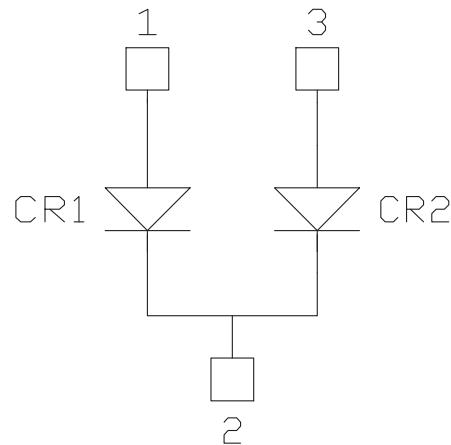


## Product Overview

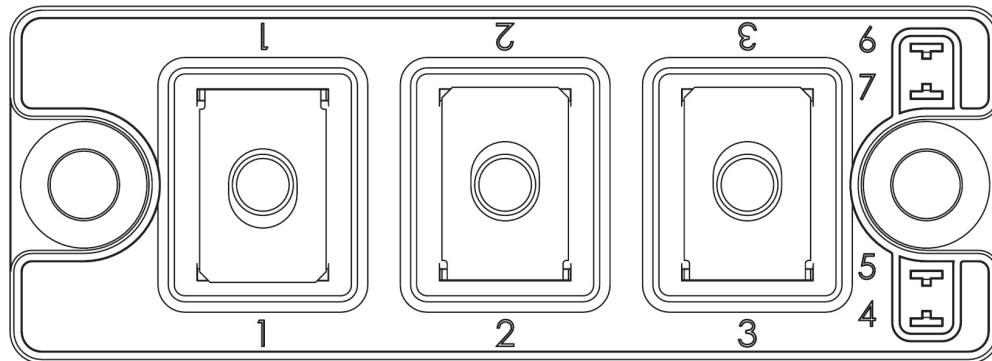
The APTDF300KK60D16AG device is a 600V, 300A fast diode common-cathode power module.

The following figures show the electrical diagram and pinout location of the device.

**Figure 1.** Electrical Diagram



**Figure 2.** Pinout Location



**Note:** All ratings are at  $T_J = 25^\circ\text{C}$ , unless otherwise specified.

 **CAUTION** These devices are sensitive to electrostatic discharge. Proper handling procedures must be followed.

## Features

The APTDF300KK60D16AG device has the following key features:

- Fast-recovery times
- Soft-recovery characteristics
- High-blocking voltage
- High current
- Low-leakage current
- M6 power connectors
- Aluminum Nitride (AlN) substrate for improved thermal performance

## Benefits

The APTDF300KK60D16AG device has the following benefits:

- Outstanding performance at high-frequency operation
- Low losses
- Low-noise switching
- Direct mounting to heatsink (isolated package)
- Low junction-to-case thermal resistance
- RoHS Compliant

## Application

The APTDF300KK60D16AG device has the following applications:

- Uninterruptible Power Supply (UPS)
- Induction heating
- Welding equipment
- High-speed rectifiers

## 1. Electrical Specification

The following sections describe the electrical specifications of the APTDF300KK60D16AG device.

### 1.1 Diode Characteristics (Per Diode)

The following table lists the absolute maximum ratings of the APTDF300KK60D16AG device.

**Table 1-1.** Absolute Maximum Ratings

Symbol	Parameter	Maximum Ratings		Unit
$V_{RRM}$	Peak repetitive reverse voltage	600		V
$I_F$	DC forward current	$T_C = 25^\circ\text{C}$	530	A
		$T_C = 100^\circ\text{C}$	300	
$I_{FSM}$	Non-repetitive forward surge current	$t_p = 8.3\text{ ms}$	$T_C = 45^\circ\text{C}$	1500
$I_{FRM}$	Repetitive forward current	$t_p = 1\text{ ms}$		600

The following table lists the electrical characteristics of the APTDF300KK60D16AG device.

**Table 1-2.** Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$V_F$	Diode forward voltage	$I_F = 300\text{A}$	—	2	3	V
		$I_F = 600\text{A}$	—	2.4	—	
		$I_F = 300\text{A}$	$T_J = 125^\circ\text{C}$	1.7	—	
$I_{RRM}$	Reverse leakage current	$V_R = 600\text{V}$	—	—	100	$\mu\text{A}$
$C_T$	Junction capacitance	$V_R = 200\text{V}$	—	440	—	$\text{pF}$

The following table lists the dynamic characteristics of the APTDF300KK60D16AG device.

