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P_D = 5 W / 6 W
Transient Voltage Suppressor

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 ISO7637-2 Standrard (Pulse 5a)
- T_J = 175 °C Capability Suitable for High Reliability and Automotive Requirement
- High Surge Capability
- Flammability UL94V-0 (Equivalent)
- RoHS Compliant

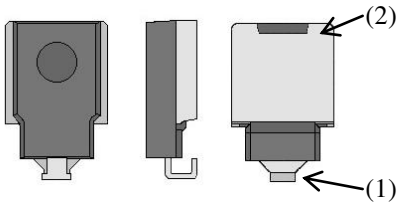
Applications

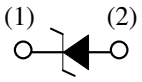
Protection of sensitive electronic equipment in passenger cars, trucks, vans, and buses:

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

Package

SZ-10





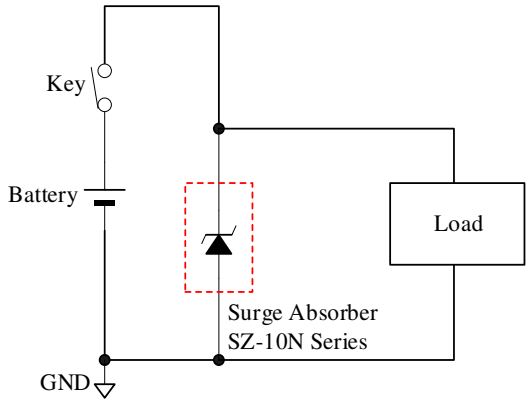
(1) Cathode
(2) Anode

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-10N40	36 V	44 V	45 A	5 W
SZ-10NN40			70 A	6 W

Typical Application



Contents

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 SZ-10N40
			6		SZ-10NN27 SZ-10NN40
DC Blocking Voltage	V_{DC}	—	22	V	SZ-10N27 SZ-10NN27
			32		SZ-10N40 SZ-10NN40
Peak Surge Reverse Current	I_{RSM}	[3]	45	A	SZ-10N40
			70		SZ-10N27 SZ-10NN40
			90		SZ-10NN27
Junction Temperature	T_J	—	−55 to 175	°C	
Storage Temperature	T_{STG}	—	−55 to 175	°C	

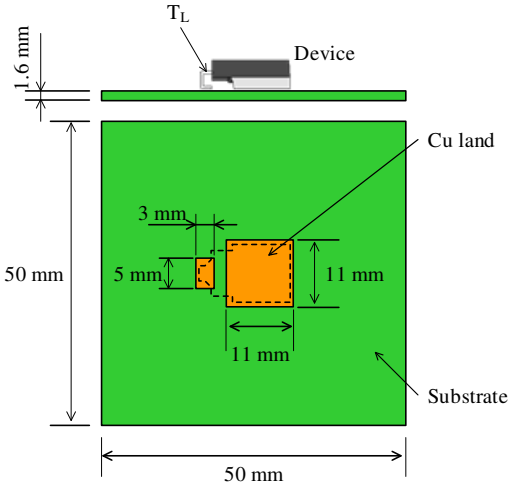
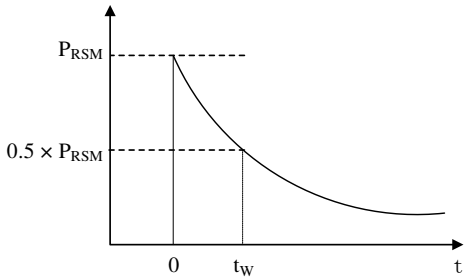


Figure 1. Lead Temperature Measurement Conditions



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

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

Figure 2. Definition of Peak Surge Reverse Current

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

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	—	—	1.03	V	SZ-10N40
			—	—	1.00		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-10N40 SZ-10NN40
Breakdown Voltage Temperature Coefficient	r_Z	I_Z = 10 mA	—	22	—	mV/°C	SZ-10N27 SZ-10NN27
			—	36	—		SZ-10N40 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-10N40 SZ-10NN40
Thermal Resistance	$R_{th(j-L)}$	(4)	—	2.0	—	°C/W	

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

SZ10N27 Rating and Characteristic Curves

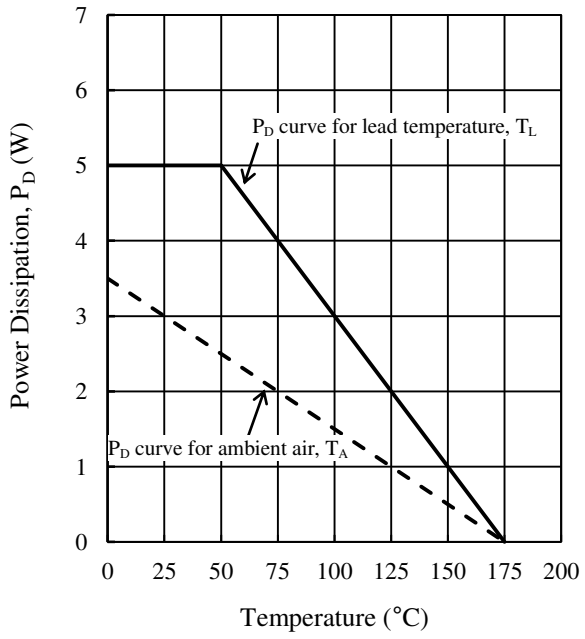


Figure 3. Power Dissipation Curves[5]

