

## 10A, 600V High Efficient Surface Mount Rectifier

### FEATURES

- AEC-Q101 qualified
- Planar technology
- Low power loss, high efficiency
- Ideal for automated placement
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free

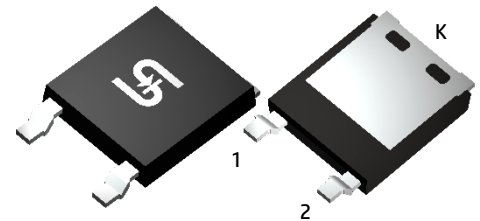
### APPLICATIONS

- DC to DC converter
- Switching mode converters and inverters
- Lighting application
- Snubber
- Freewheeling application

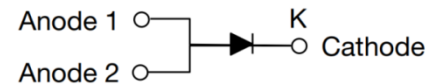
### MECHANICAL DATA

- Case: ThinDPAK
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 0.193g (approximately)

| KEY PARAMETERS    |            |      |
|-------------------|------------|------|
| PARAMETER         | VALUE      | UNIT |
| $I_F$             | 10         | A    |
| $V_{RRM}$         | 600        | V    |
| $I_{FSM}$         | 120        | A    |
| $T_J \text{ MAX}$ | 175        | °C   |
| Package           | ThinDPAK   |      |
| Configuration     | Single die |      |



ThinDPAK



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| PARAMETER                                                                   |                    | SYMBOL       | VALUE       | UNIT |
|-----------------------------------------------------------------------------|--------------------|--------------|-------------|------|
| Repetitive peak reverse voltage                                             |                    | $V_{RRM}$    | 600         | V    |
| Reverse voltage, total rms value                                            |                    | $V_{R(RMS)}$ | 420         | V    |
| Forward current                                                             |                    | $I_F$        | 10          | A    |
| Surge peak forward current single half sine-wave superimposed on rated load | $t = 8.3\text{ms}$ | $I_{FSM}$    | 120         | A    |
|                                                                             | $t = 1.0\text{ms}$ |              | 240         |      |
| Junction temperature                                                        |                    | $T_J$        | -55 to +175 | °C   |
| Storage temperature                                                         |                    | $T_{STG}$    | -55 to +175 | °C   |

**THERMAL PERFORMANCE**

| PARAMETER                              | SYMBOL          | TYP | UNIT |
|----------------------------------------|-----------------|-----|------|
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 4   | °C/W |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 12  | °C/W |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 2   | °C/W |

**Thermal Performance Note:** Units mounted on heatsink 2"x 3"x 0.25" Al-plate

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| PARAMETER                                    | CONDITIONS                                                             | SYMBOL   | TYP  | MAX | UNIT          |
|----------------------------------------------|------------------------------------------------------------------------|----------|------|-----|---------------|
| Forward voltage <sup>(1)</sup>               | $I_F = 5\text{A}, T_J = 25^\circ\text{C}$                              | $V_F$    | 1.01 | -   | V             |
|                                              | $I_F = 10\text{A}, T_J = 25^\circ\text{C}$                             |          | 1.11 | 1.3 | V             |
|                                              | $I_F = 5\text{A}, T_J = 125^\circ\text{C}$                             |          | 0.84 | -   | V             |
|                                              | $I_F = 10\text{A}, T_J = 125^\circ\text{C}$                            |          | 0.98 | -   | V             |
| Reverse current @ rated $V_R$ <sup>(2)</sup> | $T_J = 25^\circ\text{C}$                                               | $I_R$    | -    | 5   | $\mu\text{A}$ |
|                                              | $T_J = 125^\circ\text{C}$                                              |          | 3    | -   | $\mu\text{A}$ |
| Junction capacitance                         | 1MHz, $V_R = 4.0\text{V}$                                              | $C_J$    | 45   | -   | pF            |
| Reverse recovery time                        | $I_F = 0.5\text{A}, I_R = 1.0\text{A}, I_{rr} = 0.25\text{A}$          | $t_{rr}$ | -    | 60  | ns            |
|                                              | $I_F = 1.0\text{A}, di/dt = 50\text{A}/\mu\text{s}, V_R = 30\text{V}$  |          | 46   | -   |               |
| Reverse recovery current                     | $I_F = 10\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_R = 400\text{V}$ | $I_{RM}$ | 7.1  | -   | A             |
| Reverse recovery charge                      |                                                                        | $Q_{rr}$ | 566  | -   | nC            |
| Reverse recovery time                        |                                                                        | $t_{rr}$ | 111  | -   | ns            |

