. DC Reverse Voltage (V)	100
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	6CWQ...	Units	Conditions
$I_{F(AV)}$ Max. Average Forward (Per Leg) Current * See Fig. 5 (Per Device)	3.5	A	50% duty cycle @ $T_C = 135^\circ\text{C}$ , rectangular wave form
	7		
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	440	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse 10ms Sine or 6ms Rect. pulse
	70		
$E_{AS}$ Non-Repetit. Avalanche Energy (Per Leg)	5.0	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1$ Amp, $L = 10$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	0.5	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

## Electrical Specifications

Parameters	6CWQ...	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.81	V	@ 3A $T_J = 25^\circ\text{C}$
	0.96	V	@ 6A
	0.63	V	@ 3A $T_J = 125^\circ\text{C}$
	0.74	V	@ 6A
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	1	mA	$T_J = 25^\circ\text{C}$
	4.9	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$V_{F(TO)}$ Threshold Voltage	0.48	V	$T_J = T_J \text{ max.}$
$r_t$ Forward Slope Resistance	30.89	m $\Omega$	
$C_T$ Typ. Junction Capacitance (Per Leg)	92	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance (Per Leg)	5.0	nH	Measured lead to lead 5mm from package body
dv/dt Max. Voltage Rate of Change	10000	V/ $\mu\text{s}$	(Rated $V_R$ )

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle <2%

## Thermal-Mechanical Specifications

Parameters	6CWQ...	Units	Conditions
$T_J$ Max. Junction Temperature Range (*)	-40 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance (Per Leg) Junction to Case (Per Device)	4.70	$^\circ\text{C/W}$	DC operation * See Fig. 4
	2.35		
wt Approximate Weight	0.3 (0.01)	g (oz.)	
Case Style	D-Pak		Similar to TO-252AA
Marking Device	6CWQ10FN		

