300V/20A
Silicon Carbide - Schottky Barrier Diode for Audio

■FEATURES

- Reverse voltage V_R: 300V
- Forward current I_F:10A (Per diode), 20A (Per device)
- High-speed switching characteristics
  15ns typ.
  (Per diode, V_R = 300V, Ta = 25°C)
- Low temperature dependence
- Low-loss assembly technology (Copper thick wire)
- Package Outline TO-247-3

■GENERAL DESCRIPTION

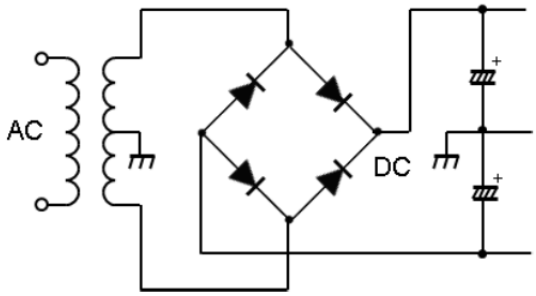
The MUSES7003 is a silicon carbide - schottky barrier diode (SiC-SBD) for audio.

The MUSES7003 improves the sound quality of audio equipment by high-speed switching characteristics and high-quality sound manufacturing technology.

Combination with the MUSES series operational amplifiers and the MUSES7003 can offer an excellent quality sound, because the SiC-SBD will fully bring out the performance of the MUSES series operational amplifiers.

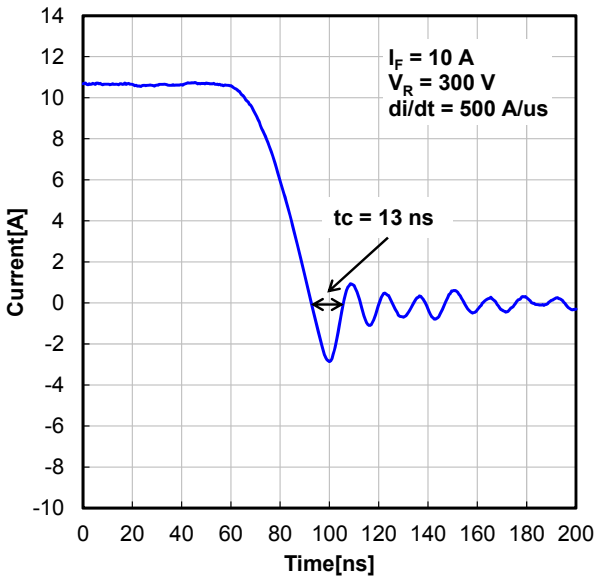
■APPLICATION

- Premium home audio
  Bridge rectifier circuit for audio equipment

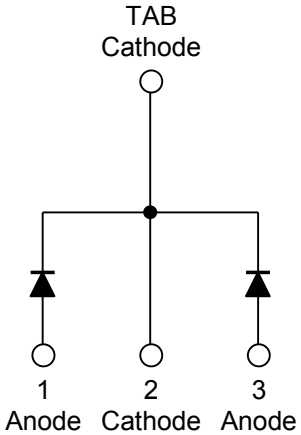


■HIGH-SPEED SWITCHING CHARACTERISTICS

(Per diode)



■EQUIVALENT CIRCUIT



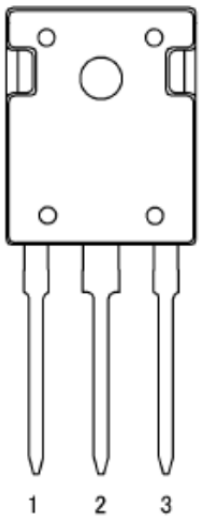
■ SiC-SBD (AUDIO) LINEUP

PART NUMBER	NUMBER OF CIRCUITS	V_R	I_F	PACKAGE OUTLINE	NOTE
MUSES7001	1	300V	10A	TO-247-3	
NJD7002	1	200V	0.5A	SSOP8-A3	

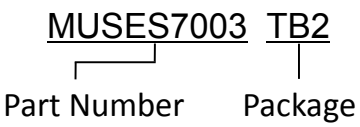
■PIN CONFIGURATION

PIN NO.	SYMBOL
1	Anode
2	Cathode
3	Anode
TAB	Cathode

(Top View)



■MARK INFORMATION



■ORDERING INFORMATION

PART NUMBER	PACKAGE OUTLINE	RoHS	HALOGEN-FREE	TERMINAL FINISH	MARKING	WEIGHT (g)	MOQ(pcs)
MUSES7003TB2	TO-247-3	yes	yes	Sn-2Bi	MUSES7003	6.4	300

■**ABSOLUTE MAXIMUM RATINGS** (Ta=25°C unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT	CONDITION
Peak Reverse voltage	V_{RM}	300	V	
Reverse voltage (DC)	V_R	300	V	
Forward current	I_F	10	A	Per diode, T_j ≦150°C
		20	A	Per device, T_j ≦150°C
Surge forward current	I_{FSM}	40 *1	A	Per diode
		80 *1	A	Per device
Junction temperature	Tj	150	°C	
Storage temperature	T_{STG}	-55 to 150	°C	