**Table 1-3.** Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$I_F = 300\text{A}$	$T_J = 25^\circ\text{C}$	—	31	—
		$V_R = 400\text{V}$	$T_J = 125^\circ\text{C}$	—	140	—
$Q_{rr}$	Reverse recovery charge	$\text{di}/\text{dt} = 800\text{ A}/\mu\text{s}$	$T_J = 25^\circ\text{C}$	—	220	—
			$T_J = 125^\circ\text{C}$	—	2760	—
$I_{rm}$	Reverse recovery current		$T_J = 25^\circ\text{C}$	—	16	—
			$T_J = 125^\circ\text{C}$	—	36	—
$t_{rr}$	Reverse recovery time	$I_F = 300\text{A}$	$T_J = 125^\circ\text{C}$	—	90	—
$Q_{rr}$	Reverse recovery charge	$V_R = 400\text{V}$	—	5.2	—	$\mu\text{C}$
$I_{rm}$	Reverse recovery current	$\text{di}/\text{dt} = 4000\text{ A}/\mu\text{s}$	—	108	—	A
$R_{thJC}$	Junction-to-case thermal resistance		—	—	0.149	$^\circ\text{C}/\text{W}$

## 1.2 Thermal and Package Characteristics

The following table lists the thermal and package characteristics of the APTDF300KK60D16AG device.

**Table 1-4.** Thermal and Package Characteristics

Symbol	Characteristic	Min.	Max.	Unit
$V_{ISOL}$	RMS isolation voltage, any terminal to case, $t = 1$ min, 50/60Hz	4000	—	V
$T_J$	Operating junction temperature range	-40	175	°C
$T_{JOP}$	Recommended junction temperature under switching conditions	-40	$T_{Jmax} - 25$	
$T_{STG}$	Storage temperature range	-40	125	
$T_c$	Operating case temperature	-40	125	
Torque	Mounting torque	For terminals To heatsink	M6	3 5 N.m
Wt	Package weight	—	160	g

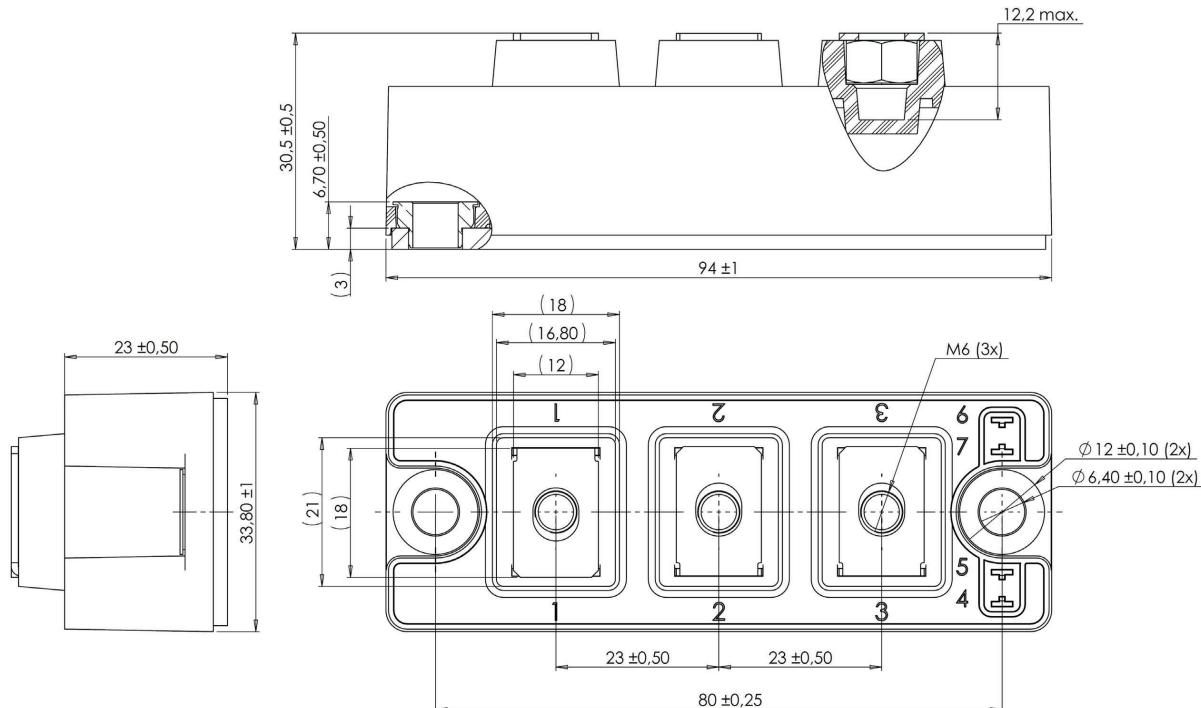
## 2. Package Specifications

The following section describes the package specification of the APTDF300KK60D16AG device.

