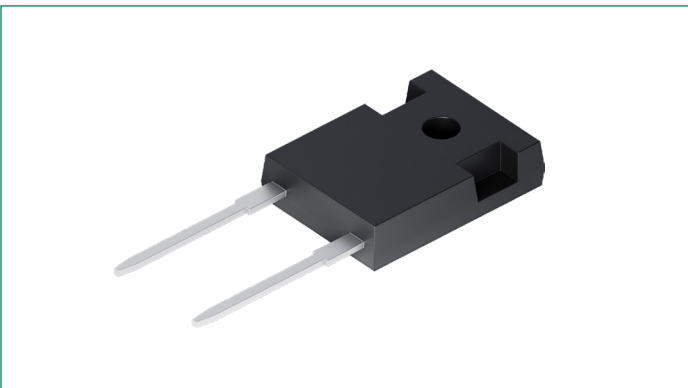


# DPS30I600HA

## 600 V, 30 A Fast Recovery Diode

RoHS



### Description

This 600 V, 30 A general-purpose, power fast recovery diode features a single chip in a TO-247 package.

### Features

- Planar passivated chips
- Reverse leakage current,  $I_R \leq 10 \mu\text{A} @ 25^\circ\text{C}$
- Good thermal behavior;  $R_{\text{th(j-c)}}$  is 0.45 K/W
- Typical recovery time is 38 ns

### Benefits

- Stable long-term reliability
- Low standby losses
- Higher current-handling capability
- High efficiency in switching

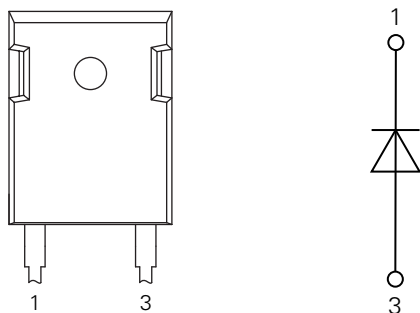
### Applications

- Anti-parallel diode for high frequency switching devices
- Anti-saturation diode
- Snubber diode
- Freewheeling diode
- Rectifiers in switch mode powers supplies (SMPS)
- Uninterruptable power supplies (UPS)

### Package

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

### Pinout Diagram (TO-247)



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

### Product Summary

| Characteristic     | Value | Unit |
|--------------------|-------|------|
| $V_{\text{RRM}}$   | 600   | V    |
| $I_{\text{F(AV)}}$ | 30    | A    |
| $t_{\text{rr}}$    | 38    | 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              | $T_c = 130\text{ }^{\circ}\text{C}$ , $T_{vj} = 150\text{ }^{\circ}\text{C}$ , rectangular, $d = 0.5$ | 30          | A                  |
| $I_{FSM}$   | Non-repetitive Forward Surge Current | $t_p = 10\text{ ms}$ , $f = 50\text{ Hz}$ , half sine wave, $V_R = 0\text{ V}$                        | 450         | A                  |
| $P_{tot}$   | Total Power Dissipation              | $T_c = 25\text{ }^{\circ}\text{C}$                                                                    | 278         | 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   | $\mu\text{A}$ |
|            |                   | $V_R = 600\text{ V}$ , $T_{vj} = 150\text{ }^{\circ}\text{C}$       | –     | –    | 5    | mA            |
| $V_F$      | Forward Voltage   | $I_F = 30\text{ A}$ ; Pulse, $T_{vj} = 25\text{ }^{\circ}\text{C}$  | –     | 1.35 | 1.45 | V             |
|            |                   | $I_F = 60\text{ A}$ ; Pulse, $T_{vj} = 25\text{ }^{\circ}\text{C}$  | –     | –    | 1.68 |               |
|            |                   | $I_F = 30\text{ A}$ ; Pulse, $T_{vj} = 150\text{ }^{\circ}\text{C}$ | –     | 1.18 | 1.25 |               |
|            |                   | $I_F = 60\text{ A}$ ; Pulse, $T_{vj} = 150\text{ }^{\circ}\text{C}$ | –     | –    | 1.35 |               |
| $V_{(FO)}$ | Threshold Voltage | –                                                                   | –     | –    | 0.58 | V             |
| $r_F$      | Slope Resistance  | –                                                                   | –     | –    | 13.3 | 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          | $V_R = 600\text{ V}$ , $f = 1\text{ MHz}$                                          | –     | 37   | –    | pF    |
| $t_{rr}$ | Reverse Recovery Time         | $I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$               | –     | 60   | 80   | ns    |
|          |                               | $I_F = 1\text{ A}$ , $V_R = 30\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$   | –     | 38   | –    |       |
|          |                               | $I_F = 30\text{ A}$ , $V_R = 300\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$ | –     | 120  | –    |       |
| $I_{rm}$ | Peak Reverse Recovery Current | $I_F = 30\text{ A}$ , $V_R = 300\text{ V}$ , $-di_F/dt = 200\text{ A}/\mu\text{s}$ | –     | 5.1  | –    | A     |

