P_D = 5 W / 6 W
Transient Voltage Suppressor Diodes
SZ-10N Series

Data Sheet

Description

The SZ-10N series are power Zener diodes designed for the protection of automotive electronic units, especially from the surge generated during load dump conditions and voltage transients induced by inductive loads. The package of the IC has high dissipation and high surge capability.

Features

- AEC-Q101 Qualified
- Meets the Surge Protection Requirements in ISO16750-2 Standard (Pulse 5a)
- T_J = 175 °C Capability Suitable for High Reliability and Automotive Requirement
- High Surge Capability
- Flammability: Equivalent to UL94V-0
- Bare Lead Frame: Pb-free (RoHS Compliant)

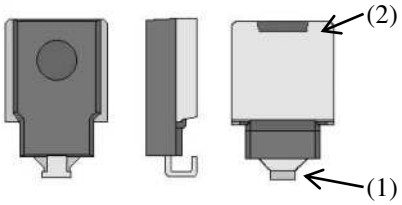
Applications

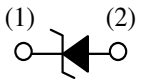
Protection of sensitive electronic equipment in passenger cars, trucks, vans, and buses:

- Engine Control Units
- Electric Control Units
- Braking System
- Power Steering System
- Airbags
- Audio/Infotainment Equipment

Package

SZ-10





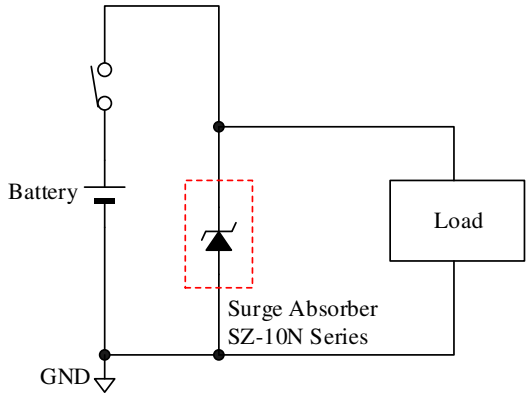
(1) Cathode
(2) Anode

Not to scale

Selection Guide

Part Number	V_Z		I_{RSM}	P_D
	Min.	Max.		
SZ-10N27	24 V	30 V	70 A	5 W
SZ-10NN27			90 A	6 W
SZ-10NN40	36 V	44 V	70 A	6 W

Typical Application



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Contents

Description ---- 1
Contents ---- 2
Absolute Maximum Ratings ---- 3
Electrical Characteristics ---- 4
SZ-10N27 Rating and Characteristic Curves ---- 5
SZ-10NN27 Rating and Characteristic Curves ---- 7
SZ-10NN40 Rating and Characteristic Curves ---- 9
Physical Dimensions ---- 11
Marking Diagram ---- 12
Important Notes ---- 13

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Absolute Maximum Ratings

Unless otherwise specified, T_A = 25 °C.

Parameter	Symbol	Conditions	Rating	Unit	Remarks
Power Dissipation[1]	P_D	Lead temperature[2]	5	W	SZ-10N27
			6		SZ-10NN27 SZ-10NN40
DC Blocking Voltage	V_{DC}	—	22	V	SZ-10N27 SZ-10NN27
			32		SZ-10NN40
Peak Pulse Reverse Current	I_{RSM}	[3]	70	A	SZ-10N27 SZ-10NN40
			90		SZ-10NN27
Junction Temperature	T_J	—	−55 to 175	°C	
Storage Temperature	T_{STG}	—	−55 to 175	°C	

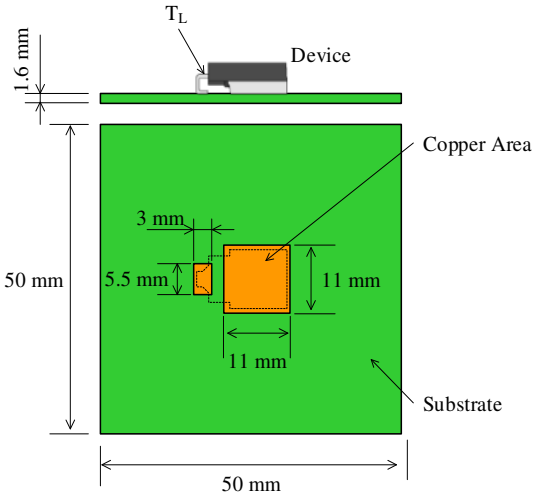
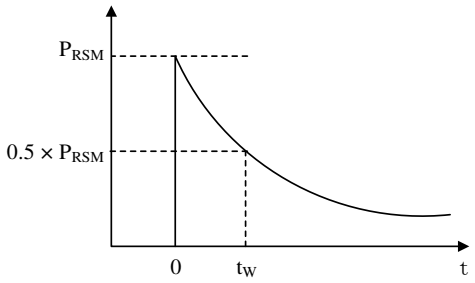


Figure 1. Lead Temperature Measurement Conditions



$P_{RSM} = V_Z \times I_{RP}$

Where:
V_Z is Breakdown Voltage
I_{RP} is Peak Current of Pulse

Figure 2. Definition of Peak Pulse Reverse Current

[1] See Figure 3.
[2] See Figure 1.
[3] See Figure 2.

