

**$V_{RSM} = 600\text{ V}$ ,  $I_{F(AV)} = 60\text{ A}$ ,  $t_{rr} = 150\text{ ns}$**   
**Fast Recovery Diode**  
**CTNS-4606S**

**Description**

The CTNS-4606S is a 600 V, 60 A, fast recovery diode. The typical  $V_F$  of 1.15 V and the maximum  $t_{rr}$  of 150 ns ( $I_F : I_{RP} = 1 : 1$ ) are realized by optimizing the trade-off relationship between  $V_F$  and  $t_{rr}$ . The low thermal resistance package achieves high performance in terms of heat dissipation.

**Features**

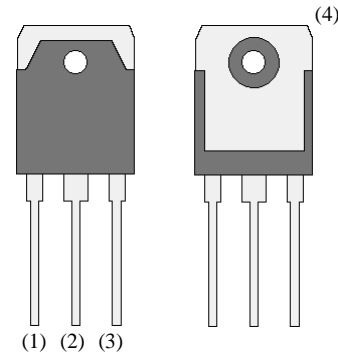
- $V_{RSM}$  ----- 600 V
- $I_{F(AV)}$  ----- 60 A
- $V_F$  ----- 1.15 V
- $t_{rr1} (I_F = I_{RP})$  ----- 150 ns
- Bare Lead Frame: Pb-free (RoHS Compliant)

**Applications**

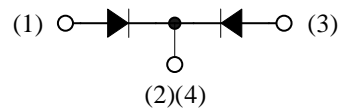
- PFC Circuit (DCM and CRM)
- Freewheel Diode  
 (Offline Buck and Buck-boost Converter)

**Package**

TO3P-3L



Not to scale



- (1) Anode
- (2) Cathode
- (3) Anode
- (4) Cathode

## CTNS-4606S

### Absolute Maximum Ratings

Unless otherwise specified,  $T_A = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Conditions	Rating	Unit
Peak Repetitive Reverse Voltage	$V_{RSM}$		600	V
Repetitive Reverse Voltage	$V_{RM}$		600	V
Average Forward Current	$I_{F(AV)}$	See Figure 1 and Figure 2	60	A
Surge Forward Current <sup>(1)</sup>	$I_{FSM}$	Half cycle sine wave, positive side, 10 ms, 1 shot	250	A
$I^2t$ Limiting Value <sup>(1)</sup>	$I^2t$	$1\text{ ms} \leq t \leq 10\text{ ms}$	312.5	$\text{A}^2\text{s}$
Junction Temperature	$T_J$		-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$		-40 to 150	$^\circ\text{C}$

### Electrical Characteristics

Unless otherwise specified,  $T_A = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop <sup>(1)</sup>	$V_F$	$T_J = 25\text{ }^\circ\text{C}$ , $I_F = 30\text{ A}$	—	1.15	1.3	V
		$T_J = 100\text{ }^\circ\text{C}$ , $I_F = 30\text{ A}$	—	1.1	—	V
Reverse Leakage Current <sup>(1)</sup>	$I_R$	$V_R = V_{RM}$	—	—	50	$\mu\text{A}$
Reverse Leakage Current Under High Temperature <sup>(1)</sup>	$H \cdot I_R$	$V_R = V_{RM}$ , $T_J = 150\text{ }^\circ\text{C}$	—	—	20	mA
Reverse Recovery Time <sup>(1)</sup>	$t_{rr1}$	$I_F = I_{RP} = 500\text{ mA}$ 90% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	150	ns
	$t_{rr2}$	$I_F = 500\text{ mA}$ , $I_{RP} = 1000\text{ mA}$ , 75% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	100	ns
Thermal Resistance <sup>(2)</sup>	$R_{th(J-C)}$		—	—	1.0	$^\circ\text{C/W}$

<sup>(1)</sup> The rating of one chip.

<sup>(2)</sup>  $R_{th(J-C)}$  is thermal resistance between junction and the case

Rating and Characteristic Curves

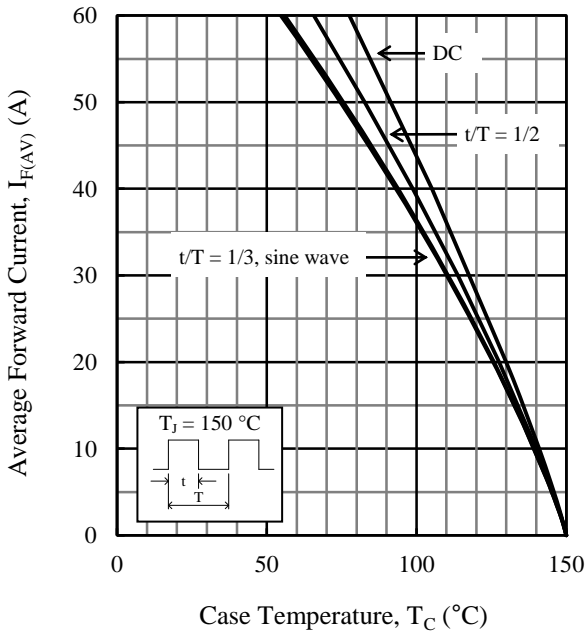


Figure 1.  $I_{F(AV)}$  vs.  $T_C$  Typical Characteristics ( $V_R = 0\text{ V}$ )