## Thermal Specifications

| Symbol        | Characteristics                      | Value |      |      | Units |
|---------------|--------------------------------------|-------|------|------|-------|
|               |                                      | Min.  | Typ. | Max. |       |
| $R_{th(j-c)}$ | Thermal Resistance, Junction to Case | –     | –    | 0.45 | K/W   |

## Package TO-247-2L

| Symbol | Characteristics | Conditions | Value |      |      | Units |
|--------|-----------------|------------|-------|------|------|-------|
|        |                 |            | Min.  | Typ. | Max. |       |
| G      | Weight          | –          | –     | 6    | –    | g     |
| $M_d$  | Mounting Torque | –          | 0.8   | –    | 1.2  | Nm    |
| $F_C$  | Mounting Force  | –          | 20    | –    | 120  | N     |

## Characteristic Curves

Figure 1. Typical Forward Characteristics

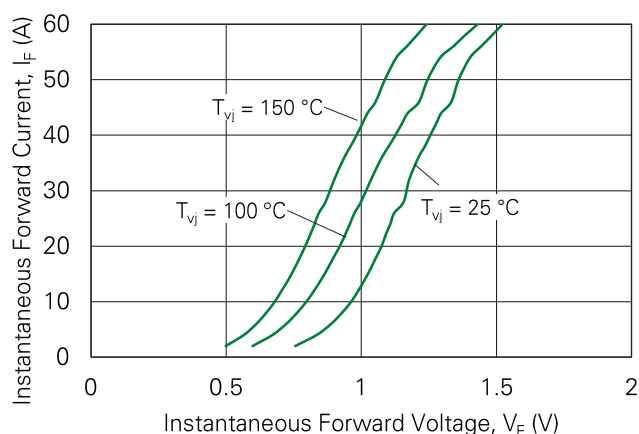
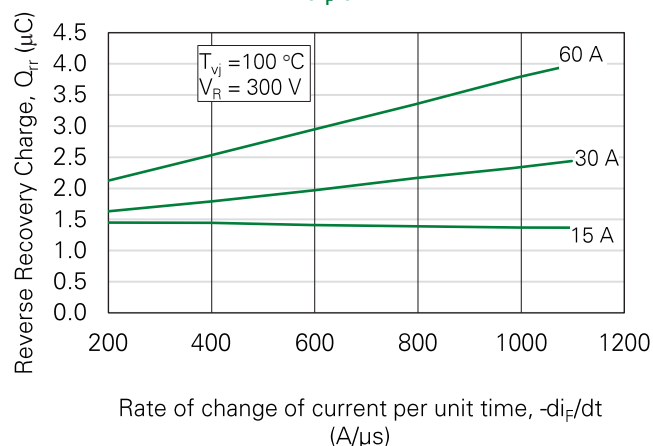
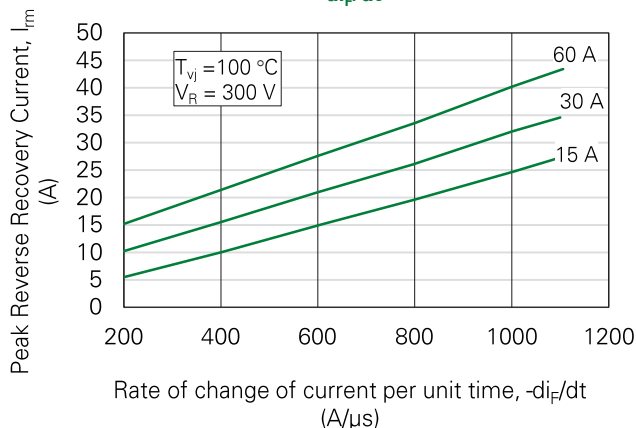
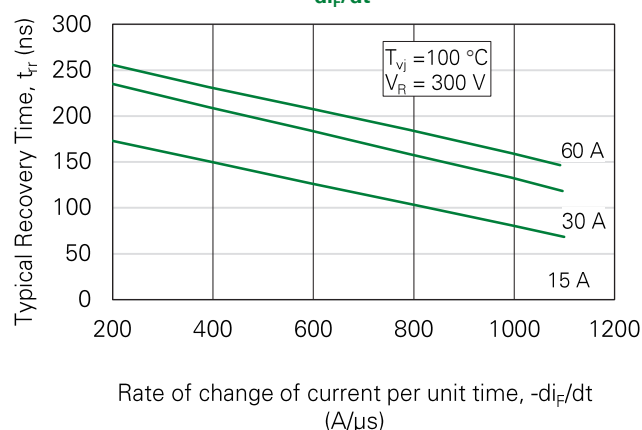
Figure 2. Typical Reverse Recovery Charge vs.  $-di_F/dt$ Figure 3. Typical Peak Reverse Recovery Current vs.  $-di_F/dt$ Figure 4. Typical Recovery Time vs.  $-di_F/dt$ 