## 2.1 Package Outline

The following figure shows the package outline drawing of the APTDF300KK60D16AG device. The dimensions in the following figure are in millimeters.

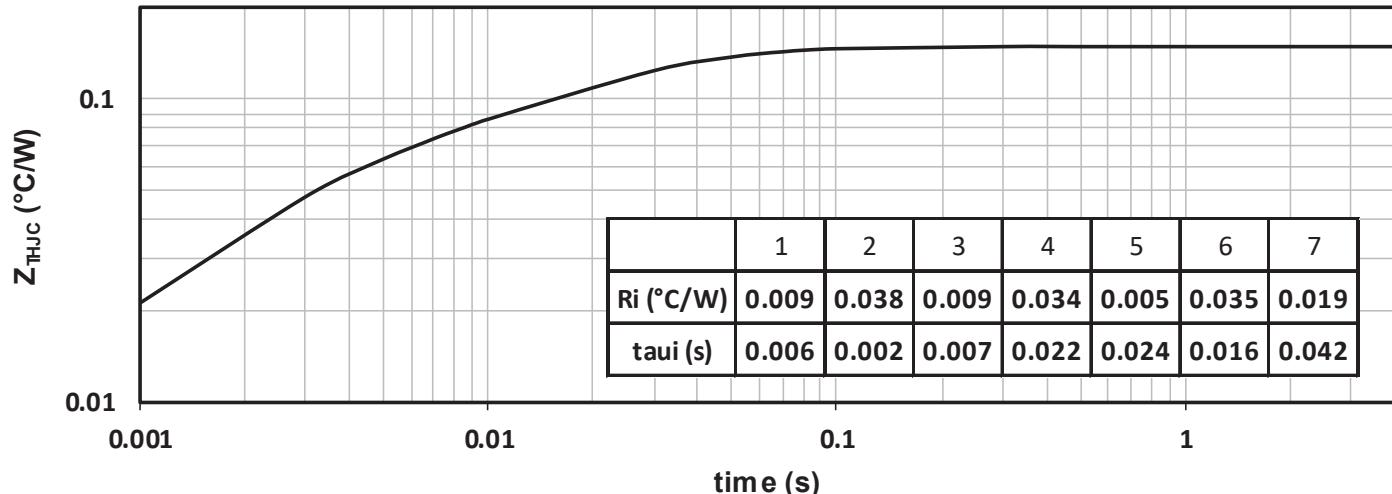
**Figure 2-1.** Package Outline Drawing



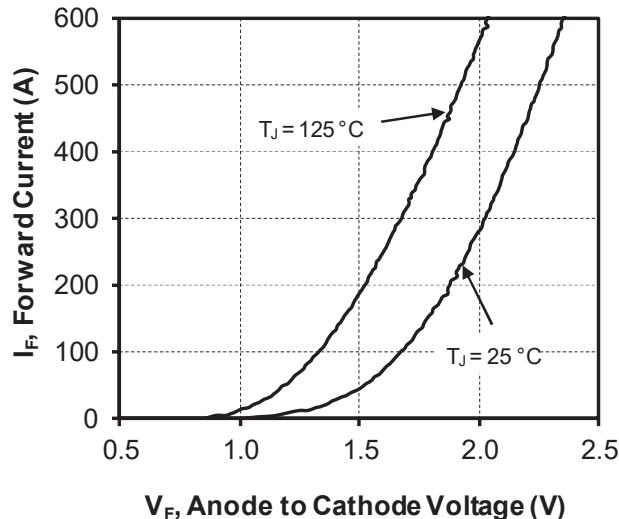
### 3. Typical Performance Curve

The following figures show the performance curves of the APTDF300KK60D16AG device.

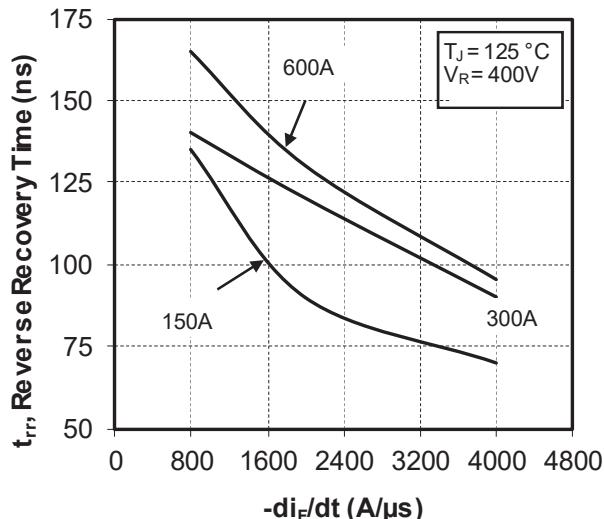
**Figure 3-1.** Maximum Thermal Impedance