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Electrical Characteristics

Unless otherwise specified, T_A = 25 °C.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Remarks
Forward Voltage Drop	V_F	I_F = 6 A	—	—	1.00	V	SZ-10N27
			—	—	0.98		SZ-10NN40
					0.95		SZ-10NN27
Reverse Leakage Current	I_R	$V_R = V_{DC}$	—	—	10	μA	
Breakdown Voltage	V_Z	I_Z = 10 mA	24	—	30	V	SZ-10N27 SZ-10NN27
			36	—	44		SZ-10NN40
Breakdown Voltage Temperature Coefficient	r_Z	I_Z = 10 mA	—	22	36	mV/°C	SZ-10N27 SZ-10NN27
			—	36	48		SZ-10NN40
Breakdown Region Equivalent Resistance	R_Z	I_Z = 1 A to 10 A	—	0.08	—	Ω	SZ-10N27 SZ-10NN27
			—	0.1	—		SZ-10NN40
Thermal Resistance	$R_{th(J-L)}$	(4)	—	2.0	—	°C/W	

Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Package Weight		—	2.6	—	g

(4) $R_{th(J-L)}$ is thermal resistance between junction and lead. Lead temperature is measured as shown in Figure 1.

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SZ-10N27 Rating and Characteristic Curves

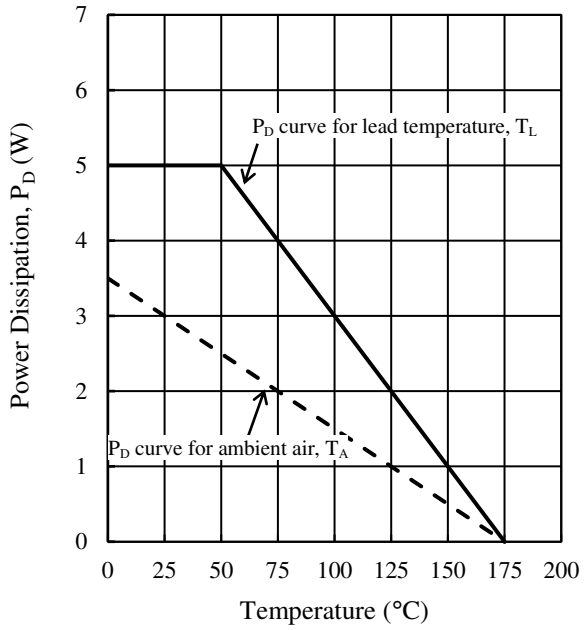


Figure 3. SZ-10N27 Power Dissipation Curves[5]

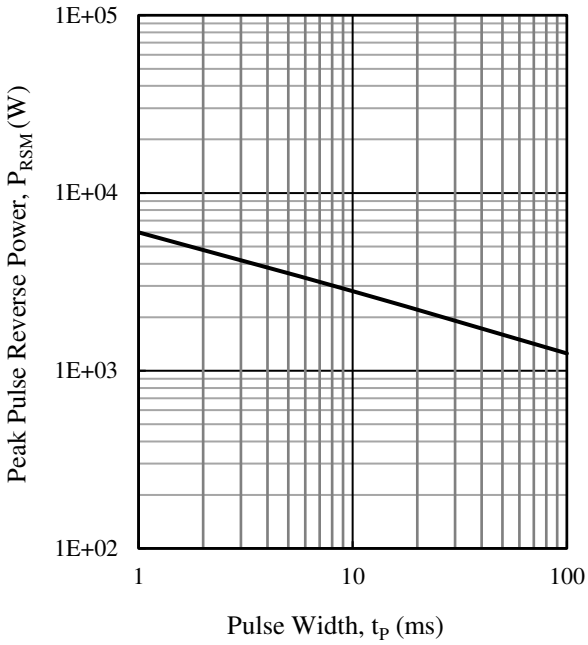


Figure 4. SZ-10N27 Peak Pulse Reverse Power[6]

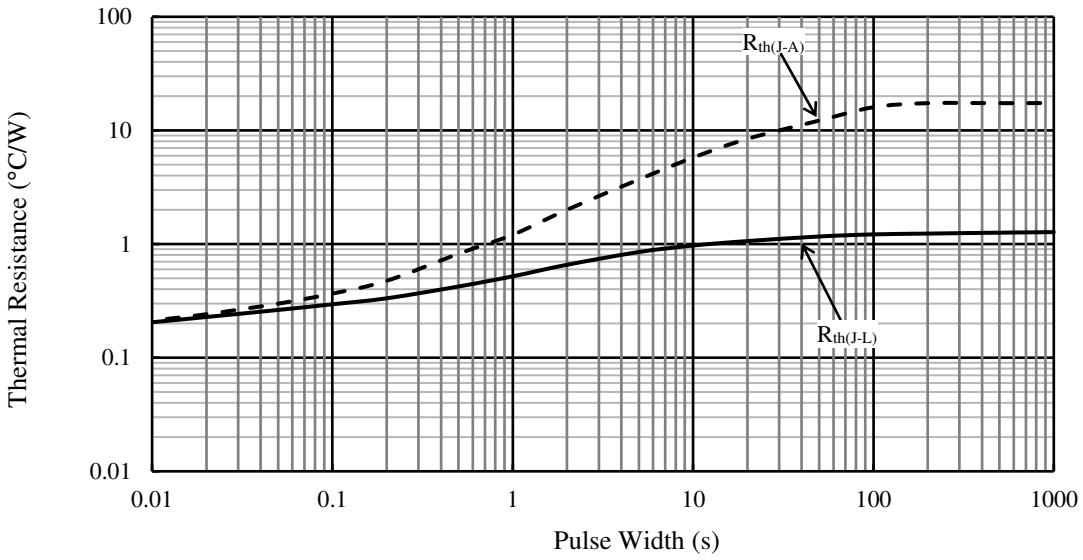


Figure 5. SZ-10N27 Typical Transient Thermal Resistance Characteristics [7]