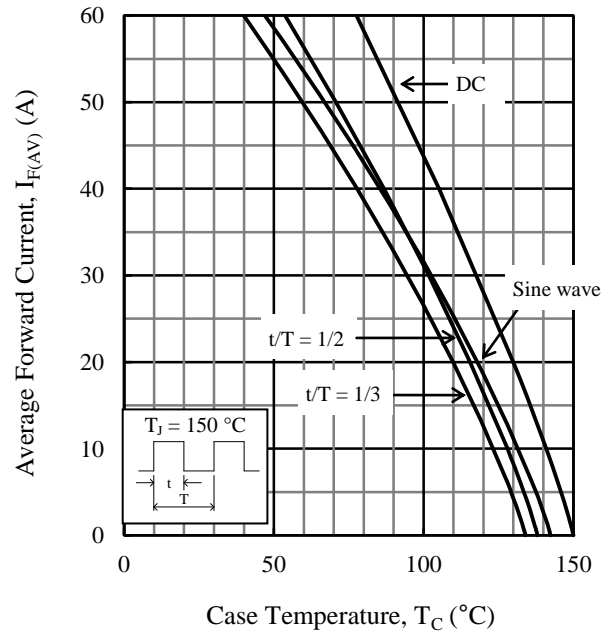


Figure 2.  $I_{F(AV)}$  vs.  $T_C$  Typical Characteristics ( $V_R = 600\text{ V}$ )