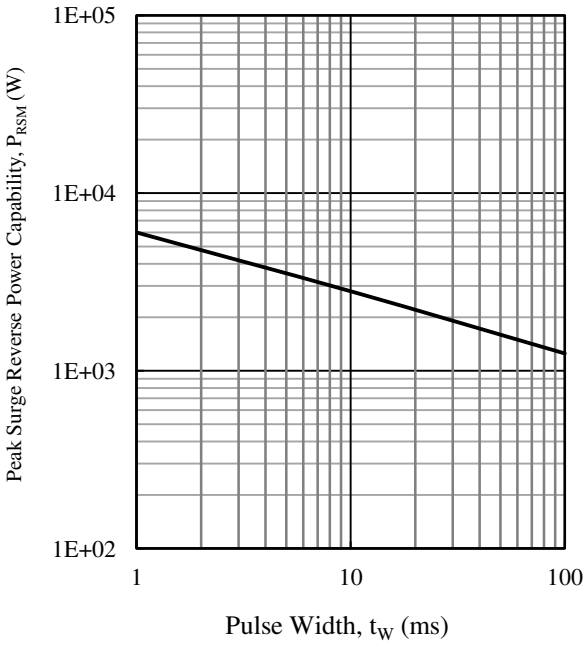


Figure 4. Peak Surge Reverse Power Capability[6]

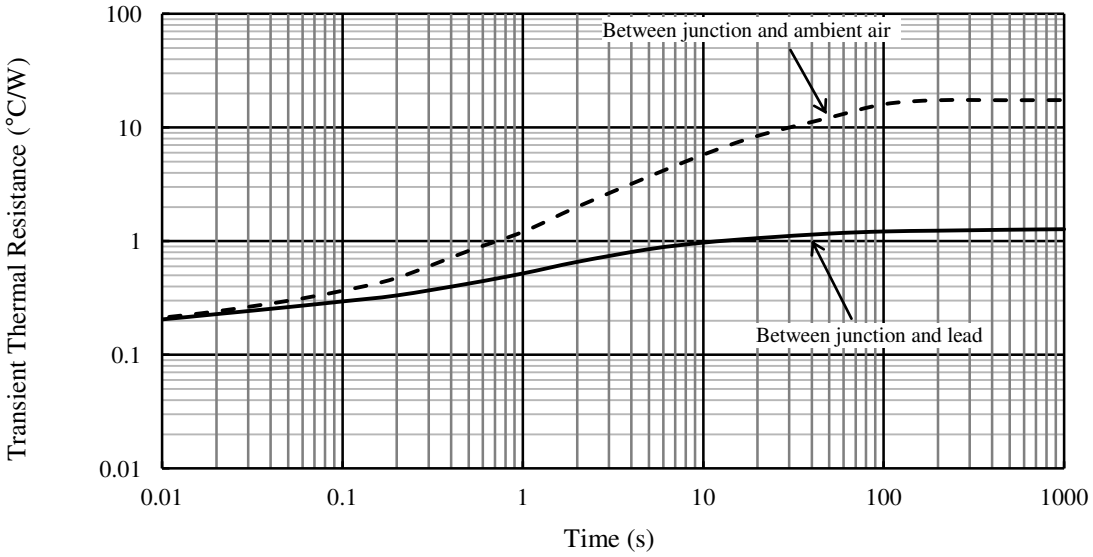


Figure 5. Typical Transient Thermal Resistance[7]

[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.