[5] See Figure 1 for the measurement conditions of the lead temperature.
[6] See Figure 2.
[7] See Figure 1 for the measurement conditions of the lead temperature.

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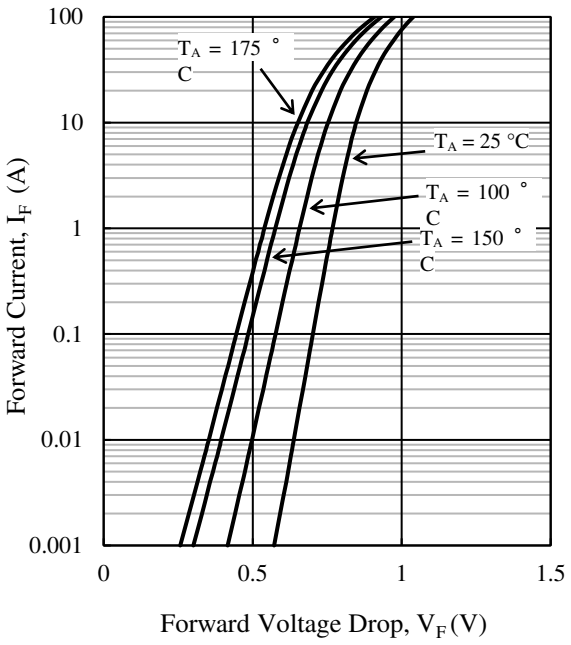


Figure 6. SZ-10N27 Typical Characteristics: I_F vs. V_F

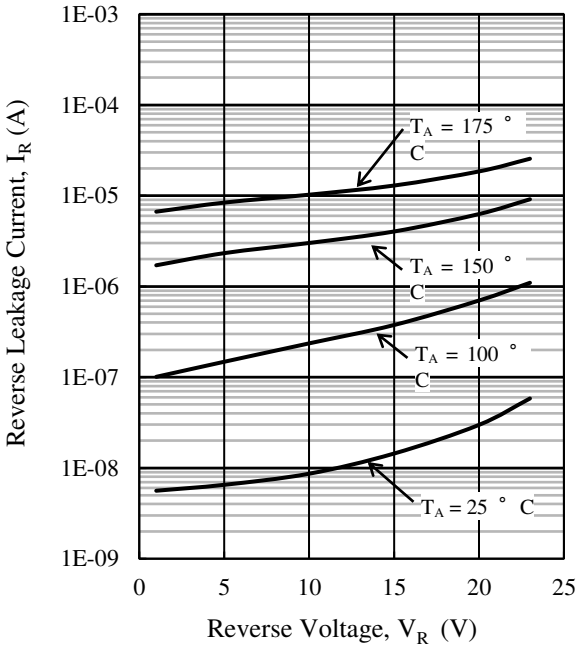


Figure 7. SZ-10N27 Typical Characteristics: I_R vs. V_R

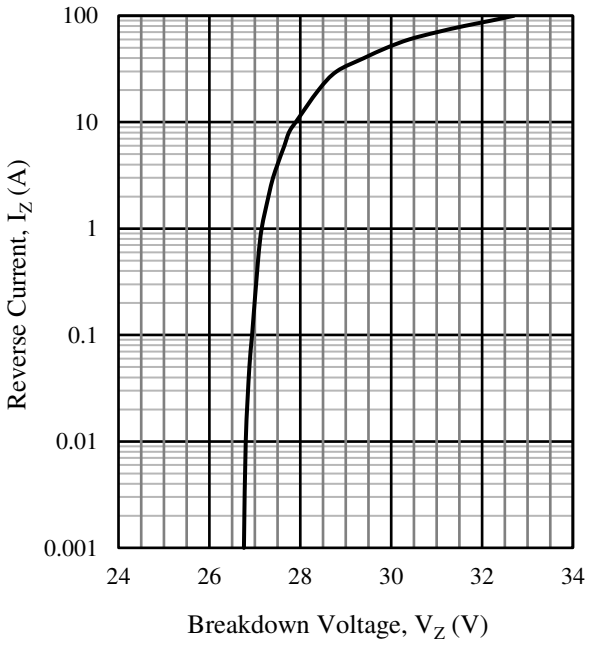


Figure 8. SZ-10N27 Typical Characteristics: I_Z vs. V_Z (T_J = 25 °C, t = 0.6 ms)