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

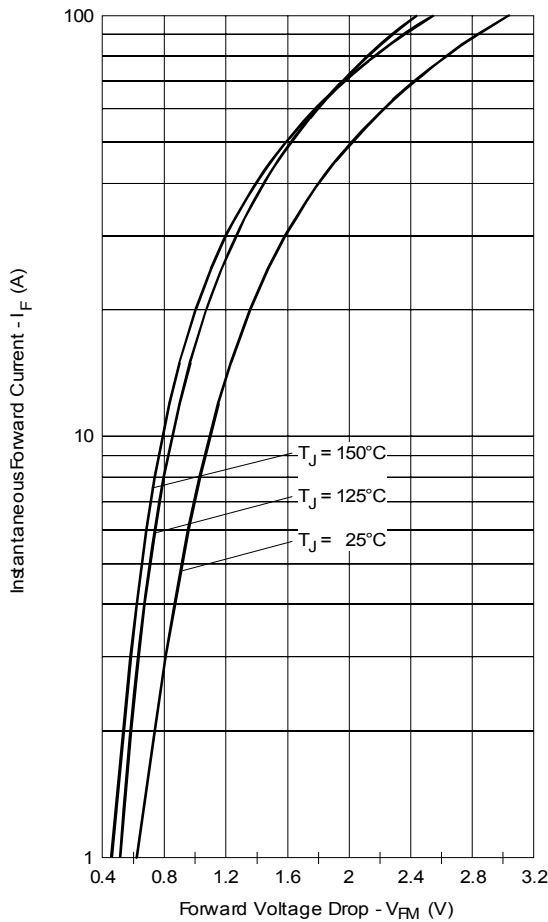


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

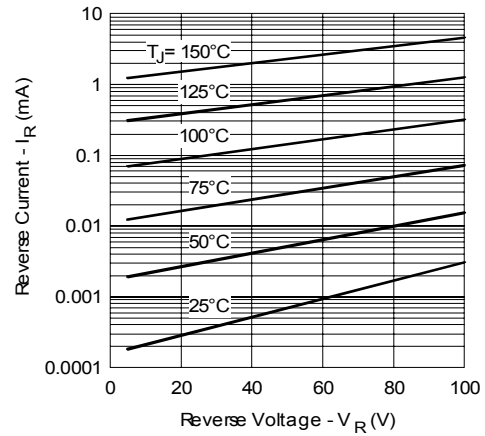


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

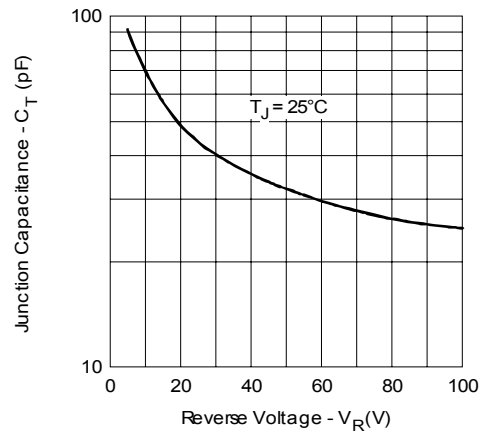


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

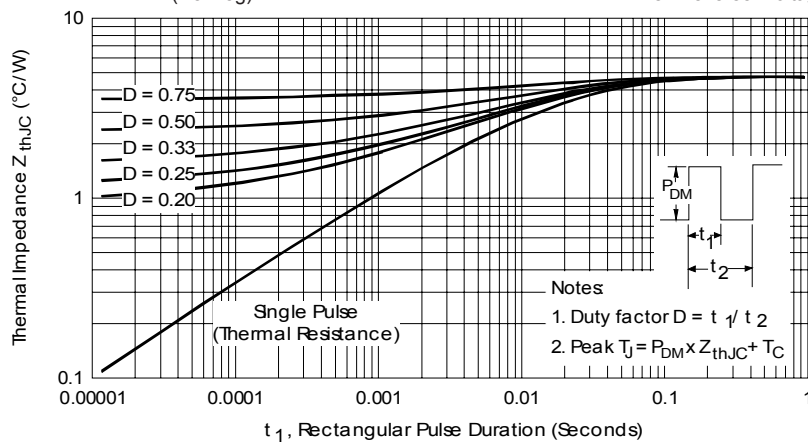


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

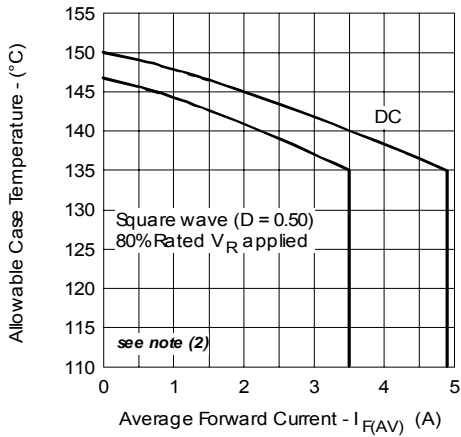


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

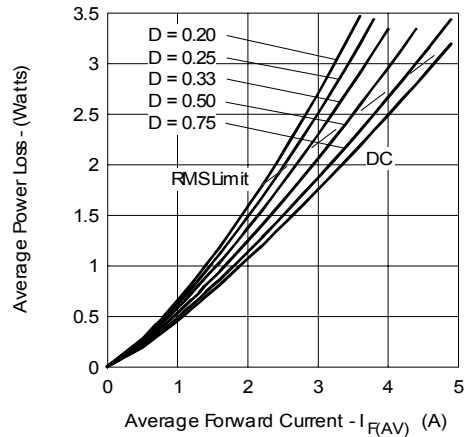


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

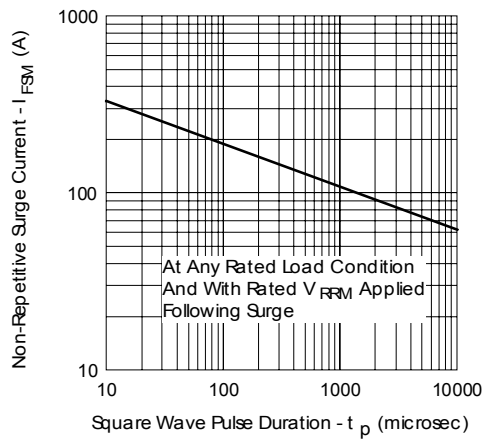


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

(2) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);  
 $P_{d_{REV}} = \text{Inverse Power Loss} = V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table

**NOTES**

- 1- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
- 2- DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)
- 3- LEAD DIMENSION UNCONTROLLED IN 10
- 4- DIMENSION OF E1, L3 & R3 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 FURTHEST EXTREMITY OF THE PLASTIC BODY.
- 7- DIMENSION B1 & B2 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		NOMINAL VALUE
	MILLIMETERS	INCHES	
A	2.18	2.39	.085
A1	—	0.13	—
b	0.84	0.89	.028
B1	0.65	0.79	.025
B2	0.78	1.14	.030
B3	4.93	3.40	.193
c	0.46	0.61	.018
c1	0.41	0.56	.016
c2	0.48	0.69	.018
D	0.97	6.22	.239
D1	0.21	—	.008
E	6.35	6.73	.250
E1	6.35	—	.170
H	9.40	10.41	.370
L	1.40	1.78	.055
L1	2.74	—	.108 REF.
L2	0.51	—	.020 BSC
L3	0.89	1.27	.035
L4	—	1.02	.040
L5	1.14	1.52	.045
#	0°	10°	0°
#1	0°	15°	0°
#2	25°	30°	25°

