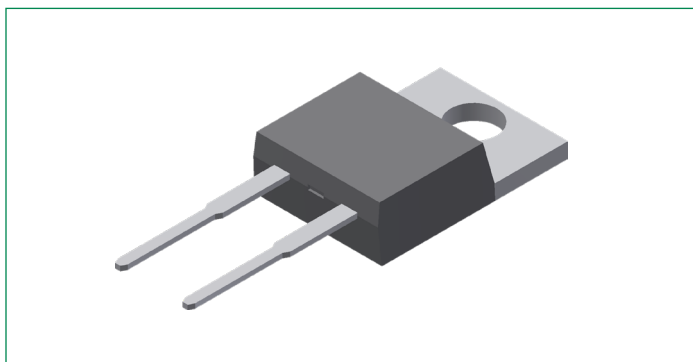


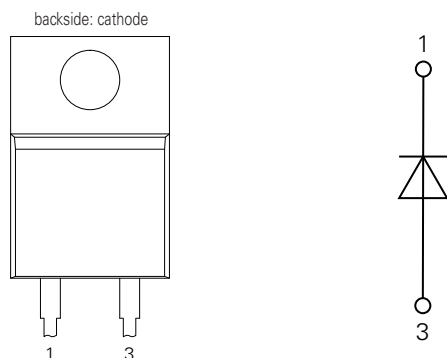
# DPT15I600PA

## 600 V, 15 A Fast Recovery Diode

RoHS



### Pinout Diagram TO-220



**1:** Cathode; **3:** Anode; **Backside:** Cathode

### Description

This 600 V, 15 A general-purpose, power fast recovery diode features a single chip in a TO-220 package.

### Features

- Reverse leakage current,  $I_R \leq 10 \mu\text{A}$  @ 25 °C
- Efficient heat transfer;  $R_{th(j-c)}$  is 0.86 K/W
- Typical recovery time is 26 ns

### Benefits

- Stable long-term reliability
- High current-handling capability
- Optimized for higher switching frequencies

### Applications

- Power factor control
- Switch mode power supplies (SMPS)
- Maximum Power Point Tracking (MPPT) solar inverters

### Package TO-220

- RoHS compliant
- Epoxy meets UL 94V-0
- Industry-standard outline

### Product Summary

| Characteristic | Value | Unit |
|----------------|-------|------|
| $V_{RRM}$      | 600   | V    |
| $I_{F(AV)}$    | 15    | A    |
| $t_{rr}$       | 26    | ns   |

## Maximum Ratings

| Symbol      | Characteristics                      | Condition                                                                                             | Value       | Units              |
|-------------|--------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|--------------------|
| $V_{RRM}$   | Repetitive Peak Reverse Voltage      | $T_{vj} = 25\text{ }^{\circ}\text{C}$                                                                 | 600         | V                  |
| $I_{F(AV)}$ | Average Forward Current              | $T_c = 120\text{ }^{\circ}\text{C}$ , $T_{vj} = 150\text{ }^{\circ}\text{C}$ , rectangular, $d = 0.5$ | 15          | A                  |
| $I_{FSM}$   | Non-repetitive Forward Surge Current | $t_p = 10\text{ ms}$ , half sine wave, $V_R = 0\text{ V}$                                             | 150         | A                  |
| $P_{tot}$   | Total Power Dissipation              | $T_c = 25\text{ }^{\circ}\text{C}$                                                                    | 145         | W                  |
| $T_{vj}$    | Virtual Junction Temperature Range   | –                                                                                                     | –55 to +150 | $^{\circ}\text{C}$ |
| $T_{op}$    | Operating Temperature Range          | –                                                                                                     | –55 to +125 | $^{\circ}\text{C}$ |
| $T_{stg}$   | Storage Temperature Range            | –                                                                                                     | –55 to +150 | $^{\circ}\text{C}$ |