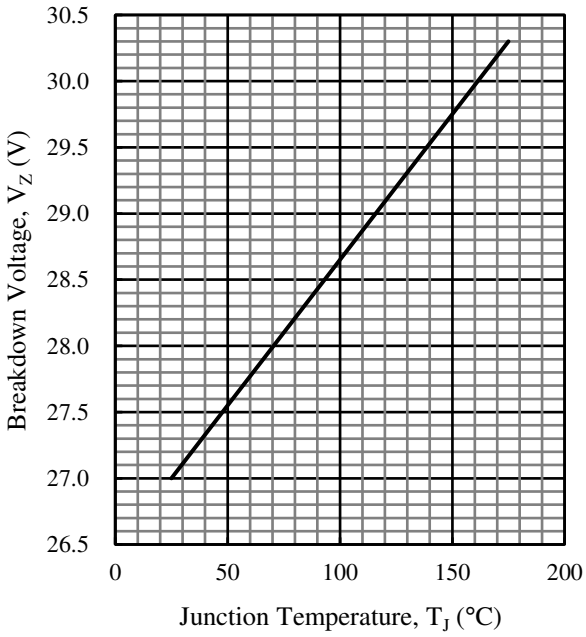


Figure 9. SZ-10N27 Typical Characteristics: V_Z vs. T_J

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SZ-10NN27 Rating and Characteristic Curves

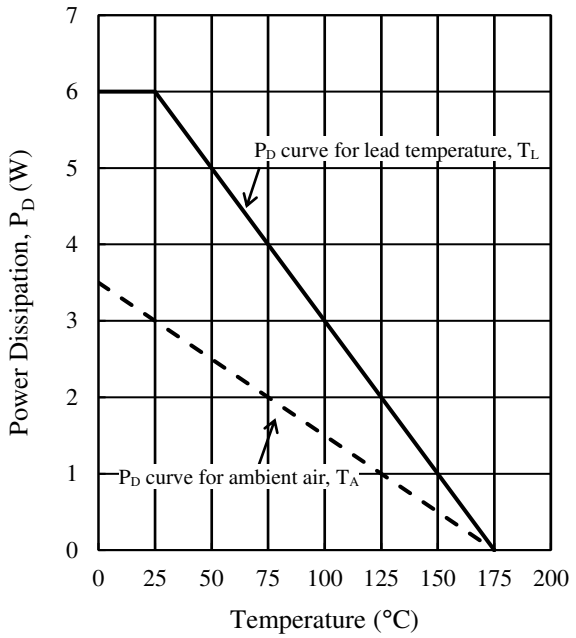


Figure 10. SZ-10NN27 Power Dissipation Curves[8]

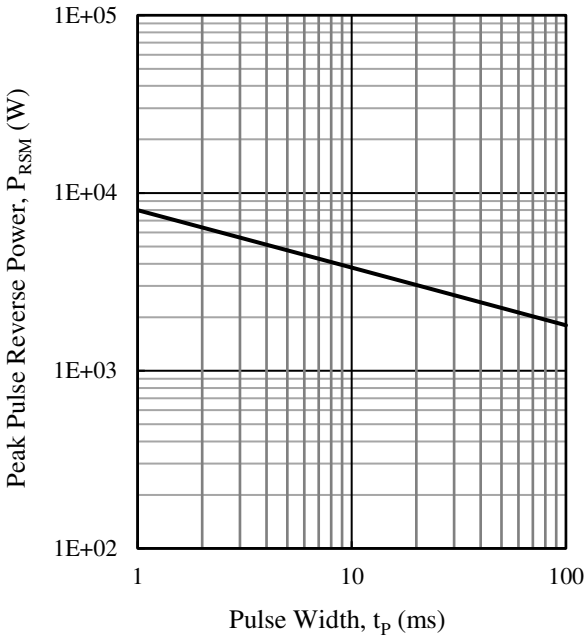


Figure 11. SZ-10NN27 Peak Pulse Reverse Power[9]

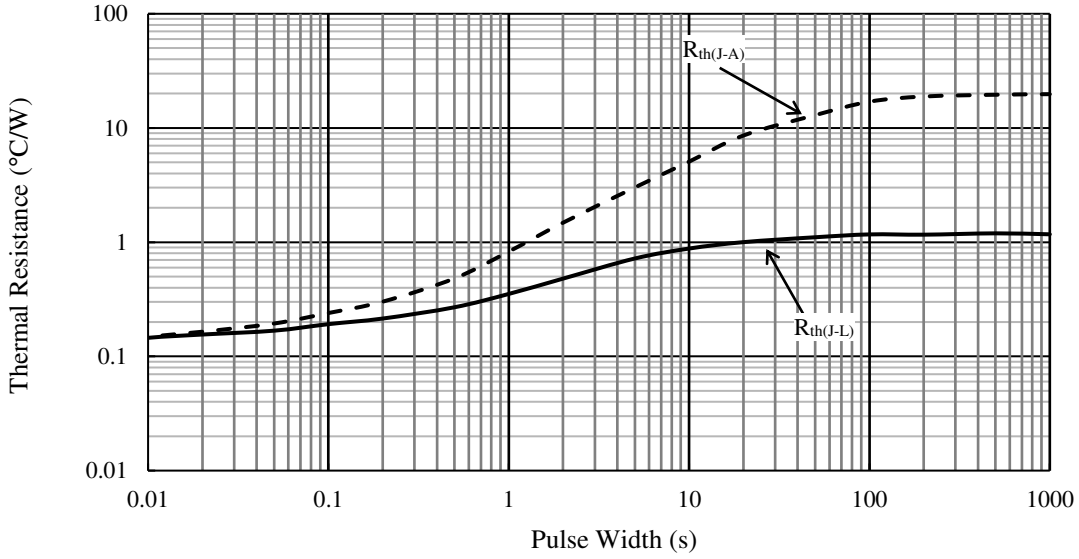


Figure 12. SZ-10NN27 Typical Transient Thermal Resistance Characteristics [10]

[8] See Figure 1 for the measurement conditions of the lead temperature.
[9] See Figure 2.
[10] See Figure 1 for the measurement conditions of the lead temperature.