**Notes:**

1. Pulse test with  $PW = 0.3\text{ms}$
2. Pulse test with  $PW = 30\text{ms}$

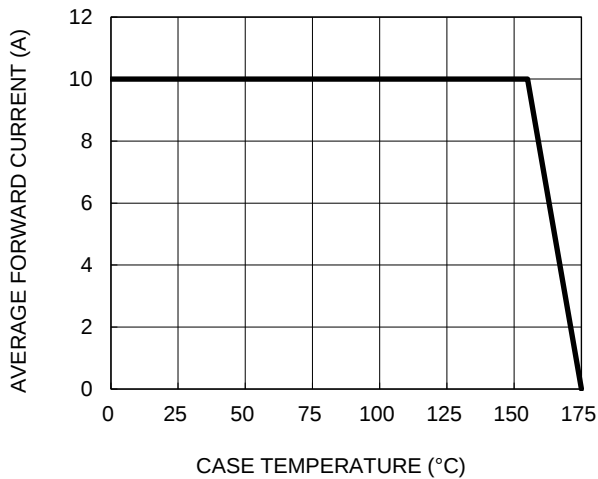
**ORDERING INFORMATION**

| ORDERING CODE | PACKAGE  | PACKING             |
|---------------|----------|---------------------|
| PHAD10JH      | ThinDPAK | 4,500 / Tape & Reel |

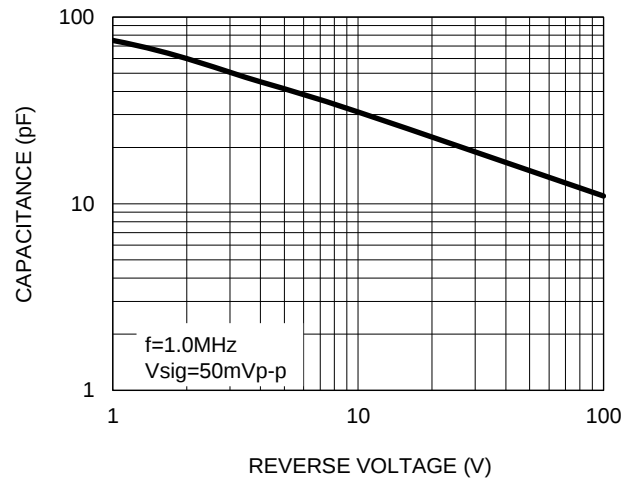
## CHARACTERISTICS CURVES

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

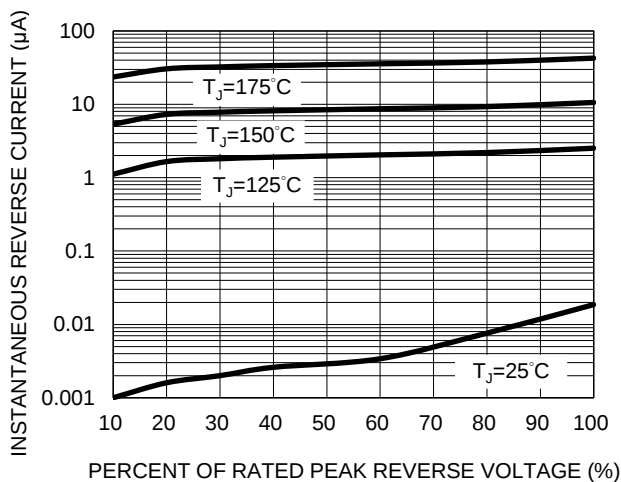
**Fig.1 Forward Current Derating Curve**



