

## 6A, 200V - 600V Surface Mount Ultrafast Rectifiers

### FEATURES

- Very low profile, typical height of 1.1mm
- Excellent high temperature stability
- Glass passivated chip junction
- Controlled avalanche characteristics
- Low leakage current
- High forward surge capability
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### TYPICAL APPLICATIONS

For use in high voltage, high frequency power factor corrections, switching mode power supplies, freewheeling diodes and secondary dc to dc rectifications

### MECHANICAL DATA

**Case:** TO-277A (SMPC)

Molding compound, UL flammability classification rating 94V-0

Moisture sensitivity level: level 1, per J-STD-020

Part no. with suffix "H" means AEC-Q101 qualified

Packing code suffix "G" means green compound (halogen-free)

**Terminal:** Matte tin plated leads, solderable per JESD22-B102

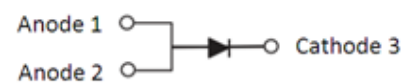
Meet JESD 201 class 1A whisker test

**Polarity:** Indicated by cathode band

**Weight:** 95 mg (approximately)



TO-277A (SMPC)



| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted) |  |                                                                  |                                 |                 |              |        |      |      |   |
|----------------------------------------------------------------------------------------------|--|------------------------------------------------------------------|---------------------------------|-----------------|--------------|--------|------|------|---|
| PARAMETER                                                                                    |  |                                                                  | SYMBOL                          | TPUH6D          |              | TPUH6J |      | UNIT |   |
| Marking code                                                                                 |  |                                                                  |                                 | UH6D            |              | UH6J   |      |      |   |
| Maximum repetitive peak reverse voltage                                                      |  |                                                                  | V <sub>RRM</sub>                | 200             |              | 600    |      | V    |   |
| Maximum average forward rectified current                                                    |  |                                                                  | I <sub>F(AV)</sub>              | 6               |              |        |      | A    |   |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load          |  |                                                                  | I <sub>FSM</sub>                | 80              |              |        |      | A    |   |
| Maximum instantaneous forward voltage <sup>(1)</sup>                                         |  | Test condition                                                   |                                 | V <sub>F</sub>  | TYP          | MAX    | TYP  | MAX  | V |
|                                                                                              |  | I <sub>F</sub> =3A                                               | T <sub>J</sub> =25°C            |                 | 0.80         | -      | 1.98 | -    |   |
|                                                                                              |  |                                                                  | T <sub>J</sub> =125°C           |                 | 0.65         | -      | 1.23 | -    |   |
|                                                                                              |  | I <sub>F</sub> =6A                                               | T <sub>J</sub> =25°C            |                 | 0.87         | 1.05   | 2.45 | 3.00 |   |
|                                                                                              |  |                                                                  | T <sub>J</sub> =125°C           |                 | 0.73         | 0.90   | 1.59 | 1.80 |   |
| Maximum reverse current @ rated V <sub>R</sub>                                               |  | T <sub>J</sub> =25°C                                             |                                 | I <sub>R</sub>  | 10           |        |      | μA   |   |
|                                                                                              |  | T <sub>J</sub> =125°C                                            |                                 |                 | 200          |        |      |      |   |
| Maximum reverse recovery time                                                                |  | I <sub>F</sub> =0.5A, I <sub>R</sub> =1A, I <sub>RR</sub> =0.25A |                                 | t <sub>rr</sub> | 25           |        |      | ns   |   |
|                                                                                              |  | I <sub>F</sub> =1A, di/dt=-50A/μs, V <sub>R</sub> =30V           |                                 |                 | 45           |        |      |      |   |
| Typical thermal resistance                                                                   |  |                                                                  | R <sub>θJM</sub> <sup>(2)</sup> |                 | 12           |        |      | °C/W |   |
|                                                                                              |  |                                                                  | R <sub>θJA</sub> <sup>(3)</sup> |                 | 80           |        |      |      |   |
| Typical junction capacitance <sup>(4)</sup>                                                  |  |                                                                  | C <sub>J</sub>                  |                 | 50           |        |      | pF   |   |
| Operating junction temperature range                                                         |  |                                                                  | T <sub>J</sub>                  |                 | - 55 to +175 |        |      | °C   |   |
| Storage temperature range                                                                    |  |                                                                  | T <sub>STG</sub>                |                 | - 55 to +175 |        |      | °C   |   |