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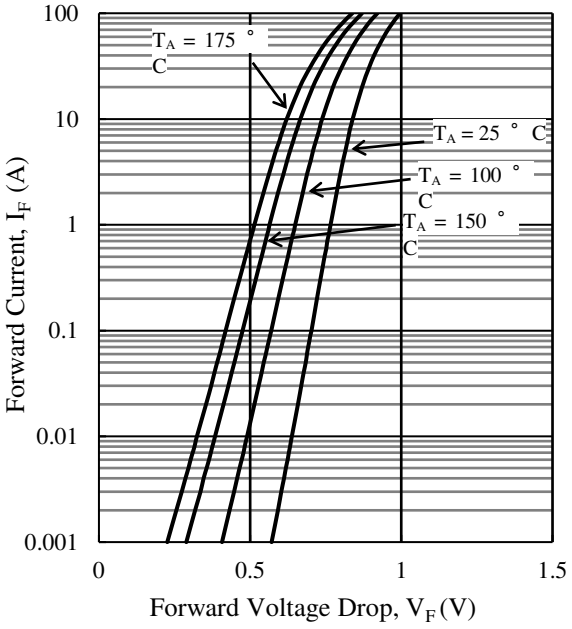


Figure 13. SZ-10NN27 Typical Characteristics: I_F vs. V_F

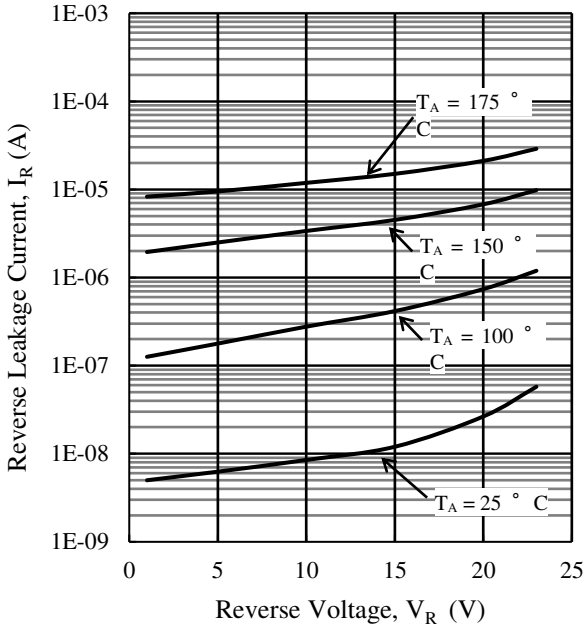


Figure 14. SZ-10NN27 Typical Characteristics: I_R vs. V_R

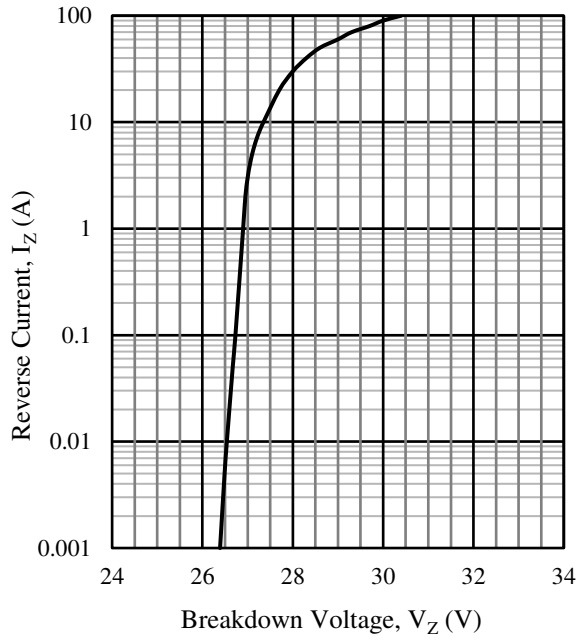


Figure 15. SZ-10NN27 Typical Characteristics: I_Z vs. V_Z (T_J = 25 °C, t = 0.6 ms)

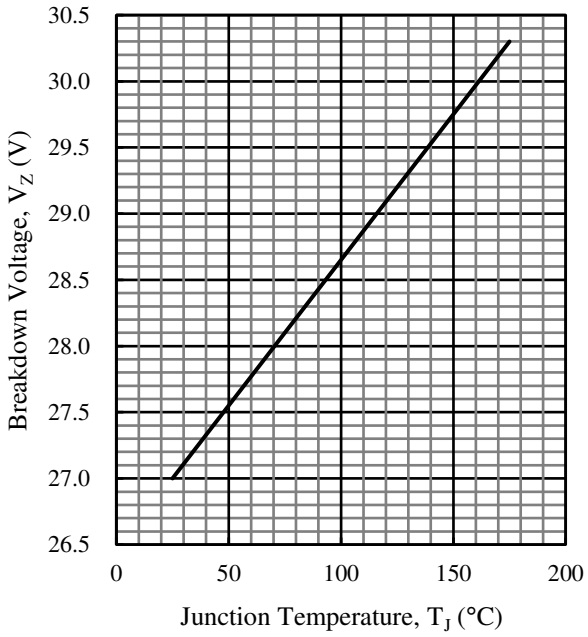


Figure 16. SZ-10NN27 Typical Characteristics: V_Z vs. T_J

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SZ-10NN40 Rating and Characteristic Curves