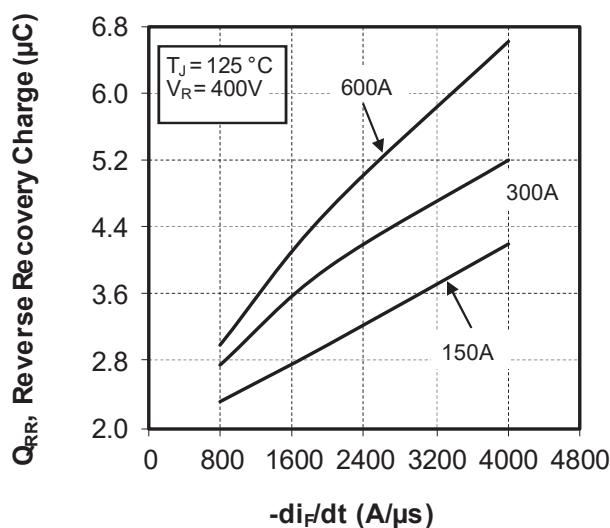
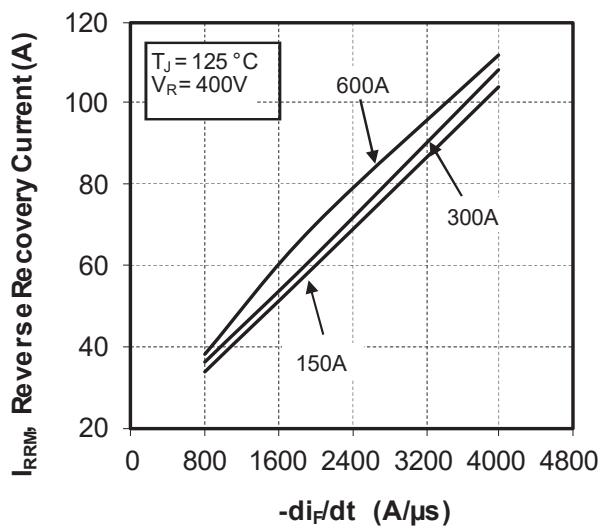
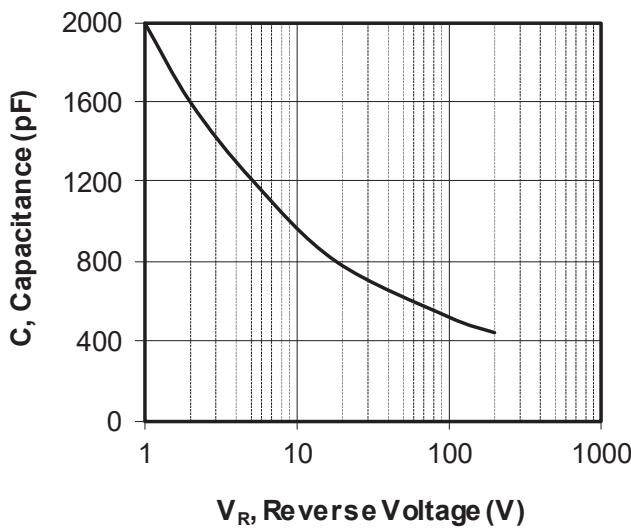
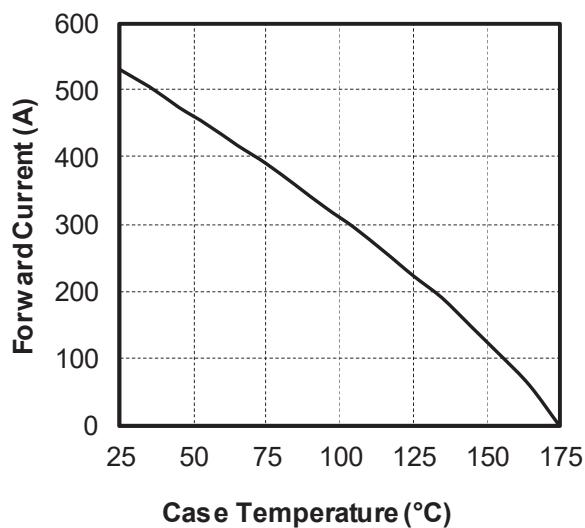


**Figure 3-2.** Forward Current vs. Forward Voltage



**Figure 3-3.**  $t_{rr}$  vs. Current Rate of Charge



**Figure 3-4.**  $Q_{rr}$  vs. Current Rate Charge**Figure 3-5.**  $I_{RRM}$  vs. Current Rate of Charge**Figure 3-6.** Capacitance vs. Reverse Voltage**Figure 3-7.** Forward Current vs. Case Temperature

## 4. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
A	01/2024	Initial revision

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