*1: Non-repetitive maximum peak forward current in one cycle of 50Hz sin wave

■**ELECTRICAL CHARACTERISTICS** (Ta=25°C unless otherwise specified, Per diode)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Forward voltage	V_F	I_F = 10A, Tj = 25°C	-	1.60	1.80	V
		I_F = 10A, Tj = 150°C	-	1.85	2.15	
Reverse current	I_R	V_R = 300V, Tj =25°C	-	5	50	μA
		V_R = 300V, Tj =150°C	-	10	100	
Switching time	t_C	V_R = 300V, di/dt=500A/μs	-	15	20	ns
Total capacitance	Ct	V_R = 1V, f = 1MHz	-	370	430	pF
		V_R = 300V, f = 1MHz	-	45	-	

■**THERMAL CHARACTERISTICS**

PARAMETER	SYMBOL	CONDITION	VALUE	UNIT
Junction-to-ambient thermal resistance	Zth(j-a)	Per diode	35	°C /W
		Per device	35	°C /W
Junction-to-case thermal resistance	Zth(j-c)	Per diode	3.0	°C /W
		Per device	2.0	°C /W

■ **NOTE**

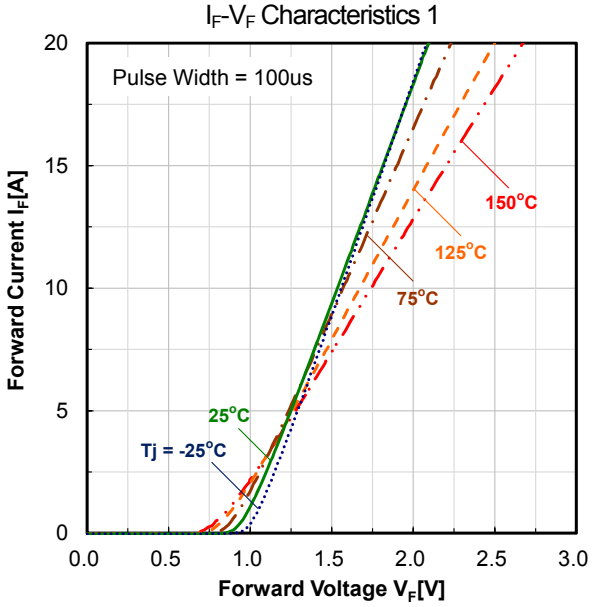
Junction temperature during operation should not exceed 150 °C.

Be careful about thermal design. The temperature dependence of the forward characteristic depends on the operating current.

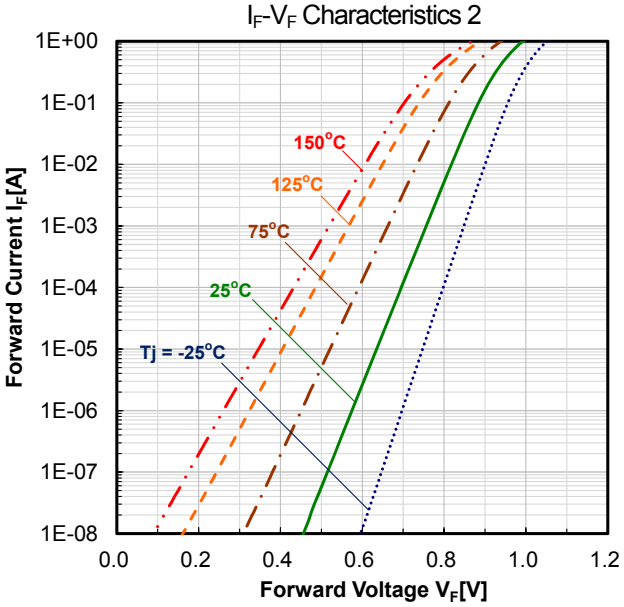
Be careful about inrush current at power-on. Inrush current shall not exceed the absolute maximum rating of surge forward current.

■TYPICAL CHARACTERISTICS (Per diode)

