

$V_{RM} = 600\text{ V}$, $I_{F(AV)} = 40\text{ A}$, $t_{rr} = 75\text{ ns}$
Fast Recovery Diode
CTXR-5406S

Description

The CTXR-5406S is a fast recovery diode of 600 V / 40 A. The low Q_{rr} characteristic allows the product to have almost no ringing at turn-off. The maximum t_{rr} of 75 ns is realized by optimizing a life-time control. These characteristics lead to the realization of low-noise systems. The low thermal resistance package achieves high performance in terms of heat dissipation.

Features

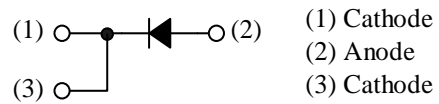
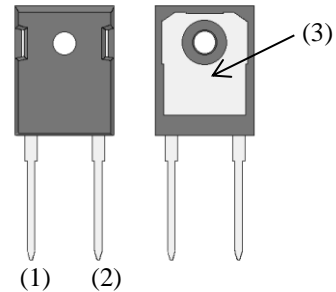
- Bare Lead Frame: Pb-free (RoHS Compliant)
- V_{RM} ----- 600 V
- $I_{F(AV)}$ ----- 40 A
- V_F ----- 2.5 V
- t_{rr} ----- 75 ns
- Flammability: Equivalent to UL94V-0

Applications

- PFC Circuit
- Inverter Circuit

Package

TO247-2L



Not to scale

CTXR-5406S

Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Rating	Unit
Nonrepetitive Peak Reverse Voltage	V_{RSM}		600	V
Repetitive Peak Reverse Voltage	V_{RM}		600	V
Average Forward Current	$I_{F(AV)}$	See Figure 1 and Figure 2	40	A
Surge Forward Current	I_{FSM}	Half cycle sine wave, positive side, 10 ms, 1 shot	200	A
I^2t Limiting Value	I^2t	$1\text{ ms} \leq t \leq 10\text{ ms}$	200	A^2s
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	V_F	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 40\text{ A}$	—	—	2.5	V
		$T_J = 100\text{ }^\circ\text{C}$, $I_F = 40\text{ A}$	—	2.1	—	V
Reverse Leakage Current	I_R	$V_R = V_{RM}$	—	—	10	μA
Reverse Leakage Current Under High Temperature	$H \cdot I_R$	$V_R = V_{RM}$, $T_J = 150\text{ }^\circ\text{C}$	—	—	2	mA
Reverse Recovery Time	t_{rr}	$I_F = 40\text{ A}$, $di/dt = -200\text{ A}/\mu\text{s}$, 100% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	75	ns
Reverse Recovery Charge	Q_{rr}	$I_F = 40\text{ A}$, $di/dt = -200\text{ A}/\mu\text{s}$, $V_R = 400\text{ V}$, 100% recovery point, $T_J = 25\text{ }^\circ\text{C}$	—	—	190	nC
Thermal Resistance ⁽¹⁾	$R_{th(J-C)}$		—	—	1.1	$^\circ\text{C}/\text{W}$

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Heatsink Mounting Screw Torque		0.686	—	0.882	N·m
Package Weight		—	6.1	—	g

⁽¹⁾ $R_{th(J-C)}$ is thermal resistance between junction and case.

Derating Curves

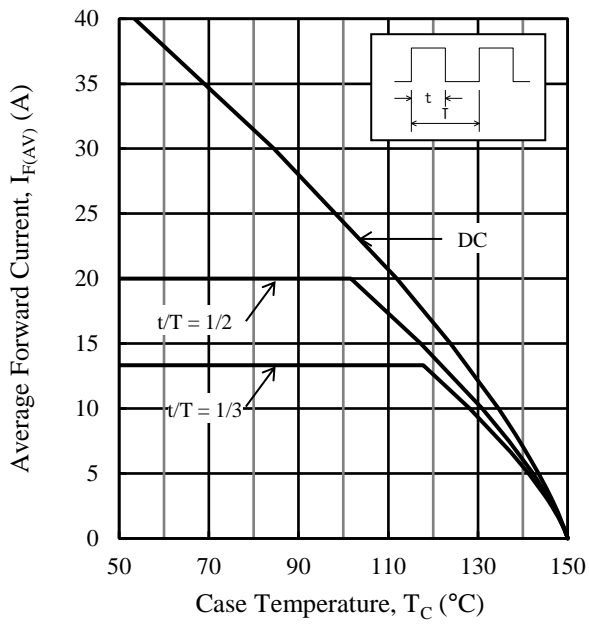


Figure 1. T_C vs. I_F ($T_J = 150\text{ }^\circ\text{C}$, $V_R = 0\text{ V}$)