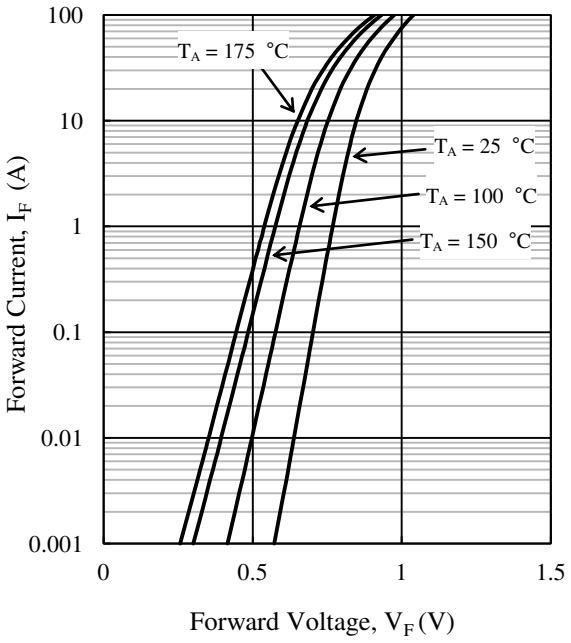


Figure 6. I_F vs. V_F Typical Characteristics

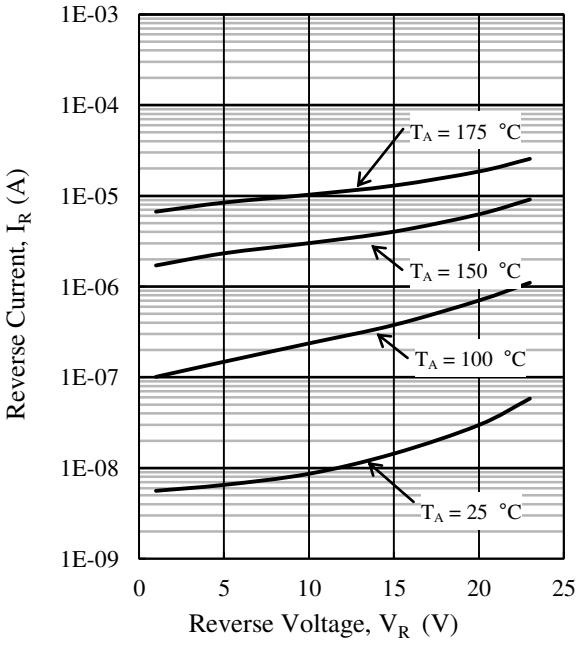


Figure 7. I_R vs. V_R Typical Characteristics

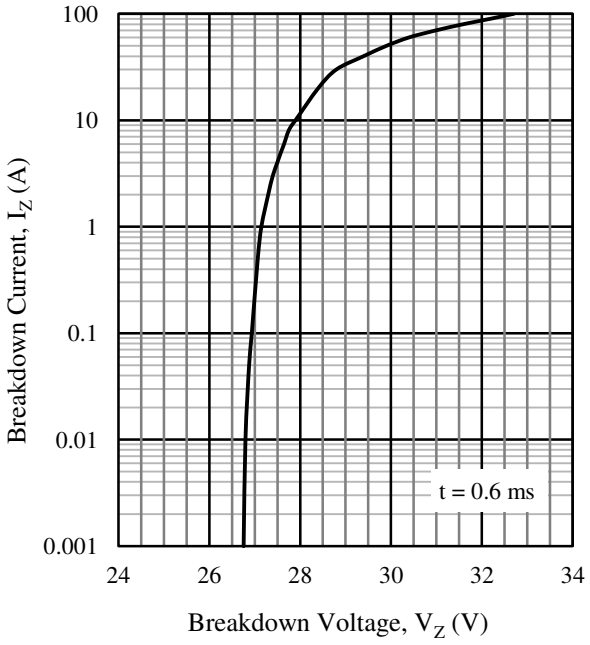


Figure 8. I_Z vs. V_Z Typical Characteristics

SZ10NN27 Rating and Characteristic Curves

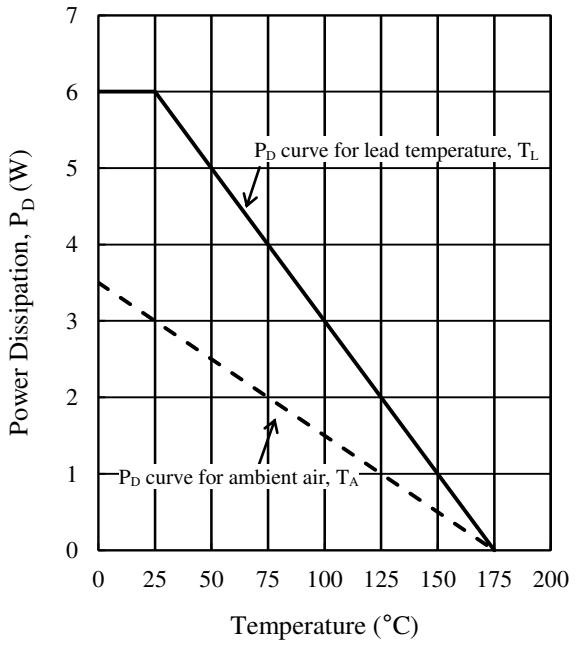


Figure 9. Power Dissipation Curves[8]

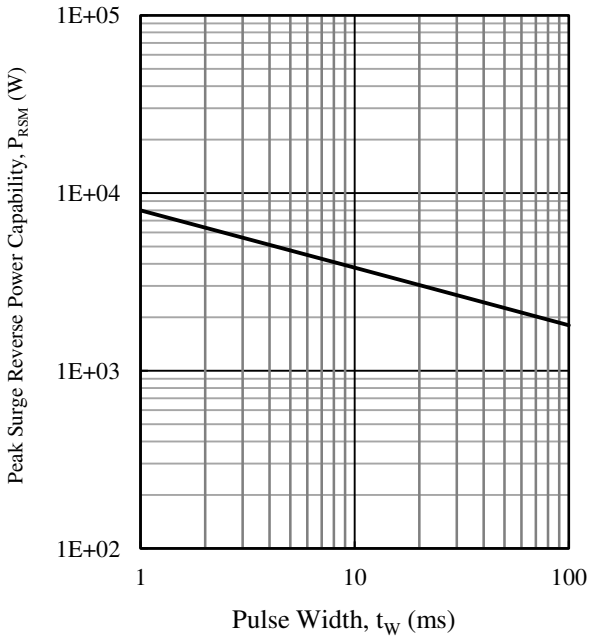


Figure 10. Peak Surge Reverse Power Capability[9]

