

International IOR Rectifier

6CWQ04FNPbF

SCHOTTKY RECTIFIER

7 Amp

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

$$V_R = 40\text{V}$$

Major Ratings and Characteristics

| Characteristics | Values | Units |
|--|------------|------------------|
| $I_{F(AV)}$ Rectangular waveform | 7 | A |
| V_{RRM} | 40 | V |
| I_{FSM} @ tp = 5 μ s sine | 500 | A |
| V_F @ 3 Apk, $T_J = 125^\circ\text{C}$ (per leg) | 0.49 | V |
| T_J range | -40 to 150 | $^\circ\text{C}$ |

Description/ Features

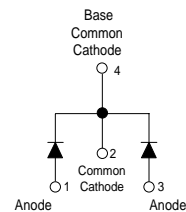
The 6CWQ04FNPbF surface mount, center tap, Schottky rectifier series has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery 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
- Lead-Free ("PbF" suffix)

Case Styles



D-PAK (TO-252AA)



6CWQ04FNPbF

Bulletin PD-21057 rev. B 07/06



Voltage Ratings

| | |
|--|-------------|
| Part number | 6CWQ04FNPbF |
| V _R Max. DC Reverse Voltage (V) | 40 |
| 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 7 | A | 50% duty cycle @ T _C = 135°C, rectangular wave form |
| I _{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 500 80 | A | 5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V _{RRM} applied |
| E _{AS} Non-Repet. Avalan. Energy (Per Leg) | 8.0 | mJ | T _J = 25 °C, I _{AS} = 1 Amp, L = 16 mH |
| I _{AR} Repetitive Avalanche Current (Per Leg) | 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 | 6CWQ... | Units | Conditions |
|---|---------|-------|---|
| V _{FM} Max. Forward Voltage Drop (Per Leg) * 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 (Per Leg) * See Fig. 2 (1) | 2 | mA | T _J = 25 °C |
| | 24 | mA | T _J = 125 °C V _R = rated V _R |
| V _{F(TO)} Threshold Voltage | 0.34 | V | T _J = T _J max. |
| r _t Forward Slope Resistance | 37.33 | mΩ | |
| C _T Typ. Junction Capacitance (Per Leg) | 189 | 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 |
| dv/dt Max. Voltage Rate of Change | 10000 | V/µs | (Rated V _R) |

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

Thermal-Mechanical Specifications

| Parameters | 6CWQ... | 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 (Per Leg) Junction to Case (Per Device) | 4.70 | °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 | 6CWQ04FN | | |

