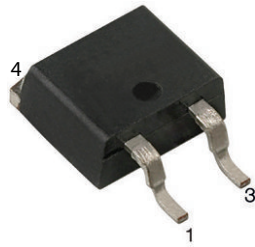
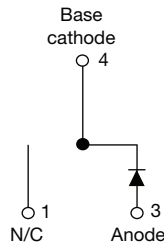


1200 V Gen 3 Power SiC Merged PIN Schottky Diode, 10 A


D²PAK 2L (TO-263AB 2L)


FEATURES

- Majority carrier diode using Schottky technology on SiC wide band gap material
- High CTI molding compound provides excellent electrical insulation at relevant working voltages
- Improved V_F and efficiency by thin wafer technology
- Positive V_F temperature coefficient for easy paralleling
- Virtually no recovery tail and no switching losses
- Temperature invariant switching behavior
- 175 °C maximum operating junction temperature
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- MPS structure for high ruggedness to forward current surge events
- Meets JESD 201 class 1A whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|-------------------------------|-------------------------------------|
| I_F | 10 A |
| V_R | 1200 V |
| V_F at I_F at 25 °C, typ. | 1.35 V |
| T_J max. | 175 °C |
| I_R at V_R at 175 °C | 4.5 μ A |
| Q_C ($V_R = 800$ V) | 55 nC |
| Package | D ² PAK 2L (TO-263AB 2L) |
| Circuit configuration | Single |

DESCRIPTION / APPLICATIONS

Wide band gap SiC based 1200 V Schottky diode, designed for high performance and ruggedness.

Optimum choice for high speed hard switching and efficient operation over a wide temperature range, it is also recommended for all applications suffering from Silicon ultrafast recovery behavior.

Typical applications include AC/DC PFC and DC/DC ultra high frequency output rectification in FBPS and LLC converters.

MECHANICAL DATA

Case: D²PAK 2L (TO-263AB 2L)

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

| MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise specified) | | | | |
|---|----------------------|--|-------------|------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Peak repetitive reverse voltage | V_{RRM} | | 1200 | V |
| Continuous forward current | $I_F^{(1)}$ | $T_C = 145$ °C (DC) | 10 | A |
| | $I_F^{(2)}$ | $T_C = 152$ °C (DC) | | |
| DC blocking voltage | V_{DC} | | 1200 | V |
| Repetitive peak forward current | I_{FRM} | $T_C = 25$ °C, $f = 50$ Hz, square wave, DC = 25 % | 45 | A |
| Non-repetitive peak forward surge current | I_{FSM} | $T_C = 25$ °C, $t_p = 10$ ms, half sine wave | 84 | |
| | | $T_C = 110$ °C, $t_p = 10$ ms, half sine wave | 74 | |
| Power dissipation | $P_{tot}^{(1)}$ | $T_C = 25$ °C | 94 | W |
| | | $T_C = 110$ °C | 41 | |
| | $P_{tot}^{(2)}$ | $T_C = 25$ °C | 125 | W |
| | | $T_C = 110$ °C | 72 | |
| I^2t value | $\int i^2 dt$ | $T_C = 25$ °C | 61 | A ² s |
| | | $T_C = 110$ °C | 27 | |
| Operating junction and storage temperatures | $T_J^{(3)}, T_{Stg}$ | | -55 to +175 | °C |

Notes

(1) Based on maximum R_{th}

(2) Based on typical R_{th}

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{thJA}$

**ELECTRICAL SPECIFICATIONS** ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-------------------------|--------|---|------|------|------|---------------|
| Forward voltage | V_F | $I_F = 10\text{ A}$ | - | 1.35 | 1.5 | V |
| | | $I_F = 10\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$ | - | 1.73 | 2.0 | |
| | | $I_F = 10\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$ | - | 1.85 | - | |
| Reverse leakage current | I_R | $V_R = V_R\text{ rated}$ | - | 0.6 | 60 | μA |
| | | $V_R = V_R\text{ rated}, T_J = 150\text{ }^{\circ}\text{C}$ | - | 2.5 | 130 | |
| | | $V_R = V_R\text{ rated}, T_J = 175\text{ }^{\circ}\text{C}$ | - | 4.5 | - | |
| Total capacitance | C | $V_R = 1\text{ V}, f = 1\text{ MHz}$ | - | 610 | - | pF |
| | | $V_R = 800\text{ V}, f = 1\text{ MHz}$ | - | 38 | - | |
| Total capacitive charge | Q_C | $V_R = 800\text{ V}, f = 1\text{ MHz}$ | - | 55 | - | nC |

