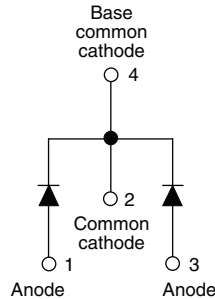


Schottky Rectifier, 2 x 6 A


D-PAK


FEATURES

- 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 (Pb)-free ("PbF" suffix)
- Designed and qualified for AEC Q101 level


RoHS*
COMPLIANT

PRODUCT SUMMARY

| | |
|-------------|---------|
| $I_{F(AV)}$ | 2 x 6 A |
| V_R | 40 V |

DESCRIPTION

The 12CWQ04FNPbF 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, freewheeling diodes, battery charging, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|--------------------------------------|-------------|------------|
| $I_{F(AV)}$ | Rectangular waveform | 12 | A |
| V_{RRM} | | 40 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 550 | A |
| V_F | 6 Apk, $T_J = 125^\circ C$ (per leg) | 0.48 | V |
| T_J | Range | - 55 to 150 | $^\circ C$ |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | 12CWQ04FNPbF | UNITS |
|--------------------------------------|-----------|--------------|-------|
| Maximum DC reverse voltage | V_R | 40 | V |
| Maximum working peak reverse voltage | V_{RWM} | | |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current See fig. 5 | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 134^\circ C$, rectangular waveform | 6 | A |
| | | | 12 | |
| Maximum peak one cycle non-repetitive surge current See fig. 7 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 550 | A |
| | | 10 ms sine or 6 ms rect. pulse | 90 | |
| Non-repetitive avalanche energy per leg | E_{AS} | $T_J = 25^\circ C$, $I_{AS} = 1.5 A$, $L = 8 mH$ | 9 | mJ |
| Repetitive avalanche current per leg | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 1.2 | A |

* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS | | | | | |
|---|----------------|---|-----------------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop per leg See fig. 1 | $V_{FM}^{(1)}$ | 6 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.53 | V |
| | | 12 A | | 0.68 | |
| | | 6 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.48 | |
| | | 12 A | | 0.64 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 3 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 40 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J \text{ maximum}$ | | 0.28 | V |
| Forward slope resistance | r_t | | | 25.58 | m Ω |
| Typical junction capacitance per leg | C_T | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 405 | pF |
| Typical series inductance per leg | L_S | Measured lead to lead 5 mm from package body | | 5.0 | nH |

Note

(1) Pulse width < 300 μ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | |
|---|----------------------|--|------------|-------------|---------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum junction and storage temperature range | $T_J^{(1)}, T_{Stg}$ | | | - 55 to 150 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation See fig. 4 | per leg | 3.0 | $^\circ\text{C}/\text{W}$ |
| | | | per device | 1.5 | |
| Approximate weight | | | | 0.3 | g |
| | | | | 0.01 | oz. |
| Marking device | | Case style D-PAK (similar to TO-252AA) | 12CWQ04FN | | |