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

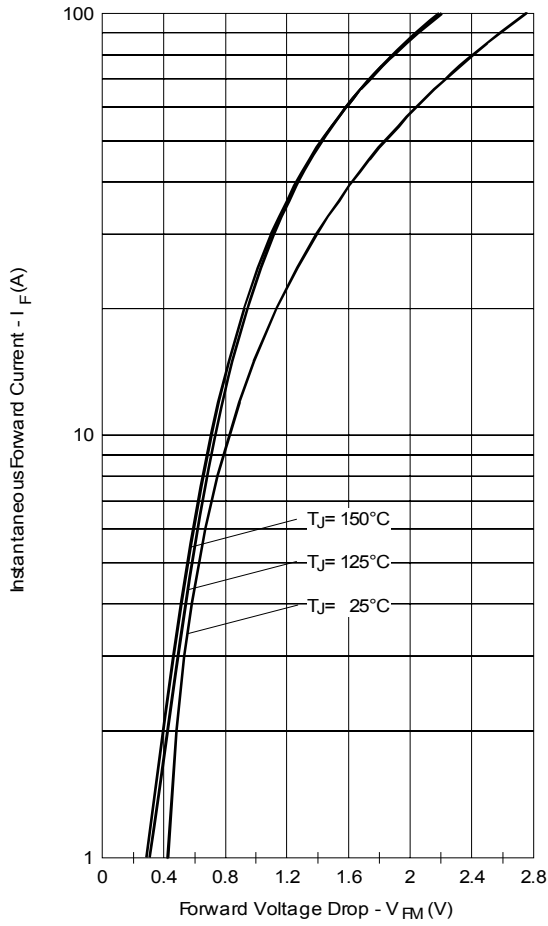


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

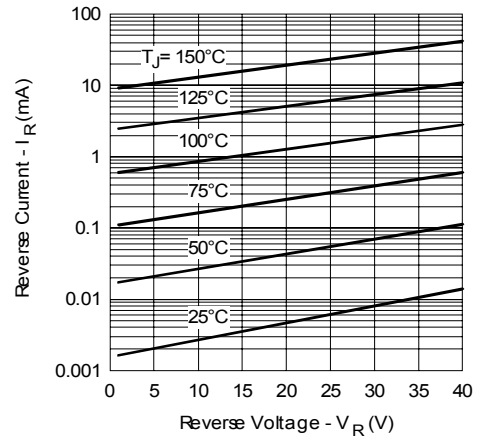


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

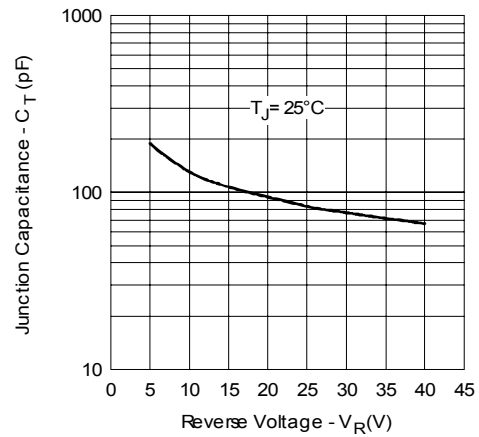


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

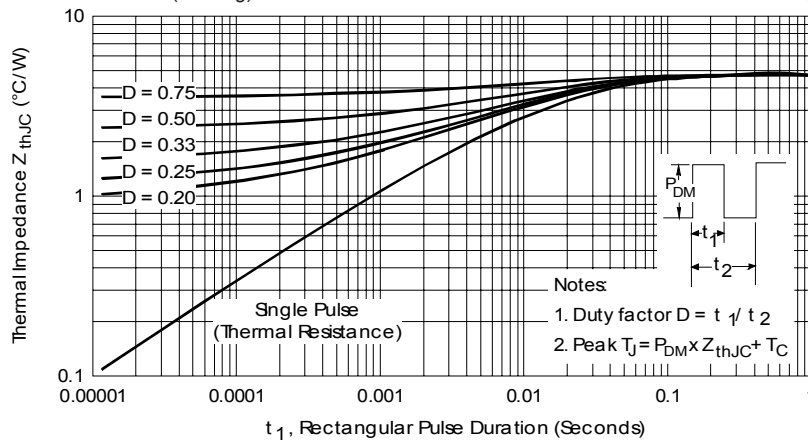


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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Bulletin PD-21057 rev. B 07/06