Note 1: Pulse test with PW=300μs, 1% duty cycle

Note 2: Mounted on FR4 PCB with 16mm x 16mm Cu pad area

Note 3: Free air, mounted on recommended pad

Note 4: Measured at 1 MHz and Applied V<sub>R</sub>=4.0 V

| ORDERING INFORMATION  |                 |              |                     |         |                         |
|-----------------------|-----------------|--------------|---------------------|---------|-------------------------|
| PART NO.              | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | PACKAGE | PACKING                 |
| TPUH6x<br>(Note 1, 2) | H               | S1           | G                   | SMPC    | 1,500/ 7" Plastic reel  |
|                       |                 | S2           |                     | SMPC    | 6,000/ 13" Plastic reel |

Note 1: "x" defines voltage from 200V (TPUH6D) to 600V (TPUH6J)

Note 2: Whole series with green compound

| EXAMPLE            |          |                 |              |                     |                                      |
|--------------------|----------|-----------------|--------------|---------------------|--------------------------------------|
| PREFERRED PART NO. | PART NO. | PART NO. SUFFIX | PACKING CODE | PACKING CODE SUFFIX | DESCRIPTION                          |
| TPUH6JHS1G         | TPUH6J   | H               | S1           | G                   | AEC-Q101 qualified<br>Green compound |