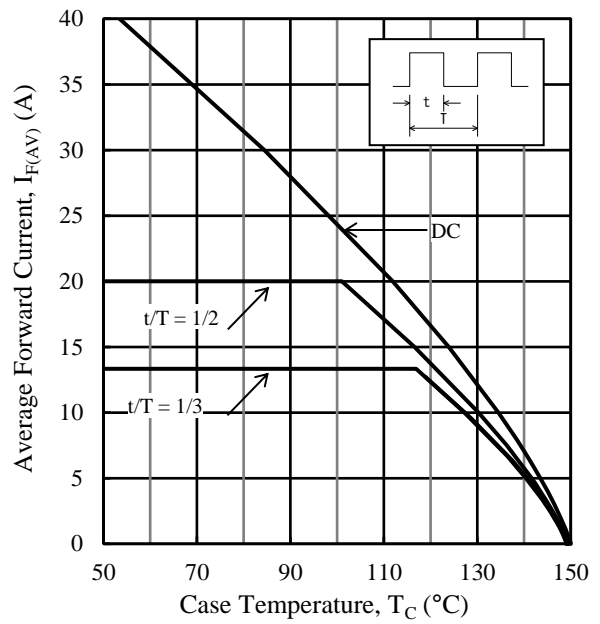


Figure 2. T_C vs. I_F ($T_J = 150\text{ }^\circ\text{C}$, $V_R = 600\text{ V}$)

Characteristic Curves

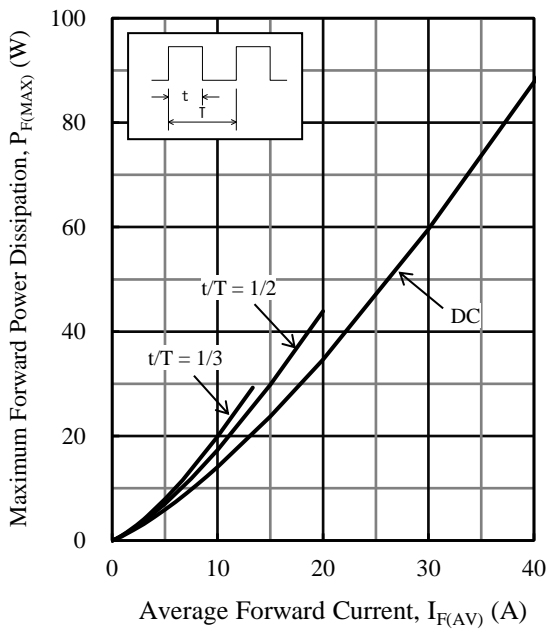


Figure 3. $P_{F(MAX)}$ vs. $I_{F(AV)}$ ($T_J = 150\text{ }^\circ\text{C}$)

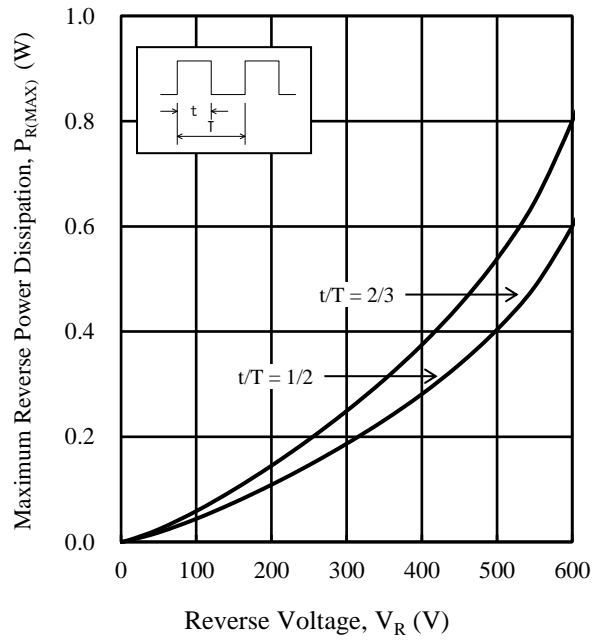


Figure 4. $P_{R(MAX)}$ vs. V_R ($T_J = 150\text{ }^\circ\text{C}$)