## Electrical Characteristics – Static

| Symbol     | Characteristics   | Conditions                                                          | Value |      |      | Units         |
|------------|-------------------|---------------------------------------------------------------------|-------|------|------|---------------|
|            |                   |                                                                     | Min.  | Typ. | Max. |               |
| $I_R$      | Reverse Current   | $V_R = 600\text{ V}$ , $T_{vj} = 25\text{ }^{\circ}\text{C}$        | –     | –    | 10   | $\mu\text{A}$ |
|            |                   | $V_R = 600\text{ V}$ , $T_{vj} = 150\text{ }^{\circ}\text{C}$       | –     | –    | 0.5  | mA            |
| $V_F$      | Forward Voltage   | $I_F = 15\text{ A}$ ; Pulse, $T_{vj} = 25\text{ }^{\circ}\text{C}$  | –     | 1.9  | 2.3  | V             |
|            |                   | $I_F = 30\text{ A}$ ; Pulse, $T_{vj} = 25\text{ }^{\circ}\text{C}$  | –     | –    | 2.5  |               |
|            |                   | $I_F = 15\text{ A}$ ; Pulse, $T_{vj} = 150\text{ }^{\circ}\text{C}$ | –     | 1.37 | 1.75 |               |
|            |                   | $I_F = 30\text{ A}$ ; Pulse, $T_{vj} = 150\text{ }^{\circ}\text{C}$ | –     | –    | 2.04 |               |
| $V_{(FO)}$ | Threshold Voltage | –                                                                   | –     | –    | 0.77 | V             |
| $r_F$      | Slope Resistance  | –                                                                   | –     | –    | 28.4 | m $\Omega$    |

## Electrical Characteristics – Dynamic ( $T_{vj} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| Symbol   | Characteristics               | Conditions                                                                         | Value |      |      | Units |
|----------|-------------------------------|------------------------------------------------------------------------------------|-------|------|------|-------|
|          |                               |                                                                                    | Min.  | Typ. | Max. |       |
| $C_j$    | Junction Capacitance          | $V_R = 400\text{ V}$ , $f = 1\text{ MHz}$                                          | –     | 14   | –    | pF    |
| $t_{rr}$ | Reverse Recovery Time         | $I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$               | –     | 28   | 35   | ns    |
|          |                               | $I_F = 1\text{ A}$ , $V_R = 30\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$   | –     | 26   | –    |       |
|          |                               | $I_F = 15\text{ A}$ , $V_R = 300\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$ | –     | 25   | –    |       |
| $I_{rm}$ | Peak Reverse Recovery Current | $I_F = 15\text{ A}$ , $V_R = 300\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$ | –     | 2.5  | –    | A     |

## Thermal Specifications

| Symbol        | Characteristics                      | Value |      |      | Units |
|---------------|--------------------------------------|-------|------|------|-------|
|               |                                      | Min.  | Typ. | Max. |       |
| $R_{th(j-c)}$ | Thermal Resistance, Junction to Case | –     | –    | 0.86 | K/W   |

## Package TO-220

| Symbol | Characteristics          | Conditions | Value |      |      | Units |
|--------|--------------------------|------------|-------|------|------|-------|
|        |                          |            | Min.  | Typ. | Max. |       |
| G      | Weight                   | –          | –     | 2    | –    | g     |
| $M_d$  | Mounting Torque          | –          | 0.4   | –    | 0.6  | Nm    |
| $F_c$  | Mounting Force with clip | –          | 20    | –    | 60   | N     |