Note

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

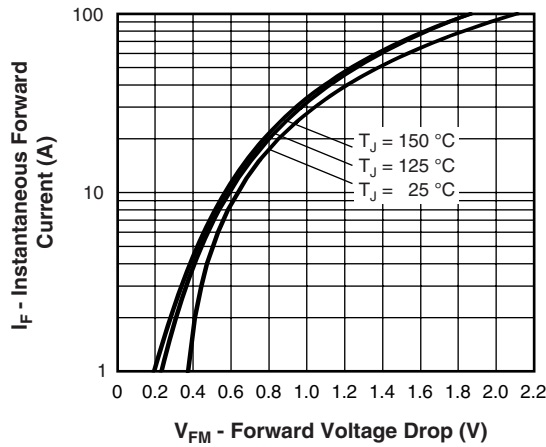


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

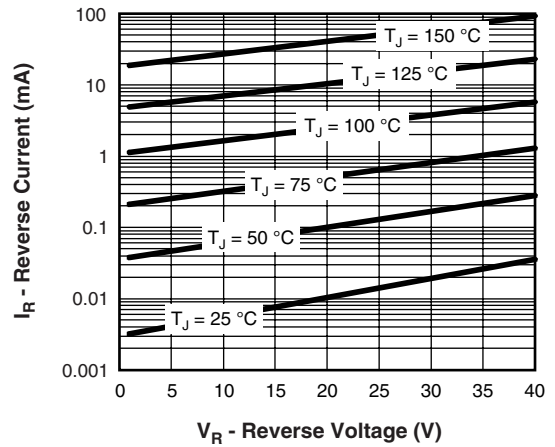


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

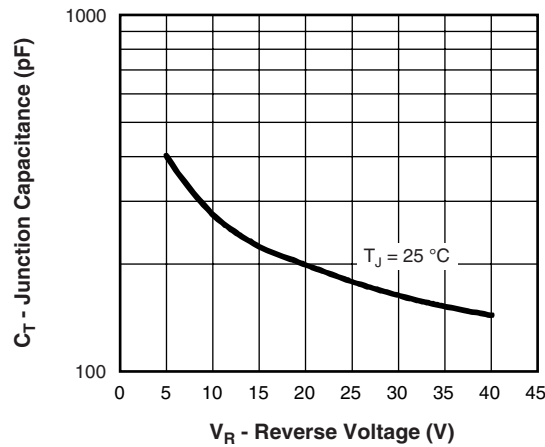


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

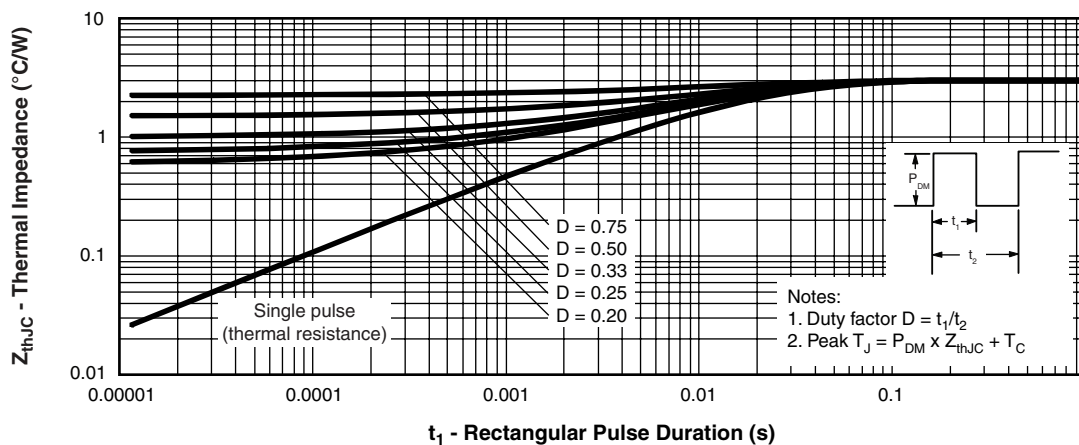


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

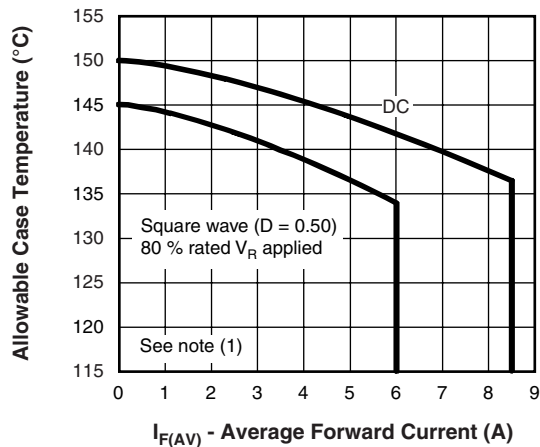


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

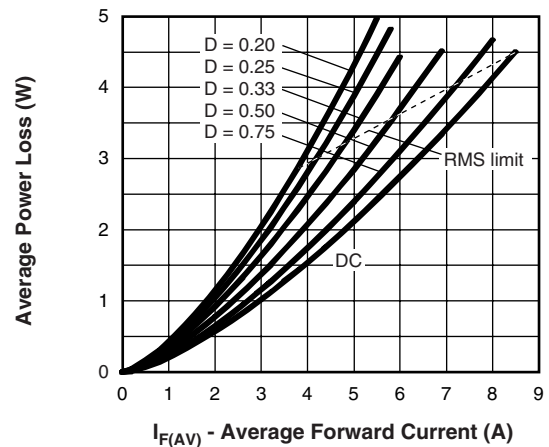


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

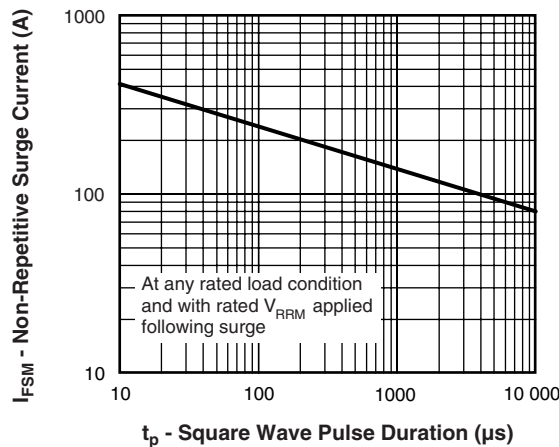


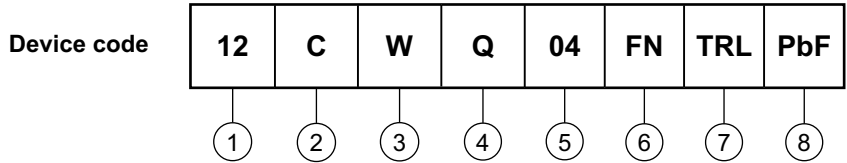
Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



ORDERING INFORMATION TABLE



- 1** - Current rating (12 A)
- 2** - Center tap configuration
- 3** - Package identifier:
W = D-PAK
- 4** - Schottky "Q" series
- 5** - Voltage rating (04 = 40 V)
- 6** - FN = TO-252AA
- 7** -
 - None = Tube (50 pieces)
 - TR = Tape and reel
 - TRL = Tape and reel (left oriented)
 - TRR = Tape and reel (right oriented)
- 8** -
 - None = Standard production
 - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95016 |
| Part marking information | http://www.vishay.com/doc?95059 |
| Packaging information | http://www.vishay.com/doc?95033 |



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