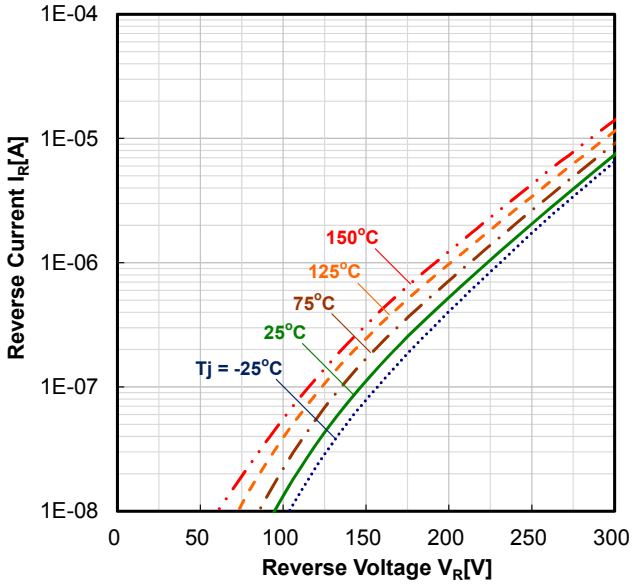
I_F-V_F Characteristics 1



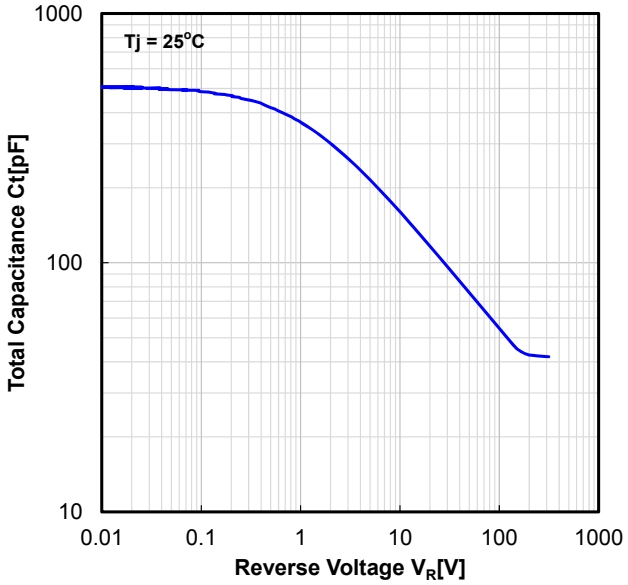
I_F-V_F Characteristics 2



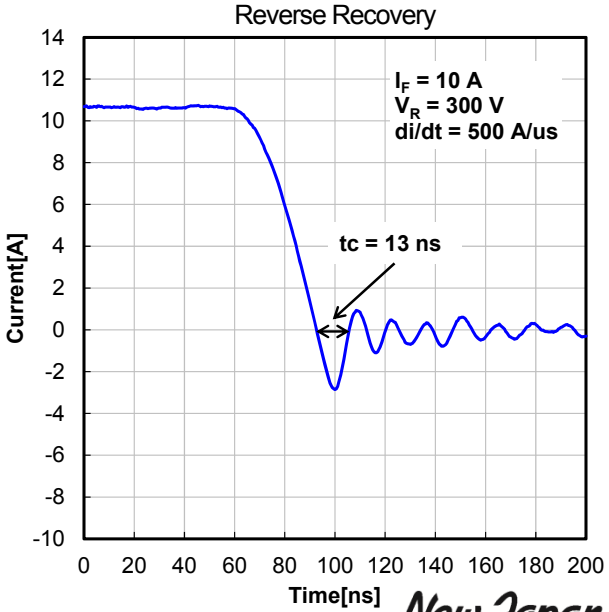
I_R-V_R Characteristics



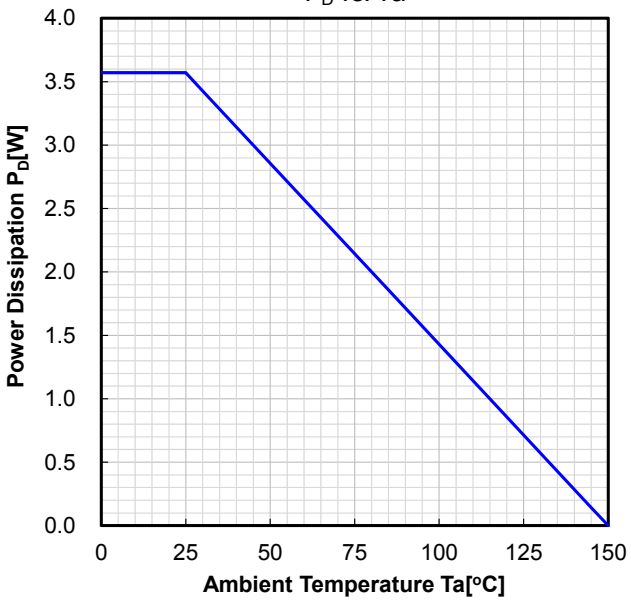