## Characteristic Curves

Figure 1. Typical Forward Characteristics

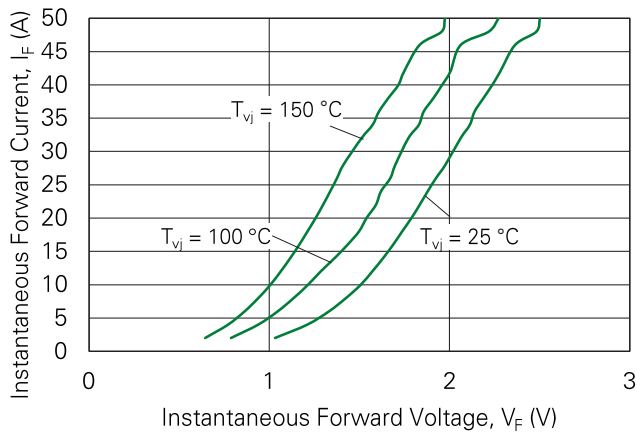
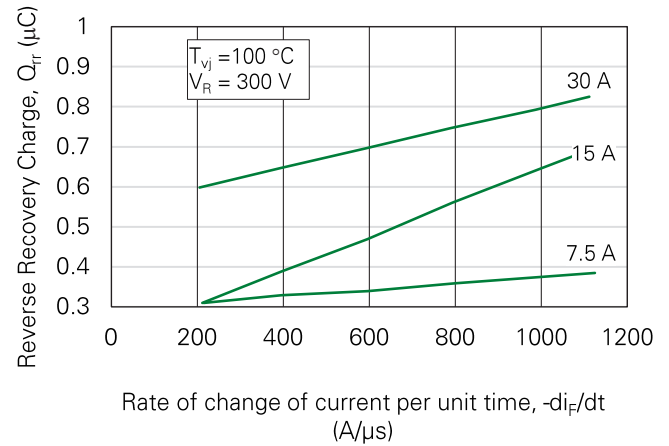
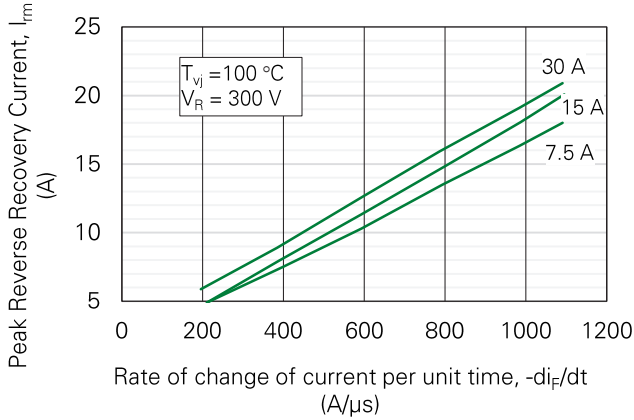
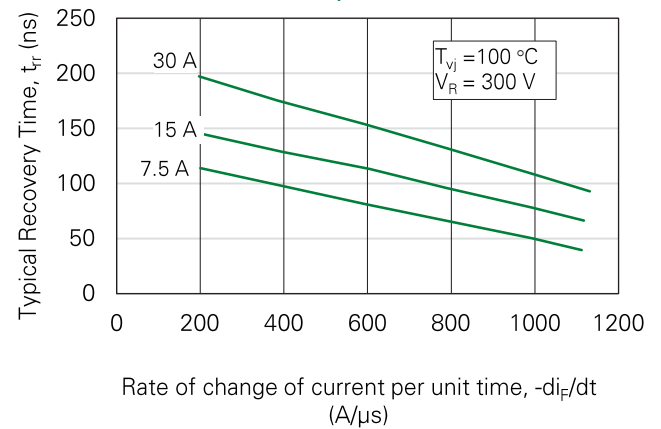
Figure 2. Typical Reverse Recovery Charge vs.  $-di_F/dt$ Figure 3. Typical Peak Reverse Recovery Current vs.  $-di_F/dt$ Figure 4. Typical Recovery Time vs.  $-di_F/dt$ 

Figure 5. Typical Forward Recovery Voltage vs. Diode Current Slope

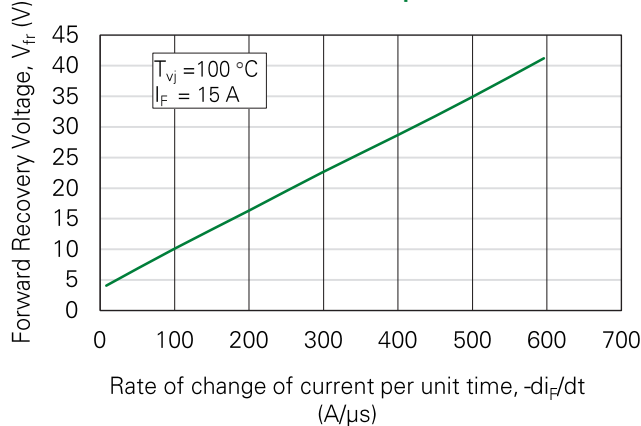
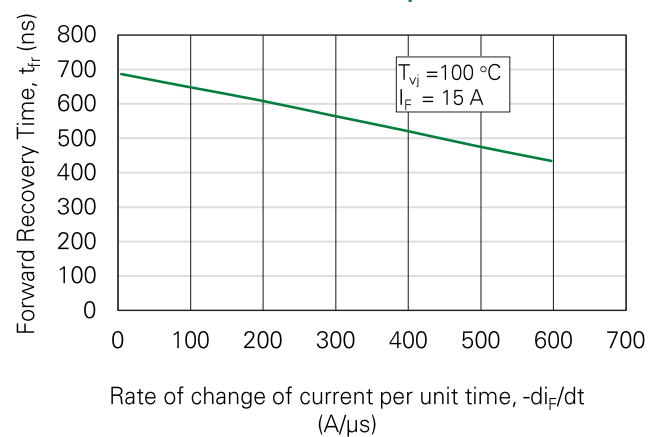
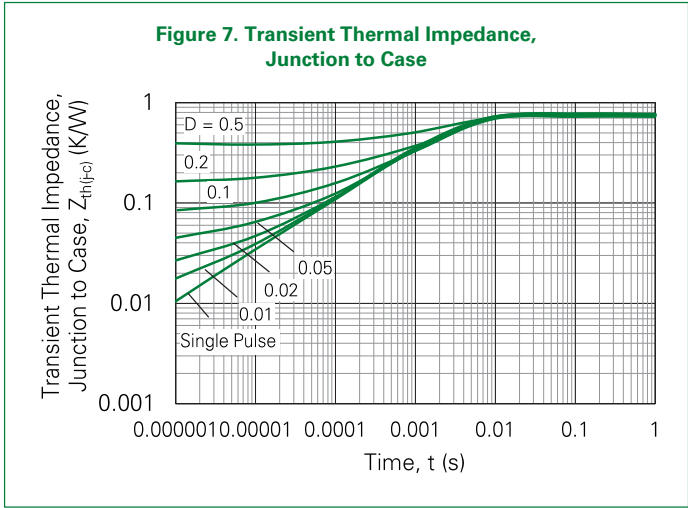