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

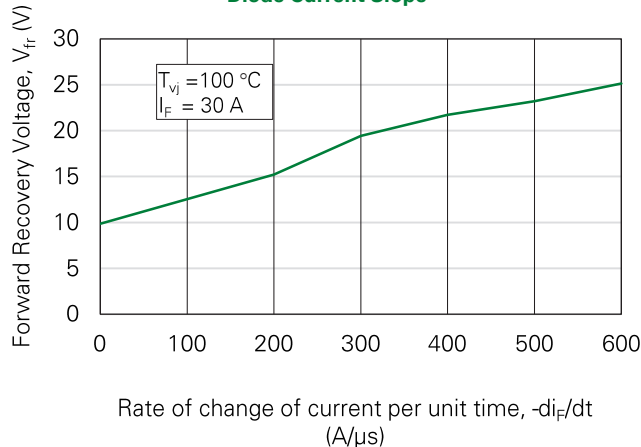


Figure 6. Typical Forward Recovery Time vs. Diode Current Slope

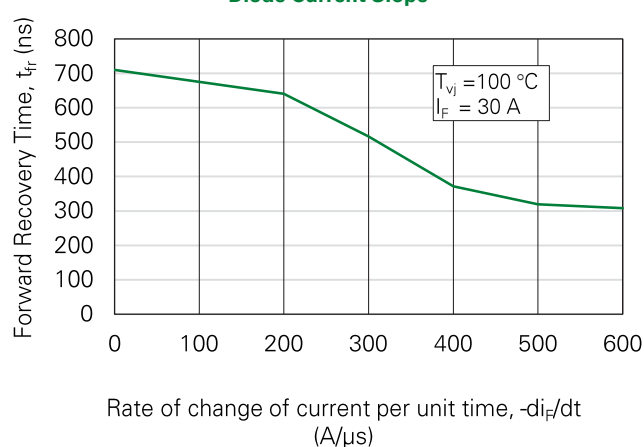
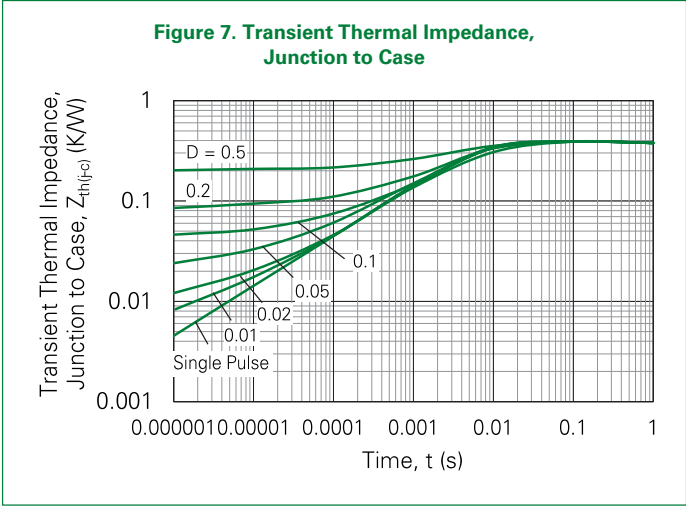