**LEAD ASSIGNMENTS**

**MARKET**

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

**IRF1 & CUPAK**

- 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 6CWQ10FN  
LOT CODE 8024  
ASSEMBLED ON WW 02, 2000

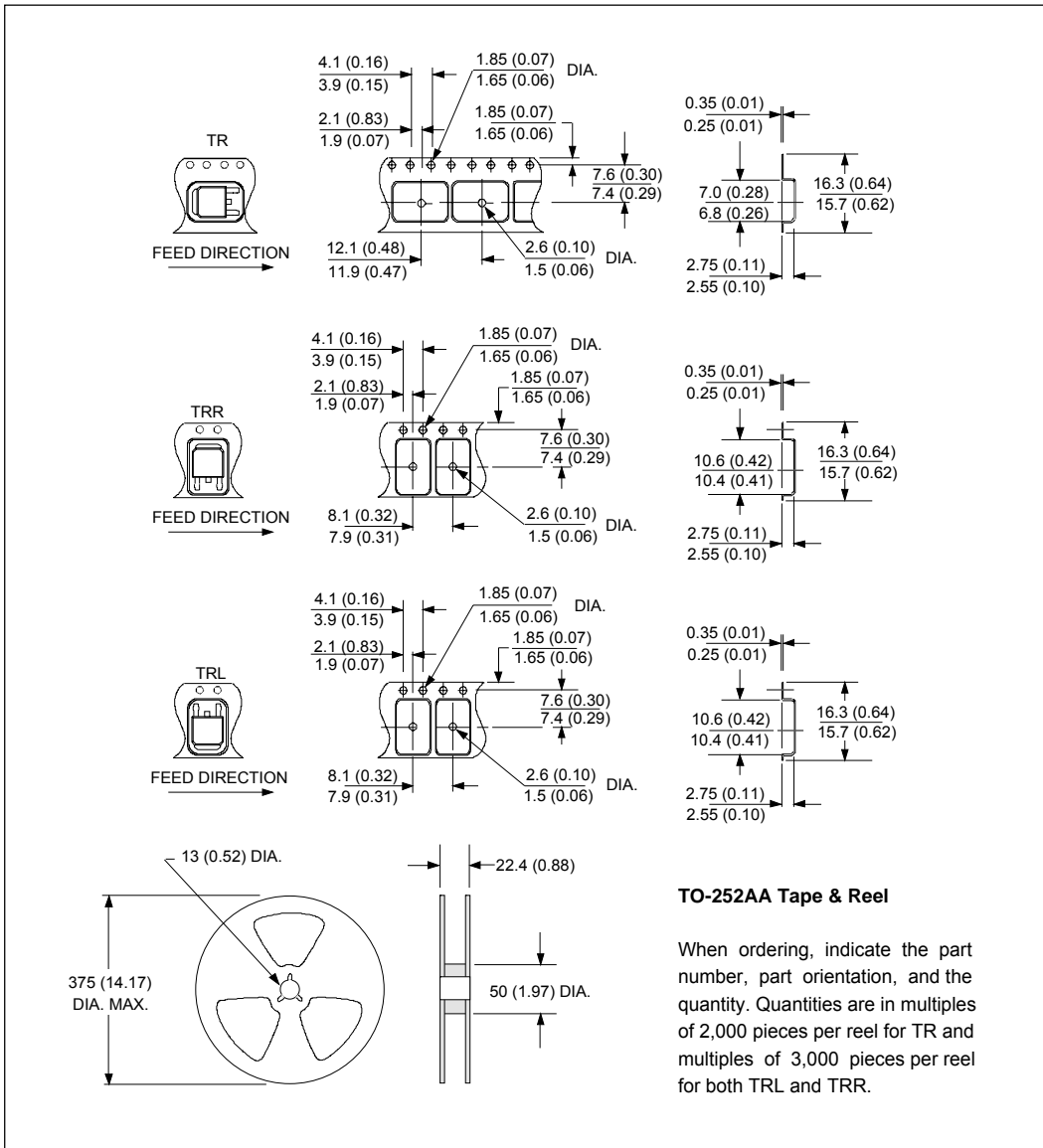
INTERNATIONAL  
RECTIFIER  
LOGO

ASSEMBLY  
LOT CODE

PART NUMBER

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

Tape & Reel Information



Ordering Information Table

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

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.