Ct-V_R Characteristics



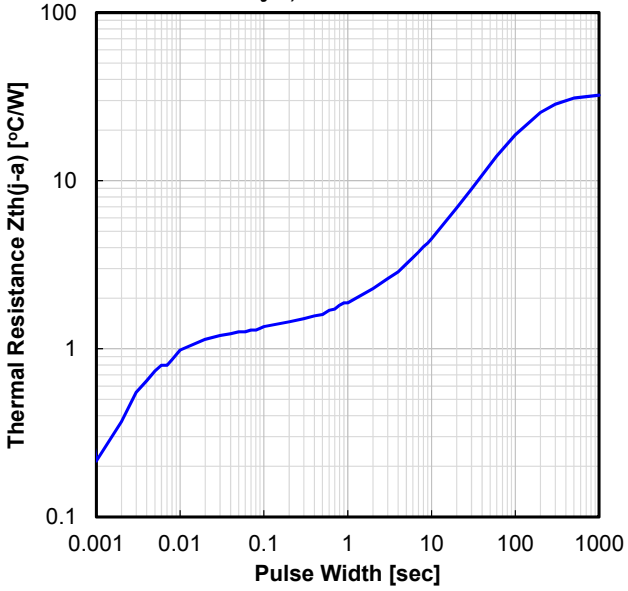
Reverse Recovery



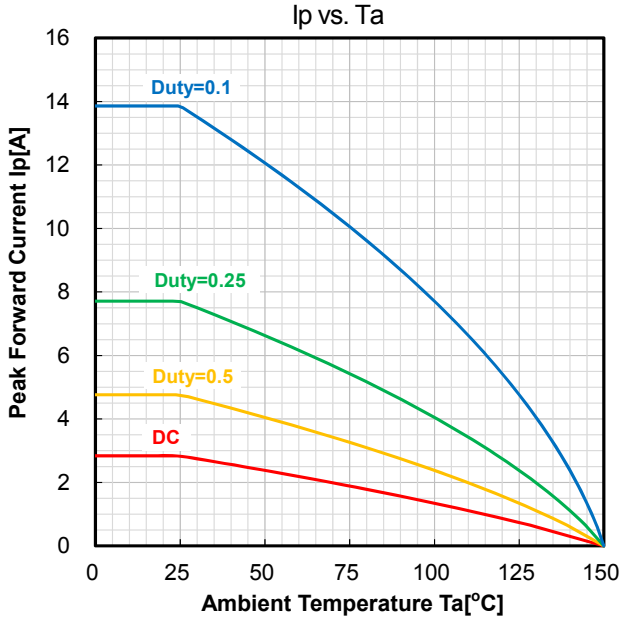
P_D vs. Ta



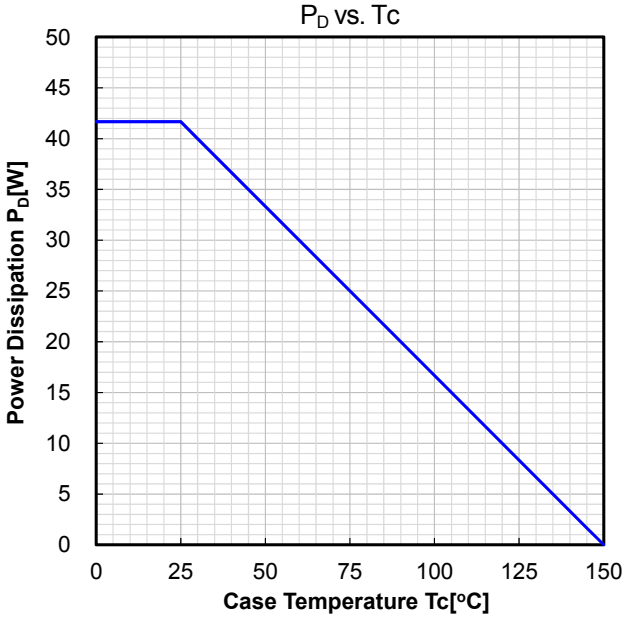
Zth(j-a) vs. Pulse Width



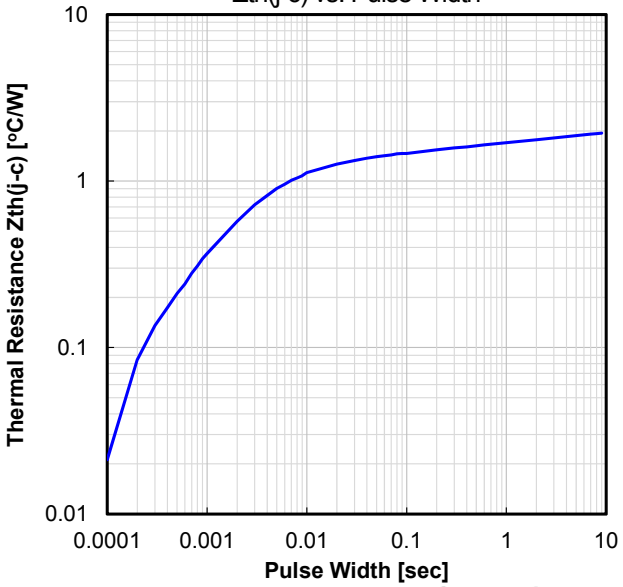