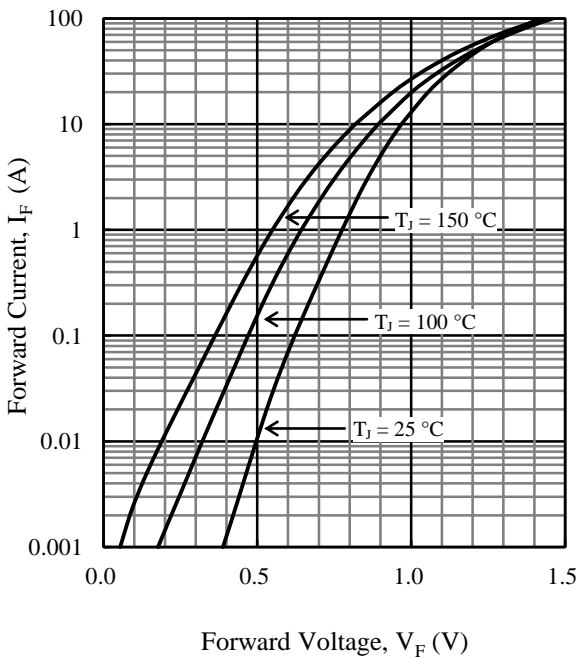


Figure 3.  $V_F$  vs.  $I_F$  Typical Characteristics

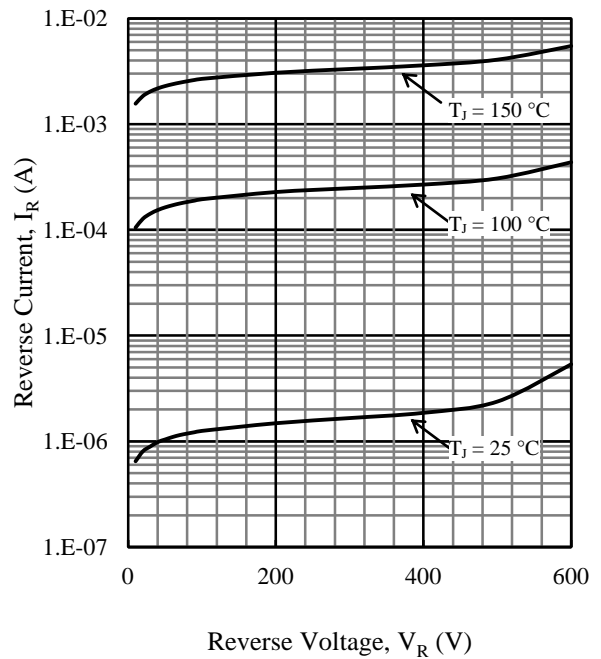
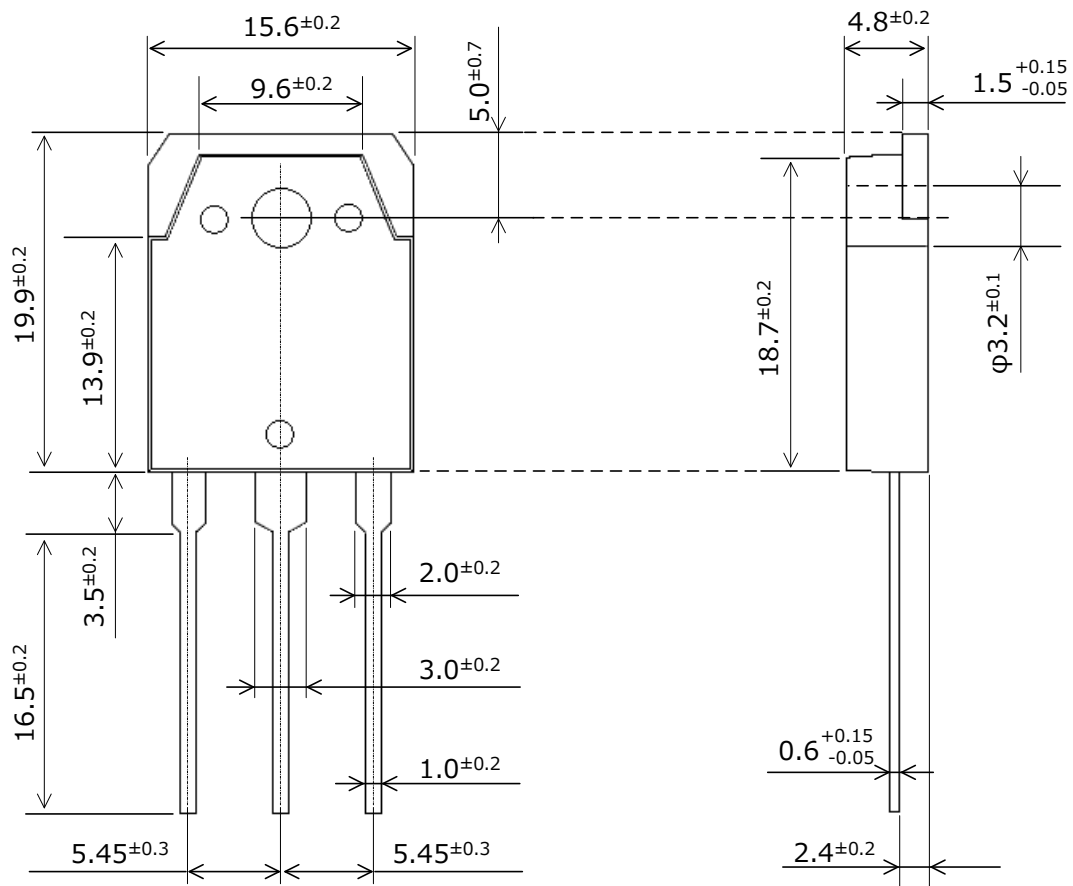


Figure 4.  $V_R$  vs.  $I_R$  Typical Characteristics

Physical Dimensions

• TO3P-3L



NOTES:

- Dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time, within the following limits:  
 Flow:  $260 \pm 5 \text{ }^\circ\text{C} / 10 \pm 1 \text{ s}$ , 2 times  
 Soldering Iron:  $380 \pm 10 \text{ }^\circ\text{C} / 3.5 \pm 0.5 \text{ s}$ , 1 time (Soldering should be at a distance of at least 1.5 mm from the body of the product.)
- Recommended screw torque for TO3P: 0.686 N·m to 0.882 N·m (7 kgf·cm to 9 kgf·cm)

Marking Diagram

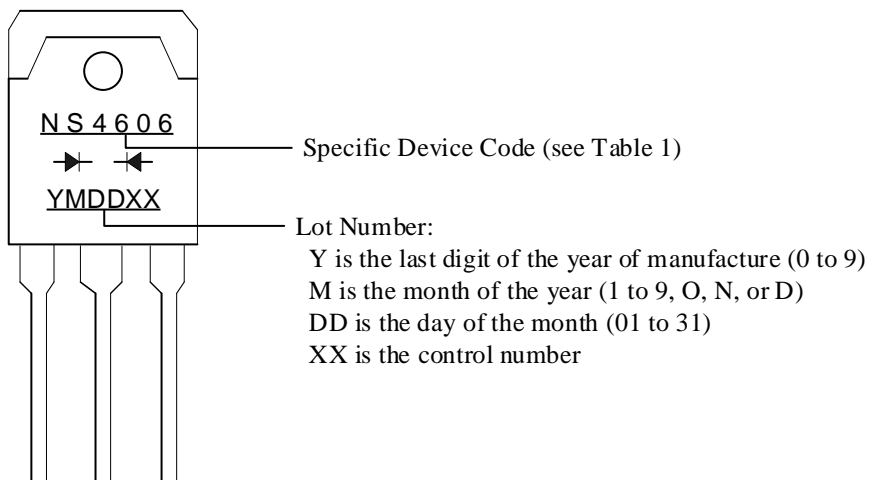


Table 1. Specific Device Code

Specific Device Code	Part Number
NS4606	CTNS-4606S

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