## RATINGS AND CHARACTERISTICS CURVES

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

FIG. 1 MAXIMUM FORWARD CURRENT DERATING CURVE

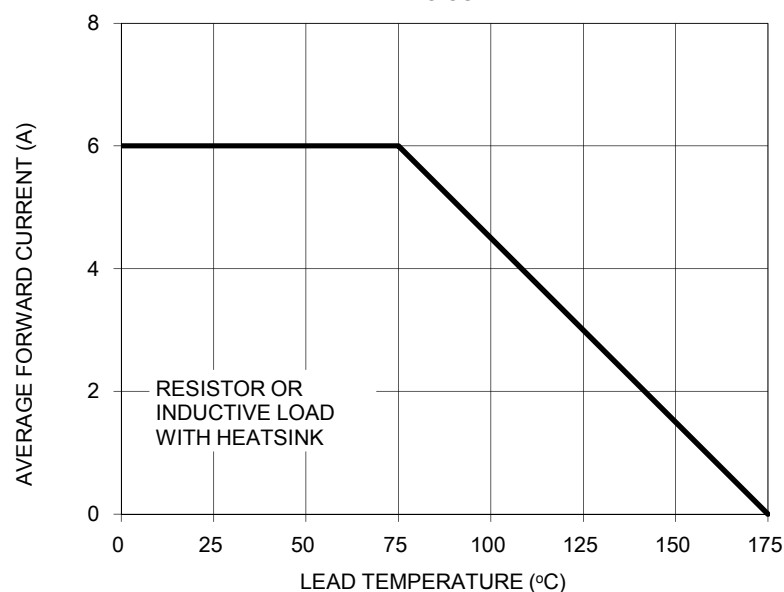


FIG. 2 TYPICAL INSTANTANEOUS FORWARD CHARACTERISTICS

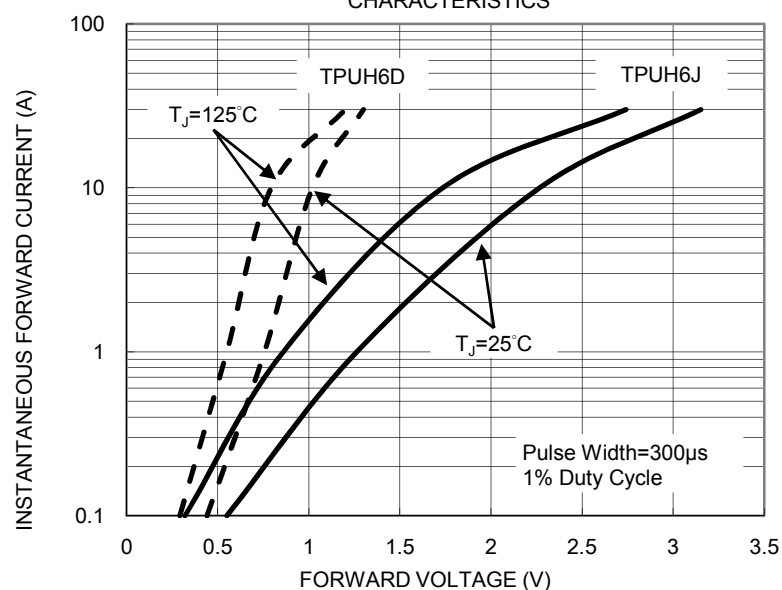


FIG. 3 MAXIMUM NON-REPETITIVE FORWARD PEAK SURGE CURRENT

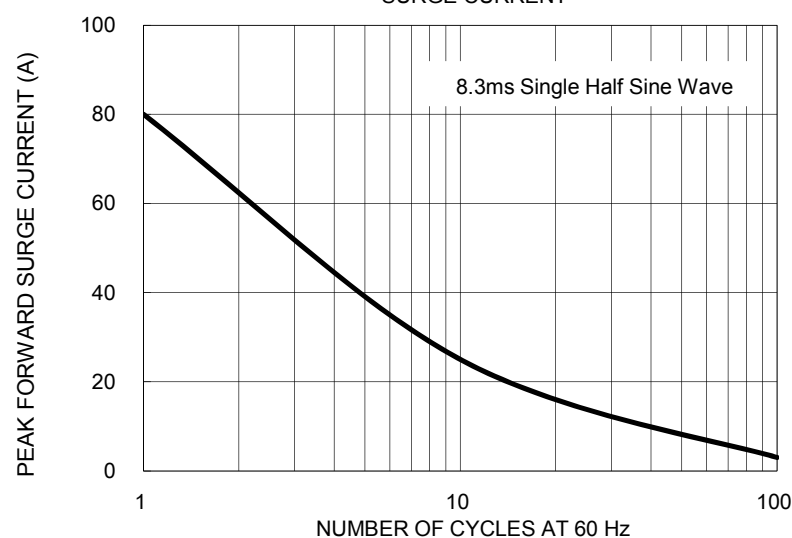


FIG. 4 TYPICAL REVERSE CHARACTERISTICS

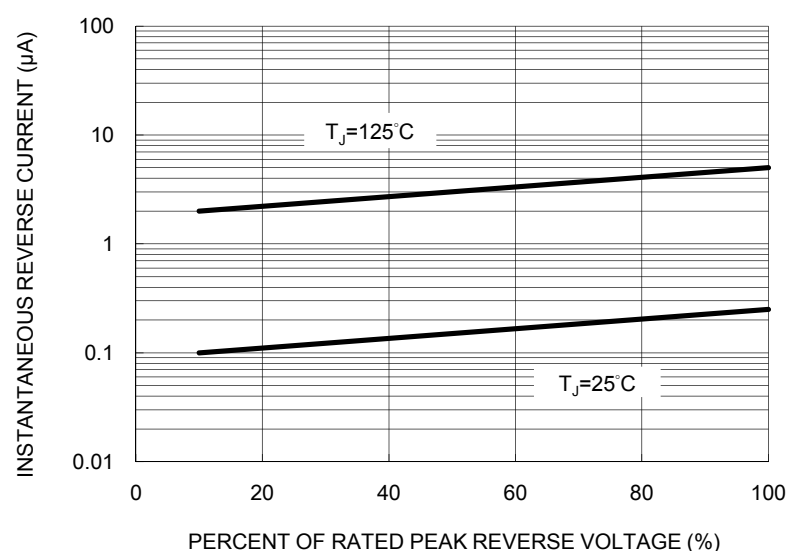


FIG. 5 TYPICAL JUNCTION CAPACITANCE

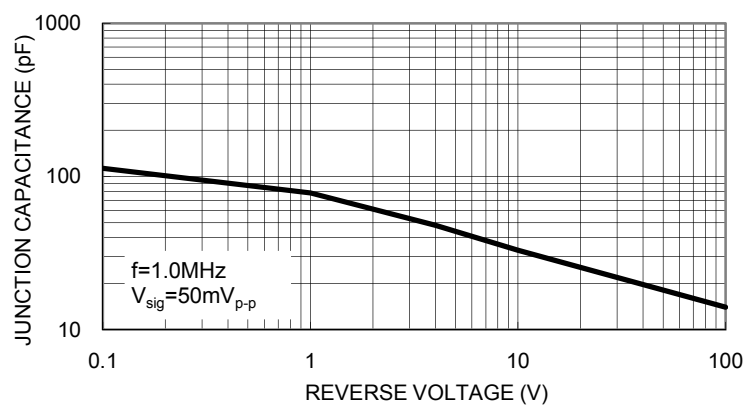
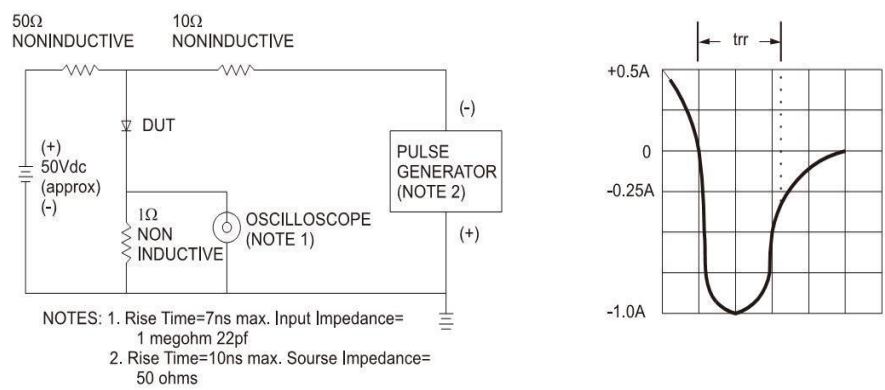
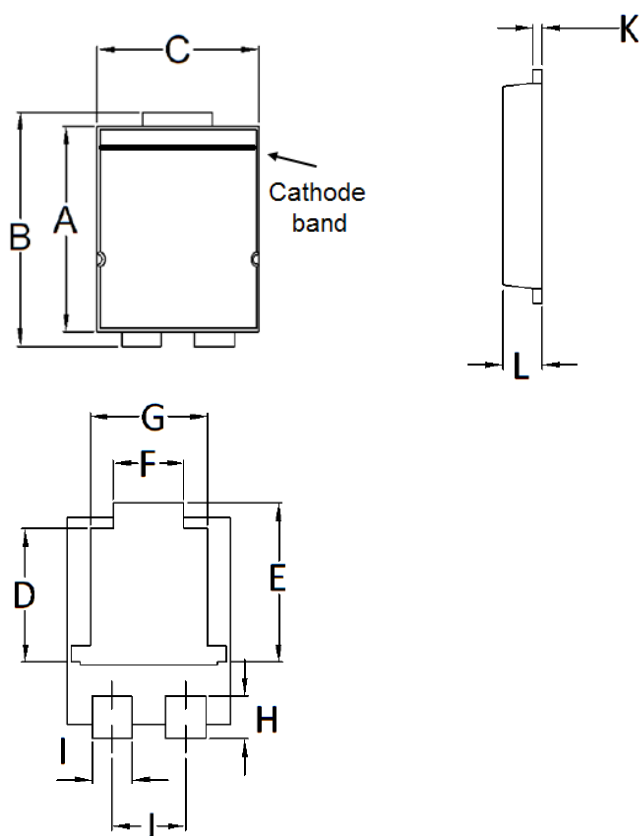


FIG.6 REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT DIAGRAM

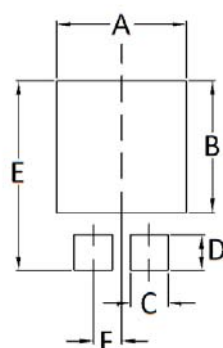


PACKAGE OUTLINE DIMENSIONS  
TO-277A (SMPC)



| DIM. | Unit (mm) |       | Unit (inch) |       |
|------|-----------|-------|-------------|-------|
|      | Min       | Max   | Min         | Max   |
| A    | 5.650     | 5.750 | 0.222       | 0.226 |
| B    | 6.350     | 6.650 | 0.250       | 0.262 |
| C    | 4.550     | 4.650 | 0.179       | 0.183 |
| D    | 3.540     | 3.840 | 0.139       | 0.151 |
| E    | 4.235     | 4.535 | 0.167       | 0.179 |
| F    | 1.850     | 2.150 | 0.073       | 0.085 |
| G    | 3.170     | 3.470 | 0.125       | 0.137 |
| H    | 1.043     | 1.343 | 0.041       | 0.053 |
| I    | 1.000     | 1.300 | 0.039       | 0.051 |
| J    | 1.930     | 2.230 | 0.076       | 0.088 |
| K    | 0.175     | 0.325 | 0.007       | 0.013 |
| L    | 1.000     | 1.200 | 0.039       | 0.047 |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 4.80      | 0.189       |
| B      | 4.72      | 0.186       |
| C      | 1.40      | 0.055       |
| D      | 1.27      | 0.050       |
| E      | 6.80      | 0.268       |
| F      | 1.04      | 0.041       |

MARKING DIAGRAM



P/N = Marking Code  
YW = Date Code  
F = Factory Code

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