Ip vs. Ta



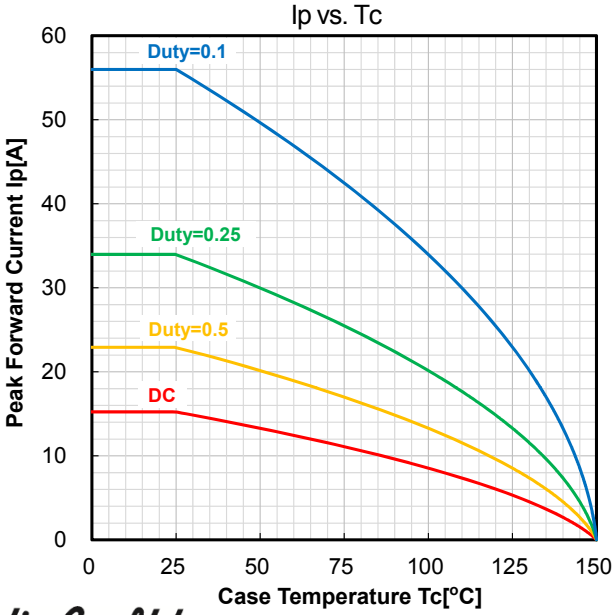
P_D vs. Tc



Zth(j-c) vs. Pulse Width

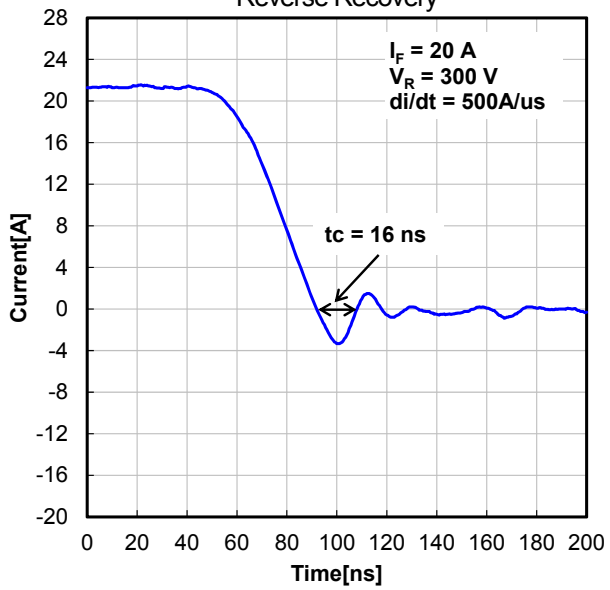


Ip vs. Tc

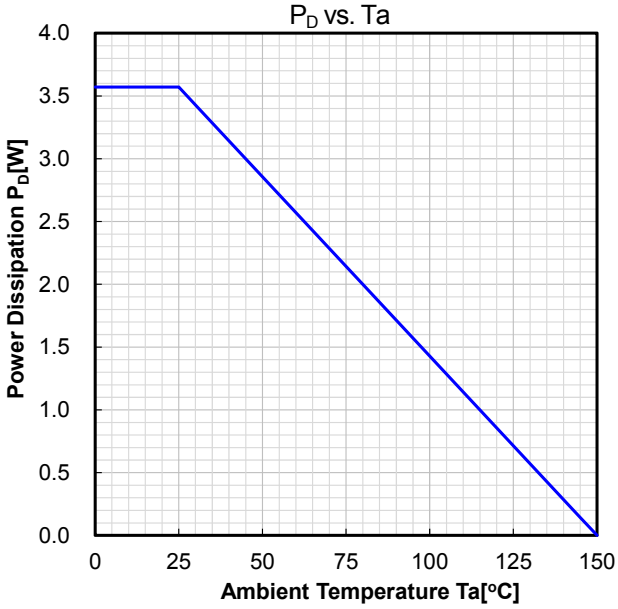


■TYPICAL CHARACTERISTICS (Per device)