THERMAL - MECHANICAL SPECIFICATIONS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--------------------------------------|------------|-----------------|------|-----------|------|----------------------|
| Thermal resistance, junction to case | R_{thJC} | | - | 1.2 | 1.6 | $^{\circ}\text{C/W}$ |
| Marking device | | | | 3C10ET12S | | |

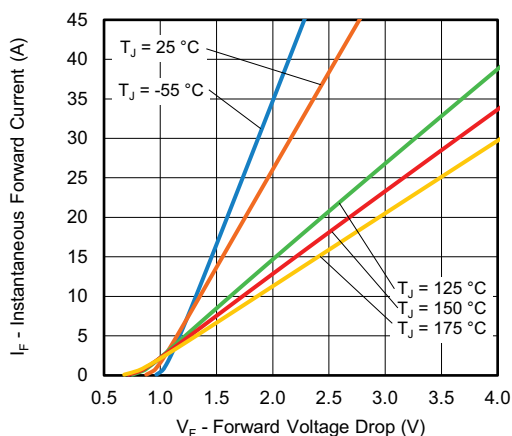


Fig. 1 - Typical Forward Voltage Drop Characteristics

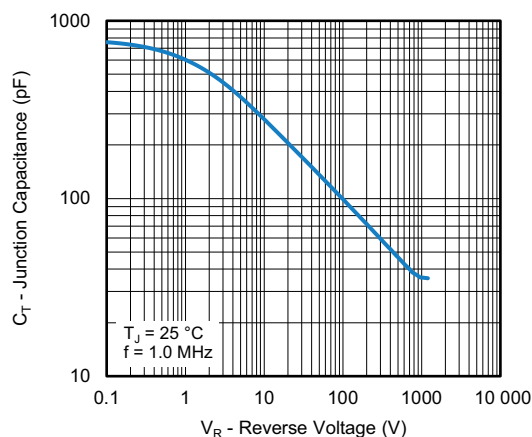


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

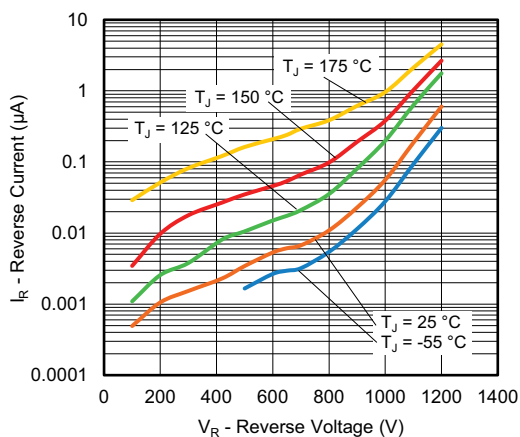


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

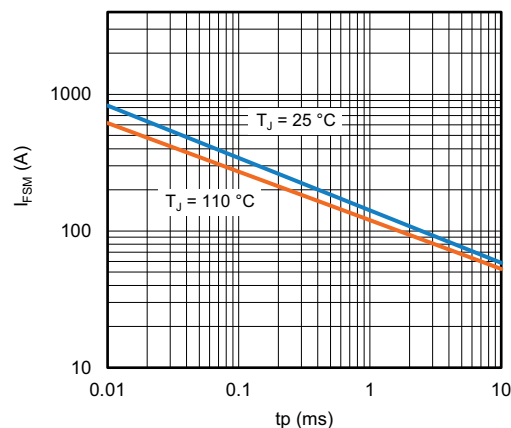


Fig. 4 - Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Square Wave)