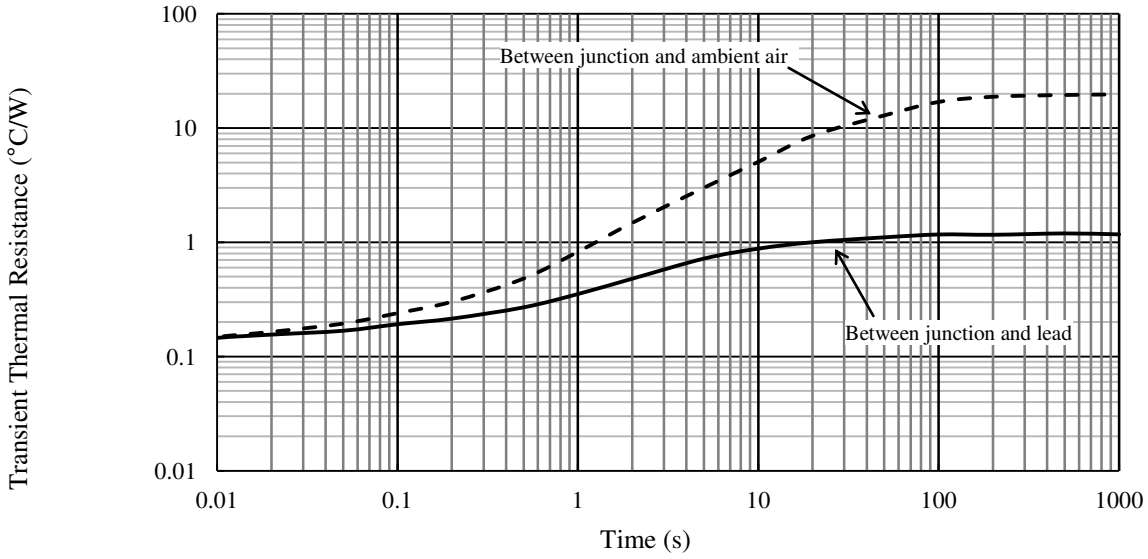


Figure 11. Typical Transient Thermal Resistance[10]

[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.