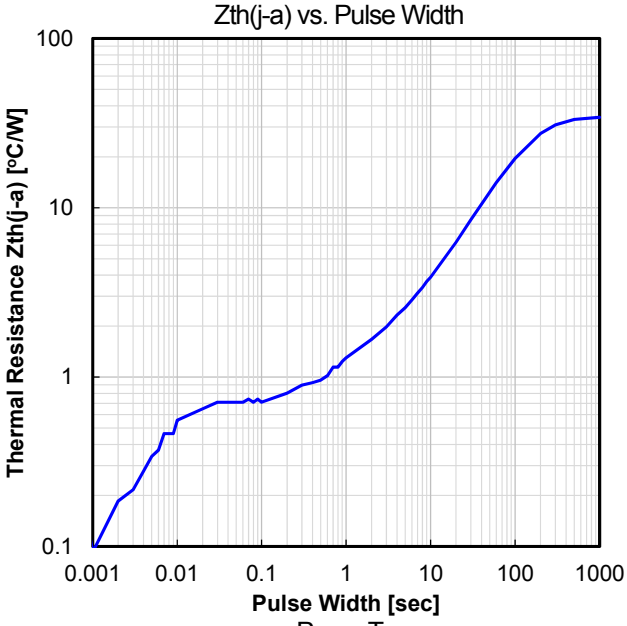
Reverse Recovery



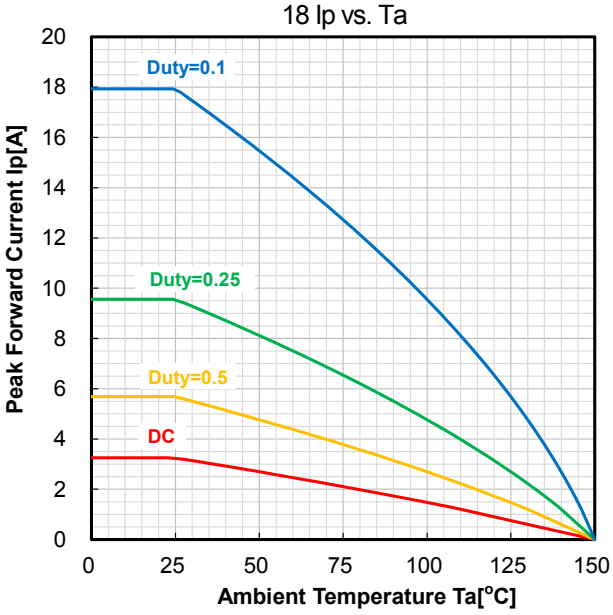
P_D vs. Ta



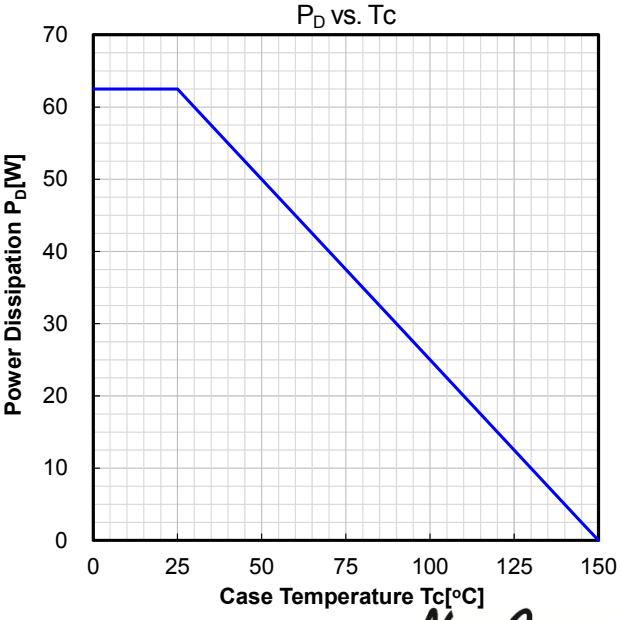
Zth(j-a) vs. Pulse Width



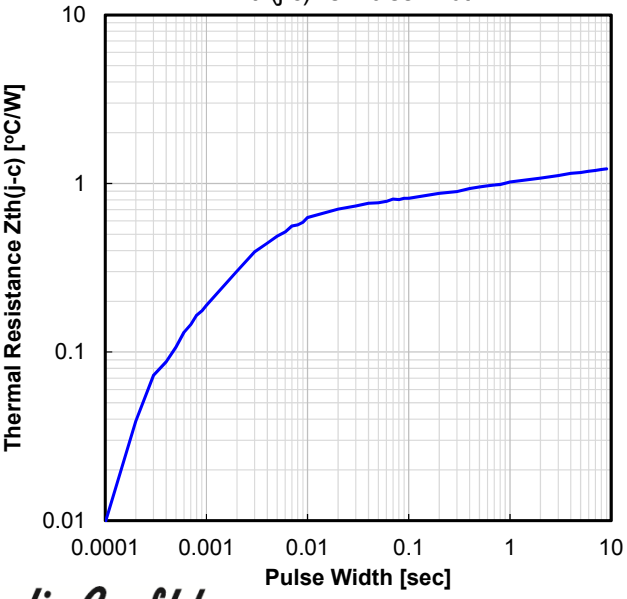
18 Ip vs. Ta

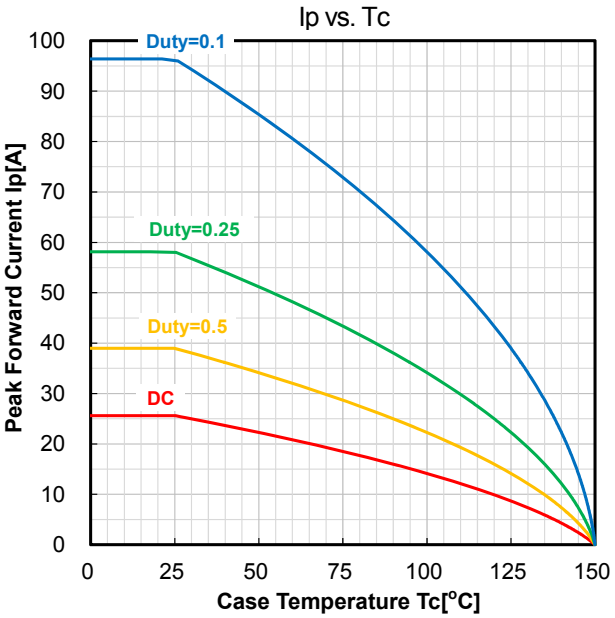


