

### Features

- Revolutionary semiconductor material - Silicon Carbide
- Benchmark switching behavior
- No reverse recovery/ No forward recovery
- Temperature independent switching behavior
- Optimized for high temperature operation
- Qualified according to JEDEC criteria

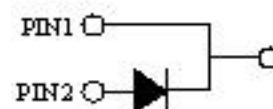
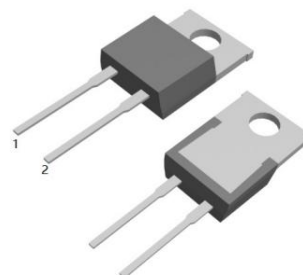
### Applications

- Switch mode power supply
- Power factor correction
- Solar inverter
- Uninterruptible power supply

### Description

- System efficiency improvement over Si diodes
- Enabling higher frequency / increased power density solutions
- System size/cost savings due to reduced heatsink requirements and smaller magnetics
- Reduced EMI
- Highest efficiency across the entire load range
- Robust diode operation during surge events
- High reliability

TO-220AD-2L



### Key performance parameters

#### Product Summary

|             |       |
|-------------|-------|
| $V_{DC}$    | 650V  |
| $I_F$       | 8A    |
| $T_{j,max}$ | 175°C |

### Package Marking and Ordering Information

| Part #   | Marking  | Package     | Packing | Reel Size | Tape Width | Qty   |
|----------|----------|-------------|---------|-----------|------------|-------|
| PESC0865 | PESC0865 | TO-220AD-2L | Tube    | N/A       | N/A        | 50pcs |

### Absolute Maximum Ratings

| Parameter                                                                                                                                                                | Symbol         | Value       | Unit                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|----------------------|
| Repetitive peak reverse voltage                                                                                                                                          | $V_{RRM}$      | 650         | V                    |
| Continuous forward current for<br>$T_C = 150^\circ\text{C}$                                                                                                              | $I_F$          | 8           | A                    |
| Non-Repetitive Peak Forward Surge Current<br>$T_C=25^\circ\text{C}, t_p=8.3\text{ ms}$ , Half Sine Pulse<br>$T_C=150^\circ\text{C}, t_p=8.3\text{ ms}$ , Half Sine Pulse | $I_{FSM}$      | 70<br>60    | A                    |
| $i^2t$ value $T_C = 25^\circ\text{C}$ , $t_p=8.3\text{ ms}$<br>$i^2t$ value $T_C = 150^\circ\text{C}$ , $t_p=8.3\text{ ms}$                                              | $\int i^2 dt$  | 20<br>15    | $\text{A}^2\text{s}$ |
| Total power dissipation $T_C = 25^\circ\text{C}$                                                                                                                         | $P_D$          | 77          | W                    |
| Operating junction and storage temperature                                                                                                                               | $T_j, T_{stg}$ | -55 to +175 | $^\circ\text{C}$     |

**Thermal Resistance**

| Parameter                                              | Symbol     | Condition                                     | Value |      |      | Unit |
|--------------------------------------------------------|------------|-----------------------------------------------|-------|------|------|------|
|                                                        |            |                                               | min.  | typ. | max. |      |
| Thermal resistance, junction – case.                   | $R_{thJC}$ |                                               | -     | 1.3  | 2.0  | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | SMD version, device on PCB, minimal footprint | -     | -    | 40   | °C/W |

**Electrical Characteristic****Static Characteristic ( $T_j=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter           | Symbol   | Test Condition                             | Value |      |      | Unit          |
|---------------------|----------|--------------------------------------------|-------|------|------|---------------|
|                     |          |                                            | min.  | typ. | max. |               |
| DC blocking voltage | $V_{DC}$ | $I_R=100\mu\text{A}$                       | 650   | -    | -    | V             |
| Forward voltage     | $V_F$    | $I_F=8\text{A}, T_j=25^{\circ}\text{C}$    | -     | 1.42 | 1.7  | V             |
|                     |          | $I_F=8\text{A}, T_j=150^{\circ}\text{C}$   | -     | 1.84 | 2.1  | V             |
| Reverse current     | $I_R$    | $V_R=650\text{V}, T_j=25^{\circ}\text{C}$  |       | 0.1  | 20   | $\mu\text{A}$ |
|                     |          | $V_R=650\text{V}, T_j=150^{\circ}\text{C}$ | -     | 1    | 200  |               |

**Dynamic Characteristic ( $T_j=25^{\circ}\text{C}$  unless otherwise noted)**

| Parameter               | Symbol | Test Condition                                | Value |      |      | Unit |
|-------------------------|--------|-----------------------------------------------|-------|------|------|------|
|                         |        |                                               | min.  | typ. | max. |      |
| Total capacitance       | C      | $V_R=0.1\text{V}, f=1\text{MHz}$              | -     | 388  | -    | pF   |
|                         |        | $V_R=200\text{V}, f=1\text{MHz}$              | -     | 38   | -    |      |
|                         |        | $V_R=400\text{V}, f=1\text{MHz}$              | -     | 37   | -    |      |
| Total capacitive charge | $Q_C$  | $V_R=400\text{V}, Q_c = \int_0^{V_R} C(V) dV$ | -     | 21   | -    | nC   |