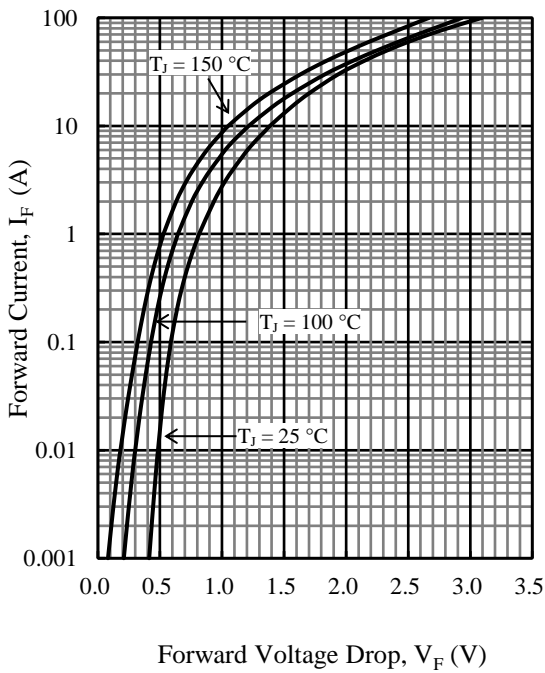


Figure 5. Typical Characteristics: V_F vs. I_F

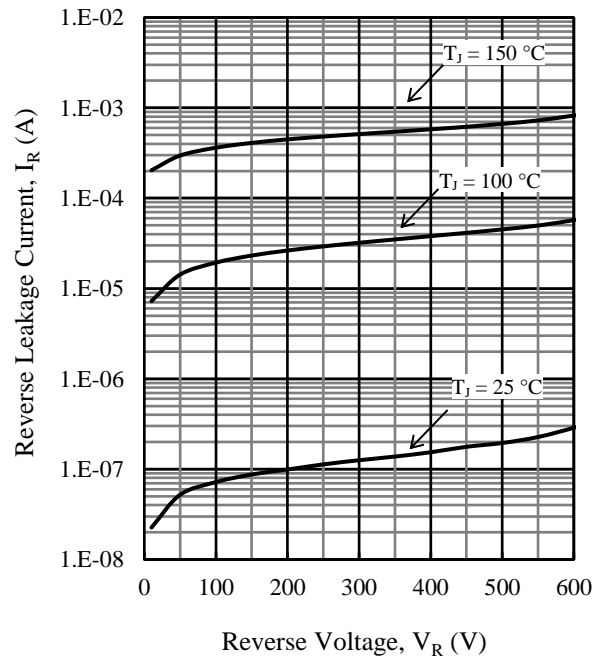


Figure 6. Typical Characteristics: V_R vs. I_R

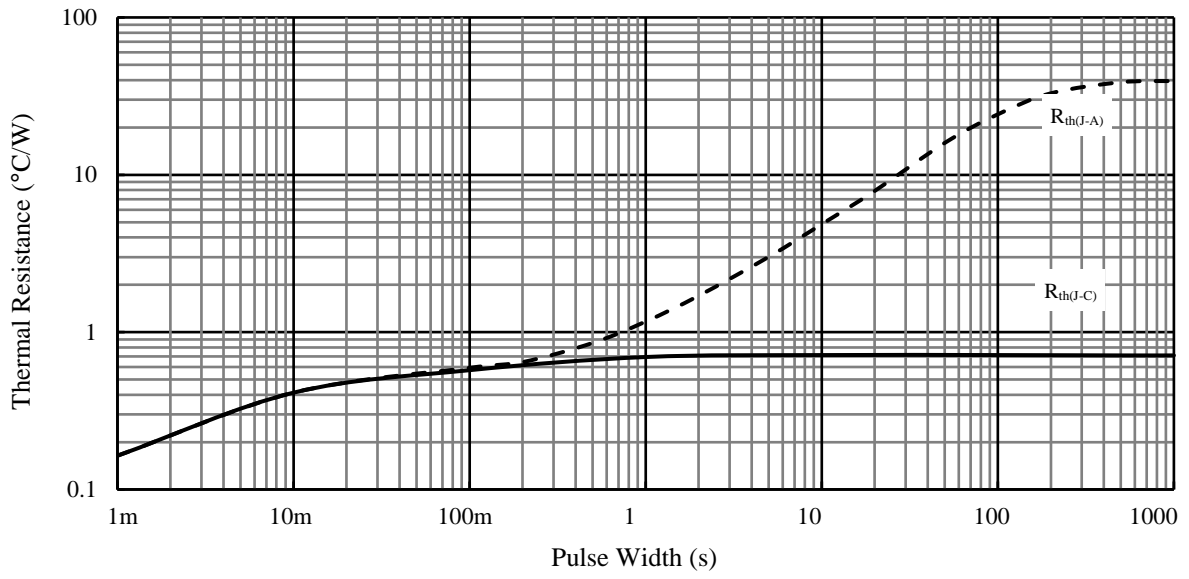
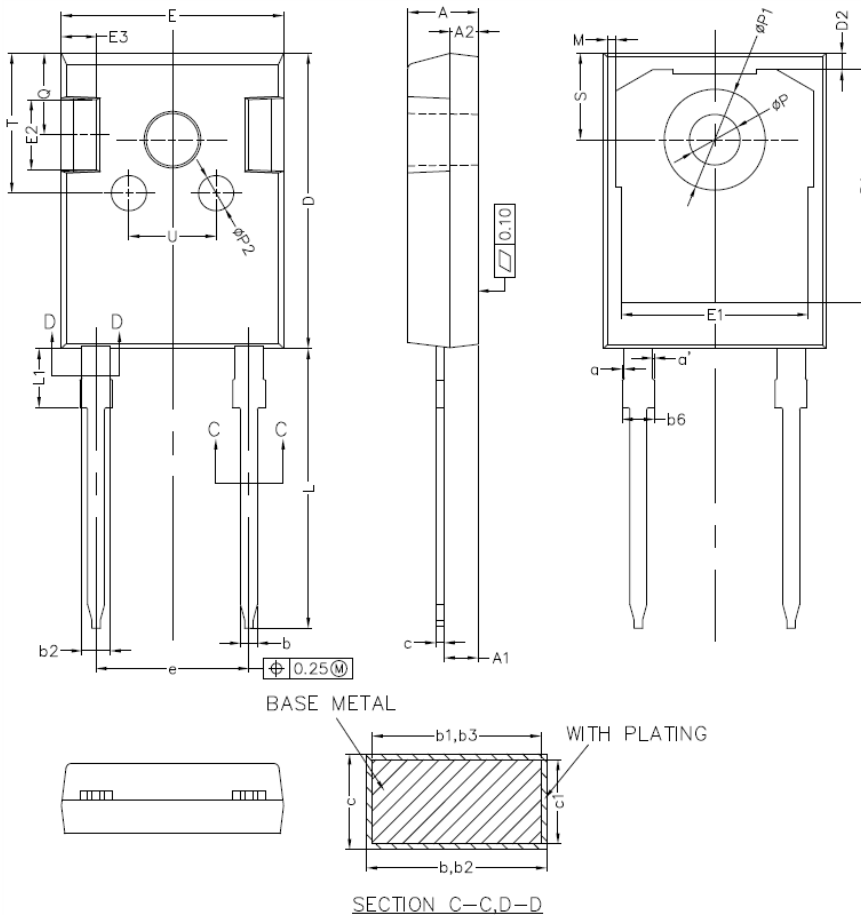