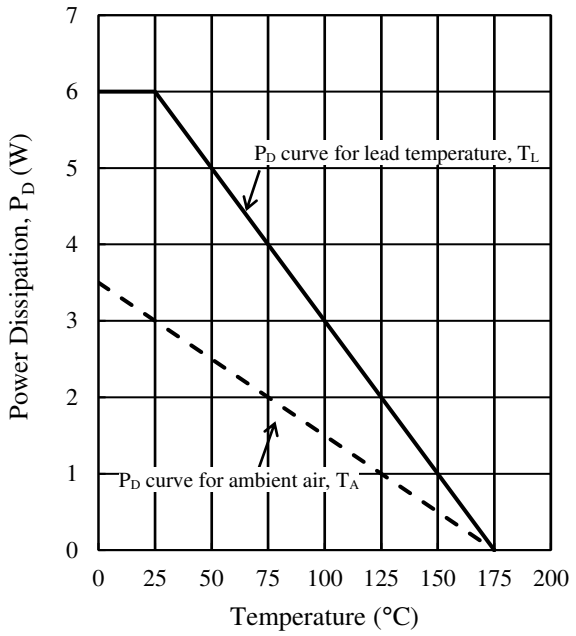


Figure 17. SZ-10NN40 Power Dissipation Curves[11]

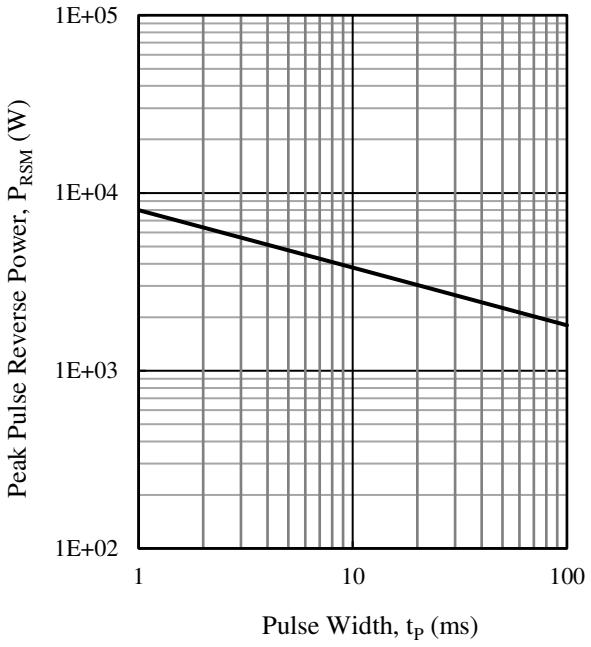


Figure 18. SZ-10NN40 Peak Pulse Reverse Power[12]

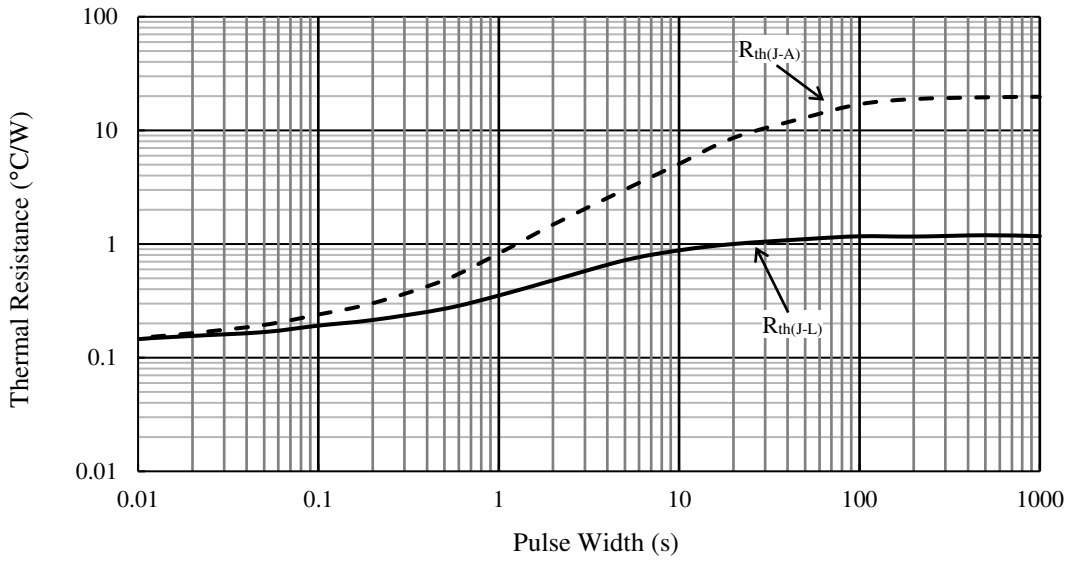


Figure 19. SZ-10NN40 Typical Transient Thermal Resistance Characteristics [13]

[11] See Figure 1 for the measurement conditions of the lead temperature.
[12] See Figure 2.
[13] See Figure 1 for the measurement conditions of the lead temperature.