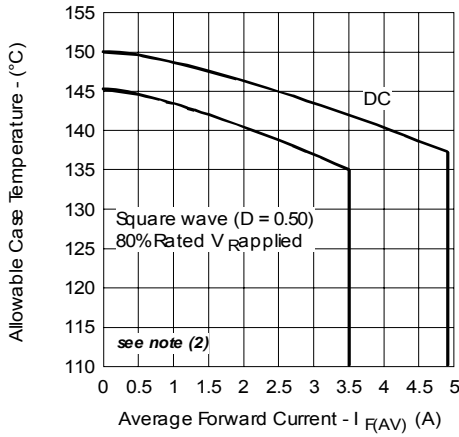


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

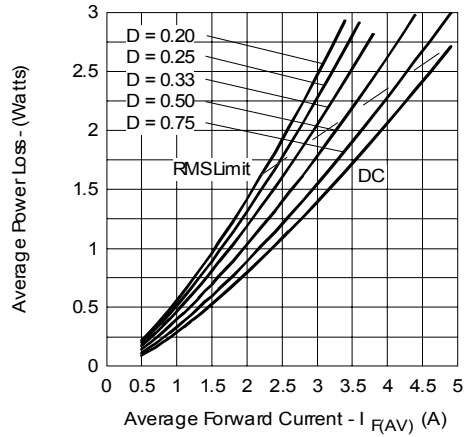


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

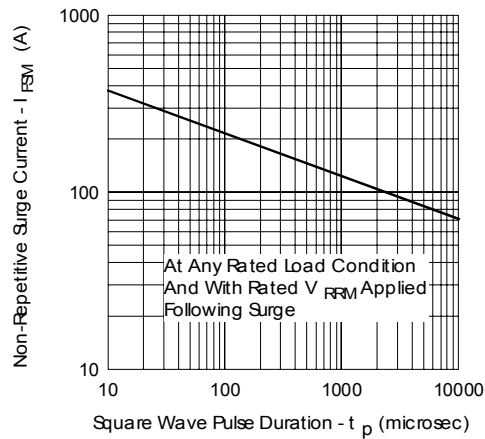


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

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

Outline Table

NOTES:

- 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
- 2.- DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]
- 3.- LEAD DIMENSION UNCONTROLLED IN L5
- 4.- DIMENSION D1, E1, L5 & 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 WELD FLASH. WELD 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 M.
- 9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

| DIMENSIONS | MILLIMETERS | | INCHES | | NOTES |
|------------|-------------|-----------|--------|------|-------|
| | MAX. | MIN. | MAX. | MIN. | |
| A | 2.15 | 2.59 | .086 | .104 | |
| A1 | - | 0.13 | - | .005 | |
| b | 0.64 | 0.89 | .025 | .035 | |
| b1 | 0.65 | 0.79 | .025 | .031 | |
| b2 | 0.76 | 1.14 | .030 | .045 | |
| b3 | 4.95 | 5.46 | .195 | .215 | |
| c | 0.46 | 0.61 | .018 | .024 | |
| c1 | 0.41 | 0.56 | .016 | .022 | |
| c2 | 0.46 | 0.89 | .018 | .035 | |
| D | 0.97 | 0.22 | .295 | .245 | |
| D1 | 5.21 | - | .205 | - | |
| E | 6.25 | 6.75 | .250 | .265 | |
| E1 | 4.32 | - | .170 | - | |
| 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 | 0.81 BSC | .020 BSC | | | |
| L3 | 0.89 | 1.27 | .035 | .050 | |
| L4 | - | 1.02 | - | .040 | |
| L5 | 1.14 | 1.52 | .045 | .060 | |
| a | 0° | 10° | 0° | 10° | |
| a1 | 0° | 15° | 0° | 15° | |
| a2 | 25° | 35° | 25° | 35° | |

LEAD ASSIGNMENTS

HEXFET

- 1.- GATE
- 2.- COLLECTOR
- 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 6CWQ04FN
LOT CODE 8024
ASSEMBLED ON WW 02, 2000