P_D vs. Tc

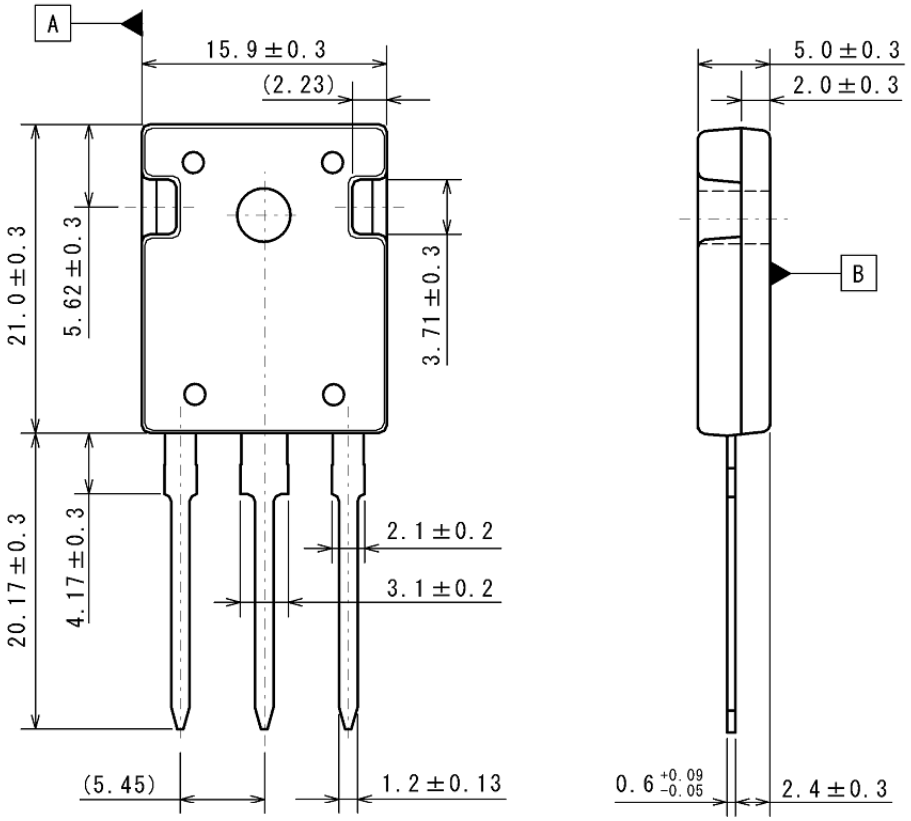


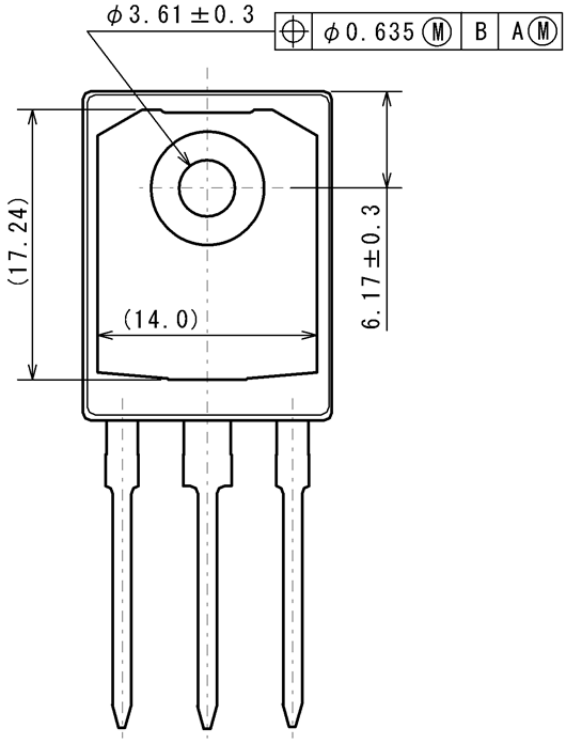
Zth(j-c) vs. Pulse Width




Ip vs. Tc
Duty=0.1
Duty=0.25
Duty=0.5
DC
Peak Forward Current Ip[A]
Case Temperature Tc[°C]
100
90
80
70
60
50
40
30
20
10
0
0
25
50
75
100
125
150