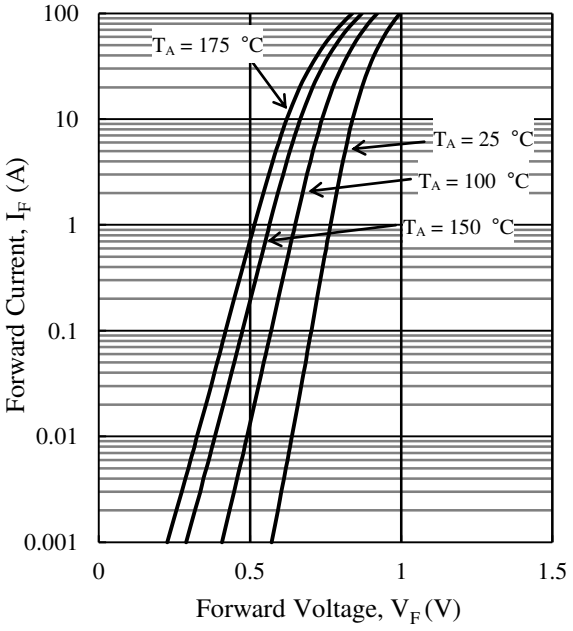


Figure 12. V_F vs. I_F Typical Characteristics

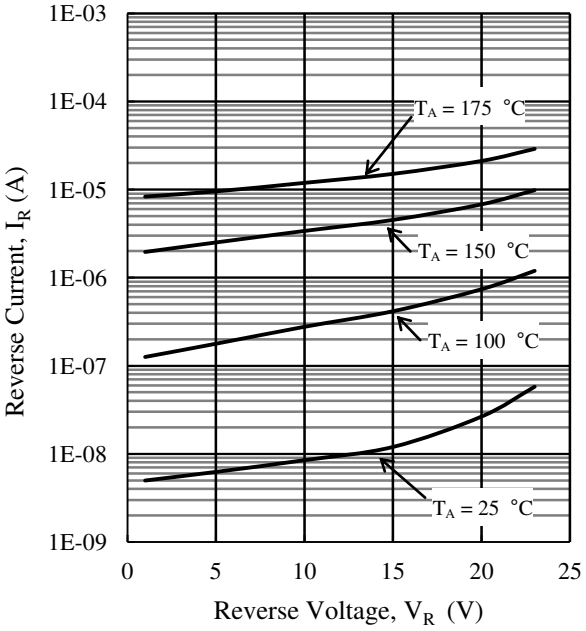


Figure 13. V_R vs. I_R Typical Characteristics

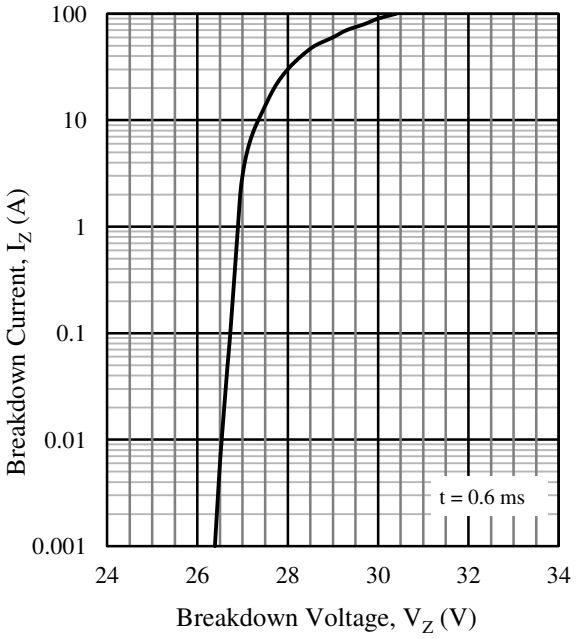


Figure 14. I_Z vs. V_Z Typical Characteristics

SZ10N40 Rating and Characteristic Curves

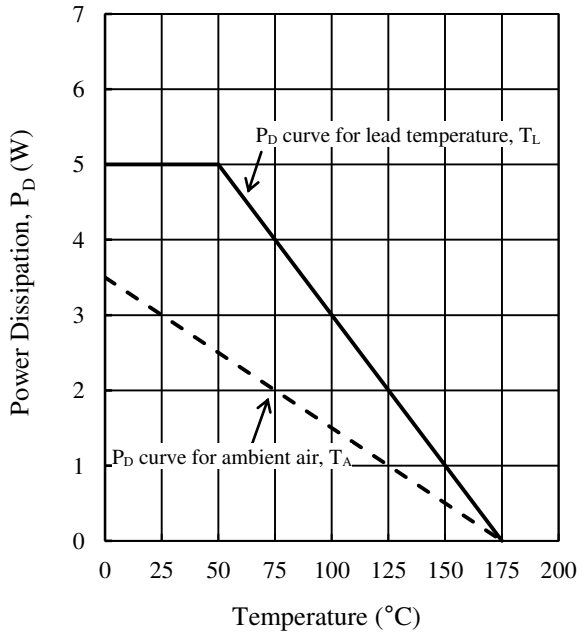


Figure 15. Power Dissipation Curves[11]

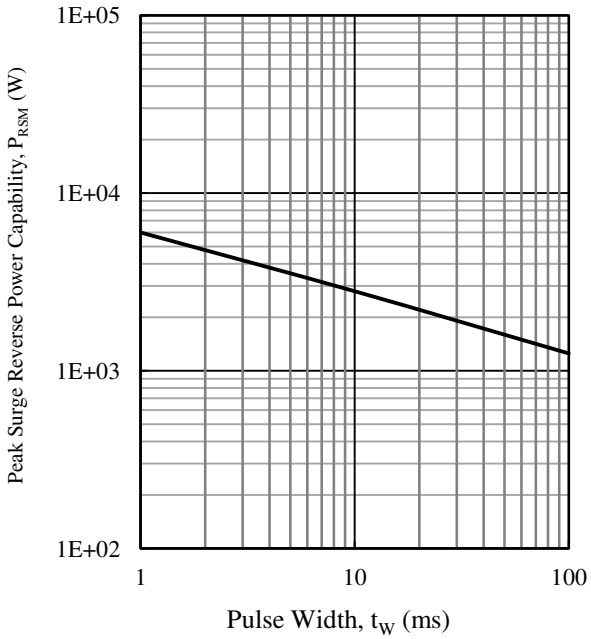


Figure 16. Peak Surge Reverse Power Capability[12]

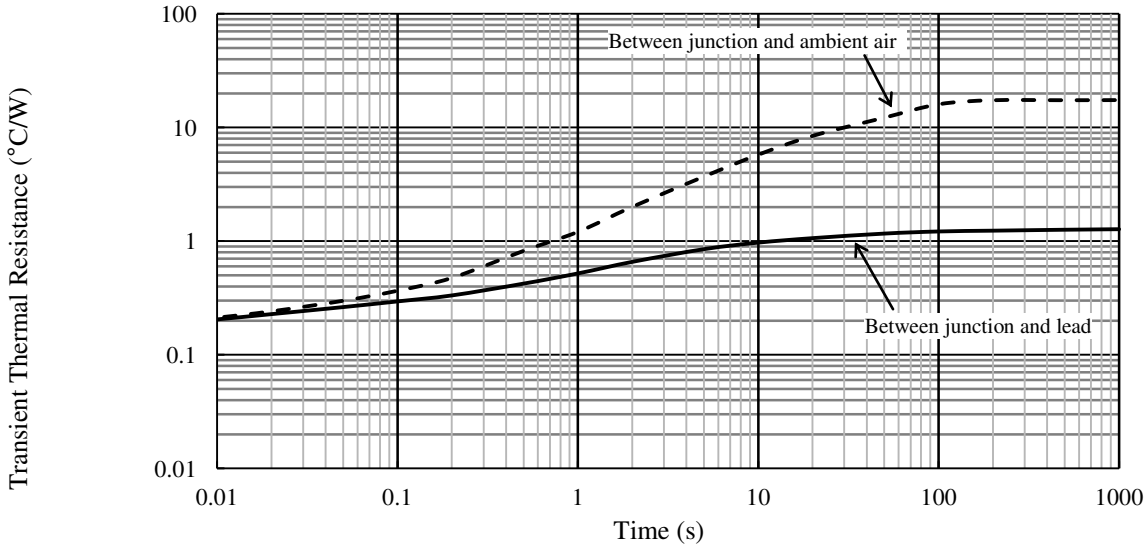


Figure 17. Typical Transient Thermal Resistance[13]

[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.