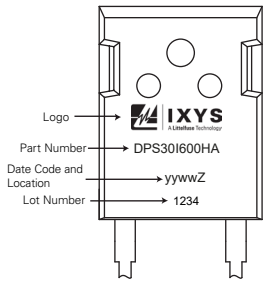
Figure 7. Transient Thermal Impedance, Junction to Case



Packing Options

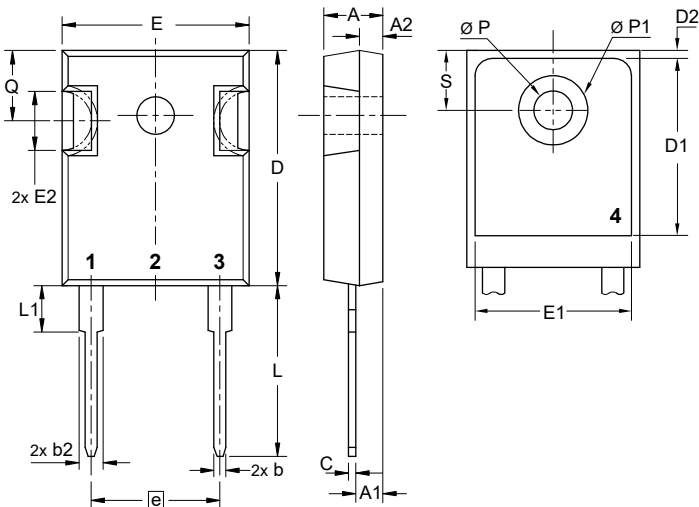
| Part Number | Marking     | Packing Mode  |
|-------------|-------------|---------------|
| DPS30I600HA | DPS30I600HA | Tube (30 pcs) |

Part Numbering and Marking



- D = Diode
- P = FRED
- S = Fast
- 30 = Current Rating (A)
- I = Single Part Diode
- 600 = Voltage Rating (V)
- HA = Package (TO-247-2L)

Part Outline Drawing TO-247-2L



| Symbol | Millimeters |       | Inches    |       |
|--------|-------------|-------|-----------|-------|
|        | Min.        | Max.  | Min.      | Max   |
| A      | 4.70        | 5.30  | 0.185     | 0.209 |
| A1     | 2.21        | 2.59  | 0.087     | 0.102 |
| A2     | 1.50        | 2.49  | 0.059     | 0.098 |
| b      | 0.99        | 1.40  | 0.039     | 0.055 |
| b2     | 1.65        | 2.39  | 0.065     | 0.094 |
| b4     | 2.59        | 3.43  | 0.102     | 0.135 |
| c      | 0.38        | 0.89  | 0.015     | 0.035 |
| D      | 20.79       | 21.45 | 0.819     | 0.845 |
| D1     | 13.07       | –     | 0.515     | –     |
| D2     | 0.51        | 1.35  | 0.020     | 0.053 |
| E      | 15.48       | 16.24 | 0.610     | 0.640 |
| E1     | 13.45       | –     | 0.530     | –     |
| E2     | 4.31        | 5.48  | 0.170     | 0.216 |
| e      | 10.92 BSC   |       | 0.430 BSC |       |
| L      | 19.80       | 20.30 | 0.780     | 0.800 |
| L1     | –           | 4.49  | –         | 0.177 |
| Q      | 5.38        | 6.19  | 0.212     | 0.244 |
| S      | 6.14BSC     |       | 0.242 BSC |       |
| ØP     | 3.55        | 3.65  | 0.140     | 0.144 |
| ØP1    | –           | 7.39  | –         | 0.29  |

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