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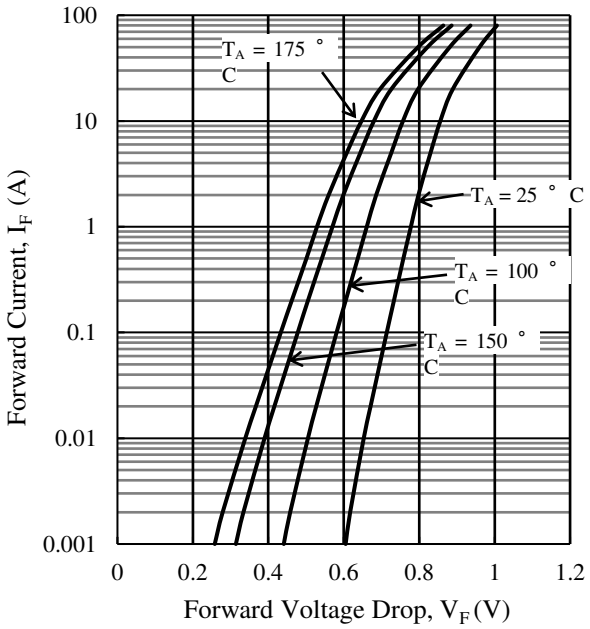


Figure 20. SZ-10NN40 Typical Characteristics: I_F vs. V_F

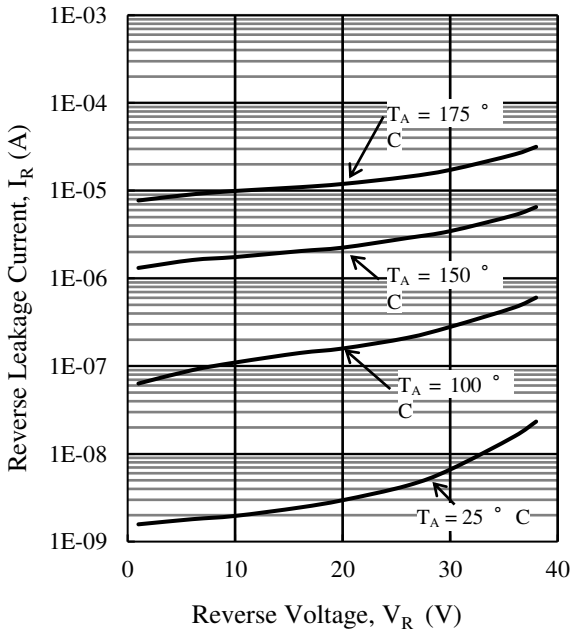


Figure 21. SZ-10NN40 Typical Characteristics: I_R vs. V_R

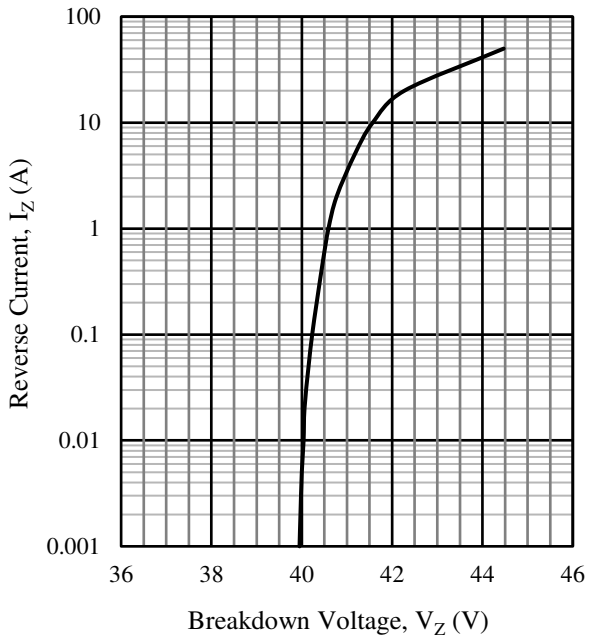


Figure 22. SZ-10NN40 Typical Characteristics: I_Z vs. V_Z (T_J = 25 °C, t = 0.6 ms)