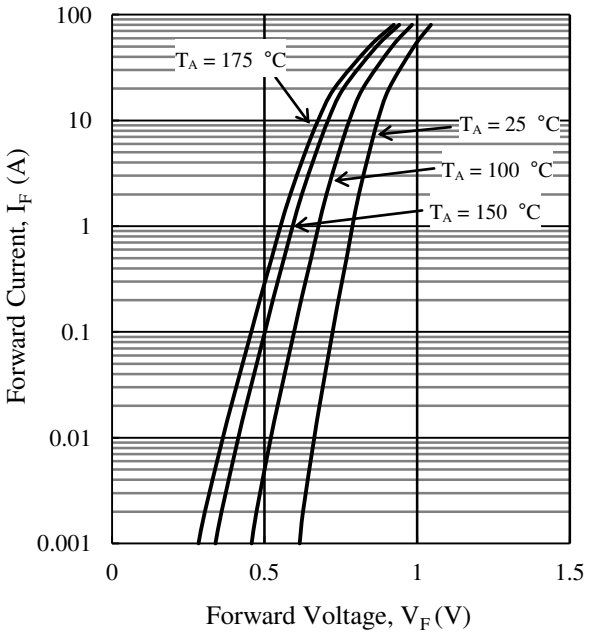


Figure 18. V_F vs. I_F Typical Characteristics

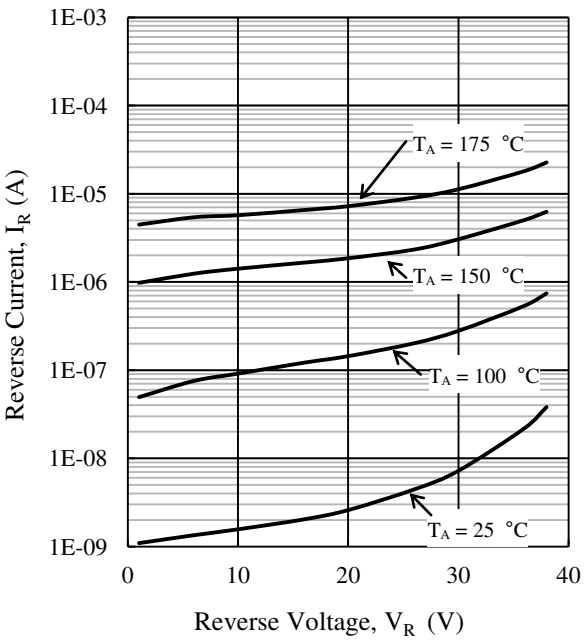


Figure 19. V_R vs. I_R Typical Characteristics

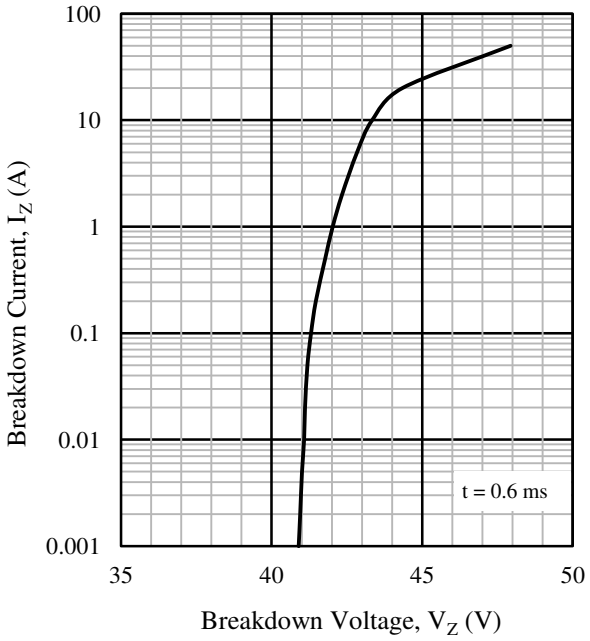


Figure 20. I_Z vs. V_Z Typical Characteristics

SZ10NN40 Rating and Characteristic Curves

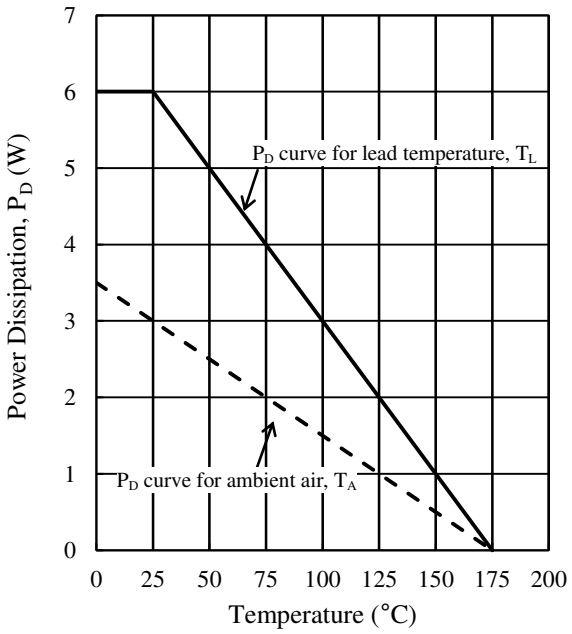


Figure 21. Power Dissipation Curves[14]

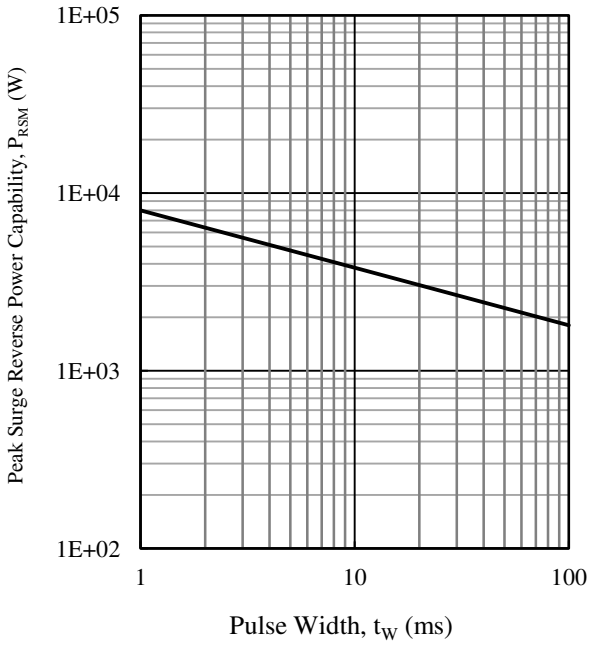


Figure 22. Peak Surge Reverse Power Capability[15]

