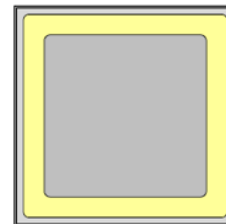


CPW6-1700-Z025A

Gen 6 Silicon Carbide Schottky Diode

Description

This is the 6th generation of high voltage, high performance Z-Rec[®] silicon carbide Schottky diode in a packageless bare die format to be implemented into any custom module design. The lower forward voltage, smaller reverse leakage current, zero reverse recovery, and high thermal conductivity make this schottky diode ideal for high frequency switching applications including high density DC to DC converters. This schottky diode can be used in conjunction with either IGBT or MOSFET as an anti-parallel diode, or as a rectifier.



Topside View
(Anode)



Package Type: Bare Die
PN: CPW6-1700-Z025A

Features

- 1700V Schottky Rectifier
- Zero Reverse Recovery
- Zero Forward Recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_f

Applications

- Solar Inverters
- Motor Drives
- EV Chargers
- UPS
- Industrial Power Supplies

Absolute Maximum Ratings ($T_j = 25^\circ\text{C}$ unless otherwise specified)

Stress beyond those listed under absolute maximum ratings may damage the device

| Parameter | Symbol | Rating | Unit | Comments |
|--|-------------------|-------------|------------------|---|
| Repetitive Peak Reverse Voltage | V_{RRM} | 1700 | V | |
| Continuous Forward Current | I_F | 84 | A | $T_c = 25^\circ\text{C}$ |
| | | 40 | A | $T_c = 135^\circ\text{C}$ |
| | | 30 | A | $T_c = 150^\circ\text{C}$ |
| Repetitive Peak Forward Surge Current | I_{FRM} | 131 | A | $T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Pulse |
| | | 73 | A | $T_c = 110^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Pulse |
| Non-repetitive Forward Surge Current | I_{FSM} | 206 | A | $T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Pulse |
| | | 173 | A | $T_c = 110^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Pulse |
| Operating Junction and Storage Temperature | T_{vj}, T_{stg} | -55 to +175 | $^\circ\text{C}$ | |
| Processing Temperature | T_{proc} | 325 | $^\circ\text{C}$ | Non-reactive ambient |

Note -All above notation to T_c specifies case temperature from die packaged in TO-247, with $R_{th(j-c)} < 0.4^\circ\text{C/W}$



Electrical Characteristics

| Parameter | Symbol | Typical | Max | Unit | Test Conditions |
|---------------------------|--------|---------|-----|---------|--|
| Forward Voltage | V_F | 1.5 | | V | $I_F = 25A, T_{vj} = 25^\circ C$ |
| | | 1.9 | | | $I_F = 25A, T_{vj} = 175^\circ C$ |
| Reverse Current | I_R | 2.5 | | μA | $V_R = 1700V, T_{vj} = 25^\circ C$ |
| | | 14.7 | | | $V_R = 1700V, T_{vj} = 175^\circ C$ |
| Total Capacitive Charge | Q_C | 325 | | nC | $V_R = 1700V, T_{vj} = 25^\circ C$ |
| Total Capacitance | C | 3108 | | μF | $V_R = 0V, T_{vj} = 25^\circ C, f = 1MHz$ |
| | | 136 | | | $V_R = 800V, T_{vj} = 25^\circ C, f = 1MHz$ |
| | | 134 | | | $V_R = 1700V, T_{vj} = 25^\circ C, f = 1MHz$ |
| Capacitance Stored Energy | E_C | 204 | | μJ | $V_R = 1700V$ |

Note:

All 175°C values are guaranteed by design and characterization

Thermal Characteristics

| Parameter | Symbol | Typical | Unit |
|---|---------------|---------|--------------|
| Thermal Resistance from Junction to Case ¹ | $R_{th(j-c)}$ | 0.26 | $^\circ C/W$ |

Note:

¹Tested in TO-247 package

Mechanical Parameters

| Parameter | Typical | Units |
|------------------------------------|-----------|---------|
| Die Size | 4.4 x 4.4 | mm |
| Anode Pad Opening | 3.5 x 3.5 | mm |
| Die Thickness | 360 | μm |
| Topside Anode Metalization (Al) | 4 | μm |
| Backside Cathode Metalization (Ni) | 0.8 | μm |
| Backside Cathode Metalization (Au) | 0.01 | μm |
| Frontside Passivation (polymide) | 7.3 | μm |