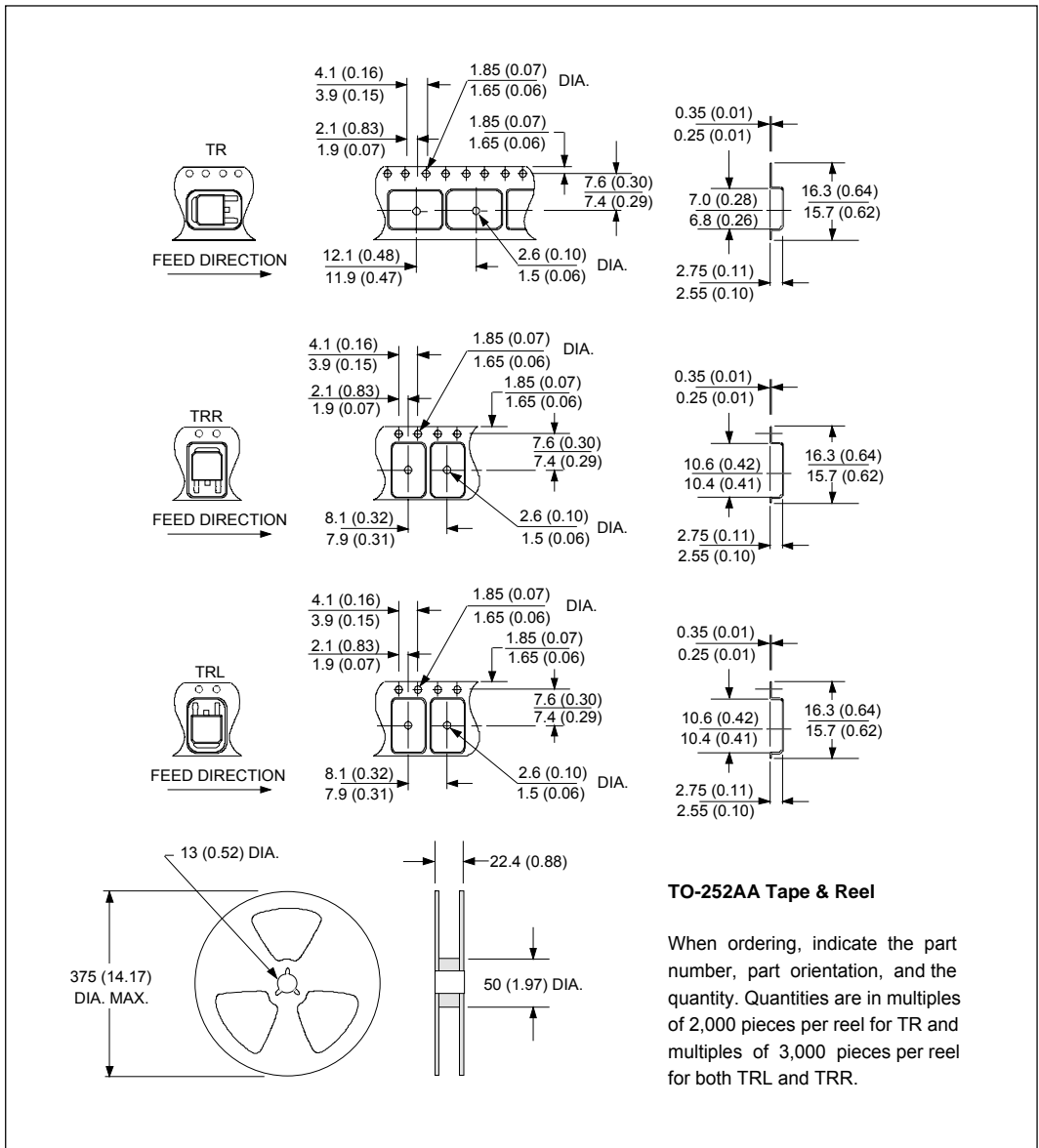
INTERNATIONAL
RECTIFIER
LOGO

ASSEMBLY
LOT CODE

PART NUMBER

DATE CODE
P = LEAD-FREE
YEAR 0 = 2000
WEEK 02
X = SITE ID

Tape & Reel Information



Ordering Information Table

| Device Code | 6 | C | W | Q | 04 | FN | TRL | PbF |
|-------------|---|---|---|---|----|----|-----|-----|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| 1 | - | Current Rating (7A) | | | | | | |
| 2 | - | Center Tap Configuration | | | | | | |
| 3 | - | Package Identifier | | | | | | |
| | | W = D-Pak | | | | | | |
| 4 | - | Schottky "Q" Series | | | | | | |
| 5 | - | Voltage Rating (04 = 40V) | | | | | | |
| 6 | - | FN = TO-252AA (D-Pak) | | | | | | |
| 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 and Lead-Free.
Qualification Standards can be found on IR's Web site.