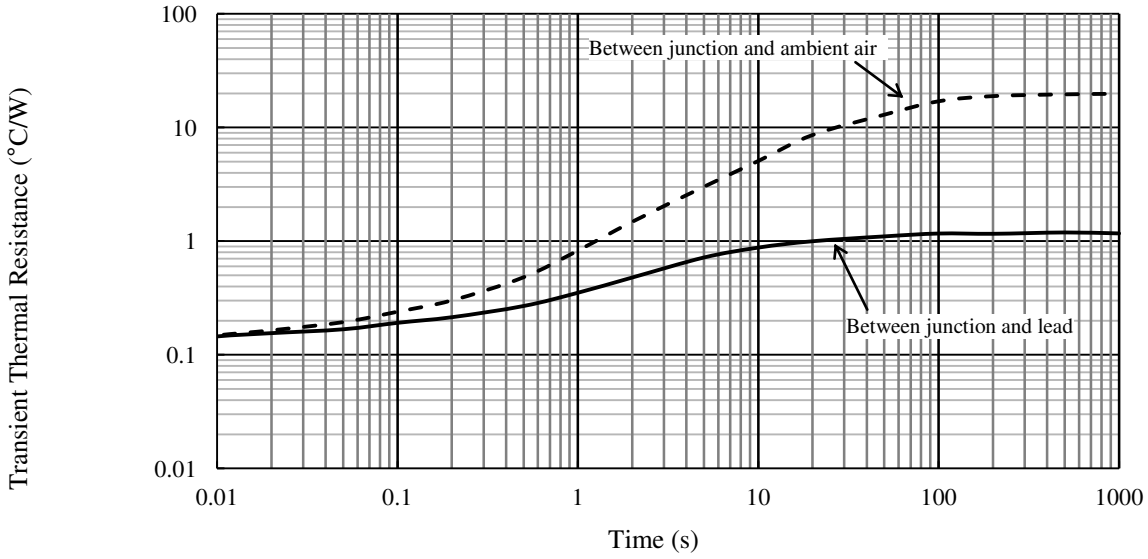


Figure 23. Typical Transient Thermal Resistance[16]

[14] See Figure 1 for the measurement conditions of the lead temperature.
[15] See Figure 2.
[16] See Figure 1 for the measurement conditions of the lead temperature.