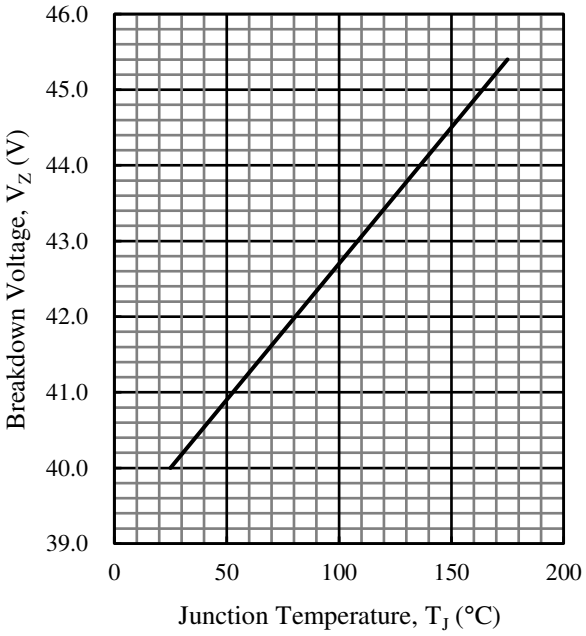
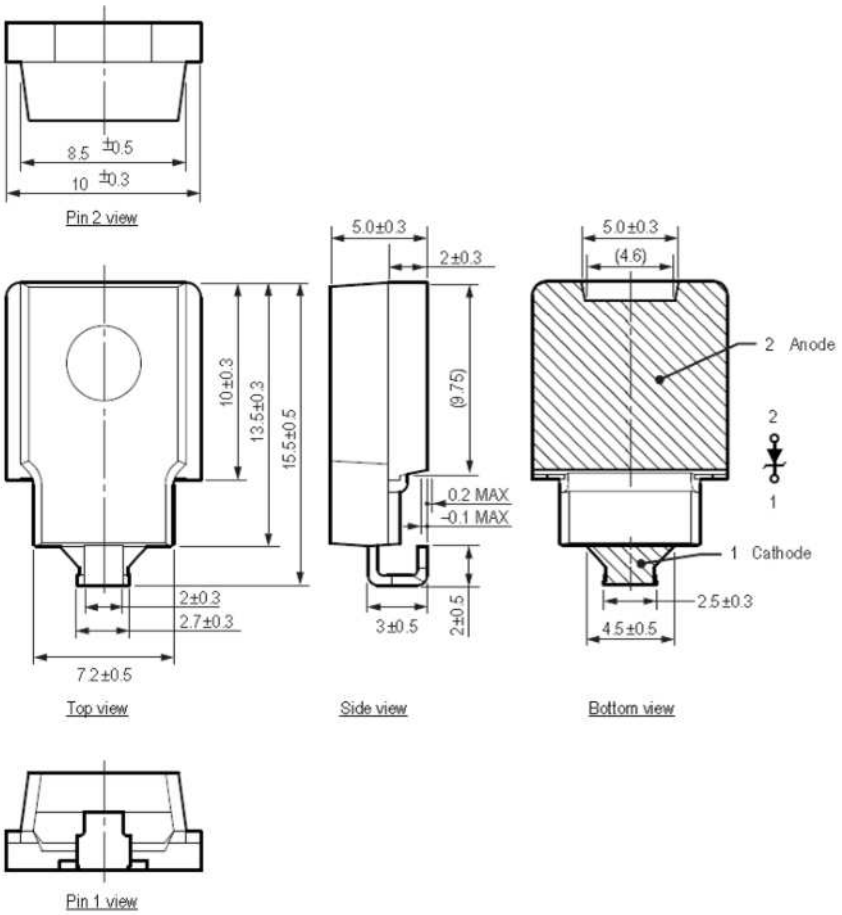


Figure 23. SZ-10NN40 Typical Characteristics: V_Z vs. T_J

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Physical Dimensions

● **SZ-10 Package**

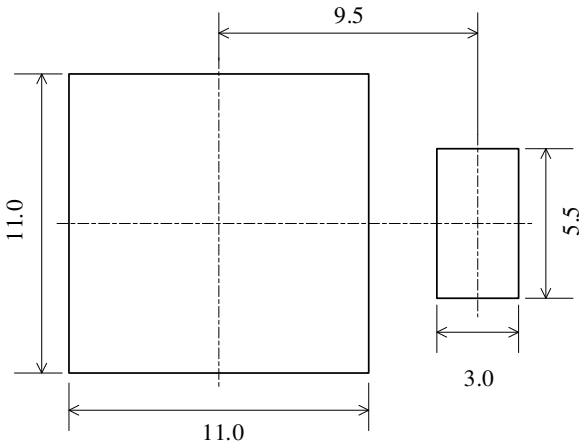


NOTES:

- Dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- Moisture Sensitivity Level 3 (MSL 3)
- When soldering the products, it is required to minimize the working time within the following limits:
- Reflow:
  Preheat: 150 °C to 200 °C / 60 s to 120 s
  Solder heating: 240 °C / 30s, 3 times (245 °C peak)
- Soldering iron: 350 °C / 3.5 s, 1 time

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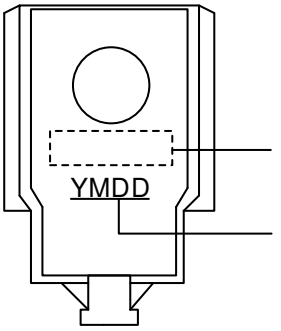
● **SZ-10 Land Pattern Example**



NOTE:

- Dimensions in millimeters

Marking Diagram



Specific Device Code (see Table 1)

Lot Number:
Y is the last digit of the year of manufacture (0 to 9)
M is the month of the year (1 to 9, O, N, or D)
DD is the day of the month (01 to 31)

Table 1. Specific Device Code

Specific Device Code	Part Number
BN27	SZ-10N27
DN27	SZ-10NN27
DN40	SZ-10NN40

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Important Notes

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- No anti-radioactive ray design has been adopted for the Sanken Products.
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