Typical Performance

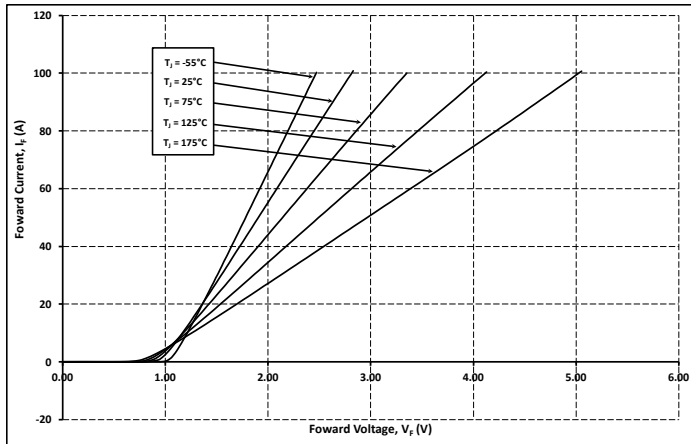


Figure 1

Typical Forward Characteristics

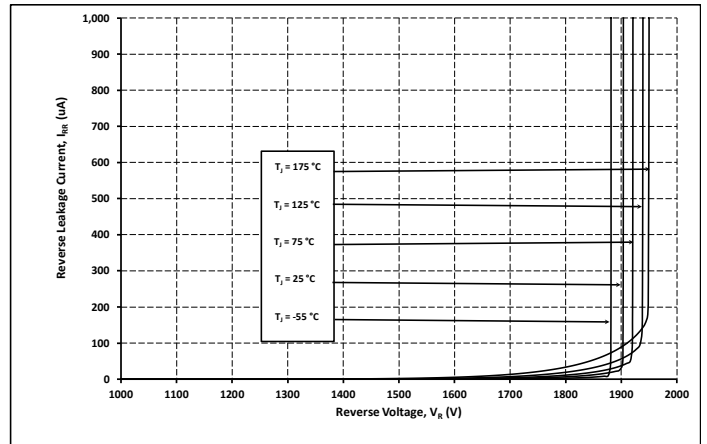


Figure 2

Typical Reverse Characteristics



Figure 3

Typical Capacitance vs Reverse Voltage

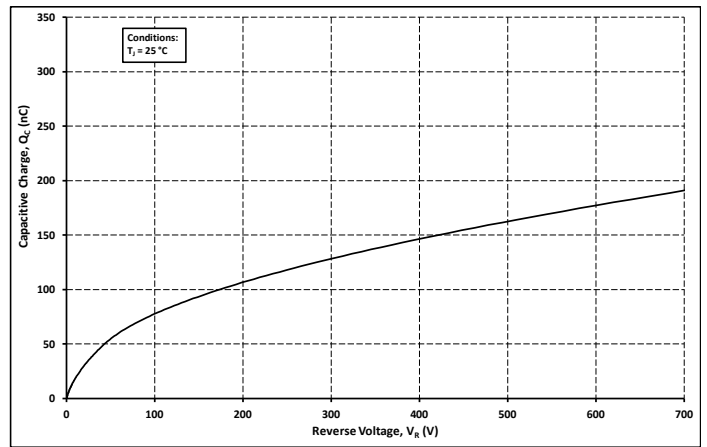


Figure 4

Typical Recovery Charge vs Reverse Voltage

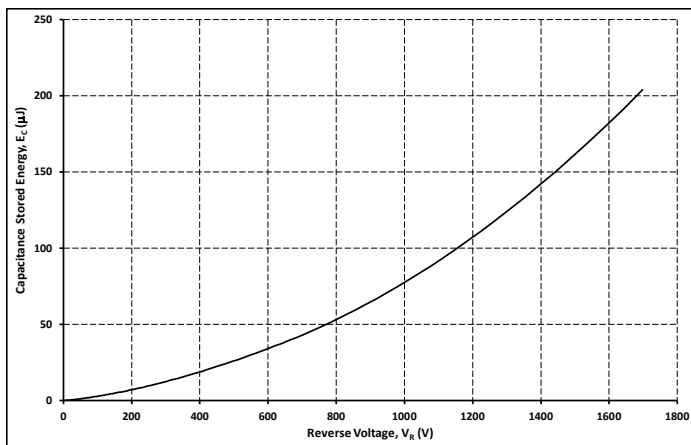


Figure 5

Typical Capacitance Stored Energy vs Reverse Voltage

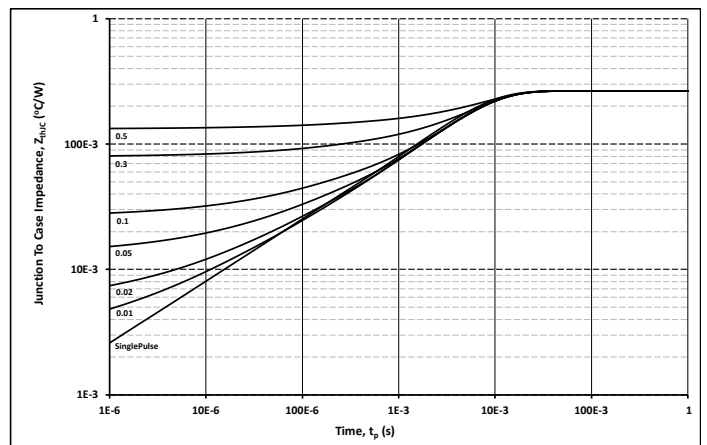
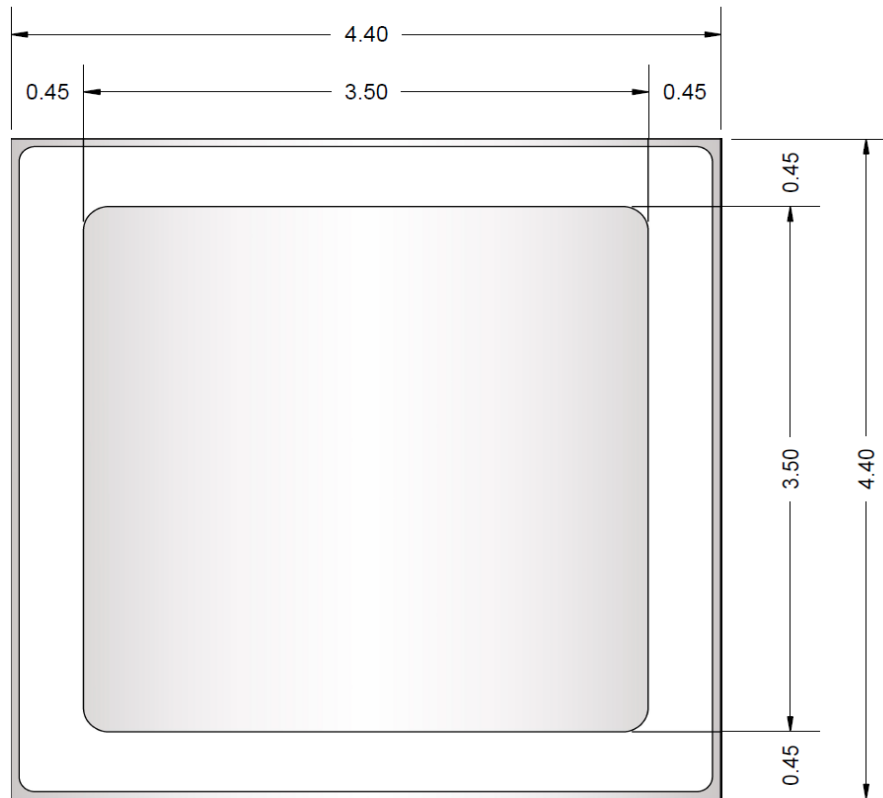


Figure 6

Typical Thermal Impedance Characteristics



Product Dimensions CPW6-1700-Z025A (Package Type — Bare Die)





Product Ordering Information

| Order Number | Description | Package |
|---------------------|---|------------------|
| CPW6-1700-Z025A-FA6 | Gen6 1700V 25A Schottky Diode, Full Wafer, Multiple Fab | Bare Die Product |

Revision History

| Revision History | Date of Change | Brief Summary |
|------------------|----------------|-----------------|
| 1 | 07/01/2022 | Initial Release |



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