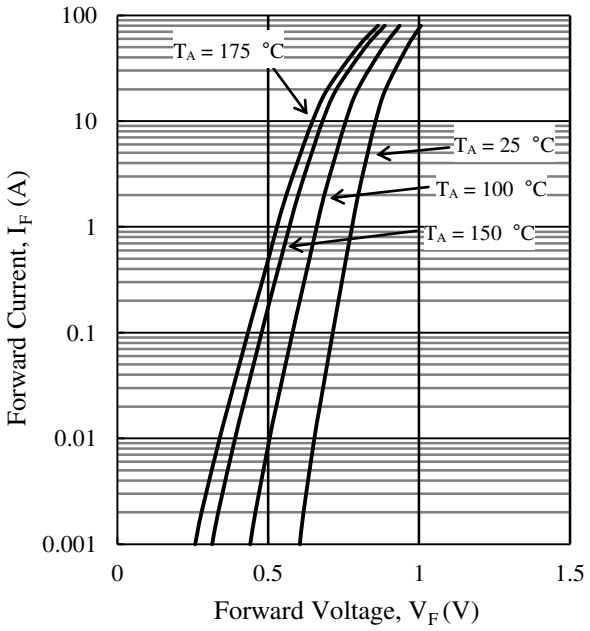


Figure 24. V_F vs. I_F Typical Characteristics

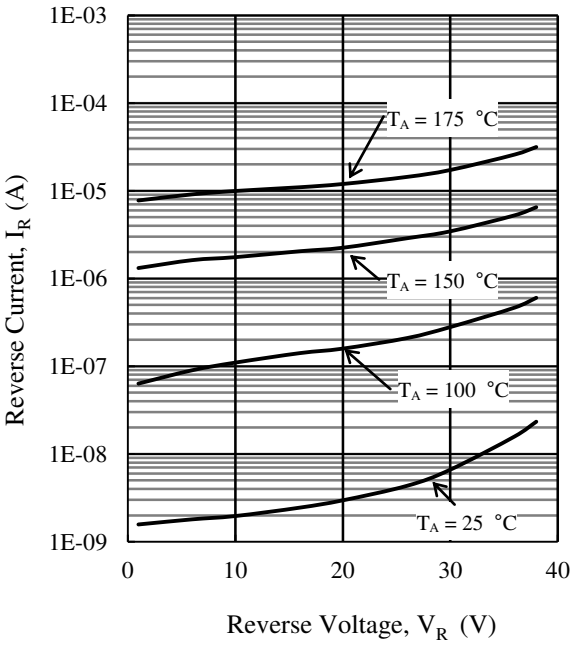


Figure 25. V_R vs. I_R Typical Characteristics

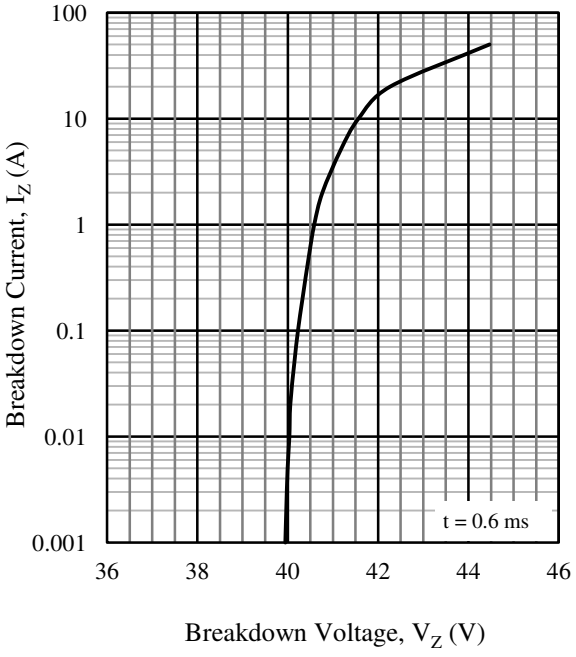
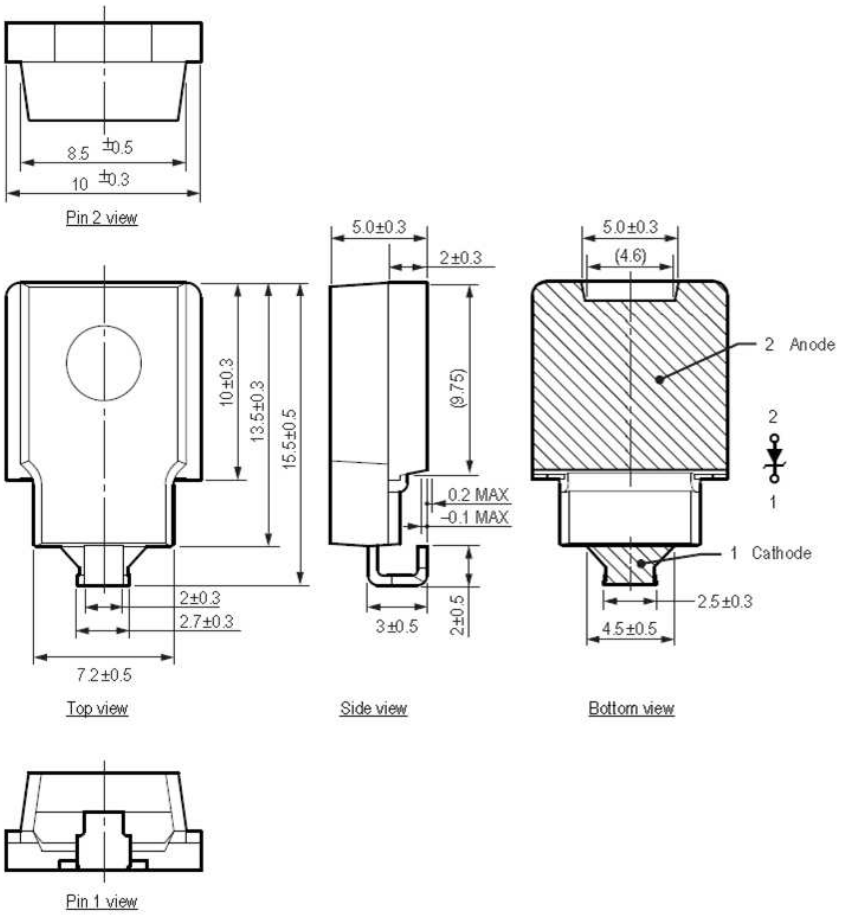


Figure 26. I_Z vs. V_Z Typical Characteristics

Physical Dimensions

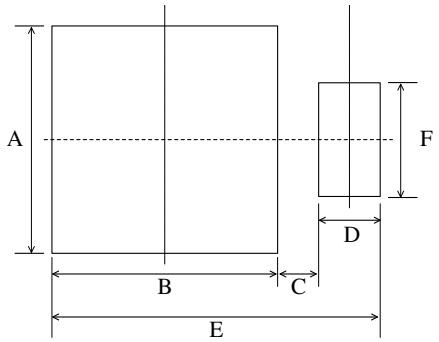
● **SZ-10 Package**



NOTES:

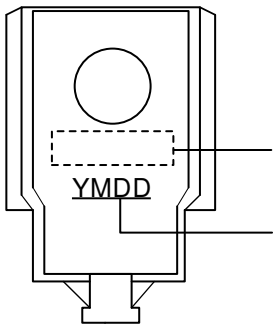
- Dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, be sure to minimize the working time, within the following limits:
  Reflow (MSL 3)
  Preheat: 180 °C / 90 ± 30 s
  Solder heating: 250 °C / 10 ± 1s, 2 times (260 °C peak)
  Soldering iron: 380 ± 10 °C / 3.5 ± 0.5 s, 1 time

● **SZ-10 Land Pattern Example**



Symbol	Dimensions (mm)	
	Min.	Max.
A	10.8	11.2
B	10.8	11.2
C	2.4	2.6
D	3.1	3.5
E	16.5	17.1
F	5.3	5.7

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
BN40	SZ-10N40
DN27	SZ-10NN27
DN40	SZ-10NN40

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