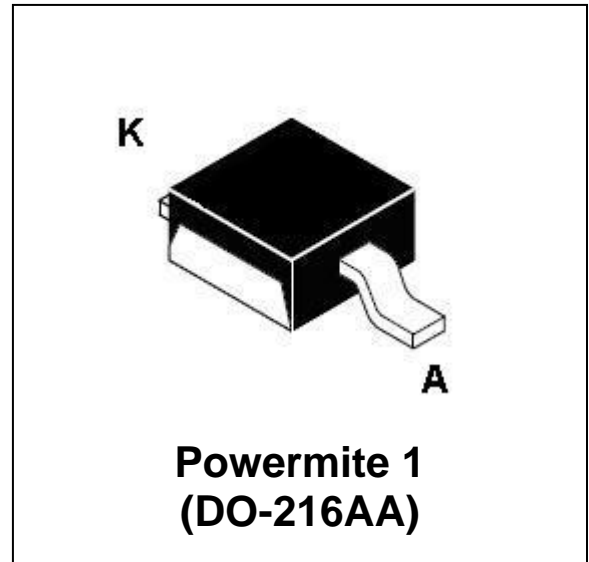


### Main product characteristics

|              |        |
|--------------|--------|
| $I_O$        | 1A     |
| $V_{RRM}$    | 20V    |
| $T_{j(MAX)}$ | 125°C  |
| $V_{F(MAX)}$ | 0.415V |

### Features and benefits

- Low forward voltage drop
- Low profile package height
- Efficient heat path with integral locking bottom metal tab
- Low thermal resistance DO-216AA package



### Description and applications

Single schottky rectifier assembled in Powermite 1<sup>®</sup> package which features a full metallic bottom that eliminates possibility of solder flux entrapment during assembly. The package also incorporates a unique locking tab which acts as an efficient heat path from die to mounting plane for external heat sinking with very low thermal resistance junction to case (bottom).

This product is suitable for use in switching and regulating power supplies and also charge pump circuits.

### Absolute maximum ratings<sup>(1)</sup>

| Symbol                          | Parameter  | Value       | Unit             |
|---------------------------------|--|-------------|------------------|
| $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | 20          | V                |
| $V_{R(RMS)}$                    | RMS Reverse Voltage  | 14          | V                |
| $I_O$                           | Average rectified forward output current<br>( $T_C = 135^\circ\text{C}$ )              | 1.0         | A                |
| $I_{FRM}$                       | Peak repetitive forward current<br>(100kHz square wave, $T_C = 135^\circ\text{C}$ )    | 2.0         | A                |
| $I_{FSM}$                       | Non repetitive peak forward surge current<br>(8.3ms single half sine wave)             | 50          | A                |
| dV/dt                           | Voltage rate of change (at max $V_R$ )   | 10000       | V/ $\mu\text{s}$ |
| $T_{STG}$                       | Storage temperature  | -55 to +150 | °C               |
| $T_J$                           | Junction temperature   | -55 to +125 | °C               |