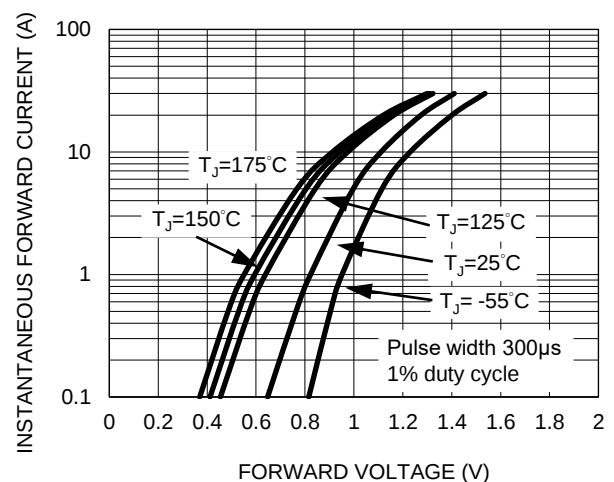
**Fig.2 Typical Junction Capacitance**



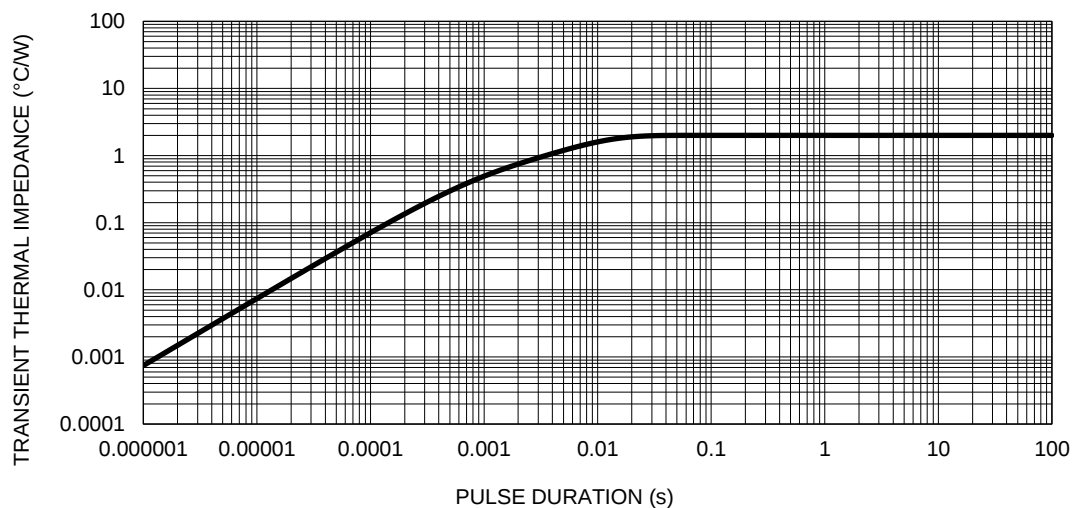
**Fig.3 Typical Reverse Characteristics**



**Fig.4 Typical Forward Characteristics**

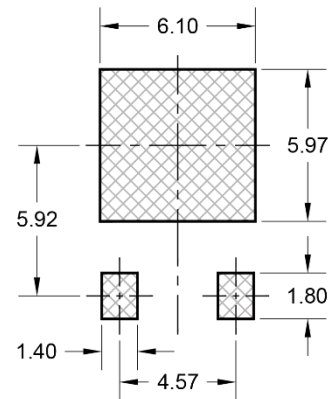
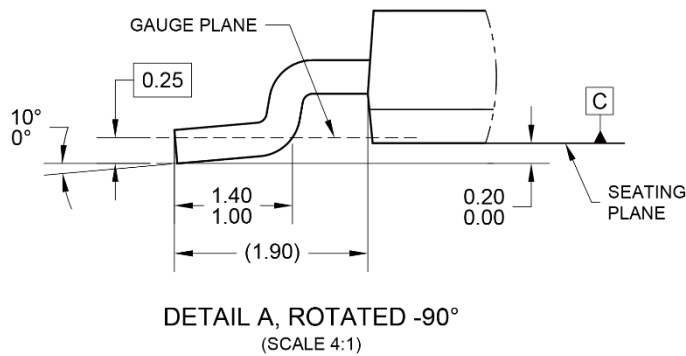
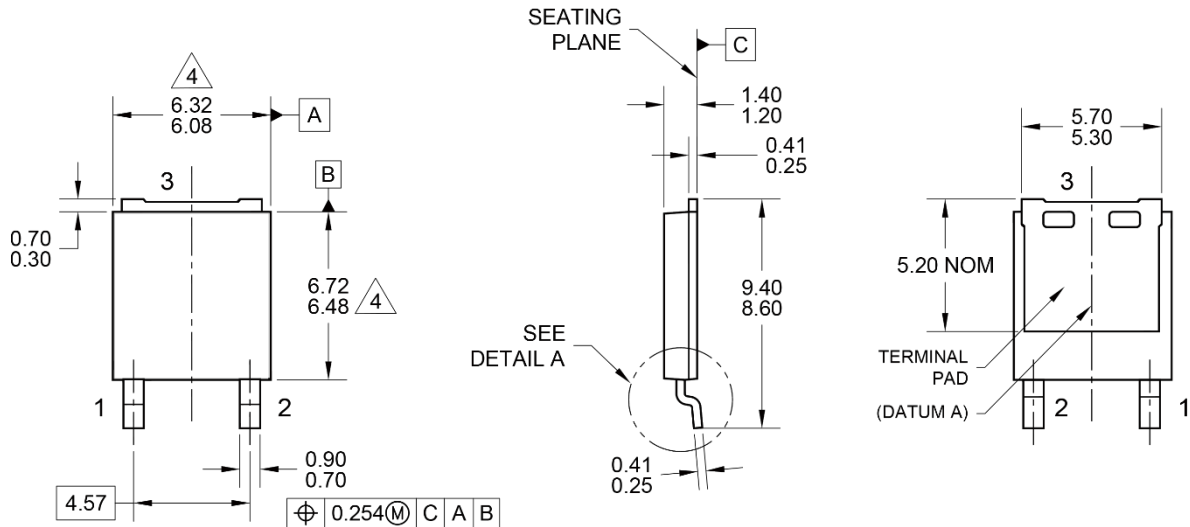


**Fig.5 Typical Transient Thermal Impedance**

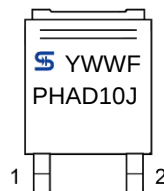


## PACKAGE OUTLINE DIMENSIONS

### ThinDPAK



### SUGGESTED PAD LAYOUT



### MARKING DIAGRAM

YWW = DATE CODE  
F = FACTORY CODE

### NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC TO-252, VARIATION AE, ISSUE F.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION, OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-TDPAK-065 REV A.

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