### Typical Performance Characteristics

Fig 1: Forward Characteristics

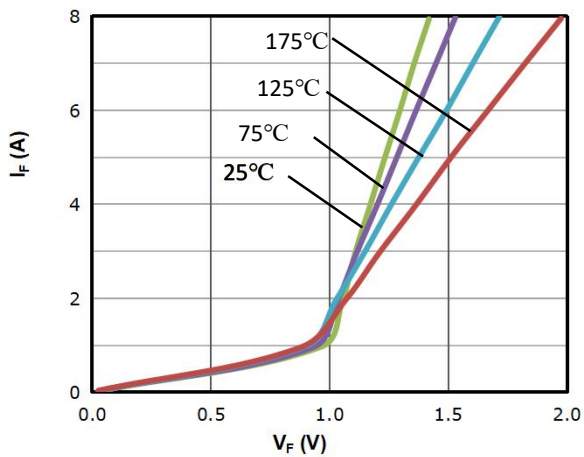


Fig 2: Reverse Characteristics

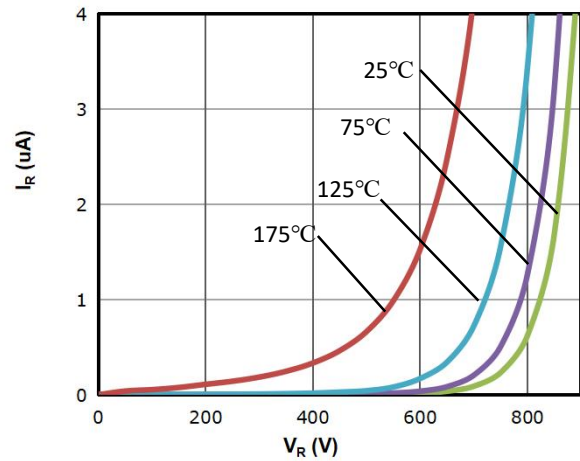


Fig 3: Total Capacitance Charge VS. Reverse Voltage

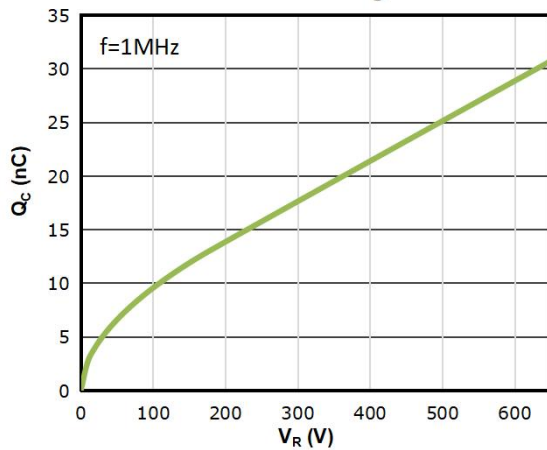


Fig 4: Capacitance Characteristics

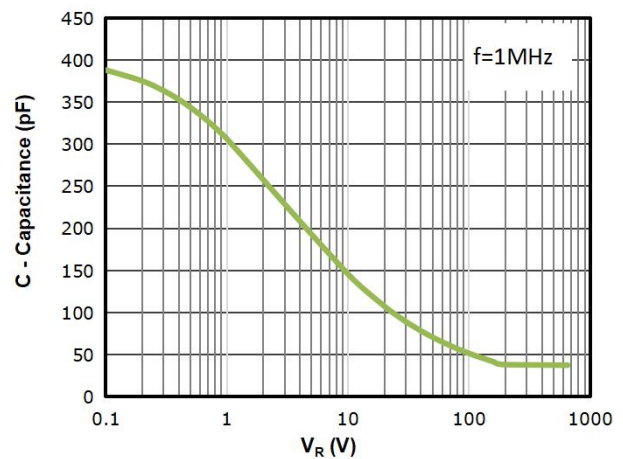


Fig 5: Power Dissipation

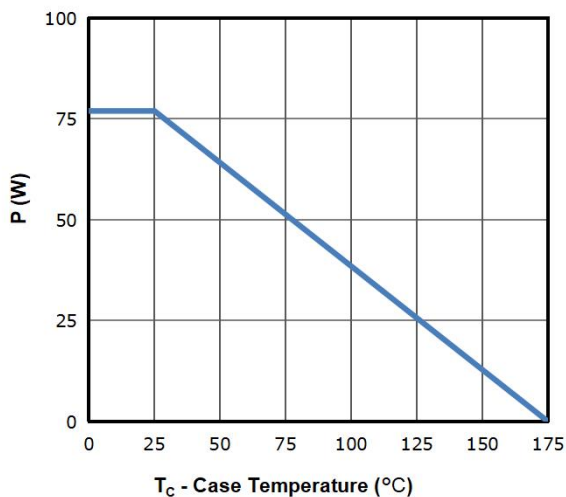
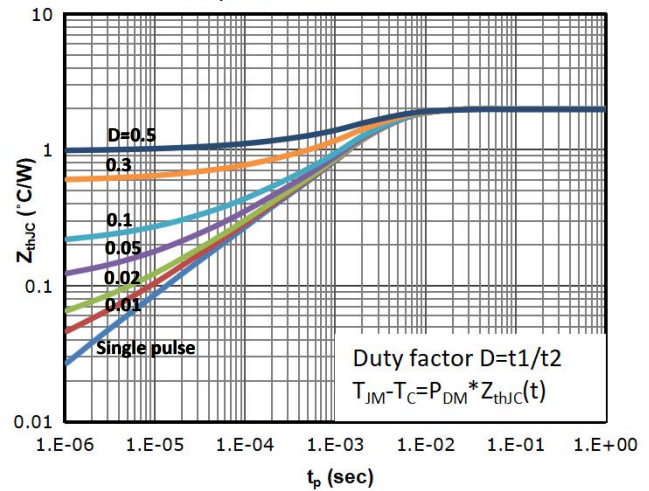
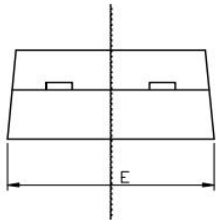
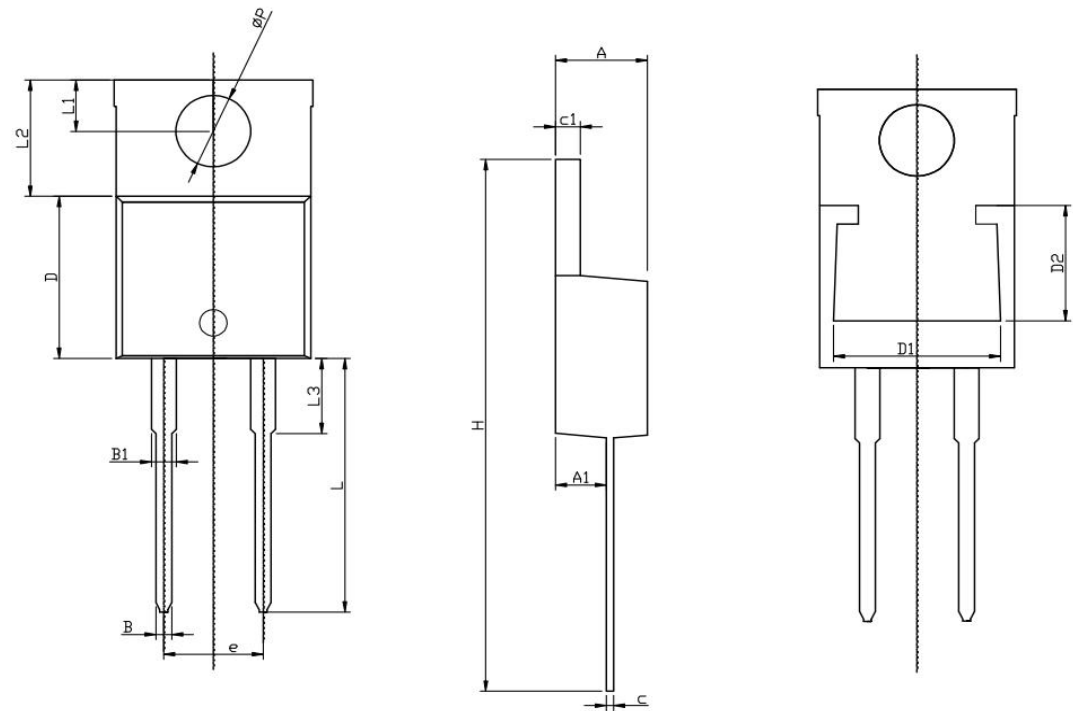


Fig 6: Max. Transient Thermal Impedance

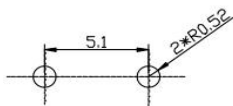




Package Outline: TO-220AD-2L



RECOMMENDED LAND PATTERN



UNIT: mm

|    | MIN   | NOM   | MAX   |
|----|-------|-------|-------|
| A  | 4.50  | 4.70  | 4.90  |
| A1 | 2.45  | 2.60  | 2.70  |
| B  | 0.72  | 0.82  | 0.92  |
| B1 | 1.12  | 1.27  | 1.42  |
| C  | 0.28  | 0.38  | 0.48  |
| c1 | 1.17  | 1.27  | 1.37  |
| D  | 8.46  | 8.66  | 8.86  |
| D1 | 7.70  | 7.90  | 8.40  |
| D2 | 5.00  | 5.20  | 5.40  |
| e  |       | 5.10  |       |
| E  | 9.85  | 10.15 | 10.45 |
| H  | 28.00 | 28.50 | 29.00 |
| ϕP |       | 3.84  |       |
| L  | 13.1  | 13.6  | 14.1  |
| L1 | 2.54  | 2.74  | 2.94  |
| L2 | 6.04  | 6.24  | 6.44  |
| L3 | 3.85  | 4.05  | 4.35  |

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### Disclaimer

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