<sup>(1)</sup> All ratings at 25°C unless specified otherwise

## Schottky Barrier Rectifier

### Characteristics

#### Static Electrical Characteristics

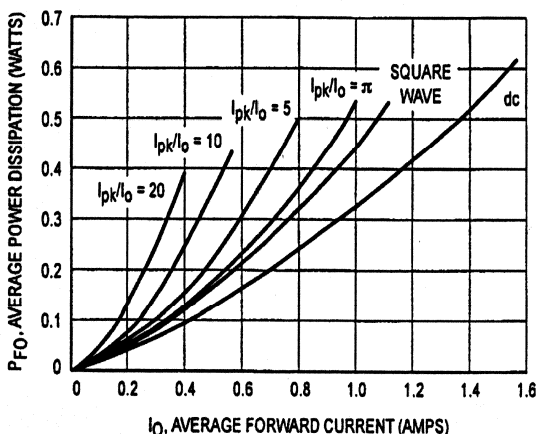
| Symbol      | Parameter                             | Test Conditions                    |                      | Typ | max   | Units |
|-------------|---------------------------------------|------------------------------------|----------------------|-----|-------|-------|
| $V_F^{(2)}$ | Maximum forward voltage               | $T_J = 25^\circ\text{C}$           | $I_F = 0.1\text{ A}$ |     | 0.34  | V     |
|             |                                       |                                    | $I_F = 1.0\text{ A}$ |     | 0.45  |       |
|             |                                       |                                    | $I_F = 3.0\text{ A}$ |     | 0.65  |       |
|             |                                       | $T_J = 85^\circ\text{C}$           | $I_F = 0.1\text{ A}$ |     | 0.25  |       |
|             |                                       |                                    | $I_F = 1.0\text{ A}$ |     | 0.415 |       |
|             |                                       |                                    | $I_F = 3.0\text{ A}$ |     | 0.67  |       |
| $I_R^{(2)}$ | Maximum instantaneous reverse current | $T_J = 25^\circ\text{C}$           | $V_R = 20\text{V}$   |     | 0.40  | mA    |
|             |                                       |                                    | $V_R = 10\text{V}$   |     | 0.10  |       |
|             |                                       | $T_J = 85^\circ\text{C}$           | $V_R = 20\text{V}$   |     | 25    |       |
|             |                                       |                                    | $V_R = 10\text{V}$   |     | 18    |       |
| $C_T$       | Junction capacitance                  | $V_R = 5\text{V}, f = 1\text{MHz}$ |                      | 80  |       | pF    |

<sup>(2)</sup> Measured with a test pulse of 380 $\mu\text{s}$  to minimize self-heating effect

#### Thermal Characteristics

| Symbol          | Parameter                          | Value | Unit               |
|-----------------|------------------------------------|-------|--------------------|
| $R_{\theta JC}$ | Junction to case (bottom)          | 15    | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Junction to ambient <sup>(3)</sup> | 240   | $^\circ\text{C/W}$ |

<sup>(3)</sup> Mounted on FR-4 PC board using 1oz copper with recommended minimum foot print

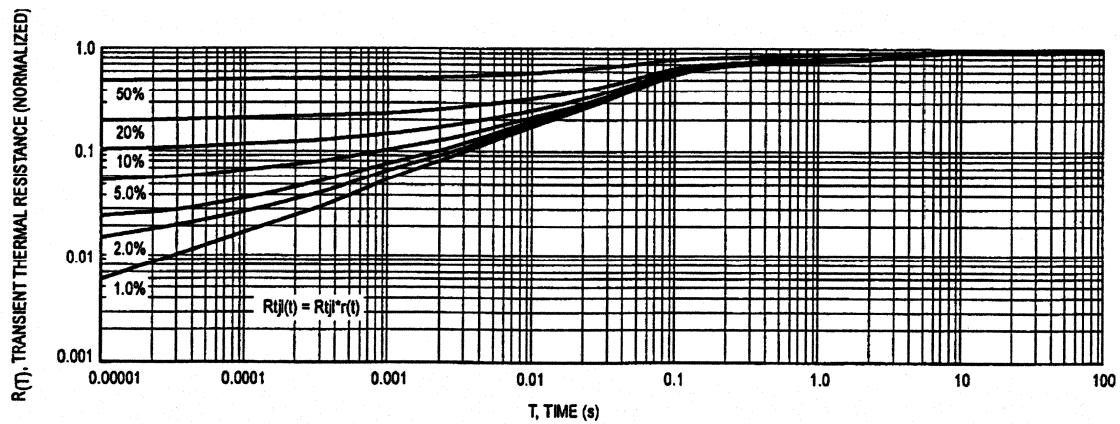


Reverse power dissipation and the possibility of thermal runaway must be considered when operating this device under any reverse voltage conditions. Calculations of  $T_J$  therefore must include forward and reverse power effects. The allowable operating  $T_J$  may be calculated from the equation:

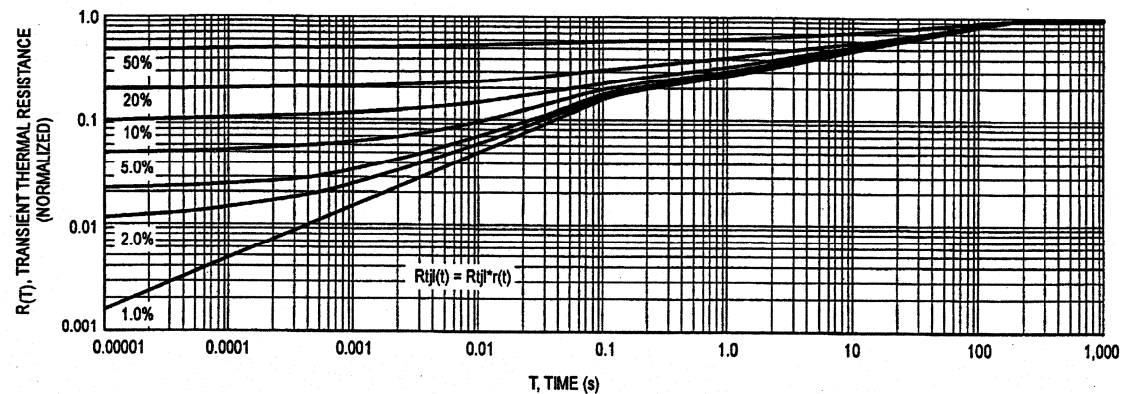
$T_J = T_{J\max} = r(t)(P_f + P_r)$  where  
 $r(t)$  = thermal impedance under given conditions.  
 $P_f$  = forward power dissipation, and  
 $P_r$  = reverse power dissipation

This graph displays the de-rated allowable  $T_J$  due to reverse bias under DC conditions only and is calculated as  $T_J = T_{J\max} - r(t) P_r$ , Where  $r(t) = R_{thja}$ . For other power applications further calculations must be performed.

## Schottky Barrier Rectifier



Thermal Impedance Junction to Case (bottom)



Thermal Impedance Junction to Ambient

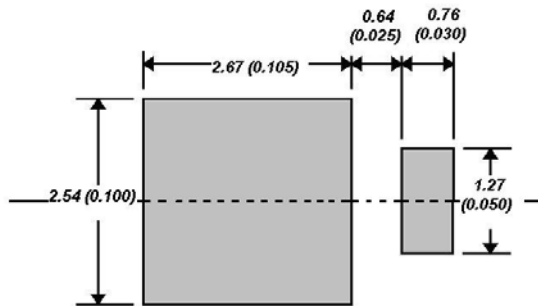
## Mechanical Characteristics

### Physical dimensions

| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A    | 0.73        | 0.99 | 0.029  | 0.039 |
| B    | 0.40        | 0.66 | 0.016  | 0.026 |
| C    | 1.77        | 2.03 | 0.070  | 0.080 |
| D    | 2.21        | 2.46 | 0.087  | 0.097 |
| E    | 0.50        | 0.76 | 0.020  | 0.030 |
| F    | 1.29        | 1.54 | 0.051  | 0.061 |
| G    | 0.53        | 0.78 | 0.021  | 0.031 |
| H    | 0.10        | 0.20 | 0.004  | 0.008 |
| I    | 1.77        | 2.03 | 0.070  | 0.080 |
| J    | 0.89        | 1.14 | 0.035  | 0.045 |

## Schottky Barrier Rectifier

### Footprint dimensions



Powermite 1<sup>®</sup> footprint dimensions in *mm (inches)*

### Package materials & information

**Case** : Epoxy meets UL94V-0

**Electrode finish** : Matte Sn  
plating - fully RoHS compliant

**Marking code** :

# S20

### Ordering information

| Product order code | Marking | Package                   | Weight  | Base qty | Delivery mode           |
|--------------------|---------|---------------------------|---------|----------|-------------------------|
| UPS120e3 / TR7     | S20     | Powermite 1<br>(DO-216AA) | 0.016 g | 3000     | Tape and reel (7 inch)  |
| UPS120e3 / TR13    | S20     | Powermite 1<br>(DO-216AA) | 0.016 g | 12000    | Tape and reel (13 inch) |

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