Figure 6. Typical Forward Recovery Time vs. Diode Current Slope

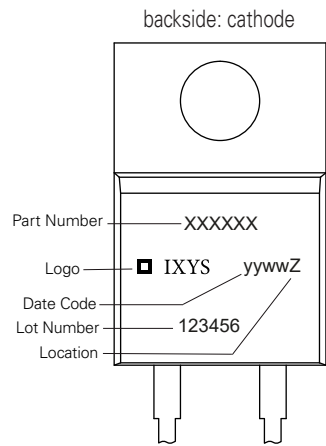




Packing Options

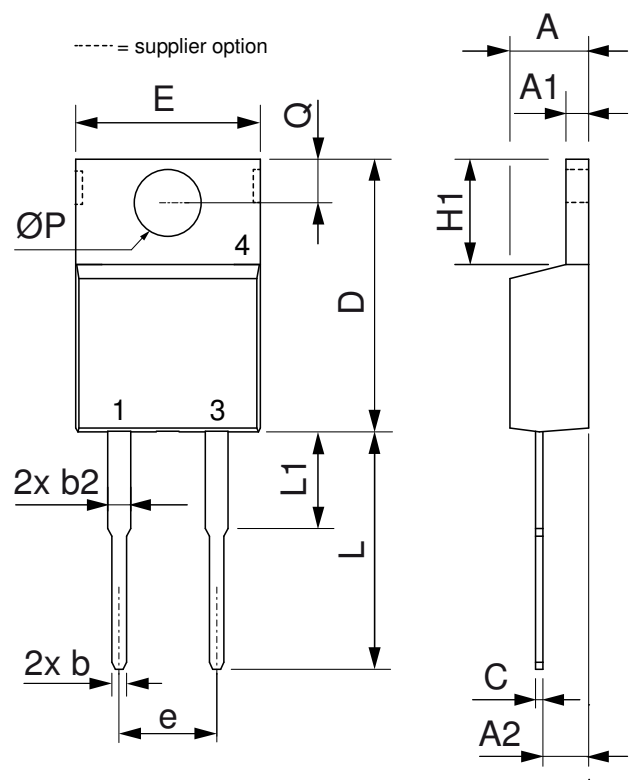
| Part Number | Marking     | Packing Mode  |
|-------------|-------------|---------------|
| DPT15I600PA | DPT15I600PA | Tube (50 pcs) |

Part Numbering and Marking



- D = Diode
- P = FRED
- T = Hyperfast
- 15 = Current Rating (A)
- I = Single Part Diode
- 600 = Voltage Rating (V)
- PA = Package (TO-220AC)

Part Outline Drawing TO-220AC



| Symbol | Millimeters |       | Inches    |       |
|--------|-------------|-------|-----------|-------|
|        | Min.        | Max.  | Min.      | Max.  |
| A      | 4.32        | 4.82  | 0.170     | 0.190 |
| A1     | 1.14        | 1.39  | 0.045     | 0.055 |
| A2     | 2.29        | 2.79  | 0.090     | 0.110 |
| b      | 0.64        | 1.01  | 0.025     | 0.040 |
| b2     | 1.15        | 1.65  | 0.045     | 0.065 |
| C      | 0.35        | 0.56  | 0.014     | 0.022 |
| D      | 14.73       | 16.00 | 0.580     | 0.630 |
| E      | 9.91        | 10.66 | 0.390     | 0.420 |
| e      | 5.08 BSC    |       | 0.200 BSC |       |
| H1     | 5.85        | 6.85  | 0.230     | 0.270 |
| L      | 12.70       | 13.97 | 0.500     | 0.550 |
| L1     | 2.79        | 5.84  | 0.110     | 0.230 |
| QP     | 3.54        | 4.08  | 0.139     | 0.161 |
| Q      | 2.54        | 3.18  | 0.100     | 0.125 |

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