Figure 7. Typical Transient Thermal Resistance Characteristics

CTXR-5406S

Physical Dimension

• TO247-2L



Symbol	Min.	Typ.	Max.
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	—	0.15
a'	0	—	0.15
b	1.16	—	1.26
b1	1.15	1.20	1.25
b2	1.96	—	2.06
b3	1.95	2.00	2.02
b6	—	—	2.25
c	0.59	—	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.06	13.26	13.46
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	10.78	10.88	10.98
L	19.80	19.92	20.10
L1	3.93	—	4.46
M	0.35	—	0.95
P	3.50	3.60	3.70
P1	7.00	—	7.40
P2	2.40	2.50	2.60
Q	5.60	—	6.00
S	6.05	6.15	6.25
T	9.80	—	10.20
U	6.00	—	6.40

NOTES:

- Dimensions in millimeters
- All the dimensions exclude mold flashes.
- 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 °C / 10 s, 1 time
 Soldering Iron: 350 °C / 3.5 s, 1 time
 Soldering should be at a distance of at least 1.5 mm from the body of the product.

Marking Diagram

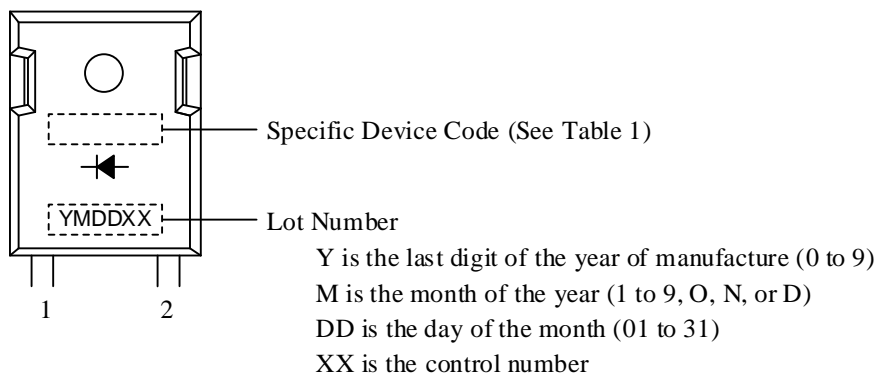


Table 1. Specific Device Code

Specific Device Code	Part Number
XR5406	CTXR-5406S

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