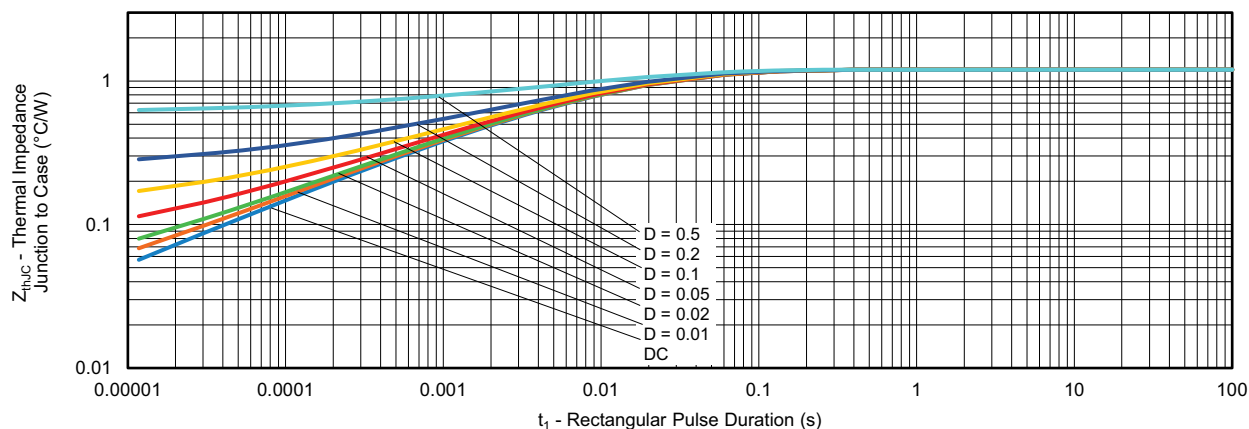
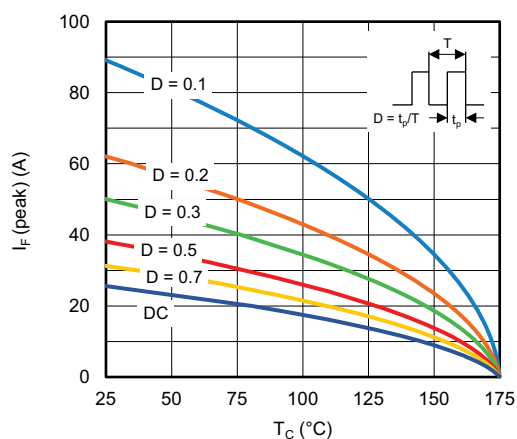

Fig. 5 - Typical Thermal Impedance Z_{thJC} Characteristics


Fig. 6 - Peak Forward Current vs. Maximum Allowable Case Temperature

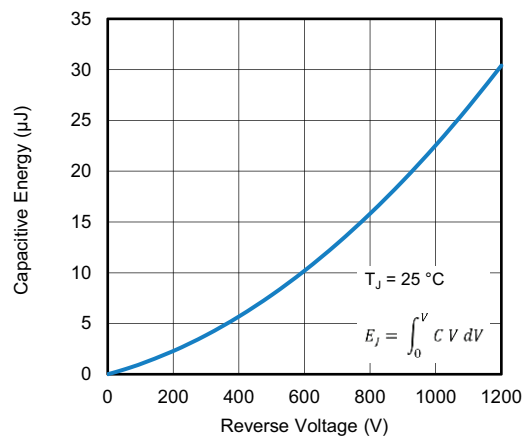


Fig. 8 - Typical Capacitive Energy vs. Reverse Voltage

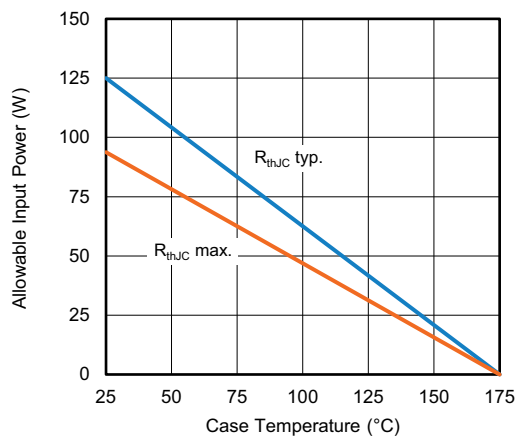


Fig. 7 - Forward Power Loss Characteristics

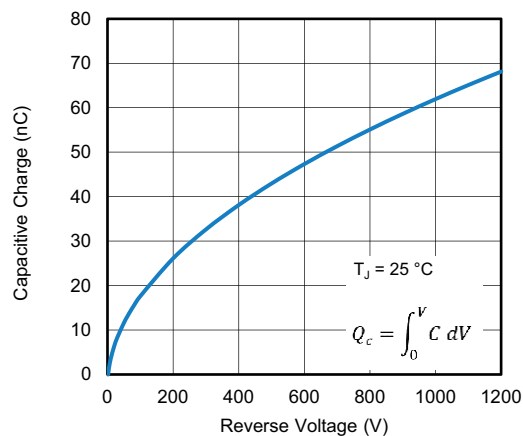


Fig. 9 - Typical Capacitive Charge vs. Reverse Voltage

**ORDERING INFORMATION TABLE**

| | | | | | | | | | | |
|-------------|------------|-----------|-----------|----------|----------|-----------|----------|----------|----------|------------|
| Device code | VS- | 3C | 10 | E | T | 12 | S | 2 | L | -M3 |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ |

- | | |
|---|--|
| ① | - Vishay Semiconductors product |
| ② | - 3C = SiC diode, generation 3 |
| ③ | - Current rating (10 = 10 A) |
| ④ | - E = single diode |
| ⑤ | - T = D ² PAK package |
| ⑥ | - Voltage rating: (12 = 1200 V) |
| ⑦ | - S = surface mountable |
| ⑧ | - 2 = true 2 pin D ² PAK |
| ⑨ | - L = tape and reel (left oriented) |
| ⑩ | - Environmental digit: -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free |

ORDERING INFORMATION

| PREFERRED P/N | BASE QUANTITY | PACKAGING DESCRIPTION |
|-------------------|---------------|-----------------------|
| VS-3C10ET12S2L-M3 | 800 per reel | 13" diameter reel |

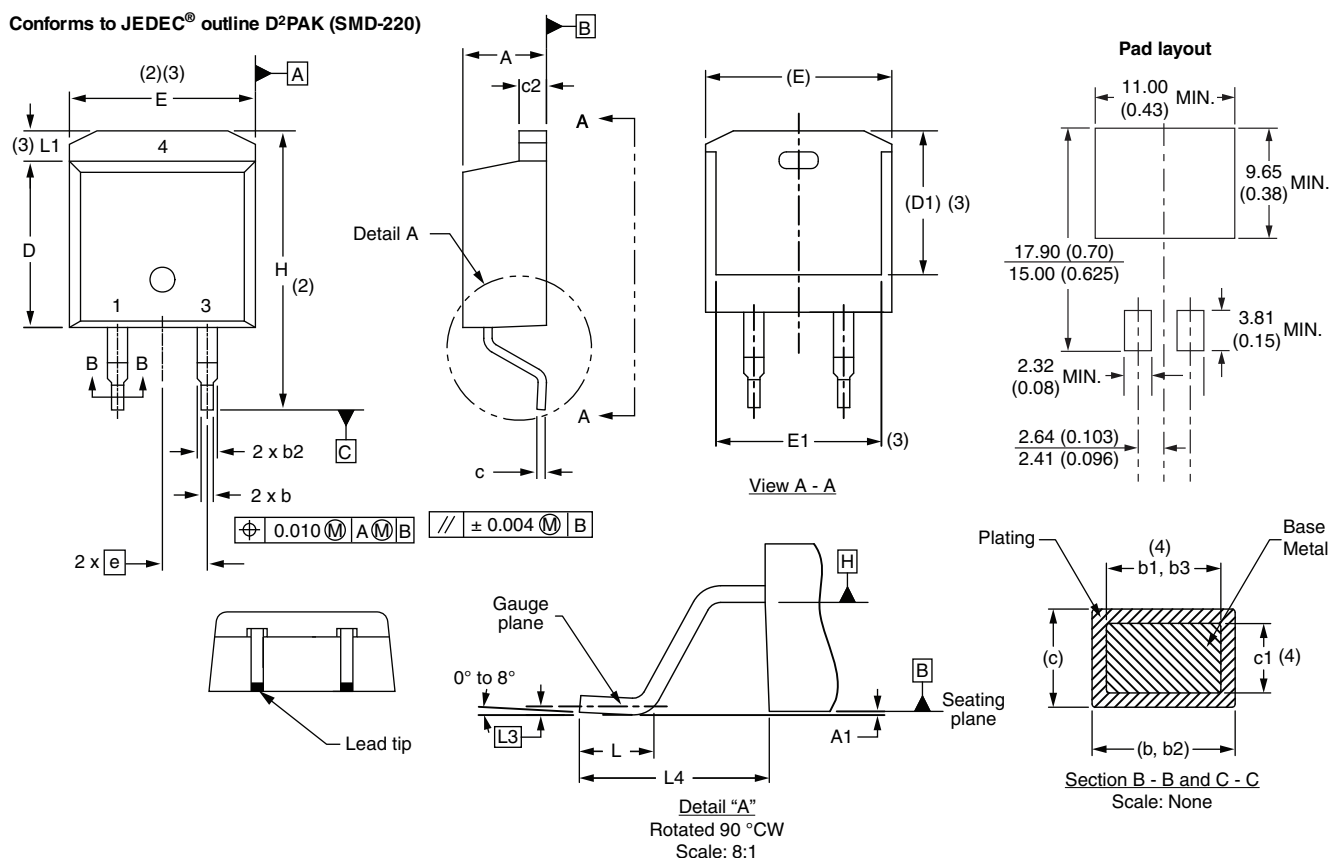
LINKS TO RELATED DOCUMENTS

| | |
|--------------------------|--|
| Dimensions | www.vishay.com/doc?96683 |
| Part marking information | www.vishay.com/doc?96693 |
| Packaging information | www.vishay.com/doc?95032 |

D²PAK 2L (TO-263AB 2L)

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC® outline TO-263AB



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