■PACKAGE OUTLINE

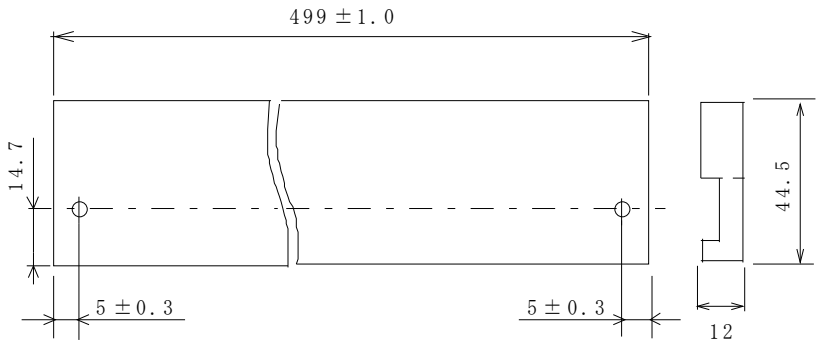




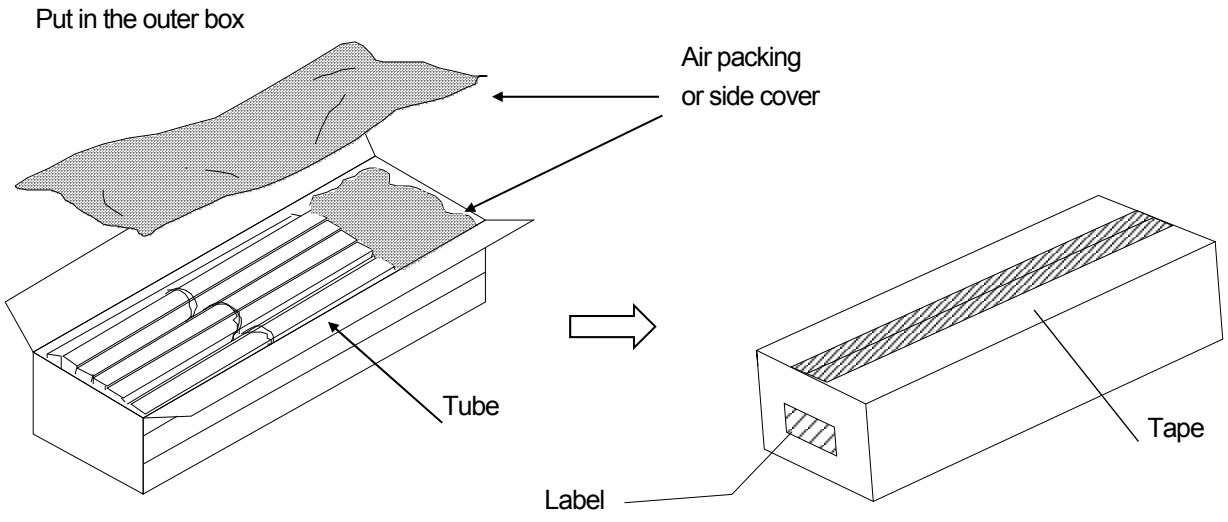
■PACKING SPECIFICATION

Plastic Tube Container dimensions for TO-247-3

1. Material PVC
2. Stopper Stick Pin
3. Contents 30pcs / Tube



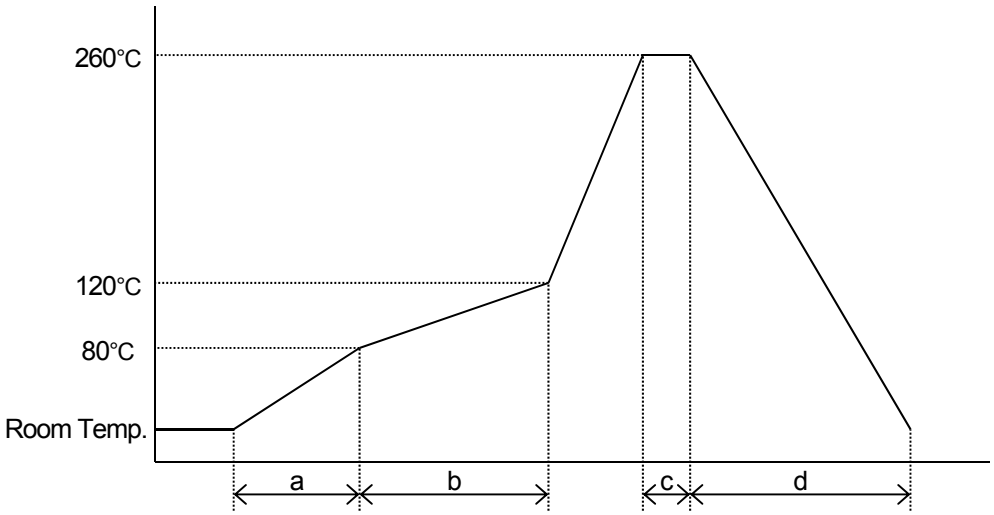
UNIT : mm



■RECOMMENDED MOUNTING METHOD

FLOW SOLDERING METHOD

∗ flow soldering procedure



a : Temperature ramping rate	: 1 to 7°C /s
b : Pre-heating temperature	: 80 to 120°C
Pre-heating time	: 60 to 120s
c : Peak temperature	: not exceeding 260°C
Peak time	: within 10s
d : Temperature ramping rate	: 1 to 7°C /s

The temperature indicates at the lead.

IRON SOLDERING METHOD

∗ Iron Soldering conditions
Temperature of Iron: not exceeding 350°C
Soldering time: within 3s (At 1 lead)

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